SPRU EEC-20-001
RCRA ICM REPORT FOR SPRU FACILITY

Attachment 8
SPRU Upper Level Soil Confirmation Data Validation Report

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SEPARATIONS PROCESS RESEARCH UNIT (SPRU)
DISPOSITION PROJECT (DP)

Date: 3/11/2020

ATTACHMENT 8
ANALYTICAL DATA VALIDATION REPORT FOR
SPRU UPPER LEVEL SOIL CONFIRMATION

NYSDEC Hazardous Waste Facility Permit
No. 4-4224-00024/00042

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TABLES

ATTACHMENTS

ACRONYMS

AOC	Areas of Concern
CCAL	Continuing Calibration
CCB	Continuing Calibration Blank
CCV	Continuing Calibration Verification
CLP	Contract Laboratory Program
COC	Chain-of-Custody
EBs	Equipment Rinse Blanks
EDD	Electronic Data Deliverable
EPA	Environmental Protection Agency
GEL	Gel Laboratories, LLC
ICAL	Initial Continuing Calibration
ICS	Initial Calibration Standard
IS	Internal Standard
LCS	Laboratory Control Sample
MB	Method Blank
MS	Matrix Spike
MS	Matrix Spike
MSD	MS Duplicate
NELAP	National Environmental Laboratory Accreditation Program
NFG	National Functional Guidelines
NYSDEC	New York State Department of Environmental Conservation
QAPjP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
SDG	Sample Delivery Group
SPRU	Separations Process Research Unit
SWMUs	Solid Waste Management Unit
TAL	Target Analyte List
TB	Trip Blanks
VOC	Volatile Organic Compound

1.0 PROJECT SUMMARY

The goal of this investigation is to obtain a remediation determination of "No Further Action" for the Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) for the Upper Level of the Separations Process Research Unit (SPRU) Disposition Project in accordance with Hazardous Waste Facility Permit No. 4-4224-00024/00042 issued by the New York State Department of Environmental Conservation (NYSDEC). Confirmation soil sampling and analysis activities have been conducted to provide sufficient data of known and acceptable quality for defensible decision making. Only chemical (non-radiological) data are within the scope of this investigation since radiological closure has separate jurisdiction.

2.0 SAMPLES ANALYZED AND SUBSET VALIDATED

There were ten shipments to the laboratory, with a single chain-of-custody (COC) form for each shipment. Shipments were identified by Sample Delivery Group (SDG) numbers assigned by the laboratory: 171026, 433718, 450565, 454474, 454715, 454944, 455067, 455239, 456917, and 457973. A total of 100 samples in the ten SDGs underwent data validation analysis as documented in this report. The samples included a total of 79 soil samples and 11 field quality control (QC) water samples. The 79 soil samples (all grey till samples with the exception of SFT01, SHS01 and S13) are listed in Table 1 and were carried through the data validation process. The first six digits of each lab sample ID indicate its SDG.

Table 1. Soil Samples for Data Validation

Laboratory Sample ID	SPRU Site Sample ID	Sample Matrix	Collection Date-Time
433718001	G2SOL01	soil	9/25/17 [a]
433718002	G2SOL01D	soil	9/25/17
433718006	G2SOL02	soil	9/25/17
433718007	G2SOL06	soil	9/25/17 [a]
433718008	G2SOL07	soil	9/25/17 [a]
433718009	G2SOL09	soil	9/25/17
433718010	G2SOL11	soil	9/25/17
433718011	G2SOL12	soil	9/25/17
433718012	G2SWSOL01	soil	9/25/17
433718013	G2SWSOL02	soil	9/25/17
433718014	G2SWSOL04	soil	9/25/17
433718015	G2SWSOL05	soil	9/25/17
433718016	G2SWSOL06	soil	9/25/17
433718017	G2SWSOL07	soil	9/25/17
433718018	G2ESOL01	soil	9/25/17
433718019	G2ESOL02	soil	9/25/17
433718020	G2ESOL03	soil	9/25/17
450565001	S13	soil	5/18/18; 1000
450565002	SHS01 (initial sample)	soil	5/18/18; 1005
454474001	SHS01 (post-excavation confirmation sample)	soil	7/10/18;1430
454474002	SET01	soil	7/10/18; 1440
454474003	SW17	soil	7/10/18; 1450
454474004	SW18	soil	7/10/18; 1500
454474005	SW19	soil	7/10/18; 1510
454474006	SW20	soil	7/10/18; 1520
454715001	SW01	soil	7/16/18; 1405
454715002	SW02	soil	7/16/18; 1425
454715003	SW03	soil	7/16/18; 1455

Laboratory Sample ID	SPRU Site Sample ID	Sample Matrix	Collection Date-Time
454944002	S09	soil	7/18/18; 0845
454944003	S06	soil	7/18/18; 0910
454944004	SW24	soil	7/18/18; 0920
454944005	S05	soil	7/18/18; 1020
454944006	S14	soil	7/18/18; 1040
454944007	S15	soil	7/18/18; 1335
454944008	S19	soil	7/18/18; 1350
454944009	SW22	soil	7/18/18; 1400
454944010	S10	soil	7/18/18; 1420
455067003	SW21	soil	7/19/18; 0820
455067004	SW23	soil	7/19/18; 0840
455067005	SW16	soil	7/19/18; 0910
455067006	S01	soil	7/19/18; 0925
455067007	SW15	soil	7/19/18; 0945
455067008	S11	soil	7/19/18; 1005
455067009	S07	soil	7/19/18; 1025
455067010	S04	soil	7/19/18; 1040
455067011	SW04	soil	7/19/18; 1100
455067012	SW05	soil	7/19/18; 1255
455067013	S03	soil	7/19/18; 1310
455067014	S02	soil	7/19/18; 1325
455067015	S16	soil	7/19/18; 1335
455067016	SW21D	soil (field duplicate)	7/19/18; 0825
455239003	SW06	soil	7/20/18; 1510
455239004	SW06D	soil (field duplicate)	7/20/18; 1515
455239005	SW14	soil	7/20/18; 1425
455239006	SW13	soil	7/20/18; 1430
455239007	S12	soil	7/20/18; 1435
455239008	SW12	soil	7/20/18; 1445
455239009	S08	soil	7/20/18; 1450
456917001	S17	soil	8/9/18; 0820
456917002	S18	soil	8/9/18; 0822
456917003	SW07	soil	8/9/18; 0824
456917004	SW08	soil	8/9/18; 0826
456917005	SW09	soil	8/9/18; 0828
456917006	SW10	soil	8/9/18; 0830
456917007	SW11	soil	8/9/18; 0832
456917010	G2ESOL04	soil	8/9/18; 0834
456917011	G2SOL05D	soil (field duplicate)	8/9/18; 0811
456917012	G2SOL05	soil	8/9/18; 0811
456917013	G2SWSOL08	soil	8/9/18; 0745
456917014	G2SWSOL09	soil	8/9/18; 0749
456917015	G2SWSOL10	soil	8/9/18; 0753
456917016	G2SWSOL11	soil	8/9/18; 0757
456917017	G2SWSOL12	soil	8/9/18; 0801

Laboratory Sample ID	SPRU Site Sample ID	Sample Matrix	Collection Date-Time
456917018	G2SWSOL03	soil	8/9/18; 0805
456917019	G2SOL03	soil	8/9/18; 0807
456917020	G2SOL04	soil	8/9/18; 0809
456917021	G2SOL08	soil	8/9/18; 0813
456917022	G2SOL10	soil	8/9/18; 0815
457973001	SFT01	soil	8/22/18; 1400

[a] Date of initial sample collection. A second sample was collected from this location on 10/26/17 and submitted to Adirondack Laboratories for SVOC analysis.

3.0 ANALYTICAL LABORATORIES AND METHODS

All analyses were performed by GEL Laboratories, LLC (GEL) in Charleston, South Carolina with the exception of three SVOC analysis results that were conducted by Adirondack Laboratories as noted in Table 1. Relevant state certifications held by GEL include NY NELAP 11501 and SC Chemistry 10120001. Adirondack Environmental Laboratories Inc. (AEL) certifications include NY NELAP 10709. Soils were analyzed dry or corrected for moisture determination. Analyses were conducted under their respective SDGs using methods specified on the COCs and in the following supporting documents:

- SPRU-ENV-007, Quality Assurance Project Plan for the RCRA Interim Corrective Measures Work Plans
- SPRU-ENV-020, RCRA Interim Corrective Measure Work Plan for the Upper Level SWMUs
- SPRU-ENV-017, RCRA Interim Corrective Measure Work Plan G2 Area of Concern (AOC-008)
- SPRU-RC-119, Sample Collection

Although COCs requested volatile organic compound (VOC) analysis be run both neat (undiluted) and by methanol extraction (diluted) on grey till soils, samples from SDGs 454474 and 454715 were run only diluted.

4.0 ANALYTICAL DATA PACKAGES AND RESULTS

Data and supporting documentation were reported by GEL as electronic document packages received from 9/28/17 through 10/11/17 (G2 Phase 1 data) and 6/15/18 through 8/29/18 (G2 Phase 2 and H2 data). In response to an initial data verification inquiry, the first six data packages were revised on 8/7/18 to report a complete target analyte list (TAL) for metals. Electronic Data Deliverable (EDD) spreadsheets, including laboratory analysis results and qualifiers, accompanied document packages and revisions. A third EDD was issued for SDG 455239 on 8/21/18 to supply missing laboratory qualifiers.

In response to other inquiries, GEL package and EDD revisions for SDGs 450565 and 456917 were re-issued on 8/28/18 and 9/5/18, respectively. The revised SDG 456917 package included G2ESOL04 semi-volatile analyses added per request by SPRU personnel. However, the semi-volatile list provided was missing several analytes and the SDG 456917 package was revised a second time on 9/11/18 to include a complete semi-volatile list. The package for SDG 457973 was also revised a second time on 9/10/18 to include full QC information. These files comprised the raw material for the data validation conducted and documented in this report.

5.0 DATA VALIDATION PROCESS

Data were validated to Stage 2B (G2 Phase 1) and Stage 4 manually (G2 Phase 2 and H2 data), as defined by *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 540-R-08-005, January 2009). Data validation also followed EPA/240/R-02/004, *Guidance on Environmental Data Verification and Data Validation* (U.S. EPA, 2008). Specific criteria were taken from U.S. EPA's SW-846 online manual and the laboratory analytical methods with adjustments per the RCRA *Quality Assurance Project Plan for SPRU Interim Corrective Measures Work Plans (SPRU-ENV-007 Draft R12,*7/3/18). Actions were modeled on U.S. EPA's National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (EPA-540-R-2017-001, January 2017); the NFG for Organic Superfund Methods Data Review (EPA-540-R-2017-002, January 2017); and related U.S. EPA Region 2 Standard Operating Procedures HW-3a R1, HW-3b R1, HW-3c R1, HW-22 R5/HW-35A R1, and HW-24 R4/HW-33A R1. EDDs, case and analytical narratives, COC and sample receipt forms, QC summaries, select

underlying data, and any laboratory correspondence were reviewed as source material in order to form validation judgements. GEL QC data summaries were the primary source for data validation, although their flagging benchmarks often mismatch national and regional EPA guidance. The locations of the complete data sections including QA/QC results in each of the final GEL reports are provided for each analyte group (VOC, SVOC, and metals) in Table 2. The data summary pages from the laboratory reports are provided as attachments to this report. The full laboratory data reports are provided as an electronic appendix (Appendix 1) to the main report.

Table 2. Laboratory Package Data Locations

SDG	VOCs, pages	SVOCs, pages	Metals, pages
171026	NA	NA	NA
433718	10-99	712-733	947-999
450565	8-42	194-217	272-321
454474	10-39	NA	216-273
454715	10-80	254-280	497-545
454944	9-146	473-511	764-824
455067	10-153	781-846	1146-1247
455239	8-92	499-546	952-1051
456917	12-166	167-199	200-242
457973	9-28	NA	32-80

Validation judgments fall within the six criteria categories listed below. Conditions that may have affected data quality are presented in Section 6.0.

1. Sample preservation and holding time
2. Initial and continuing calibration
3. Analyte identification and quantitation
4. Laboratory- and field-generated blanks
5. Laboratory control sample and matrix spike recoveries
6. Laboratory- and field-generated duplicates

The product of data validation is the assignment of data qualifiers that describe the quality, usability, and limitations of analytical results. Qualifiers are taken from U.S. EPA guidance and are defined below:

[null]	The detected analyte was positively identified and the result is acceptable for use as reported.
J	The detected analyte was positively identified, but the result is approximate. Bias may be high (J+) or low (J-).
NJ	The detected analyte was only tentatively identified and the result is approximate.
U	The analyte was not detected. The sample detection and quantitation limits are valid.
UJ	The analyte was not detected. The sample detection and quantitation limits are approximate.
R	The sample result was rejected as unusable due to serious quality deficiencies. The analyte may be present or absent.

One or more of the following qualifier reason codes will indicate the supporting bases for the qualifier given:

Q	The sample was held beyond the normal holding time prior to analysis.
V	The analyte was detected in the lab method blank.

Y	Result is from an unpreserved or incorrectly preserved sample; the data may not be accurate.
1	Compound identification criteria were not met.
2	Laboratory Control Sample (LCS) criteria were not met.
4	Matrix interference is present.
7	The analyte was detected in the equipment rinsate blank.
8	The analyte was detected in the trip blank.
9	The field duplicate reproducibility was not within control limits.
10	Internal standard (IS) or carrier criteria were not met when affecting quantitation.
11	Matrix Spike (MS) or MS Duplicate (MSD) recovery was not within the control limits.
13	Initial or Continuing Calibration (ICAL or CCAL) criteria were not met.
14	Surrogate or tracer spike recovery is out of specification.
18	The laboratory duplicate or MSD reproducibility was not within control limits.
19	The analyte was detected in the storage blank.
21	Result is above detection, but less than the sample quantitation limit.
23	Result was derived beyond the calibration range of the instrument/method.

6.0 VALIDATION FINDINGS

Each subsection below covers a group of validation functions listed in the order described in Section 5.0. A discussion on assignment of qualifiers accompanies the discussion of each function where an anomaly is identified. Changed or newly assigned data qualifiers are presented for submitted samples in Section 7. Overall statistics for the subset of 10,721 data points are provided in Table 3.

Table 3. Qualifier Impact to Dataset

Data Class (Qualifiers)	Final Count	Final Percent (%)
Rejects (R)	31	0.2%
Clean detects (null)	564	5.3%
Qualified detects	287	2.7%
Non-detects (U, UJ)	9839	91.8%

6.1 Sample Preservation and Holding Times

Grey till soil samples for volatile analysis were collected in wide-mouth jars with varying headspace due to the cementitious nature of the soil. All grey till soil volatiles samples were collected and stored between 0°C and 6°C and were analyzed 2–14 days following collection. SPRU project personnel documented and discussed with GEL the low recoveries of VOC internal standards in the samples that improve with methanol extraction. This suggested enhanced retention of VOCs in the dense grey till. The Contract Laboratory Program (CLP) Guidance for Field Samplers (EPA-540-R-014-013) recommends a 14-day limit for sample VOC analysis. This requirement was met for all samples.

For SDG 456917, the late addition of SVOC analysis to sample G2ESOL04 required extraction out of the 14-day holding time requirement. All SVOC results for the sample were qualified UJ for uncertainty, with qualifier code Q.

6.2 Initial and Continuing Calibration

Failure to meet initial and continuing calibration qualifications were given code 13.

Volatile Organics

- In SDG 450565, VOA Continuing Calibration Verification (CCV) failed for acetone. Sample results were qualified J (for detects) or UJ (for non-detects).
- In SDG 455067, one VOA CCV failed for tetrachloroethylene, supporting UJ qualification in the neat runs (no dilution) of samples 3, 5, 6, 7, 8, 9, 10, 11, and 15. Another VOA CCV failed for vinyl chloride, supporting J qualification in the neat runs of samples 4, 12, 13, and 14.
- 1,4-dioxane was routinely analyzed as a VOC, which is non-standard. Validation guidance for 1,4-dioxane as a SVOC was used to supplement VOC guidance, but the minimum response factor was not met. Non-detect results for 1,4-dioxane were qualified UJ.

Semivolatile Organics

- In SDG 454715, a SVOC CCV failure for bis(2- ethyhexyl)phthalate resulted in UJ qualifications in samples 1 and 2.
- In SDG 455239, an SVOC CCV failure for p-nitroaniline resulted in UJ qualifications in samples 3, 4, 5, 6, 7, 8, and 9.
- In SDG 456917, failure of the water CCV for acetone resulted in samples 8 and 9 to be qualified UJ. Failure of a soil CCV for 3,3'-dichlorobenzidine resulted in UJ qualification in sample 20.

Metals

- In SDGs 454474, 454715 and 454944, levels were comparable and silver required J+ qualification in all samples. In SDG 454715, detection of Sb in a continuing calibration blank (CCB) caused all three samples to be qualified UJ.
- In SDG 455067, a CCB low bias for Pb caused J- qualification in sample 16. An Initial Calibration Standard (ICS) detection of Ag along with comparable interference levels in associated samples 3–15 caused their detection to be qualified J+. Another ICS low bias for Ag and Cd caused those metals in sample 16 to be qualified J- (for detects) or UJ (for non-detects). Detection of Tl caused it to be qualified in sample 16 as J+. An ICS low bias for Na caused J- qualification in comparable associated samples 3–15.
- In SDG 455239, a PQL verification failure for Zn caused sample 2 (EB) to be qualified J+. ICS low bias for Cd and Sb caused J- (detect) and UJ (non-detect) qualifications in sample 3-9. ICS detection of Na caused J+ qualification in samples 3–9.
- In SDG 456917, two CCB low bias results for K caused sample 1, 3, 5 and 20 result to be qualified J-. Another CCB low bias for As caused J- qualification in samples 2–7 and 20. An ICS detection of Ag, Cd, K, and Na caused most of those results in samples 1–7 and 20 to be qualified J+. Another ICS low bias for Na caused sample 10 to be qualified J-, while detection of Ag resulted in a J+ qualification.
- In SDG 457973, ICS detection of Ag and Na caused those metals in sample 1 (SFT01) to be qualified J+.
- For SDG 433718, cadmium and thallium were reported in the initial calibration verification (ICV) or CCB blanks caused the results for these two analytes in three samples (G2ESOL01, G2ESOL02, and G2ESOL03) to be qualified UJ.

6.3 Analytical Identification and Quantitation

One sample of each VOC and SVOC analysis for each SDG were examined in the raw data. Detected analytes in those samples were checked in chromatograms and spectra and recalculated to final reported units. Anomalies noted triggered checks for detected results in other samples. Qualifications based on deficiencies associated with IS and surrogate analyses were given codes 10 and 14, respectively. Other analyte identification qualifications were assigned code 1. The results of the analytical identification and quantitation are discussed below.

Volatile Organics

As expected, VOC surrogates and IS in the neat (undiluted) analyses experienced significant failures that were mostly eliminated in methanol dilution analyses. This was consistent with prior experience with VOC analyses conducted on the grey till samples. Specific issues noted with respect to IS analyses on the neat (undiluted) samples were noted for SDGs 433718, 455067 and 455239. For SDG 455067, only IS1 in samples 5, 7, 9, 11, 12 and 15 was acceptable. In SDG 455239, all ISs were affected. In SDG 456917, IS1 failed in samples 1–3 and 21–22, IS2 failed in all samples except 10, 11, 14, 15, and 16, and IS3 failed in all samples except 10 and 15. Based on these IS and surrogate results and the U qualification by the laboratory, the majority of the VOC analyte results reported were qualified UJ.

Several issues were noted with respect to SDG 456917. The sample 20 (G2SOL04) diluted VOC analysis failed ion abundance criteria for cis-1,2-dichloroethene, resulting in rejection of this analyte. For the neat sample 2 run (S18), five analytes were rejected for missing characteristic ions or failing abundance ratios. For other neat (undiluted) runs, three analytes in sample 1 (S17) and five analytes in sample 3 (SW07) were rejected for characteristic ion absence or ratio failure. These rejected (R-qualified) analytes were reported as detected and J-qualified by the laboratory. The trichlorofluoromethane result in the diluted run for sample 14 (G2SWSOL09) was qualified J+ due to CCV and peak analysis. Trichloroethylene was qualified J+ for extra major ions and signs of peak co-elution. The sample 1 (S17) result for 1,2,4-trichlorobenzene was qualified J+ due to the presence of uncharacteristic ions. Two analytes were rejected in samples 4 (SW08), 19 (G2SOL03), 21 (G2SOL08), and 22 (G2SOL10) for ion absence or ratio failure.

In SDG 455067, VOC identification issues were found in the neat run of sample 3 (SW21). Four analytes (1,2,4-trichlorobenzene, and 1,2-, 1,3- and 1,4-dichlorobenzene) failed ion abundance ratio criteria (±20% absolute), and a fifth (vinyl chloride) was missing its largest reference ion (no ratio). These five analytes were rejected. 1,2,3-trichlorobenzene was qualified J+ for extra major ions and signs of peak co-elution.

The following J+ (estimated with potential high bias) data qualifications were applied to VOC sample analyte results based on the VOC surrogate, IS, and/or peak abundance data quantification:

- In SDG 454944, laboratory reported detections (J-qualified) of carbon disulfide and 1,2,4-trichlorobenzene were J+ qualified based on data validation.
- In SDG 455067, laboratory reported detections (J-qualified) of carbon disulfide and 1,2,4-trichlorobenzene, 1,2,3-trichlorobenzene, 1,2-, 1,3- and 1,4-dichlorobenzene, methylene chloride, and vinyl chloride were J+ qualified based on data validation.
- In SDG 456917, laboratory reported detections (J-qualified) for nine different analytes were J+ qualified based on data validation.

Semivolatile Organics

In SDG 454944, SVOC analyte identification issues were observed for sample 9 (SW22) chromatograms and spectra. Benzo(a)anthracene and chrysene peaks overlapped each other and perhaps one or two minor peaks, while ion scans had unidentified mass-240 relative intensities equal to or much greater than characteristic masses. Both analytes were rejected. Phenanthrene had minor overlap and significant intensity at unexplained mass 188, and the result was qualified J+. In SDG 455239, the SVOC spectrum for sample 3 (SW06) for the di-n-octylphthalate result had several major ions not present in the reference causing J+ qualification. 6.4

Laboratory- and Field-Generated Blanks

Laboratory and field blanks were generated in accordance with laboratory analysis and QAPjP requirements. In accordance with QAPjP requirements, equipment rinse blanks (EBs) were collected for re-used sampling equipment for SDGs 455067, 455239 and 459917 for up to 20 samples (independent of SDG or sampling event). SDGs 450565, 454474, 457973 and 456917 did not require EBs due to use of new or dedicated sampling equipment.

Volatile Organics

Ambient field blanks were not collected and SDGs 450565, 454474, and 457973 omitted trip blanks (TB) with VOC samples per allowance of the QAPjP. Volatile storage blanks were not included in the data packages, but GEL provided a supplemental statement that only SDG 456917 was affected by the detection of methylene chloride (a common laboratory contaminant) in the storage blank. Consequently, 11 of 12 methylene chloride detections in SDG 456917 samples were qualified as UJ. The twelfth sample was confirmed at J+ qualification. Storage blank qualifications were given code 19.

In SDG 455067, the detection of 1,2,4-trichlorobenzene in the laboratory method blank (MB) confirmed the J+ qualification of the sample 3 result and caused the sample 6 result to be re-qualified as UJ. Lab method blank qualifications were given code V. In SDG 433718, methylene chloride, 1,2,3-trichlorobenzene, and 1,2,4- trichlorobenzene were detected in the MB and sample G2ESOL01, G2ESOL02, and G2ESOL03 results for methylene chloride detections were qualified UJ.

The EB applicable for SDGs 455067, 454944, and 455239 had an acetone detection that caused all acetone detects in these SDGs to be qualified as non-detects (UJ). All equipment rinsate blank qualifications were given code 7.

Semivolatile Organics

Dimethyl phthalate was reported in the MB for SDG 171026 at 350 ug/kg therefore the dimethyl phthalate sample results reported for G2SOL01, G2SOL06, and G2SOL07 ranging from 460 to 520 ug/kg were qualified J+.

Metals

In SDG 450565, the detection of Ca and Na in the MB caused all samples to be qualified J+ for those analytes. In SDG 455239, the metals MB for water had a marginal detection of Zn in the EB (sample 2). The EB was qualified J+ to maintain functionality. The metals MB for soil was biased low for silver, causing samples 3 through 9 to be qualified J-. In SDG 456917, the MB for water was biased low for Ni, and the EB (sample 8) was qualified UJ. Lab MB qualifications were given code V. Detection of Co and Zn in the EB caused J+ qualifications for several Co results in SDGs 455067 and 454715. Detection of six metals in the EB caused numerous J+ qualifications in SDG 456917 samples. Na in sample 10 (G2ESOL04) was qualified J. All equipment rinsate blank qualifications were given code 7.

6.5 Laboratory Control Sample and Matrix Spike Recoveries

The majority of the data qualifications in this category were due to matrix spike (MS) recovery failures in soil samples; this issue was identified in the Case Narratives provided by GEL. Qualifications for MS were given code 11. Qualifications for LCS recovery failures were given code 2.

Volatile Organics

The following qualifiers were applied with respect to MS recoveries for volatile organics.

In SDG 455067, the VOC soil dilution MS/MSD recovered grossly low (<20%) for chloroethane and low for 11 other analytes. Source sample 3 (SW21) chloroethane was rejected, and remaining corresponding non-detects were qualified UJ. The field duplicate sample 16 (SW21D) was batched separately and not qualified. The neat (undiluted) MS/MSD recovered grossly low for 2-hexanone, 1,2,3- and 124-trichlorobenzenes, and 1,2-dibromo-3-chloropropane; low for 28 more analytes; high for 8; and split high/low for isopropylbenzene. Qualifiers for SW21 VOC analytes were confirmed as J-qualified for detects and were UJ-qualified for non-detects. Trichloroethylene met national guidance so lab flagging was disregarded.

In SDG 456917, the VOC soil dilution MS/MSD recovered grossly low for chloroethane and low for 16 more analytes. The qualifier UJ in source sample 11 (G2SOL05) and field duplicate sample 12 (G2SOL05D) was applied to these 16 analytes. Trichloroethylene, toluene, and chlorobenzene met national guidance, so lab flagging was disregarded. The VOC neat soil MS/MSD recovered grossly low for 1,2,3- and 1,2,4- dichlorobenzene, and low for 25 more analytes. These analytes in source sample and field duplicate were also qualified UJ (non-detect). Flags were disregarded in three analytes that met national guidance and in two with high recoveries but no detection in samples. Other failures in the companion MSD were disregarded due to a poor extraction in the neat (undiluted) samples, as seen in surrogate recoveries and documented in the laboratory narrative.

In SDG 455239, the VOC soil dilution MS/MSD recovered grossly low for chloroethane and low for 12 more analytes. Chloroethane in source sample 3 (SW06) and its field duplicate sample 4 (SW06D) were rejected, while the low analytes were qualified UJ (non-detect). The VOC soil neat MS/MSD confirmed qualifications for 4 grossly low and 27 more low analytes in the source and duplicate. A toluene flag was disregarded since recovery met the national criterion.

The following qualifiers were applied with respect to water (QC) samples:

- In SDGs 454715, 454944, and 455067, the VOC water MS/MSD recovered low for acetone, so the analyte was qualified UJ in the TB and EB.
- In SDG 456917 and 455239, the VOC water MS/MSD recovered low for acetone, 2-butanone and 2-hexanone. Results in the TB and EB were qualified J (detect) or UJ (non-detect).

Semivolatile Organics

The following qualifiers were applied with respect to MS and LCS recoveries for semivolatile organics:

- In SDG 455239, the SVOC soil MS/MSD recovered grossly low for hexachlorocyclopentadiene, so it was rejected in source sample 3 (SW06) and its field duplicate sample 4 (SW06D).
- In SDG 456917, a SVOC soil MS failed low for hexachlorocyclopentadiene, so it was qualified UJ in source sample 20 (G2SOL04).
- In SDG 456917, a soil SVOC LCS recovered low for benzaldehyde, causing the non-detect in sample 20 (G2SOL04) to be qualified UJ.
- The SVOC water MS/MSD failed low for all but 6 analytes and were qualified UJ in the EB.

For SVOC analyses associated with SDG 433718, the relative percent difference (RPD) between the Matrix Spike (MS) and MS duplicate (MSD) did not meet acceptance limits for three analytes (benzo(ghi)perylene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene). However, the individual MS and MSD percent recoveries were within the acceptance limits. This criteria deficiency was determined to have no adverse impact on the reported sample data and no data qualification was required for these sample results.

Metals

The following qualifiers were applied with respect to MS recoveries for metals:

- In SDG 433718, the metals MS/MSD did not meet the acceptance criteria for percent recoveries for arsenic, selenium, thallium and zinc. Sample results for these analytes in sample G2ESOL01 were qualified J if detected and UJ if not detected.
- In SDG 450565, the main metals MS recovered high for Cr and Mg with passing post-spike checks, causing sample detections of these elements to be qualified J.
- In SDG 454474, the main metals MS/MSD failed low for Sb, Pb, Ni and Tl, and high for Ba and K, while all post-spike checks passed. Sample detects of these metals were qualified J, while a non-detect of the low group was qualified UJ.
- In SDG 454944, the metals MS/MSD failed grossly low for Zn, low for Cu, and high for Ba and K, while all post-spikes passed. Source sample 2 (S09) detects of all these were qualified J.
- In SDG 455067, the metals MS/MSD for SW21 failed low for Sb, Co, Ni and Zn with passing post-spike so the sample detects were qualified J and non-detects qualified UJ. A soil metals MS/MSD of SW21D failed low for Zn, both ways for Ba, and high for K with passing post-spike checks. Sample detects for Zn and Ba were qualified J, and K was qualified J+. All qualifications for MS recovery failures were given code 11.
- In SDG 455239, the metals MS for soil recovered low for Ni and Zn, and high for K, with passing post-spike checks. These metals were qualified J in source sample 3 (SW06) and duplicate sample 4 (SW06D).
- In SDG 456917, both Sb MS/MSD recovered low without a post-spike, so Sb detects in source samples 1 and 10 were qualified J-. The metals MS recovered low for Cd, Co, Pb, Sb, and Tl with passing post-spikes; therefore, these metals in sample 1 (S17) were qualified J (detects) or UJ (non-detects). The metal MS of G2ESOL04 failed for 12 metals, which were qualified in the source sample as J (detect) or UJ (non-detect).
- In SDG 457973, the metals MS recovered low for Co with a passing post-spike. That metal was qualified J in source sample 1 (SFT01).

6.6 Laboratory- and Field-Generated Duplicates

U.S. EPA's allowance for an extended 35% reproducibility range on laboratory-generated soil matrix duplicates was applied to both the laboratory (MS duplicate) and field duplicate samples. All qualifications for lab sample duplicate or MSD reproducibility failure were given code 18. Qualifications for serial dilution were given code 3.

Volatile Organics

- In SDG 455067, the VOC soil dilution sample MS/MSD precision failed grossly high (>100%) for chloroethane, confirming prior rejection in source sample 3 (SW21). Its field duplicate sample 16 (SW21D) was batched separately and not qualified. Neat MS/MSD precision failed for 33 analytes, which were confirmed at prior qualifications in SW21. The VOC water MS/MSD failed precision for 22 analytes, so they were qualified or confirmed UJ in the EB.

- In SDG 455239, the VOC neat soil sample MS/MSD precision failed for five analytes, confirming prior qualifications in source sample 3 (SW06) and field duplicate sample 4 (SW06D).
- In SDG 456917, the VOC neat soil sample MS/MSD precision failed for nine analytes, which were confirmed at prior qualification in source sample 11 (G2SOL05) and field duplicate sample 12 (G2SOL05D).
- In SDG 457973, an LCS and LCSD pair failed precision for bromomethane, causing UJ qualification in the sample (both neat and diluted).

Metals

- In SDG 455067, the metals MSD of SW21D (sample 16) had flags for several metals that were disregarded due to EPA Region 2 soil criteria, but Ca in the source sample was qualified J.
- In SDG 456917, flags in the two main metals MSDs for soils were disregarded due to EPA Region 2 soil criteria. But Ca and Mg did require qualifier J in source sample 10 (G2ESOL04). In addition, the serial dilution for sample 10 (G2ESOL04) failed EPA criteria for four metals (Cr, Co, Pb, Ni, Zn), and these analytes were qualified J in this sample.
- In SDG 457973, the MSD failed precision for Ca and Mg, and these analytes were qualified J in source sample 1 (SFT01).
- In SDG 450565, the main metals sample duplicate had flags for three metals that were disregarded due to EPA Region 2 soil criteria, but Al, Cr, Cu, Mg and Mn still required qualifier J in source sample 1 (S13).

Field Duplicates

SDGs 455067, 455239 and 456917 contained field duplicates. EPA Region 2 precision limits of 50% RPD or 2x quantitation limit (QL) for soils were broadened by the SPRU QAPjP to 100% RPD or 3x PQL. In SDG 455067, samples 3 and 16 (SW21/D) passed for all analytes. In SDG 455239, samples 3 and 4 (SW06/D) passed for all analytes. In SDG, samples 11 and 12 (GSSOL05/D) were only analyzed for VOCs and passed for all analytes.

7.0 CONCLUSION

Based on the validation performed, the vast majority of the data is usable despite the quality issues noted. As expected, the volatile organic (VOC) analytes in the neat (undiluted) samples experienced poor internal standard and surrogate recoveries as documented in the laboratory narratives and were qualified accordingly. Numerous volatile detections in SDGs 433718, 454944, 455239, 455067, and 456917 received a UJ qualification (analyte not detected; sample detection and quantitation limits are approximate) or J qualification (analyte detected, result approximate) and are considered imprecise based on the reason code(s) assigned. A few of the VOCs detected are common laboratory contaminants like acetone, methylene chloride, and 2-butanone. For SDG 450565, the only VOC detections reported were acetone and 2-butanone. However, these detections were isolated to the SHS01 location, which was further excavated following initial sampling and resampled in SDG 454474.

Summary tables including final data qualifiers for detected VOC and SVOC analytes are included in Table 4 and Table 5. Rejected VOC and SVOC analytes are included in Table 6. All metals data are included in Table 7.

Table 4. VOC Analytes Detected in Upper Level SWMUs and G2 AOC

Sample No.	All units ug/kg	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	2-Butanone	Acetone	Carbon disulfide	Chloroform	Methylene chloride	Tetrachloro-ethene	Toluene	Trichloroethene	Trichlorofluoro-methane	Vinyl chloride
	SCO [a]	***20000*** [b]	***3400*** [c]	***1100***	***2400***	***1800***	***50***	***50***	***2700*** [c]	***370***	***50***	***1300***	***700***	***470***	***NC***	***20***
G2ESOL01								2.06 J					0.426 J			
G2ESOL02												0.734 J (46.4 J) [f]		0.421 J		
G2ESOL03													0.543 J			
G2SOL01D													0.402 J			
G2SOL03													0.331 J+			
G2SOL04														0.448 J+ (23.9 J+) [f]		
G2SOL08									2.29 J+							
G2SOL10									2.97 J+							
G2SWSOL09													0.528 J		17.8 J+ [e]	
S01						0.405 J+					3.43 J+					
S03									3.41 J+							
S05									1.60 J+							
S09			0.408 J+													
S10									2.07 J+							
S17		1.98 J+	1.73 J+					4.18 J+	3.48 J+							
S18										1.48 J+	0.368 J			1.72 J+ (32.2 J+) [f]	0.537 J+	
SHS01 [d]							6.92	74.4 J								
SW05		0.560 J+	0.458 J+													
SW07									1.95 J+		15.9 J+					
SW09									4.05 J+							
SW10														4.70 J+ (105 J+) [f]		
SW11														0.382 J+		
SW14									1.85 J+							
SW15											2.38 J+					
SW21		1.95 J+														
SW21D																1.75 J+
SW22									2.45 J+							
SW23		2.08 J+	1.67 J+	0.349 J+	0.644 J+	0.840 J+										
SW24			0.479 J+													

NOTE: All results in table are from neat (undiluted) sample runs unless otherwise noted.

[a] Source: NYCRR Table 375-6.8(b) Soil Cleanup Objectives based on the more restrictive value for residential use or groundwater protection unless otherwise noted

[b] CP-51 / Soil Cleanup Guidance based on protection of ecological resources

[c] CP-51 / Soil Cleanup Guidance based on protection of groundwater

[d] Acetone and 2-Butanone results are from initial sampling event; SHS01 post-excavation sample was analyzed via methanol extraction (dilution factor=50) and was non-detect for all VOC analytes.

[e] Sample result reported for methanol dilution (dilution factor=50); neat (undiluted) sample result was non-detect.

[f] Result in parentheses is methanol extraction run (dilution factor=50).

NC = No criteria

Table 5. SVOC Analytes Detected in Upper Level SWMUs

Sample No.	All units ug/kg	Benzo(b)-fluoranthene	Di-n-butylphthalate	Dimethyl-phthalate	Di-n-octylphthalate	Fluoranthene	Phenanthrene	Pyrene
	SCO [a]	***1000***	***8100*** [b]	***100000***	***100000*** [b]	***100000***	***100000***	***100000***
G2SOL01				460 J+				
G2SOL06				490 J+				
G2SOL07				520 J+				
S19						14.2 J	14.5 J	
SHS01		2.48 J						
SW06					108 J+			
SW21D			11.5 J					
SW22						32.1 J	21.7 J+	21.4 J

[a] Source: NYCRR Table 375-6.8(b) Soil Cleanup Objectives based on the more restrictive value for residential or groundwater protection unless noted.
[b] CP-51 / Soil Cleanup Guidance based on groundwater protection.

Table 6. Rejected Analytical Results for Upper Level SWMUs and G2 AOC

Sample_No	Parameter	Result (ug/kg)	Validation Qualifier	Qualifier Reason_Code	MDL	Dilution Factor
G2SOL03	1,2,3-Trichlorobenzene	0.674	R	1,10,14,21	0.331	1
G2SOL03	1,2,4-Trichlorobenzene	0.663	R	1,10,14,21	0.331	1
G2SOL04	cis-1,2-Dichloroethylene	35.1	R	1,14,21	16.7	50
G2SOL08	1,2,4-Trichlorobenzene	1.08	R	1,10,14,21	0.298	1
G2SOL08	1,4-Dichlorobenzene	0.645	R	1,10,14,21	0.298	1
G2SOL08	Acetone	3.48	R	1,10,14,21	2.98	1
G2SOL10	1,2,4-Trichlorobenzene	1.22	R	1,10,14,21	0.319	1
G2SOL10	Acetone	3.95	R	1,10,14,21	3.19	1
S17	1,2-Dichlorobenzene	0.7	R	1,10,14,21	0.318	1
S17	1,4-Dichlorobenzene	0.996	R	1,10,14,21	0.318	1
S18	1,2,3-Trichlorobenzene	1.21	R	1,10,14,21	0.316	1
S18	1,2,4-Trichlorobenzene	1.07	R	1,10,14,21	0.316	1
S18	1,3-Dichlorobenzene	0.379	R	1,10,14,21	0.316	1
S18	1,4-Dichlorobenzene	0.705	R	1,10,14,21	0.316	1
S18	cis-1,2-Dichloroethylene	0.368	R	1,10,14,21	0.316	1
SW07	1,2,3-Trichlorobenzene	0.848	R	1,10,14,21	0.322	1
SW07	1,2,4-Trichlorobenzene	1.2	R	1,10,14,21	0.322	1
SW07	1,3-Dichlorobenzene	0.451	R	1,10,14,21	0.322	1
SW07	1,4-Dichlorobenzene	0.751	R	1,10,14,21	0.322	1
SW07	Acetone	4.74	R	1,10,14,21	3.22	1
SW08	1,2,4-Trichlorobenzene	0.456	R	1,10,14,21	0.326	1
SW08	1,4-Dichlorobenzene	0.326	R	1,10,14,21	0.326	1
SW21	1,2,4-Trichlorobenzene	2.1	R	1,10,11,14,18,21	0.304	1
SW21	1,2-Dichlorobenzene	0.74	R	1,10,11,14,18,21	0.304	1
SW21	1,3-Dichlorobenzene	0.71	R	1,10,11,14,18,21	0.304	1
SW21	1,4-Dichlorobenzene	0.953	R	1,10,11,14,18,21	0.304	1
SW21	Vinyl chloride	2.74	R	1,10,11,14	0.304	1
SW06	Hexachlorocyclopentadiene	ND	R	11,18	108	1
SW06D	Hexachlorocyclopentadiene	ND	R	11,18	108	1
SW22	Benzo(a)anthracene	17.1	R	1,21	10.7	1
SW22	Chrysene	10.7	R	1,21	10.7	1

Qualifier Reason Code Definitions:

1	Compound identification criteria were not met.
10	Internal standard (IS) or carrier criteria were not met when affecting quantitation.
11	Matrix Spike (MS) or MS Duplicate (MSD) recovery was not within the control limits.
14	Surrogate or tracer spike recovery is out of specification.
18	The laboratory duplicate or MSD reproducibility was not within control limits.
21	Result is above detection, but less than the sample quantitation limit.

Table 7. Metals Results for Upper Level SWMUs and G2 AOC

Sample No.	All units mg/kg (ppm)	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium[b]	Silver	Sodium	Thallium	Vanadium	Zinc
	SCO [a]	*NC*	*NC*	*16*	*350*	*14*	*2.5*	*NC*	*36*	*30*	*270*	*2000[c]*	*400*	*NC*	*2000*	*0.73*	*130*	*NC*	*4*	*8.3*	*NC*	*5*	*100*	*2200*
G2ESOL01			ND	7.81 J	59.9		ND UJ		13	10.1		24200	2.53		430	0.0217	23.4		1.66 J	0.136 J		ND UJ		55.6 J
G2ESOL02			ND	7.05	56		0.117 UJ		13	13.5		24600	3.76		538	0.0661	26		1.61 J	0.15 J		ND UJ		338 J
G2ESOL03			ND	6.9	50.1		ND UJ		12.9	11.2		24400	4.19		577	0.028	25.3		1.48 J	ND		ND UJ		59.4 J
G2ESOL04		7190	ND UJ	6.29 J	51.5 J+	0.493 J	ND U	13400 J	11.4 J+	9.34 J	22.3 J+	18900	9.36 J+	5760 J	377	0.0247	21.6 J	851 J+	0.86 J-	0.476 J+	64.8 J	ND UJ	14 J	48 J
G2SOL04		8250		8.87 J-	46.1 J	0.576 J	0.29 J+	17300 J	13.7 J	12.2	35.7	23300	11.9	7270 J	508	0.0221	26.3 J	893 J	0.565 J	0.443 J+	203 J+		16.3 J	54.9 J
S01		7510		7.3	60.2	0.609		24400	12.6	10.7 J+	26.9	23200	11.5	9210	415	0.0238	25.1	1190	0.775 J	0.614 J+	98.4 J-	1.09 J	16.5	50.3
S02		6230		7.77	63.7	0.545		22000	10.6	9.79 J+	24.9	20100	10.9	9800	395	0.02	22.7	1440	0.671 J	0.569 J+	108 J-	0.788 J	13.6	50.7
S03		6780		6.95	60.4	0.549		21000	11.3	9.94 J+	26.2	21300	10.9	9400	407	0.0273	23.1	1300	0.798 J	0.637 J+	108 J-	0.807 J	14.6	51.5
S04		5720		7.05	47.2	0.491 J		20900	9.74	8.94 J+	23.6	18800	10.4	8530	381	0.0271	20.6	1190	0.754 J	0.577 J+	90 J-	0.887 J	12.7	49.9
S05		10600		9.41	83.1	0.744		29400	16.9	12.7	43.3	30200	12.1	14700	551	0.0276	29.9	1840	0.778	0.844 J+	88	1.35 J	22	84.2
S06		10700		8.36	93.6	0.791		20300	17.3	12.9	32.2	28600	12.6	10400	463	0.0301	30.3	1840	0.711	0.873 J+	86.2	1.5 J	22.2	56
S07		6030		7.53	53.1	0.49		20900	10.4	9.29 J+	24	18900	10.4	8610	380	0.0252	21.2	1140	0.675 J	0.526 J+	64.3 J-	0.793 J	13.3	49.9
S08		9270		8.91	75.4	0.655		19400	13.7	11.7	27.9	24000	11.9	9050	429	0.0246	25.9	1660	0.786 J	0.357 J-	112 J+		18.1	50.8 J+
S09		10300		9.16	76.1 J	0.763	0.128 J	24600	16.9	13	41.8 J	29100	14.9	11700	628	0.0289	30.8	1790 J	0.768 J-	0.803 J+	64.6	1.29 J	22	110 J
S10		10600		9.05	68.5	0.759		18500	17.5	13.6	31.5	28600	15.3	10200	436	0.0242	32.8	1810	0.745	0.877 J+	74.1	1.46 J	21.6	53.6
S11		7360		8.07	67	0.592		21600	12.7	11.2 J+	28.3	23500	12.6	9720	423	0.0273	26.1	1300	0.842 J	0.694 J+	80.5 J-	0.955 J	15.7	56.6
S12		9660		8.79	68.4	0.642		36900	14.3	11.3	28.8	24100	12	9180	440	0.0202	26	1670	0.875 J	0.19 J-	122 J+		18.1	62.4
S13		12000 J			0.652			37 J+	21.6 J		4.29 J	56.3	0.754 J	352 J	10.3 J	0.0306	0.547 J				27.7 J+		0.87	21.1
S14		11600		8.89	153	0.847		22200	18.9	12.8	32.5	29300	12.5	10600	488	0.028	30.9	2140	0.84	0.888 J+	75.5	1.47 J	23.9	62.3
S15		10000		8.45	68.3	0.772		31900	16.5	11.9	29.5	30800	13.5	14700	854	0.0301	29.1	1840	0.806	0.885 J+	62.6	1.28 J	21.8	50
S16		9470		7.49	79.9	0.673		21500	18	12.2	30.3	27400	12.8	9010	468	0.0267	29.5	1230	0.839 J	0.843 J+	82.7 J-	1.37 J	20	58
S17		5310		4.58 J	30.6 J+	0.37 J	0.23 J+	12500 J	9.18 J+	7.93 J	20.8 J+	15500	11.9 J+	6170 J	317	0.0262	17.8 J	754 J	0.651 J-	0.295 J+	79.7 J+	ND UJ	10.3 J	36.7 J
S18		7460		6.81 J-	49.8 J+	0.544 J	0.141 J+	25200 J	12 J+	9.81	24.7 J+	21500	10.2 J+	9880 J	432	0.348	22.1 J	990 J+	0.521 J	0.321 J+	175 J+		15.6 J	56.2 J
S19		12200		8.69	109	0.863		19800	19.4	12.7	32.7	30100	12.9	10700	466	0.0295	31.1	2230	0.855	0.915 J+	74.2	1.35 J	24.3	56.8
SET01		10000		8.52	74.1	0.701		22100	16.8	13.3	33.6	28300	13.8	10200	524	0.179	31.6	1260	0.779 J	0.728 J+	66.9	1.25 J	21.5	59.1
SFT01		6750	0.919 J	8.8	47.7	0.501 J	0.12 J	18800 J	11	7.43 J	25.1	17700	15.4	9960 J	365	0.0422	16	753	0.513 J	0.338 J+	56 J+		15.4	158
SHS01		9800	0.462 J	8.21	52.7 J	0.626		17000	16.1	12	32.7	27100	13.6	9570	478	0.0293	28.5	977 J	0.818 J	0.751 J+	51.4	1.3 J	19.5	58.3
SW01		8530	ND UJ	9.13	50.3 J	0.594		20000	14.5	12.9 J+	31.1	24700	18 J	9190	405	0.0245	29.8 J	1120 J	0.863 J	0.645 J+	63.3	1.15 J	17.4	48
SW02		9040	ND UJ	7.82	63.3	0.656		21600	14.8	11.1 J+	29.5	25300	11.4	9720	441	0.0223	26.6	1280	0.876 J	0.627 J+	90.7	1.12 J	18.9	51.4
SW03		8190	ND UJ	6.89	51.8	0.621		19400	13.5	10 J+	26.6	23400	11	9240	444	0.0217	24.6	1100	0.815 J	0.588 J+	89.1	1.16 J	17.2	48.6
SW04		7530		7.89	58.1	0.588		22900	12.9	10.6 J+	28.2	23600	11.5	8990	445	0.0226	25	1390	0.808 J	0.725 J+	93.4 J-	1.1 J	16.3	54.3
SW05		6620		7.82	55.3	0.554		21300	11.1	9.72 J+	25.4	21400	10.9	9690	394	0.0235	22.7	1450	0.918 J	0.736 J+	102 J-	0.966 J	14.5	51.3
SW06		9760		9.88	77.8	0.724		20900	14.7	11.8	29.2	25500	12.5	9810	453	0.0258	27.1 J	1720 J	0.818 J	0.323 J-	134 J+		20.2	54.8 J
SW06D		8990		8.98	66.5	0.64		21500	13.6	10.8	27.6	24000	12	9390	419	0.023	25.7 J	1660 J	0.877 J	0.274 J-	130 J+		18.8	53.4 J
SW07		6110		4.97 J-	44.6 J+	0.378 J	0.231 J+	16400 J	9.78 J+	7	19.9 J+	16800	6.49 J+	6460 J	427	0.0227	16.7 J	768 J	0.629 J	0.275 J+	178 J+		12 J	43.8 J
SW08		8150		8.48 J-	57.6 J	0.553 J	0.242 J+	20900 J	13.2 J+	10.2	31 J+	22800	9.86 J+	8600 J	477	0.0186	23.8 J	1050 J+	0.713 J	0.482 J+	256 J+		16.6 J	83 J
SW09		7060		6.16 J-	50.1 J+	0.519 J	0.172 J+	19100 J	11.3 J+	8.83	21.6 J+	19300	8.09 J+	7440 J	444	0.0241	19.6 J	932 J	0.615 J	0.348 J+	189 J+		14.6 J	46.6 J
SW10		8180		7.68 J-	62.1 J	0.574 J	0.283 J+	22300 J	13.3 J+	10.4	28.3 J+	22700	9.63 J+	9100 J	451	0.0159	23.7 J	1100 J+	0.65 J	0.41 J+	344 J+		16.7 J	64.3 J
SW11		8500		7.49 J-	59.5 J	0.575 J	0.237 J+	17500 J	14.3 J	10.6	28.4 J+	22900	12.4 J+	8390 J	428	0.0241	24.7 J	1030 J+	0.688 J	0.424 J+	143 J+		17.2 J	56.6 J
SW12		9110		9.12	69.8	0.641		20100	13.9	10.9	27.6	23600	12.4	9280	416	0.0257	25.5	1670	0.798 J	0.379 J-	122 J+		18.2	60
SW13		8860		8.87	75.8	0.633		18500	13.5	11	31.8	23800	12.2	8880	418	0.029	26.1	1590	0.895 J	0.35 J-	114 J+		17.6	53
SW14		9340		9.71	66.3	0.655		19400	14.4	11.7	33.8	25300	13.5	9490	473	0.0296	28	1610	0.81 J	0.352 J-	105 J+		18.2	190
SW15		6310		8.11	56	0.519 J		19600	11	9.89 J+	23.8	20600	11.5	8880	399	0.0259	23.8	1120	0.896 J	0.571 J+	42.1 J-	0.872 J	13.5	50.9
SW16		7080		7.69	58.7	0.542		18100	12	10.1 J+	26	21500	10.6	8850	389	0.0296	24	1170	0.778 J	0.661 J+	53.4 J-	0.912 J	14.7	49.6
SW17		4930	ND UJ	9.05	18.9	0.383 J	0.129 J	13600	8.2	14	21.2	16700	24	5680	347		27.7	551	0.743 J	0.432 J+	89.3	0.807 J	9.59	40.5
SW18		10200		8.94	53.1	0.706		10600	16.6	12.3	35.3	29200	13.8	7400	523	0.0595	31.2	797	0.657 J	0.893 J+	140	1.41 J	21	71.2
SW19		9460		7.96	81.6	0.682		32000	15.8	12.6	35.3	26300	13.3	9670	513	0.027	29.5	1170	0.764 J	0.569 J+	105	1.25 J	19.2	60.7
SW20		10700		8.73	76.7	0.754		13500	17.2	13.5	33.8	29200	14.8	7570	547	0.0242	32.4	938	0.778 J	0.791 J+	68.2	1.35 J	21.8	74
SW21		7800	ND UJ	7.86	66.1	0.622		29700	13.9	10.4 J+	28.8	22700	11.1	10100	410	0.0271	25.1 J	1180 J	0.754 J	0.576 J+	63.1 J-	1.01 J	16.7	54.4 J
SW21D		10100		12.4	71.8 J	0.844	ND UJ	30800 J	15.2	12.8	31.4	32100	14.3 J-	9970	767	0.0255	28.7	1160 J+	0.812 J	0.201 J-	85.8	1.53 J+	19.5	61.4 J
SW22		10500		8.59	81.4	0.761		19200	16.9	12	32.2	27800	12.3	10200	466	0.0288	28.9	1750	0.759	0.865 J+	70.8	1.6 J	21.6	65.3
SW23		8000		7.53	64.6	0.586		18500	13.3	11.3	27.9	24400	13.4	8820	452	0.0286	26.5	1060	0.951 J	0.798 J+	84.7 J-	0.988 J	16.2	53.6
SW24		11500		8.57	81.6	0.81	0.169 J	21000	18.3	11.7	35.4	28400	11.8	10800	475	0.0266	29	2040	0.798	0.837 J+	107	1.44 J	23.3	138

NOTE: All results in table are from neat (undiluted) sample runs unless otherwise noted.

[a] Source: NYCRR Table 375-6.8(b) Soil Cleanup Objectives based on the more restrictive value for residential use or groundwater protection unless noted.

[b] Selenium analyses runs used a dilution factor of 2.

[c] CP-51 / Soil Cleanup Guidance based on residential protection

NC = No criteria

SPRU DATA VALIDATION REPORT

LABORATORY DATA ATTACHENTS