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ENVIRONMENT

Mr. George Jacob
Remedial Project Manager
Central New York Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866

Date:
June 14, 2011

Contact:
Shekhar R. Melkote

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Our ref:
TL003165.0027

Subject:
Proposal to Permanently Shut Down Soil-Vapor Extraction System (Remedial Work Element I), JCI Jones Chemicals, Inc. Superfund Site, 100 Sunny Sol Boulevard, Caledonia, New York

Dear Mr. Jacob:

On behalf of JCI Jones Chemicals, Inc. (JCI), ARCADIS U.S., Inc. (ARCADIS) has prepared this proposal to permanently shut down the soil-vapor extraction (SVE) system from the JCI Superfund Site in Caledonia, New York (“the Site”). If approved, the SVE system equipment would be de-commissioned and removed from the Site.

Background

The remedial design/remedial action at the Site was initiated by JCI as required by the Consent Decree under the Comprehensive Environmental Response, Compensation, and Liability Act established on July 11, 2001, with the United States Environmental Protection Agency (U.S. EPA; New York State Department of Environmental Conservation [NYSDEC] Site Code 826003; EPA Identification NY000813428). The remedial action included treatment of affected soil by SVE (Remedial Work Element I). Remedial Work Element II includes pump-and-treat of the affected groundwater, in-situ chemical oxidation (ISCO) treatment, and monitored natural attenuation (MNA). The SVE system was started on April 20, 2004, and was shut down on May 14, 2008, as it was no longer effective.

The remedial investigation had indicated tetrachloroethene (PCE) and its degradation products to be the primary chemicals of interest in the soil and groundwater at the Site. PCE concentrations ranged up to 330,000 micrograms per kilogram (µg/kg) and 67,000 micrograms per liter (µg/L) in soil and groundwater, respectively. The source of the contamination was associated with the former solvent aboveground storage tank (AST) area. Outside the former solvent AST source area, PCE and trichloroethene (TCE) concentrations in soil were relatively low.

The soil-remediation goals are the NYSDEC Technical and Administrative Guidance Memorandum HWR-94-4046: Soil Cleanup Objectives. The groundwater remediation goals are based on the New York State Groundwater Quality Standards (6 NYCRR Part 703.5).

A summary of soil- and groundwater-remediation goals is presented in the table below:

Chemical of Concern	**Soil (milligrams per kilogram)**	**Groundwater (micrograms per liter)**
Tetrachloroethene	1.4	5
Trichloroethene	0.7	5
Cis-1,2-Dichloroethene	0.3	5
Trans-1,2-Dichloroethene	0.3	5
1,1-Dichloroethene	0.4	5
Vinyl Chloride	0.2	2

Soil-Vapor Extraction System

The SVE system was designed to remove volatile organic compound (VOC) vapors from the vadose zone in the source area. The SVE system originally consisted of three SVE wells (Table A-1; Figure A-1). Four 170-pound granular activated carbon (GAC) vessels were used to treat the SVE effluent. The GAC vessels have been removed and disposed off site. From startup in April 2004 until May 2006, the SVE system was in continuous operation (24 hours per day). In May 2006, SVE system operations were scaled back to eight hours per day with U.S. EPA approval in order to promote non-steady-state conditions that could possibly improve mass removal. On May 14, 2008, the SVE system was shut down as mass removal was at asymptotic levels and the system was no longer effective. Approximately 186 pounds of PCE equivalents had been removed from the vadose zone.

Confirmatory Sampling

In May 2007, vadose-zone soil within the source area was sampled to verify the effectiveness of the SVE system and to evaluate whether continued SVE operation was necessary. Eight soil borings (Figure A-1) were advanced in the source area based on prior soil-sampling results and recommendations from NYSDEC. Continuous soil cores were collected at each location from ground surface to approximately 12 feet below ground surface (bgs; approximate depth of groundwater). The soil headspace was screened using an organic vapor analyzer (OVA) with a photoionization detector (PID). Based on field-screening data, at least one sample per soil boring was collected for analysis.

Results indicated that PCE concentrations were well below the Remedial Action Objective (RAO; Table A-2). An exception was the soil sample collected from location P-2 between 2 to 3 feet bgs. P-2 is located east of the ISCO injection well OI-4; the PCE detection was consistent with the conceptual site model that identifies this area as the principal source area. PCE in soil was reported at P-2 with a concentration of 31,000 µg/kg (31 milligrams per kilogram [mg/kg]). The reported PCE concentration of 31 mg/kg at P-2 exceeded the soil remediation goal of 1.4 mg/kg. The concentration, however, does not indicate a residual dense non-aqueous phase liquid source. TCE was also detected at P-2 above reporting limits at 44 µg/kg (0.044 mg/kg) but well below the RAO.

To address the PCE detection at the P-2 sample location, a fourth SVE well (SVE-4) was installed October 29, 2007, approximately equidistant between SVE-1 and SVE-2 (Figure A-1). It was installed to be consistent with the Record of Decision and to address residual vadose-zone PCE-affected soil. SVE-4 is constructed similarly to the other three SVE wells, with the exception of depth; it is 4 inches in diameter, 8 feet deep, and screened between 1 and 8 feet bgs. After SVE-4 was installed, the system was started and inspected for leaks. SVE-3, the westernmost SVE well, was shut down; SVE-1, 2, and 4 were operated to focus on the area of suspected residual PCE-affected soil.

The SVE system was in operation with this new SVE well for four months between October 2007 and May 2008. On May 7, 2008, vadose-zone soil sample P-9 (2 to 3 feet bgs; adjacent to previous sampling location of P-2) was collected for analysis to evaluate whether operation of the SVE system with the new SVE-4 well was successful in reducing the residual PCE concentration at the location of sample P-2. Analytical results of confirmatory sample P-9 indicated that the SVE system with the new well (SVE-4) was not effective in treating this isolated “hot spot.” PCE was detected in P-9 at a concentration of 40 mg/kg, exceeding the soil remediation goal (Table A-2).

Confirmatory sampling data indicate that PCE-affected soil at P-2/P-9 is relatively shallow and localized (horizontally). OVA-PID readings decreased significantly below 4 feet bgs. Adjacent sample locations did not indicate significant concentrations of PCE or related compounds.

P-2/P-9 is located almost equidistant between SVE-2 and SVE-1, near SVE-4. This may be a stagnant zone where SVE has not been as effective as at other locations, particularly in shallow depths where the PCE was detected. Continued SVE operation was not efficiently treating the area of P-2/P-9. It is therefore recommended that the SVE system be shut down permanently. The negligible volume of PCE-affected soil remaining in the vadose zone of the source area can be better addressed through excavation or other active on-site treatment, such as treating with sodium permanganate ($NaMnO_4$) to remove this isolated, stagnant “hot spot.”

Based on OVA screening during confirmatory soil sampling, the extent of PCE-affected soil remaining at shallow depths is very limited, likely to be between one or two 55-gallon drums (or approximately 15 cubic feet). Excavation would be the most cost-effective approach in permanently closing SVE and removing the equipment off site.

Soil Excavation and Off-Site Disposal

The small area of affected soil near the P-2/P-9 sample location will be excavated using a backhoe or trackhoe to a depth of 4 feet (Figure A-1). The dimensions of the excavation area would be approximately 18 inches by 18 inches by 4 feet deep. The excavated soil would be drummed and characterized prior to off-site disposal. Up to five soil confirmatory samples would be collected from the sides and base of the excavation to ensure sufficient extent of affected soil is being removed. The samples would be analyzed at Columbia Analytical Services, Inc. in Rochester, New York, for VOCs using EPA Method 8021C. If the confirmatory samples are below the soil remediation goals, the excavated area would be backfilled with clean fill material. The excavated soil would be disposed off site under appropriate waste manifests. Appropriate health and safety and community air-monitoring protocols outlined in the Community Air Monitoring Plan will be followed during the excavation activities.

As we had previously discussed, on-site treatment of excavated soil using $NaMnO_4$ solution is also possible in lieu of off-site disposal. However, $NaMnO_4$ can cause heavy staining with a deep purple color that is difficult to neutralize. Often, large quantities of diluted H_2O_2 and distilled white vinegar will have to be kept on hand for neutralization, adding to the overall costs. Due to the low volume of affected soil and inherent complications of handling $NaMnO_4$, off-site disposal appears to be a cost-effective solution and is, therefore, recommended.

Reporting and Schedule

Results of the confirmatory sampling and excavation activities will be summarized in the next routine semiannual operation, maintenance, and monitoring report. Upon receipt of U.S. EPA's approval of this proposal, soil excavation will be scheduled and conducted in conjunction with upcoming field activities.

Please contact Shekhar Melkote at 570.961.9433 if you have any questions or comments.

Sincerely,

ARCADIS U.S., Inc.

Shekhar R Melkote

Shekhar Melkote
Principal Hydrogeologist

Copies:
Tom Festa; NYSDEC
Tim Gaffney; JCI
Kevin M. Warner, P.E.; ARCADIS

Attachments

Table A-1
SVE Well Data
JCI Jones Chemicals, Inc.
Caledonia, New York

Well ID	Total Depth (feet bgs)	Casing Diameter (inches)	Screened Interval (feet bgs)	Casing Elevation (NGVD)	Date	Depth to Water (feet bgs)	Groundwater Elevation (feet NGVD)	Vacuum (inches of water)	OVA (ppm)
SVE -1	15	4	5-15		4/21/04	NA	NA	NM	NM
					5/13/04	NA	NA	-18	NM
					5/26/04	NA	NA	-22	7.1
					7/1/04	NA	NA	-16	5.6
					10/1/04	NA	NA	-0.14	3.4
					2/8/05	NA	NA	-18	1.6
					5/25/05	NA	NA	-17	0.4
					9/27/05	NA	NA	-12.5	1.1
					5/5/06	NA	NA	-19.5	0
					11/16/06	NA	NA	-26	1.2
					5/3/07	NA	NA	-29	0.4
					11/1/07	NA	NA	-27	8.4
					5/6/08	NA	NA	-21	0.3
SVE-2	17	4	2-17		4/21/04	NA	NA	NM	NM
					5/13/04	NA	NA	-17	NM
					5/26/04	NA	NA	-20	5.5
					7/1/04	NA	NA	-16	3.4
					10/1/04	NA	NA	-14	2.5
					2/8/05	NA	NA	-16	0.7
					5/25/05	NA	NA	-17	0.1
					9/27/05	NA	NA	-11	0.5
					5/5/06	NA	NA	-12	0.1
					11/16/06	NA	NA	-27	0.6
					5/3/07	NA	NA	-22	0.2
					11/1/07	NA	NA	-21	2.5
					5/6/08	NA	NA	-18	0.4
SVE-3	17	4	2-17		4/21/04	NA	NA	NM	NM
					5/13/04	NA	NA	-17	NM
					5/26/04	NA	NA	-21	2
					7/1/04	NA	NA	-17	1.2
					10/1/04	NA	NA	-15	1.6
					2/8/05	NA	NA	-17	0.1
					5/25/05	NA	NA	-17.5	0.2
					9/27/05	NA	NA	-10.5	0.7
					5/5/06	NA	NA	-14	0.1
					11/16/06	NA	NA	-19	0.1
					5/3/07	NA	NA	-22	0.4
					11/1/07*	NA	NA	NM	NM
SVE-4	8	4	1-8		11/1/07	NA	NA	-21	35.9
					5/6/08	NA	NA	20	3.5

Table A-1
SVE Well Data
JCI Jones Chemicals, Inc.
Caledonia, New York

Well ID	Total Depth (feet bgs)	Casing Diameter (inches)	Screened Interval (feet bgs)	Casing Elevation (NGVD)	Date	Depth to Water (feet bgs)	Groundwater Elevation (feet NGVD)	Vacuum (inches of water)	OVA (ppm)
OW-1	~15	1	5-15	648.95	4/21/04	9.72	639.23	-0.29	NA
					5/13/04	NM	NM	NM	NA
					5/26/04	9.46	639.49	-0.36	NA
					7/1/04	10.69	638.26	-0.32	NA
					10/1/04	11.13	637.82	-0.37	NA
					2/8/05	11.10	637.85	-0.35	NA
					5/25/05	10.49	638.46	0.2	NA
					9/27/05	14.35	634.60	0.35	NA
					5/5/06	12.06	636.89	-0.5	NA
					11/16/06	12.99	635.96	0.4	NA
					5/3/07	9.53	639.42	-0.35	NA
					11/1/07	DRY	DRY	-0.6	NA
					5/6/08	10.14	638.81	-0.4	NA
OW-2	~15	1	5-15	649.01	4/21/04	9.83	639.18	-0.34	NA
					5/13/04	NM	NM	NM	NA
					5/26/04	9.59	639.42	-0.48	NA
					7/1/04	10.79	638.22	-0.4	NA
					10/1/04	11.28	637.73	-0.43	NA
					2/8/05	NM	NM	NM	NA
					9/27/05	13.20	635.81	0.45	NA
					5/5/06	12.17	636.84	0.55	NA
					11/16/06	13.08	635.93	-0.6	NA
					5/3/07	9.65	639.36	0.55	NA
					11/1/07	DRY	DRY	-0.85	NA
					5/6/08	10.29	638.72	-0.6	NA
OW-3	~15	1	5-15	653.12	4/21/04	13.75	639.37	-0.7	NA
					5/13/04	NM	NM	NM	NA
					5/26/04	13.48	639.64	-1	NA
					7/1/04	14.71	638.41	-1.25	NA
					10/1/04	15.18	637.94	-2	NA
					2/8/05	15.15	637.97	-1.25	NA
					5/25/05	14.52	638.60	-0.9	NA
					9/27/05	13.48	639.64	-1.15	NA
					5/5/06	16.10	637.02	1.1	NA
					11/16/06	17.03	636.09	1.4	NA
					5/3/07	13.56	639.56	0.7	NA
					11/1/07	19.92	633.20	-1.75	NA
					5/6/08	14.22	638.90	-1.25	NA

Table A-1
SVE Well Data
JCI Jones Chemicals, Inc.
Caledonia, New York

Well ID	Total Depth (feet bgs)	Casing Diameter (inches)	Screened Interval (feet bgs)	Casing Elevation (NGVD)	Date	Depth to Water (feet bgs)	Groundwater Elevation (feet NGVD)	Vacuum (inches of water)	OVA (ppm)
OP-11	22	2	17-22	653.39	4/21/04	13.32	640.07	-0.04	NA
					5/13/04	NM	NM	NM	NA
					5/26/04	14.67	638.72	0	NA
					7/1/04	14.91	638.48	0	NA
					10/1/04	15.62	637.77	-0.04	NA
					2/8/05	15.67	637.72	0	NA
					5/25/05	14.98	638.41	0	NA
					9/27/05	19.00	634.39	-0.55	NA
					5/5/06	NM	NM	NM	NA
					11/16/06	NM	NM	0.5	NA
					5/3/07	14.01	639.38	0	NA
					11/1/07	20.37	633.02	-0.85	NA
					5/6/08	14.66	638.73	0	NA

Notes:

11/1/07* = SVE-3 off-line
bgs = below ground surface
NA = not applicable
NGVD = National Geodetic Vertical Datum
NM = not measured
OVA = organic vapor analyzer
ppm = parts per million

Table A-2
Vadose Zone Confirmatory Soil Sampling Results
May 2, 2007 and May 7, 2008
JCI Jones Chemicals, Inc.
Caledonia, New York

Chemical Analyte	Sample Location and Identification, Sample Depth (feet bgs), and Sample Date									
	P-1	**P-2[1]**	**P-3**	**P-4**	**P-5[1]**	**P-6**	**P-7**	**P-8**	**EB-SI**	**P-9**
	9 - 10	**2 - 3**	**9 - 10**	**8 - 10**	**9 - 11**	**9 - 11**	**8 - 10**	**8 - 10**	**NA**	**2 - 3**
	5/2/07	**5/2/07**	**5/2/07**	**5/2/07**	**5/2/07**	**5/2/07**	**5/2/07**	**5/2/07**	**5/2/07**	**5/7/08**
Benzene	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Bromodichloromethane	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Bromoform	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Bromomethane	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Carbon Tetrachloride	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Chlorobenzene	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Chloroethane	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Chloroform	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Chloromethane	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Dibromochloromethane	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
1, 1-Dichloroethane	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
1,2-Dichloroethane	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
1,1-Dichloroethene	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Cis-1, 2-Dichloroethene	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Trans- 1,2 -Dichloroethene	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
1,2 -Dichloropropane	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Cis-1, 3-Dichloropropene	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Trans-1,3-Dichloropropene	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Ethylbenzene	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Methylene Chloride	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
1,1,2,2-Tetrachloroethane	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Tetrachloroethene	**50**	**31,000 D**	**42**	**5.3**	**220 D**	**49**	< 5.2	**56**	< 5.0	**40,000 D**
Toluene	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
1,1,1-Trichloroethane	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
1,1,2-Trichloroethane	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
Trichloroethene	< 5.3	**44**	< 5.4	< 5.1	< 5.3	**13**	< 5.2	< 5.3	< 5.0	< 28
Vinyl Chloride	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
O-Xylene	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28
M+P-Xylene	< 5.3	< 28	< 5.4	< 5.1	< 5.3	< 5.4	< 5.2	< 5.3	< 5.0	< 28

Notes:

Concentrations are presented in micrograms per kilogram.

[1] Tetrachloroethene was detected in samples P-2 and P-5 outside the calibration range of the instruments and were flagged as an "E". The samples were reanalyzed at dilution and reflagged with a "D".

bgs = below ground surface

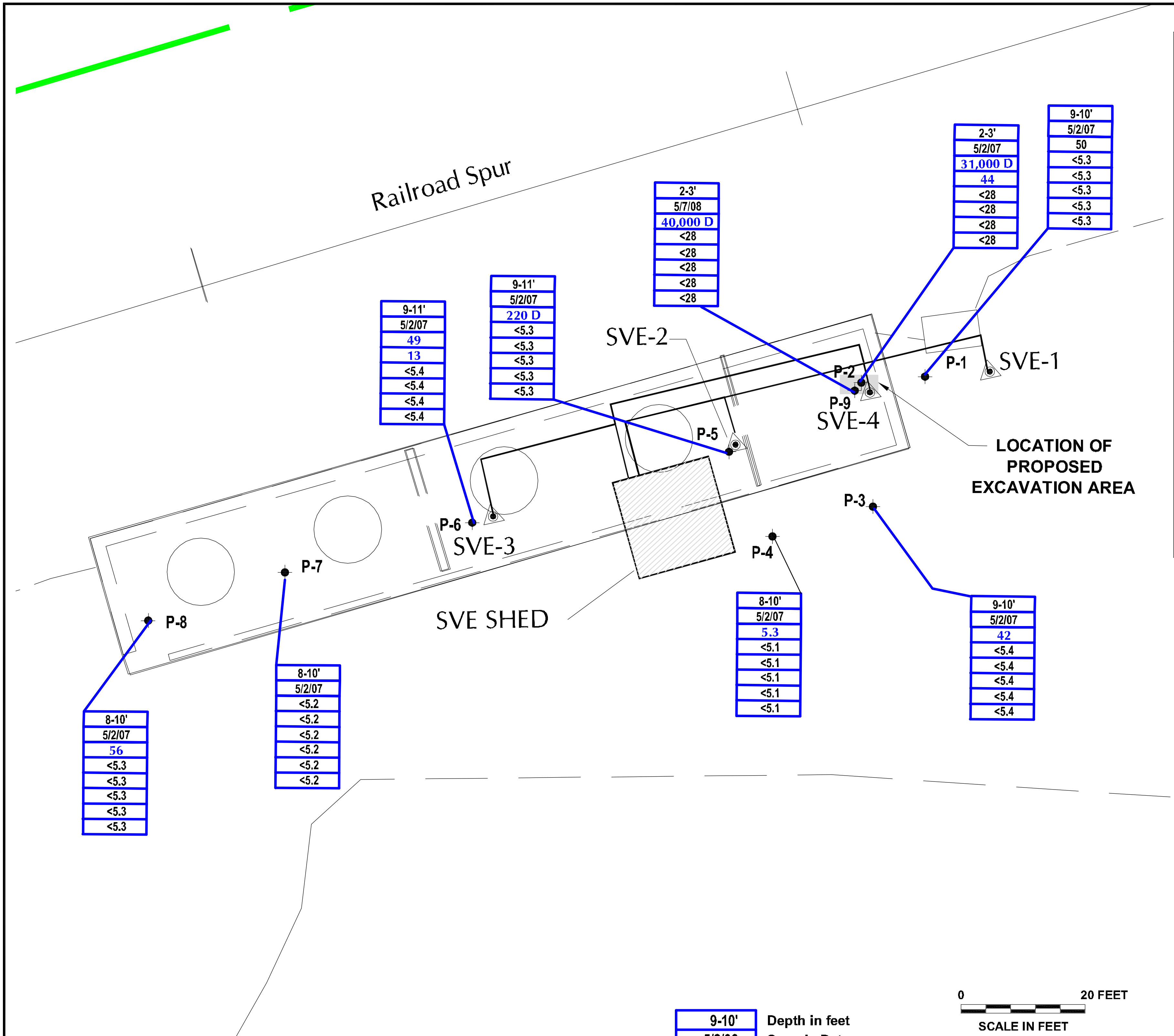
Bold = positive detection

D - indicates that results were based on a reanalysis at dilution

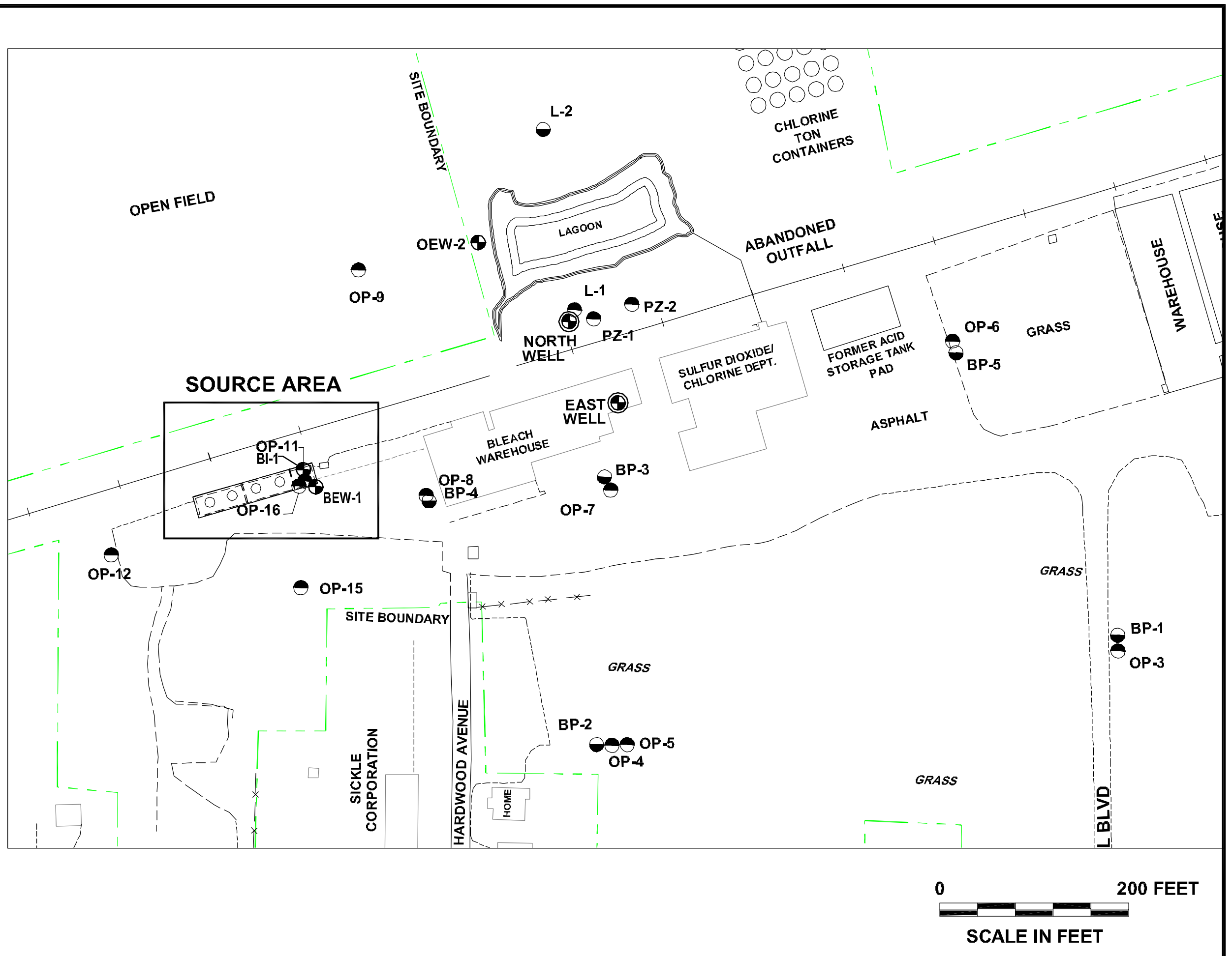
E - indicates the results were rejected due to exceeding calibration range of the instrument

EB - equipment blank

NA - not applicable



	P-8	P-7	P-6	P-5	P-9	P-2	P-1	P-4	P-3
Depth	8-10'	8-10'	9-11'	9-11'	2-3'	2-3'	9-10'	8-10'	9-10'
Date	5/2/07	5/2/07	5/2/07	5/2/07	5/7/08	5/2/07	5/2/07	5/2/07	5/2/07
PCE	**56**	<5.2	**49**	**220 D**	**40,000 D**	**31,000 D**	50	**5.3**	**42**
TCE	<5.3	<5.2	**13**	<5.3	<28	**44**	<5.3	<5.1	<5.4
Cis	<5.3	<5.2	<5.4	<5.3	<28	<28	<5.3	<5.1	<5.4
Trans	<5.3	<5.2	<5.4	<5.3	<28	<28	<5.3	<5.1	<5.4
1,1-DCE	<5.3	<5.2	<5.4	<5.3	<28	<28	<5.3	<5.1	<5.4
VC	<5.3	<5.2	<5.4	<5.3	<28	<28	<5.3	<5.1	<5.4



LEGEND

Site boundary
JCI Jones Chemicals, Inc..

P-1 ● Soil Boring

△ SVE well

9-10'	Depth in feet
5/2/06	Sample Date
PCE	Tetrachloroethene (µg/kg)
TCE	Trichloroethene
Cis	Cis-1,2 Dichloroethene (µg/kg)
Trans	Trans-1,2 Dichloroethene (µg/kg)
1,1-DCE	1,1 Dichloroethene (µg/kg)
VC	Vinyl Chloride (µg/kg)
<5.2	Chemical not detected; value shown is Practical Quantitation Limit
D	Results based on a reanalysis at dilution
µg/kg	Micrograms per kilogram

NOTE: BOLD FONT = POSITIVE DETECTION

P9 is the new sample location
sampled May 7, 2008

JCI JONES CHEMICALS, INC. - SUPERFUND SITE
CALEDONIA, NEW YORK

VADOSE-ZONE SOIL CONFIRMATORY SAMPLE LOCATIONS MAY 2, 2007, AND MAY 7, 2008

ARCADIS

FIGURE
A-1