



Data Validation Summary Report

Client/Company:	VHB
Site/Project Name:	National Park Service (NPS) – Caneel Bay Resort EE/CA, US Virgin Islands
Laboratory:	Eurofins TestAmerica-Canton, North Canton, OH
SDGs/Lab Project #:	240-144999-1 (J144999)
Date(s) of Collection:	February 19, 2021 through February 22, 2021
Samples & Analyses:	15 Incremental Sampling Methodology (ISM) soils + 21 Discrete soil samples for project-specific lists of Metals, Polycyclic Aromatic Hydrocarbons (PAHs), & Pesticides 12 ISM soils + 18 Discrete soil samples for PCB Aroclors 21 Discrete soil samples for Volatile Organic Compounds (VOCs) 26 Discrete soil samples for pH
Senior Data Reviewers:	Susan D. Chapnick, M.S., New Environmental Horizons, Inc. & Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Date Completed:	April 19, 2021

USEPA Stage 2B data validation (DV) review was performed for all analyses based on the following documents: *Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site*, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (SAP); USEPA *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*, OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; USEPA *National Functional Guidelines for Organic Superfund Methods Data Review*, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017 (NFG); USEPA *National Functional Guidelines for Inorganic Superfund Methods Data Review*, OLEM 9355.0-135, USEPA-540-R-2017-001, January 2017 (NFG); USEPA SW-846 Methods and others as specified herein; and professional judgment.

Data Validation Summary

During this USEPA Stage 2 DV review of Metals, VOCs, PAHs, Pesticides, PCB Aroclors, and pH, selected sample results were negated (U) or estimated (J, J-, J+, or UJ) due to QC issues. NEH generated a validated electronic data deliverable (EDD) based on the EDD file received from the laboratory. All sample data are considered usable for project decisions with the understanding of the potential uncertainty (bias) in the qualified results.

The following QC elements, as presented on summary QC forms and as applicable to the analytical methods, were reviewed:

- Data package completeness and agreement of analyses with Chain-of-Custody (COC)
- Sample receipt, holding times, and preservation criteria
- Calibration verification (tune checks, initial and continuing calibrations)
- Method blank and field equipment blank results
- Internal Standard relative intensities
- Laboratory Control Sample (LCS) recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) recoveries
- MS/MSD and Field Duplicate (FD) relative percent differences (RPDs)
- Other method-specific QC if applicable and reported (*e.g.*, serial dilution results)
- Evaluation of laboratory qualifiers applied to the data
- Calculation verification of one sample result per media per method of analysis*
- Calculation verification of one sample-specific limit of quantitation (LOQ) per media per method of analysis*
- Sensitivity evaluation – comparison of LOQs to project action limits
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

**For EPA Stage 2B DV, calculation verification of LOQ and sample results as well as review of raw instrument data are not required or performed.*

This DV Report consists of three parts: 1) the DV Summary Report; 2) the DV Checklists for each media and analysis method, which detail all of the QC reviewed and the issues that required action or affected the data certainty in terms of accuracy, precision, representativeness, and sensitivity; and 3) the validated EDD, which includes the USEPA DV qualifiers added to the results and validation notes to document bias and reasons for the DV actions.

Sensitivity evaluation was based on reviewing non-detects compared to the Project Action Limits (PALs) listed in Table 1 of the Caneel Bay SAP. All non-detects met sensitivity requirements except for Antimony samples IA-3-01 B, IA-3-01 C, IA-3-02 A, IA-3-02 B+MS/MSD, IA-3-02 C, IA-REF-02 A, IA-REF-02 B, IA-REF-02 C, SC-101, SC-102, SC-3-03 (0-3), SC-3-03 (0-3), SC-3-03 (3-6), SC-3-04 (0-3), SC-3-04 (3-6), SC-3-06 (0-3), SC-3-06 (3-6), SC-3-07 (0-3), SC-3-07 (3-6), SC-3-08 (3-6), SC-3-09 (0-3), SC-3-09 (3-6), SC-3-10 (0-3), SC-3-10 (3-6), SC-3-11 (0-3), SC-3-11 (3-6), SC-REF-01 (0-0.5), & SC-REF-02 (0-2.6); Cadmium in samples IA-REF-02 A & IA-REF-02 B; Mercury in samples IA-REF-02 A, IA-REF-02 B, SC-101, SC-3-10 (0-3), SC-3-04 (0-3), SC-3-04 (3-6), SC-3-07 (3-6), SC-3-11 (0-3), SC-REF-01 (0-0.5), & SC-REF-02 (0-2.6); Selenium in samples IA-3-01 B, IA-3-01 C, IA-3-02 C, & SC-3-07 (3-6); and Thallium in all

samples except IA-REF-02 A, SC-3-07 (3-6), SC-3-11 (0-3), SC-REF-01 (0-0.5), & SC-REF-02 (0-2.6) all due to method limitations; Aroclor 1242, Aroclor 1248, Aroclor 1254, beta-BHC and Endrin in all samples; Aldrin in all samples except IA-2-01 A, IA-2-01 B, IA-2-01 C, IA-3-01 A, IA-3-01 B, IA-3-01 C, IA-3-02 B +MS/MSD, and SC-3-11 (3-6); delta-BHC and Heptachlor epoxide in samples IA-2-01 A, IA-2-02 A, IA-2-02 B, and IA-2-02 C; 4,4'-DDD in all samples except IA-2-02 A, IA-2-02 B, IA-2-02 C, IA-3-02 A, SC-3-06 (0-3), and SC-3-08 (0-3); 4,4'-DDE in samples IA-REF-02 A, IA-REF-02 B, SC-101, SC-3-03 (0-3), SC-3-03 (3-6), SC-3-04 (0-3), SC-3-04 (3-6), SC-3-07 (3-6), SC-3-08 (3-6), SC-3-10 (0-3), SC-REF-01 (0-0.5), and SC-REF-02 (0-2.6); 4,4'-DDT in samples IA-2-01 A, IA-REF-02 A, IA-REF-02 B, SC-101, SC-102, SC-3-03 (0-3), SC-3-03 (3-6), SC-3-04 (0-3), SC-3-04 (3-6), SC-3-06 (3-6), SC-3-07 (3-6), SC-3-08 (3-6), SC-3-10 (0-3), SC-3-10 (3-6), SC-3-11 (3-6), SC-REF-01 (0-0.5), SC-REF-02 (0-2.6), and SC-REF-03 (0-3); Dieldrin in all samples except IA-2-01 A, IA-2-01 B, IA-2-01 C, IA-2-02 B, IA-3-01 A, IA-3-01 B, IA-3-01 C, IA-3-02 A, IA-3-02 B +MS/MSD, IA-REF-02 C, and SC-3-11 (0-3); Heptachlor in samples IA-2-01 A, IA-2-01 B, IA-2-01 C, IA-2-02 A, IA-2-02 B, IA-2-02 C, IA-3-01 B, IA-REF-02 A, SC-102, SC-3-04 (3-6), SC-3-06 (0-3), SC-3-08 (3-6), and SC-3-10 (3-6); and Technical Chlordane in samples IA-2-01 A, IA-2-01 B, IA-2-01 C, IA-2-02 A, IA-2-02 C, and IA-REF-02 A, due to method limitations and sample-specific preparation factors. Ultimately, the data user will need to evaluate the usability of these non-detects above PALs for project decisions. See the DV Checklist for further details.

Table 1 in this DV Summary Report presents the samples and analytical parameters validated and Table 2 (attached) summarizes the DV actions taken as an excerpt from the validated EDD.

Table 1. Samples and Analytical Parameters Validated

Sample ID ¹	Lab ID	Sampling Date	Matrix	Analytical Parameters ²	Sample Type ³
IA-REF-02 A	240-144999-1	2/19/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-REF-02 B	240-144999-2	2/19/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-REF-02 C	240-144999-3	2/19/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-REF-02	240-144999-4	2/19/2021	Soil	pH	Discrete Field Sample
IA-2-02 A	240-144999-5	2/20/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-2-02 B	240-144999-6	2/20/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-2-02 C	240-144999-7	2/20/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-2-02	240-144999-8	2/20/2021	Soil	pH	Discrete Field Sample
IA-2-01 A	240-144999-9	2/20/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-2-01 B	240-144999-10	2/20/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-2-01 C	240-144999-11	2/20/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-2-01	240-144999-12	2/20/2021	Soil	pH	Discrete Field Sample

Table 1. Samples and Analytical Parameters Validated - continued

Sample ID¹	Lab ID	Sampling Date	Matrix	Analytical Parameters²	Sample Type³
SC-REF-02 (0-2.6)	240-144999-13	2/21/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample [used for Metals MS/MSD]
SC-REF-03 (0-3)	240-144999-14	2/21/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample [used for PAH, Metals, Pest, and PCB MS/MSD]
SC-101	240-144999-15	2/22/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample [used for pH LR]
SC-102	240-144999-16	2/22/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-3-03 (0-3)	240-144999-17	2/19/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-3-03 (3-6)	240-144999-18	2/19/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-3-04 (0-3)	240-144999-19	2/19/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample [used for pH LR]
SC-3-04 (3-6)	240-144999-20	2/19/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-3-06 (0-3)	240-144999-23	2/19/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-3-06 (3-6)	240-144999-24	2/19/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-3-07 (0-3)	240-144999-26	2/19/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-3-07 (3-6)	240-144999-27	2/19/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-3-08 (0-3)	240-144999-29	2/21/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-3-08 (3-6)	240-144999-30	2/21/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-3-09 (0-3)	240-144999-32	2/21/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-3-09 (3-6)	240-144999-33	2/21/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-3-10 (0-3)	240-144999-34	2/22/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-3-10 (3-6)	240-144999-35	2/22/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-3-11 (0-3)	240-144999-37	2/21/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample [used for PAH, Metals, Pest, and PCB MS/MSD]
SC-3-11 (3-6)	240-144999-38	2/21/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample
SC-REF-01 (0-0.5)	240-144999-40	2/21/2021	Soil	Metals, VOC, PAH, Pest, PCB, & pH	Discrete Field Sample [used for Metals MS/MSD]

Table 1. Samples and Analytical Parameters Validated - *continued*

Sample ID ¹	Lab ID	Sampling Date	Matrix	Analytical Parameters ²	Sample Type ³
IA-3-02 A	240-144999-41	2/21/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-3-02 B +MS/MSD	240-144999-42	2/21/2021	Soil	Metals, PAH, Pest, & PCB	Discrete Field Sample [used for MS/MSD]
IA-3-02 C	240-144999-43	2/21/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-3-02	240-144999-44	2/21/2021	Soil	pH	Discrete Field Sample
IA-3-01 A	240-144999-45	2/21/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-3-01 B	240-144999-46	2/21/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-3-01 C	240-144999-47	2/21/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-3-01	240-144999-48	2/21/2021	Soil	pH	Discrete Field Sample

¹ TCLP soil samples did not require validation, based on the SAP.

² All soils were also analyzed for % Moisture / % Solids to convert results to a dry-weight basis.

³ ISM Soils prepared by Lab SOP NC-OP-044 Soil Processing, Rev.4, 1/13/2021 (included in the SAP), using the 2-D slab cake method and modified to generate a 10g ISM sample for Metals and to generate a 30g ISM sample for organics.

Analytical Methods

Metals: USEPA SW-846 Method 6020B for 13 Metals & 7471B for Mercury

VOC: USEPA SW-846 Method 8260C for 50 VOCs

PAH: USEPA SW-846 Method 8270D for 18 PAHs

Pest: USEPA SW-846 Method 8081B for 22 Pesticides

PCB: USEPA SW-846 Method 8082A for 7 PCB Aroclors

pH: USEPA SW-846 Method 9045D

USEPA DV Qualifiers

U = The analyte was analyzed for but was not detected above the level of the reported sample-specific LOQ.

UJ = The analyte was not detected above the reported concentration. The reported quantitation limit (LOQ) is approximate and may be inaccurate or imprecise.

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity, but the result may be biased high.

J- = The result is an estimated quantity, but the result may be biased low.

R = The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table 2. Summary of Data Validation Actions
Caneel Bay SDG 240-144999-1

AR-001796

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect Y/N	Unit	DV Qualifier	DV Comment	DV Level
IA-2-01 A	240-144999-9	SW-846 6020B	Selenium	0.33	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 A	240-144999-9	SW-846 6020B	Silver	0.069	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 A	240-144999-9	SW-846 6020B	Antimony	0.27	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 A	240-144999-9	SW-846 6020B	Cadmium	0.25	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 A	240-144999-9	SW-846 6020B	Beryllium	0.26	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 B	240-144999-10	SW-846 6020B	Silver	0.082	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 B	240-144999-10	SW-846 6020B	Selenium	0.36	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 B	240-144999-10	SW-846 6020B	Antimony	0.27	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 B	240-144999-10	SW-846 6020B	Beryllium	0.25	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 C	240-144999-11	SW-846 6020B	Silver	0.071	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 C	240-144999-11	SW-846 6020B	Selenium	0.34	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 C	240-144999-11	SW-846 6020B	Antimony	0.24	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 A	240-144999-5	SW-846 6020B	Selenium	0.28	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 A	240-144999-5	SW-846 6020B	Silver	0.1	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 A	240-144999-5	SW-846 6020B	Antimony	0.17	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 A	240-144999-5	SW-846 6020B	Beryllium	0.25	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 B	240-144999-6	SW-846 6020B	Selenium	0.31	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 B	240-144999-6	SW-846 6020B	Silver	0.08	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 B	240-144999-6	SW-846 6020B	Antimony	0.2	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 B	240-144999-6	SW-846 6020B	Beryllium	0.25	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 C	240-144999-7	SW-846 6020B	Selenium	0.32	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 C	240-144999-7	SW-846 6020B	Silver	0.1	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 C	240-144999-7	SW-846 6020B	Antimony	0.2	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 C	240-144999-7	SW-846 6020B	Beryllium	0.25	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-01 A	240-144999-45	SW-846 6020B	Selenium	0.18	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-01 A	240-144999-45	SW-846 6020B	Silver	0.044	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-01 A	240-144999-45	SW-846 6020B	Antimony	0.29	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-01 A	240-144999-45	SW-846 6020B	Cadmium	0.1	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-01 A	240-144999-45	SW-846 6020B	Beryllium	0.23	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 6020B	Nickel	15	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 6020B	Lead	7.7	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 6020B	Zinc	72	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 6020B	Silver	0.048	Y	mg/kg	J	Bias Indeterminate: Potential contamination + Result < LOQ	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 6020B	Copper	78	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 6020B	Barium	65	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 6020B	Arsenic	1.9	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 6020B	Chromium, Total	24	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 6020B	Cadmium	0.094	Y	mg/kg	J	Bias Indeterminate: Potential contamination + Result < LOQ	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 6020B	Beryllium	0.23	Y	mg/kg	J	Bias Indeterminate: Potential contamination + Result < LOQ	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 6020B	Nickel	16	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 6020B	Lead	9.4	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 6020B	Silver	0.055	Y	mg/kg	J	Bias Indeterminate: Potential contamination + Result < LOQ	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 6020B	Zinc	76	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 6020B	Arsenic	2.1	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 6020B	Barium	72	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 6020B	Beryllium	0.22	Y	mg/kg	J	Bias Indeterminate: Potential contamination + Result < LOQ	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 6020B	Copper	81	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 6020B	Chromium, Total	26	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 6020B	Cadmium	0.11	Y	mg/kg	J	Bias Indeterminate: Potential contamination + Result < LOQ	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 6020B	Selenium	0.19	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 6020B	Silver	0.035	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 6020B	Antimony	0.56	N	mg/kg	UJ	Bias Indeterminate: Low MS/MSD recoveries not confirmed by post-digest spike	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 6020B	Cadmium	0.093	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 6020B	Beryllium	0.21	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 6020B	Selenium	0.2	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 6020B	Silver	0.036	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 6020B	Antimony	0.54	N	mg/kg	UJ	Bias Indeterminate: Low MS/MSD recoveries not confirmed by post-digest spike	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 6020B	Cadmium	0.097	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 6020B	Beryllium	0.22	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 C	240-144999-43	SW-846 6020B	Silver	0.033	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 C	240-144999-43	SW-846 6020B	Antimony	0.56	N	mg/kg	UJ	Bias Indeterminate: Low MS/MSD recoveries not confirmed by post-digest spike	EPA Stage 2B
IA-3-02 C	240-144999-43	SW-846 6020B	Cadmium	0.09	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 C	240-144999-43	SW-846 6020B	Beryllium	0.19	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 A	240-144999-1	SW-846 6020B	Thallium	0.077	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 A	240-144999-1	SW-846 6020B	Selenium	0.22	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 A	240-144999-1	SW-846 6020B	Beryllium	0.25	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 B	240-144999-2	SW-846 6020B	Selenium	0.2	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B

Table 2. Summary of Data Validation Actions
Caneel Bay SDG 240-144999-1

AR-001797

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect Y/N	Unit	DV Qualifier	DV Comment	DV Level
IA-REF-02 B	240-144999-2	SW-846 6020B	Beryllium	0.24	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 C	240-144999-3	SW-846 6020B	Selenium	0.2	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 C	240-144999-3	SW-846 6020B	Cadmium	0.095	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 C	240-144999-3	SW-846 6020B	Beryllium	0.25	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-101	240-144999-15	SW-846 6020B	Selenium	0.14	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-101	240-144999-15	SW-846 6020B	Cadmium	0.049	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-102	240-144999-16	SW-846 6020B	Selenium	0.21	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-102	240-144999-16	SW-846 6020B	Silver	0.048	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-102	240-144999-16	SW-846 6020B	Cadmium	0.15	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-102	240-144999-16	SW-846 6020B	Beryllium	0.2	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (0-3)	240-144999-17	SW-846 6020B	Selenium	0.27	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (0-3)	240-144999-17	SW-846 6020B	Silver	0.035	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (0-3)	240-144999-17	SW-846 6020B	Cadmium	0.12	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (0-3)	240-144999-17	SW-846 6020B	Beryllium	0.18	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (3-6)	240-144999-18	SW-846 6020B	Cadmium	0.077	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (3-6)	240-144999-18	SW-846 6020B	Silver	0.031	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (3-6)	240-144999-18	SW-846 6020B	Selenium	0.18	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-04 (0-3)	240-144999-19	SW-846 6020B	Selenium	0.15	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-04 (0-3)	240-144999-19	SW-846 6020B	Beryllium	0.18	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-04 (0-3)	240-144999-19	SW-846 6020B	Cadmium	0.057	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-04 (3-6)	240-144999-20	SW-846 6020B	Beryllium	0.15	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-04 (3-6)	240-144999-20	SW-846 6020B	Cadmium	0.062	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-04 (3-6)	240-144999-20	SW-846 6020B	Selenium	0.12	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (0-3)	240-144999-23	SW-846 6020B	Silver	0.039	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (0-3)	240-144999-23	SW-846 6020B	Selenium	0.29	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (0-3)	240-144999-23	SW-846 6020B	Cadmium	0.13	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (0-3)	240-144999-23	SW-846 6020B	Beryllium	0.24	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (3-6)	240-144999-24	SW-846 6020B	Silver	0.025	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (3-6)	240-144999-24	SW-846 6020B	Selenium	0.19	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (3-6)	240-144999-24	SW-846 6020B	Cadmium	0.13	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-07 (0-3)	240-144999-26	SW-846 6020B	Selenium	0.29	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-07 (0-3)	240-144999-26	SW-846 6020B	Silver	0.056	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-07 (3-6)	240-144999-27	SW-846 6020B	Beryllium	0.17	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-07 (3-6)	240-144999-27	SW-846 6020B	Thallium	0.064	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-07 (3-6)	240-144999-27	SW-846 6020B	Arsenic	0.76	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-08 (0-3)	240-144999-29	SW-846 6020B	Beryllium	0.19	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-08 (0-3)	240-144999-29	SW-846 6020B	Antimony	0.16	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-08 (0-3)	240-144999-29	SW-846 6020B	Silver	0.073	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-08 (0-3)	240-144999-29	SW-846 6020B	Selenium	0.29	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-08 (3-6)	240-144999-30	SW-846 6020B	Silver	0.041	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-08 (3-6)	240-144999-30	SW-846 6020B	Selenium	0.42	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-08 (3-6)	240-144999-30	SW-846 6020B	Cadmium	0.079	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (0-3)	240-144999-32	SW-846 6020B	Selenium	0.17	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (0-3)	240-144999-32	SW-846 6020B	Silver	0.034	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (0-3)	240-144999-32	SW-846 6020B	Cadmium	0.1	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (0-3)	240-144999-32	SW-846 6020B	Beryllium	0.16	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (3-6)	240-144999-33	SW-846 6020B	Selenium	0.19	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (3-6)	240-144999-33	SW-846 6020B	Silver	0.038	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (3-6)	240-144999-33	SW-846 6020B	Cadmium	0.12	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (3-6)	240-144999-33	SW-846 6020B	Beryllium	0.15	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-10 (0-3)	240-144999-34	SW-846 6020B	Selenium	0.13	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-10 (0-3)	240-144999-34	SW-846 6020B	Cadmium	0.052	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-10 (3-6)	240-144999-35	SW-846 6020B	Silver	0.036	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-10 (3-6)	240-144999-35	SW-846 6020B	Selenium	0.18	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-10 (3-6)	240-144999-35	SW-846 6020B	Beryllium	0.16	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-10 (3-6)	240-144999-35	SW-846 6020B	Cadmium	0.12	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (0-3)	240-144999-37	SW-846 6020B	Thallium	0.095	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (0-3)	240-144999-37	SW-846 6020B	Selenium	0.14	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (0-3)	240-144999-37	SW-846 6020B	Copper	58	Y	mg/kg	J	Bias Indeterminate: Low MS/MSD recoveries not confirmed by post-digest spike	EPA Stage 2B
SC-3-11 (0-3)	240-144999-37	SW-846 6020B	Silver	0.029	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (0-3)	240-144999-37	SW-846 6020B	Antimony	0.36	N	mg/kg	UJ	Bias Indeterminate: Low MS/MSD recoveries not confirmed by post-digest spike	EPA Stage 2B
SC-3-11 (0-3)	240-144999-37	SW-846 6020B	Cadmium	0.075	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (3-6)	240-144999-38	SW-846 6020B	Beryllium	0.17	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (3-6)	240-144999-38	SW-846 6020B	Cadmium	0.081	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (3-6)	240-144999-38	SW-846 6020B	Silver	0.028	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (3-6)	240-144999-38	SW-846 6020B	Selenium	0.16	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-01 (0-0.5)	240-144999-40	SW-846 6020B	Selenium	0.15	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B

Table 2. Summary of Data Validation Actions
Caneel Bay SDG 240-144999-1

AR-001798

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect Y/N	Unit	DV Qualifier	DV Comment	DV Level
SC-REF-01 (0-0.5)	240-144999-40	SW-846 6020B	Thallium	0.076	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-01 (0-0.5)	240-144999-40	SW-846 6020B	Arsenic	0.55	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-01 (0-0.5)	240-144999-40	SW-846 6020B	Antimony	0.4	N	mg/kg	UJ	Bias Indeterminate: Low MS/MSD recoveries not confirmed by post-digest spike	EPA Stage 2B
SC-REF-01 (0-0.5)	240-144999-40	SW-846 6020B	Beryllium	0.2	N	mg/kg	U	Negated at the LOQ due to Method Blank Action	EPA Stage 2B
SC-REF-01 (0-0.5)	240-144999-40	SW-846 6020B	Cadmium	0.047	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-02 (0-2.6)	240-144999-13	SW-846 6020B	Selenium	0.13	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-02 (0-2.6)	240-144999-13	SW-846 6020B	Thallium	0.067	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-02 (0-2.6)	240-144999-13	SW-846 6020B	Arsenic	0.51	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-02 (0-2.6)	240-144999-13	SW-846 6020B	Antimony	0.38	N	mg/kg	UJ	Bias Indeterminate: Low MS/MSD recoveries not confirmed by post-digest spike	EPA Stage 2B
SC-REF-02 (0-2.6)	240-144999-13	SW-846 6020B	Beryllium	0.17	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-02 (0-2.6)	240-144999-13	SW-846 6020B	Cadmium	0.056	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 6020B	Silver	0.038	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 6020B	Selenium	0.24	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 6020B	Zinc	77	Y	mg/kg	J	Bias Indeterminate: Low MS/MSD recoveries not confirmed by post-digest spike	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 6020B	Beryllium	0.14	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 6020B	Antimony	0.28	Y	mg/kg	J	Bias Indeterminate: Low MS/MSD recoveries not confirmed by post-digest spike + Result < LOQ	EPA Stage 2B
IA-2-01 A	240-144999-9	SW-846 7471B	Mercury	0.044	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 B	240-144999-10	SW-846 7471B	Mercury	0.048	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 C	240-144999-11	SW-846 7471B	Mercury	0.055	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 A	240-144999-5	SW-846 7471B	Mercury	0.063	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 B	240-144999-6	SW-846 7471B	Mercury	0.066	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-01 A	240-144999-45	SW-846 7471B	Mercury	0.063	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 7471B	Mercury	0.025	Y	mg/kg	J	Bias Indeterminate: Potential contamination + Result < LOQ	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 7471B	Mercury	0.052	Y	mg/kg	J	Bias Indeterminate: Potential contamination + Result < LOQ	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 7471B	Mercury	0.026	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 7471B	Mercury	0.022	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 C	240-144999-43	SW-846 7471B	Mercury	0.036	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 C	240-144999-3	SW-846 7471B	Mercury	0.017	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-102	240-144999-16	SW-846 7471B	Mercury	0.055	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (0-3)	240-144999-17	SW-846 7471B	Mercury	0.031	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (3-6)	240-144999-18	SW-846 7471B	Mercury	0.033	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (0-3)	240-144999-23	SW-846 7471B	Mercury	0.1	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (3-6)	240-144999-24	SW-846 7471B	Mercury	0.028	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-07 (0-3)	240-144999-26	SW-846 7471B	Mercury	0.067	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-08 (0-3)	240-144999-29	SW-846 7471B	Mercury	0.092	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-08 (3-6)	240-144999-30	SW-846 7471B	Mercury	0.022	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (0-3)	240-144999-32	SW-846 7471B	Mercury	0.03	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (3-6)	240-144999-33	SW-846 7471B	Mercury	0.029	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-10 (3-6)	240-144999-35	SW-846 7471B	Mercury	0.048	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (3-6)	240-144999-38	SW-846 7471B	Mercury	0.023	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 7471B	Mercury	0.022	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 A	240-144999-9	SW-846 8081B	Aldrin	24	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 A	240-144999-9	SW-846 8081B	4,4-DDE	31	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-2-01 B	240-144999-10	SW-846 8081B	Aldrin	22	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 B	240-144999-10	SW-846 8081B	4,4-DDE	28	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-2-01 C	240-144999-11	SW-846 8081B	4,4-DDT	39	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 C	240-144999-11	SW-846 8081B	Aldrin	43	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 B	240-144999-6	SW-846 8081B	trans-Chlordane	130	Y	ug/kg	J-	Bias Low: Dual Column imprecision	EPA Stage 2B
IA-2-02 B	240-144999-6	SW-846 8081B	Chlordane, Technical	670	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-2-02 B	240-144999-6	SW-846 8081B	Dieldrin	21	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-3-01 A	240-144999-45	SW-846 8081B	Aldrin	1.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8081B	Aldrin	7.3	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8081B	4,4-DDT	9	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8081B	Dieldrin	6.5	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8081B	4,4-DDE	14	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8081B	Aldrin	2.2	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8081B	4,4-DDT	3.2	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8081B	4,4-DDE	8.5	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8081B	Dieldrin	11	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 8081B	4,4-DDD	4.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 8081B	trans-Chlordane	23	N	ug/kg	U	Result negated due to Dual Column imprecision + LOQ raised	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 8081B	Dieldrin	2.8	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 8081B	Aldrin	1.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 8081B	4,4-DDT	2.8	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 8081B	Endrin Aldehyde	5.1	N	ug/kg	UJ	Bias Indeterminate: MS/MSD imprecision	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 8081B	4,4-DDE	4.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 8081B	Dieldrin	2.5	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B

Table 2. Summary of Data Validation Actions
Caneel Bay SDG 240-144999-1

AR-001799

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect Y/N	Unit	DV Qualifier	DV Comment	DV Level
IA-3-02 C	240-144999-43	SW-846 8081B	4,4-DDE	4.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 C	240-144999-43	SW-846 8081B	4,4-DDT	2.4	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
SC-3-04 (3-6)	240-144999-20	SW-846 8081B	trans-Chlordane	1.5	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
SC-3-06 (0-3)	240-144999-23	SW-846 8081B	4,4-DDD	12	Y	ug/kg	J-	Bias Low: Dual Column imprecision	EPA Stage 2B
SC-3-06 (3-6)	240-144999-24	SW-846 8081B	4,4-DDE	3.4	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
SC-3-07 (0-3)	240-144999-26	SW-846 8081B	4,4-DDT	3.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-08 (0-3)	240-144999-29	SW-846 8081B	trans-Chlordane	3.8	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
SC-3-08 (0-3)	240-144999-29	SW-846 8081B	Endrin Aldehyde	3.2	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
SC-3-09 (0-3)	240-144999-32	SW-846 8081B	trans-Chlordane	1.4	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
SC-3-09 (0-3)	240-144999-32	SW-846 8081B	4,4-DDT	3.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (3-6)	240-144999-33	SW-846 8081B	4,4-DDT	5.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-10 (3-6)	240-144999-35	SW-846 8081B	beta-BHC	47	N	ug/kg	U	Result negated due to Dual Column imprecision + LOQ raised	EPA Stage 2B
SC-3-11 (0-3)	240-144999-37	SW-846 8081B	4,4-DDE	16	Y	ug/kg	J+	Bias High: High Surrogate recoveries	EPA Stage 2B
SC-3-11 (0-3)	240-144999-37	SW-846 8081B	4,4-DDT	5.7	Y	ug/kg	J+	Bias High: High Surrogate recoveries	EPA Stage 2B
SC-3-11 (0-3)	240-144999-37	SW-846 8081B	Dieldrin	3.3	Y	ug/kg	J	Bias Indeterminate: High Surrogate recoveries + Dual Column imprecision + Result < LOQ	EPA Stage 2B
SC-3-11 (3-6)	240-144999-38	SW-846 8081B	Aldrin	2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (3-6)	240-144999-38	SW-846 8081B	4,4-DDE	4.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 8081B	4,4-DDE	4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	1,1,2,2-Tetrachloroethane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	1,1,2-Trichloro-1,2,2-trifluoroethane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	cis-1,3-Dichloropropene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	1,1,1-Trichloroethane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Chloroform	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Chloromethane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	cis-1,2-Dichloroethene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	1,1,2-Trichloroethane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Benzene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Bromoform	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Acetone	49	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	4-Methyl-2-Pentanone	39	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Bromomethane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Dibromochloromethane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Chloroethane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Chlorobenzene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Carbon disulfide	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Carbon Tetrachloride	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	2-Hexanone	39	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	1,2-Dibromo-3-chloropropane	19	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	1,2-Dichlorobenzene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	1,2,4-Trichlorobenzene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	1,1-Dichloroethane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	1,1-Dichloroethene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	1,4-Dichlorobenzene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Methyl ethyl ketone	39	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	1,3-Dichlorobenzene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	1,2-Dichloroethane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	1,2-Dichloropropane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Cyclohexane	19	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Toluene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Tetrahydrofuran	39	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Styrene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Tetrachloroethene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	trans-1,2-Dichloroethene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Vinyl chloride	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Xylenes, Total	19	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Trichlorofluoromethane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	trans-1,3-Dichloropropene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Trichloroethene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Ethylbenzene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	1,2-Dibromoethane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Dichlorodifluoromethane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Bromodichloromethane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	n-Hexane	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Methylcyclohexane	19	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Methylene chloride	49	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Methyl Tert-Butyl Ether	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 8260C	Isopropylbenzene	9.7	N	ug/kg	UJ	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B

Table 2. Summary of Data Validation Actions
Caneel Bay SDG 240-144999-1

AR-001815

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect Y/N	Unit	DV Qualifier	DV Comment	DV Level
IA-2-01 A	240-144999-9	SW-846 8270D	Fluorene	6.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 A	240-144999-9	SW-846 8270D	Naphthalene	7.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 B	240-144999-10	SW-846 8270D	Fluorene	7.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 B	240-144999-10	SW-846 8270D	Naphthalene	9.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 B	240-144999-10	SW-846 8270D	1-Methylnaphthalene	5.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 B	240-144999-10	SW-846 8270D	2-Methylnaphthalene	7.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 B	240-144999-10	SW-846 8270D	Acenaphthene	9.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 C	240-144999-11	SW-846 8270D	Fluorene	8.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 C	240-144999-11	SW-846 8270D	Naphthalene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 C	240-144999-11	SW-846 8270D	1-Methylnaphthalene	5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 C	240-144999-11	SW-846 8270D	2-Methylnaphthalene	7.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 C	240-144999-11	SW-846 8270D	Anthracene	9.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01 C	240-144999-11	SW-846 8270D	Acenaphthene	5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 A	240-144999-5	SW-846 8270D	Fluorene	7.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 A	240-144999-5	SW-846 8270D	Naphthalene	5.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 A	240-144999-5	SW-846 8270D	2-Methylnaphthalene	4.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 A	240-144999-5	SW-846 8270D	Acenaphthene	8.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 B	240-144999-6	SW-846 8270D	Fluorene	6.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 B	240-144999-6	SW-846 8270D	2-Methylnaphthalene	5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 B	240-144999-6	SW-846 8270D	Anthracene	9.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 B	240-144999-6	SW-846 8270D	Acenaphthene	5.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 B	240-144999-6	SW-846 8270D	Naphthalene	6.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 C	240-144999-7	SW-846 8270D	Fluorene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 C	240-144999-7	SW-846 8270D	Naphthalene	5.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 C	240-144999-7	SW-846 8270D	2-Methylnaphthalene	4.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-02 C	240-144999-7	SW-846 8270D	Acenaphthene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-01 A	240-144999-45	SW-846 8270D	1-Methylnaphthalene	9.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-01 A	240-144999-45	SW-846 8270D	Naphthalene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-01 A	240-144999-45	SW-846 8270D	2-Methylnaphthalene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	Fluoranthene (Idryl)	110	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	Fluorene	11	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	Benz(k)fluoranthene	32	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	Chrysene	45	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	Phenanthrene	89	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	Pyrene	110	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	Indeno(1,2,3-cd)pyrene	24	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	Naphthalene	6.1	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	2-Methylnaphthalene	6.1	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	Acenaphthene	14	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	1-Methylnaphthalene	4	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	Benz(a)pyrene	44	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	Benz(b)fluoranthene	52	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	Benz(g,h,i)perylene	26	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	Anthracene	20	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 B	240-144999-46	SW-846 8270D	Benz(a)anthracene	46	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8270D	Fluorene	3.4	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8270D	Fluoranthene (Idryl)	29	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8270D	Pyrene	25	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8270D	Phenanthrene	25	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8270D	Chrysene	9.6	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8270D	Acenaphthene	4.3	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8270D	Benz(b)fluoranthene	18	Y	ug/kg	J+	Bias High: Potential Contamination	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8270D	Benz(g,h,i)perylene	11	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8270D	Benz(a)anthracene	14	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8270D	Anthracene	3.8	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-01 C	240-144999-43	SW-846 8270D	Benz(a)pyrene	14	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 8270D	Fluorene	5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 8270D	Chrysene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 8270D	Naphthalene	5.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 8270D	2-Methylnaphthalene	4.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 8270D	Benz(a)pyrene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 A	240-144999-41	SW-846 8270D	Benz(a)anthracene	10	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 8270D	Fluorene	6.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 8270D	Indeno(1,2,3-cd)pyrene	9.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 8270D	Naphthalene	6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 8270D	2-Methylnaphthalene	4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 8270D	Acenaphthene	4.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B

Table 2. Summary of Data Validation Actions
Caneel Bay SDG 240-144999-1

AR-001816

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect Y/N	Unit	DV Qualifier	DV Comment	DV Level
IA-3-02 B +MS/MSD	240-144999-42	SW-846 8270D	1-Methylnaphthalene	3.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 8270D	Benz(g,h,l)perylene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 B +MS/MSD	240-144999-42	SW-846 8270D	Anthracene	5.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 C	240-144999-43	SW-846 8270D	Fluorene	5.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 C	240-144999-43	SW-846 8270D	Benz(k)fluoranthene	8.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 C	240-144999-43	SW-846 8270D	Chrysene	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 C	240-144999-43	SW-846 8270D	Naphthalene	6.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 C	240-144999-43	SW-846 8270D	2-Methylnaphthalene	5.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 C	240-144999-43	SW-846 8270D	Benz(a)pyrene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 C	240-144999-43	SW-846 8270D	Anthracene	3.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-02 C	240-144999-43	SW-846 8270D	Benz(a)anthracene	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 A	240-144999-1	SW-846 8270D	Pyrene	5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 A	240-144999-1	SW-846 8270D	Fluoranthene (Idryl)	5.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 A	240-144999-1	SW-846 8270D	Fluorene	4.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 A	240-144999-1	SW-846 8270D	2-Methylnaphthalene	3.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 A	240-144999-1	SW-846 8270D	Naphthalene	5.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 B	240-144999-2	SW-846 8270D	Benz(a)anthracene	3.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 B	240-144999-2	SW-846 8270D	Anthracene	3.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 B	240-144999-2	SW-846 8270D	1-Methylnaphthalene	5.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 B	240-144999-2	SW-846 8270D	Acenaphthene	5.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 B	240-144999-2	SW-846 8270D	2-Methylnaphthalene	8.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 B	240-144999-2	SW-846 8270D	Fluorene	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 B	240-144999-2	SW-846 8270D	Naphthalene	8.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 B	240-144999-2	SW-846 8270D	Chrysene	3.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 B	240-144999-2	SW-846 8270D	Pyrene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 C	240-144999-3	SW-846 8270D	Fluorene	4.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 C	240-144999-3	SW-846 8270D	Naphthalene	5.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 C	240-144999-3	SW-846 8270D	Fluoranthene (Idryl)	7.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 C	240-144999-3	SW-846 8270D	Pyrene	4.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-02 C	240-144999-3	SW-846 8270D	2-Methylnaphthalene	3.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-101	240-144999-15	SW-846 8270D	Fluoranthene (Idryl)	10	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-101	240-144999-15	SW-846 8270D	Chrysene	3.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-101	240-144999-15	SW-846 8270D	Pyrene	7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-101	240-144999-15	SW-846 8270D	Phenanthrene	7.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-102	240-144999-16	SW-846 8270D	Chrysene	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-102	240-144999-16	SW-846 8270D	Pyrene	19	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-102	240-144999-16	SW-846 8270D	Phenanthrene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-102	240-144999-16	SW-846 8270D	Benz(b)fluoranthene	17	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-102	240-144999-16	SW-846 8270D	Benz(a)anthracene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (0-3)	240-144999-17	SW-846 8270D	Benz(k)fluoranthene	8.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (0-3)	240-144999-17	SW-846 8270D	Benz(g,h,l)perylene	8.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (0-3)	240-144999-17	SW-846 8270D	Acenaphthene	4.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (0-3)	240-144999-17	SW-846 8270D	Anthracene	4.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (3-6)	240-144999-18	SW-846 8270D	Fluoranthene (Idryl)	17	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (3-6)	240-144999-18	SW-846 8270D	Chrysene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (3-6)	240-144999-18	SW-846 8270D	Pyrene	16	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (3-6)	240-144999-18	SW-846 8270D	Phenanthrene	15	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (3-6)	240-144999-18	SW-846 8270D	Benz(a)pyrene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (3-6)	240-144999-18	SW-846 8270D	Benz(b)fluoranthene	15	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-03 (3-6)	240-144999-18	SW-846 8270D	Benz(a)anthracene	10	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-04 (3-6)	240-144999-20	SW-846 8270D	Pyrene	4.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (0-3)	240-144999-23	SW-846 8270D	2-Methylnaphthalene	7.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (0-3)	240-144999-23	SW-846 8270D	1-Methylnaphthalene	5.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (0-3)	240-144999-23	SW-846 8270D	Anthracene	7.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (0-3)	240-144999-23	SW-846 8270D	Benz(k)fluoranthene	15	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (3-6)	240-144999-24	SW-846 8270D	Benz(a)anthracene	4.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (3-6)	240-144999-24	SW-846 8270D	Phenanthrene	6.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (3-6)	240-144999-24	SW-846 8270D	Pyrene	6.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (3-6)	240-144999-24	SW-846 8270D	Chrysene	4.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-06 (3-6)	240-144999-24	SW-846 8270D	Fluoranthene (Idryl)	7.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-07 (0-3)	240-144999-26	SW-846 8270D	Benz(g,h,l)perylene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-07 (0-3)	240-144999-26	SW-846 8270D	Indeno(1,2,3-cd)pyrene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-07 (0-3)	240-144999-26	SW-846 8270D	Anthracene	7.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-08 (0-3)	240-144999-29	SW-846 8270D	Benz(a)anthracene	14	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-08 (0-3)	240-144999-29	SW-846 8270D	Benz(g,h,l)perylene	14	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-08 (0-3)	240-144999-29	SW-846 8270D	Phenanthrene	7.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-08 (0-3)	240-144999-29	SW-846 8270D	Indeno(1,2,3-cd)pyrene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B

Table 2. Summary of Data Validation Actions
Caneel Bay SDG 240-144999-1

AR-001817

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect Y/N	Unit	DV Qualifier	DV Comment	DV Level
SC-3-08 (0-3)	240-144999-29	SW-846 8270D	Benz(k)fluoranthene	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (0-3)	240-144999-32	SW-846 8270D	Fluorene	6.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (0-3)	240-144999-32	SW-846 8270D	Dibenz(a,h)anthracene	8.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (0-3)	240-144999-32	SW-846 8270D	Acenaphthene	7.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (3-6)	240-144999-33	SW-846 8270D	Chrysene	7.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (3-6)	240-144999-33	SW-846 8270D	Benz(a)anthracene	6.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (3-6)	240-144999-33	SW-846 8270D	Benz(b)fluoranthene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (3-6)	240-144999-33	SW-846 8270D	Phenanthrene	4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (3-6)	240-144999-33	SW-846 8270D	Pyrene	8.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-09 (3-6)	240-144999-33	SW-846 8270D	Fluoranthene (Idryl)	9.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-10 (3-6)	240-144999-35	SW-846 8270D	Pyrene	9.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-10 (3-6)	240-144999-35	SW-846 8270D	Phenanthrene	7.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-10 (3-6)	240-144999-35	SW-846 8270D	Benz(b)fluoranthene	8.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-10 (3-6)	240-144999-35	SW-846 8270D	Chrysene	6.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-10 (3-6)	240-144999-35	SW-846 8270D	Fluoranthene (Idryl)	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (0-3)	240-144999-37	SW-846 8270D	Dibenz(a,h)anthracene	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (0-3)	240-144999-37	SW-846 8270D	Fluorene	14	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (3-6)	240-144999-38	SW-846 8270D	Benz(g,h,l)perylene	16	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (3-6)	240-144999-38	SW-846 8270D	Phenanthrene	17	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (3-6)	240-144999-38	SW-846 8270D	Indeno(1,2,3-cd)pyrene	14	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-3-11 (3-6)	240-144999-38	SW-846 8270D	Benz(k)fluoranthene	15	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 8270D	Fluoranthene (Idryl)	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 8270D	Chrysene	8.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 8270D	Pyrene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 8270D	Phenanthrene	5.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 8270D	Benz(b)fluoranthene	7.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 8270D	Benz(g,h,l)perylene	17	N	ug/kg	UJ	Bias Indeterminate: MS/MSD imprecision	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 8270D	Benz(a)anthracene	6.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-2-01	240-144999-12	SW-846 9045D	pH	8.1	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
IA-2-02	240-144999-8	SW-846 9045D	pH	8.4	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
IA-3-01	240-144999-48	SW-846 9045D	pH	8.3	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
IA-3-02	240-144999-44	SW-846 9045D	pH	8.4	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
IA-REF-02	240-144999-4	SW-846 9045D	pH	8.3	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-101	240-144999-15	SW-846 9045D	pH	8.5	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-102	240-144999-16	SW-846 9045D	pH	8.8	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-03 (0-3)	240-144999-17	SW-846 9045D	pH	8.4	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-03 (3-6)	240-144999-18	SW-846 9045D	pH	8.3	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-04 (0-3)	240-144999-19	SW-846 9045D	pH	9.2	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-04 (3-6)	240-144999-20	SW-846 9045D	pH	8.6	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-06 (0-3)	240-144999-23	SW-846 9045D	pH	8.9	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-06 (3-6)	240-144999-24	SW-846 9045D	pH	8.4	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-07 (0-3)	240-144999-26	SW-846 9045D	pH	8.8	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-07 (3-6)	240-144999-27	SW-846 9045D	pH	8.7	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-08 (0-3)	240-144999-29	SW-846 9045D	pH	8.5	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-08 (3-6)	240-144999-30	SW-846 9045D	pH	8.6	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-09 (0-3)	240-144999-32	SW-846 9045D	pH	8.7	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-09 (3-6)	240-144999-33	SW-846 9045D	pH	8.9	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-10 (0-3)	240-144999-34	SW-846 9045D	pH	8.9	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-10 (3-6)	240-144999-35	SW-846 9045D	pH	8.9	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-11 (0-3)	240-144999-37	SW-846 9045D	pH	8.6	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-3-11 (3-6)	240-144999-38	SW-846 9045D	pH	8.7	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-REF-01 (0-0.5)	240-144999-40	SW-846 9045D	pH	8	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-REF-02 (0-2.6)	240-144999-13	SW-846 9045D	pH	8.3	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
SC-REF-03 (0-3)	240-144999-14	SW-846 9045D	pH	8.5	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B

Dates Sampled: 2/19/2021 - 2/22/2021

Method of Analysis: Volatile Organic Compounds (VOCs) by Method 8260C

No. Samples: 21

Matrix: Soil

Data Validation Summary Table - EPA Stage 2B: Volatile Organic Compounds (VOCs) in Soil

Data Element	HT & Preservation	Blank Actions	Surrogate	LCS/LCSD	MS/MSD	LD / FD	Tunes / ICAL CCV	LOQ & Quant. Correct	IS	%Solids
Acceptable										
Yes		√	√	√	NA			√		√
No	Estimate (J, J-, or UJ) all results					Estimate (J) 2 results	Estimate (UJ) 2 results		Estimate (UJ) 66 results	

Other Issues: Qualifier Actions: 11 "J" qualified lab results accepted as estimated (J) results

Selection of results for Reporting: not required.

Comments:

An EPA-compliant Stage 2B data validation review was performed on Quality Control forms associated with this data package, which involved evaluation of the following (where applicable): agreement of analyses conducted with COC requests; Holding times and sample preservation; Laboratory blank and field blank results compared to field sample results; Field Duplicate results; surrogate recoveries; LCS/LCSD (or equivalent) results; MS/MSD results; Laboratory Duplicate results; Quantitation limits compared to Project Action Limits; Instrument Tune acceptability; Initial and Continuing Calibration acceptability; and evaluation of laboratory qualifiers applied to the dataset. The project narrative was also reviewed to determine whether additional issues were found that weren't reported in the QC previously evaluated. No raw data was reviewed nor were any re-calculations of data performed. Data users should reference the EPA Stage 3 data validation performed on SDG 240-145042-1.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? Yes. A full data deliverable (called Level 4), including results, summary QC, and all raw data, was provided for review.
2. Were all result forms for all samples listed on the chain-of-custody present in data package? Yes, discreet soils received for total VOC analysis and TCLP VOC analysis. The samples analyzed for TCLP did not require validation. Note, in the EDD the sample names were missing the foot (') designations that appeared on the COC and hardcopy report for some samples.

Sample Receiving: Discrete soil samples were received at Eurofins TestAmerica - Canton lab in multiple coolers on 2/25/2021, 3 to 6 days following sample collection. Three of the coolers were received with Temperatures > 6 °C (up to 14.5 °C) with samples in water (ice melted) due to weather and FedEx shipping delays. The low-level sample aliquots were outside of HT since they needed to be frozen within 48 hours of collection. The TCLP VOC samples did not require validation.

Holding Time (HT) evaluation: Samples were only analyzed as low-level aliquots even though, according to VHB, medium-level methanol-preserved aliquots were collected and the Caneel Bay SAP only required medium-level VOC analysis since it was known that it would be unlikely that the low-level soils could have been preserved properly due to location of sampling (Virgin Islands) versus location for sample analysis (Canton, Ohio). Upon receipt, the laboratory froze the low-level aliquots; however, there was no mention in the narrative or raw data about the methanol-preserved aliquots. Since the samples were received outside of temperature requirements and were not frozen within 48 hours (frozen 24 to 72 hours past the 48 hours required HT), all VOC data for the discreet soil samples are uncertain. All VOC results in the 21 discrete soils were non-detect except for 17 detected results. The samples were analyzed in 3 QC Batches (475268, 474938, and 475159) by 3/4/2021, which is within 14 days from sample collection; therefore, analytical holding time acceptable.

***ACTION: All results in the 21 discrete VOC samples estimated (J- or UJ) with possible low bias, unless other issues affect the data, due to sample preservation issues and holding time exceedance (holding time exceeded for freezing low-level aliquots). Note, several low bias (J-) results changed to indeterminate (J) bias due to cumulative bias.**

Selection of Results for Reporting: all samples were analyzed only once at DF=1 except for samples SC-3-08 (0-5) and SC-3-11 (0-5), which were analyzed at DF=2 since the DF=1 analysis of these samples was problematic due to sample foaming. Since only one results per compound reported, no Selection of results required.

Blank Evaluation: Method Blanks = MB 240-475268/6, MB 240-474938/3-A, and MB 240-475159/1-A; Trip Blanks = none; and Equipment Blank (EB) = EB-SOIL-20210222-01 (reported in SDG 240-145189-1). The Method Blanks and EBs were non-detect for the 3 detected results; therefore, Blank Action to negate or estimate data not required.

Surrogates: all 4 surrogates (dibromofluoromethane, 1,2-dichloroethane-d4, toluene-d8, and 4-bromofluorobenzene) were recovered within lab acceptance criteria in all samples and QC - no action required.

LCS/LCSD: LCS 240-475268/5, LCS 240-475398/5, and LCS 240-475199/7 - no LCSD performed. Lab used in-house limits to judge acceptability of LCS recovery; however, here, Caneel Bay SAP Criteria (Table 19) 70-130% used to judge accuracy. Lab spiked all 50 target VOCs into LCS. All LCS %Rec were within 70-130% recovery except: 2-hexanone and 4-methyl-2-pentanone were recovered above 130% in LCS 240-475268/5. Since 2-hexanone and 4-methyl-2-pentanone were non-detect in SC-3-10 (0-3') and SC-3-10 (3-6'), the two samples associated with this LCS, no action required for high LCS recoveries. Overall, lab demonstrated acceptable accuracy for analysis of VOCs in the absence of the site matrix.

MS/MSD: there were no MS/MSD analyses performed on the samples in this SDG.

BFB Tunes: Instrument A3UX18 Tunes (2 ICAL + 1 CCV) and A3UX8 (1 ICAL + 2CCVs). Method 8260C tune criteria was used and all tunes met criteria and were acquired by summing 3 peaks across apex of BFB peak with background subtraction. All samples and standards were analyzed within 12 hours of BFB tune - No Action required.

ICALs: Instrument A3UX18 on 11/6/2020 & 12/4/2020 and A3UX8 on 11/4/2019. For Instrument A3UX18, most compounds calibrated on 11/6/2020 with bromomethane calibrated on 12/4/2020. ICALs were 5- to 9-level ICALs performed from 1, 2, 5, or 10 to 250 or 500 µg/L. minimum RRFs in Form VI are not those in Table 4 of Method 8260C; however, all compounds met min. RRF requirements listed in Table 4 of Method 8260C except for bromomethane for instrument A3UX18, which was reported with an average RRF of 0.072 while Table 4 min. RRF is 0.100 (A3UX8 reported average RRF was 0.178). For all compounds with %RSD > 15%, lab used regression analysis resulting in curves with $r^2 > 0.990$. ICALs contained more compounds than requested in Caneel Bay SAP Table 1. All project-specific compounds were included in the ICAL. For all compounds, %RSDs were < 20% across each ICAL or $r^2 > 0.990$. Instrument A3UX18 was only associated with the analysis of samples SC-3-10 (0-3') and SC-3-10 (3-6')

***ACTION: Bromomethane estimated (UJ) in samples SC-3-10 (0-3') and SC-3-10 (3-6') with possible low bias due to low sensitivity during the Initial Calibration**

CCVs: only CCVs preceding samples reviewed here evaluated:

- Instrument A3UX18 CCV 240-475268/3 on 3/3/2021 preceding samples 240-144999-34 & -35
- Instrument A3UX8 CCV 240-475199/6 on 3/3/21 preceding 240-144999-17 through 020, -24, -26, -27, -13, -14, -30, -32, -33, -37, -38, -15, & -16; and CCV 240-475398/3 on 3/4/21 preceding analysis of 240-144999-23, -29, and -40

minimum RRFs and %D for all target compounds within $\pm 20\%$ except: MTBE and 1,1,2,2-tetrachloroethane %D > 20% (increase in sensitivity) and minimum RRF for bromomethane was not met in CCV 240-475268/3 (lab used the incorrect min. RRF for bromomethane and did not meet Method 8260C criteria). Since MTBE and 1,1,2,2-tetrachloroethane were non-detect in 2 samples preceding this CCV, no action required for enhanced sensitivity.

***ACTION: Bromomethane estimated (UJ) in samples SC-3-10 (0-3') and SC-3-10 (3-6') with possible low bias due to low Calibration Verification**

Internal Standards (IS): Lab used Fluorobenzene (FB), Chlorobenzene-d5 (CBNZd5), and 1,4-Dichlorobenzene-d4 (DCBd4) areas and RTs were within criteria for all samples and QC except 1,4-dichlorobenzene-d4 low, but > 20%, in samples SC-102, SC-3-03 (0-3), SC-3-03 (3-6), SC-3-04 (0-3), SC-3-04 (3-6), SC-3-07 (0-3), SC-3-08 (0-3), SC-3-09 (0-3), SC-3-09 (3-6), SC-3-11 (0-3), and SC-REF-03 (0-3). This IS is associated with quantitation of 1,1,2,2-tetrachloroethane, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, 1,2-dibromo-3-chloropropane, and 1,2,4-trichlorobenzene.

***ACTION: 1,1,2,2-Tetrachloroethane, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, 1,2-dibromo-3-chloropropane, and 1,2,4-trichlorobenzene estimated (UJ) in samples SC-102, SC-3-03 (0-3), SC-3-03 (3-6), SC-3-04 (0-3), SC-3-04 (3-6), SC-3-07 (0-3), SC-3-08 (0-3), SC-3-09 (0-3), SC-3-9 (3-6), SC-3-11 (0-3), and SC-REF-03 (0-3) with possible low bias due to low IS recovery.**

%Solids: all 21 soils had % Solids > 30% - no Action required.

Compound List Reporting: Lab reported results for all 50 VOCs requested in SAP Table 1 (Caneel Bay SAP Table 1 contains 52 entries, including the m,p- and o-xylene isomers as well as Xylenes (total) but lab only reported Xylene(total)). The lab reported some compounds using a synonym for the compound (e.g., Ethylene dibromide (EDB) was reported as 1,2-dibromoethane). Table 1 identifies several common synonyms for the compounds of interest.

Sensitivity: for all samples, the laboratory reported LOQs were below the project required LOQs since the lab performed the low-level soil VOC analysis rather than the Caneel Bay SAP anticipated medium-level soil analyses. Since all but 3 VOC results are unusable, the data user will need to determine whether the project objectives for VOC soil analysis are met in subsequent SDGs. The detected results had values < Project Soil Action Levels given in Caneel Bay SAP Table 1.

Qualifier Action : there was 11 "J" results reported indicating the result reported was uncertain due to quantitation below the instrument calibration range (data accepted as "J" value with indeterminate bias due to result < LOQ).

***ACTION: 11 "J" results qualified by the lab were accepted as estimated (J) results with indeterminate bias due to reporting at a level < LOQ.**

Narrative : There were no issues raised in the narrative not already addressed or which would have affected sample data quality - No additional action required.

FD evaluation: 2 sets of FD samples were included in this SDG for Discrete soil samples: SC-3-10 (0-3) / SC-101 & SC-3-10 (3-6) / SC-102. Samples SC-3-10 (0-3) and SC-101 were non-detect for all VOCs; therefore, while these results are consistent with each other, it is not possible to quantitatively evaluate FD precision. FD precision though considered acceptable for SC-3-10 (0-3) and SC-101. A comparison of detected results in SC-3-10 (3-6) / SC-102 is shown below

Field Duplicate Evaluation_ Sample IDs:

Sample = SC-3-10 (3-6)

FD = SC-102

Analyte Name	DF= 1 LOQ (µg/Kg)	Sample µg/Kg	Sample Result Q Level	FD		FD Result		RPD	Action *
				µg/Kg	Q	Level	Level		
Acetone	26	72	J > 2 x LOQ	140	J	> 2 x LOQ	64.2%	J Both	
Methyl ethyl ketone	21	15	J < 2 x LOQ	24	J	< 2 x LOQ	46.2%	None	

Q = Validation Qualifier; NC = Not Calculated

*Action only taken for RPD > 50% if one or both results are > 2 x LOQ

FD precision was acceptable for all VOCs in FD pair SC-3-10 (3-6) and SC-102 except for Acetone, which reported RPD > 50% for values > 2 x LOQ

***ACTION: Acetone estimated (J) in samples SC-3-10 (3-6) and SC-102 with indeterminate bias due to FD imprecision.**

EPA SW-846 Method 8260C, NFG, and Caneel Bay SAP requirements

Preservation:	Samples should be preserved following SW-846 Method 5035A (waters acid preserved, soils water & methanol preserved sample); received at 4±2°C. Low-level soils frozen to < -7°C within 48-hr of collection. If samples were not properly preserved, J det / J ND or J det / R ND based on professional judgment
HT:	water: pH < 2 - 14d < HT ≤ 28 d; J- det/ J NDs; HT > 28 d, J- det/R ND; pH > 2 - 7d < HT ≤ 14 d; J- det/ J NDs; HT > 14 d, J- det/R ND soil: 14d < HT ≤ 28 d; J det/ J NDs; HT > 28 d, J det/R ND
Surrogates:	70-130% Acceptance criteria; Recovery > 130%, J+ det/Accept ND; 10% ≤ Recovery < 70%, J- det/J NDs; Recovery < 10%, J- det/R NDs
LCS/LCSD:	70-130% / RPD ≤ 30% Acceptance criteria; Recovery > 130, J+ det/Accept ND; 10% ≤ Recovery < 70%, J- det/J NDs; Recovery < 10%, J- det/R NDs. LCS/LCSD RPD > 30%, J/UJ
MS/MSD:	70-130% / RPD ≤ 30% Acceptance criteria; %Rec < 10%, J- det/ R NDs; 10% ≤ %Rec < LCL, J- det/ J NDs; %Rec > UCL, J+ det/Accept NDs for Unspiked Sample only; MS/MSD RPD > 30%, J/UJ unspiked sample only
Lab Dup (LD):	If performed, RPD > 30% if value >2x LOQ, J det. Not required per Caneel Bay SAP.
FD:	Both Conc. > 2x LOQ, RPD > 30% J det; One result ND, other >2 x LOQ, J det/J NDs; Both Conc. < 2x LOQ; RPD > criteria, No Action
Tune:	Criteria per Table 3 8260C; acquisition of tune given as sum of 3 scans across peak with background subtraction. If criteria not met (Abundances out or analysis > 12 hrs from BFB injection and CCVs don't meet frequency & criteria); use professional judgment
ICAL:	≥ 5-Level, lowest level ≤ LOQ; min. RRF per Table 4 of Method 8260C. If min. RRF not met for lowest standard and/or average RRF, J- det/J ND; if %RSD across ICAL > 20% or r2 < 0.99; J det/ J ND.
CCV:	Analyzed at the beginning of each 12 hour shift. Min. RRF not met, J- det/ UJ NDs; %D or %Drift > +20%, J+ det/Accept ND; %D or %Drift > -20%, J- det/J ND (neg. %D = loss in sensitivity; positive %D = enhanced sensitivity)
Internal Standards (IS):	RT shift outside window (RT > ±30 of IS RT in CCV) or 20% ≤ Area < 50% of IS in CCV , J+ det/ UJ NDs; Area < 20% of CCAL, J+ det / R NDs; Area > 200% IS in CCV, J- det / Accept NDs. If it's suspected that IS outside criteria is due to poor IS addition to sample (i.e., mis-spike), then professional judgment used to J det/UJ NDs

EPA SW-846 Method 8260C, NFG, and SAP requirement - *continued*

Blanks:	<p>Non-Matrix related TB or EB Blank contamination, professional judgment used in comparing results to samples.</p> <p>Project-specific action: Lab Method Blank action taken first followed by Trip Blank and then Equipment Blank Action.</p> <p>If Blank is reported at < LOQ (or < 2x LOQ for methylene chloride, 2-butanone and acetone): all samples < LOQ negated (U) at sample LOQ and all samples > LOQ accepted without qualification</p> <p>If Blank ≥ LOQ (or > 2x LOQ for methylene chloride, 2-butanone and acetone): if sample is < LOQ, negate (U) at sample LOQ; if sample result is > LOQ but < BAL, negate result (U) at the level found in the sample; and if sample result is ≥ BAL, accept sample result without qualification.</p> <p>Where Blank Action Level (BAL) = Result reported in Blank x (Sample LOQ/Blank LOQ)</p>
LOQs & Reporting:	<p>If result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Verify LOQs are sample specific and that all compounds requested were reported.</p>
% Solids:	<p>If %Solids < 30%, J det / J NDs; if %solids < 10%, J det / R NDs.</p>
Sensitivity:	<p>Identify non-detects > PALs given in Table 1 of the Caneel Bay SAP</p>
TICs:	<p>Not requested for this project.</p>
DV Qualifier Definitions:	<p>U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; NJ = the analyte has been "tentatively identified" and the result is usable as an estimated value with indeterminate bias; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.</p>
References:	<p><i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP); USEPA National Functional Guidelines for Organic Superfund Methods Data Review , Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017; USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use , OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) , Third Edition, Revision 1, December 1996 and updates, Method 8260C Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) ; Eurofins TestAmerica - Canton SOP NC-MS-019 Determination of Volatile Organics by GC/MS based on Methods 8260C, 8260B, and 8260A, Rev. 6, 7/23/18</i></p>

Dates Sampled: 2/19/2021 - 2/22/2021
 Method of Analysis: PAHs by Method 8270D

No. Samples: 36
 Matrix: Soil

Data Validation Summary Table - EPA Stage 2B: Polycyclic Aromatic Hydrocarbons (PAHs) in Soil

Data Element	HT & Preservation	Blank Actions	Surrogate	LCS/LCSD	MS/MSD	LD / FD	Tunes / ICAL	QL & Quant. Correct	IS	%Solids
Acceptable							CCV			
Yes		√	√	√		√	√	√	√	√
No	Estimate (J or J+) 27 results	None			Estimate (UJ) 1 result					

Other Issues: Qualifier Actions: 150 "J" qualified lab results accepted as estimated (J) results

Selection of results for Reporting: none required

Comments:

An EPA-compliant Stage 2B data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALs, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; Surrogate recoveries; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 2B DV, no raw data was reviewed nor were any re-calculations of data performed. Data users should reference the EPA Stage 3 data validation performed on SDG 240-145024-1.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? Yes. A full data deliverable (called Level 4 deliverable), including results, summary QC, and all raw data, was provided for review.
2. Were all result forms for all samples listed on the chain-of-custody present in data package? Yes. ISM and Discrete samples received for SVOC PAH analysis. Other samples are included on the COCs in this data package for TCLP analyses, which were not required to be validated based on the Caneel Bay SAP (2021). Note that the lab identified sample "IA-3-02 B" as "IA-3-02 B +MS/MSD" because this was the sample ID exactly as written on the COC; however, the intention was that MS/MSD was to be performed on aliquots of this sample, which it was. The lab data package and EDD therefore identify the unspiked parent sample "IA-3-02 B" as "IA-3-02 B +MS/MSD" and the MS as "IA-3-02 B +MS/MSDMS" and the MSD as "IA-3-02 B +MS/MSDSD."

Sample Receiving: ISM Soil & Discrete Soil samples were received at Eurofins TestAmerica - Canton lab in multiple coolers on 2/25/2021, 3 to 6 days following sample collection. Three of the coolers were received with Temperatures > 6 °C (up to 14.5 °C) with samples in water (ice melted) due to weather and FedEx shipping delays. Sample receipt information listed that samples "IA-3-01A, B, & C arrived out of temp." Additionally, the lab documented that samples IA-2-03 B, IA-2-03 C, IA-3-01 B, and IA-3-01 C have "cooler water in the bag," and SC-3-08 (0-5) had water in the jar from the cooler. Professional judgment used to take no action on Soil samples due to temperature exceedances, which were still received at < room temperatures, would not be expected to affect the usability of PAH soil data and because the ISM soils are air-dried at room temperature for a few days prior to analysis, anyway as part of the preparation procedure. Professional judgment used to take DV action due to cooler water present in sample containers for affected detected results due to potential for contamination. Non-detected results not impacted. Actions taken in SDG 240-145024-1 for samples IA-2-03 B and IA-2-03 C. No actions required for SC-3-08 (0-5) analyzed for TCLP since this parameter was not validated.

***ACTION: Estimate (J+) 27 detected PAH results in samples IA-3-01 B and IA-3-01 C with a possible high bias, unless other issues affect the data, due to potential contamination from cooler water present in the sample containers (Note, several high bias (J+) results changed to indeterminate bias (J) due to cumulative bias).**

Holding Time (HT) evaluation: All samples for ISM were prepared at the Canton lab on 2/26/2021 through 3/02/2021 in Prep Batch #474833 (Lab SOP NC-OP-044 using 2-D slab cake method). Aliquots of the ISM samples were extracted by Method 3540C in 2 QC Batches: QC Batch 475223 on 3/3/21 for all ISM except samples IA-3-01B and IA-3-01 C, which were extracted in QC Batch 475246 on 3/3/21. The discrete soil samples were extracted in 2 QC Batches: QC Batch 475493 on 3/4/21 (associated with SC-3-11 (0-3'), SC-REF-01 (0-0.5), SC-101, SC-102, SC-3-10 (0-3'), and SC-3-10 (3-6')) and all other discrete soil samples were extracted in QC Batch 474795 on 3/1/21. All discrete and ISM soil sample extracts for PAH analysis were analyzed by 3/8/2021. The soils were extracted and analyzed within HT - No Action required.

Blank Evaluation: Method Blanks = MB 240-475223/23-A and MB 240-475246/6-A (associated with ISM samples) and MB 240-474795/23-A and MB 240-475493/20-A (associated with discrete samples); and Equipment Blank = Equipment Blank (EB) = EB-Soil-20210222-01 (associated with Discrete soils) and EB-SOIL-20210224 (associated with ISM samples) reported in SDG 240-145147-1. The Method Blanks and the EBs were non-detect for all 18 Caneel Bay SAP-specific PAHs; therefore, no Blank Action required.

Selection of Results for Reporting: all sample extracts were only analyzed once at Dilution Factor (DF)=1. Since only one result per compound per sample reported, no selection of results required.

Surrogates: lab spiked 3 Acid (phenol-d5, 2-fluorophenol, and 2,4,6-tribromophenol) and 3 Base/Neutral (BN) (nitrobenzene-d5, 2-fluorobiphenyl, and terphenyl-d14) surrogates even though there are no acid PAH compounds. Lab used in-house acceptance limits but here, QAPP limits (30-130%) used to judge the acceptance of the 3 BN Surrogates, which may impact the PAHs, and lab limits used to judge acceptance of the acid surrogates. All surrogates were within Caneel Bay SAP or lab limits; therefore, no action required.

LCS/LCSD: Lab used in-house criteria for recoveries but here Caneel SAP criteria 40-140% recovery used to judge accuracy LCS = LCS 240-475223/24-A and LCS 240-475246/7-A (associated with ISM samples) and LCS 240-474795/24-A and LCS 240-475493/21-A (associated with discrete samples). All 18 PAHs spiked in all LCS - No LCSD performed. All 18 PAHs were recovered within criteria in all LCS - lab demonstrated acceptable accuracy for preparation and analysis of the 18 project-specific PAHs in the absence of the site matrix. No Action required.

MS/MSD: performed on SC-REF-03 (0-3), IA-3-02 B, and SC-3-11 (0-3). For all 3 MS/MSDs, lab spiked all 18 project-specific PAHs and used in-house limits to judge acceptability but here SAP limits used (% Rec 40-150% and MS/MSD RPD \leq 35%). All MS & MSD %Rec and MS/MSD RPDs were within criteria except: benzo(g,h,i)perylene RPD > 35% in SC-REF-03 (0-3) MS/MSD. Accuracy and precision was acceptable for all PAHs in these samples except precision was unacceptable for benzo(g,h,i)perylene in SC-REF-03 (0-3) MS/MSD.

***ACTION: Benzo(g,h,i)perylene estimated (UI) in sample SC-REF-03 (0-3) with indeterminate bias due to MS/MSD imprecision.**

DFTPP Tunes: Inst. A4AG3 2/1/2021 (ICAL), 3/3/2021, & 3/7/2021; A4HP7 3/2/2021 (ICAL), 3/4/2021, 3/5/2021, 3/8/2021, & 3/9/2021; and A4HP9 3/2/2021 (ICAL) & 3/9/2021. Canton used slightly different criteria from Method 8270D tuning criteria, but the criteria used was tighter than 8270C or 8270D criteria so this is acceptable. All Abundances were within acceptance criteria and all samples were analyzed within 12 hours of tune. Tune raw data indicates average of scans with background correction used for tune - acceptable. DDT breakdown and pentachlorophenol and benzidine tailing factors were acceptable in all runs. No Action required.

ICALs: Inst. A4AG3 2/1/2021, A4HP7 3/2/2021, and A4HP9 3/2/2021 were 9-level calibrations from 0.1 to 25 $\mu\text{g}/\text{mL}$ for 18 PAHs. ICALs contained many more compounds than the PAHs reported for the samples in this SDG. The min. RRF as indicated in Table 4 Method 8270D was monitored and all RRFs were > min. RRF and all %RSD were all < 20% for all 3 ICALs; therefore, ICALs acceptable. ICVs were also acceptable - No Action required.

CCVs: only CCVs associated with sample analyses reviewed. Applicable CCVs are:

- Inst. A4AG3: CCV 240-475297/2 on 3/3/21 preceding the analysis of 240-14999-13, -14, -17 through -20, -23, -24, -26, -27, -30, & -33; CCV 240-475777/2 on 3/7/21 preceding analysis of 240-144999-29, -32, & -38
 - Inst. A4HP7: CCV 240-475403/2 on 3/4/21 preceding analysis of 240-144999-21, -25, -28, -31, -36, & -39; CCV 240-475553/2 on 3/5/21 preceding analysis of samples 240-144999-46 & -47; CCV 240-475808/2 on 3/8/21 preceding 240-144999-37 (+ MS/MSD) and -40; CCV 240-475996/2 on 3/9/21 preceding 240-144999-15, -16, -22, -34, & -35
 - Inst. A4HP9: CCV 240-475859/2 on 3/8/21 preceding 240-144999-1 to -3, -5 to -7, -9 to -11, -41 to -43 (including MS/MSD) & -45
- Full Scan CCVs were 10 $\mu\text{g}/\text{mL}$ standards while SIM was 0.250 $\mu\text{g}/\text{m}$ standards for PAHs. All CCVs contained more compounds than the 18 project-specific PAHs. For all CCVs, the min. RRF was met for all PAHs and %D \leq \pm 20%; therefore, CCVs acceptable - No Action required.

Internal Standards (IS): All 6 IS's (1,4-Dichlorobenzene-d4, Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, Chrysene-d12, and Perylene-d12) had areas and RTs within criteria; therefore, No Action required.

Compound Reporting: Lab properly reported results for the 18 PAHs listed in the Caneel Bay SAP Table 1. In the EDD, Fluoranthene is listed as "Fluoranthene (Idryl)," but this parenthetical suffix is not used in the hardcopy report and is not explained.

%Solids: all soil samples had %Solids > 30% - No Action required.

Sensitivity: for all samples, the soil LOQs were all below the Project Soil Action Levels (PALs) given in Table 1 of the Caneel Bay SAP; therefore, since all non-detects were < PALs, sensitivity was acceptable for these soil analyses.

Qualifier Action : there were 150 "J" results reported indicating the result reported was uncertain due to quantitation below the instrument calibration range (data accepted as "J" value with indeterminate bias due to result < LOQ). Non-detects were reported at the sample-specific LOQ supported by the Initial Calibration; therefore, these non-detects are accurate as reported (i.e., no need to qualify "U" data as "UJ").

***ACTION: 150 "J" results qualified by the lab were accepted as estimated (J) results with indeterminate bias due to reporting at levels < LOQ.**

Narrative : There were no issues raised in the narrative not already addressed or which would have affected sample data quality - No additional action required.

FD evaluation: 2 sets of FD samples were included in this SDG for Discrete soil samples: SC-3-10 (0-3) / SC-101 & SC-3-10 (3-6) / SC-102. A comparison of detected results in these FD pairs is shown below

Field Duplicate Evaluation_ Sample IDs:

Sample = SC-3-10 (0-3)

FD = SC-101

Analyte Name	DF= 1		Sample		Sample Result		FD		FD Result		RPD	Action *
	LOQ (µg/Kg)		µg/Kg	Q	Level	µg/Kg	Q	Level				
Fluoranthene (Idryl)	16		16	U	LOQ	10	J	< 2 x LOQ	NC		None	
Chrysene	16		16	U	LOQ	3.9	J	< 2 x LOQ	NC		None	
Pyrene	16		16	U	LOQ	7	J	< 2 x LOQ	NC		None	
Phenanthrene	16		16	U	LOQ	7.8	J	< 2 x LOQ	NC		None	

Q = Validation Qualifier; NC = Not Calculated

*Action only taken for RPD > 50% if one or both results are > 2 x LOQ

FD precision was acceptable for all PAHs in FD pair SC-3-10 (0-3) and SC-101 indicating acceptable precision from sample collection through analysis for these soil samples for PAHs. No Action required.

Field Duplicate Evaluation_ Sample IDs:

Sample = SC-3-10 (3-6)

FD = SC-102

Analyte Name	DF= 1		Sample		Sample Result		FD		FD Result		RPD	Action *
	LOQ (µg/Kg)		µg/Kg	Q	Level	µg/Kg	Q	Level				
Benz(a)anthracene	19		19	U	LOQ	11	J	< 2 x LOQ	NC		None	
Benz(b)fluoranthene	19		8.8	J	< 2 x LOQ	17	J	< 2 x LOQ	63.6%		None *	
Chrysene	19		6.5	J	< 2 x LOQ	12	J	< 2 x LOQ	59.5%		None *	
Fluoranthene (Idryl)	19		12	J	< 2 x LOQ	26		< 2 x LOQ	73.7%		None *	
Phenanthrene	19		7.2	J	< 2 x LOQ	13	J	< 2 x LOQ	57.4%		None *	
Pyrene	19		9.6	J	< 2 x LOQ	19	J	< 2 x LOQ	65.7%		None *	

Q = Validation Qualifier; NC = Not Calculated

*Action only taken for RPD > 50% if one or both results are > 2 x LOQ

FD precision was acceptable for all PAHs in FD pair SC-3-10 (3-6) and SC-102 indicating acceptable precision from sample collection through analysis for these soil samples for PAHs. No Action required.

EPA SW-846 Method 8270D, NFG, and Caneel Bay SAP requirements

Preservation:	Criteria = Sample Temperature upon receipt ≤ 6°C; use judgment if outside criteria.
HT:	GW Extraction: 7d <HT< 14 d; J- det/ J NDs; HT >14 d, J- det/R ND Soil: extraction: 14d <HT< 28 d; J- det/ J NDs; HT >28 d, J- det/R ND; however, HT extended to up to 1 year if soil is frozen Analysis of extract: 40d < Extract HT < 60d, J- det/ J NDs; Extract HT > 60d; J- det/ R NDs; however, HT extended to up to 1 year if extract is frozen
Surrogates:	Acceptance criteria 30-130%; Recovery > 130%, J+ det/Accept ND; 10% ≤ Recovery < 30%, J- det/J NDs; Recovery < 10%, J- det/R NDs.
LCS/LCSD:	40-140% and RPD ≤ 20% Acceptance criteria; Recovery > 140%, J+ det/Accept ND; 10% ≤ Recovery < 40%, J- det/J NDs; Recovery < 10%, J- det/R NDs ; LCS/LCSD RPD > 20% J det/J NDs for all samples in the associated analytical batch.
MS/MSD:	40-140% and RPD ≤ 20% (waters) RPD ≤ 35% (soils) Acceptance criteria; Recovery > 140%, J+ det/Accept ND; 10% ≤ Recovery < 40%, J- det/J NDs; Recovery < 10%, J- det/R NDs ; MS/MSD RPD > criteria J det/J NDs. Action taken on Unspiked sample only.
LD:	If performed, RPD > 30% if value >2x LOQ, J det. Not required for SVOC analysis per Caneel Bay SAP.
FD:	Both Conc. > 2x LOQ, RPD > 30% J det; One result ND, other >2 x LOQ, J det/J NDs; Both Conc. < 2x LOQ; RPD >criteria, No Action
Tune:	Criteria per Table 3 8270D; acquisition of tune given as sum of 3 scans across peak with background subtraction. DDT breakdown ≤ 20%; tailing factors: benzidine ≤ 2; pentachlorophenol ≤ 2. If criteria not met (Abundances out or analysis > 12 hrs from DFTPP injection and CCVs don't meet frequency & criteria); use professional judgment
ICAL:	≥ 5-Level, lowest level ≤ LOQ; if RRF < min.-required RRF J- det/ J ND; if %RSD > 20% or "r2" < 0.99 or , J det/UJ NDs. If %RSD > 90%, J det/ R NDs. Criteria based on Table 4 Method 8270D.
CCV:	Analyzed at the beginning of each 12 hour shift. Min RRF not met, J- det/J NDs. %D or %Drift > +20%, J+ det/Accept ND; %D or %Drift > -20%, J- det/J NDs (assuming negative %D = loss in sensitivity; positive %D = enhanced sensitivity)
Blanks:	Non-Matrix related EB Blank contamination, professional judgment used in comparing results to samples. Project-specific action: Lab Method Blank action taken first followed by Equipment Blank Action. If Blank is reported at < LOQ: all samples < LOQ negated (U) at sample LOQ and all samples > LOQ accepted without qualification If Blank ≥ LOQ: if sample is < LOQ, negate (U) at sample LOQ; if sample result is > LOQ but < BAL, negate result (U) at the level found in the sample; and if sample result is ≥ BAL, accept sample result without qualification. Where Blank Action Level (BAL) = Result reported in Blank x (Sample LOQ/Blank LOQ)

EPA SW-846 Method 8270D, NFG, and Caneel Bay SAP requirements - *continued*

IS:	20% < IS recovery < 50%; J det/ J ND with indeterminate bias (unclear if low IS is due to overall loss in instrument sensitivity causing IS and other compounds to be biased low or whether issue only affects IS, in which case, quantitation of detects possible biased high). If IS recovery < 20%, J- det / R ND.
LOQs & Reporting:	If result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Verify LOQs are sample specific and that all compounds requested were reported.
% Solids	If %Solids < 30%, J det / J NDs; if %solids < 10%, J det / R NDs.
Sensitivity:	Identify non-detects > PALs given in Table 1 of Caneel Bay SAP
TICs:	Not requested for this project.
DV Qualifier Definitions:	U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; NJ = the analyte has been "tentatively identified" and the result is usable as an estimated value with indeterminate bias; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.
References:	<i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP); USEPA National Functional Guidelines for Organic Superfund Methods Data Review, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017; USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846), Third Edition, Revision 1, December 1996 and updates, Method 8270D Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) ; Eurofins TestAmerica - Canton SOP NC-MS-018 GC/MS Analysis based on Methods 8270C, 8270D, and 8270E Rev. 8, 07/02/19.</i>

Dates Sampled: 2/19/2021 - 2/22/2021
 Method of Analysis: 8081B

No. Samples: 36
 Matrix: Soil

Data Validation Summary Table - EPA Stage 2B: Pesticides in Soil

Data Element	Preservation & HT	Blank Actions	Surrogates	LCS / Blank Spike	MS/MSD	FD	Resolution Check	DDT/Endrin Breakdown	ICALs	CCVs
Yes		√	√	√		√	√	√	√	√
No	Estimate (J or J+) 8 results	None			Estimate (UJ) 1 result					

Data Element	Florisil Cartridge Check (80-120%)	GPC Check (80-110%)	Col. 1 & 2 Precision	LOQ & Quant. Correct	IS	%Solids
Yes	NA	NA		√	√	√
No			Negate (U) 2 & Estimate (J) 19 results			

Other Issues: *Qualifier Actions:* 35 "J" qualified lab results accepted as estimated (J) results

Selection of results for Reporting: none required

Comments:

An EPA-compliant Stage 2B data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALs, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; Surrogate recoveries; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 2B DV, no raw data was reviewed nor were any re-calculations of data performed. Data users should reference the EPA Stage 3 data validation performed on SDG 240-145024-1.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? Yes. A full data deliverable (called Level 4 deliverable), including results, summary QC, and all raw data, was provided for review.
 2. Were all result forms for all samples listed on the chain-of-custody present in data package? Yes. ISM and Discrete samples received for Pesticide analysis. Other samples are included on the COCs in this data package for TCLP analyses, which were not required to be validated based on the Caneel Bay SAP (2021). Note that the lab identified sample "IA-3-02 B" as "IA-3-02 B +MS/MSD" because this was the sample ID exactly as written on the COC; however, the intention was that MS/MSD was to be performed on aliquots of this sample, which it was. The lab data package and EDD therefore identify the unspiked parent sample "IA-3-02 B" as "IA-3-02 B +MS/MSD" and the MS as "IA-3-02 B +MS/MSDMS" and the MSD as "IA-3-02 B +MS/MSDSD."
-

Sample Receiving: ISM Soil & Discrete Soil samples were received at Eurofins TestAmerica - Canton lab in multiple coolers on 2/25/2021, 3 to 6 days following sample collection. Three of the coolers were received with Temperatures > 6 °C (up to 14.5 °C) with samples in water (ice melted) due to weather and FedEx shipping delays. Sample receipt information listed that samples "IA-3-01A, B, & C arrived out of temp." Additionally, the lab documented that samples IA-2-03 B, IA-2-03 C, IA-3-01 B, and IA-3-01 C have "cooler water in the bag," and SC-3-08 (0-5) had water in the jar from the cooler. Professional judgment used to take no action on Soil samples due to temperature exceedances, which were still received at < room temperatures, would not be expected to affect the usability of Pesticide soil data and because the ISM soils are air-dried at room temperature for a few days prior to analysis, anyway as part of the preparation procedure. Professional judgment used to take DV action due to cooler water present in sample containers for affected detected results due to potential for contamination. Non-detected results not impacted. Actions taken in SDG 240-145024-1 for samples IA-2-03 B and IA-2-03 C. No actions required for SC-3-08 (0-5) analyzed for TCLP since this parameter was not validated.

***ACTION: Estimate (J+) 8 detected Pesticide results in samples IA-3-01 B and IA-3-01 C with a possible high bias, unless other issues affect the data, due to potential contamination from cooler water present in the sample containers (Note, several high bias (J+) results changed to indeterminate bias (J) due to cumulative bias).**

Holding Time (HT) evaluation: All samples for ISM were prepared at the Canton lab on 2/26/2021 through 3/02/2021 in Prep Batch #474833 (Lab SOP NC-OP-044 using 2-D slab cake method). Aliquots of the ISM samples were extracted by Method 3540C in QC Batch 475226 on 3/3/2021 and the discrete soils were extracted in 2 QC Batches: 474823 on 3/1/2021 and 475033 on 3/2/2021. All discrete and ISM sample extracts for Pesticides were analyzed by 3/9/2021. HT acceptable - No Action required. (NOTE: Form IV for MB 240-475226/23-A was missing several IA samples that were extracted in this batch - this was confirmed in the raw preparation log).

Blank Evaluation: Method Blanks = MB 240-475226/23-A (associated with ISM samples) and MB 240-474823/23-A, MB 240-475033/8-A (associated with discrete soils); and Equipment Blank = EB-Soil-20210222-01 (associated with discrete samples) and EB-SOIL-20210224 (associated with ISM samples) - both reported in SDG 180-117691-1. The Method Blanks and EB were non-detect for all Pesticides; therefore, Blank Action to negate or estimate data not required.

Selection of Results for Reporting: all sample extracts were only analyzed once (DF=1) except: samples IA-3-01 B and IA-REF-02 A were analyzed at DF=5; IA-2-01 B and IA-2-01 C were analyzed at DF=10; IA-2-01 A and IA-2-02 B were analyzed at DF=20; and samples IA-2-01 C, IA-2-02 A, IA-2-02 B, and IA-2-02 C were analyzed at DF=50 based on the nature of the sample matrix (according to narrative). Since only one result per compound per sample reported, there is no selection of results required.

Surrogates: Tetrachloro-m-xylene (TCX) and Decachlorobiphenyl (DCB) %Rec were within lab criteria for all samples + QC on both GC columns used for analysis except: DCB %Rec high on GC Column 1 for sample IA-2-02A and IA-2-01 C; DCB %Rec high on GC Column 2 for SC-3-11 (0-3'); and TCX %Rec high on GC Column 1, DCB %Rec high on GC Column 2 and not reported for GC Column 1 for sample IA-2-01 C. No action required for DCB %Rec high on one GC Column since the %Rec was acceptable on the other GC Column as were the recoveries for TCX on both GC Columns. Detected results in sample SC-3-11 (0-3') may be uncertain based on high surrogate recoveries.

***ACTION: 4,4'-DDE, 4,4'-DDT, and Dieldrin in sample SC-3-11 (0-3') estimated (J+) with possible high bias, unless other issues affect the data, due to high Surrogate recoveries (Note, 1 high bias (J+) changed to indeterminate bias (J) due to cumulative bias)**

LCS/LCSD: LCS 240-474823/24-A, LCS 240-475033/9-A, and LCS 240-475226/24-A. Lab spiked all 20 single-component Pesticides (no Toxaphene or Technical Chlordane spiked), as expected. No LCSD performed. All LCS %Rec were within laboratory statistical recovery acceptance limits indicating lab demonstrated acceptable recovery for analysis of Pesticides in the absence of the site matrix - No Action required.

MS/MSD: performed on samples SC-REF-03 (0-3'), SC-3-11 (0-3'), and IA-3-02 B. Lab spiked 20 single-component and all MS & MSD %Rec and MS/MSD RPDs were acceptable except RPD high for Endrin aldehyde in IA-3-02 B MS/MSD.

***ACTION: Endrin aldehyde estimated (UJ) with indeterminate bias in sample IA-3-02 B (called IA-3-02 B +MS/MSD in EDD) due to MS/MSD imprecision**

Resolution Check : chromatograms for standards checked and adequate resolution between peaks was found for Instrument A2HP15 and A2HP3 Column 1 (CLP-1) and Column 2 (CLP-2) for the Calibration Mixtures used for analysis.

DDT/Endrin Breakdown: PEMs for DDT and Endrin Breakdown measured and reported for ICAL and CCVs for both GC columns. DDT and Endrin breakdown met criteria (breakdown $\leq 15\%$ for each GC Column) - No Action required

ICAL : Instruments A2HP3 on 1/12/21 and A2HP15 on 1/14/21. Method of Internal Standard quantitation used so Relative Response Factors reported. ICALs were 7-level from 5 to 200 $\mu\text{g/L}$ for single-component pesticides. Separate ICALs for A2HP15 (on 1/19/2021) and A2HP3 (on 1/12/21) for Technical Chlordane (6-level ICAL from 10 to 500 $\mu\text{g/L}$ for each of 4 separate peaks) and Toxaphene (5-level ICAL from 100 to 5000 $\mu\text{g/L}$ for each of 5 separate peaks) on A2HP5 (on 1/14/21) and A2HP3 (on 1/12/21) were performed. %RSD < 20% or $r^2 > 0.99$ (DCB on GC Column 1 for A2HP3 calibrated using linear regression) for all compounds & surrogates on both GC columns in all ICALs. ICALs valid - No Action required.

RT window: Retention Time window studies not in data; however, retention times were stable across ICALs and CCVs. No Action required.

CCVs : since method of Internal Standard quantitation performed, bracketing CCVs not required (i.e., only the opening sequence CCV important to judging accuracy of data). For the analyses performed, the CCVs are performed in sets (single component Pesticide CCV, Toxaphene CCV, and Technical Chlordane CCV) and the relevant CCVs analyzed are:

- Inst. A2HP3 CCV 240-475329/4, CCV 240-475329/5, & CCV 240-475329/6 on 3/3/21 preceding analysis of 240-144999-17 through-20, -23, -24, -26,-27, -13, -14, -29, & -30; CCV 240-475524/4, CCV 240-475524/5, & CCV 240-475524/6 prior to 240-144999-32, -33, -38, & -40; CCV 240-475920/4, CCV 240-475920/5, & CCV 240-475920/6 prior to analysis of 240-144999-46, -1, -2, -3,-5, -6, & -7; CCV 240-476097/4, CCV 240-476097/5, CCV 240-476097/6 prior to 240-144999-9, -10, -11, -41, -42, -43, -45, & -47
- Inst. A2HP15 CCV 240-475349/4, CCV 240-475349/5, & CCV 240-475349/6 on 3/3/21 prior to analysis of samples 240-144999-37, -34, -35, -15, & -16; CCV 240-475515/4, CCV 240-475515/5, & CCV 240-475515/6 prior to analysis of 240-144999-21, -22, -25, -28, -31, -36-, & -39

All CCVs on both Column 1 and 2 had %D $\leq \pm 20\%$ for all target analytes except: Methoxychlor %D > 20% (increase sensitivity) in Column 2 for CCV 240-476478/4 and in Column 2 for CCV 240-476653/4. Since Methoxychlor was non-detect in all samples, no action required for enhanced sensitivity of GC Column 2 for these CCVs on A2HP3. Overall CCVs acceptable - No Action required.

Internal Standard (IS): lab spiked 1-Bromo-2-nitrobenzene into each extract prior to analysis as IS. The Area and RT of this IS in all samples and QC were within criteria - no Action required.

Compound Reporting: Lab reported results for all 22 Pesticides requested in Table 1 of the Caneel Bay SAP. The lab reported some compounds using a synonym for a compound (e.g., gamma-Chlordane was reported as trans-Chlordane).

%Solids: all samples had %Solids > 30% - no Action required.

Sensitivity: for all samples, the laboratory reported LOQs equivalent, on a sample-specific basis, to the Achievable Laboratory LOQs given in Table 1 of the Caneel Bay SAP. The non-detects were all below the Project Soil Action Level (PAL) given in Table 1 except: beta-BHC and Endrin in all samples' Aldrin in all samples except IA-2-01 A, IA-2-01 B, IA-2-01 C, IA-3-01 A, IA-3-01 B, IA-3-01 C, IA-3-02 B +MS/MSD, and SC-3-11 (3-6); delta-BHC and Heptachlor epoxide in samples IA-2-01 A, IA-2-02 A, IA-2-02 B, and IA-2-02 C; 4,4'-DDD in all samples except IA-2-02 A, IA-2-02 B, IA-2-02 C, IA-3-02 A, SC-3-06 (0-3), and SC-3-08 (0-3); 4,4'-DDE in samples IA-REF-02 A, IA-REF-02 B, SC-101, SC-3-03 (0-3), SC-3-03 (3-6), SC-3-04 (0-3), SC-3-04 (3-6), SC-3-07 (3-6), SC-3-08 (3-6), SC-3-10 (0-3), SC-REF-01 (0-0.5), and SC-REF-02 (0-2.6); 4,4'-DDT in samples IA-2-01 A, IA-REF-02 A, IA-REF-02 B, SC-101, SC-102, SC-3-03 (0-3), SC-3-03 (3-6), SC-3-04 (0-3), SC-3-04 (3-6), SC-3-06 (3-6), SC-3-07 (3-6), SC-3-08 (3-6), SC-3-10 (0-3), SC-3-10 (3-6), SC-3-11 (3-6), SC-REF-01 (0-0.5), SC-REF-02 (0-2.6), and SC-REF-03 (0-3); Dieldrin in all samples except IA-2-01 A, IA-2-01 B, IA-2-01 C, IA-2-02 B, IA-3-01 A, IA-3-01 B, IA-3-01 C, IA-3-02 A, IA-3-02 B +MS/MSD, IA-REF-02 C, and SC-3-11 (0-3); Heptachlor in samples IA-2-01 A, IA-2-01 B, IA-2-01 C, IA-2-02 A, IA-2-02 B, IA-2-02 C, IA-3-01 B, IA-REF-02 A, SC-102, SC-3-04 (3-6), SC-3-06 (0-3), SC-3-08 (3-6), and SC-3-10 (3-6); and Technical Chlordane in samples IA-2-01 A, IA-2-01 B, IA-2-01 C, IA-2-02 A, IA-2-02 C, and IA-REF-02 A due to method limitations and sample-specific preparation and analysis factors.

Data users will need to evaluate the usability of the non-detects above the PALs for project uses.

Dual Column precision evaluation: lab reported all results from GC Column 1, their primary column, unless the RPD was > 40%, in which case the lower of the 2 GC Column values was reported. Based on professional judgment, this reporting approach is considered acceptable for project decisions. All detected results were reported with dual column RPDs < 40% except:

- Sample IA-2-01 A 4,4'-DDE RPD > 40% but < 100%
- Sample IA-2-01 B 4,4'-DDE RPD > 40% but < 100%
- Sample IA-2-02 B trans-Chlordane, Dieldrin, and Chlordane, Technical RPD > 40% but < 100%
- Sample IA-3-01 B Dieldrin and 4,4'-DDE RPD > 40% but < 100%
- Sample IA-3-01 C 4,4'-DDT RPD > 100%
- Sample IA-3-02 A Dieldrin RPD > 40% but < 100% but trans-Chlordane RPD > 100%
- Sample IA-3-02 B +MS/MSD 4,4-DDT and Dieldrin RPD > 40% but < 100%
- Sample IA-3-02 C 4,4'-DDT RPD > 40% but < 100%
- Sample SC-3-04 (3-6) trans-Chlordane RPD > 40% but < 100%
- Sample SC-3-06 (0-3) 4,4'-DDD RPD > 40% but < 100%
- Sample SC-3-06 (3-6) 4,4'-DDE RPD > 40% but < 100%
- Sample SC-3-08 (0-3) trans-Chlordane and Endrin aldehyde RPD > 40% but < 100%
- Sample SC-3-09 (0-3) trans-Chlordane RPD > 40% but < 100%
- Sample SC-3-10 (3-6) beta-BHC RPD > 100%
- Sample SC-3-11 (0-3) Dieldrin RPD > 40% but < 100%

The lab flagged all these data with a "P" qualifier to indicate the RPD exceedance. All results with RPD > 40% but < 100% estimated with possible low bias and results with RPD > 100% negated (U) at the higher of the 2 GC Column values based on professional judgment rather than rejection of results due to RPD > 100%.

***ACTION:** *trans-Chlordane in sample IA-3-02 A negated (U) and LOQ raised to 23 µg/kg and beta-BHC in sample SC-3-10 (3-6) negated (U) and the LOQ raised to 47 µg/kg. The other 19 detected results shown above with RPDs > 40% but < 100% were estimated (J-) with possible low bias, unless other issues affect the data, due to dual column imprecision and reporting of the lower of the two GC Column values (Note, several low bias (J-) results changed to indeterminate bias (J) due to cumulative bias).*

Qualifier Action: there were 35 "J" results reported indicating the result reported was uncertain due to quantitation below the instrument calibration range (data accepted as "J" value with indeterminate bias due to result < LOQ). This excludes the 1 "JP" qualified result that was negated due to large dual column imprecision. Non-detects were reported at the sample-specific LOQ supported by the Initial Calibration; therefore, these non-detects are accurate as reported (i.e., no need to qualify "U" data as "UJ"). There were no additional qualifiers on the data requiring action

***ACTION:** *35 "J" results qualified by the lab were accepted as estimated (J) results with indeterminate bias due to reporting at levels < LOQ.*

Narrative : there were no issues raised in the narrative not already addressed or which would have affected sample data quality - No additional action required.

FD evaluation: 2 sets of FD samples were included in this SDG for Discrete soil samples: SC-3-10 (0-3) / SC-101 & SC-3-10 (3-6) / SC-102. Samples SC-3-10 (0-3) and SC-101 were non-detect for all Pesticides; therefore, while these results are consistent with each other, it is not possible to quantitatively evaluate FD precision. FD precision though considered acceptable for SC-3-10 (0-3) and SC-101. A comparison of detected results in SC-3-10 (3-6) / SC-102 is shown below

Field Duplicate Evaluation_ Sample IDs:

Sample = SC-3-10 (3-6)

FD = SC-102

Analyte Name	DF= 1	Sample	Sample Result	FD	FD Result	RPD	Action *
	LOQ (µg/Kg)	µg/Kg	Q Level	µg/Kg	Q Level		
4,4'-DDE	6.2	10	< 2 x LOQ	13	< 2 x LOQ	26.1%	No Action

Q = Validation Qualifier; NC = Not Calculated

*Action only taken for RPD > 50% if one or both results are > 2 x LOQ

FD precision was acceptable for all Pesticides in FD pair SC-3-10 (3-6) and SC-102 indicating acceptable precision from sample collection through analysis and representativeness of the results reported for Pesticides for this site location.

EPA SW-846 Method 8081B, NFG, and QAPP requirements

Preservation:	Criteria = Sample Temperature upon receipt $\leq 6^{\circ}\text{C}$; use judgment if outside criteria.
HT:	GW Extraction: 7d <HT< 14 d; J- det/ J NDs; HT >28 d, J- det/R ND Soil: extraction: 14d <HT< 28 d; J- det/ J NDs; HT >28 d, J- det/R ND; however, HT extended to up to 1 year if soil is frozen Analysis of extract: 40d < Extract HT < 60d, J- det/ J NDs; Extract HT > 60d; J- det/ R NDs; however, HT extended to up to 1 year if extract is frozen
Surrogates:	Acceptance criteria 30-150% on both GC Columns; Recovery > 150%, J+ det/Accept ND; $10\% \leq \text{Recovery} < 30\%$, J- det/J NDs; Recovery < 10%, J- det/R NDs.
LCS:	Lab Control limits and RPD $\leq 30\%$ (SAP) criteria; Recovery > UCL, J+ det/Accept ND; $10\% \leq \text{Recovery} < \text{LCL}$, J- det/J NDs; Recovery < 10%, J- det/R NDs ; LCS/LCSD RPD > 20% J det/J NDs for all samples in the associated analytical batch.
MS/MSD:	Lab Control limits and RPD $\leq 30\%$ (SAP) criteria; Recovery > UCL, J+ det/Accept ND; $10\% \leq \text{Recovery} < \text{LCL}$, J- det/J NDs; Recovery < 10%, J- det/R NDs ; MS/MSD RPD > criteria J det/J NDs. Action taken on Unspiked sample only.
LD:	If performed, RPD > 30% if value >2x LOQ, J det. Not required per Caneel Bay SAP.
FD:	Both Conc. > 2xLOQ, RPD > 30% (water) or > 50% (soil) J det; One result ND, other >2 x LOQ, J det/J NDs; Both Conc. < 2xLOQ; RPD >criteria, No Action
Blanks:	Non-Matrix related EB Blank contamination, professional judgment used in comparing results to samples. Project-specific action: Lab Method Blank action taken first followed by Equipment Blank Action. If Blank is reported at < LOQ: all samples < LOQ negated (U) at sample LOQ and all samples > LOQ accepted without qualification If Blank \geq LOQ: if sample is < LOQ, negate (U) at sample LOQ; if sample result is > LOQ but < BAL, negate result (U) at the level found in the sample; and if sample result is \geq BAL, accept sample result without qualification. Where Blank Action Level (BAL) = Result reported in Blank x (Sample LOQ/Blank LOQ)
Resolution Check:	RCM < 60% resolution if INDA & INDB used, J detects based on technical judgment. If RCM not analyzed, verify resolution acceptable for calibrations
DDT & Endrin Breakdown:	4,4'-DDT breakdown > 15%, J- det DDT/ R ND DDT; Accept ND DDE & DDD but NJ det DDD & DDE Endrin breakdown > 15%, J- det Endrin/ R ND Endrin; Accept ND Endrin aldehyde & endrin ketone but NJ det endrin aldehyde & endrin ketone
ICAL:	5-Level for single-component Pests and toxaphene; if %RSD > 20% except alpha-BHC, delta-BHC, J det/J ND. If alpha-BHC or delta-BHC %RSD > 25%, J det/J ND. If Toxaphene %RSD > 30%, J det/J ND. ICAL can also use curve statistics - if "r" < 0.995 or "r2" < 0.99, J det/UJ NDs.
CCV:	%D or %Drift > +25%, J+ det/Accept ND; %D or %Drift > -25%, J- det/J ND (assuming negative %D = loss in sensitivity; positive %D = enhanced sensitivity) on a per column basis, as technically reasonable. Opening and closing CCVs must meet criteria. Verify resolution between adjacent peaks is acceptable- If not, action may be needed depending on the sample data.

EPA SW-846 Method 8081B, NFG, and Caneel Bay SAP requirements - *continued*

IS:	20% < IS recovery < 50%; J det/ J ND with indeterminate bias (unclear if low IS is due to overall loss in instrument sensitivity causing IS and other compounds to be biased low or whether issue only affects IS, in which case, quantitation of detects possible biased high). If IS recovery < 20%, J- det / R ND.
Retention Time Window:	RT window study performed across 72-hr period with 3 injections of each compound of concern. Window = RT ± 3x std. dev (or ± 0.05 for heptachlor, aldrin and BHC compounds and ± 0.07 for all other target for nominal windows if std. dev. too tight). If compound detected outside window, use professional judgment to J or R detect.
Col. 1&2 Precision:	RPD 41%-71% J det; RPD 71%-100% NJ det; RPD =101%-200% negate (U) result at the highest of the 2 GC Column values; RPD > 201% Reject (R) result at level found. If RPD > 40% and result < LOQ, negate (U) result at LOQ. Bias in the results depends on whether lowest or highest of 2 GC column results chosen for reporting or whether interferences are observed in the data. Use professional judgment.
% Solids	If %Solids < 30%, J det / J NDs; if %solids < 10%, J det / R NDs.
Sensitivity:	Identify non-detects > PALs given in Table 1 of Caneel Bay SAP
DV Qualifier Definitions:	U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; NJ = the analyte has been "tentatively identified" and the result is usable as an estimated value with indeterminate bias; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.
References:	<i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site</i> , prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP); <i>USEPA National Functional Guidelines for Organic Superfund Methods Data Review</i> , Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017; <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use</i> , OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; <i>USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)</i> , Third Edition, Revision 1, December 1996 and updates, Method 8081B <i>Organochlorine Pesticides by Gas Chromatography</i> ; and Eurofins TestAmerica-Canton SOP NC-GC-042 Gas Chromatographic Analysis of Pesticides Based on Methods 8081A and 8081B, Rev. 3, 10/29/20

Dates Sampled: 2/19/2021 - 2/22/2021

Method of Analysis: 8082A

No. Samples: 30

Matrix: Soil

Data Validation Summary Table - EPA Stage 2B: PCB Aroclors in Soil

Data Element	Preservation		Surrogates	LCS	MS/MSD	FD	ICAL/CCV	Col. 1 & 2		LOQ	%Solids	Pattern
	& HT							Precision	& Quant. Correct	Match		
Acceptable												
Yes	√		√	√	√	√	√	√		√	√	√
No												

Other Issues: *Qualifier Actions:* none required

Blank Action: none required

Selection of results for Reporting: none required

Comments:

An EPA-compliant Stage 2B data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALs, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; Surrogate recoveries; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 2B DV, no raw data was reviewed nor were any re-calculations of data performed. Data users should reference the EPA Stage 3 data validation performed on SDG 240-145024-1.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? Yes. A full data deliverable (called Level 4 deliverable), including results, summary QC, and all raw data, was provided for review.
2. Were all result forms for all samples listed on the chain-of-custody present in data package? No, after sample receipt, VHB requested PCB Aroclor analysis of IA-Ref-02 A, IA-Ref-02 B, and IA-Ref-02 C (i.e. original COCs requested PCB Aroclor analysis of 27 samples but 30 samples reported in this SDG). Note that the lab identified sample "IA-3-02 B" as "IA-3-02 B +MS/MSD" because this was the sample ID exactly as written on the COC; however, the intention was that MS/MSD was to be performed on aliquots of this sample, which it was. The lab data package and EDD therefore identify the unspiked parent sample "IA-3-02 B" as "IA-3-02 B +MS/MSD" and the MS as "IA-3-02 B +MS/MSDMS" and the MSD as "IA-3-02 B +MS/MSDSD."

Sample Receiving: ISM Soil & Discrete Soil samples were received at Eurofins TestAmerica - Canton lab in multiple coolers on 2/25/2021, 3 to 6 days following sample collection. Three of the coolers were received with Temperatures > 6 °C (up to 14.5 °C) with samples in water (ice melted) due to weather and FedEx shipping delays. Sample receipt information listed that samples "IA-3-01A, B, & C arrived out of temp." Additionally, the lab documented that samples IA-2-03 B, IA-2-03 C, IA-3-01 B, and IA-3-01 C have "cooler water in the bag," and SC-3-08 (0-5) had water in the jar from the cooler. Professional judgment used to take no action on Soil samples due to temperature exceedances, which were still received at < room temperatures, would not be expected to affect the usability of PCB Aroclor soil data and because the ISM soils are air-dried at room temperature for a few days prior to analysis, anyway as part of the preparation procedure. Professional judgment used to take DV action due to cooler water present in sample containers for affected detected results due to potential for contamination. Non-detected results not impacted. Actions taken in SDG 240-145024-1 for samples IA-2-03 B and IA-2-03 C. No actions required for SC-3-08 (0-5) analyzed for TCLP since this parameter was not validated and no action required for PCB Aroclors in IA-3-01 B and IA-3-01 C since these samples were both non-detect for all Aroclors.

Holding Time (HT) evaluation: All samples for ISM were prepared at the Canton lab on 2/26/2021 through 3/02/2021 in Prep Batch #474833 (Lab SOP NC-OP-044 using 2-D slab cake method). Aliquots of the ISM samples were extracted by Method 3540C in 2 QC Batches: QC Batch 476235 on 3/3/21 and 475608 on 3/5/2021. The discrete soils were extracted in 2 QC Batches: 474811 on 3/1/2021 and 475029 on 3/2/2021. All sample extracts for PCB Aroclors underwent sulfuric acid cleanup prior to analysis on 3/8/2021; therefore, HT acceptable - No Action required.

Blank Evaluation: Method Blanks = MB 240-475235/17-A & MB 240-475608/11-A (associated with ISM samples) and MB 240-474811/23-A & MB 240-475029/8-A (associated with discrete soils); and Equipment Blank = EB-Soil-20210222-01 (associated with discrete samples) and EB-SOIL-20210224 (associated with ISM samples) - both reported in SDG 180-117691-1. All Method Blanks and EBs were non-detect for all PCB Aroclors; therefore, Blank Action to negate or estimate data not required.

Selection of Results for Reporting: all sample extracts were only analyzed once (DF=1). Since only one result per compound per sample reported, there is no selection of results required.

Surrogates: Tetrachloro-m-xylene (TCX) and Decachlorobiphenyl (DCB) %Rec were within lab criteria for all samples + QC - lab only reported %Rec from GC Column 1 and not from both Columns. Raw data shows surrogate recoveries on both GC Column were comparable - no Action required.

LCS/LCSD: LCS 240-475235/18-A & LCS 240-475608/12-A (associated with ISM samples) and LCS 240-474811/24-A & LCS 240-475029/9-A. Lab spiked Aroclors 1016 and 1260 at 1000 µg/kg. No LCSD performed. The recoveries were within lab limits in all LCS indicating acceptable accuracy for extraction and analysis of PCB Aroclors in the absence of the site matrix - No Action required.

MS/MSD: performed on SC-REF-03 (0-3'), SC-3-11 (0-3'), and IA-3-02 B. Lab spiked Aroclors 1016 and 1260 at 1000 µg/kg. The MS & MSD recoveries and MS/MSD RPDs were all within criteria indicating acceptable accuracy and precision for PCB Aroclor analysis from the site matrices - No Action required.

FD evaluation: 2 sets of FD samples were included in this SDG for Discrete soil samples: SC-3-10 (0-3) / SC-101 & SC-3-10 (3-6) / SC-102. All 4 samples were non-detect for all PCB Aroclors; therefore, while these results are consistent with each other, it is not possible to quantitatively evaluate FD precision. FD precision though considered acceptable for SC-3-10 (0-3) / SC-101 & SC-3-10 (3-6) / SC-102. No Action required.

Retention Time : RT stable for TCX and DCB and detected Aroclors across analyses on both GC Columns (Column A = CLP-1 and Column B = CLP-2). During ICAL, RT windows established for Aroclor peaks and Surrogates.

ICAL : Inst. A2HP12 ICAL performed on 2/8/2021, Inst. A2HP10 on 2/25/2021, and Inst. A2HP11 ICAL performed on 3/1/2021 were 6-levels from 0.05 to 1.5 ng/µL for each of 5 peaks for all 7 project-required Aroclors (plus Aroclors 1262 and 1268 not required). Method of Internal Standard quantitation used so Relative Response Factors reported. %RSD < 20% for all peaks in 6-level calibrations except a few individual peaks that were calibrated using regression analysis with $r^2 > 0.990$. ICALs acceptable. ICVs following ICALs were all acceptable.

CCVs: since method of Internal Standard quantitation performed, bracketing CCVs not required (i.e., only the opening sequence CCV important to judging accuracy of data). For the analyses performed, the CCV consisted of analysis of 5 standards (combined Aroclors 1016/1260, Aroclors 1232/1262, Aroclors 1242/1268, Aroclors 1221/1254, and single Aroclor 1248) with the Aroclors at 0.5 ng/µL. The relevant CCVs analyzed are:

- Inst. A2HP11 CCV 240-475173/3, CCV 240-475173/4, CCV 240-475173/5, CCV 240-475173/6, & CCV 240-475173/7 on 3/3/21 prior to analysis of 240-144999-17 through -20, -23, -24, -26, -27, -13, -14; CCVIS 240-475173/29 prior to analysis of 240-144999-29, -30, -32, -33, -38, & -40
 - Inst. A2HP12 CCV 240-475386/3, CCV 240-475386/4, CCV 240-475386/5, CCV 240-475386/6, & CCV 240-475386/7 on 3/4/21 prior to analysis of samples 240-144999-37, -34, -35, -15, -16
 - Inst. A2HP10 CCV 240-475559/3, CCV 240-475559/4, & CCV 240-475559/5, CCV 240-475559/6, and CCV 240-475559/7 on 3/5/21 prior to analysis of 240-144999-41, -42, -43, -45, -46, -47; CCV 240-475893/3, CCV 240-475893/4, CCV 240-475893/5, CCV 240-475893/6, and CCV 240-475893/7 prior to analysis of 240-144999-1 through -3
- CCVs had %D $\leq \pm 20\%$ for each of the 3 to 5 peaks in each Aroclor on both Column 1 and 2 except some individual peaks on one column or the other exceeded criteria; however, since the other peaks on the GC Column were acceptable as were responses for all peaks on the other GC Column, no action required. CCVs all acceptable.
-

Compound Reporting: Lab reported results for all 7 PCB Aroclors requested in Table 1 of the Caneel Bay SAP. Aroclors 1262 and Aroclors 1268 were not required to be reported.

Internal Standard (IS): lab spiked 1-Bromo-2-nitrobenzene into each extract prior to analysis as IS. The Area and RT of this IS in all samples and QC were within criteria - no Action required.

Dual Column precision evaluation: lab reported all detects (e.g., LCS) from GC Column 1 unless RPD > 40%, in which case the lab reported the lower value from GC Column 1 or 2. Dual Column evaluation for PCB Aroclors is not required by Method 8082A since pattern recognition using a single column is usually sufficient confirmation; however, lab did report dual column precision evaluation for sample SC-3-08 (0-3') and all LCS and MS samples. For the one detect, Aroclor 1260 in SC-3-08 (0-3'), the dual column RPD was < 40% and lab reported the value from GC Column 1. No Action required.

%Solids: all samples had %Solids > 30% - no Action required.

Sensitivity: for all samples, the laboratory reported LOQs equivalent to the Achievable Laboratory LOQs, on a sample-specific basis, given in Table 1 of the Caneel Bay SAP. For all samples, the non-detects were reported at levels less than the Project Soil Action Levels (PALs) except for Aroclors 1242, 1248, and 1254 in all samples, as expected, due to method limitations.

Data users will need to evaluate the usability of these non-detects for project uses.

Qualifier Action: there were no "J" qualified data reported, which is appropriate for Aroclor data. Non-detects were qualified with a "U" and reported at the sample-specific LOQ supported by the Initial Calibration; therefore, these non-detects are accurate as reported (i.e., no need to qualify "U" data as "UJ"). There were no additional qualifiers added to the data so no Qualifier action required.

Narrative : there were no issues raised in the narrative not already addressed or which would have affected sample data quality - No additional action required.

EPA SW-846 Method 8082A, NFG, and Caneel Bay SAP requirements

Preservation:	Criteria = Sample Temperature upon receipt $\leq 6^{\circ}\text{C}$; use judgment if outside criteria.
HT:	GW Extraction: 7d <HT< 14 d; J- det/ J NDs; HT >28 d, J- det/R ND Soil: extraction: 14d <HT< 28 d; J- det/ J NDs; HT >28 d, J- det/R ND; however, HT extended to up to 1 year if soil is frozen Analysis of extract: 40d < Extract HT < 60d, J- det/ J NDs; Extract HT > 60d; J- det/ R NDs; however, HT extended to up to 1 year if extract is frozen
Surrogates:	Acceptance criteria 30-150% on both GC Columns; Recovery > 150%, J+ det/Accept ND; $10\% \leq \text{Recovery} < 30\%$, J- det/J NDs; Recovery < 10%, J- det/R NDs.
LCS:	Lab Control limits and RPD $\leq 30\%$ (SAP) criteria; Recovery > UCL, J+ det/Accept ND; $10\% \leq \text{Recovery} < \text{LCL}$, J- det/J NDs; Recovery < 10%, J- det/R NDs ; LCS/LCSD RPD > 20% J det/J NDs for all samples in the associated analytical batch.
MS/MSD:	Lab Control limits and RPD $\leq 30\%$ (SAP) criteria; Recovery > UCL, J+ det/Accept ND; $10\% \leq \text{Recovery} < \text{LCL}$, J- det/J NDs; Recovery < 10%, J- det/R NDs ; MS/MSD RPD > criteria J det/J NDs. Action taken on Unspiked sample only.
LD:	If performed, RPD > 30% if value >2x LOQ, J det. Not required per Caneel Bay SAP.
FD:	Both Conc. > 2xLOQ, RPD > 30% (water) > 50% (soil) J det; One result ND, other >2 x LOQ, J det/J NDs; Both Conc. < 2xLOQ; RPD >criteria, No Action
Blanks:	Non-Matrix related Blank contamination, EB contaminant in all samples associated with Blank. Project-specific action: Lab Method Blank action taken first followed by Equipment Blank Action. If Blank is reported at < LOQ: all samples < LOQ negated (U) at sample LOQ and all samples > LOQ accepted without qualification If Blank \geq LOQ: if sample is < LOQ, negate (U) at sample LOQ; if sample result is > LOQ but < BAL, negate result (U) at the level found in the sample; and if sample result is \geq BAL, accept sample result without qualification. Where Blank Action Level (BAL) = Result reported in Blank x (Sample LOQ/Blank LOQ)
ICAL:	5-Level AR 1016/1260 & single-point for other Aroclors; RT window must be established; if %RSD > 20% or "r" < 0.995 or "r2" < 0.99, J det/UJ NDs. If an Aroclor is detected, 5-level calibration for that Aroclor should be done followed by reanalysis of the sample extract with the suspected detection of the Aroclor in question.
CCV:	%D > $\pm 25\%$ opening CCV or %D > $\pm 30\%$ for closing CCV, J det/J ND on a per column basis, as technically reasonable.

EPA SW-846 Method 8082A, NFG, and Caneel Bay SAP requirements - *continued*

IS:	20% < IS recovery < 50%; J det/ J ND with indeterminate bias (unclear if low IS is due to overall loss in instrument sensitivity causing IS and other compounds to be biased low or whether issue only affects IS, in which case, quantitation of detects possible biased high). If IS recovery < 20%, J- det / R ND.
Retention Time Window:	RT window study performed across 72-hr period with 3 injections of Aroclors/surrogates and window = RT ± 3x std. dev. If Aroclor detected outside window, use professional judgment to accept, NJ, or R detect.
Col. 1&2 Precision:	Lab should report the lowest of the 2 GC Column values. RPD 41%-71% J det; RPD 71%-100% NJ det; RPD =101%-200% negate (U) result at the highest of the 2 GC Column values; RPD > 201% Reject (R) result at level found. If RPD > 40% and result < LOQ, negate (U) result at LOQ. Bias in the results depends on whether lowest or highest of 2 GC column results chosen for reporting or whether interferences are observed in the data. Use professional judgment.
% Solids	If %Solids < 30%, J det / J NDs; if %solids < 10%, J det / R NDs.
Sensitivity:	Identify non-detects > PALs given in Table 1 of the Caneel Bay SAP.
DV Qualifier Definitions:	U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; NJ = the analyte has been "tentatively identified" and the result is usable as an estimated value with indeterminate bias; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.
References:	<i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site</i> , prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP); <i>USEPA National Functional Guidelines for Organic Superfund Methods Data Review</i> , Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017; <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use</i> , OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; <i>USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)</i> , Third Edition, Revision 1, December 1996 and updates, Method 8082A <i>Polychlorinated Biphenyls (PCBs) by Gas Chromatography</i> ; and Eurofins TestAmerica-Canton SOP NC-GC-045 Gas Chromatographic Analysis of PCBs Based on Methods 8082 and 8082A, Rev. 3, 8/31/20

Metals Data Validation Checklist
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

Dates Sampled: 2/19/2021 through 2/22/2021
 Method of Analysis: ICP-MS Metals by 6020B; Mercury by 7471B

No. Samples: 36
 Matrix: Soil

Data Validation Summary Table - EPA Stage 2B: Metals in Soil

QC Met Criteria?+A 5:N14	HT & Preserve	Calibration ICV / CCV / LL check std %R	Calibration Interference Check Stds ICS / ICSAB %R	Lab Blanks MB / ICB / CCBs	Field Blanks	Lab Control Sample LCS %R	Matrix QC MS/MSD %R	Matrix QC MS/MSD RPD	Matrix QC Serial Dilution %D	Field Duplicate RPD	ICP-MS Tune & IS %R	Sensitivity Sample-Specific QLs	Calculation Verification
Yes		√	√		√	√		√	√	√	√		NA
No	Estimate (J+/J) 22 results			Negate (U) 1 result	[EBs included in SDG 240-145189-1]		Estimate (J/UJ) 9 results					74 nondetect results LOQ > PAL	

Other: Estimate (J) 152 results < LOQ
See DV Qualifier definitions and QC evaluation criteria listed at the end of this DV Checklist.

Data Validation Level / Scope:

An EPA-compliant Stage 2B data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALS, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; Standard Reference Material (SRM) recoveries; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 2B DV, no raw data was reviewed nor were any re-calculations of data performed. Data users should reference the EPA Stage 3 data validation performed on SDG 240-145024-1.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? *Yes. A full deliverable, including summary QC, raw instrument data, and preparation information was provided.*
 2. Were all result forms for all samples listed on the chain-of-custody (COC) present in data package? *Yes. ISM and Discrete samples received for Metals analysis. Other samples are included on the COCs in this data package for TCLP analyses, which were not required to be validated based on the Caneel Bay SAP (2021). Note that the lab identified sample "IA-3-02 B" as "IA-3-02 B +MS/MSD" because this was the sample ID exactly as written on the COC; however, the intention was that MS/MSD was to be performed on aliquots of this sample, which it was. The lab data package and EDD therefore identify the unspiked parent sample "IA-3-02 B" as "IA-3-02 B +MS/MSD" and the MS as "IA-3-02 B +MS/MSDMS" and the MSD as "IA-3-02 B +MS/MSDSD." 14 project-specific Metals analyzed as follows: Method 6020B (ICP-MS) for Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Thallium, & Zinc and Method 7471B (CVAA) for Mercury; and % Moisture (% Solids) was also performed to convert Soil sample results to dry-wt basis.*
-

Sample Receipt & Preservation: ISM Soil & Discrete Soil samples were received at Eurofins TestAmerica - Canton lab in multiple coolers on 2/25/2021, 3 to 6 days following sample collection. These samples were reported by the lab in 1 laboratory data package SDG: #240-144999-1. Three of the coolers were received with Temperatures > 6 °C (up to 14.5 °C) with samples in water (ice melted) due to weather and FedEx shipping delays. Sample receipt information listed that samples "IA-3-01A, B, & C arrived out of temp." Additionally, the lab documented that samples IA-2-03 B, IA-2-03 C, IA-3-01 B, and IA-3-01 C have "cooler water in the bag," and SC-3-08 (0-5) had water in the jar from the cooler. Professional judgment used to take no action on Soil samples due to temperature exceedances, which were still received at < room temperatures, would not be expected to affect the usability of Metals soil data and because the ISM soils are air-dried at room temperature for a few days prior to analysis, anyway as part of the preparation procedure. Professional judgment used to take DV action due to cooler water present in sample containers for affected detected results due to potential for contamination. Nondetected results not impacted. Actions taken in SDG 240-145024-1 for samples IA-2-03 B and IA-2-03 C. No actions required for SC-3-08 (0-5) analyzed for TCLP since this parameter was not validated.

***ACTION: Estimate (J+) 22 detected Metals results in samples IA-3-01 B and IA-3-01 C due to potential contamination from cooler water present in the sample containers. Estimated results have a potential high bias unless additional QC exceedance applied, then DV action changed to "J" and cumulative bias is indeterminate.**

Holding Times:

ISM preparation information included in data package: Soils prepared 2/26/2021 through 3/02/2021 in Prep Batch #474833 (Lab SOP NC-OP-044 using 2-D slab cake method), modified to generate a 10g ISM sample for Metals digestion & analysis.

ICP-MS 6020B ISM Soil: Method 3050B - ISM Soil modified to use ~ 10g soil, Prep Batch #475233 on 3/3/2021.

7471B ISM Soil: modified to use ~ 3g soil, Prep Batch #475241 on 3/3/2021.

ICP-MS 6020B Discrete Soil: Prep Batch #474682 on 2/26/2021; Prep Batch #474698 on 2/26/2021; & Prep Batch #474873 on 3/1/2021.

7471B Discrete Soil: Prep Batch #474685 on 2/26/2021; Prep Batch #474703 on 2/26/2021; & Prep Batch #474879 on 3/1/2021.

6020B ICP-MS Metals: analysis 3/1/2021 through 3/4/2021: Acceptable HT < 180 days

7471B CVAA Mercury: analysis 3/2/2021 & 3/4/2021: Acceptable HT < 28 days

Lab Blank Actions: Lab Blank actions (method blanks and instrument blanks as reported on QC Summary Form 3) taken first, applied to all associated field samples. To calculate the sample-specific Blank Action Level (BAL), the ratio of the Sample QL/Blank QL is used since the QLs account for all of the sample-specific analysis factors (e.g. extraction volumes, extract final volume, dilution factors). See Blank evaluation criteria for DV Action at the end of this DV checklist for further details.

4 Method Blanks (MB) were associated with the ISM & Discrete Soil samples in this SDG for 6020B analyses: MB 240-474682/1-A, MB 240-474698/1-A, MB 240-474873/1-A, & MB 240-475233/1-A and 4 MB for 7471B for Mercury: MB 240-474685/1-A, MB 240-474703/1-A, MB 240-474879/1-A, & MB 240-475241/1-A. MBs were nondetect for all 14 project-specific Metals by both methods of analysis except for Beryllium (0.0522 J mg/Kg) in MB 240-474682/1-A (associated with SC-REF-01 (0-0.5) only). Note that the lab reported all initial and continuing blanks for all sample data (including TCLP data that were not validated); however, only the ICBs/CCBs associated with the ISM & Discrete Soil analysis batches were evaluated herein. For lab instrument blanks, blank actions were evaluated for sample(s) analyzed on the same day and associated time(s) as the ICB or CCB.

***ACTION: Negate (U) 1 result at the LOQ due to Method Blank Action as shown on the attached Blank Action Worksheet.**

Field Equipment blanks: The EB associated with the ISM Soil samples is EB-SOIL-20210224, collected on 2/24/2021, and the EB associated with the discrete soil samples is EB-SOIL-20210222-01, collected 2/22/2021. Both EBs are included in SDG 240-145189-1. The EB represents the potential contamination from the soil drill bit used for sample collection for ISM Soil samples and from the sampling spoon for discrete soil samples. The EBs were nondetect for all project-specific Metals except for Copper in both EBs and Chromium in EB-SOIL-20210222-01. The Copper results were negated (U) at the LOQ due to Method Blank Action (see DV Checklist for SDG 240-145189-1). The Chromium result of 0.33 µg/L, converted to soil-equivalent units (using nominal prep factors of 10g initial weight to 500mL final volume; DF=5 for 6020 Metals) = 0.33 µg/L x 100mL/1g x 5 x 1/1000 units conversion = 0.16 mg/Kg (at 100% solids). This value is < the sample LOQs reported for Chromium in the discrete soil samples and all Chromium results were reported at orders-of-magnitude > LOQs (ranging from 12 to 38 mg/Kg Chromium); therefore, No Field Blank Action required.

Initial & Continuing Calibration Check standards / Low Level Check Standards: All 6020B & 7471B ICV, CCV, and ICVL (low-level) calibration checks met SAP/QAPP acceptance criteria of 90-110%R for ICV/CCV and 70-130%R for the ICVL based on QC Summary Form 2A & 2B results. Low level check standards for Mercury met lab limits of 50-150% recovery - Professional judgment used to take no action because these lab control limits for 7471B are considered acceptable for this method even though slightly wider than QAPP limits. Note that the lab did not report low level check standard results on summary Form 2B for 6020B Metals; however, "ICVL" results were reported on Form 2A and no deviations were noted in the lab narrative; therefore, assumed acceptable (raw data not reviewed at EPA Stage 2B DV level). No Action required.

Interference Check Standards: All ICSA/AB results associated with the ISM Soil sample 6020B analyses were acceptable based on QA Summary Form 4A results. No Action required.

ICP-MS Internal Standards Relative Intensity (%RI) & Tune: All IS %RI were acceptable for 6020B ICP-MS based on QC Summary Form 15 results for the IS results associated with the ISM Soil samples and QC. Tune assumed acceptable since no deviations noted in lab narrative (raw data are not reviewed at the EPA Stage 2B DV level). No Action required.

Laboratory Control Sample: 4 LCS performed for 6020B analyses associated with the ISM Soil samples in this SDG: LCS 240-474682/15-A, LCS 240-474698/2-A, LCS 240-474873/3-A, & LCS 240-475233/2-A and 4 LCS for 7471B for Mercury: LCS 240-474685/2-A, LCS 240-474703/2-A, LCS 240-474879/2-A, & LCS 240-475241/2-A. Recoveries for all 14 project-specific Metals by both methods of analysis were acceptable compared to SAP and EPA DV criteria. No LCSD (duplicate) was performed; however, precision in the site matrix can be assessed based on the MS/MSD results. These LCS results are an indication of acceptable accuracy for the lab performance of Metals by Methods 6020B & 7471B. No Action required.

Matrix Spike / Matrix Spike Duplicate: MS/MSD was performed on 5 Soil samples in this SDG for 6020B & 7471B. 3 MS/MSD as defined on the COC for samples IA-3-02 B+MS/MSD, SC-3-11 (0-3), & SC-REF-03 (0-3) plus 2 additional MS/MSDs performed on samples SC-REF-01 (0-0.5) & SC-REF-02 (0-2.6). All MS/MSD recoveries were acceptable compared to SAP criteria except for Antimony, Copper, & Zinc. Antimony recoveries were low (<75% but > 10%) in all MS/MSDs of IA-3-02 B+MS/MSD, SC-3-11 (0-3), SC-REF-01 (0-0.5), SC-REF-02 (0-2.6) & SC-REF-03 (0-3). Copper recoveries were low (<75% but > 10%) in MS & MSD of SC-3-11 (0-3) and Zinc recoveries were low (<75% but >10%) in MS & MSD of SC-REF-03 (0-3). The lab flagged Copper & Zinc recoveries as outside of lab control limits of 80-120%R in IA-3-02 B+MS/MSD; however, they were within SAP/QAPP acceptance limits of 75-125%R; therefore, no action was required other than to remove the "F1" lab qualifier. Post-Digest spike results were reported with acceptable recoveries for all Metals; therefore, the apparent low bias seen in the MS/MSD results was not supported by the Post-Digest spike results. All MS/MSD Relative percent differences (RPDs) were acceptable. These results indicate acceptable accuracy and precision of the project-specific Metals analyzed with the exception of Antimony in all 5 MS/MSD pairs and Copper & Zinc at individual locations. Professional judgment used, as allowed by EPA NFG, to take action on all 3 ISM replicates at this location as associated results and to take action only on the unspiked parent sample for Discrete Soil samples.

***ACTION: Estimate (J or UJ) the Antimony results in samples IA-3-02 A, IA-3-02 B+MS/MSD, IA-3-02 C, SC-3-11 (0-3), SC-REF-01 (0-0.5), SC-REF-02 (0-2.6), & SC-REF-03 (0-3); estimate (J) Copper in sample SC-3-11 (0-3); and estimate (J) Zinc in sample SC-REF-03 (0-3) due to low MS/MSD recoveries not confirmed by post-digest spike recoveries. Estimated results have an indeterminate bias since Post Digest Spike recoveries were acceptable.**

Serial Dilution: Serial dilutions were performed on the same 5 Soil samples used for MS/MSD for 6020B: IA-3-02 B+MS/MSD, SC-3-11 (0-3), SC-REF-01 (0-0.5), SC-REF-02 (0-2.6) & SC-REF-03 (0-3). Note that the lab did not calculate all of the % Differences; however, QC Summary Form 8 lists the initial and serial dilution results and they were all acceptable ($\leq 15\%$ for Soils) for results > 50xMDL. No Action required.

Lab Narrative: No further issues were noted in the lab narrative of the pdf data package that were not already evaluated.

Field Duplicate Samples (FD): 2 sets of FD samples were included in this SDG for Discrete soil samples: SC-3-10 (0-3) / SC-101 & SC-3-10 (3-6) / SC-102. FD precision based on relative percent difference (RPD) of the results met acceptance criteria of $RPD \leq 50\%$ for all project-specific Metals. These results indicate acceptable precision and representativeness of the Discrete Soil samples to the locations sampled. See the following tables for FD RPD calculations.

Metals Data Validation Checklist
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

Field Duplicate Precision Calculations

Analyte	Sample: SC-3-10 (0-3) mg/Kg dry wt	FD: SC-101 mg/Kg dry wt	RPD %	DV Action	Comment
Antimony	0.36 U	0.29 U	NC	none	
Arsenic	1.4	1.7	19	none	
Barium	38	38	0	none	
Beryllium	0.19	0.19	0	none	
Cadmium	0.052 J	0.049 J	6	none	
Chromium	13	13	0	none	
Copper	55	50	10	none	
Lead	2.1	2	5	none	
Mercury	0.11 U	0.099 U	NC	none	
Nickel	7.9	7.7	3	none	
Selenium	0.13 J	0.14 J	7	none	
Silver	0.18 U	0.14 U	NC	none	
Thallium	0.18 U	0.14 U	NC	none	
Zinc	38	33	14	none	
%Solids	93	92.9	0	none	

Analyte	Sample: SC-3-10 (3-6) mg/Kg dry wt	FD: SC-102 mg/Kg dry wt	RPD %	DV Action	Comment
Antimony	0.46 U	0.52 U	NC	none	
Arsenic	1.4	1.9	30	none	
Barium	49	56	13	none	
Beryllium	0.16 J	0.2 J	22	none	
Cadmium	0.12 J	0.15 J	22	none	
Chromium	17	21	21	none	
Copper	56	57	2	none	
Lead	5.3	5.9	11	none	
Mercury	0.048 J	0.055 J	14	none	
Nickel	11	12	9	none	
Selenium	0.18 J	0.21 J	15	none	
Silver	0.036 J	0.048 J	29	none	
Thallium	0.23 U	0.26 U	NC	none	
Zinc	53	58	9	none	
%Solids	80.7	69.8	14	none	

NC = Not calculated

% Solids / % Moisture: Low % Solids (generally considered as < 30%) may indicate sample heterogeneity and introduce uncertainty to the quantitation accuracy. All Soil sample % Solids were > 30% (% Moisture < 70%). No Action required.

Selection of Results for Reporting: The samples in this SDG were analyzed once (7471B for Mercury at dilution factor (DF) = 1 and 6020B Metals at DF=5) for each method and reported with only one result for each metal. No selection of results required.

Qualifier Action: Lab reported 153 results qualified "J" (result reported < LOQ but ≥ MDL). One result was negated (U) due to blank action and the rest were accepted as estimated values due to uncertainty < LOQ. Other qualifiers (in addition to "U") added by the lab to the ISM & Discrete Soil results included: B and F1. These additional lab qualifiers were removed during DV and replaced with appropriate DV qualifier, if required, as described in this DV Checklist.

***ACTION: 152 J-qualified lab results accepted as estimated (J) with indeterminate bias due to Result < LOQ.**

Sensitivity: The results and QLs for nondetected results for the 14 project-specific Metals by Methods 6020B & 7471B were reported on a sample-specific basis in units of mg/Kg dry wt in Soil. Lab-achieved Quantitation Limit (QL) for nondetect results ≤ SAP Project Action Level (PAL) listed in Table 1 for Metals in Soil with the following exceptions: Antimony 27 samples (IA-3-01 B, IA-3-01 C, IA-3-02 A, IA-3-02 B+MS/MSD, IA-3-02 C, IA-REF-02 A, IA-REF-02 B, IA-REF-02 C, SC-101, SC-102, SC-3-03 (0-3), SC-3-03 (0-3), SC-3-03 (3-6), SC-3-04 (0-3), SC-3-04 (3-6), SC-3-06 (0-3), SC-3-06 (3-6), SC-3-07 (0-3), SC-3-07 (3-6), SC-3-08 (3-6), SC-3-09 (0-3), SC-3-09 (3-6), SC-3-10 (0-3), SC-3-10 (3-6), SC-3-11 (0-3), SC-3-11 (3-6), SC-REF-01 (0-0.5), & SC-REF-02 (0-2.6) due to method limitations Cadmium in 2 samples IA-REF-02 A & IA-REF-02 B due to method limitation; Mercury in 10 samples IA-REF-02 A, IA-REF-02 B, SC-101, SC-3-10 (0-3), SC-3-04 (0-3), SC-3-04 (3-6), SC-3-07 (3-6), SC-3-11 (0-3), SC-REF-01 (0-0.5), & SC-REF-02 (0-2.6) due to method limitation; Selenium in 4 samples IA-3-01 B, IA-3-01 C, IA-3-02 C, & SC-3-07 (3-6) due to method limitation; and Thallium in 31 samples = all samples except IA-REF-02 A, SC-3-07 (3-6), SC-3-11 (0-3), SC-REF-01 (0-0.5), & SC-REF-02 (0-2.6). Lab "J" data are reported below the LOQ down to the MDL, to help meet project sensitivity needs (see Qualifier Action section, above).

Data users will need to determine the usability of the 74 non-detected results with LOQs > PALs for project decisions.

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment

QC Measure	Criteria / DV Actions
Preservation & Holding Time	Analysis: ICP/MS Metals Method 6020 / ICP-AES Metals Method 6010: HT = 180d to analysis (aq. & solids); CVAA for Mercury HT = 28d. Actions: >180d all 6020 Metals / >28d Mercury: J detects; Non-detects: R or UJ based on professional judgment if > 2x HT exceedance, may R non-detects. Temperature: outside control limits of ≤ 6°C: use professional judgment. Preservation: Aqueous Total: pH > 2: use professional judgment to qualify results.
Blanks - Lab & Field	Order of Blank Action = Lab Blank actions first, then Field Blank action Matrix-matched Lab Blanks (method and instrument blanks, MB/ICB/CCB) criteria: < LOQ. Only the highest associated lab blank result per batch per metal used to take blank actions; use professional judgment for multiple MBs, ICBs & CCBs per batch. If Blank is < QL: all samples detected < QL negate (U) at the sample-specific QL; all samples detected > QL accept without qualification If Blank is ≥ QL: all samples detected < QL negate (U) at the sample-specific QL; all samples detected > QL but < 10x Blank level, J+ (estimate with a high bias) at the value reported; all samples detected > 10x Blank level accept without qualification [EPA NFG*] If Blank is a negative value (negative drift): use professional judgment Blank Action Level (BAL) = Result reported in Blank x (Sample QL/Blank QL) Field Blanks: matrix-matched aqueous: same actions as for lab blanks Field Blanks: Non-matrix matched (aqueous EB with soil/sediment): convert EB/FB results to soil-equivalent or sediment-equivalent units to calculate BAL using sample prep factors and % solids for dry-weight conversion. Then follow same actions as for lab blanks. *NOTE: The EPA NFG action when MB > QL and sample result is > QL but < 10x MB to report at MB result and use professional judgment to qualify results as estimated high (J+) or unusable (R); however, professional judgment was used to take action as described above for this project.
LCS/LCSD	Aq 80-120%R / RPD ≤ 20%; Solid LCS/LCSD: use vendor or SRM limits. [Note: EPA NFG 70-130% all matrices]. %R<low end %: J- / UJ. %R > high end %: J+ detects. %Rec < 40%: J- detects / R nondetects; > 150% R detects [EPA NFG] RPD > 20%: J / UJ. Actions affect all samples in batch.
MS/MSD	75-125%R. %R < 75% but ≥ 30%(Aq) or ≥ 10%(So) : J- / UJ. %R > 125%: J+ detects; Aq %R < 30%: J- detects / R non-detects; Solid %R < 10%: -J detects / R non-detects. Note must be evaluated cumulatively with Post-digest spike recoveries [EPA NFG]. Actions affect all "similar" metals in batch, using professional judgment to determine affected results as allowed by EPA - may only affect unspiked (native) sample used for MS/MSD. Exception: sample conc. > 4x spike level: no action (spike-added is "swamped out"). Use professional judgment to take no action when only one spike (MS or MSD) was out of control, the other spike was in control, and MS/MSD precision was acceptable.
Post-Digest Spike	75-125%R. EPA NFG requires DV Actions for Post-digest spikes be evaluated cumulatively with MS/MSD recoveries for assessing bias (see above). If MS/MSD recoveries low + Post-digest spike low, J-; If MS/MSD recoveries high + Post-digest spike high, J+. Any other combinations of exceedances that are not comparable; therefore, estimate J with indeterminate bias. Exception: sample conc. > 4x spike level: no action (spike-added is "swamped out").

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment - continued

QC Measure	Criteria / DV Actions
MD/MSD or Lab Duplicate	Aq Results > 5xRL: RPD > 20%: J / UJ affected results to be determined using professional judgment as allowed by EPA. Aq Results < 5xRL: difference > ±RL: J / UJ affected results Soil/Sed Results > 5xRL: RPD > 35%: J / UJ affected results to be determined using professional judgment as allowed by EPA. Soil/Sed Results < 5xRL: difference > ± 2xRL: J / UJ affected results
Field Duplicate [discrete samples only]	Aq Results > 2xQL: RPD > 30%, J / UJ FD results only [SAP Table 19] Aq Results < 2xQL: use professional judgment [consider: absolute difference > ±2xQL, J / UJ] Soil/Sed Results > 2xQL: RPD > 50%, J/UJ FD results only [SAP Table 19] Soil/Sed Results < 2xQL: use professional judgment [consider: absolute difference > ±4xQL, J / UJ]
ICV/CCV	6020B ICV/CCV: 90-110%R; 7471B/7470A ICV/CCV 85-115 %R: recoveries < low end%: J- / UJ; recoveries > high end%: J+ detects; if severe exceedance <75%: R non-detects & J-: detects; > 160%: may R detects.
Low-Level Check standard	Lab SOP limits: 70-130%R [no EPA NFG criteria]. If performed and tabulated in summary QC, use professional judgment to qualify data. Consider: Results < 2xLow-Level Check Standard: < low end: J- / UJ; > high end: J+ detects.
ICSA/AB [6020 only]	Control limits 80-120%R. %R > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects. Also check detected Metals > QL that were not spiked into the ICS: J+ detects. Potential false positives and false negatives: use professional judgment to evaluate (see lab IECs for ICP instrument) and in consideration of sample-specific interferent concentrations.
Serial Dil	Results > 50xMDL: % Difference > 10% for Aqueous and > 15% for Soil/Sed: J/UJ. Use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects [EPA NFG]
Tune [6020 only]	Tune not performed properly: use professional judgment. Resolution of mass calibration > ±0.1 μ or % RSD > 5%: UJ non-detects / J detects.
Internal Standard (IS) [6020 only]	IS criteria for ICP-MS 60-125% Relative Intensity (RI). %RI < 60% or > 125% and original sample reanalyzed at 2-fold dilution: J detects / UJ non-detects; original sample not reanalyzed: J/UJ or R - use professional judgment [EPA NFG]
ISM Replicates [A, B, C]	RSD ≤ 50% for results > 2x LOQ; exceedances J detects / UJ non-detects Results, 2x LOQ use professional judgment.
Sensitivity	Lab-achieved Quantitation Limit (QL) ≤ SAP Project Action Level (PAL) listed in Table 1 for 14 site-specific Metals in Soil. Several Metals are expected to exceed PALs for nondetected results based on lab/method limitations, including antimony, arsenic, selenium, thallium, and mercury. Lab "J" data are reported below the LOQ down to the MDL, to help meet project sensitivity needs.

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment - *continued*

QC Measure	Criteria / DV Actions
EPA NFG DV Qualifiers - definitions from Table 22 of the Caneel Bay SAP (2021)	U = The analyte was analyzed for but was not detected above the level of the reported sample-specific LOQ. UJ = The analyte was not detected above the reported concentration. The reported quantitation limit QL is approximate and may be inaccurate or imprecise. J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. J+ = The result is an estimated quantity, but the result may be biased high. J- = The result is an estimated quantity, but the result may be biased low. R = The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified. LOQ = Level of Quantitation = quantitation limit (QL) for this project <i>Note: Data with DV qualifiers U, UJ, J, J+, and J- are generally usable; data qualified R are unusable for project objectives.</i>
References	<ul style="list-style-type: none"> ▪ <i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP).</i> ▪ <i>USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-135, USEPA-540-R-2017-001, January 2017 (NFG).</i> ▪ <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009.</i> ▪ USEPA SW-846 Methods 6020B (ICP-MS for 13 Metals) & 7471B (CVAA for Mercury). ▪ Eurofins TestAmerica-Canton Lab SOP NC-MT-002: <i>Inductively Coupled Plasma - Mass Spectrometry, Rev. 12, 12/07/20;</i> SOP NC-IP-010 <i>Acid Digestion for Solid Samples, Rev. 9, 10/14/20;</i> SOP NC-MT-14: <i>Preparation and Analysis of Mercury in Aqueous and Solid Samples by Cold Vapor Atomic Absorption Spectroscopy, Rev. 11, 12/07/20.</i>

Metals Blank Action Worksheet
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

#sys_sample_code	chemical_name	result_value	lab_qualifier	LOQ	dilution	BAL	Action	Validator_Qual	Validation_Note
Method 6020B		mg/Kg		mg/Kg					
Lab Blank Actions									
MB 240-474682/1-A	Beryllium	0.0522	J	0.2	5				Blank level ≤ LOQ; therefore BAL = LOQ
SC-REF-01 (0-0.5)	Beryllium	0.18	JB	0.2	5	0.2	Negate	U	Negated at the LOQ due to Method Blank Action
ICB/CCB 3/4/2021 @ 21:58	Cadmium	0.243	J	1	1				Blank level ≤ LOQ; therefore BAL = LOQ
No soil Cadmium results reported associated with this CCB									
ICB/CCB 3/4/2021 @ 21:58	Chromium	3.69	J	2	1				Blank level ≤ LOQ; therefore BAL = LOQ
No soil Chromium results reported associated with this CCB									
<i>BAL = Blank Action Level (see DV Checklist for details)</i>									

Dates Sampled: 2/19/2021 through 2/22/2021
 Method of Analysis: EPA SW846 Method 9045D

No. Samples: 26
 Matrix: Soil

Data Validation Summary Table - EPA Stage 2B: pH in Soil

QC Met Criteria?	HT & Preserve	Calibration ICV / CCV %R	Lab Blanks MB / ICB / CCBs	Field Blanks	Lab Control Sample LCS %R	LCSD RPD	Matrix QC MS %R	Matrix QC MD/LR RPD	Field Duplicate RPD	% Solids ≥ 30%	Sensitivity	Calculation Verification	Other
Yes		√	NA	NA	NA	NA	NA	√	√	√	√	NA	NA
No	Estimate (J) 26 results												

Other: See DV Qualifier definitions and QC evaluation criteria listed at the end of this DV Checklist.

Data Validation Level / Scope:

An EPA-compliant Stage 2B data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALs, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 2B DV, no raw data or instrument-specific QC (unless tabulated on QC summary forms) were reviewed and calculation verification is not performed.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? *Yes. A full deliverable, including summary QC, raw instrument data, and preparation information was provided.*
2. Were all result forms for all samples listed on the chain-of-custody (COC) present in data package? *Yes. Discrete soil samples received for pH (along with other analyses presented in separate DV Checklists) present in the data package 240-144999-1. Lab reported pH and Corrosivity as the same analytical results but under two separate chemical names. They are the same analysis reported twice by the lab for each sample.*

Sample Receipt & Preservation: 26 Discrete Soil samples for pH were received at ELLE-TestAmerica Canton lab in multiple coolers on 2/25/2021, 3 to 6 days following sample collection. These samples were reported by the lab in 1 laboratory data package SDG: #240-144999-1. Three of the coolers were received with Temperatures > 6 °C (up to 14.5 °C) with samples in water (ice melted) due to weather and FedEx shipping delays. Sample receipt information listed that samples "IA-3-01A, B, & C arrived out of temp." Additionally, the lab documented that samples IA-2-03 B, IA-2-03 C, IA-3-01 B, and IA-3-01 C have "cooler water in the bag," and SC-3-08 (0-5) had water in the jar from the cooler. None of these samples were analyzed for pH; therefore, No Action required.

Holding Times: SAP/QAPP HT ≤ 1 day (24h) from sample collection.

The samples in this SDG were received outside of pH HT and analyzed 2 days following receipt:

Samples IA-REF-02, SC-3-03 (0-3), SC-3-03 (3-6), SC-3-04 (0-3), SC-3-04 (3-6), SC-3-06 (0-3), SC-3-06 (3-6), SC-3-07 (0-3), & SC-3-07 (3-6): collected 2/19/2021; analyzed 2/27/2021 = 8 days HT

Samples IA-2-01 & IA-2-02: collected 2/20/2021; analyzed 2/27/2021 = 7 days HT

Samples IA-3-01, IA-3-02, SC-3-08 (0-3), SC-3-08 (3-6), SC-3-09 (0-3), SC-3-09 (3-6), SC-3-11 (0-3), SC-3-11 (3-6), SC-REF-01 (0-0.5), SC-REF-02 (0-2.6), & SC-REF-03 (0-3): collected 2/21/2021; analyzed 2/27/2021 = 6 days HT

Samples SC-101, SC-102, SC-3-10 (0-3), & SC-3-10 (3-6): collected 2/22/2021; analyzed 2/27/2021 = 5 days HT

***ACTION: Estimate (J) pH results in all 26 samples due to HT exceedance. Estimated results have an indeterminate bias as it is not known how the pH might change in the soil over time.**

Lab Blank Actions: Not applicable to pH method.

Field Equipment blanks: No EB was collected and none required to be associated with the Soil sample for pH, based on the SAP.

Initial & Continuing Calibration Check standards: All CCVs reported on summary QC forms met SAP acceptance criteria of ± 3% true value (97-103% recovery for pH = 7 CCV). Note that lab limits were tighter at 99-101% recovery and all CCVs met the tighter criteria. No Action required.

Laboratory Control Sample: LCS not required for pH [consistent with SAP] - see CCV for method accuracy information.

Matrix Duplicate / Lab Duplicate: Lab Replicate/Lab Duplicate was performed on soil samples SC-101 & SC-3-04 (0-3) for pH in soil in this SDG. Relative percent differences (RPDs) were acceptable compared to SAP limits of RPD ≤10% indicating acceptable precision for pH in the soils at these locations. No Action required.

Lab Narrative: No further issues noted in the lab narrative that have not already been addressed.

Field Duplicate Samples (FD): 2 sets of FD samples were included in this SDG for Discrete soil samples: SC-3-10 (0-3) / SC-101 & SC-3-10 (3-6) / SC-102. FD precision based on relative percent difference (RPD) of the results met SAP acceptance criteria of $RPD \leq 15\%$ for pH. These results indicate acceptable precision and representativeness of the Discrete Soil samples to the locations sampled for pH. See the following tables for FD RPD calculations.

Field Duplicate Precision Calculations

Analyte	Sample: SC-3-10 (0-3) s.u.	FD: SC-101 s.u.	RPD %	DV Action	Comment
pH	8.9	8.5	5	none	

Analyte	Sample: SC-3-10 (3-6) s.u.	FD: SC-102 s.u.	RPD %	DV Action	Comment
pH	8.9	8.8	1	none	

Sensitivity: The results for pH were reported in standard pH units (s.u.) for Soils. No Project Action Limit (PAL) was listed for pH in the Caneel Bay SAP Table 1 for Soil pH. All pH results in the discrete soils were reported to ± 0.1 s.u.; therefore, sensitivity considered acceptable compared to method requirements.

Qualifier Action: Lab applied qualifier "HF" to pH data. The lab definition for this qualifier is "Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request." The "HF" qualifier was removed for validated pH results. DV Actions taken for HT exceedances as documented above. No further action required.

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment

QC Measure	Criteria / DV Actions
Preservation & Holding Time	HT pH in soil/ sediment: 1 day [SAP criteria]. Actions: analysis > HT: J pH results. Temperature: outside control limits of ≤ 6 °C: use professional judgment.
Blanks - Lab & Field	Not applicable to pH.
LCS	See CCV.
MD or Lab Duplicate Lab Replicate	Soil/Sediment RPD $\leq 10\%$. Actions for RPD exceedance: J associated/affected results to be determined using professional judgment as allowed by EPA.
Field Duplicate	RPD $\leq 15\%$ [SAP criteria]; Actions: J exceedance
CCV	CCV: $\pm 3\%$ of True Value [SAP criteria]: CCV = 97-103%R for pH = 7. %R < low end%: J- ; recoveries > high end%: J+ detects.
Sensitivity	No PAL listed for pH.

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment - continued

QC Measure	Criteria / DV Actions
EPA NFG DV Qualifiers - definitions from Table 22 of the Caneel Bay SAP (2021)	<p>U = The analyte was analyzed for but was not detected above the level of the reported sample-specific LOQ.</p> <p>UJ = The analyte was not detected above the reported concentration. The reported quantitation limit QL is approximate and may be inaccurate or imprecise.</p> <p>J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.</p> <p>J+ = The result is an estimated quantity, but the result may be biased high.</p> <p>J- = The result is an estimated quantity, but the result may be biased low.</p> <p>R = The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.</p> <p>LOQ = Level of Quantitation = quantitation limit (QL) for this project</p> <p><i>Note: Data with DV qualifiers U, UJ, J, J+, and J- are generally usable; data qualified R are unusable for project objectives.</i></p>
References	<ul style="list-style-type: none"> ▪ <i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site</i>, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP). ▪ <i>USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review</i>, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-135, USEPA-540-R-2017-001, January 2017 (NFG). ▪ <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use</i>, OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009. ▪ USEPA SW-846 Method 9045D. ▪ Eurofins TestAmerica-Canton Lab SOP NC-WC-0101: <i>pH Electrometric Method [Methods: SW846 Methods 9040B, 9040C, 9041A, 9045C and 9045D, and SM4500 H⁺ B]</i>, Rev. 16, 07/30/2019.



Data Validation Summary Report

Client/Company:	VHB
Site/Project Name:	National Park Service (NPS) – Caneel Bay Resort EE/CA, US Virgin Islands
Laboratory:	Eurofins TestAmerica-Canton, North Canton, OH
SDGs/Lab Project #:	240-145024-1 (J145024)
Date(s) of Collection:	February 17, 2021 - February 19, 2021
Samples & Analyses:	6 Incremental Sampling Methodology (ISM) soil samples + 4 Discrete soil samples for project-specific lists of Metals, Polycyclic Aromatic Hydrocarbons (PAHs), Pesticides, & PCB Aroclors 3 Discrete soil samples for Volatile Organic Compounds (VOCs) 6 Discrete soil samples for pH
Senior Data Reviewers:	Susan D. Chapnick, M.S., New Environmental Horizons, Inc. & Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Date Completed:	April 16, 2021

USEPA Stage 3 data validation (DV) review was performed for all analyses except VOC & pH, which were validated at the Stage 2B DV level based on the following documents: *Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site*, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (SAP); USEPA *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*, OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; USEPA *National Functional Guidelines for Organic Superfund Methods Data Review*, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017 (NFG); USEPA *National Functional Guidelines for Inorganic Superfund Methods Data Review*, OLEM 9355.0-135, USEPA-540-R-2017-001, January 2017 (NFG); USEPA SW-846 Methods and others as specified herein; and professional judgment.

Data Validation Summary

During this USEPA Stage 3 DV review of Metals, PAHs, Pesticides, and PCB Aroclors and the Stage 2B DV review of VOCs and pH, all VOC results except for 3 detects were rejected (R) and other sample results were negated (U) or estimated (J or J-) due to QC issues. NEH generated a validated electronic data deliverable (EDD) based on the EDD file received from the laboratory. All sample data are considered usable for project decisions with the understanding of the potential uncertainty (bias) in the qualified results, with the exception of the 147 rejected results that are not usable for project decisions.

The following QC elements, as presented on summary QC forms and as applicable to the analytical methods, were reviewed:

- Data package completeness and agreement of analyses with Chain-of-Custody (COC)
- Sample receipt, holding times, and preservation criteria
- Calibration verification (tune checks, initial and continuing calibrations)
- Method blank and field equipment blank results
- Internal Standard relative intensities
- Laboratory Control Sample (LCS) recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) recoveries
- MS/MSD and Field Duplicate (FD) relative percent differences (RPDs)
- Other method-specific QC if applicable and reported (*e.g.*, serial dilution results)
- Evaluation of laboratory qualifiers applied to the data
- Calculation verification of one sample result per media per method of analysis*
- Calculation verification of one sample-specific limit of quantitation (LOQ) per media per method of analysis*
- Sensitivity evaluation – comparison of LOQs to project action limits
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

**For EPA Stage 2B DV, calculation verification of LOQ and sample results as well as review of raw instrument data are not required or performed.*

This DV Report consists of three parts: 1) the DV Summary Report; 2) the DV Checklists for each media and analysis method, which detail all of the QC reviewed and the issues that required action or affected the data certainty in terms of accuracy, precision, representativeness, and sensitivity; and 3) the validated EDD, which includes the USEPA DV qualifiers added to the results and validation notes to document bias and reasons for the DV actions.

Sensitivity evaluation was based on reviewing non-detects compared to the Project Action Limits (PALs) listed in Table 1 of the Caneel Bay SAP. All non-detects met sensitivity requirements except for Antimony in samples IA-2-03 B, IA-2-03 C, IA-2-04 A, IA-2-04 B, SC-3-01 (0.5-2.5), SC-3-02 (0-3.0), & SC-3-02 (3-6); Mercury in samples SC-3-01 (0.5-2.5), SC-3-02 (0-3.0), & SC-3-02 (3-6); Silver in sample SC-3-02 (3-6); Thallium in samples IA-2-03 A, IA-2-03 B, IA-2-03 C, IA-2-04 A, IA-2-04 B, IA-2-04 C, & SC-3-

02 (3-6) due to method limitations; and Aldrin, beta-BHC, 4,4'-DDD, Endrin, Aroclor 1242, Aroclor 1248, and Aroclor 1254 in all samples; gamma-BHC (Lindane) in samples IA-2-04 A, SC-3-01 (0.5-2.5), SC-3-01 (5-6), and SC-3-02 (3-6); 4,4'-DDE in sample SC-3-02 (0-3.0); 4,4'-DDT in samples IA-2-04 A, SC-3-02 (0-3.0), and SC-3-02 (3-6); Dieldrin in all samples except IA-2-04 B and IA-2-04 C; and Heptachlor in sample IA-2-04 A due to method limitations and sample-specific preparation & dilution factors. Ultimately, the data user will need to evaluate the usability of these non-detects above PALs for project decisions. See the DV Checklist for further details.

Table 1 in this DV Summary Report presents the samples and analytical parameters validated and Table 2 (attached) summarizes the DV actions taken as an excerpt from the validated EDD.

Table 1. Samples and Analytical Parameters Validated

Sample ID	Lab ID	Sampling Date	Matrix	Analytical Parameters¹	Sample Type²
SC-3-01 (5-6)	240-145024-1	2/17/2021	Soil	Metals, VOC, PAH, Pest, PCB & pH	Discrete Field Sample
SC-3-01 (0.5-2.5)	240-145024-2	2/17/2021	Soil	Metals, VOC, PAH, Pest, PCB & pH	Discrete Field Sample
IA-2-04	240-145024-3	2/18/2021	Soil	pH	Discrete Field Sample
IA-2-04 A	240-145024-4	2/18/2021	Soil	Metals, PAH, Pest & PCB	ISM Field Sample
IA-2-04 B	240-145024-5	2/18/2021	Soil	Metals, PAH, Pest & PCB	ISM Field Sample
IA-2-04 C	240-145024-6	2/18/2021	Soil	Metals, PAH, Pest & PCB	ISM Field Sample
IA-2-03	240-145024-7	2/18/2021	Soil	pH	Discrete Field Sample
IA-2-03 A	240-145024-8	2/18/2021	Soil	Metals, PAH, Pest & PCB	ISM Field Sample
IA-2-03 B	240-145024-9	2/18/2021	Soil	Metals, PAH, Pest & PCB	ISM Field Sample
IA-2-03 C	240-145024-10	2/18/2021	Soil	Metals, PAH, Pest & PCB	ISM Field Sample
SC-3-02 (0-3.0)	240-145024-12	2/19/2021	Soil	Metals, PAH, Pest, PCB & pH	Discrete Field Sample
SC-3-02 (3-6)	240-145024-13	2/19/2021	Soil	Metals, VOC, PAH, Pest, PCB & pH	Discrete Field Sample

¹ All soils were also analyzed for % Moisture / % Solids to convert results to a dry-weight basis. Additional analyses were performed for Waste Characterization including TCLP; these additional parameters were not validated based on SAP requirements.

² ISM Soils prepared by Lab SOP NC-OP-044 Soil Processing, Rev.4, 1/13/2021 (included in the SAP), using the 2-D slab cake method and modified to generate a 10g ISM sample for Metals and to generate a 30g ISM sample for organics.

Analytical Methods

Metals: USEPA SW-846 Method 6020B for 13 Metals & 7471B for Mercury
VOC: USEPA SW-846 Method 8260C for 50 VOCs
PAH: USEPA SW-846 Method 8270D for 18 PAHs
Pest: USEPA SW-846 Method 8081B for 22 pesticides
PCB: USEPA SW-846 Method 8082A for 7 PCB Aroclors
pH: USEPA SW-846 Method 9045D

USEPA DV Qualifiers

U = The analyte was analyzed for but was not detected above the level of the reported sample-specific LOQ.

UJ = The analyte was not detected above the reported concentration. The reported quantitation limit (LOQ) is approximate and may be inaccurate or imprecise.

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity, but the result may be biased high.

J- = The result is an estimated quantity, but the result may be biased low.

R = The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table 2. Summary of Data Validation Actions
Caneel Bay SDG 240-145024-1

AR-001864

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect_YN	Units	DV Qualifier	DV Comment	DV Level
IA-2-03 A	240-145024-8	SW-846 6020B	Cadmium	0.17	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03 A	240-145024-8	SW-846 6020B	Selenium	0.27	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03 A	240-145024-8	SW-846 6020B	Antimony	0.23	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03 A	240-145024-8	SW-846 6020B	Beryllium	0.25	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03 A	240-145024-8	SW-846 6020B	Silver	0.059	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 6020B	Silver	0.054	Y	mg/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 6020B	Selenium	0.27	Y	mg/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 6020B	Nickel	17	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 6020B	Zinc	95	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 6020B	Beryllium	0.24	Y	mg/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 6020B	Arsenic	3.9	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 6020B	Barium	54	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 6020B	Cadmium	0.16	Y	mg/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 6020B	Lead	12	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 6020B	Copper	72	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 6020B	Chromium, Total	31	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 6020B	Arsenic	3.7	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 6020B	Barium	56	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 6020B	Beryllium	0.24	Y	mg/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 6020B	Lead	11	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 6020B	Zinc	94	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 6020B	Silver	0.054	Y	mg/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 6020B	Nickel	18	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 6020B	Selenium	0.27	Y	mg/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 6020B	Cadmium	0.15	Y	mg/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 6020B	Chromium, Total	32	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 6020B	Copper	75	Y	mg/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 6020B	Selenium	0.26	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 6020B	Silver	0.096	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 6020B	Cadmium	0.26	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 6020B	Beryllium	0.27	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 6020B	Silver	0.082	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 6020B	Selenium	0.27	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 6020B	Beryllium	0.23	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 6020B	Cadmium	0.22	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 C	240-145024-6	SW-846 6020B	Beryllium	0.23	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 C	240-145024-6	SW-846 6020B	Selenium	0.27	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 C	240-145024-6	SW-846 6020B	Antimony	0.17	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 C	240-145024-6	SW-846 6020B	Silver	0.11	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 6020B	Thallium	0.052	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 6020B	Selenium	0.13	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 6020B	Silver	0.028	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 6020B	Beryllium	0.15	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 6020B	Cadmium	0.13	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (5-6)	240-145024-1	SW-846 6020B	Cadmium	0.15	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (5-6)	240-145024-1	SW-846 6020B	Antimony	0.12	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (5-6)	240-145024-1	SW-846 6020B	Thallium	0.1	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (5-6)	240-145024-1	SW-846 6020B	Selenium	0.27	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (5-6)	240-145024-1	SW-846 6020B	Silver	0.049	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (0-3.0)	240-145024-12	SW-846 6020B	Cadmium	0.072	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (0-3.0)	240-145024-12	SW-846 6020B	Thallium	0.053	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (0-3.0)	240-145024-12	SW-846 6020B	Silver	0.018	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (0-3.0)	240-145024-12	SW-846 6020B	Arsenic	0.61	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (0-3.0)	240-145024-12	SW-846 6020B	Selenium	0.094	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (3-6)	240-145024-13	SW-846 6020B	Cadmium	0.071	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (3-6)	240-145024-13	SW-846 6020B	Arsenic	0.71	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (3-6)	240-145024-13	SW-846 6020B	Selenium	0.15	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03 A	240-145024-8	SW-846 7471B	Mercury	0.041	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 7471B	Mercury	0.05	Y	mg/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3

Table 2. Summary of Data Validation Actions
Caneel Bay SDG 240-145024-1

AR-001865

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect_YN	Units	DV Qualifier	DV Comment	DV Level
IA-2-03 C	240-145024-10	SW-846 7471B	Mercury	0.035	Y	mg/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 7471B	Mercury	0.042	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 7471B	Mercury	0.052	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 C	240-145024-6	SW-846 7471B	Mercury	0.05	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (5-6)	240-145024-1	SW-846 7471B	Mercury	0.04	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03 A	240-145024-8	SW-846 8081B	4,4-DDT	4.1	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 3
IA-2-03 A	240-145024-8	SW-846 8081B	Chlordane, Technical	310	N	ug/kg	U	Result negated due to Dual Column imprecision + LOQ raised	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8081B	4,4-DDE	13	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8081B	4,4-DDT	4.5	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Dual Column imprecision + Result < LOQ	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8081B	4,4-DDE	8.9	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8081B	4,4-DDT	2.1	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Dual Column imprecision + Result < LOQ	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8081B	trans-Chlordane	15	N	ug/kg	U	Result negated due to Dual Column imprecision + LOQ raised	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 8081B	trans-Chlordane	6.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 8081B	Endosulfan Sulfate	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 8081B	Endosulfan II	27	Y	ug/kg	J-	Bias Low: Dual Column imprecision	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 8081B	Endosulfan I	9.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 8081B	4,4-DDE	22	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 8081B	Endosulfan II	26	N	ug/kg	U	Result negated due to Dual Column imprecision + LOQ raised	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 8081B	Chlordane, Technical	17	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 8081B	4,4-DDT	4.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 8081B	trans-Chlordane	2.4	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 8081B	Dieldrin	2.1	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 3
IA-2-04 C	240-145024-6	SW-846 8081B	trans-Chlordane	6.3	Y	ug/kg	J-	Bias Low: Dual Column imprecision	EPA Stage 3
IA-2-04 C	240-145024-6	SW-846 8081B	Chlordane, Technical	34	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 3
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8081B	4,4-DDT	2.2	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 3
SC-3-01 (5-6)	240-145024-1	SW-846 8081B	4,4-DDT	2.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (5-6)	240-145024-1	SW-846 8081B	4,4-DDE	3.1	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 3
SC-3-02 (3-6)	240-145024-13	SW-846 8081B	trans-Chlordane	11	N	ug/kg	U	Result negated due to Dual Column imprecision + LOQ raised	EPA Stage 3
SC-3-02 (3-6)	240-145024-13	SW-846 8081B	4,4-DDE	4.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (3-6)	240-145024-13	SW-846 8081B	Endosulfan II	8.3	Y	ug/kg	J-	Bias Low: Dual Column imprecision	EPA Stage 3
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Methyl Tert-Butyl Ether	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Methyl Acetate	39	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Methylcyclohexane	16	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Styrene	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Methylene chloride	39	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Ethylbenzene	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Dichlorodifluoromethane	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	1,2-Dibromoethane	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Isopropylbenzene	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	n-Hexane	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Trichloroethene	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	trans-1,3-Dichloropropene	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Trichlorofluoromethane	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Vinyl chloride	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Xylenes, Total	16	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Tetrahydrofuran	32	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Tetrachloroethene	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	trans-1,2-Dichloroethene	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Toluene	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	1,2-Dichloropropane	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	1,3-Dichlorobenzene	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	1,2-Dichloroethane	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	2-Hexanone	32	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	1,4-Dichlorobenzene	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	Methyl ethyl ketone	32	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	1,2-Dichlorobenzene	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	1,1,2-Trichloro-1,2,2-trifluoroethane	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	1,1,2-Trichloroethane	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8260C	1,1,1-Trichloroethane	7.9	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B

Table 2. Summary of Data Validation Actions
Caneel Bay SDG 240-145024-1

AR-001867

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect_YN	Units	DV Qualifier	DV Comment	DV Level
SC-3-01 (5-6)	240-145024-1	SW-846 8260C	1,1,2-Trichloro-1,2,2-trifluoroethane	7.4	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (5-6)	240-145024-1	SW-846 8260C	Bromoform	7.4	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (5-6)	240-145024-1	SW-846 8260C	Benzene	7.4	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (5-6)	240-145024-1	SW-846 8260C	Acetone	37	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (5-6)	240-145024-1	SW-846 8260C	Carbon Tetrachloride	7.4	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (5-6)	240-145024-1	SW-846 8260C	Carbon disulfide	7.4	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (5-6)	240-145024-1	SW-846 8260C	Bromomethane	7.4	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (5-6)	240-145024-1	SW-846 8260C	2-Hexanone	29	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (5-6)	240-145024-1	SW-846 8260C	1,4-Dichlorobenzene	7.4	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (5-6)	240-145024-1	SW-846 8260C	1,3-Dichlorobenzene	7.4	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (5-6)	240-145024-1	SW-846 8260C	4-Methyl-2-Pentanone	29	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-01 (5-6)	240-145024-1	SW-846 8260C	Methyl ethyl ketone	29	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Tetrachloroethene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Styrene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Tetrahydrofuran	20	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Methyl Acetate	25	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Isopropylbenzene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Methylene chloride	25	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Methylcyclohexane	10	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Vinyl chloride	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Trichlorofluoromethane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Methyl Tert-Butyl Ether	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Xylenes, Total	10	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	trans-1,2-Dichloroethene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Toluene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Trichloroethene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	trans-1,3-Dichloropropene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	n-Hexane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Methyl ethyl ketone	20	Y	ug/kg	J-	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	2-Hexanone	20	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	1,4-Dichlorobenzene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	1,2-Dichloropropane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	1,3-Dichlorobenzene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Bromoform	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Bromomethane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Benzene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	4-Methyl-2-Pentanone	20	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Acetone	120	Y	ug/kg	J-	Bias Low: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	1,1-Dichloroethane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	1,1-Dichloroethene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	1,1,2-Trichloroethane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	1,1,2,2-Tetrachloroethane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	1,1,2-Trichloro-1,2,2-trifluoroethane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	1,2,4-Trichlorobenzene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	1,2-Dichloroethane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	1,2-Dichlorobenzene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	1,2-Dibromo-3-chloropropane	10	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	1,1,1-Trichloroethane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Carbon Tetrachloride	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Carbon disulfide	1.4	Y	ug/kg	J	Bias Indeterminate: Sample preservation issue + HT exceedance + Result < LOQ	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	1,2-Dibromoethane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Chlorobenzene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Chloroform	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Chloroethane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Dibromochloromethane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Ethylbenzene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	cis-1,3-Dichloropropene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	cis-1,2-Dichloroethene	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Chloromethane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B

Table 2. Summary of Data Validation Actions
Caneel Bay SDG 240-145024-1

AR-001868

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect_YN	Units	DV Qualifier	DV Comment	DV Level
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Cyclohexane	10	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Dichlorodifluoromethane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
SC-3-02 (3-6)	240-145024-13	SW-846 8260C	Bromodichloromethane	5.1	N	ug/kg	R	Unusable: Sample preservation issue + HT exceedance	EPA Stage 2B
IA-2-03 A	240-145024-8	SW-846 8270D	Fluorene	5.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03 A	240-145024-8	SW-846 8270D	Indeno(1,2,3-cd)pyrene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03 A	240-145024-8	SW-846 8270D	Naphthalene	6.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03 A	240-145024-8	SW-846 8270D	2-Methylnaphthalene	5.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03 A	240-145024-8	SW-846 8270D	Acenaphthene	5.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03 A	240-145024-8	SW-846 8270D	Anthracene	6.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	Pyrene	100	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	Benz(k)fluoranthene	38	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	Chrysene	66	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	Benz(g,h,i)perylene	17	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	Fluorene	7.4	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	Fluoranthene (Idryl)	120	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	2-Methylnaphthalene	4.6	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	Acenaphthene	7.7	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	Benz(a)pyrene	64	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	Benz(b)fluoranthene	100	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	Anthracene	12	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	Benz(a)anthracene	62	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	Naphthalene	4.9	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	Indeno(1,2,3-cd)pyrene	18	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 B	240-145024-9	SW-846 8270D	Phenanthrene	70	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8270D	Fluorene	5.4	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8270D	Indeno(1,2,3-cd)pyrene	27	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8270D	Fluoranthene (Idryl)	83	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8270D	Chrysene	46	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8270D	Naphthalene	4.5	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8270D	Pyrene	64	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8270D	Phenanthrene	45	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8270D	Benz(k)fluoranthene	31	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8270D	Acenaphthene	5.3	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8270D	Benz(b)fluoranthene	55	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8270D	Benz(g,h,i)perylene	31	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8270D	Benz(a)pyrene	45	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8270D	Anthracene	6.7	Y	ug/kg	J	Bias Indeterminate: Potential Contamination + Result < LOQ	EPA Stage 3
IA-2-03 C	240-145024-10	SW-846 8270D	Benz(a)anthracene	40	Y	ug/kg	J+	Bias High: Potential contamination	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 8270D	Naphthalene	7.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 8270D	Benz(a)anthracene	14	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 8270D	Anthracene	5.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 8270D	1-Methylnaphthalene	8.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 8270D	2-Methylnaphthalene	9.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 8270D	Fluorene	8.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 A	240-145024-4	SW-846 8270D	Benz(a)pyrene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 8270D	Anthracene	9.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 8270D	Acenaphthene	6.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 8270D	1-Methylnaphthalene	5.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 8270D	2-Methylnaphthalene	9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 8270D	Naphthalene	8.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 8270D	Indeno(1,2,3-cd)pyrene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 B	240-145024-5	SW-846 8270D	Fluorene	10	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 C	240-145024-6	SW-846 8270D	Naphthalene	9.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 C	240-145024-6	SW-846 8270D	Anthracene	9.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-04 C	240-145024-6	SW-846 8270D	Benz(g,h,i)perylene	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8270D	Fluorene	6.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8270D	Indeno(1,2,3-cd)pyrene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8270D	Benz(k)fluoranthene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8270D	Acenaphthene	8.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3

Table 2. Summary of Data Validation Actions
Caneel Bay SDG 240-145024-1

AR-001869

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect_YN	Units	DV Qualifier	DV Comment	DV Level
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8270D	Benz(g,h,i)perylene	15	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 8270D	Anthracene	4.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (5-6)	240-145024-1	SW-846 8270D	Benz(a)anthracene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (5-6)	240-145024-1	SW-846 8270D	Benz(a)pyrene	15	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-01 (5-6)	240-145024-1	SW-846 8270D	Chrysene	15	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (3-6)	240-145024-13	SW-846 8270D	Pyrene	8.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (3-6)	240-145024-13	SW-846 8270D	Phenanthrene	7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (3-6)	240-145024-13	SW-846 8270D	Chrysene	9.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (3-6)	240-145024-13	SW-846 8270D	Fluoranthene (ldryl)	8.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (3-6)	240-145024-13	SW-846 8270D	Benz(b)fluoranthene	7.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
SC-3-02 (3-6)	240-145024-13	SW-846 8270D	Benz(a)anthracene	6.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 3
IA-2-03	240-145024-7	SW-846 9045D	pH	7.9	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 3
IA-2-04	240-145024-3	SW-846 9045D	pH	8.4	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 3
SC-3-01 (0.5-2.5)	240-145024-2	SW-846 9045D	pH	8.2	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 3
SC-3-01 (5-6)	240-145024-1	SW-846 9045D	pH	8.1	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 3
SC-3-02 (0-3.0)	240-145024-12	SW-846 9045D	pH	8.7	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 3
SC-3-02 (3-6)	240-145024-13	SW-846 9045D	pH	8.5	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 3

Dates Sampled: 2/17/2021 - 2/19/2021

Method of Analysis: Volatile Organic Compounds (VOCs) by Method 8260C

No. Samples: 3

Matrix: Soil

Data Validation Summary Table - EPA Stage 2B: Volatile Organic Compounds (VOCs) in Soil

Data Element	HT & Preservation	Blank Actions	Surrogate	LCS/LCSD	MS/MSD	LD / FD	Tunes / ICAL	LOQ & Quant. Correct	IS	%Solids
Acceptable							CCV			
Yes		√	√	√	NA	NA	√	√	√	√
No	Reject (R) 147 & Estimate (J- or J) 3 results									

Other Issues: Qualifier Actions: 1"J" qualified lab result accepted as an estimated (J) result

Selection of results for Reporting: not required.

Comments:

An EPA-compliant Stage 2B data validation review was performed on Quality Control forms associated with this data package, which involved evaluation of the following (where applicable): agreement of analyses conducted with COC requests; Holding times and sample preservation; Laboratory blank and field blank results compared to field sample results; Field Duplicate results; surrogate recoveries; LCS/LCSD (or equivalent) results; MS/MSD results; Laboratory Duplicate results; Quantitation limits compared to Project Action Limits; Instrument Tune acceptability; Initial and Continuing Calibration acceptability; and evaluation of laboratory qualifiers applied to the dataset. The project narrative was also reviewed to determine whether additional issues were found that weren't reported in the QC previously evaluated. No raw data was reviewed nor were any re-calculations of data performed. Data users should reference the EPA Stage 3 data validation performed on SDG 240-145042-1.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? Yes. A full data deliverable (called Level 4), including results, summary QC, and all raw data, was provided for review.
2. Were all result forms for all samples listed on the chain-of-custody present in data package? Yes, discreet soils received for total VOC analysis and TCLP VOC analysis. The samples analyzed for TCLP did not require validation. Note, in the EDD the sample names were missing the foot (') designations that appeared on the COC and on the hardcopy report.

Sample Receiving: Discrete soil samples were received at Eurofins TestAmerica - Canton lab in multiple coolers on 2/25/2021, 6 to 8 days following sample collection. The coolers containing the VOC samples for TCLP analysis (i.e., "Terra-Core" samples) were received in coolers < 6 °C; however, the samples were outside of HT since they needed to be frozen within 48 hours of collection. The discreet soils for total VOC analysis were received in coolers > 6 °C and the low-level water-preserved aliquots were also received outside of holding time. Sample SC-03-05 (0.5') as listed on the COC for TCLP analysis was changed to SC-03-02 (0.5') based on client request. The TCLP VOC samples did not require validation.

Selection of Results for Reporting: all samples were analyzed only once at DF=1. No Selection of results required.

Holding Time (HT) evaluation: Samples were only analyzed as low-level aliquots even though, according to VHB, medium-level methanol-preserved aliquots were collected and the Caneel Bay SAP only required medium-level VOC analysis since it was known that it would be unlikely that the low-level soils could have been preserved properly due to location of sampling (Virgin Islands) versus location for sample analysis (Canton, Ohio). Upon receipt, the laboratory froze the low-level aliquots; however, there was no mention in the narrative or raw data about the methanol-preserved aliquots. Since the samples were received outside of temperature requirements and were not frozen within 48 hours (frozen 144 hours past the 48 hours required HT), all VOC data for the discreet soil samples are uncertain. All VOC results in the 21 discrete soils were non-detect except for 17 detected results. Samples were analyzed in QC Batch 240-475067 on 3/2/2021.

***ACTION: Methyl ethyl ketone, acetone, and carbon disulfide in sample SC-3-02 (3-6) estimated (J-) with possible low bias, unless other issues affect the data, and all non-detects in all samples rejected (R) as possible false negatives due to sample preservation issues + HT exceedances (147 results rejected) (Note, 1 low bias (J-) result changed to indeterminate bias (J) due to cumulative bias).**

Blank Evaluation: Method Blank = MB 240-475067/6; Trip Blanks = none; and Equipment Blank (EB) = EB-SOIL-20210224 and EB-SOIL-20210222-01 (reported in SDG 240-145189-1). The Method Blank and EBs were non-detect for the 3 detected results; therefore, Blank Action to negate or estimate data not required.

Surrogates: all 4 surrogates (dibromofluoromethane, 1,2-dichloroethane-d4, toluene-d8, and 4-bromofluorobenzene) were recovered within lab acceptance criteria (80-120%) in all samples and QC - no action required.

LCS/LCSD: LCS240-475067/5 - no LCSD performed. Lab used in-house limits to judge acceptability of LCS recovery; however, here, Caneel Bay SAP Criteria (Table 19) 70-130% used to judge accuracy. Lab spiked all 50 target VOCs into LCS. All LCS %Rec were within 70-130% recovery except: 2-hexanone, 4-methyl-2-pentanone, and bromomethane were recovered above 130%. Since the samples were non-detect and subsequently rejected for these compounds, no action required. Note, MTBE was also flagged as being recovered above criteria but recovery, while > lab criteria, was < 130%. No Action required.

MS/MSD: there were no MS/MSD analyses performed on the samples in this SDG.

Field Duplicate (FD) samples: there were no FDs associated with the samples in this SDG.

BFB Tunes: Instrument A3UX18 Tunes (2 ICAL + 1 CCV). Method 8260C tune criteria was used and both tunes met criteria and were acquired by summing 3 peaks across apex of BFB peak with background subtraction. All samples and standards were analyzed within 12 hours of BFB tune - No Action required.

ICALs: Instrument A3UX18 on 11/6/2020 & 12/4/2020. Most compounds calibrated on 11/6/2020 with bromomethane calibrated on 12/4/2020. 5- to 9-level ICALs performed from 1, 2, 5, or 10 to 250 or 500 µg/L. minimum RRFs in Form VI are not those in Table 4 of Method 8260C; however, all compounds met min. RRF requirements listed in Table 4 of Method 8260C except for bromomethane, which was reported with an average RRF of 0.072 while Table 4 min. RRF is 0.100. For all compounds with %RSD > 15%, lab used regression analysis resulting in curves with $r^2 > 0.990$. ICALs contained more compounds than requested in Caneel Bay SAP Table 1. All project-specific compounds were included in the ICAL. For all compounds, %RSDs were < 20% across each ICAL or $r^2 > 0.990$. Since bromomethane was rejected in all sample, no action required; however, had data been usable, this compound would have been considered estimated with low bias due to low sensitivity during the ICAL. The ICV on 11/6/2020 was acceptable except for bromomethane, which was recovered below criteria. No Action required.

CCVs: CCV 240-475067/4 on 3/2/2021. minimum RRFs and %D for all target compounds within $\pm 20\%$ except: MTBE and 1,1,2,2-tetrachloroethane %D > 20% (increase in sensitivity) and minimum RRF for bromomethane was not met (lab used the incorrect min. RRF for bromomethane and did not meet Method 8260C criteria). Since MTBE, 1,1,2,2-tetrachloroethane, and bromomethane were non-detect and subsequently rejected in all sample, no action for CCV criteria exceedance.

Internal Standards (IS): Lab used Fluorobenzene (FB), Chlorobenzene-d5 (CBNZd5), and 1,4-Dichlorobenzene-d4 (DCBd4) areas and RTs were within criteria for all samples and QC - No Action required

%Solids: all 3 soils had % Solids > 30% - no Action required.

Compound List Reporting: Lab reported results for all 50 VOCs requested in SAP Table 1 (Caneel Bay SAP Table 1 contains 52 entries, including the m,p- and o-xylene isomers as well as Xylenes (total) but lab only reported Xylene(total)). The lab reported some compounds using a synonym for the compound (e.g., Ethylene dibromide (EDB) was reported as 1,2-dibromoethane). Table 1 identifies several common synonyms for the compounds of interest.

Sensitivity: for all samples, the laboratory reported LOQs were below the project required LOQs since the lab performed the low-level soil VOC analysis rather than the Caneel Bay SAP anticipated medium-level soil analyses. Since all but 3 VOC results are unusable, the data user will need to determine whether the project objectives for VOC soil analysis are met in subsequent SDGs. The 3 detected results had values < Project Soil Action Levels given in Caneel Bay SAP Table 1.

Qualifier Action : there was 1 "J" result reported indicating the result reported was uncertain due to quantitation below the instrument calibration range (data accepted as "J" value with indeterminate bias due to result < LOQ).

***ACTION:** 1 "J" result qualified by the lab was accepted as an estimated (J) result with indeterminate bias due to reporting at a level < LOQ.

Narrative : There were no issues raised in the narrative not already addressed or which would have affected sample data quality - No additional action required.

EPA SW-846 Method 8260C, NFG, and Caneel Bay SAP requirements

Preservation:	Samples should be preserved following SW-846 Method 5035A (waters acid preserved, soils water & methanol preserved sample); received at 4±2°C. Low-level soils frozen to < -7°C within 48-hr of collection. If samples were not properly preserved, J det / J ND or J det / R ND based on professional judgment
HT:	water: pH < 2 - 14d < HT ≤ 28 d; J- det/ J NDs; HT > 28 d, J- det/R ND; pH > 2 - 7d < HT ≤ 14 d; J- det/ J NDs; HT > 14 d, J- det/R ND soil: 14d < HT ≤ 28 d; J det/ J NDs; HT > 28 d, J det/R ND
Surrogates:	70-130% Acceptance criteria; Recovery > 130%, J+ det/Accept ND; 10% ≤ Recovery < 70%, J- det/J NDs; Recovery < 10%, J- det/R NDs
LCS/LCSD:	70-130% / RPD ≤ 30% Acceptance criteria; Recovery > 130, J+ det/Accept ND; 10% ≤ Recovery < 70%, J- det/J NDs; Recovery < 10%, J- det/R NDs. LCS/LCSD RPD > 30%, J/UJ
MS/MSD:	70-130% / RPD ≤ 30% Acceptance criteria; %Rec < 10%, J- det/ R NDs; 10% ≤ %Rec < LCL, J- det/ J NDs; %Rec > UCL, J+ det/Accept NDs for Unspiked Sample only; MS/MSD RPD > 30%, J/UJ unspiked sample only
Lab Dup (LD):	If performed, RPD > 30% if value >2x LOQ, J det. Not required per Caneel Bay SAP.
FD:	Both Conc. > 2x LOQ, RPD > 30% J det; One result ND, other >2 x LOQ, J det/J NDs; Both Conc. < 2x LOQ; RPD > criteria, No Action
Tune:	Criteria per Table 3 8260C; acquisition of tune given as sum of 3 scans across peak with background subtraction. If criteria not met (Abundances out or analysis > 12 hrs from BFB injection and CCVs don't meet frequency & criteria); use professional judgment
ICAL:	≥ 5-Level, lowest level ≤ LOQ; min. RRF per Table 4 of Method 8260C. If min. RRF not met for lowest standard and/or average RRF, J- det/J ND; if %RSD across ICAL > 20% or r2 < 0.99; J det/ J ND.
CCV:	Analyzed at the beginning of each 12 hour shift. Min. RRF not met, J- det/ UJ NDs; %D or %Drift > +20%, J+ det/Accept ND; %D or %Drift > -20%, J- det/J ND (neg. %D = loss in sensitivity; positive %D = enhanced sensitivity)
Internal Standards (IS):	RT shift outside window (RT > ±30 of IS RT in CCV) or 20% ≤ Area < 50% of IS in CCV , J+ det/ UJ NDs; Area < 20% of CCAL, J+ det / R NDs; Area > 200% IS in CCV, J- det / Accept NDs. If it's suspected that IS outside criteria is due to poor IS addition to sample (i.e., mis-spike), then professional judgment used to J det/UJ NDs

EPA SW-846 Method 8260C, NFG, and SAP requirement - *continued*

Blanks:	<p>Non-Matrix related TB or EB Blank contamination, professional judgment used in comparing results to samples.</p> <p>Project-specific action: Lab Method Blank action taken first followed by Trip Blank and then Equipment Blank Action.</p> <p>If Blank is reported at < LOQ (or < 2x LOQ for methylene chloride, 2-butanone and acetone): all samples < LOQ negated (U) at sample LOQ and all samples > LOQ accepted without qualification</p> <p>If Blank ≥ LOQ (or > 2x LOQ for methylene chloride, 2-butanone and acetone): if sample is < LOQ, negate (U) at sample LOQ; if sample result is > LOQ but < BAL, negate result (U) at the level found in the sample; and if sample result is ≥ BAL, accept sample result without qualification.</p> <p>Where Blank Action Level (BAL) = Result reported in Blank x (Sample LOQ/Blank LOQ)</p>
LOQs & Reporting:	If result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Verify LOQs are sample specific and that all compounds requested were reported.
% Solids:	If %Solids < 30%, J det / J NDs; if %solids < 10%, J det / R NDs.
Sensitivity:	Identify non-detects > PALs given in Table 1 of the Caneel Bay SAP
TICs:	Not requested for this project.
DV Qualifier Definitions:	U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; NJ = the analyte has been "tentatively identified" and the result is usable as an estimated value with indeterminate bias; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.
References:	<i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP); USEPA National Functional Guidelines for Organic Superfund Methods Data Review , Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017; USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use , OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) , Third Edition, Revision 1, December 1996 and updates, Method 8260C Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) ; Eurofins TestAmerica - Canton SOP NC-MS-019 Determination of Volatile Organics by GC/MS based on Methods 8260C, 8260B, and 8260A, Rev. 6, 7/23/18</i>

Dates Sampled: 2/17/2021 - 2/19/2021
 Method of Analysis: PAHs by Method 8270D

No. Samples: 10
 Matrix: Soil

Data Validation Summary Table - EPA Stage 3: Polycyclic Aromatic Hydrocarbons (PAHs) in Soil

Data Element	HT & Preservation	Blank Actions	Surrogate	LCS/LCSD	MS/MSD	LD / FD	Tunes / ICAL	QL & Quant. Correct	IS	%Solids
Acceptable							CCV			
Yes		√	√	√	NA	NA	√	√	√	√
No	Estimate (J or J+) 29 results	None								

Other Issues: Qualifier Actions: 47 "J" qualified lab results accepted as estimated (J) results

Selection of results for Reporting: none required

Comments:

An EPA-compliant Stage 3 data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALs, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; surrogate recoveries; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 3 DV, raw data were reviewed to perform calculation verification of one sample result and calculation verification of the sample-specific LOQ per analytical method per media.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? Yes. A full data deliverable (called Level 4 deliverable), including results, summary QC, and all raw data, was provided for review.
2. Were all result forms for all samples listed on the chain-of-custody present in data package? Yes, 6 ISM, 4 Discrete, and 2 soils for TCLP SVOC analysis received. The TCLP samples did not require validation. Note, in the EDD the sample names were missing the foot (') designations that appeared on the COC and on the hardcopy report.

Sample Receiving: ISM Soil and Discrete soil samples were received at Eurofins TestAmerica - Canton lab in multiple coolers on 2/25/2021, 6 to 8 days following sample collection. Three of the coolers were received with Temperatures > 6 °C (up to 14.5 °C) with samples in water (ice melted) due to weather and FedEx shipping delays. Additionally, the lab documented in SDG 240-144999-1 that samples IA-2-03 B, IA-2-03 C, IA-3-01 B, and IA-3-01 C have "cooler water in the bag," and SC-3-08 (0-5) had water in the jar from the cooler. Professional judgment used to take no action on Soil samples due to temperature exceedances, which were still received at < room temperatures, would not be expected to affect the usability of PAH soil data and because the ISM soils are air-dried at room temperature for a few days prior to analysis, anyway as part of the preparation procedure. Sample SC-03-05 (0.5') as listed on the COC for TCLP analysis was changed to SC-03-02 (0.5') based on client request. The TCLP analyses were not validated. Professional judgment used to take DV action due to cooler water present in sample containers for affected detected results in samples IA-2-03 B and IA-2-03 C due to potential for contamination. Nondetected results not impacted. Actions taken in SDG 240-144999-1 for samples IA-3-01 B, IA-3-01 C, and SC-3-08 (0-5).

***ACTION: 29 detected PAHs in samples IA-2-03 B and IA-2-03 C estimated (J+) due to potential contamination from cooler water present in the sample containers (Note, several high bias (J+) results changed to indeterminate bias (J) due to cumulative bias.**

Holding Time (HT) evaluation: 6 samples for ISM were prepared on 2/26/2021 through 3/02/2021 in QC Batch 474833 (Lab SOP NC-OP-044 using 2-D slab cake method) and then aliquots of the ISM samples were extracted by Method 3540C on 3/3-3/4/2021 in QC Batch 475223. The 4 discrete soil samples were extracted on 3/1-3/2/2021 by Method 3540C (Soxhlet extraction) in QC Batch 474795. All sample extracts for PAH analysis were analyzed by 3/15/2021; therefore, HT acceptable - No Action required.

Blank Evaluation: Full Scan Method Blanks = MB 240-474795/23-A (associated with discrete soils) and MB 240-475223/23-A (associated with 6 ISM samples), Equipment Blank = Equipment Blank (EB) = EB-SOIL-20210224 and EB-SOIL-20210222-01 (reported in SDG 240-145147-1). All Method Blanks and EBs were non-detect for all 18 Caneel Bay SAP-specific PAHs; therefore, no Blank Action required.

Selection of Results for Reporting: all sample extracts were only analyzed once (DF=1) and dilution analysis was not required. Therefore, no selection of results required.

Surrogates: Lab spiked 3 Acid (phenol-d5, 2-fluorophenol, and 2,4,6-tribromophenol) and 3 Base/Neutral (BN) (nitrobenzene-d5, 2-fluorobiphenyl, and terphenyl-d14) surrogates even though there are no acid PAH compounds. Lab used in-house acceptance limits but here, QAPP limits (30-130%) used to judge the acceptance of the 3 BN Surrogates, which may impact the PAHs, and lab limits used to judge acceptance of the acid surrogates. All surrogates were within Caneel Bay SAP or lab limits; therefore, accuracy for extraction and analysis acceptable - No Action required..

LCS/LCSD: Lab used in-house criteria for recoveries but here Caneel SAP criteria 40-140% recovery used to judge accuracy. All 18 PAHs spiked. LCS 240-474795/24-A (associated with discrete soils) and LCS 240-475223/24-A (associated with 6 ISM samples) - No LCSD performed. All 18 PAHs were recovered within criteria; therefore, lab demonstrated acceptable accuracy for the method of analysis for PAHs - No Action required.

MS/MSD: there were no MS/MSD analyses performed on the samples in this SDG.

Field Duplicate (FD) samples: there were no FDs associated with the samples in this SDG. ISM replicate relative standard deviation (RSD) will be evaluated by the data users after all data are validated.

DFTPP Tunes: Inst. A4AG3 2/1/2021 (ICAL) & 3/7/2021 (for discrete soil samples) and Inst. A4HP9 3/2/2021 (ICAL) & 3/8/2021 & 3/12/2021 (2nd ICAL), & 3/15/2021 (for ISM samples). Lab used slightly different criteria from Method 8270D tuning criteria, but the criteria used was tighter than 8270C or 8270D criteria so this is acceptable. All Abundances were within acceptance criteria and all samples were analyzed within 12 hours of tune. Tune raw data indicates average of scans with background correction used for tune - acceptable. DDT breakdown and pentachlorophenol and benzidine tailing factors were acceptable in all runes. No Action required.

ICALs: Inst. A4AG3 on 2/1/2021 and Inst. A4HP9 on 3/2/2021 and again on 3/12/2021. All 3 ICALS were 9-level calibrations from 0.1 to 25 µg/mL for 18 PAHs. ICALS contained many more compounds than the PAHs reported for the samples in this SDG. The min. RRF as indicated in Table 4 Method 8270D was monitored and all RRFs were > min. RRF and all %RSD were all < 20%; therefore, ICALS acceptable. ICVs were all acceptable - No Action required.

CCVs : A4AG3 CCV 240-475777/2 on 3/7/21 (for analysis of discrete soils); A4HP9 CCV 240-475859/2 on 3/8/21 and CCV 240-476783/2 on 3/15/21. 10 µg/mL standard analyzed containing more compounds than PAHs reported for the samples in this SDG. min. RRF met for all PAHs and %D ≤ ±20%; therefore, CCVs acceptable - No Action required.

Internal Standards (IS): All 6 IS's (1,4-Dichlorobenzene-d4, Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, Chrysene-d12, and Perylene-d12) had areas and RTs within criteria; therefore, no action required.

Compound Reporting: Lab properly reported results for the 18 PAHs listed in the Caneel Bay SAP Table 1. In the EDD, Fluoranthene is listed as "Fluoranthene (Idryl)," but this parenthetical suffix is not used in the hardcopy report and is not explained.

%Solids: all samples had %Solids > 30% - no Action required.

Sensitivity: for all samples, the LOQs were all below the Project Soil Action Levels (PALs) given in Table 1 of the Caneel Bay SAP; therefore, since all non-detects were < PALs, sensitivity was acceptable for these analyses.

Qualifier Action : there were 47 "J" results reported indicating the result reported was uncertain due to quantitation below the instrument calibration range (data accepted as "J" value with indeterminate bias due to result < LOQ). Non-detects were reported at the sample-specific LOQ supported by the Initial Calibration; therefore, these non-detects are accurate as reported (i.e., no need to qualify "U" data as "UJ").

***ACTION: 47 "J" results qualified by the lab were accepted as estimated (J) results with indeterminate bias due to reporting at levels < LOQ.**

Chromatography review: The sample chromatograms, mass spectra of detects and quantitation reports were scanned and data appeared to have been reported correctly.

Narrative : There were no issues raised in the narrative not already addressed or which would have affected sample data quality - No additional action required.

LOQ & Result Verification: IA-2-03 B (lab ID 240-145024-9)

Fluoranthene response = 161737; IS (Pheanthrene-d10) Response = 284239@ 4 ng/μL on-column; RRF from ICAL = 1.265
 31.00 g of ISM sample with 97.2% solids extracted to 2 mL final volume and analyzed with DF=1

$$\text{Fluoranthene Conc.} = \frac{161737 \times 4 \times 2 \times 1000}{284239 \times (31.00 \times 0.972) \times 1.265} = 119 = 120 \mu\text{g/kg} \quad \checkmark$$

Sample-Specific
 LOQ:

Sample-Specific DL based on 0.1 ng/μL lowest std = 0.1 x (1000/(31 x 0.972)) = 3.3 μg/kg;
 Method Blank LOQ for 30g of 100% solid sample extracted to 2 mL was 15 μg/kg; therefore,
 sample-specific LOQ = 15 x (30/31 x 0.972) = 15 μg/kg ✓
 Lab reported LOQ at level > lowest-level calibration standard, indicating LOQ was supported by the calibration.

EPA SW-846 Method 8270D, NFG, and Caneel Bay SAP requirements

Preservation:	Criteria = Sample Temperature upon receipt $\leq 6^{\circ}\text{C}$; use judgment if outside criteria.
HT:	GW Extraction: 7d <HT< 14 d; J- det/ J NDs; HT >14 d, J- det/R ND Soil: extraction: 14d <HT< 28 d; J- det/ J NDs; HT >28 d, J- det/R ND; however, HT extended to up to 1 year if soil is frozen Analysis of extract: 40d < Extract HT < 60d, J- det/ J NDs; Extract HT > 60d; J- det/ R NDs; however, HT extended to up to 1 year if extract is frozen
Surrogates:	Acceptance criteria 30-130%; Recovery > 130%, J+ det/Accept ND; 10% \leq Recovery < 30%, J- det/J NDs; Recovery < 10%, J- det/R NDs.
LCS/LCSD:	40-140% and RPD \leq 20% Acceptance criteria; Recovery > 140%, J+ det/Accept ND; 10% \leq Recovery < 40%, J- det/J NDs; Recovery < 10%, J- det/R NDs ; LCS/LCSD RPD > 20% J det/J NDs for all samples in the associated analytical batch.
MS/MSD:	40-140% and RPD \leq 20% (waters) RPD \leq 35% (soils) Acceptance criteria; Recovery > 140%, J+ det/Accept ND; 10% \leq Recovery < 40%, J- det/J NDs; Recovery < 10%, J- det/R NDs ; MS/MSD RPD > criteria J det/J NDs. Action taken on Unspiked sample only.
LD:	If performed, RPD > 30% if value >2x LOQ, J det. Not required for SVOC analysis per Caneel Bay SAP.
FD:	Both Conc. > 2x LOQ, RPD > 30% J det; One result ND, other >2 x LOQ, J det/J NDs; Both Conc. < 2x LOQ; RPD >criteria, No Action
Tune:	Criteria per Table 3 8270D; acquisition of tune given as sum of 3 scans across peak with background subtraction. DDT breakdown \leq 20%; tailing factors: benzidine \leq 2; pentachlorophenol \leq 2. If criteria not met (Abundances out or analysis > 12 hrs from DFTPP injection and CCVs don't meet frequency & criteria); use professional judgment
ICAL:	\geq 5-Level, lowest level \leq LOQ; if RRF < min.-required RRF J- det/ J ND; if %RSD > 20% or "r2" < 0.99 or , J det/UJ NDs. If %RSD > 90%, J det/ R NDs. Criteria based on Table 4 Method 8270D.
CCV:	Analyzed at the beginning of each 12 hour shift. Min RRF not met, J- det/J NDs. %D or %Drift > +20%, J+ det/Accept ND; %D or %Drift > -20%, J- det/J NDs (assuming negative %D = loss in sensitivity; positive %D = enhanced sensitivity)
Blanks:	Non-Matrix related EB Blank contamination, professional judgment used in comparing results to samples. Project-specific action: Lab Method Blank action taken first followed by Equipment Blank Action. If Blank is reported at < LOQ: all samples < LOQ negated (U) at sample LOQ and all samples > LOQ accepted without qualification If Blank \geq LOQ: if sample is < LOQ, negate (U) at sample LOQ; if sample result is > LOQ but < BAL, negate result (U) at the level found in the sample; and if sample result is \geq BAL, accept sample result without qualification. Where Blank Action Level (BAL) = Result reported in Blank x (Sample LOQ/Blank LOQ)

EPA SW-846 Method 8270D, NFG, and Caneel Bay SAP requirements - *continued*

IS:	20% < IS recovery < 50%; J det/ J ND with indeterminate bias (unclear if low IS is due to overall loss in instrument sensitivity causing IS and other compounds to be biased low or whether issue only affects IS, in which case, quantitation of detects possible biased high). If IS recovery < 20%, J- det / R ND.
LOQs & Reporting:	If result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Verify LOQs are sample specific and that all compounds requested were reported.
% Solids	If %Solids < 30%, J det / J NDs; if %solids < 10%, J det / R NDs.
Sensitivity:	Identify non-detects > PALs given in Table 1 of Caneel Bay SAP
TICs:	Not requested for this project.
DV Qualifier Definitions:	U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; NJ = the analyte has been "tentatively identified" and the result is usable as an estimated value with indeterminate bias; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.
References:	<i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site</i> , prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP); <i>USEPA National Functional Guidelines for Organic Superfund Methods Data Review</i> , Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017; <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use</i> , OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; <i>USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)</i> , Third Edition, Revision 1, December 1996 and updates, <i>Method 8270D Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)</i> ; Eurofins TestAmerica - Canton SOP NC-MS-018 GC/MS Analysis based on Methods 8270C, 8270D, and 8270E Rev. 8, 07/02/19.

Dates Sampled: 2/17/2021 - 2/19/2021

Method of Analysis: 8081B

No. Samples: 10

Matrix: Soil

Data Validation Summary Table - EPA Stage 3: Pesticides in Soil

Data Element	Preservation & HT	Blank Actions	Surrogates	LCS / Blank Spike	MS/MSD	FD	Resolution Check	DDT/Endrin Breakdown	ICALs	CCVs
Yes		√	NA	NA	NA	NA	√	√	√	√
No	Estimate (J or J+) 4 results	None								

Data Element	Florisil Cartridge Check (80-120%)	GPC Check (80-110%)	Col. 1 & 2 Precision	LOQ & Quant. Correct	IS	%Solids
Yes	NA	NA		√	√	√
No			Negate (U) 4 & Estimate (J or J-) 12 results			

Other Issues: Qualifier Actions: 16 "J" qualified lab results accepted as estimated (J) results

Selection of results for Reporting: none required

Comments:

An EPA-compliant Stage 3 data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALs, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; surrogate recoveries; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 3 DV, raw data were reviewed to perform calculation verification of one sample result and calculation verification of the sample-specific LOQ per analytical method per media.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? Yes. A full data deliverable (called Level 4 deliverable), including results, summary QC, and all raw data, was provided for review.
 2. Were all result forms for all samples listed on the chain-of-custody present in data package? Yes, 6 ISM, 4 Discrete, and 2 soils for TCLP Pesticide analysis received. The TCLP samples did not require validation. Note, in the EDD the sample names were missing the foot (') designations that appeared on the COC and on the hardcopy report.
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Sample Receiving: ISM Soil and Discrete soil samples were received at Eurofins TestAmerica - Canton lab in multiple coolers on 2/25/2021, 6 to 8 days following sample collection. Three of the coolers were received with Temperatures > 6 °C (up to 14.5 °C) with samples in water (ice melted) due to weather and FedEx shipping delays. Additionally, the lab documented in SDG 240-144999-1 that samples IA-2-03 B, IA-2-03 C, IA-3-01 B, and IA-3-01 C have "cooler water in the bag," and SC-3-08 (0-5) had water in the jar from the cooler. Professional judgment used to take no action on Soil samples due to temperature exceedances, which were still received at < room temperatures, would not be expected to affect the usability of Pesticide soil data and because the ISM soils are air-dried at room temperature for a few days prior to analysis, anyway as part of the preparation procedure. Sample SC-03-05 (0.5') as listed on the COC for TCLP analysis was changed to SC-03-02 (0.5') based on client request. The TCLP analyses were not validated. Professional judgment used to take DV action due to cooler water present in sample containers for affected detected results in samples IA-2-03 B and IA-2-03 C due to potential for contamination. Nondetected results not impacted. Actions taken in SDG 240-144999-1 for samples IA-3-01 B, IA-3-01 C, and SC-3-08 (0-5).

***ACTION: 4,4'-DDE and 4,4'-DDT in samples IA-2-03 B and IA-2-03 C estimated (J+) due to potential contamination from cooler water present in the sample containers (Note, two high bias (J+) results changed to indeterminate bias (J) due to cumulative bias.**

Holding Time (HT) evaluation: 6 samples for ISM were prepared on 2/26/2021 through 3/02/2021 in QC Batch 474833 (Lab SOP NC-OP-044 using 2-D slab cake method) and then aliquots of the ISM samples were extracted by Method 3540C on 3/3-3/4/2021 in QC Batch 475226. The 4 discrete soil samples were extracted on 3/1-3/2/2021 by Method 3540C (Soxhlet extraction) in QC Batch 474823. All sample extracts for Pesticide analysis were analyzed by 3/8/2021; therefore, HT acceptable - No Action required.

Blank Evaluation: Method Blanks = MB 240-474823/23-A (associated with discrete soils) and MB 240-475226/23-A (associated with ISM samples); and Equipment Blanks = EB-SOIL-20210224 and EB-SOIL-20210222-01 (reported in SDG 180-117691-1). All Method Blanks and EBs were non-detect for all Pesticides; therefore, Blank Action to negate or estimate data not required.

Selection of Results for Reporting: all sample extracts were only analyzed once (DF=1) except for sample IA-2-04 A, which was only analyzed at DF=5 due to matrix issues, according to the project narrative. Since only one result per compound per sample reported, there is no selection of results required.

Surrogates: Tetrachloro-m-xylene (TCX) and Decachlorobiphenyl (DCB) %Rec were within lab criteria for all samples + QC on both GC columns used for analysis except: DCB %Rec high on GC Column 1 for SC-3-02 (3-6). All results were reported from GC Column 1; however, since DCB recovery was acceptable on GC Column 2 and TCX recovery was acceptable on both GC Columns, no action taken for high DCB recovery on one GC Column for sample SC-3-02 (3-6) - No Action overall.

LCS/LCSD: LCS 240-474823/24-A (associated with discrete soils) and LCS 240-475226/24-A (associated with ISM samples). Lab spiked all 20 single-component Pesticides (no Toxaphene or Technical Chlordane spiked), as expected. No LCSD performed. All LCS %Rec were within laboratory statistical recovery acceptance limits indicating lab demonstrated acceptable recovery for analysis of Pesticides in the absence of the site matrix - No Action required.

MS/MSD: there were no MS/MSD analyses performed on the samples in this SDG.

Field Duplicate (FD) samples: there were no FDs associated with the samples in this SDG. ISM replicate relative standard deviation (RSD) will be evaluated by the data users after all data are validated.

Resolution Check : chromatograms for standards checked and adequate resolution between peaks was found for Instrument A2HP3 & A2HP15 Column 1 (CLP-1) and Column 2 (CLP-2) for the Calibration Mixtures used for analysis.

DDT/Endrin Breakdown: PEMs for DDT and Endrin Breakdown measured and reported for ICAL and CCVs for both GC columns. DDT and Endrin breakdown met criteria (breakdown $\leq 15\%$ for each GC Column) - No Action required

ICAL : Instrument A2HP3 ICAL on 1/12-1/13/2021 and another ICAL on 1/19/2021 (just for single-component pesticides) and Instrument A2HP15. Method of Internal Standard quantitation used so Relative Response Factors reported. ICALs were 7-level from 5 to 200 $\mu\text{g/L}$ for single-component pesticides. Separate ICALs on 1/12/2021 for Technical Chlordane (6-level ICAL from 10 to 500 $\mu\text{g/L}$ for each of 4 separate peaks) and Toxaphene (5-level ICAL from 100 to 5000 $\mu\text{g/L}$ for each of 5 separate peaks) were performed. %RSD < 20% for all compounds & surrogates on both GC columns in all ICALs - lab used regression analysis for surrogate DCB for calibration done on GC Column 1 for 1/12-1/13/2021 ICAL with $r^2 > 0.99$ (allowed by SW-846). ICALs valid - No Action required.

RT window: Retention Time window studies not in data; however, retention times were stable across ICAL and CCVs. No Action required.

CCVs : since method of Internal Standard quantitation performed, bracketing CCVs not required (i.e., only the opening sequence CCV important to judging accuracy of data). For the analyses performed, the CCVs are performed in sets (single component Pesticide CCV, Toxaphene CCV, and Technical Chlordane CCV) and the relevant CCVs analyzed are:

- Inst. A2HP3 CCV 240-475329/4, CCV 240-475329/5 & CCV 240-475329/6 on 3/3/21 prior to analysis of samples SC-3-01 (5-6), SC-3-01 (0.5-2.5), SC-3-02 (0-3.0), and SC-3-02 (3-6); CCV 240-475920/4, CCV 240-475920/5 & CCV 240-475920/6 on 3/8/21 prior to analysis of 6 ISM samples.

- Inst. A2HP15 used for analysis of TCLP samples - no review

All CCVs on both Column 1 and 2 had %D $\leq \pm 20\%$ for all target analytes. CCVs all acceptable, No Action required.

Internal Standard (IS): lab spiked 1-Bromo-2-nitrobenzene into each extract prior to analysis as IS. The Area and RT of this IS in all samples and QC were within criteria - no Action required.

Compound Reporting: Lab reported results for all 22 Pesticides requested in Table 1 of the Caneel Bay SAP. The lab reported some compounds using a synonym for a compound (e.g., gamma-Chlordane was reported as trans-Chlordane).

%Solids: all samples had %Solids > 30% - no Action required.

Sensitivity: for all samples, the laboratory reported LOQs equivalent, on a sample-specific basis, to the Achievable Laboratory LOQs given in Table 1 of the Caneel Bay SAP. The non-detects were all below the Project Soil Action Level (PAL) given in Table 1 except: aldrin, beta-BHC, 4,4'-DDD, and endrin results in all samples; gamma-BHC (Lindane) in samples IA-2-04 A, SC-3-01 (0.5-2.5), SC-3-01 (5-6), and SC-3-02 (3-6); 4,4'-DDE in sample SC-3-02 (0-3.0); 4,4'-DDT in samples IA-2-04 A, SC-3-02 (0-3.0), and SC-3-02 (3-6); dieldrin in all samples except IA-2-04 B and IA-2-04 C; and heptachlor in sample IA-2-04 A due to method limitations and sample-specific preparation and analysis factors.

Data users will need to evaluate the usability of the non-detects above the PALs for project uses.

Dual Column precision evaluation: lab reported all results from GC Column 1 (called their primary column) unless the RPD > 40%, in which case the lab reported the lower value of the two GC Columns. Based on professional judgment, this reporting approach is considered acceptable for project decisions. All detected results were reported with dual column RPDs < 40% except:

- Sample SC-3-01 (5-6) 4,4'-DDE RPD > 40% but < 100%
- Sample SC-3-01 (0.5-2.5) 4,4'-DDT RPD > 40% but < 100%
- Sample IA-2-04 A 4,4'-DDE and Endosulfan II RPD > 40% but < 100%
- Sample IA-2-04 B trans-Chlordane and Dieldrin RPD > 40% but < 100% and Endosulfan II RPD > 100%
- Sample IA-2-04 C trans-Chlordane and Technical Chlordane RPD > 40% but < 100%
- Sample IA-2-03 A 4,4'-DDT RPD > 40% but < 100% and Technical Chlordane RPD > 100%
- Sample IA-2-03 B 4,4'-DDT RPD > 40% but < 100%
- Sample IA-2-03 C 4,4'-DDT RPD > 40% but < 100% and trans-Chlordane RPD > 100%
- Sample SC-3-02 (3-6) Endosulfan II RPD > 40% but < 100% and trans-Chlordane RPD > 100%

The lab flagged all these data with a "P" qualifier to indicate the RPD exceedance. All results with RPD > 40% but < 100% estimated with possible low bias and results with RPD > 100% negated (U) at the higher of the 2 GC Column values based on professional judgment rather than rejection of results due to RPD > 100%.

***ACTION: Endosulfan II in sample IA-2-04 B negated (U) and LOQ raised to 26 µg/L; Chlordane (technical) negated (U) in sample IA-2-03 A and LOQ raised to 310 µg/L; and trans-Chlordane negated (U) in samples IA-2-03 C and SC-3-02 (3-6) and LOQs raised to 15 µg/L and 11 µg/L, respectively (the elevated LOQs are all the higher value of dual column analyses). The other 12 detected results shown above with RPDs > 40% but < 100% were estimated (J-) with possible low bias, unless other issues affect the data, due to dual column imprecision and reporting of the lower of the two GC Column values (Note, several low bias (J-) results changed to indeterminate bias (J) due to cumulative bias).**

Qualifier Action: there were 16 "J" results reported indicating the result reported was uncertain due to quantitation below the instrument calibration range (data accepted as "J" value with indeterminate bias due to result < LOQ). This excludes 4 "JP" qualified results that were negated due to large dual column imprecision. Non-detects were reported at the sample-specific LOQ supported by the Initial Calibration; therefore, these non-detects are accurate as reported (i.e., no need to qualify "U" data as "UJ"). There were no additional qualifiers on the data requiring action

***ACTION: 16 "J" results qualified by the lab were accepted as estimated (J) results with indeterminate bias due to reporting at levels < LOQ.**

Chromatogram Review: Sample chromatogram reviewed - data appears to have been reported properly, no action required.

Narrative : there were no issues raised in the narrative not already addressed or which would have affected sample data quality - No additional action required.

LOQ and Result verification : IA-2-04 C 4,4'-DDE GC Col. 1 Response = 287407852; IS Response = 309908961 @ 50 µg/L; Avg. RRF from A2HP3 ICAL =0.9419 ; GC Col. 2 Response = 78575492; IS Response = 84926995 @ 50 µg/L; Avg. RRF from A2HP3 ICAL Avg. CF from ICAL = 1.049; 10.54 g of 97.8% solids sample extracted to 10 mL final volume; DF = 1 analyzed

$$\text{Conc Col. 1} = \frac{287407852 \times 10 \times 50}{309908961 \times (10.54 \times 0.978) \times 0.9419} = 47.8 \text{ } \mu\text{g/kg}$$

$$\text{Conc Col. 2} = \frac{78575492 \times 10 \times 50}{84926995 \times (10.54 \times 0.978) \times 1.049} = 42.8 \text{ } \mu\text{g/kg}$$

$$\text{RPD} = 11.0\%$$

The lab reported the higher of the 2 GC Column values (48 µg/kg), compliant with their SOP but non-compliant with SW-846 and CLP criteria; however, this is a conservative approach to reporting of pesticides. Since the RPD was < 40% and since the value was > sample-specific LOQ, the result was not qualified by the lab. Therefore, calculation and reporting of results considered confirmed. No Action required.

Sample-Specific LOQ:	Sample-Specific DL based on 5 µg/L lowest std = $5 \times (10 / (10.54 \times 0.978)) = 4.9 \text{ } \mu\text{g/kg}$; Method Blank LOQ for 10g of 100% solid sample extracted to 10 mL was 5 µg/kg; therefore, sample-specific LOQ = $5 \times (10 / (10.54 \times 0.978)) = 4.9 \text{ } \mu\text{g/kg}$ ✓ Lab reported LOQ at level = lowest-level calibration standard, indicating LOQ was supported by the calibration.
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EPA SW-846 Method 8081B, NFG, and QAPP requirements

Preservation:	Criteria = Sample Temperature upon receipt $\leq 6^{\circ}\text{C}$; use judgment if outside criteria.
HT:	GW Extraction: 7d <HT< 14 d; J- det/ J NDs; HT >28 d, J- det/R ND Soil: extraction: 14d <HT< 28 d; J- det/ J NDs; HT >28 d, J- det/R ND; however, HT extended to up to 1 year if soil is frozen Analysis of extract: 40d < Extract HT < 60d, J- det/ J NDs; Extract HT > 60d; J- det/ R NDs; however, HT extended to up to 1 year if extract is frozen
Surrogates:	Acceptance criteria 30-150% on both GC Columns; Recovery > 150%, J+ det/Accept ND; $10\% \leq \text{Recovery} < 30\%$, J- det/J NDs; Recovery < 10%, J- det/R NDs.
LCS:	Lab Control limits and RPD $\leq 30\%$ (SAP) criteria; Recovery > UCL, J+ det/Accept ND; $10\% \leq \text{Recovery} < \text{LCL}$, J- det/J NDs; Recovery < 10%, J- det/R NDs ; LCS/LCSD RPD > 20% J det/J NDs for all samples in the associated analytical batch.
MS/MSD:	Lab Control limits and RPD $\leq 30\%$ (SAP) criteria; Recovery > UCL, J+ det/Accept ND; $10\% \leq \text{Recovery} < \text{LCL}$, J- det/J NDs; Recovery < 10%, J- det/R NDs ; MS/MSD RPD > criteria J det/J NDs. Action taken on Unspiked sample only.
LD:	If performed, RPD > 30% if value >2x LOQ, J det. Not required per Caneel Bay SAP.
FD:	Both Conc. > 2xLOQ, RPD > 30% (water) or > 50% (soil) J det; One result ND, other >2 x LOQ, J det/J NDs; Both Conc. < 2xLOQ; RPD >criteria, No Action
Blanks:	Non-Matrix related EB Blank contamination, professional judgment used in comparing results to samples. Project-specific action: Lab Method Blank action taken first followed by Equipment Blank Action. If Blank is reported at < LOQ: all samples < LOQ negated (U) at sample LOQ and all samples > LOQ accepted without qualification If Blank \geq LOQ: if sample is < LOQ, negate (U) at sample LOQ; if sample result is > LOQ but < BAL, negate result (U) at the level found in the sample; and if sample result is \geq BAL, accept sample result without qualification. Where Blank Action Level (BAL) = Result reported in Blank x (Sample LOQ/Blank LOQ)
Resolution Check:	RCM < 60% resolution if INDA & INDB used, J detects based on technical judgment. If RCM not analyzed, verify resolution acceptable for calibrations
DDT & Endrin Breakdown:	4,4'-DDT breakdown > 15%, J- det DDT/ R ND DDT; Accept ND DDE & DDD but NJ det DDD & DDE Endrin breakdown > 15%, J- det Endrin/ R ND Endrin; Accept ND Endrin aldehyde & endrin ketone but NJ det endrin aldehyde & endrin ketone
ICAL:	5-Level for single-component Pests and toxaphene; if %RSD > 20% except alpha-BHC, delta-BHC, J det/J ND. If alpha-BHC or delta-BHC %RSD > 25%, J det/J ND. If Toxaphene %RSD > 30%, J det/J ND. ICAL can also use curve statistics - if "r" < 0.995 or "r2" < 0.99, J det/UJ NDs.
CCV:	%D or %Drift > +25%, J+ det/Accept ND; %D or %Drift > -25%, J- det/J ND (assuming negative %D = loss in sensitivity; positive %D = enhanced sensitivity) on a per column basis, as technically reasonable. Opening and closing CCVs must meet criteria. Verify resolution between adjacent peaks is acceptable- If not, action may be needed depending on the sample data.

EPA SW-846 Method 8081B, NFG, and Caneel Bay SAP requirements - *continued*

IS:	20% < IS recovery < 50%; J det/ J ND with indeterminate bias (unclear if low IS is due to overall loss in instrument sensitivity causing IS and other compounds to be biased low or whether issue only affects IS, in which case, quantitation of detects possible biased high). If IS recovery < 20%, J- det / R ND.
Retention Time Window:	RT window study performed across 72-hr period with 3 injections of each compound of concern. Window = RT ± 3x std. dev (or ± 0.05 for heptachlor, aldrin and BHC compounds and ± 0.07 for all other target for nominal windows if std. dev. too tight). If compound detected outside window, use professional judgment to J or R detect.
Col. 1&2 Precision:	RPD 41%-71% J det; RPD 71%-100% NJ det; RPD =101%-200% negate (U) result at the highest of the 2 GC Column values; RPD > 201% Reject (R) result at level found. If RPD > 40% and result < LOQ, negate (U) result at LOQ. Bias in the results depends on whether lowest or highest of 2 GC column results chosen for reporting or whether interferences are observed in the data. Use professional judgment.
% Solids	If %Solids < 30%, J det / J NDs; if %solids < 10%, J det / R NDs.
Sensitivity:	Identify non-detects > PALs given in Table 1 of Caneel Bay SAP
DV Qualifier Definitions:	U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; NJ = the analyte has been "tentatively identified" and the result is usable as an estimated value with indeterminate bias; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.
References:	<i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site</i> , prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP); <i>USEPA National Functional Guidelines for Organic Superfund Methods Data Review</i> , Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017; <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use</i> , OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; <i>USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)</i> , Third Edition, Revision 1, December 1996 and updates, Method 8081B <i>Organochlorine Pesticides by Gas Chromatography</i> ; and Eurofins TestAmerica-Canton SOP NC-GC-042 Gas Chromatographic Analysis of Pesticides Based on Methods 8081A and 8081B, Rev. 3, 10/29/20

Dates Sampled: 2/17/2021 - 2/19/2021

No. Samples: 10

Method of Analysis: 8082A

Matrix: Soil

Data Validation Summary Table - EPA Stage 3: PCB Aroclors in Soil

Data Element	Preservation						Col. 1 & 2	LOQ & Quant.	Pattern	
	& HT	Surrogates	LCS	MS/MSD	FD	ICAL/CCV	Precision	Correct	%Solids	Match
Yes	√	√	√	NA	NA	√	NA	√	√	NA
No										

Other Issues: *Qualifier Actions:* none required

Blank Action: none required

Selection of results for Reporting: none required

Comments:

An EPA-compliant Stage 3 data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALs, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; surrogate recoveries; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 3 DV, raw data were reviewed to perform calculation verification of one sample result and calculation verification of the sample-specific LOQ per analytical method per media.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? Yes. A full data deliverable (called Level 4 deliverable), including results, summary QC, and all raw data, was provided for review.
2. Were all result forms for all samples listed on the chain-of-custody present in data package? Yes, 6 ISM and 4 Discrete soils were received. Note, in the EDD the sample names were missing the foot (') designations that appeared on the COC and on the hardcopy report.

Sample Receiving: ISM Soil and Discrete soil samples were received at Eurofins TestAmerica - Canton lab in multiple coolers on 2/25/2021, 6 to 8 days following sample collection. Three of the coolers were received with Temperatures > 6 °C (up to 14.5 °C) with samples in water (ice melted) due to weather and FedEx shipping delays. Additionally, the lab documented in SDG 240-144999-1 that samples IA-2-03 B, IA-2-03 C, IA-3-01 B, and IA-3-01 C have "cooler water in the bag," and SC-3-08 (0-5) had water in the jar from the cooler. Professional judgment used to take no action on Soil samples due to temperature exceedances, which were still received at < room temperatures, would not be expected to affect the usability of PCB Aroclor soil data and because the ISM soils are air-dried at room temperature for a few days prior to analysis, anyway as part of the preparation procedure. Sample SC-03-05 (0.5') as listed on the COC for TCLP analysis was changed to SC-03-02 (0.5') based on client request. The TCLP analyses were not validated. Professional judgment used to take DV action due to cooler water present in sample containers for affected detected results in samples IA-2-03 B and IA-2-03 C due to potential for contamination; however, since all PCB Aroclors were non-detect, no action required for potential cooler water contamination.

Holding Time (HT) evaluation: 6 samples for ISM were prepared on 2/26/2021 through 3/02/2021 in QC Batch 474833 (Lab SOP NC-OP-044 using 2-D slab cake method) and then aliquots of the ISM samples were extracted by Method 3540C on 3/3/2021 in QC Batch 475235. The 4 discrete soil samples were extracted on 3/1/2021 by Method 3540C (Soxhlet extraction) in QC Batch 474811. All sample extracts for PCB Aroclors underwent sulfuric acid cleanup prior to analysis on 3/5/2021; therefore, HT acceptable - No Action required.

Blank Evaluation: Method Blanks = MB 240-474811/23-A (associated with discrete soils) and MB 240-475235/17-A (associated with ISM samples); and Equipment Blanks = EB-SOIL-20210224 and EB-SOIL-20210222-01 (reported in SDG 180-117691-1). All Method Blanks and EBs were non-detect for all PCB Aroclors; therefore, Blank Action to negate or estimate data not required.

Selection of Results for Reporting: all sample extracts were only analyzed once (DF=1). Since only one result per compound per sample reported, there is no selection of results required.

Surrogates: Tetrachloro-m-xylene (TCX) and Decachlorobiphenyl (DCB) %Rec were within lab criteria for all samples + QC - lab only reported %Rec from GC Column 1. Raw data shows surrogate recoveries on GC Column 2 and these were comparable to recoveries on GC Column 1 - no Action required.

LCS/LCSD: LCS 240-474811/24-A (associated with discrete soils) and LCS 240-475235/18-A (associated with ISM samples). Lab spiked Aroclors 1016 and 1260 at 1000 µg/kg. No LCSD performed. The recoveries were within lab limits in both LCS indicating acceptable accuracy for extraction and analysis of PCB Aroclors in the absence of the site matrix - No Action required.

MS/MSD: there were no MS/MSD analyses performed on the samples in this SDG.

Field Duplicate (FD) samples: there were no FDs associated with the samples in this SDG. ISM replicate relative standard deviation (RSD) will be evaluated by the data users after all data are validated.

Retention Time : RT stable for TCX and DCB and detected Aroclors across analyses on both GC Columns (Column A = CLP-1 and Column B = CLP-2). During ICAL, RT windows established for Aroclor peaks and Surrogates.

ICAL : Inst. A2HP10 ICAL performed on 2/25/2021 and Inst. A2HP11 ICAL performed on 3/1/2021 were 6-levels from 0.05 to 1.5 ng/μL for each of 5 peaks for all 7 project-required Aroclors (plus Aroclors 1262 and 1268 not required). Method of Internal Standard quantitation used so Relative Response Factors reported. %RSD < 20% for all peaks in 6-level calibrations except a few individual peaks that were calibrated using regression analysis with $r^2 > 0.990$. ICALs acceptable. ICVs following ICALs were all acceptable.

CCVs : since method of Internal Standard quantitation performed, bracketing CCVs not required (i.e., only the opening sequence CCV important to judging accuracy of data). For the analyses performed, the CCV consisted of analysis of 5 standards (combined Aroclors 1016/1260, Aroclors 1232/1262, Aroclors 1242/1268, Aroclors 1221/1254, and single Aroclor 1248) with the Aroclors at 0.5 ng/μL. The relevant CCVs analyzed are:

- Inst. A2HP11 CCV 240-475173/3, CCV 240-475173/4, CCV 240-475173/5, CCV 240-475173/6, & CCV 240-475173/7 on 3/3/21 prior to analysis of samples SC-3-01 (5-6'), SC-3-01 (0.5-2.5), SC-3-02 (0-3.0'), and SC-3-02 93-6')
 - Inst. A2HP10 CCV 240-475559/3, CCV 240-475559/4, & CCV 240-475559/5, CCV 240-475559/6, and CCV 240-475559/7 on 3/5/21 prior to analysis of 6 ISM samples.
- All CCVs on both Column 1 and 2 had %D $\leq \pm 20\%$ for each of the 5 peaks in each Aroclor. CCVs all acceptable, No Action required.
-

Compound Reporting: Lab reported results for all 7 PCB Aroclors requested in Table 1 of the Caneel Bay SAP. Aroclors 1262 and Aroclors 1268 were not required to be reported.

Internal Standard (IS): lab spiked 1-Bromo-2-nitrobenzene into each extract prior to analysis as IS. The Area and RT of this IS in all samples and QC were within criteria - no Action required.

Dual Column precision evaluation: lab reported all detects (e.g., LCS) from GC Column 1 regardless of whether the value was the higher or lower of the two GC Columns. For the LCS, dual column precision for Aroclors 1016 and 1260 was acceptable (RPD < 40%). Dual Column evaluation for PCB Aroclors is not required by Method 8082A since pattern recognition using a single column is usually sufficient confirmation. All Aroclors were non-detect in the samples so no dual column evaluation performed.

%Solids: all samples had %Solids > 30% - no Action required.

Sensitivity: for all samples, the laboratory reported LOQs equivalent to the Achievable Laboratory LOQs, on a sample-specific basis, given in Table 1 of the Caneel Bay SAP. For all samples, the non-detects were reported at levels less than the Project Soil Action Levels (PALs) except for Aroclors 1242, 1248, and 1254 in all samples, as expected, due to method limitations.

Data users will need to evaluate the usability of these non-detects for project uses.

Qualifier Action: there were no "J" qualified data reported, which is appropriate for Aroclor data. Non-detects were qualified with a "U" and reported at the sample-specific LOQ supported by the Initial Calibration; therefore, these non-detects are accurate as reported (i.e., no need to qualify "U" data as "UJ"). There were no additional qualifiers added to the data so no Qualifier action required.

Chromatogram Review: Sample chromatograms reviewed and none of the samples contained peaks on GC Column 1 and 2 that are consistent with PCB Aroclors (i.e., there are no apparent Aroclors in these soils).

Narrative : there were no issues raised in the narrative not already addressed or which would have affected sample data quality - No additional action required.

LOQ and Result verification: all Aroclors were non-detect in all samples so only LOQ evaluated

Sample SC-3-01 (0.5-2.5), 9.96g of 88.4% Solids sample extracted to 10 mL final volume and analyzed at DF=1.

Sample-Specific LOQ:	Sample-Specific DL based on 0.05 ng/μ lowest std = $0.05 \times (10 / (9.96 \times 0.884)) = 0.05 \text{ ng/kg} = 57 \text{ μg/kg}$; Method Blank LOQ for 10g of 100% solid sample extracted to 10 mL was 50 μg/kg; therefore, sample-specific LOQ = $50 \times (10 / 9.96 \times 0.884) = 57 \text{ μg/kg}$ ✓ Lab reported LOQ at level = lowest-level calibration standard, indicating LOQ was supported by the calibration.
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EPA SW-846 Method 8082A, NFG, and Caneel Bay SAP requirements

Preservation:	Criteria = Sample Temperature upon receipt $\leq 6^{\circ}\text{C}$; use judgment if outside criteria.
HT:	GW Extraction: 7d <HT< 14 d; J- det/ J NDs; HT >28 d, J- det/R ND Soil: extraction: 14d <HT< 28 d; J- det/ J NDs; HT >28 d, J- det/R ND; however, HT extended to up to 1 year if soil is frozen Analysis of extract: 40d < Extract HT < 60d, J- det/ J NDs; Extract HT > 60d; J- det/ R NDs; however, HT extended to up to 1 year if extract is frozen
Surrogates:	Acceptance criteria 30-150% on both GC Columns; Recovery > 150%, J+ det/Accept ND; $10\% \leq \text{Recovery} < 30\%$, J- det/J NDs; Recovery < 10%, J- det/R NDs.
LCS:	Lab Control limits and RPD $\leq 30\%$ (SAP) criteria; Recovery > UCL, J+ det/Accept ND; $10\% \leq \text{Recovery} < \text{LCL}$, J- det/J NDs; Recovery < 10%, J- det/R NDs ; LCS/LCSD RPD > 20% J det/J NDs for all samples in the associated analytical batch.
MS/MSD:	Lab Control limits and RPD $\leq 30\%$ (SAP) criteria; Recovery > UCL, J+ det/Accept ND; $10\% \leq \text{Recovery} < \text{LCL}$, J- det/J NDs; Recovery < 10%, J- det/R NDs ; MS/MSD RPD > criteria J det/J NDs. Action taken on Unspiked sample only.
LD:	If performed, RPD > 30% if value >2x LOQ, J det. Not required per Caneel Bay SAP.
FD:	Both Conc. > 2xLOQ, RPD > 30% (water) > 50% (soil) J det; One result ND, other >2 x LOQ, J det/J NDs; Both Conc. < 2xLOQ; RPD >criteria, No Action
Blanks:	Non-Matrix related Blank contamination, EB contaminant in all samples associated with Blank. Project-specific action: Lab Method Blank action taken first followed by Equipment Blank Action. If Blank is reported at < LOQ: all samples < LOQ negated (U) at sample LOQ and all samples > LOQ accepted without qualification If Blank \geq LOQ: if sample is < LOQ, negate (U) at sample LOQ; if sample result is > LOQ but < BAL, negate result (U) at the level found in the sample; and if sample result is \geq BAL, accept sample result without qualification. Where Blank Action Level (BAL) = Result reported in Blank x (Sample LOQ/Blank LOQ)
ICAL:	5-Level AR 1016/1260 & single-point for other Aroclors; RT window must be established; if %RSD > 20% or "r" < 0.995 or "r2" < 0.99, J det/UJ NDs. If an Aroclor is detected, 5-level calibration for that Aroclor should be done followed by reanalysis of the sample extract with the suspected detection of the Aroclor in question.
CCV:	%D > $\pm 25\%$ opening CCV or %D > $\pm 30\%$ for closing CCV, J det/J ND on a per column basis, as technically reasonable.

EPA SW-846 Method 8082A, NFG, and Caneel Bay SAP requirements - *continued*

IS:	20% < IS recovery < 50%; J det/ J ND with indeterminate bias (unclear if low IS is due to overall loss in instrument sensitivity causing IS and other compounds to be biased low or whether issue only affects IS, in which case, quantitation of detects possible biased high). If IS recovery < 20%, J- det / R ND.
Retention Time Window:	RT window study performed across 72-hr period with 3 injections of Aroclors/surrogates and window = RT ± 3x std. dev. If Aroclor detected outside window, use professional judgment to accept, NJ, or R detect.
Col. 1&2 Precision:	Lab should report the lowest of the 2 GC Column values. RPD 41%-71% J det; RPD 71%-100% NJ det; RPD =101%-200% negate (U) result at the highest of the 2 GC Column values; RPD > 201% Reject (R) result at level found. If RPD > 40% and result < LOQ, negate (U) result at LOQ. Bias in the results depends on whether lowest or highest of 2 GC column results chosen for reporting or whether interferences are observed in the data. Use professional judgment.
% Solids	If %Solids < 30%, J det / J NDs; if %solids < 10%, J det / R NDs.
Sensitivity:	Identify non-detects > PALs given in Table 1 of the Caneel Bay SAP.
DV Qualifier Definitions:	U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; NJ = the analyte has been "tentatively identified" and the result is usable as an estimated value with indeterminate bias; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.
References:	<i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site</i> , prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP); <i>USEPA National Functional Guidelines for Organic Superfund Methods Data Review</i> , Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017; <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use</i> , OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; <i>USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)</i> , Third Edition, Revision 1, December 1996 and updates, Method 8082A <i>Polychlorinated Biphenyls (PCBs) by Gas Chromatography</i> ; and Eurofins TestAmerica-Canton SOP NC-GC-045 Gas Chromatographic Analysis of PCBs Based on Methods 8082 and 8082A, Rev. 3, 8/31/20

Metals Data Validation Checklist
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

Dates Sampled: 2/17/2021 - 2/19/2021
 Method of Analysis: ICP-MS Metals by 6020B; Mercury by 7471B

No. Samples: 10
 Matrix: Soil

Data Validation Summary Table - EPA Stage 3: Metals in Soil

QC Met Criteria?	HT & Preserve	Calibration ICV / CCV / LL check std %R	Calibration Interference Check Stds ICS / ICSAB %R	Lab Blanks MB / ICB / CCBs	Field Blanks	Lab Control Sample LCS %R	Matrix QC MS/MSD %R	Matrix QC MS/MSD RPD	Matrix QC Serial Dilution %D	Field Duplicate RPD	ICP-MS Tune & IS %R	Sensitivity Sample-Specific QLs	Calculation Verification
Yes		√	√	√	√	√	NA	NA	NA	NA	√		√
No	Estimate (J/J+) 24 results				[EBs included in SDG 240-145189-1]							18 nondetect results LOQ > PAL	

Other: Estimate (J) 50 results < LOQ
See DV Qualifier definitions and QC evaluation criteria listed at the end of this DV Checklist.

Data Validation Level / Scope:

An EPA-compliant Stage 3 data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALS, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; Standard Reference Material (SRM) recoveries; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 3 DV, raw data were reviewed to perform calculation verification of one sample result and calculation verification of the sample-specific LOQ per analytical method per media.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? *Yes. A full deliverable, including summary QC, raw instrument data, and preparation information was provided.*
2. Were all result forms for all samples listed on the chain-of-custody (COC) present in data package? *Yes. ISM and Discrete Soil samples received for Metals analysis. Other samples are included on the COCs in this data package for TCLP analyses, which were not required to be validated based on the Caneel Bay SAP (2021). 14 project-specific Metals analyzed as follows: Method 6020B (ICP-MS) for Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Thallium, & Zinc and Method 7471B (CVAA) for Mercury; and % Moisture (% Solids) was also performed to convert Soil sample results to dry-wt basis.*

Sample Receipt & Preservation: ISM Soil and Discrete soil samples were received at Eurofins TestAmerica - Canton lab in multiple coolers on 2/25/2021, 6 to 8 days following sample collection. These Soil samples were reported by the lab in 1 laboratory data package SDG: #240-145024-1. Three of the coolers were received with Temperatures > 6 °C (up to 14.5 °C) with samples in water (ice melted) due to weather and FedEx shipping delays. Additionally, the lab documented in SDG 240-144999-1 that samples IA-2-03 B, IA-2-03 C, IA-3-01 B, and IA-3-01 C have "cooler water in the bag," and SC-3-08 (0-5) had water in the jar from the cooler. Professional judgment used to take no action on Soil samples due to temperature exceedances, which were still received at < room temperatures, would not be expected to affect the usability of Metals soil data and because the ISM soils are air-dried at room temperature for a few days prior to analysis, anyway as part of the preparation procedure. Professional judgment used to take DV action due to cooler water present in sample containers for affected detected results due to potential for contamination. Nondetected results not impacted. Actions taken in SDG 240-144999-1 for samples IA-3-01 B, IA-3-01 C, and SC-3-08 (0-5). Professional judgment used to take no action on Soil samples due to temperature exceedances, which were still received at < room temperatures, would not be expected to affect the usability of Metals soil data and because the ISM soils are air-dried at room temperature for a few days prior to analysis, anyway as part of the preparation procedure. Sample SC-03-05 (0.5') as listed on the COC was changed to SC-03-02 (0.5') based on client request.

***ACTIONS: Estimate (J+) 24 detected Metals results in samples IA-2-03 B & IA-2-03 C due to potential contamination from cooler water present in the sample containers. Estimated results have a potential high bias unless additional QC exceedance applied, then DV action changed to "J" and cumulative bias is indeterminate.**

Holding Times:

ISM preparation information included in data package: Soils prepared 2/26/2021 through 3/02/2021 in Prep Batch #474833 (Lab SOP NC-OP-044 using 2-D slab cake method), modified to generate a 10g ISM sample for Metals digestion & analysis.

ICP-MS Metals by 6020B (soil): Method 3050B - ISM Soil modified to use ~ 10g soil, Prep Batch #475242 3/3/2021 and Discrete Soil (~ 1g) Prep Batch #474873 3/1/2021. 7471B ISM Soil modified to use ~ 3g soil, Prep Batch #475243 3/3/2021 and Discrete Soil (~0.6g) Prep Batch #474879 3/1/2021.

6020B ICP-MS Metals: analysis 3/2/2021 & 3/4/2021: Acceptable HT < 180 days

7471B CVAA Mercury: analysis 3/2/2021 & 3/4/2021: Acceptable HT < 28 days

Lab Blank Actions: Lab Blank actions (method blanks and instrument blanks as reported on QC Summary Form 3) taken first, applied to all associated field samples. To calculate the sample-specific Blank Action Level (BAL), the ratio of the Sample QL/Blank QL is used since the QLs account for all of the sample-specific analysis factors (e.g. extraction volumes, extract final volume, dilution factors). See Blank evaluation criteria for DV Action at the end of this DV checklist for further details.

3 Method Blanks were associated with the Soil samples in this SDG for 6020B analyses: MB 240-474873/1-A, MB 240-475233/1-A, & MB 240-475242/1-A and 2 MBs for 7471B for Mercury: MB 240-474879/1-A & MB 240-475243/1-A. MBs were nondetect for all 14 project-specific Metals by both methods of analysis. Note that the lab reported all initial and continuing blanks for all sample data (Soils & TCLP samples); however, only the ICBs/CCBs associated with the Soil analysis batches were evaluated herein. For lab instrument blanks, blank actions were evaluated for sample(s) analyzed on the same day as the highest ICB or CCB. All ICBs/CCBs were nondetect for all 14 Metals by 6020B & 7471B. No Lab Blank Action required.

Field Equipment blanks: The EB associated with the ISM Soil samples is EB-SOIL-20210224, collected on 2/24/2021, and the EB associated with the discrete soil samples is EB-SOIL-20210222-01, collected 2/22/2021. Both EBs are included in SDG 240-145189-1. The EB represents the potential contamination from the soil drill bit used for sample collection for ISM Soil samples and from the sampling spoon for discrete soil samples. The EBs were nondetect for all project-specific Metals except for Copper in both EBs and Chromium in EB-SOIL-20210222-01. The Copper results were negated (U) at the LOQ due to Method Blank Action (see DV Checklist for SDG 240-145189-1). The Chromium result of 0.33 µg/L, converted to soil-equivalent units (using nominal prep factors of 1g initial weight to 100mL final volume; DF=5 for 6020 Metals) = 0.33 µg/L x 100mL/1g x 5 x 1/1000 units conversion = 0.16 mg/Kg (at 100% solids). This value is < the sample LOQs reported for Chromium in the discrete soil samples and all Chromium results were reported at orders-of-magnitude > LOQs (ranging from 12 to 31 mg/Kg Chromium); therefore, No Field Blank Action required.

Initial & Continuing Calibration Check standards / Low Level Check Standards: All 6020B & 7471B ICV, CCV, and ICVL (low-level) calibration checks met acceptance criteria of 90-110%R based on QC Summary Form 2A & 2B results. Note that the lab did not report low level check standard results on summary Form 2B for 6020B Metals; however, no deviations were noted in the lab narrative and a spot-check of the raw data showed acceptable recoveries. No Action required.

Interference Check Standards: All ICSA/AB results associated with the Soil sample 6020B analyses were acceptable based on QA Summary Form 4A results. No Action required.

ICP-MS Internal Standards Relative Intensity (%RI) & Tune: All IS %RI were acceptable for 6020B ICP-MS based on QC Summary Form 15 results for the IS results associated with the Soil samples and QC. Tune acceptable with all %RSD < 5.0 as reported in raw data. No Action required.

Laboratory Control Sample: 3 LCSs were performed for 6020B analyses associated with the Soil samples in this SDG: LCS 240-474873/3-A, LCS 240-475233/2-A, & LCS 240-475242/2-A and 2 LCS for 7471B for Mercury: LCS 240-474879/2-A & LCS 240-475243/2-A. Recoveries for all 14 project-specific Metals by both methods of analysis were acceptable compared to SAP and EPA DV criteria. No LCSD (duplicate) was performed; however, precision in the site matrix can be assessed based on the MS/MSD results. These LCS results are an indication of acceptable accuracy for the lab performance of Metals by Methods 6020B & 7471B. No Action required.

Matrix Spike / Matrix Spike Duplicate: No MS/MSD performed for the soil samples in this SDG. None requested on the COC.

Serial Dilution: No serial dilution was performed on soil samples in this SDG because no MS/MSD analysis.

Lab Narrative: No further issues were noted in the lab narrative of the pdf data package that were not already evaluated.

Field Duplicate Samples (FD): No FD samples included in this SDG. ISM replicate relative standard deviation (RSD) will be evaluated by the data users after all data are validated.

% Solids / % Moisture: Low % Solids (generally considered as < 30%) may indicate sample heterogeneity and introduce uncertainty to the quantitation accuracy. All Soil sample % Solids were > 30% (% Moisture < 70%). No Action required.

Selection of Results for Reporting: The samples in this SDG were analyzed once (7471B for Mercury at dilution factor (DF) = 1 and 6020B Metals at DF=5) for each method and reported with only one result for each metal. No selection of results required.

Qualifier Action: Lab reported 50 results qualified "J" (result reported < LOQ but \geq MDL). These results were accepted as estimated values due to uncertainty < LOQ. Other than this lab qualifier, there were no additional qualifiers added to the data by the lab.

***ACTION: 50 J-qualified lab results accepted as estimated (J) with indeterminate bias due to Result < LOQ.**

Sensitivity: The results and QLs for nondetected results for the 14 project-specific Metals by Methods 6020B & 7471B were reported on a sample-specific basis in units of mg/Kg dry wt in Soil. Lab-achieved Quantitation Limit (QL) for nondetect results \leq SAP Project Action Level (PAL) listed in Table 1 for Metals in Soil with the following exceptions: Antimony in samples IA-2-03 B, IA-2-03 C, IA-2-04 A, IA-2-04 B, SC-3-01 (0.5-2.5), SC-3-02 (0-3.0), & SC-3-02 (3-6); Mercury in samples SC-3-01 (0.5-2.5), SC-3-02 (0-3.0), & SC-3-02 (3-6); Silver in sample SC-3-02 (3-6); and Thallium in samples IA-2-03 A, IA-2-03 B, IA-2-03 C, IA-2-04 A, IA-2-04 B, IA-2-04 C, & SC-3-02 (3-6). These metals were expected to exceed PALs for nondetected results based on lab/method limitations. Lab "J" data are reported below the LOQ down to the MDL, to help meet project sensitivity needs (see Qualifier Action section, above).

Data users will need to determine the usability of the 18 non-detected results with LOQs > PALs for project decisions.

Calculation Verification for ICP-MS Metals 6020B - Soil

Result Verification: Lead sample IA-2-03 A (lab ID# 240-145024-8)

Analysis: 3/4/2021 @ 12:25:xx; prep batch #475242 3/3/2021; initial weight 9.59 g; final volume 500 mL; % Solids 97.1%; Inst ID I14; DF = 5; Pb mass 208;

Inst result = 47.600 µg/L (detect > LOQ of 1.0 µg/L)

Lab Result = 13 mg/Kg dry wt

Result Calculation = instrument value x final volume/initial weight x DF x 1/(%solids/100) x units conversion =

47.600 µg/L x 500 mL/9.59 g x 5 x 1/0.971 x (1/1000) = 5.719 mg/Kg dry wt; rounded to 2 significant figures = 12.78 mg/Kg dry wt

rounded to 2 sig figs = 13 mg/Kg dry wt ✓

Sample-Specific LOQ:

MDL for Pb = 0.0623 mg Kg / aqueous 0.45 µg/L ; LOQ for Pb = 0.20 mg/Kg / aqueous 1.0 µg/L (QC Form 9; MDL study date 12/15/2017 solid / 8/12/2019 aqueous)

The LOQ is supported by the low level check standard at 1 µg/L; therefore, the QL is supported by the calibration.

Lab sample-specific LOQ reported for Lead = 0.27 mg/Kg

QL Calculation: LOQ x final volume/initial weight x DF x 1/(%Solids/100) x units conversion =

1.0 µg/L x 500 mL/9.59 g x 5 x 1/0.971 x (1/1000) = 0.268 mg/Kg dry wt; rounded to 2 sig figs = 0.27 mg/Kg dry wt ✓

Calculation Verification for CVAA Mercury by 7471B - Soil

Result Verification: Mercury sample IA-2-03 A (lab ID# 240-145024-8)

Analysis: 3/4/2021 @ 14:18:57; prep 3/4/2021; initial weight 2.62 g; final volume 500 mL; Inst DF = 1;

Instrument result = 0.2093 ppb (µg/L), which is between the low standard in ICAL of 0.2 ppb and the LOQ reported as 0.6 ppb; therefore, reported flagged "J"

%Solids = 97.1%

Lab Result = 0.041 J mg/Kg dry wt

Calculation: result value x final volume/initial wt x DF x (1/(%solids/100)) = 0.2093 µg/L x 500mL/2.62g x 1 x 1/0.971 x 1/1000 units conversion =

0.041 J mg/Kg dry wt ✓

Sample-Specific LOQ:

Low level in standard curve = 0.2 ppb for Mercury; r2 = 0.9999436 linear fit for 6-point calibration (range = 0.2 - 10 ppb and included blank). The LOQ for Mercury of 0.6 µg/L is supported by the low level in multi-point calibration curve (which is < LOQ) and the low-level check standard at 0.2 µg/L; therefore, the LOQ is supported by the calibration.

Lab reported sample LOQ for Hg = 0.12 mg/Kg dry wt.

Sample LOQ Calculation: LOQ x final volume/initial wt x DF x (1/(%solids/100)) = 0.6 µg/L x 500mL/2.62g x 1 x 1/0.971 x 1/1000 units conversion =

0.118 mg/Kg dry wt; rounded to 2 sig figs = 0.12 mg/Kg dry wt ✓

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment

QC Measure	Criteria / DV Actions
Preservation & Holding Time	Analysis: ICP/MS Metals Method 6020 / ICP-AES Metals Method 6010: HT = 180d to analysis (aq. & solids); CVAA for Mercury HT = 28d. Actions: >180d all 6020 Metals / >28d Mercury: J detects; Non-detects: R or UJ based on professional judgment if > 2x HT exceedance, may R non-detects. Temperature: outside control limits of ≤ 6°C: use professional judgment. Preservation: Aqueous Total: pH > 2: use professional judgment to qualify results.
Blanks - Lab & Field	Order of Blank Action = Lab Blank actions first, then Field Blank action Matrix-matched Lab Blanks (method and instrument blanks, MB/ICB/CCB) criteria: < LOQ. Only the highest associated lab blank result per batch per metal used to take blank actions; use professional judgment for multiple MBs, ICBs & CCBs per batch. If Blank is < QL: all samples detected < QL negate (U) at the sample-specific QL; all samples detected > QL accept without qualification If Blank is ≥ QL: all samples detected < QL negate (U) at the sample-specific QL; all samples detected > QL but < 10x Blank level, J+ (estimate with a high bias) at the value reported; all samples detected > 10x Blank level accept without qualification [EPA NFG*] If Blank is a negative value (negative drift): use professional judgment Blank Action Level (BAL) = Result reported in Blank x (Sample QL/Blank QL) Field Blanks: matrix-matched aqueous: same actions as for lab blanks Field Blanks: Non-matrix matched (aqueous EB with soil/sediment): convert EB/FB results to soil-equivalent or sediment-equivalent units to calculate BAL using sample prep factors and % solids for dry-weight conversion. Then follow same actions as for lab blanks. *NOTE: The EPA NFG action when MB > QL and sample result is > QL but < 10x MB to report at MB result and use professional judgment to qualify results as estimated high (J+) or unusable (R); however, professional judgment was used to take action as described above for this project.
LCS/LCSD	Aq 80-120%R / RPD ≤ 20%; Solid LCS/LCSD: use vendor or SRM limits. [Note: EPA NFG 70-130% all matrices]. %R<low end %: J- / UJ. %R > high end %: J+ detects. %Rec < 40%: J- detects / R nondetects; > 150% R detects [EPA NFG] RPD > 20%: J / UJ. Actions affect all samples in batch.
MS/MSD	75-125%R. %R < 75% but ≥ 30%(Aq) or ≥ 10%(So) : J- / UJ. %R > 125%: J+ detects; Aq %R < 30%: J- detects / R non-detects; Solid %R < 10%: -J detects / R non-detects. Note must be evaluated cumulatively with Post-digest spike recoveries [EPA NFG]. Actions affect all "similar" metals in batch, using professional judgment to determine affected results as allowed by EPA - may only affect unspiked (native) sample used for MS/MSD. Exception: sample conc. > 4x spike level: no action (spike-added is "swamped out"). Use professional judgment to take no action when only one spike (MS or MSD) was out of control, the other spike was in control, and MS/MSD precision was acceptable.
Post-Digest Spike	75-125%R. EPA NFG requires DV Actions for Post-digest spikes be evaluated cumulatively with MS/MSD recoveries for assessing bias (see above). If MS/MSD recoveries low + Post-digest spike low, J-; If MS/MSD recoveries high + Post-digest spike high, J+. Any other combinations of exceedances that are not comparable; therefore, estimate J with indeterminate bias. Exception: sample conc. > 4x spike level: no action (spike-added is "swamped out").

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment - *continued*

QC Measure	Criteria / DV Actions
MD/MSD or Lab Duplicate	Aq Results > 5xRL: RPD > 20%: J / UJ affected results to be determined using professional judgment as allowed by EPA. Aq Results < 5xRL: difference > ±RL: J / UJ affected results Soil/Sed Results > 5xRL: RPD > 35%: J / UJ affected results to be determined using professional judgment as allowed by EPA. Soil/Sed Results < 5xRL: difference > ± 2xRL: J / UJ affected results
Field Duplicate [discrete samples only]	Aq Results > 2xQL: RPD > 30%, J / UJ FD results only [SAP Table 19] Aq Results < 2xQL: use professional judgment [consider: absolute difference > ±2xQL, J / UJ] Soil/Sed Results > 2xQL: RPD > 50%, J/UJ FD results only [SAP Table 19] Soil/Sed Results < 2xQL: use professional judgment [consider: absolute difference > ±4xQL, J / UJ]
ICV/CCV	6020B ICV/CCV: 90-110%R; 7471B/7470A ICV/CCV 85-115 %R: recoveries < low end%: J- / UJ; recoveries > high end%: J+ detects; if severe exceedance <75%: R non-detects & J-: detects; > 160%: may R detects.
Low-Level Check standard	Lab SOP limits: 70-130%R [no EPA NFG criteria]. If performed and tabulated in summary QC, use professional judgment to qualify data. Consider: Results < 2xLow-Level Check Standard: < low end: J- / UJ; > high end: J+ detects.
ICSA/AB [6020 only]	Control limits 80-120%R. %R > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects. Also check detected Metals > QL that were not spiked into the ICS: J+ detects. Potential false positives and false negatives: use professional judgment to evaluate (see lab IECs for ICP instrument) and in consideration of sample-specific interferent concentrations.
Serial Dil	Results > 50xMDL: % Difference > 10% for Aqueous and > 15% for Soil/Sed: J/UJ. Use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects [EPA NFG]
Tune [6020 only]	Tune not performed properly: use professional judgment. Resolution of mass calibration > ±0.1 μ or % RSD > 5%: UJ non-detects / J detects.
Internal Standard (IS) [6020 only]	IS criteria for ICP-MS 60-125% Relative Intensity (RI). %RI < 60% or > 125% and original sample reanalyzed at 2-fold dilution: J detects / UJ non-detects; original sample not reanalyzed: J/UJ or R - use professional judgment [EPA NFG]
ISM Replicates [A, B, C]	RSD ≤ 50% for results > 2x LOQ; exceedances J detects / UJ non-detects Results, 2x LOQ use professional judgment.
Sensitivity	Lab-achieved Quantitation Limit (QL) ≤ SAP Project Action Level (PAL) listed in Table 1 for 14 site-specific Metals in Soil. Several Metals are expected to exceed PALs for nondetected results based on lab/method limitations, including antimony, arsenic, selenium, thallium, and mercury. Lab "J" data are reported below the LOQ down to the MDL, to help meet project sensitivity needs.

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment - *continued*

QC Measure	Criteria / DV Actions
EPA NFG DV Qualifiers - definitions from Table 22 of the Caneel Bay SAP (2021)	U = The analyte was analyzed for but was not detected above the level of the reported sample-specific LOQ. UJ = The analyte was not detected above the reported concentration. The reported quantitation limit QL is approximate and may be inaccurate or imprecise. J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. J+ = The result is an estimated quantity, but the result may be biased high. J- = The result is an estimated quantity, but the result may be biased low. R = The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified. LOQ = Level of Quantitation = quantitation limit (QL) for this project <i>Note: Data with DV qualifiers U, UJ, J, J+, and J- are generally usable; data qualified R are unusable for project objectives.</i>
References	<ul style="list-style-type: none"> ▪ <i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP).</i> ▪ <i>USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-135, USEPA-540-R-2017-001, January 2017 (NFG).</i> ▪ <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009.</i> ▪ USEPA SW-846 Methods 6020B (ICP-MS for 13 Metals) & 7471B (CVAA for Mercury). ▪ Eurofins TestAmerica-Canton Lab SOP NC-MT-002: <i>Inductively Coupled Plasma - Mass Spectrometry</i>, Rev. 12, 12/07/20; SOP NC-IP-010 <i>Acid Digestion for Solid Samples</i>, Rev. 9, 10/14/20; SOP NC-MT-14: <i>Preparation and Analysis of Mercury in Aqueous and Solid Samples by Cold Vapor Atomic Absorption Spectroscopy</i>, Rev. 11, 12/07/20.

Dates Sampled: 2/17/2021 - 2/19/2021
 Method of Analysis: EPA SW846 Method 9045D

No. Samples: 6
 Matrix: Soil

Data Validation Summary Table - EPA Stage 2B: pH in Soil

QC Met Criteria?	HT & Preserve	Calibration ICV / CCV %R	Lab Blanks MB / ICB / CCBs	Field Blanks	Lab Control Sample LCS %R	LCSD RPD	Matrix QC MS %R	Matrix QC MD/LR RPD	Field Duplicate RPD	% Solids ≥ 30%	Sensitivity	Calculation Verification	Other
Yes		√	NA	NA	NA	NA	NA	NA	NA	√	√	NA	NA
No	Estimate (J) 6 results												

Other: See DV Qualifier definitions and QC evaluation criteria listed at the end of this DV Checklist.

Data Validation Level / Scope:

An EPA-compliant Stage 2B data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALs, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 2B DV, no raw data or instrument-specific QC (unless tabulated on QC summary forms) were reviewed and calculation verification is not performed.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? *Yes. A full deliverable, including summary QC, raw instrument data, and preparation information was provided.*
2. Were all result forms for all samples listed on the chain-of-custody (COC) present in data package? *Yes. Discrete soil samples received for pH (along with other analyses presented in separate DV Checklists) present in the data package 240-145024-1. Lab reported pH and Corrosivity as the same analytical results but under two separate chemical names. They are the same analysis reported twice by the lab for each sample.*

Sample Receipt & Preservation: 6 Discrete Soil samples for pH were received at ELLE-TestAmerica Canton lab in multiple coolers on 2/25/2021, 6 to 8 days following sample collection. These Soil samples were reported by the lab in 1 laboratory data package SDG: #240-145024-1. Three of the coolers were received with Temperatures > 6 °C (up to 14.5 °C) in water (ice melted) due to weather and FedEx shipping delays. Sample SC-03-05 (0.5') as listed on the COC was changed to SC-03-02 (0.5') based on client request. Actions taken due to HT exceedances for pH (see below); therefore, no additional action taken for Temperature exceedance.

Holding Times: SAP/QAPP HT ≤ 1 day (24h) from sample collection.

All samples received outside of pH HT by 5 to 7 days. Analyses were a week to 2 weeks following receipt: 3/4/2021 through 3/15/2021.

Samples IA-2-03 & IA-2-04 collected 2/18/2021; analyzed 3/4/2021 = 14 days HT

Samples SC-3-01 (0.5-2.5) & SC-3-01 (5-6) collected 2/17/2021; analyzed 3/12/2021 = 23 days HT

Sample SC-3-02 (0-3.0) collected 2/19/2021; analyzed 3/12/2021 = 21 days HT

Sample SC-3-02 (3-6) collected 2/19/2021; analyzed 3/15/2021 = 24 days HT

***ACTION: Estimate (J) all pH data in the Soils in this SDG due to HT exceedances. Estimated results have an indeterminate bias as it is not known how the pH might change in the soils over time.**

Lab Blank Actions: Not applicable to pH method.

Field Equipment blanks: No EB was collected and none required to be associated with these Soil samples for pH, based on the SAP.

Initial & Continuing Calibration Check standards: All CCVs reported on summary QC forms met SAP acceptance criteria of ± 3% true value (97-103% recovery for pH = 7 CCV). Note that lab limits were tighter at 99-101% recovery and all CCVs met the tighter criteria. No Action required.

Laboratory Control Sample: LCS not required for pH [consistent with SAP] - see CCV for method accuracy information.

Matrix Duplicate / Lab Duplicate: No Matrix Duplicate/Lab Replicate was performed for pH in soil in this SDG.

Lab Narrative: No further issues noted in the lab narrative that have not already been addressed.

Field Duplicate Samples (FD): No FD samples included in this SDG.

Sensitivity: The results for pH were reported in standard pH units (s.u.) for Soils. No Project Action Limit (PAL) was listed for pH in the Caneel Bay SAP Table 1 for Soil pH. All pH results in the discrete soils were reported to ± 0.1 s.u.; therefore, sensitivity considered acceptable compared to method requirements.

Qualifier Action: Lab applied qualifiers "HF" to all pH data. The lab definition for this qualifier is "Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request." The "HF" qualifier was removed for validated pH results. DV Actions taken for HT exceedances as documented above. No further action required.

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment

QC Measure	Criteria / DV Actions
Preservation & Holding Time	HT pH in soil/ sediment: 1 day [SAP criteria]. Actions: analysis > HT: J pH results. Temperature: outside control limits of ≤ 6 °C: use professional judgment.
Blanks - Lab & Field	Not applicable to pH.
LCS	See CCV.
MD or Lab Duplicate Lab Replicate	Soil/Sediment RPD ≤ 10%. Actions for RPD exceedance: J associated/affected results to be determined using professional judgment as allowed by EPA.
Field Duplicate	RPD ≤ 15% [SAP criteria]; Actions: J exceedance
CCV	CCV: ± 3% of True Value [SAP criteria]: CCV = 97-103%R for pH = 7. %R < low end%: J- ; recoveries > high end%: J+ detects.
Sensitivity	No PAL listed for pH.

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment - continued

QC Measure	Criteria / DV Actions
EPA NFG DV Qualifiers - definitions from Table 22 of the Caneel Bay SAP (2021)	<p>U = The analyte was analyzed for but was not detected above the level of the reported sample-specific LOQ.</p> <p>UJ = The analyte was not detected above the reported concentration. The reported quantitation limit QL is approximate and may be inaccurate or imprecise.</p> <p>J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.</p> <p>J+ = The result is an estimated quantity, but the result may be biased high.</p> <p>J- = The result is an estimated quantity, but the result may be biased low.</p> <p>R = The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.</p> <p>LOQ = Level of Quantitation = quantitation limit (QL) for this project</p> <p><i>Note: Data with DV qualifiers U, UJ, J, J+, and J- are generally usable; data qualified R are unusable for project objectives.</i></p>
References	<ul style="list-style-type: none"> ▪ <i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site</i>, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP). ▪ <i>USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review</i>, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-135, USEPA-540-R-2017-001, January 2017 (NFG). ▪ <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use</i>, OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009. ▪ USEPA SW-846 Method 9045D. ▪ Eurofins TestAmerica-Canton Lab SOP NC-WC-0101: <i>pH Electrometric Method [Methods: SW846 Methods 9040B, 9040C, 9041A, 9045C and 9045D, and SM4500 H⁺ B]</i>, Rev. 16, 07/30/2019.



Data Validation Summary Report

Client/Company:	VHB
Site/Project Name:	National Park Service (NPS) – Caneel Bay Resort EE/CA, US Virgin Islands
Laboratory:	Eurofins TestAmerica-Canton, North Canton, OH Eurofins Lancaster Laboratories Environmental, Lancaster, PA
SDGs/Lab Project #:	240-145147-1 (J145147)
Date(s) of Collection:	February 22, 2021 through February 24, 2021
Samples & Analyses:	21 Incremental Sampling Methodology (ISM) soil samples for project-specific lists of Metals, Polyaromatic Hydrocarbons (PAHs), & Pesticides 9 ISM soil samples for PCB Aroclors 8 discrete soil sample for pH 1 Groundwater sample + 2 Equipment Blanks for PAHs
Senior Data Reviewers:	Susan D. Chapnick, M.S., New Environmental Horizons, Inc. & Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Date Completed:	April 16, 2021

USEPA Stage 2B data validation (DV) review was performed for all analyses except VOC, which were validated at the Stage 3 DV level based on the following documents: *Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site*, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (SAP); *USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*, OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; *USEPA National Functional Guidelines for Organic Superfund Methods Data Review*, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017 (NFG); *USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review*, OLEM 9355.0-135, USEPA-540-R-2017-001, January 2017 (NFG); USEPA SW-846 Methods and others as specified herein; and professional judgment.

Data Validation Summary

During this USEPA Stage 2B DV review of Metals, PAHs, Pesticides, PCB Aroclors, and pH, selected sample results were negated (U) or estimated (J or UJ) due to QC issues. NEH generated a validated electronic data deliverable (EDD) based on the EDD file received from the laboratory. All sample data are considered usable for project decisions with the understanding of the potential uncertainty (bias) in the qualified results.

The following QC elements, as presented on summary QC forms and as applicable to the analytical methods, were reviewed:

- Data package completeness and agreement of analyses with Chain-of-Custody (COC)
- Sample receipt, holding times, and preservation criteria
- Calibration verification (tune checks, initial and continuing calibrations)
- Method blank and field equipment blank results
- Internal Standard relative intensities
- Laboratory Control Sample (LCS) recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) recoveries
- MS/MSD and Field Duplicate (FD) relative percent differences (RPDs)
- Other method-specific QC if applicable and reported (*e.g.*, serial dilution results)
- Evaluation of laboratory qualifiers applied to the data
- Calculation verification of one sample result per media per method of analysis*
- Calculation verification of one sample-specific limit of quantitation (LOQ) per media per method of analysis*
- Sensitivity evaluation – comparison of LOQs to project action limits
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

**For EPA Stage 2B DV, calculation verification of LOQ and sample results as well as review of raw instrument data are not required or performed.*

This DV Report consists of three parts: 1) the DV Summary Report; 2) the DV Checklists for each media and analysis method, which detail all of the QC reviewed and the issues that required action or affected the data certainty in terms of accuracy, precision, representativeness, and sensitivity; and 3) the validated EDD, which includes the USEPA DV qualifiers added to the results and validation notes to document bias and reasons for the DV actions.

Sensitivity evaluation was based on reviewing non-detects compared to the Project Action Limits (PALs) listed in Table 1 of the Caneel Bay SAP. All non-detects met sensitivity requirements except for Antimony in all 21 samples; Arsenic in sample IA-REF-01; Cadmium in samples IA-3-03 A, IA-3-03 C, IA-REF-01 B, & IA-REF-01 C; Mercury in sample IA-REF-01 C; Selenium in sample IA-1-04 B; and Thallium in all samples except IA-1-01 A & IA-1-01 B all due to method limitations or blank actions; Aldrin, Aroclor 1242, Aroclor 1248, Aroclor 1254, beta-BHC, and Endrin results in all samples; 4,4'-DDD, in all samples except IA-3-04 C; 4,4'-DDE in samples IA-1-03 A, IA-1-03 B, IA-1-03 C, IA-1-04 A, IA-1-04 B, IA-1-04 C, IA-3-03 A, IA-3-03 B, IA-3-03 C, IA-REF-01 A, IA-REF-01 B, and IA-REF-01 C; 4,4'-DDT in samples

IA-1-02 A, IA-1-02 B, IA-1-03 A, IA-1-03 B, IA-1-04 A, IA-1-04 B, IA-1-04 C, IA-3-03 A, IA-3-03 B, IA-3-03 C, IA-3-04 A, IA-3-04 C, IA-REF-01 A, IA-REF-01 B, and IA-REF-01 C; and Dieldrin in samples IA-1-01 A, IA-1-01 B, IA-1-01 C, IA-1-02 A, IA-1-02 B, IA-1-04 B, IA-1-04 C, IA-3-03 A, IA-3-03 B, IA-3-03 C, IA-3-04 B, IA-REF-01 A, IA-REF-01 B, and IA-REF-01 C. For MW-01, all non-detects met sensitivity requirements specified in Table 2 of the Caneel Bay SAP except for Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, and Indeno(1,2,3-cd)pyrene due to method limitations and sample-specific preparation factors. Ultimately, the data user will need to evaluate the usability of these non-detects above PALs for project decisions. See the DV Checklist for further details.

Table 1 in this DV Summary Report presents the samples and analytical parameters validated and Table 2 (attached) summarizes the DV actions taken as an excerpt from the validated EDD.

Table 1. Samples and Analytical Parameters Validated

Sample ID¹	Lab ID	Sampling Date	Matrix	Analytical Parameters²	Sample Type³
IA-1-01 A	240-145147-1	2/24/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample [used for Metals MS/MSD]
IA-1-01 B	240-145147-2	2/24/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-1-01 C	240-145147-3	2/24/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-1-01	240-145147-4	2/24/2021	Soil	pH	Discrete Field Sample
IA-1-02 A	240-145147-5	2/24/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-1-02 B	240-145147-6	2/24/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-1-02 C	240-145147-7	2/24/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-1-02	240-145147-8	2/24/2021	Soil	pH	Discrete Field Sample
IA-1-03 A	240-145147-9	2/24/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-1-03 B	240-145147-10	2/24/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-1-03 C	240-145147-11	2/24/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-1-03	240-145147-12	2/24/2021	Soil	pH	Discrete Field Sample
IA-1-04 A	240-145147-13	2/24/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-1-04 B	240-145147-14	2/24/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-1-04 C	240-145147-15	2/24/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-1-04	240-145147-16	2/24/2021	Soil	pH	Discrete Field Sample

Table 1. Samples and Analytical Parameters Validated - continued

Sample ID¹	Lab ID	Sampling Date	Matrix	Analytical Parameters²	Sample Type³
IA-3-04 A	240-145147-17	2/23/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-3-04 B	240-145147-18	2/23/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-3-04 C	240-145147-19	2/23/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-3-04	240-145147-20	2/23/2021	Soil	pH	Discrete Field Sample
IA-3-03 A	240-145147-21	2/23/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-3-03 B	240-145147-22	2/23/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-3-03 C	240-145147-23	2/23/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-3-03	240-145147-24	2/23/2021	Soil	pH	Discrete Field Sample
IA-REF-01 A	240-145147-25	2/22/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-REF-01 B	240-145147-26	2/22/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-REF-01 C	240-145147-27	2/22/2021	Soil	Metals, PAH, Pest, & PCB	ISM Field Sample
IA-REF-01	240-145147-28	2/22/2021	Soil	pH	Discrete Field Sample
MW-01	240-145147-29	2/24/2021	Groundwater	PAH	Field Sample
EB-SOIL-20210224	240-145147-30	2/24/2021	Water	PAH	Equipment Blank
EB-SOIL-20210222-01	240-145147-31	2/22/2021	Water	PAH	Equipment Blank
IA-2-05	240-145147-35	2/24/2021	Soil	pH	Discrete Field Sample

¹ IDW soil and aqueous samples included in this SDG did not require validation, based on direction from VHB.

² All soils were also analyzed for % Moisture / % Solids to convert results to a dry-weight basis.

³ ISM Soils prepared by Lab SOP NC-OP-044 Soil Processing, Rev.4, 1/13/2021 (included in the SAP), using the 2-D slab cake method and modified to generate a 10g ISM sample for Metals and to generate a 30g ISM sample for organics.

Analytical Methods

Metals: USEPA SW-846 Method 6020B for 13 Metals & 7471B for Mercury

PAH: USEPA SW-846 Method 8270D (ISM soil) at Canton and 8270D SIM (Groundwater & EBs) for 18 PAHs at ELLE

Pest: USEPA SW-846 Method 8081B for 22 pesticides

PCB: USEPA SW-846 Method 8082A for 7 PCB Aroclors

pH: USEPA SW-846 Method 9045D

USEPA DV Qualifiers

U = The analyte was analyzed for but was not detected above the level of the reported sample-specific LOQ.

UJ = The analyte was not detected above the reported concentration. The reported quantitation limit (LOQ) is approximate and may be inaccurate or imprecise.

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity, but the result may be biased high.

J- = The result is an estimated quantity, but the result may be biased low.

R = The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table 2. Summary of Data Validation Actions
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

AR-001912

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect Y/N	Unit	DV Qualifier	DV Comment	DV Level
IA-1-01 A	240-145147-1	SW-846 6020B	Selenium	0.25	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 A	240-145147-1	SW-846 6020B	Thallium	0.07	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 A	240-145147-1	SW-846 6020B	Silver	0.055	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 A	240-145147-1	SW-846 6020B	Antimony	0.53	N	mg/kg	UJ	Bias Low: Low MS/MSD recoveries	EPA Stage 2B
IA-1-01 A	240-145147-1	SW-846 6020B	Cadmium	0.11	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 A	240-145147-1	SW-846 6020B	Beryllium	0.25	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 B	240-145147-2	SW-846 6020B	Silver	0.06	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 B	240-145147-2	SW-846 6020B	Selenium	0.27	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 B	240-145147-2	SW-846 6020B	Antimony	0.54	N	mg/kg	UJ	Bias Low: Low MS/MSD recoveries	EPA Stage 2B
IA-1-01 B	240-145147-2	SW-846 6020B	Thallium	0.08	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 B	240-145147-2	SW-846 6020B	Cadmium	0.18	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 C	240-145147-3	SW-846 6020B	Silver	0.066	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 C	240-145147-3	SW-846 6020B	Selenium	0.23	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 C	240-145147-3	SW-846 6020B	Antimony	0.54	N	mg/kg	UJ	Bias Low: Low MS/MSD recoveries	EPA Stage 2B
IA-1-01 C	240-145147-3	SW-846 6020B	Cadmium	0.24	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 C	240-145147-3	SW-846 6020B	Beryllium	0.26	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 A	240-145147-5	SW-846 6020B	Selenium	0.18	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 A	240-145147-5	SW-846 6020B	Silver	0.041	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 A	240-145147-5	SW-846 6020B	Cadmium	0.13	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 B	240-145147-6	SW-846 6020B	Selenium	0.19	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 B	240-145147-6	SW-846 6020B	Silver	0.036	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 B	240-145147-6	SW-846 6020B	Cadmium	0.12	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 C	240-145147-7	SW-846 6020B	Selenium	0.22	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 C	240-145147-7	SW-846 6020B	Silver	0.047	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 C	240-145147-7	SW-846 6020B	Beryllium	0.26	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 C	240-145147-7	SW-846 6020B	Cadmium	0.15	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 A	240-145147-9	SW-846 6020B	Selenium	0.2	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 A	240-145147-9	SW-846 6020B	Silver	0.054	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 A	240-145147-9	SW-846 6020B	Cadmium	0.086	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 A	240-145147-9	SW-846 6020B	Beryllium	0.24	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 B	240-145147-10	SW-846 6020B	Selenium	0.23	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 B	240-145147-10	SW-846 6020B	Silver	0.061	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 B	240-145147-10	SW-846 6020B	Beryllium	0.24	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 B	240-145147-10	SW-846 6020B	Cadmium	0.097	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 C	240-145147-11	SW-846 6020B	Beryllium	0.22	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 C	240-145147-11	SW-846 6020B	Cadmium	0.11	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 C	240-145147-11	SW-846 6020B	Selenium	0.23	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 C	240-145147-11	SW-846 6020B	Silver	0.061	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 A	240-145147-13	SW-846 6020B	Beryllium	0.24	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 A	240-145147-13	SW-846 6020B	Cadmium	0.11	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 A	240-145147-13	SW-846 6020B	Selenium	0.17	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 A	240-145147-13	SW-846 6020B	Silver	0.039	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 B	240-145147-14	SW-846 6020B	Silver	0.033	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 B	240-145147-14	SW-846 6020B	Beryllium	0.22	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 B	240-145147-14	SW-846 6020B	Cadmium	0.09	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 C	240-145147-15	SW-846 6020B	Selenium	0.16	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 C	240-145147-15	SW-846 6020B	Silver	0.036	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 C	240-145147-15	SW-846 6020B	Beryllium	0.23	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 C	240-145147-15	SW-846 6020B	Cadmium	0.099	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B

Table 2. Summary of Data Validation Actions
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

AR-001913

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect Y/N	Unit	DV Qualifier	DV Comment	DV Level
IA-3-03 A	240-145147-21	SW-846 6020B	Selenium	0.27	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 B	240-145147-22	SW-846 6020B	Selenium	0.28	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 B	240-145147-22	SW-846 6020B	Cadmium	0.066	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 C	240-145147-23	SW-846 6020B	Selenium	0.34	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 A	240-145147-17	SW-846 6020B	Silver	0.031	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 A	240-145147-17	SW-846 6020B	Selenium	0.33	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 A	240-145147-17	SW-846 6020B	Beryllium	0.23	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 B	240-145147-18	SW-846 6020B	Selenium	0.34	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 B	240-145147-18	SW-846 6020B	Silver	0.032	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 B	240-145147-18	SW-846 6020B	Beryllium	0.25	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 C	240-145147-19	SW-846 6020B	Selenium	0.36	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 C	240-145147-19	SW-846 6020B	Silver	0.032	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 C	240-145147-19	SW-846 6020B	Beryllium	0.24	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 A	240-145147-25	SW-846 6020B	Arsenic	1.2	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 A	240-145147-25	SW-846 6020B	Selenium	0.29	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 A	240-145147-25	SW-846 6020B	Silver	0.036	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 B	240-145147-26	SW-846 6020B	Arsenic	0.68	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 B	240-145147-26	SW-846 6020B	Selenium	0.22	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 B	240-145147-26	SW-846 6020B	Beryllium	0.24	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 C	240-145147-27	SW-846 6020B	Silver	0.038	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 C	240-145147-27	SW-846 6020B	Selenium	0.31	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 C	240-145147-27	SW-846 6020B	Arsenic	1.4	N	mg/kg	U	Negated at the LOQ due to Method Blank Action	EPA Stage 2B
IA-1-01 A	240-145147-1	SW-846 7471B	Mercury	0.024	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 B	240-145147-2	SW-846 7471B	Mercury	0.032	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 C	240-145147-3	SW-846 7471B	Mercury	0.033	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 A	240-145147-5	SW-846 7471B	Mercury	0.025	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 B	240-145147-6	SW-846 7471B	Mercury	0.022	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 C	240-145147-7	SW-846 7471B	Mercury	0.02	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 A	240-145147-9	SW-846 7471B	Mercury	0.024	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 B	240-145147-10	SW-846 7471B	Mercury	0.023	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 C	240-145147-11	SW-846 7471B	Mercury	0.027	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 A	240-145147-13	SW-846 7471B	Mercury	0.024	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 B	240-145147-14	SW-846 7471B	Mercury	0.02	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 C	240-145147-15	SW-846 7471B	Mercury	0.022	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 A	240-145147-21	SW-846 7471B	Mercury	0.023	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 B	240-145147-22	SW-846 7471B	Mercury	0.02	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 C	240-145147-23	SW-846 7471B	Mercury	0.023	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 A	240-145147-17	SW-846 7471B	Mercury	0.039	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 B	240-145147-18	SW-846 7471B	Mercury	0.041	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 C	240-145147-19	SW-846 7471B	Mercury	0.036	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 A	240-145147-25	SW-846 7471B	Mercury	0.021	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 B	240-145147-26	SW-846 7471B	Mercury	0.021	Y	mg/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 A	240-145147-1	SW-846 8081B	4,4-DDT	2.4	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-1-01 B	240-145147-2	SW-846 8081B	4,4-DDT	4.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 B	240-145147-2	SW-846 8081B	4,4-DDE	3.7	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-1-01 C	240-145147-3	SW-846 8081B	4,4-DDT	3.4	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-1-02 C	240-145147-7	SW-846 8081B	4,4-DDT	3.1	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-1-02 C	240-145147-7	SW-846 8081B	Dieldrin	1.1	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-1-03 A	240-145147-9	SW-846 8081B	4,4-DDD	5.3	N	ug/kg	U	Result negated due to Dual Column imprecision + LOQ raised	EPA Stage 2B

Table 2. Summary of Data Validation Actions
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

AR-001914

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect Y/N	Unit	DV Qualifier	DV Comment	DV Level
IA-1-03 C	240-145147-11	SW-846 8081B	4,4-DDT	1.6	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-3-03 B	240-145147-22	SW-846 8081B	trans-Chlordane	3.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 A	240-145147-17	SW-846 8081B	Dieldrin	1.9	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-3-04 B	240-145147-18	SW-846 8081B	4,4-DDT	2.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 C	240-145147-19	SW-846 8081B	Dieldrin	4.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 C	240-145147-19	SW-846 8081B	4,4-DDD	1.7	Y	ug/kg	J	Bias Indeterminate: Dual Column imprecision + Result < LOQ	EPA Stage 2B
IA-1-01 A	240-145147-1	SW-846 8270D	2-Methylnaphthalene	5.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 A	240-145147-1	SW-846 8270D	1-Methylnaphthalene	4.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 A	240-145147-1	SW-846 8270D	Anthracene	14	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 A	240-145147-1	SW-846 8270D	Acenaphthene	10	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 A	240-145147-1	SW-846 8270D	Fluorene	6.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 A	240-145147-1	SW-846 8270D	Naphthalene	7.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 B	240-145147-2	SW-846 8270D	Acenaphthene	7.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 B	240-145147-2	SW-846 8270D	Anthracene	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 B	240-145147-2	SW-846 8270D	1-Methylnaphthalene	4.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 B	240-145147-2	SW-846 8270D	2-Methylnaphthalene	6.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 B	240-145147-2	SW-846 8270D	Naphthalene	7.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 B	240-145147-2	SW-846 8270D	Fluorene	5.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 C	240-145147-3	SW-846 8270D	Naphthalene	9.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 C	240-145147-3	SW-846 8270D	Fluorene	5.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 C	240-145147-3	SW-846 8270D	Dibenz(a,h)anthracene	7.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 C	240-145147-3	SW-846 8270D	2-Methylnaphthalene	5.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 C	240-145147-3	SW-846 8270D	1-Methylnaphthalene	3.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-01 C	240-145147-3	SW-846 8270D	Acenaphthene	8.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 A	240-145147-5	SW-846 8270D	Fluoranthene (Idryl)	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 A	240-145147-5	SW-846 8270D	Chrysene	9.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 A	240-145147-5	SW-846 8270D	Pyrene	8.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 A	240-145147-5	SW-846 8270D	Naphthalene	7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 A	240-145147-5	SW-846 8270D	Phenanthrene	8.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 A	240-145147-5	SW-846 8270D	2-Methylnaphthalene	4.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 A	240-145147-5	SW-846 8270D	Benz(b)fluoranthene	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 B	240-145147-6	SW-846 8270D	Indeno(1,2,3-cd)pyrene	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 B	240-145147-6	SW-846 8270D	Naphthalene	7.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 B	240-145147-6	SW-846 8270D	2-Methylnaphthalene	5.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 B	240-145147-6	SW-846 8270D	Benz(g,h,i)perylene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 B	240-145147-6	SW-846 8270D	Anthracene	3.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 C	240-145147-7	SW-846 8270D	Naphthalene	8.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 C	240-145147-7	SW-846 8270D	2-Methylnaphthalene	5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-02 C	240-145147-7	SW-846 8270D	Anthracene	4.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 A	240-145147-9	SW-846 8270D	Naphthalene	7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 A	240-145147-9	SW-846 8270D	2-Methylnaphthalene	4.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 A	240-145147-9	SW-846 8270D	Anthracene	7.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 A	240-145147-9	SW-846 8270D	Dibenz(a,h)anthracene	10	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 B	240-145147-10	SW-846 8270D	Dibenz(a,h)anthracene	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 B	240-145147-10	SW-846 8270D	Naphthalene	8.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 B	240-145147-10	SW-846 8270D	2-Methylnaphthalene	5.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 B	240-145147-10	SW-846 8270D	Anthracene	7.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 C	240-145147-11	SW-846 8270D	Naphthalene	7.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 C	240-145147-11	SW-846 8270D	Fluorene	6.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B

Table 2. Summary of Data Validation Actions
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

AR-001915

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect Y/N	Unit	DV Qualifier	DV Comment	DV Level
IA-1-03 C	240-145147-11	SW-846 8270D	Acenaphthene	10	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-03 C	240-145147-11	SW-846 8270D	2-Methylnaphthalene	5.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 A	240-145147-13	SW-846 8270D	Naphthalene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 A	240-145147-13	SW-846 8270D	Anthracene	6.5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 A	240-145147-13	SW-846 8270D	2-Methylnaphthalene	8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 A	240-145147-13	SW-846 8270D	Acenaphthene	4.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 B	240-145147-14	SW-846 8270D	Naphthalene	7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 B	240-145147-14	SW-846 8270D	Fluoranthene (Idryl)	6.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 B	240-145147-14	SW-846 8270D	Pyrene	5.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 B	240-145147-14	SW-846 8270D	Phenanthrene	9.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 B	240-145147-14	SW-846 8270D	Chrysene	3.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 B	240-145147-14	SW-846 8270D	2-Methylnaphthalene	5.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 C	240-145147-15	SW-846 8270D	2-Methylnaphthalene	6.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 C	240-145147-15	SW-846 8270D	1-Methylnaphthalene	4.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 C	240-145147-15	SW-846 8270D	Acenaphthene	10	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 C	240-145147-15	SW-846 8270D	Naphthalene	9.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 C	240-145147-15	SW-846 8270D	Fluorene	7.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-1-04 C	240-145147-15	SW-846 8270D	Dibenz(a,h)anthracene	7.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 A	240-145147-21	SW-846 8270D	Pyrene	4.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 A	240-145147-21	SW-846 8270D	Phenanthrene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 A	240-145147-21	SW-846 8270D	Naphthalene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 A	240-145147-21	SW-846 8270D	2-Methylnaphthalene	6.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 A	240-145147-21	SW-846 8270D	Fluoranthene (Idryl)	6.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 B	240-145147-22	SW-846 8270D	Fluoranthene (Idryl)	6.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 B	240-145147-22	SW-846 8270D	Pyrene	4.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 B	240-145147-22	SW-846 8270D	Naphthalene	8.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 B	240-145147-22	SW-846 8270D	Phenanthrene	10	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 B	240-145147-22	SW-846 8270D	2-Methylnaphthalene	5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 C	240-145147-23	SW-846 8270D	2-Methylnaphthalene	5.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 C	240-145147-23	SW-846 8270D	Naphthalene	8.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 C	240-145147-23	SW-846 8270D	Fluoranthene (Idryl)	8.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 C	240-145147-23	SW-846 8270D	Phenanthrene	12	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 C	240-145147-23	SW-846 8270D	Pyrene	5.9	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-03 C	240-145147-23	SW-846 8270D	Chrysene	3.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 A	240-145147-17	SW-846 8270D	Fluorene	5.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 A	240-145147-17	SW-846 8270D	Dibenz(a,h)anthracene	8.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 A	240-145147-17	SW-846 8270D	Naphthalene	8.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 A	240-145147-17	SW-846 8270D	2-Methylnaphthalene	5.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 A	240-145147-17	SW-846 8270D	Acenaphthene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 A	240-145147-17	SW-846 8270D	1-Methylnaphthalene	3.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 B	240-145147-18	SW-846 8270D	Fluorene	7.1	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 B	240-145147-18	SW-846 8270D	Dibenz(a,h)anthracene	9.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 B	240-145147-18	SW-846 8270D	Naphthalene	9.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 B	240-145147-18	SW-846 8270D	2-Methylnaphthalene	6.6	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 B	240-145147-18	SW-846 8270D	Acenaphthene	10	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 B	240-145147-18	SW-846 8270D	1-Methylnaphthalene	5	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 B	240-145147-18	SW-846 8270D	Anthracene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 C	240-145147-19	SW-846 8270D	2-Methylnaphthalene	4.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 C	240-145147-19	SW-846 8270D	Acenaphthene	6.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B

Table 2. Summary of Data Validation Actions
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

AR-001916

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect Y/N	Unit	DV Qualifier	DV Comment	DV Level
IA-3-04 C	240-145147-19	SW-846 8270D	Fluorene	5.2	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-3-04 C	240-145147-19	SW-846 8270D	Naphthalene	7.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 A	240-145147-25	SW-846 8270D	2-Methylnaphthalene	6.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 A	240-145147-25	SW-846 8270D	Phenanthrene	13	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 A	240-145147-25	SW-846 8270D	Fluorene	4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 A	240-145147-25	SW-846 8270D	Naphthalene	9.8	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 B	240-145147-26	SW-846 8270D	2-Methylnaphthalene	4.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 B	240-145147-26	SW-846 8270D	Phenanthrene	8.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 B	240-145147-26	SW-846 8270D	Naphthalene	7.7	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 C	240-145147-27	SW-846 8270D	Naphthalene	9.4	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 C	240-145147-27	SW-846 8270D	Phenanthrene	11	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
IA-REF-01 C	240-145147-27	SW-846 8270D	2-Methylnaphthalene	5.3	Y	ug/kg	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Benz(a)anthracene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Benz(a)pyrene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Benz(g,h,i,l)perylene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Benz(b)fluoranthene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	1-Methylnaphthalene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	2-Methylnaphthalene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Anthracene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Acenaphthylene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Indeno(1,2,3-cd)pyrene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Fluorene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Naphthalene	0.055	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Pyrene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Phenanthrene	0.055	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Chrysene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Benz(k)fluoranthene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Dibenz(a,h)anthracene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Fluoranthene (Idryl)	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210222-01	240-145147-31	SW-846 8270D SIM	Acenaphthene	0.039	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Anthracene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Benz(a)anthracene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Benz(b)fluoranthene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Benz(a)pyrene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	1-Methylnaphthalene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	2-Methylnaphthalene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Acenaphthylene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Acenaphthene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Benz(g,h,i,l)perylene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Indeno(1,2,3-cd)pyrene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Fluorene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Naphthalene	0.07	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Phenanthrene	0.07	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Pyrene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Chrysene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Benz(k)fluoranthene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Dibenz(a,h)anthracene	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
EB-SOIL-20210224	240-145147-30	SW-846 8270D SIM	Fluoranthene (Idryl)	0.05	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Anthracene	0.079	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B

Table 2. Summary of Data Validation Actions
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

AR-001917

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect Y/N	Unit	DV Qualifier	DV Comment	DV Level
MW-01	240-145147-29	SW-846 8270D SIM	Benz(a)anthracene	0.079	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Benz(b)fluoranthene	0.079	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Benz(a)pyrene	0.079	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	1-Methylnaphthalene	0.032	Y	ug/l	J	Bias Indeterminate: HT exceedance + Result < LOQ	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	2-Methylnaphthalene	0.079	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Acenaphthylene	0.079	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Acenaphthene	0.079	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Benz(g,h,i,l)perylene	0.079	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Indeno(1,2,3-cd)pyrene	0.079	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Fluorene	0.039	Y	ug/l	J	Bias Indeterminate: HT exceedance + Result < LOQ	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Naphthalene	0.11	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Pyrene	0.024	Y	ug/l	J	Bias Indeterminate: HT exceedance + Result < LOQ	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Phenanthrene	0.11	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Chrysene	0.079	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Benz(k)fluoranthene	0.079	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Dibenz(a,h)anthracene	0.079	N	ug/l	UJ	Bias Low: HT exceedance	EPA Stage 2B
MW-01	240-145147-29	SW-846 8270D SIM	Fluoranthene (Idryl)	0.022	Y	ug/l	J	Bias Indeterminate: HT exceedance + Result < LOQ	EPA Stage 2B
IA-1-01	240-145147-4	SW-846 9045D	pH	8.4	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
IA-1-02	240-145147-8	SW-846 9045D	pH	8	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
IA-1-03	240-145147-12	SW-846 9045D	pH	7.8	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
IA-1-04	240-145147-16	SW-846 9045D	pH	8.1	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
IA-2-05	240-145147-35	SW-846 9045D	pH	8	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
IA-3-03	240-145147-24	SW-846 9045D	pH	8.1	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
IA-3-04	240-145147-20	SW-846 9045D	pH	7.8	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B
IA-REF-01	240-145147-28	SW-846 9045D	pH	7.2	Y	pH units	J	Bias Indeterminate: HT exceedance	EPA Stage 2B

Dates Sampled: 2/22/2021 through 2/24/2021
Method of Analysis: PAHs by Method 8270D

No. Samples: 21 soil + 1 GW + 2EB
Matrix: Soil + Groundwater

Data Validation Summary Table - EPA Stage 2B: Polycyclic Aromatic Hydrocarbons (PAHs) in Soil

Data Element	HT & Preservation	Blank Actions	Surrogate	LCS/LCSD	MS/MSD	LD / FD	Tunes / ICAL CCV	QL & Quant. Correct	IS	%Solids
Acceptable										
Yes		√	√	√	NA	NA	√	√	√	√
No	Estimate (J or UJ) 54 results	None								

Other Issues: Qualifier Actions: 108 "J" qualified lab results accepted as estimated (J) results

Selection of results for Reporting: none required

Comments:

An EPA-compliant Stage 2B data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALs, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; Surrogate recoveries; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 2B DV, no raw data was reviewed nor were any re-calculations of data performed. Data users should reference the EPA Stage 3 data validation performed on SDG 240-145024-1.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? Yes. A full data deliverable (called Level 4 deliverable), including results, summary QC, and all raw data, was provided for review.
2. Were all result forms for all samples listed on the chain-of-custody present in data package? Yes, 21 ISM soils + 1 GW + 2 EBs for SVOC analysis received.

Sample Receiving: ISM Soil, IDW soil, IDW water, GW, and EB samples were received at Eurofins TestAmerica - Canton lab in multiple coolers on 3/1/2021, 4 to 7 days following sample collection. All coolers were received with Temperatures ≤ 6 °C preserved with ice. Sample IA-2-05 (discrete sample for pH only) was not listed on the COC but received by the lab. Eurofins TestAmerica - Canton lab subcontracted the analysis of the 1 GW and 2 EB samples to Eurofins Lancaster Laboratories Env. (ELLE) for analysis on 3/7/21 and these EBs + GW were received at ELLE on 3/9/21 intact but the cooler temperature was above criteria at 10.6 °C. Action taken for HT exceedance for GW + EBs (see below).

Holding Time (HT) evaluation: the 2 EB and GW samples were received at Canton already outside of HT (beyond 7 days from collection). The EBs and GW were prepared by Method 3510C (Separatory Funnel extraction) at ELLE in 2 QC Batches: 102293 on 3/11/21 associated with EB-SOIL-20210224 and GW MW-01 and QC Batch 103521 on 3/16/21 associated with extraction of sample EB-SOIL-20210222-01. The EB extracts were analyzed by Method 8270D-SIM on 3/13/2021. All samples for ISM were prepared at the Canton lab on 3/02/2021 through 3/04/2021 in Prep Batch #475148 (Lab SOP NC-OP-044 using 2-D slab cake method). Aliquots of the ISM samples were extracted by Method 3540C in 2 QC Batches: QC Batch 475609 on 3/5/2021 in (associated with 3 IA-REF ISM samples) and QC Batch 475999 on 3/9/21 (associated with the remaining 18 ISM samples). All ISM sample extracts for PAH analysis were analyzed by 3/12/2021. The ISM soils were extracted and analyzed within HT; however, HT was exceeded for the EBs and GW.

***ACTION: All results for MW-01, EB-SOIL-20210222-01, and EB-SOIL-20210224 estimated (J or UJ) with possible low bias, unless other issues affect the data, due to HT exceedance.**

Blank Evaluation: Full Scan Method Blanks = MB 240-475609/19-A and MB 240-475999/22-A (associated with ISM samples); SIM Method Blanks = MB 410-102293/1-A and MB 410-103521/1-A (associated with EBs + GW), Equipment Blank = Equipment Blank (EB) = EB-SOIL-20210224 (associated with ISM samples). The Full Scan Method Blanks and the EB were non-detect for all 18 Caneel Bay SAP-specific PAHs; therefore, no Blank Action required. The SIM Method Blank MB 410-102293/1-A reported detects for 7 PAHs; however, MW-01 was non-detect for these same 7 PAHs (MW-01 reported 4 detected PAHs but these were non-detect in MB 410-102293/1-A) so no Blank Action required.

Selection of Results for Reporting: all sample extracts were only analyzed once at Dilution Factor (DF)=1. Since only one result per compound per sample reported, no selection of results required.

Surrogates: Canton spiked 3 Acid (phenol-d5, 2-fluorophenol, and 2,4,6-tribromophenol) and 3 Base/Neutral (BN) (nitrobenzene-d5, 2-fluorobiphenyl, and terphenyl-d14) surrogates even though there are no acid PAH compounds while ELLE spiked 3 PAH surrogates for SIM analysis (1-methylnaphthalene-d10, fluoranthene-d10, and benzo(a)pyrene-d12). Both labs used in-house acceptance limits but here, QAPP limits (30-130%) used to judge the acceptance of the 3 BN Surrogates, which may impact the PAHs, and lab limits used to judge acceptance of the acid surrogates. All surrogates were within Caneel Bay SAP or lab limits except LCS 410-102293/2-A (SIM) reported low %Rec, but > 10%, for 1-methylnaphthalene-d10. Since the LCS are not validated, no action required.

LCS/LCSD: Lab used in-house criteria for recoveries but here Caneel SAP criteria 40-140% recovery used to judge accuracy. Canton Full Scan LCS = LCS 240-475609/20-A and LCS 240-475999/23-A and ELLE SIM LCS = LCS 410-102293/2-A/LCSD 410-102293/3-A and LCS 410-103521/2-A/ LCSD 410-103521/3-A. All 18 PAHs spiked in all LCS - No LCSD performed at Canton for the Full Scan analyses. All 18 PAHs were recovered within criteria in all LCS and LCSD except LCS 410-102293/2-A (SIM at ELLE) reported many low recoveries. This LCS also reported low surrogate recovery. Since LCSD 410-102293/3-A reported all recoveries within criteria and since the associated EB, MB, and LCSD reported all surrogates within criteria, the low LCS recoveries for LCS 410-102293/2-A appear to be isolated to this sample and not to the entire QC Batch. Therefore, decision made based on professional opinion to not qualify the EB results in SIM QC Batch 102293 due to low LCS recoveries. Overall, no Action required.

MS/MSD: there were no MS/MSD analyses performed on the samples in this SDG.

Field Duplicate (FD) samples: there were no FDs associated with the samples in this SDG. ISM replicate relative standard deviation (RSD) will be evaluated by the data users after all data are validated.

DFTPP Tunes: Canton Full Scan = Inst. A4HP10 1/25/2021 (ICAL), 3/11/2021, & 3/12/2021 and A4HP7 3/2/2021 (ICAL) & 3/9/2021 and ELLE SIM = HP23263 11/23/2020 (ICAL), 3/12/2021, & 3/17/2021. Canton used slightly different criteria from Method 8270D tuning criteria, but the criteria used was tighter than 8270C or 8270D criteria so this is acceptable. ELLE used Method 8270D Tuning criteria. All Abundances were within acceptance criteria and all samples were analyzed within 12 hours of tune. Tune raw data indicates average of scans with background correction used for tune - acceptable. DDT breakdown and pentachlorophenol and benzidine tailing factors were acceptable in all runs. No Action required.

ICALs: Inst. Canton Full Scan: A4HP10 on 1/25/2021 and A4HP7 on 3/2/2021 were 9-level calibrations from 0.1 to 25 µg/mL for 18 PAHs and ELLE SIM: HP23263 was a 6-level calibration from 0.01 to 2.5 µg/mL for 18 PAHs. ICALs contained many more compounds than the PAHs reported for the samples in this SDG. The min. RRF as indicated in Table 4 Method 8270D was monitored and all RRFs were > min. RRF and all %RSD were all < 20% for all 3 ICALs; therefore, ICALs acceptable. ICVs were also acceptable - No Action required.

CCVs: only CCVs associated with sample analyses reviewed. Applicable CCVs are:

- Inst. AP4HP7: CCV 240-475996/2 on 3/9/21 preceding the analysis of 240-145147-25 to -27
- A4HP10 CCV 240-476380/2 on 3/11/21 preceding analysis of 240-145147-1, -2 -3, -6, -7, -9, -11, -13, -15, -17, -22, and -23; and CCV 240-476557/2 on 3/12/21 preceding analysis of samples 240-145147-5, -10, -14, -18, -19, and -20.
- HP23263 CCVIS 410-102784/2 on 3/12/21 preceding 240-145147-29 and -30; and CCVIS 410-103957/2 on 3/17/21 preceding 240-145147-30

Full Scan CCVs were 10 µg/mL standards while SIM was 0.250 µg/m standards for PAHs. All CCVs contained more compounds than the 18 project-specific PAHs. For all CCVs, the min. RRF was met for all PAHs and %D ≤ ±20%; therefore, CCVs acceptable - No Action required.

Internal Standards (IS): All 6 IS's (1,4-Dichlorobenzene-d4, Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, Chrysene-d12, and Perylene-d12) for both Full Scan analyses at Canton and SIM analyses at ELLE had areas and RTs within criteria; therefore, no action required.

Compound Reporting: Lab properly reported results for the 18 PAHs listed in the Caneel Bay SAP Table 1. In the EDD, Fluoranthene is listed as "Fluoranthene (Idryl)," but this parenthetical suffix is not used in the hardcopy report and is not explained.

%Solids: all soil samples had %Solids > 30% - no Action required.

Sensitivity: for all samples, the soil LOQs were all below the Project Soil Action Levels (PALs) given in Table 1 of the Caneel Bay SAP; therefore, since all non-detects were < PALs, sensitivity was acceptable for these soil analyses. For the MW-01, all non-detects were below the Project Groundwater Action Level given in Table 2 of the Caneel Bay SAP except for anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, and indeno(1,2,3-cd)pyrene due to method limitations and sample-specific preparation factors.

Data users will need to evaluate the usability of these non-detects for project uses.

Qualifier Action : there were 108 "J" results reported indicating the result reported was uncertain due to quantitation below the instrument calibration range (data accepted as "J" value with indeterminate bias due to result < LOQ). Non-detects were reported at the sample-specific LOQ supported by the Initial Calibration; therefore, these non-detects are accurate as reported (i.e., no need to qualify "U" data as "UJ").

***ACTION: 108 "J" results qualified by the lab were accepted as estimated (J) results with indeterminate bias due to reporting at levels < LOQ.**

Narrative : There were no issues raised in the narrative not already addressed or which would have affected sample data quality - No additional action required.

EPA SW-846 Method 8270D, NFG, and Caneel Bay SAP requirements

Preservation:	Criteria = Sample Temperature upon receipt $\leq 6^{\circ}\text{C}$; use judgment if outside criteria.
HT:	GW Extraction: 7d <HT< 14 d; J- det/ J NDs; HT >14 d, J- det/R ND Soil: extraction: 14d <HT< 28 d; J- det/ J NDs; HT >28 d, J- det/R ND; however, HT extended to up to 1 year if soil is frozen Analysis of extract: 40d < Extract HT < 60d, J- det/ J NDs; Extract HT > 60d; J- det/ R NDs; however, HT extended to up to 1 year if extract is frozen
Surrogates:	Acceptance criteria 30-130%; Recovery > 130%, J+ det/Accept ND; 10% \leq Recovery < 30%, J- det/J NDs; Recovery < 10%, J- det/R NDs.
LCS/LCSD:	40-140% and RPD \leq 20% Acceptance criteria; Recovery > 140%, J+ det/Accept ND; 10% \leq Recovery < 40%, J- det/J NDs; Recovery < 10%, J- det/R NDs ; LCS/LCSD RPD > 20% J det/J NDs for all samples in the associated analytical batch.
MS/MSD:	40-140% and RPD \leq 20% (waters) RPD \leq 35% (soils) Acceptance criteria; Recovery > 140%, J+ det/Accept ND; 10% \leq Recovery < 40%, J- det/J NDs; Recovery < 10%, J- det/R NDs ; MS/MSD RPD > criteria J det/J NDs. Action taken on Unspiked sample only.
LD:	If performed, RPD > 30% if value >2x LOQ, J det. Not required for SVOC analysis per Caneel Bay SAP.
FD:	Both Conc. > 2x LOQ, RPD > 30% J det; One result ND, other >2 x LOQ, J det/J NDs; Both Conc. < 2x LOQ; RPD >criteria, No Action
Tune:	Criteria per Table 3 8270D; acquisition of tune given as sum of 3 scans across peak with background subtraction. DDT breakdown \leq 20%; tailing factors: benzidine \leq 2; pentachlorophenol \leq 2. If criteria not met (Abundances out or analysis > 12 hrs from DFTPP injection and CCVs don't meet frequency & criteria); use professional judgment
ICAL:	\geq 5-Level, lowest level \leq LOQ; if RRF < min.-required RRF J- det/ J ND; if %RSD > 20% or "r2" < 0.99 or , J det/UJ NDs. If %RSD > 90%, J det/ R NDs. Criteria based on Table 4 Method 8270D.
CCV:	Analyzed at the beginning of each 12 hour shift. Min RRF not met, J- det/J NDs. %D or %Drift > +20%, J+ det/Accept ND; %D or %Drift > -20%, J- det/J NDs (assuming negative %D = loss in sensitivity; positive %D = enhanced sensitivity)
Blanks:	Non-Matrix related EB Blank contamination, professional judgment used in comparing results to samples. Project-specific action: Lab Method Blank action taken first followed by Equipment Blank Action. If Blank is reported at < LOQ: all samples < LOQ negated (U) at sample LOQ and all samples > LOQ accepted without qualification If Blank \geq LOQ: if sample is < LOQ, negate (U) at sample LOQ; if sample result is > LOQ but < BAL, negate result (U) at the level found in the sample; and if sample result is \geq BAL, accept sample result without qualification. Where Blank Action Level (BAL) = Result reported in Blank x (Sample LOQ/Blank LOQ)

EPA SW-846 Method 8270D, NFG, and Caneel Bay SAP requirements - *continued*

IS:	20% < IS recovery < 50%; J det/ J ND with indeterminate bias (unclear if low IS is due to overall loss in instrument sensitivity causing IS and other compounds to be biased low or whether issue only affects IS, in which case, quantitation of detects possible biased high). If IS recovery < 20%, J- det / R ND.
LOQs & Reporting:	If result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Verify LOQs are sample specific and that all compounds requested were reported.
% Solids	If %Solids < 30%, J det / J NDs; if %solids < 10%, J det / R NDs.
Sensitivity:	Identify non-detects > PALs given in Table 1 of Caneel Bay SAP
TICs:	Not requested for this project.
DV Qualifier Definitions:	U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; NJ = the analyte has been "tentatively identified" and the result is usable as an estimated value with indeterminate bias; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.
References:	<i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site</i> , prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP); <i>USEPA National Functional Guidelines for Organic Superfund Methods Data Review</i> , Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017; <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use</i> , OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; <i>USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)</i> , Third Edition, Revision 1, December 1996 and updates, <i>Method 8270D Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)</i> ; Eurofins TestAmerica - Canton SOP NC-MS-018 GC/MS Analysis based on Methods 8270C, 8270D, and 8270E Rev. 8, 07/02/19.

Dates Sampled: 2/22/2021 through 2/24/2021
 Method of Analysis: 8081B

No. Samples: 21
 Matrix: Soil

Data Validation Summary Table - EPA Stage 2B: Pesticides in Soil

Data Element	Preservation & HT	Blank Actions	Surrogates	LCS / Blank Spike	MS/MSD	FD	Resolution Check	DDT/Endrin Breakdown	ICALs	CCVs
Yes	√	√	√	√	NA	NA	√	√	√	√
No		None								

Data Element	Florisil Cartridge Check (80-120%)	GPC Check (80-110%)	Col. 1 & 2 Precision	LOQ & Quant. Correct	IS	%Solids
Yes	NA	NA		√	√	√
No			Negate (U) 1 & Estimate (J) 8 results			

Other Issues: *Qualifier Actions:* 12 "J" qualified lab results accepted as estimated (J) results

Selection of results for Reporting: none required

Comments:

An EPA-compliant Stage 2B data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALs, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; Surrogate recoveries; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 2B DV, no raw data was reviewed nor were any re-calculations of data performed. Data users should reference the EPA Stage 3 data validation performed on SDG 240-145024-1.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? Yes. A full data deliverable (called Level 4 deliverable), including results, summary QC, and all raw data, was provided for review.
 2. Were all result forms for all samples listed on the chain-of-custody present in data package? Yes, 21 ISM soils for Pesticide analysis received.
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Sample Receiving: ISM Soil, IDW soil, IDW water, GW, and EB samples were received at Eurofins TestAmerica - Canton lab in multiple coolers on 3/1/2021, 4 to 7 days following sample collection. All coolers were received with Temperatures ≤ 6 °C preserved with ice. Sample IA-2-05 (discrete sample for pH only) was not listed on the COC but received by the lab.

Holding Time (HT) evaluation: All samples for ISM were prepared 3/02/2021 through 3/04/2021 in Prep Batch #475148 (Lab SOP NC-OP-044 using 2-D slab cake method). Aliquots of the ISM samples were extracted by Method 3540C in 2 QC Batches: QC Batch 475597 on 3/5/2021 in (associated with 3 IA-REF ISM samples) and QC Batch 476004 on 3/9/21 (associated with the remaining 18 ISM samples). All ISM sample extracts for Pesticides analysis were analyzed by 3/12/2021. HT acceptable - No Action required.

Blank Evaluation: Method Blanks = MB 240-475597/16-A and MB 240-476004/23-A; and Equipment Blank = EB-SOIL-20210224 (reported in SDG 180-117691-1). The Method Blanks and EB were non-detect for all Pesticides; therefore, Blank Action to negate or estimate data not required.

Selection of Results for Reporting: all sample extracts were only analyzed once (DF=1) except for sample IA-1-04 B which was also re-analyzed at DF=100 to report results for 4,4'-DDT, Endrin Aldehyde, and Methoxychlor based on the nature of the sample matrix (according to narrative). Since only one result per compound per sample reported, there is no selection of results required.

Surrogates: Tetrachloro-m-xylene (TCX) and Decachlorobiphenyl (DCB) %Rec were within lab criteria for all samples + QC on both GC columns used for analysis; except DCB %Rec < 10% on GC Column 2 for DF=1 analysis of IA-1-04B. Since %Rec acceptable on GC Column 1 and TCX %Rec acceptable on both GC Columns, no action since DF=100 analysis of this sample reported all surrogate recoveries within criteria proving low DCB on Column 2 was due to matrix interference. No Action required.

LCS/LCSD: LCS 240-475597/17-A and LCS 240-476004/24-A. Lab spiked all 20 single-component Pesticides (no Toxaphene or Technical Chlordane spiked), as expected. No LCSD performed. All LCS %Rec were within laboratory statistical recovery acceptance limits indicating lab demonstrated acceptable recovery for analysis of Pesticides in the absence of the site matrix - No Action required.

MS/MSD: there were no MS/MSD analyses performed on the samples in this SDG.

Field Duplicate (FD) samples: there were no FDs associated with the samples in this SDG. ISM replicate relative standard deviation (RSD) will be evaluated by the data users after all data are validated.

Resolution Check : chromatograms for standards checked and adequate resolution between peaks was found for Instrument A2HP15 and A2HP3 Column 1 (CLP-1) and Column 2 (CLP-2) for the Calibration Mixtures used for analysis.

DDT/Endrin Breakdown: PEMs for DDT and Endrin Breakdown measured and reported for ICAL and CCVs for both GC columns. DDT and Endrin breakdown met criteria (breakdown $\leq 15\%$ for each GC Column) - No Action required

ICAL : Instruments A2HP3 on 1/12/21 and A2HP15 on 1/14/21. Method of Internal Standard quantitation used so Relative Response Factors reported. ICALs were 7-level from 5 to 200 $\mu\text{g/L}$ for single-component pesticides. Separate ICALs for A2HP15 (on 1/19/2021) and A2HP3 (on 1/12/21) for Technical Chlordane (6-level ICAL from 10 to 500 $\mu\text{g/L}$ for each of 4 separate peaks) and Toxaphene (5-level ICAL from 100 to 5000 $\mu\text{g/L}$ for each of 5 separate peaks) on A2HP5 (on 1/14/21) and A2HP3 (on 1/12/21) were performed. %RSD < 20% or $r^2 > 0.99$ (DCB on GC Column 1 for A2HP3 calibrated using linear regression) for all compounds & surrogates on both GC columns in all ICALs. ICALs valid - No Action required.

RT window: Retention Time window studies not in data; however, retention times were stable across ICALs and CCVs. No Action required.

CCVs : since method of Internal Standard quantitation performed, bracketing CCVs not required (i.e., only the opening sequence CCV important to judging accuracy of data). For the analyses performed, the CCVs are performed in sets (single component Pesticide CCV, Toxaphene CCV, and Technical Chlordane CCV) and the relevant CCVs analyzed are:

- Inst. A2HP3 CCV 240-476478/4, CCV 240-476478/5, & CCV 240-476478/6 on 3/11/21 preceding analysis of 240-145147-1 through -3, -5 through -7, -9 through -11, -13 through -15, -17 through -19; and CCV 240-476653/4, CCV 240-476653/5, & CCV 240-476653/6 preceding analysis of 240-145147-21 through -23, and DF=100 re-analysis of 240-145147-14
- Inst. A2HP15 CCV 240-476100/4, CCV 240-476100/5, & CCV 240-476100/6 on 3/9/21 prior to analysis of samples 240-144147-5-25 through -27

All CCVs on both Column 1 and 2 had %D $\leq \pm 20\%$ for all target analytes except: Methoxychlor %D > 20% (increase sensitivity) in Column 2 for CCV 240-476478/4 and in Column 2 for CCV 240-476653/4. Since Methoxychlor was non-detect in all samples, no action required for enhanced sensitivity of GC Column 2 for these CCVs on A2HP3. Overall CCVs acceptable - No Action required.

Internal Standard (IS): lab spiked 1-Bromo-2-nitrobenzene into each extract prior to analysis as IS. The Area and RT of this IS in all samples and QC were within criteria - no Action required.

Compound Reporting: Lab reported results for all 22 Pesticides requested in Table 1 of the Caneel Bay SAP. The lab reported some compounds using a synonym for a compound (e.g., gamma-Chlordane was reported as trans-Chlordane).

%Solids: all samples had %Solids > 30% - no Action required.

Sensitivity: for all samples, the laboratory reported LOQs equivalent, on a sample-specific basis, to the Achievable Laboratory LOQs given in Table 1 of the Caneel Bay SAP. The non-detects were all below the Project Soil Action Level (PAL) given in Table 1 except: Aldrin, beta-BHC, and Endrin results in all samples; 4,4'-DDD in all samples except IA-3-04 C; 4,4'-DDE in samples IA-1-03 A, IA-1-03 B, IA-1-03 C, IA-1-04 A, IA-1-04 B, IA-1-04 C, IA-3-03 A, IA-3-03 B, IA-3-03 C, IA-REF-01 A, IA-REF-01 B, and IA-REF-01 C; 4,4'-DDT in samples IA-1-02 A, IA-1-02 B, IA-1-03 A, IA-1-03 B, IA-1-04 A, IA-1-04 B, IA-1-04 C, IA-3-03 A, IA-3-03 B, IA-3-03 C, IA-3-04 A, IA-3-04 C, IA-REF-01 A, IA-REF-01 B, and IA-REF-01 C; and Dieldrin in samples IA-1-01 A, IA-1-01 B, IA-1-01 C, IA-1-02 A, IA-1-02 B, IA-1-04 B, IA-1-04 C, IA-3-03 A, IA-3-03 B, IA-3-03 C, IA-3-04 B, IA-REF-01 A, IA-REF-01 B, and IA-REF-01 C due to method limitations and sample-specific preparation and analysis factors.

Data users will need to evaluate the usability of the non-detects above the PALs for project uses.

Dual Column precision evaluation: lab reported all results from GC Column 1, their primary column, unless the RPD was > 40%, in which case the lower of the 2 GC Column values was reported. Based on professional judgment, this reporting approach is considered acceptable for project decisions. All detected results were reported with dual column RPDs < 40% except:

- Sample IA-1-01 A 4,4'-DDT RPD > 40% but < 100%
- Sample IA-1-01 B 4,4'-DDE RPD > 40% but < 100%
- Sample IA-1-01 C 4,4'-DDT RPD > 40% but < 100%
- Sample IA-1-02 C Dieldrin and 4,4'-DDT RPD > 40% but < 100%
- Sample IA-1-03 A 4,4'-DDD RPD > 100%
- Sample IA-1-03 C 4,4'-DDT RPD > 40% but < 100%
- Sample IA-3-04 A Dieldrin RPD > 40% but < 100%
- Sample IA-3-04 C 4,4'-DDD RPD > 40% but < 100%

The lab flagged all these data with a "P" qualifier to indicate the RPD exceedance. All results with RPD > 40% but < 100% estimated with possible low bias and results with RPD > 100% negated (U) at the higher of the 2 GC Column values based on professional judgment rather than rejection of results due to RPD > 100%.

***ACTION: 4,4'-DDD in sample IA-1-03 A negated (U) and LOQ raised to 5.3 µg/L. The other 8 detected results shown above with RPDs > 40% but < 100% were estimated (J-) with possible low bias, unless other issues affect the data, due to dual column imprecision and reporting of the lower of the two GC Column values (Note, all low bias (J-) results changed to indeterminate bias (J) due to cumulative bias).**

Qualifier Action: there were 12 "J" results reported indicating the result reported was uncertain due to quantitation below the instrument calibration range (data accepted as "J" value with indeterminate bias due to result < LOQ). This excludes the 1 "JP" qualified result that was negated due to large dual column imprecision. Non-detects were reported at the sample-specific LOQ supported by the Initial Calibration; therefore, these non-detects are accurate as reported (i.e., no need to qualify "U" data as "UJ"). There were no additional qualifiers on the data requiring action

***ACTION: 12 "J" results qualified by the lab were accepted as estimated (J) results with indeterminate bias due to reporting at levels < LOQ.**

Narrative : there were no issues raised in the narrative not already addressed or which would have affected sample data quality - No additional action required.

EPA SW-846 Method 8081B, NFG, and QAPP requirements

Preservation:	Criteria = Sample Temperature upon receipt $\leq 6^{\circ}\text{C}$; use judgment if outside criteria.
HT:	GW Extraction: 7d <HT< 14 d; J- det/ J NDs; HT >28 d, J- det/R ND Soil: extraction: 14d <HT< 28 d; J- det/ J NDs; HT >28 d, J- det/R ND; however, HT extended to up to 1 year if soil is frozen Analysis of extract: 40d < Extract HT < 60d, J- det/ J NDs; Extract HT > 60d; J- det/ R NDs; however, HT extended to up to 1 year if extract is frozen
Surrogates:	Acceptance criteria 30-150% on both GC Columns; Recovery > 150%, J+ det/Accept ND; $10\% \leq \text{Recovery} < 30\%$, J- det/J NDs; Recovery < 10%, J- det/R NDs.
LCS:	Lab Control limits and RPD $\leq 30\%$ (SAP) criteria; Recovery > UCL, J+ det/Accept ND; $10\% \leq \text{Recovery} < \text{LCL}$, J- det/J NDs; Recovery < 10%, J- det/R NDs ; LCS/LCSD RPD > 20% J det/J NDs for all samples in the associated analytical batch.
MS/MSD:	Lab Control limits and RPD $\leq 30\%$ (SAP) criteria; Recovery > UCL, J+ det/Accept ND; $10\% \leq \text{Recovery} < \text{LCL}$, J- det/J NDs; Recovery < 10%, J- det/R NDs ; MS/MSD RPD > criteria J det/J NDs. Action taken on Unspiked sample only.
LD:	If performed, RPD > 30% if value >2x LOQ, J det. Not required per Caneel Bay SAP.
FD:	Both Conc. > 2xLOQ, RPD > 30% (water) or > 50% (soil) J det; One result ND, other >2 x LOQ, J det/J NDs; Both Conc. < 2xLOQ; RPD >criteria, No Action
Blanks:	Non-Matrix related EB Blank contamination, professional judgment used in comparing results to samples. Project-specific action: Lab Method Blank action taken first followed by Equipment Blank Action. If Blank is reported at < LOQ: all samples < LOQ negated (U) at sample LOQ and all samples > LOQ accepted without qualification If Blank \geq LOQ: if sample is < LOQ, negate (U) at sample LOQ; if sample result is > LOQ but < BAL, negate result (U) at the level found in the sample; and if sample result is \geq BAL, accept sample result without qualification. Where Blank Action Level (BAL) = Result reported in Blank x (Sample LOQ/Blank LOQ)
Resolution Check:	RCM < 60% resolution if INDA & INDB used, J detects based on technical judgment. If RCM not analyzed, verify resolution acceptable for calibrations
DDT & Endrin Breakdown:	4,4'-DDT breakdown > 15%, J- det DDT/ R ND DDT; Accept ND DDE & DDD but NJ det DDD & DDE Endrin breakdown > 15%, J- det Endrin/ R ND Endrin; Accept ND Endrin aldehyde & endrin ketone but NJ det endrin aldehyde & endrin ketone
ICAL:	5-Level for single-component Pests and toxaphene; if %RSD > 20% except alpha-BHC, delta-BHC, J det/J ND. If alpha-BHC or delta-BHC %RSD > 25%, J det/J ND. If Toxaphene %RSD > 30%, J det/J ND. ICAL can also use curve statistics - if "r" < 0.995 or "r2" < 0.99, J det/UJ NDs.
CCV:	%D or %Drift > +25%, J+ det/Accept ND; %D or %Drift > -25%, J- det/J ND (assuming negative %D = loss in sensitivity; positive %D = enhanced sensitivity) on a per column basis, as technically reasonable. Opening and closing CCVs must meet criteria. Verify resolution between adjacent peaks is acceptable- If not, action may be needed depending on the sample data.

EPA SW-846 Method 8081B, NFG, and Caneel Bay SAP requirements - *continued*

IS:	20% < IS recovery < 50%; J det/ J ND with indeterminate bias (unclear if low IS is due to overall loss in instrument sensitivity causing IS and other compounds to be biased low or whether issue only affects IS, in which case, quantitation of detects possible biased high). If IS recovery < 20%, J- det / R ND.
Retention Time Window:	RT window study performed across 72-hr period with 3 injections of each compound of concern. Window = RT ± 3x std. dev (or ± 0.05 for heptachlor, aldrin and BHC compounds and ± 0.07 for all other target for nominal windows if std. dev. too tight). If compound detected outside window, use professional judgment to J or R detect.
Col. 1&2 Precision:	RPD 41%-71% J det; RPD 71%-100% NJ det; RPD =101%-200% negate (U) result at the highest of the 2 GC Column values; RPD > 201% Reject (R) result at level found. If RPD > 40% and result < LOQ, negate (U) result at LOQ. Bias in the results depends on whether lowest or highest of 2 GC column results chosen for reporting or whether interferences are observed in the data. Use professional judgment.
% Solids	If %Solids < 30%, J det / J NDs; if %solids < 10%, J det / R NDs.
Sensitivity:	Identify non-detects > PALs given in Table 1 of Caneel Bay SAP
DV Qualifier Definitions:	U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; NJ = the analyte has been "tentatively identified" and the result is usable as an estimated value with indeterminate bias; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.
References:	<i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site</i> , prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP); <i>USEPA National Functional Guidelines for Organic Superfund Methods Data Review</i> , Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017; <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use</i> , OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; <i>USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)</i> , Third Edition, Revision 1, December 1996 and updates, Method 8081B <i>Organochlorine Pesticides by Gas Chromatography</i> ; and Eurofins TestAmerica-Canton SOP NC-GC-042 Gas Chromatographic Analysis of Pesticides Based on Methods 8081A and 8081B, Rev. 3, 10/29/20

Dates Sampled: 2/22/2021 through 2/24/2021

Method of Analysis: 8082A

No. Samples: 9

Matrix: Soil

Data Validation Summary Table - EPA Stage 2B: PCB Aroclors in Soil

Data Element	Preservation		Surrogates	LCS	MS/MSD	FD	ICAL/CCV	Col. 1 & 2		LOQ	%Solids	Pattern
	& HT							Precision	& Quant. Correct	Match		
Acceptable												
Yes	√		√	√	NA	NA	√	NA	√	√	NA	
No												

Other Issues: *Qualifier Actions:* none required

Blank Action: none required

Selection of results for Reporting: none required

Comments:

An EPA-compliant Stage 2B data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALs, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; Surrogate recoveries; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 2B DV, no raw data was reviewed nor were any re-calculations of data performed. Data users should reference the EPA Stage 3 data validation performed on SDG 240-145024-1.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? Yes. A full data deliverable (called Level 4 deliverable), including results, summary QC, and all raw data, was provided for review.
2. Were all result forms for all samples listed on the chain-of-custody present in data package? No, after sample receipt, VHB canceled the PCB Aroclor analysis of IA-1-03 A, IA-1-03 B, IA-1-03 C, IA-1-04 A, IA-1-04 B, and IA-1-04 C so that instead of 15 ISM samples for analysis, the lab reported results for 9 ISM soils, as requested by VHB.

Sample Receiving: ISM Soil, IDW soil, IDW water, GW, and EB samples were received at Eurofins TestAmerica - Canton lab in multiple coolers on 3/1/2021, 4 to 7 days following sample collection. All coolers were received with Temperatures ≤ 6 °C preserved with ice. Sample IA-2-05 (discrete sample for pH only) was not listed on the COC but received by the lab.

Holding Time (HT) evaluation: 9 samples for ISM were prepared on 2/26/2021 through 3/02/2021 in QC Batch 474833 (Lab SOP NC-OP-044 using 2-D slab cake method) and then aliquots of the ISM samples were extracted by Method 3540C in 3 QC Batches: QC Batch 475598 on 3/5/21 associated with 3 REF ISM samples; QC Batch 475790 on 3/8/21 associated with the all other samples except IA-3-03 C; and QC Batch 475977 on 3/9/21 associated sample IA-3-03 C. All sample extracts for PCB Aroclors underwent sulfuric acid cleanup prior to analysis on 3/10/2021; therefore, HT acceptable - No Action required.

Blank Evaluation: Method Blanks = MB 240-475598/23-A, MB 240-475790/23-A, and MB 240-475977/23-A; and Equipment Blanks = EB-SOIL-20210224 (reported in SDG 180-117691-1). All Method Blanks and EB were non-detect for all PCB Aroclors; therefore, Blank Action to negate or estimate data not required.

Selection of Results for Reporting: all sample extracts were only analyzed once (DF=1). Since only one result per compound per sample reported, there is no selection of results required.

Surrogates: Tetrachloro-m-xylene (TCX) and Decachlorobiphenyl (DCB) %Rec were within lab criteria for all samples + QC - lab only reported %Rec from GC Column 1 or from Column 2 but not from both Columns. Raw data shows surrogate recoveries on both GC Column were comparable - no Action required.

LCS/LCSD: LCS 240-475598/24-A, LCS 240-475790/24-A, and LCS 240-475977/24-A. Lab spiked Aroclors 1016 and 1260 at 1000 µg/kg. No LCSD performed. The recoveries were within lab limits in all LCS indicating acceptable accuracy for extraction and analysis of PCB Aroclors in the absence of the site matrix - No Action required.

MS/MSD: there were no MS/MSD analyses performed on the samples in this SDG.

Field Duplicate (FD) samples: there were no FDs associated with the samples in this SDG. ISM replicate relative standard deviation (RSD) will be evaluated by the data users after all data are validated.

Retention Time : RT stable for TCX and DCB and detected Aroclors across analyses on both GC Columns (Column A = CLP-1 and Column B = CLP-2). During ICAL, RT windows established for Aroclor peaks and Surrogates.

ICAL : Inst. A2HP12 ICAL performed on 2/8/2021, Inst. A2HP2 on 2/9/2021, and Inst. A2HP11 ICAL performed on 3/1/2021 were 6-levels from 0.05 to 1.5 ng/μL for each of 5 peaks for all 7 project-required Aroclors (plus Aroclors 1262 and 1268 not required). Method of Internal Standard quantitation used so Relative Response Factors reported. %RSD < 20% for all peaks in 6-level calibrations except a few individual peaks that were calibrated using regression analysis with $r^2 > 0.990$. ICALs acceptable. ICVs following ICALs were all acceptable.

CCVs: since method of Internal Standard quantitation performed, bracketing CCVs not required (i.e., only the opening sequence CCV important to judging accuracy of data). For the analyses performed, the CCV consisted of analysis of 5 standards (combined Aroclors 1016/1260, Aroclors 1232/1262, Aroclors 1242/1268, Aroclors 1221/1254, and single Aroclor 1248) with the Aroclors at 0.5 ng/μL. The relevant CCVs analyzed are:

- Inst. A2HP2 CCV 240-475896/3, CCV 240-475896/4, CCV 240-475896/5, CCV 240-475896/6, & CCV 240-475896/7 on 3/8/21 prior to analysis of 240-145147-25 through -26
- Inst. A2HP12 CCV 240-476095/3, CCV 240-476095/4, CCV 240-476095/5, CCV 240-476095/6, & CCV 240-476095/7 on 3/9/21 prior to analysis of samples 240-145147-17 through -18, -21, & -22
- Inst. A2HP11 CCV 240-476277/3, CCV 240-476277/4, & CCV 240-476277/5, CCV 240-476277/6, and CCV 240-476277/7 on 3/10/21 and CCVIS 240-476277/29 prior to analysis of 240-145147-23

CCVs had %D $\leq \pm 20\%$ for each of the 5 peaks in each Aroclor on both Column 1 and 2 except some individual peaks on one column or the other exceeded criteria; however, since the other 4 peaks on the GC Column were acceptable as were responses for all peaks on the other GC Column, no action required. CCVs all acceptable.

Compound Reporting: Lab reported results for all 7 PCB Aroclors requested in Table 1 of the Caneel Bay SAP. Aroclors 1262 and Aroclors 1268 were not required to be reported.

Internal Standard (IS): lab spiked 1-Bromo-2-nitrobenzene into each extract prior to analysis as IS. The Area and RT of this IS in all samples and QC were within criteria - no Action required.

Dual Column precision evaluation: lab reported all detects (e.g., LCS) from GC Column 1 unless RPD > 40%, in which case the lab reported the lower value from GC Column 1 or 2. Dual Column evaluation for PCB Aroclors is not required by Method 8082A since pattern recognition using a single column is usually sufficient confirmation. All Aroclors were non-detect in the samples so no dual column evaluation performed.

%Solids: all samples had %Solids > 30% - no Action required.

Sensitivity: for all samples, the laboratory reported LOQs equivalent to the Achievable Laboratory LOQs, on a sample-specific basis, given in Table 1 of the Caneel Bay SAP. For all samples, the non-detects were reported at levels less than the Project Soil Action Levels (PALs) except for Aroclors 1242, 1248, and 1254 in all samples, as expected, due to method limitations.

Data users will need to evaluate the usability of these non-detects for project uses.

Qualifier Action: there were no "J" qualified data reported, which is appropriate for Aroclor data. Non-detects were qualified with a "U" and reported at the sample-specific LOQ supported by the Initial Calibration; therefore, these non-detects are accurate as reported (i.e., no need to qualify "U" data as "UJ"). There were no additional qualifiers added to the data so no Qualifier action required.

Narrative : there were no issues raised in the narrative not already addressed or which would have affected sample data quality - No additional action required.

EPA SW-846 Method 8082A, NFG, and Caneel Bay SAP requirements

Preservation:	Criteria = Sample Temperature upon receipt $\leq 6^{\circ}\text{C}$; use judgment if outside criteria.
HT:	GW Extraction: 7d <HT< 14 d; J- det/ J NDs; HT >28 d, J- det/R ND Soil: extraction: 14d <HT< 28 d; J- det/ J NDs; HT >28 d, J- det/R ND; however, HT extended to up to 1 year if soil is frozen Analysis of extract: 40d < Extract HT < 60d, J- det/ J NDs; Extract HT > 60d; J- det/ R NDs; however, HT extended to up to 1 year if extract is frozen
Surrogates:	Acceptance criteria 30-150% on both GC Columns; Recovery > 150%, J+ det/Accept ND; $10\% \leq \text{Recovery} < 30\%$, J- det/J NDs; Recovery < 10%, J- det/R NDs.
LCS:	Lab Control limits and RPD $\leq 30\%$ (SAP) criteria; Recovery > UCL, J+ det/Accept ND; $10\% \leq \text{Recovery} < \text{LCL}$, J- det/J NDs; Recovery < 10%, J- det/R NDs ; LCS/LCSD RPD > 20% J det/J NDs for all samples in the associated analytical batch.
MS/MSD:	Lab Control limits and RPD $\leq 30\%$ (SAP) criteria; Recovery > UCL, J+ det/Accept ND; $10\% \leq \text{Recovery} < \text{LCL}$, J- det/J NDs; Recovery < 10%, J- det/R NDs ; MS/MSD RPD > criteria J det/J NDs. Action taken on Unspiked sample only.
LD:	If performed, RPD > 30% if value >2x LOQ, J det. Not required per Caneel Bay SAP.
FD:	Both Conc. > 2xLOQ, RPD > 30% (water) > 50% (soil) J det; One result ND, other >2 x LOQ, J det/J NDs; Both Conc. < 2xLOQ; RPD >criteria, No Action
Blanks:	Non-Matrix related Blank contamination, EB contaminant in all samples associated with Blank. Project-specific action: Lab Method Blank action taken first followed by Equipment Blank Action. If Blank is reported at < LOQ: all samples < LOQ negated (U) at sample LOQ and all samples > LOQ accepted without qualification If Blank \geq LOQ: if sample is < LOQ, negate (U) at sample LOQ; if sample result is > LOQ but < BAL, negate result (U) at the level found in the sample; and if sample result is \geq BAL, accept sample result without qualification. Where Blank Action Level (BAL) = Result reported in Blank x (Sample LOQ/Blank LOQ)
ICAL:	5-Level AR 1016/1260 & single-point for other Aroclors; RT window must be established; if %RSD > 20% or "r" < 0.995 or "r2" < 0.99, J det/UJ NDs. If an Aroclor is detected, 5-level calibration for that Aroclor should be done followed by reanalysis of the sample extract with the suspected detection of the Aroclor in question.
CCV:	%D > $\pm 25\%$ opening CCV or %D > $\pm 30\%$ for closing CCV, J det/J ND on a per column basis, as technically reasonable.

EPA SW-846 Method 8082A, NFG, and Caneel Bay SAP requirements - *continued*

IS:	20% < IS recovery < 50%; J det/ J ND with indeterminate bias (unclear if low IS is due to overall loss in instrument sensitivity causing IS and other compounds to be biased low or whether issue only affects IS, in which case, quantitation of detects possible biased high). If IS recovery < 20%, J- det / R ND.
Retention Time Window:	RT window study performed across 72-hr period with 3 injections of Aroclors/surrogates and window = RT ± 3x std. dev. If Aroclor detected outside window, use professional judgment to accept, NJ, or R detect.
Col. 1&2 Precision:	Lab should report the lowest of the 2 GC Column values. RPD 41%-71% J det; RPD 71%-100% NJ det; RPD =101%-200% negate (U) result at the highest of the 2 GC Column values; RPD > 201% Reject (R) result at level found. If RPD > 40% and result < LOQ, negate (U) result at LOQ. Bias in the results depends on whether lowest or highest of 2 GC column results chosen for reporting or whether interferences are observed in the data. Use professional judgment.
% Solids	If %Solids < 30%, J det / J NDs; if %solids < 10%, J det / R NDs.
Sensitivity:	Identify non-detects > PALs given in Table 1 of the Caneel Bay SAP.
DV Qualifier Definitions:	U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; NJ = the analyte has been "tentatively identified" and the result is usable as an estimated value with indeterminate bias; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.
References:	<i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site</i> , prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP); <i>USEPA National Functional Guidelines for Organic Superfund Methods Data Review</i> , Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017; <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use</i> , OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; <i>USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)</i> , Third Edition, Revision 1, December 1996 and updates, Method 8082A <i>Polychlorinated Biphenyls (PCBs) by Gas Chromatography</i> ; and Eurofins TestAmerica-Canton SOP NC-GC-045 Gas Chromatographic Analysis of PCBs Based on Methods 8082 and 8082A, Rev. 3, 8/31/20

Metals Data Validation Checklist
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

Dates Sampled: 2/22/2021 through 2/24/2021
 Method of Analysis: ICP-MS Metals by 6020B; Mercury by 7471B

No. Samples: 21
 Matrix: Soil

Data Validation Summary Table - EPA Stage 2B: Metals in Soil

QC Met Criteria?+A 5:N14	HT & Preserve	Calibration ICV / CCV / LL check std %R	Calibration Interference Check Stds ICS / ICSAB %R	Lab Blanks MB / ICB / CCBs	Field Blanks	Lab Control Sample LCS %R	Matrix QC MS/MSD %R	Matrix QC MS/MSD RPD	Matrix QC Serial Dilution %D	Field Duplicate RPD	ICP-MS Tune & IS %R	Sensitivity Sample-Specific QLs	Calculation Verification
Yes	√	√	√		√	√		√	√	NA	√		NA
No				Negate (U) 1 result	[EB included in SDG 240-145189-1]		Estimate (UJ) 3 results					47 nondetect results LOQ > PAL	

Other: Estimate (J) 87 results < LOQ
See DV Qualifier definitions and QC evaluation criteria listed at the end of this DV Checklist.

Data Validation Level / Scope:

An EPA-compliant Stage 2B data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALS, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; Standard Reference Material (SRM) recoveries; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 2B DV, no raw data was reviewed nor were any re-calculations of data performed. Data users should reference the EPA Stage 3 data validation performed on SDG 240-145024-1.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? *Yes. A full deliverable, including summary QC, raw instrument data, and preparation information was provided.*
 2. Were all result forms for all samples listed on the chain-of-custody (COC) present in data package? *Yes. ISM and IDW samples received for Metals analysis. Only ISM soil samples required validation, based on client communication. 14 project-specific Metals analyzed as follows: Method 6020B (ICP-MS) for Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Thallium, & Zinc and Method 7471B (CVAA) for Mercury; and % Moisture (% Solids) was also performed to convert Soil sample results to dry-wt basis.*
-

Sample Receipt & Preservation: ISM Soil, IDW soil, & IDW water samples were received at Eurofins TestAmerica - Canton lab in multiple coolers on 3/1/2021, 4 to 7 days following sample collection. These samples were reported by the lab in 1 laboratory data package SDG: #240-145147-1. All coolers were received with Temperatures $\leq 6^{\circ}\text{C}$ preserved with ice. Sample IA-2-05 (discrete sample for pH only) was not listed on the COC but received by the lab.

Holding Times:

ISM preparation information included in data package: Soils prepared 3/02/2021 through 3/04/2021 in Prep Batch #475148 (Lab SOP NC-OP-044 using 2-D slab cake method), modified to generate a 10g ISM sample for Metals digestion & analysis.

ICP-MS Metals by 6020B (soil): Method 3050B - ISM Soil modified to use ~ 10g soil, Prep Batch #475980 on 3/9/2021 & Prep Batch #476188 on 3/10/2021. 7471B ISM Soil modified to use ~ 3g soil, Prep Batch #475985 on 3/9/2021 & Prep Batch #476558 on 3/12/2021.

6020B ICP-MS Metals: analysis 3/10/2021 through 3/18/2021: Acceptable HT < 180 days

7471B CVAA Mercury: analysis 3/10/2021 & 3/16/2021: Acceptable HT < 28 days

Lab Blank Actions: Lab Blank actions (method blanks and instrument blanks as reported on QC Summary Form 3) taken first, applied to all associated field samples. To calculate the sample-specific Blank Action Level (BAL), the ratio of the Sample QL/Blank QL is used since the QLs account for all of the sample-specific analysis factors (e.g. extraction volumes, extract final volume, dilution factors). See Blank evaluation criteria for DV Action at the end of this DV checklist for further details.

2 Method Blanks (MB) were associated with the ISM Soil samples in this SDG for 6020B analyses: MB 240-475980/1-A & MB 240-476188/1-A and 2 MB for 7471B for Mercury: MB 240-475985/1-A & MB 240-476558/1-A. MBs were nondetect for all 14 project-specific Metals by both methods of analysis except for Arsenic (0.115 J mg/Kg) and Zinc (3.47 J mg/Kg) in MB 240-476188/1-A (associated with "IA-REF-01 C" only). Note that the lab reported all initial and continuing blanks for all sample data (ISM & IDW data); however, only the ICBs/CCBs associated with the ISM Soil analysis batches were evaluated herein. For lab instrument blanks, blank actions were evaluated for sample(s) analyzed on the same day as the highest ICB or CCB.

***ACTION: Negate (U) 1 result at the LOQ due to Method Blank Action as shown on the attached Blank Action Worksheet.**

Field Equipment blanks: The EB associated with the ISM Soil samples is EB-SOIL-20210224, collected on 2/24/2021, included in SDG 240-145189-1. The EB represents the potential contamination from the soil drill bit used for sample collection for ISM Soil samples. The EB was nondetect for all project-specific Metals except for Copper. The Copper result in the EB was negated (U) at the LOQ due to Method Blank Action (see DV Checklist for SDG 240-145189-1). Therefore, No Field Blank Action required.

Initial & Continuing Calibration Check standards / Low Level Check Standards: All 6020B & 7471B ICV, CCV, and ICVL (low-level) calibration checks met acceptance criteria of 90-110%R (for ICV/CCV) based on QC Summary Form 2A & 2B results. Note that the lab flagged Copper results as "⁺1" defined as "Initial Calibration Verification (ICV) is outside acceptance limits, high biased." However, all ICV/CCV and ICVL (low-level check) recoveries met SAP/QAPP criteria of 90-110% and 70-130% recoveries, respectively; therefore, no action required other than to remove the lab qualification. Low level check standards for Mercury met lab limits of 50-150% recovery - Professional judgment used to take no action because these lab control limits for 7471B are considered acceptable for this method even though slightly wider than QAPP limits. Note that the lab did not report low level check standard results on summary Form 2B for 6020B Metals; however, "ICVL" results were reported on Form 2A and no deviations were noted in the lab narrative; therefore, assumed acceptable (raw data not reviewed at EPA Stage 2B DV level). No Action required.

Interference Check Standards: All ICSA/AB results associated with the ISM Soil sample 6020B analyses were acceptable based on QA Summary Form 4A results. No Action required.

ICP-MS Internal Standards Relative Intensity (%RI) & Tune: All IS %RI were acceptable for 6020B ICP-MS based on QC Summary Form 15 results for the IS results associated with the ISM Soil samples and QC. Tune assumed acceptable since no deviations noted in lab narrative (raw data are not reviewed at the EPA Stage 2B DV level). No Action required.

Laboratory Control Sample: 2 LCS performed for 6020B analyses associated with the ISM Soil samples in this SDG: LCS 240-475980/2-A & LCS 240-476188/2-A and 2 LCS for 7471B for Mercury: LCS 240-475985/2-A & LCS 240-476558/2-A. Recoveries for all 14 project-specific Metals by both methods of analysis were acceptable compared to SAP and EPA DV criteria. No LCS (duplicate) was performed; however, precision in the site matrix can be assessed based on the MS/MSD results. These LCS results are an indication of acceptable accuracy for the lab performance of Metals by Methods 6020B & 7471B. No Action required.

Matrix Spike / Matrix Spike Duplicate: MS/MSD was performed on ISM Soil sample IA-1-01 A for 6020B & 7471B in this SDG. All MS/MSD recoveries were acceptable compared to SAP criteria except for Antimony, Copper, & Zinc. Antimony MS & MSD recoveries were low (<75% but > 10%) at 19%, Copper & Zinc recoveries were low in the MS (<75% but > 10%) and Zinc recovered high in the MSD (>125%). No action taken for Copper or Zinc because the spike level was < 4x sample concentration; therefore, the spike was "swamped out." No Post-Digest spike was reported for Antimony. All MS/MSD Relative percent differences (RPDs) were acceptable. These results indicate acceptable accuracy and precision of the project-specific Metals analyzed with the exception of Antimony. Professional judgment used, as allowed by EPA NFG, to take action on all 3 ISM replicates at this location as associated results.

***ACTION: Estimate (UJ) the nondetect Antimony results in samples IA-1-01 A, IA-1-01 B, & IA-1-01 C due to low MS/MSD recoveries with potential low bias.**

Serial Dilution: Serial dilution was performed on ISM Soil sample IA-1-01 A, as used for MS/MD, for 6020B. Note that the lab did not calculate all of the % Differences; however, QC Summary Form 8 lists the initial and serial dilution results and they were all acceptable ($\leq 15\%$ for Soils) for results $> 50 \times \text{MDL}$. No Action required.

Lab Narrative: No further issues were noted in the lab narrative of the pdf data package that were not already evaluated.

Field Duplicate Samples (FD): No FD samples included in this SDG. ISM replicate relative standard deviation (RSD) will be evaluated by the data users after all data are validated.

% Solids / % Moisture: Low % Solids (generally considered as $< 30\%$) may indicate sample heterogeneity and introduce uncertainty to the quantitation accuracy. All Soil sample % Solids were $> 30\%$ (% Moisture $< 70\%$). No Action required.

Selection of Results for Reporting: The samples in this SDG were analyzed once (7471B for Mercury at dilution factor (DF) = 1 and 6020B Metals at DF=5) for each method and reported with only one result for each metal. No selection of results required.

Qualifier Action: Lab reported 88 results qualified "J" (result reported $< \text{LOQ}$ but $\geq \text{MDL}$). One result was negated (U) due to blank action and the rest were accepted as estimated values due to uncertainty $< \text{LOQ}$. Other qualifiers added by the lab to the ISM Soil results included: *, B, and F1. All of these were removed during DV and replaced with appropriate DV qualifier, if required, as described in this DV Checklist.

***ACTION: 87 J-qualified lab results accepted as estimated (J) with indeterminate bias due to Result $< \text{LOQ}$.**

Sensitivity: The results and QLs for nondetected results for the 14 project-specific Metals by Methods 6020B & 7471B were reported on a sample-specific basis in units of mg/Kg dry wt in Soil. Lab-achieved Quantitation Limit (QL) for nondetect results $\leq \text{SAP Project Action Level (PAL)}$ listed in Table 1 for Metals in Soil with the following exceptions: Antimony in all 21 samples due to method limitations; Arsenic in sample IA-REF-01 C due to blank action; Cadmium in samples IA-3-03 A, IA-3-03 C, IA-REF-01 B, & IA-REF-01 C due to method limitations; Mercury in sample IA-REF-01 C due to method limitation; Selenium in sample IA-1-04 B due to method limitation; and Thallium in all samples except IA-1-01 A & IA-1-01 B (19 samples were reported as nondetects). Lab "J" data are reported below the LOQ down to the MDL, to help meet project sensitivity needs (see Qualifier Action section, above).

Data users will need to determine the usability of the 47 non-detected results with LOQs $> \text{PALs}$ for project decisions.

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment

QC Measure	Criteria / DV Actions
Preservation & Holding Time	Analysis: ICP/MS Metals Method 6020 / ICP-AES Metals Method 6010: HT = 180d to analysis (aq. & solids); CVAA for Mercury HT = 28d. Actions: >180d all 6020 Metals / >28d Mercury: J detects; Non-detects: R or UJ based on professional judgment if > 2x HT exceedance, may R non-detects. Temperature: outside control limits of ≤ 6°C: use professional judgment. Preservation: Aqueous Total: pH > 2: use professional judgment to qualify results.
Blanks - Lab & Field	Order of Blank Action = Lab Blank actions first, then Field Blank action Matrix-matched Lab Blanks (method and instrument blanks, MB/ICB/CCB) criteria: < LOQ. Only the highest associated lab blank result per batch per metal used to take blank actions; use professional judgment for multiple MBs, ICBs & CCBs per batch. If Blank is < QL: all samples detected < QL negate (U) at the sample-specific QL; all samples detected > QL accept without qualification If Blank is ≥ QL: all samples detected < QL negate (U) at the sample-specific QL; all samples detected > QL but < 10x Blank level, J+ (estimate with a high bias) at the value reported; all samples detected > 10x Blank level accept without qualification [EPA NFG*] If Blank is a negative value (negative drift): use professional judgment Blank Action Level (BAL) = Result reported in Blank x (Sample QL/Blank QL) Field Blanks: matrix-matched aqueous: same actions as for lab blanks Field Blanks: Non-matrix matched (aqueous EB with soil/sediment): convert EB/FB results to soil-equivalent or sediment-equivalent units to calculate BAL using sample prep factors and % solids for dry-weight conversion. Then follow same actions as for lab blanks. *NOTE: The EPA NFG action when MB > QL and sample result is > QL but < 10x MB to report at MB result and use professional judgment to qualify results as estimated high (J+) or unusable (R); however, professional judgment was used to take action as described above for this project.
LCS/LCSD	Aq 80-120%R / RPD ≤ 20%; Solid LCS/LCSD: use vendor or SRM limits. [Note: EPA NFG 70-130% all matrices]. %R<low end %: J- / UJ. %R > high end %: J+ detects. %Rec < 40%: J- detects / R nondetects; > 150% R detects [EPA NFG] RPD > 20%: J / UJ. Actions affect all samples in batch.
MS/MSD	75-125%R. %R < 75% but ≥ 30%(Aq) or ≥ 10%(So) : J- / UJ. %R > 125%: J+ detects; Aq %R < 30%: J- detects / R non-detects; Solid %R < 10%: -J detects / R non-detects. Note must be evaluated cumulatively with Post-digest spike recoveries [EPA NFG]. Actions affect all "similar" metals in batch, using professional judgment to determine affected results as allowed by EPA - may only affect unspiked (native) sample used for MS/MSD. Exception: sample conc. > 4x spike level: no action (spike-added is "swamped out"). Use professional judgment to take no action when only one spike (MS or MSD) was out of control, the other spike was in control, and MS/MSD precision was acceptable.
Post-Digest Spike	75-125%R. EPA NFG requires DV Actions for Post-digest spikes be evaluated cumulatively with MS/MSD recoveries for assessing bias (see above). If MS/MSD recoveries low + Post-digest spike low, J-; If MS/MSD recoveries high + Post-digest spike high, J+. Any other combinations of exceedances that are not comparable; therefore, estimate J with indeterminate bias. Exception: sample conc. > 4x spike level: no action (spike-added is "swamped out").

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment - continued

QC Measure	Criteria / DV Actions
MD/MSD or Lab Duplicate	Aq Results > 5xRL: RPD > 20%: J / UJ affected results to be determined using professional judgment as allowed by EPA. Aq Results < 5xRL: difference > ±RL: J / UJ affected results Soil/Sed Results > 5xRL: RPD > 35%: J / UJ affected results to be determined using professional judgment as allowed by EPA. Soil/Sed Results < 5xRL: difference > ± 2xRL: J / UJ affected results
Field Duplicate [discrete samples only]	Aq Results > 2xQL: RPD > 30%, J / UJ FD results only [SAP Table 19] Aq Results < 2xQL: use professional judgment [consider: absolute difference > ±2xQL, J / UJ] Soil/Sed Results > 2xQL: RPD > 50%, J/UJ FD results only [SAP Table 19] Soil/Sed Results <2xQL: use professional judgment [consider: absolute difference > ±4xQL, J / UJ]
ICV/CCV	6020B ICV/CCV: 90-110%R; 7471B/7470A ICV/CCV 85-115 %R: recoveries < low end%: J- / UJ; recoveries > high end%: J+ detects; if severe exceedance <75%: R non-detects & J-: detects; > 160%: may R detects.
Low-Level Check standard	Lab SOP limits: 70-130%R [no EPA NFG criteria]. If performed and tabulated in summary QC, use professional judgment to qualify data. Consider: Results < 2xLow-Level Check Standard: < low end: J- / UJ; > high end: J+ detects.
ICSA/AB [6020 only]	Control limits 80-120%R. %R > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects. Also check detected Metals > QL that were not spiked into the ICS: J+ detects. Potential false positives and false negatives: use professional judgment to evaluate (see lab IECs for ICP instrument) and in consideration of sample-specific interferent concentrations.
Serial Dil	Results > 50xMDL: % Difference > 10% for Aqueous and > 15% for Soil/Sed: J/UJ. Use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects [EPA NFG]
Tune [6020 only]	Tune not performed properly: use professional judgment. Resolution of mass calibration > ±0.1 μ or % RSD > 5%: UJ non-detects / J detects.
Internal Standard (IS) [6020 only]	IS criteria for ICP-MS 60-125% Relative Intensity (RI). %RI < 60% or > 125% and original sample reanalyzed at 2-fold dilution: J detects / UJ non-detects; original sample not reanalyzed: J/UJ or R - use professional judgment [EPA NFG]
ISM Replicates [A, B, C]	RSD ≤ 50% for results > 2x LOQ; exceedances J detects / UJ non-detects Results, 2x LOQ use professional judgment.
Sensitivity	Lab-achieved Quantitation Limit (QL) ≤ SAP Project Action Level (PAL) listed in Table 1 for 14 site-specific Metals in Soil. Several Metals are expected to exceed PALs for nondetected results based on lab/method limitations, including antimony, arsenic, selenium, thallium, and mercury. Lab "J" data are reported below the LOQ down to the MDL, to help meet project sensitivity needs.

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment - continued

QC Measure	Criteria / DV Actions
EPA NFG DV Qualifiers - definitions from Table 22 of the Caneel Bay SAP (2021)	U = The analyte was analyzed for but was not detected above the level of the reported sample-specific LOQ. UJ = The analyte was not detected above the reported concentration. The reported quantitation limit QL is approximate and may be inaccurate or imprecise. J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. J+ = The result is an estimated quantity, but the result may be biased high. J- = The result is an estimated quantity, but the result may be biased low. R = The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified. LOQ = Level of Quantitation = quantitation limit (QL) for this project <i>Note: Data with DV qualifiers U, UJ, J, J+, and J- are generally usable; data qualified R are unusable for project objectives.</i>
References	<ul style="list-style-type: none"> ▪ <i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP).</i> ▪ <i>USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-135, USEPA-540-R-2017-001, January 2017 (NFG).</i> ▪ <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009.</i> ▪ <i>USEPA SW-846 Methods 6020B (ICP-MS for 13 Metals) & 7471B (CVAA for Mercury).</i> ▪ <i>Eurofins TestAmerica-Canton Lab SOP NC-MT-002: Inductively Coupled Plasma - Mass Spectrometry, Rev. 12, 12/07/20;</i> <i>SOP NC-IP-010 Acid Digestion for Solid Samples, Rev. 9, 10/14/20; SOP NC-MT-14: Preparation and Analysis of Mercury in Aqueous and Solid Samples by Cold Vapor Atomic Absorption Spectroscopy, Rev. 11, 12/07/20.</i>

Metals Blank Action Worksheet
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

#sys_sample_code	chemical_name	result_value	lab_qualifier	LOQ	dilution	BAL	Action	Validator_Qual	Validation_Note
Method 6020B		mg/Kg		mg/Kg					
Lab Blank Actions									
MB 240-476188/1-A	Arsenic	0.115	J	1.3	5				Blank level ≤ LOQ; therefore BAL = LOQ
IA-REF-01 C	Arsenic	1.3	J	1.4	5	1.4	Negate	U	Negated at the LOQ due to Method Blank Action
MB 240-476188/1-A	Zinc	3.47	J	5	5				Blank level ≤ LOQ; therefore BAL = LOQ
IA-REF-01 C	Zinc	40	B	5.6	5	5.6	No Action		
		ug/L							
ICB/CCB 3/12/2021 (highest reported in run)	Antimony	1.94	J	2	1				Blank level ≤ LOQ; therefore BAL = LOQ
No soil ISM results reported from this run									
<i>BAL = Blank Action Level (see DV Checklist for details)</i>									

Dates Sampled: 2/22/2021 through 2/24/2021
 Method of Analysis: EPA SW846 Method 9045D

No. Samples: 8
 Matrix: Soil

Data Validation Summary Table - EPA Stage 2B: pH in Soil

QC Met Criteria?	HT & Preserve	Calibration ICV / CCV %R	Lab Blanks MB / ICB / CCBs	Field Blanks	Lab Control Sample LCS %R	LCSD RPD	Matrix QC MS %R	Matrix QC MD/LR RPD	Field Duplicate RPD	% Solids ≥ 30%	Sensitivity	Calculation Verification	Other
Yes		√	NA	NA	NA	NA	NA	NA	NA	√	√	NA	NA
No	Estimate (J) 8 results												

Other: See DV Qualifier definitions and QC evaluation criteria listed at the end of this DV Checklist.

Data Validation Level / Scope:

An EPA-compliant Stage 2B data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALs, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 2B DV, no raw data or instrument-specific QC (unless tabulated on QC summary forms) were reviewed and calculation verification is not performed.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? *Yes. A full deliverable, including summary QC, raw instrument data, and preparation information was provided.*
2. Were all result forms for all samples listed on the chain-of-custody (COC) present in data package? *Yes. Discrete soil samples received for pH (along with other analyses presented in separate DV Checklists) present in the data package 240-145147-1. Lab reported pH and Corrosivity as the same analytical results but under two separate chemical names. They are the same analysis reported twice by the lab for each sample.*

Sample Receipt & Preservation: 8 Discrete Soil samples for pH were received at ELLE-TestAmerica Canton lab in multiple coolers on 3/1/2021, 4 to 7 days following sample collection. The Soil samples were reported by the lab in 1 laboratory data package SDG: #240-145147-1. All coolers were received with Temperatures ≤ 6 °C preserved with ice. Sample IA-2-05 (discrete sample for pH only) was not listed on the COC but received by the lab.

Holding Times: SAP/QAPP HT ≤ 1 day (24h) from sample collection.

The samples in this SDG were received outside of pH HT and analyzed 3 days following receipt:

Samples IA-1-01, IA-1-02, IA-1-03, IA-1-04, & IA-2-05: collected 2/24/2021; analyzed 3/4/2021 = 8 days HT

Samples IA-3-03 & IA-3-04: collected 2/23/2021; analyzed 3/4/2021 = 9 days HT

Sample IA-REF-01: collected 2/22/2021; analyzed 3/4/2021 = 10 days HT

***ACTION: Estimate (J) pH results in all 8 samples due to HT exceedance. Estimated results have an indeterminate bias as it is not known how the pH might change in the soil over time.**

Lab Blank Actions: Not applicable to pH method.

Field Equipment blanks: No EB was collected and none required to be associated with the Soil sample for pH, based on the SAP.

Initial & Continuing Calibration Check standards: All CCVs reported on summary QC forms met SAP acceptance criteria of $\pm 3\%$ true value (97-103% recovery for pH = 7 CCV). Note that lab limits were tighter at 99-101% recovery and all CCVs met the tighter criteria. No Action required.

Laboratory Control Sample: LCS not required for pH [consistent with SAP] - see CCV for method accuracy information.

Matrix Duplicate / Lab Duplicate: No Matrix Duplicate/Lab Replicate was performed for pH in soil in this SDG.

Lab Narrative: No further issues noted in the lab narrative that have not already been addressed.

Field Duplicate Samples (FD): No FD samples included in this SDG.

Sensitivity: The results for pH were reported in standard pH units (s.u.) for Soils. No Project Action Limit (PAL) was listed for pH in the Caneel Bay SAP Table 1 for Soil pH. All pH results in the discrete soils were reported to ± 0.1 s.u.; therefore, sensitivity considered acceptable compared to method requirements.

Qualifier Action: Lab applied qualifier "HF" to pH data. The lab definition for this qualifier is "Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request." The "HF" qualifier was removed for validated pH results. DV Actions taken for HT exceedances as documented above. No further action required.

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment

QC Measure	Criteria / DV Actions
Preservation & Holding Time	HT pH in soil/ sediment: 1 day [SAP criteria]. Actions: analysis > HT: J pH results. Temperature: outside control limits of ≤ 6 °C: use professional judgment.
Blanks - Lab & Field	Not applicable to pH.
LCS	See CCV.
MD or Lab Duplicate Lab Replicate	Soil/Sediment RPD ≤ 10%. Actions for RPD exceedance: J associated/affected results to be determined using professional judgment as allowed by EPA.
Field Duplicate	RPD ≤ 15% [SAP criteria]; Actions: J exceedance
CCV	CCV: ± 3% of True Value [SAP criteria]: CCV = 97-103%R for pH = 7. %R < low end%: J- ; recoveries > high end%: J+ detects.
Sensitivity	No PAL listed for pH.

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment - continued

QC Measure	Criteria / DV Actions
EPA NFG DV Qualifiers - definitions from Table 22 of the Caneel Bay SAP (2021)	<p>U = The analyte was analyzed for but was not detected above the level of the reported sample-specific LOQ.</p> <p>UJ = The analyte was not detected above the reported concentration. The reported quantitation limit QL is approximate and may be inaccurate or imprecise.</p> <p>J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.</p> <p>J+ = The result is an estimated quantity, but the result may be biased high.</p> <p>J- = The result is an estimated quantity, but the result may be biased low.</p> <p>R = The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.</p> <p>LOQ = Level of Quantitation = quantitation limit (QL) for this project</p> <p><i>Note: Data with DV qualifiers U, UJ, J, J+, and J- are generally usable; data qualified R are unusable for project objectives.</i></p>
References	<ul style="list-style-type: none"> ▪ <i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site</i>, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP). ▪ <i>USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review</i>, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-135, USEPA-540-R-2017-001, January 2017 (NFG). ▪ <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use</i>, OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009. ▪ USEPA SW-846 Method 9045D. ▪ Eurofins TestAmerica-Canton Lab SOP NC-WC-0101: <i>pH Electrometric Method [Methods: SW846 Methods 9040B, 9040C, 9041A, 9045C and 9045D, and SM4500 H⁺ B]</i>, Rev. 16, 07/30/2019.



Data Validation Summary Report

Client/Company:	VHB
Site/Project Name:	National Park Service (NPS) – Caneel Bay Resort EE/CA, US Virgin Islands
Laboratory:	Eurofins TestAmerica-Canton, North Canton, OH Eurofins Lancaster Laboratories Environmental, Lancaster, PA
SDGs/Lab Project #:	240-145189-1 (J145189)
Date(s) of Collection:	February 22, 2021 & February 24, 2021
Samples & Analyses:	1 Groundwater (GW) sample and 2 Equipment Blanks (EB) for project-specific lists of Metals 1 GW, 2 EBs, and 1 Trip Blank for Volatile Organic Compounds (VOC)
Senior Data Reviewers:	Susan D. Chapnick, M.S., New Environmental Horizons, Inc. & Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Date Completed:	April 19, 2021

USEPA Stage 2B data validation (DV) review was performed for all analyses except VOC, which were validated at the Stage 3 DV level based on the following documents: *Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site*, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (SAP); *USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*, OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; *USEPA National Functional Guidelines for Organic Superfund Methods Data Review*, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017 (NFG); *USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review*, OLEM 9355.0-135, USEPA-540-R-2017-001, January 2017 (NFG); USEPA SW-846 Methods and others as specified herein; and professional judgment.

Data Validation Summary

During this USEPA Stage 2B DV review of Metals and VOCs, selected sample results were negated (U) or estimated (J or UJ) due to QC issues. NEH generated a validated electronic data deliverable (EDD) based on the EDD file received from the laboratory. All sample data are considered usable for project decisions with the understanding of the potential uncertainty (bias) in the qualified results.

The following QC elements, as presented on summary QC forms and as applicable to the analytical methods, were reviewed:

- Data package completeness and agreement of analyses with Chain-of-Custody (COC)
- Sample receipt, holding times, and preservation criteria
- Calibration verification (tune checks, initial and continuing calibrations)
- Method blank and field equipment blank results
- Internal Standard relative intensities
- Laboratory Control Sample (LCS) recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) recoveries
- MS/MSD and Field Duplicate (FD) relative percent differences (RPDs)
- Other method-specific QC if applicable and reported (*e.g.*, serial dilution results)
- Evaluation of laboratory qualifiers applied to the data
- Calculation verification of one sample result per media per method of analysis*
- Calculation verification of one sample-specific limit of quantitation (LOQ) per media per method of analysis*
- Sensitivity evaluation – comparison of LOQs to project action limits
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

**For EPA Stage 2B DV, calculation verification of LOQ and sample results as well as review of raw instrument data are not required or performed.*

This DV Report consists of three parts: 1) the DV Summary Report; 2) the DV Checklists for each media and analysis method, which detail all of the QC reviewed and the issues that required action or affected the data certainty in terms of accuracy, precision, representativeness, and sensitivity; and 3) the validated EDD, which includes the USEPA DV qualifiers added to the results and validation notes to document bias and reasons for the DV actions.

Sensitivity evaluation was based on reviewing non-detects compared to the Project Action Limits (PALs) listed in Table 2 for Groundwater in the Caneel Bay SAP. For MW-01, all non-detects met sensitivity requirements except for Antimony, Mercury, Thallium, 1,1,2,2-Tetrachloroethane, 1,1,2-Trichloroethane, 1,2,4-Trichlorobenzene, 1,2-Dibromo-3-chloropropane, 1,2-Dichloroethane, 1,4-Dichlorobenzene, Benzene, Bromodichloromethane, Carbon disulfide, Carbon tetrachloride, Chloroform, cis-1,3-Dichloroethene, Ethylene dibromide, trans-1,3-Dichloroethene, Trichloroethene, and Vinyl Chloride due to method limitations. Ultimately, the data user will need to evaluate the usability of these non-detects above PALs for project decisions. See the DV Checklist for further details.

Table 1 in this DV Summary Report presents the samples and analytical parameters validated and Table 2 (attached) summarizes the DV actions taken as an excerpt from the validated EDD.

Table 1. Samples and Analytical Parameters Validated

Sample ID	Lab ID	Sampling Date	Matrix	Analytical Parameters	Sample Type
MW-01	240-145189-1	2/24/2021	Groundwater	Metals & VOC	Field Sample
EB-SOIL-20210224	240-145189-2	2/24/2021	Water	Metals & VOC	Equipment Blank
EB-SOIL-20210222-01	240-145189-3	2/22/2021	Water	Metals & VOC	Equipment Blank
TRIP BLANK	240-145189-4	2/24/2021	Water	VOC	Trip Blank

Analytical Methods

Metals: USEPA SW-846 Method 6020B for 13 Metals & 7470A for Mercury

VOC: VOC: USEPA SW-846 Method 8260D for 51 VOCs

USEPA DV Qualifiers

U = The analyte was analyzed for but was not detected above the level of the reported sample-specific LOQ.

UJ = The analyte was not detected above the reported concentration. The reported quantitation limit (LOQ) is approximate and may be inaccurate or imprecise.

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity, but the result may be biased high.

J- = The result is an estimated quantity, but the result may be biased low.

R = The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table 2. Summary of Data Validation Actions
Caneel Bay SDG 240-145189-1

AR-001952

Client Sample ID	Lab Sample ID	Analytical Method	Analyte	Result	Detect Y/N	Unit	DV Qualifier	DV Comment	DV Level
EB-SOIL-20210222-01	240-145189-3	SW-846 6020B	Chromium, Total	0.33	Y	ug/l	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
EB-SOIL-20210222-01	240-145189-3	SW-846 6020B	Copper	1	N	ug/l	U	Negated at the LOQ due to Method Blank Action	EPA Stage 2B
EB-SOIL-20210224	240-145189-2	SW-846 6020B	Copper	1	N	ug/l	U	Negated at the LOQ due to Method Blank Action	EPA Stage 2B
MW-01	240-145189-1	SW-846 6020B	Silver	0.34	Y	ug/l	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
EB-SOIL-20210222-01	240-145189-3	SW-846 8260D	Chloromethane	0.5	N	ug/l	UJ	Bias Low: Low Calibration verification	EPA Stage 2B
EB-SOIL-20210222-01	240-145189-3	SW-846 8260D	Dichlorodifluoromethane	0.5	N	ug/l	UJ	Bias Low: Low Calibration verification	EPA Stage 2B
EB-SOIL-20210224	240-145189-2	SW-846 8260D	Dichlorodifluoromethane	0.5	N	ug/l	UJ	Bias Low: Low Calibration verification	EPA Stage 2B
EB-SOIL-20210224	240-145189-2	SW-846 8260D	Chloromethane	0.5	N	ug/l	UJ	Bias Low: Low Calibration verification	EPA Stage 2B
MW-01	240-145189-1	SW-846 8260D	Ethylbenzene	0.12	Y	ug/l	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
MW-01	240-145189-1	SW-846 8260D	Dichlorodifluoromethane	0.5	N	ug/l	UJ	Bias Low: Low Calibration verification	EPA Stage 2B
MW-01	240-145189-1	SW-846 8260D	Chloromethane	0.1	Y	ug/l	J	Bias Indeterminate: Low Calibration verification + Result < LOQ	EPA Stage 2B
MW-01	240-145189-1	SW-846 8260D	Toluene	0.075	Y	ug/l	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
MW-01	240-145189-1	SW-846 8260D	Methyl Tert-Butyl Ether	0.13	Y	ug/l	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
MW-01	240-145189-1	SW-846 8260D	Acetone	5	N	ug/l	U	Negated at the LOQ due to Trip Blank Action	EPA Stage 2B
MW-01	240-145189-1	SW-846 8260D	Xylenes, Total	0.39	Y	ug/l	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
TRIP BLANK	240-145189-4	SW-846 8260D	Dichlorodifluoromethane	0.5	N	ug/l	UJ	Bias Low: Low Calibration verification	EPA Stage 2B
TRIP BLANK	240-145189-4	SW-846 8260D	Chloromethane	0.5	N	ug/l	UJ	Bias Low: Low Calibration verification	EPA Stage 2B
TRIP BLANK	240-145189-4	SW-846 8260D	Methylene chloride	0.098	Y	ug/l	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B
TRIP BLANK	240-145189-4	SW-846 8260D	Acetone	1.2	Y	ug/l	J	Bias Indeterminate: Result < LOQ	EPA Stage 2B

Dates Sampled: 2/22/2021 & 2/24/2021

Method of Analysis: Volatile Organic Compounds (VOCs) by Method 8260D

No. Samples: 1 +2EB + 1TB

Matrix: Groundwater

Data Validation Summary Table - EPA Stage 2B: Volatile Organic Compounds (VOCs) in Water

Data Element	HT & Preservation	Blank Actions	Surrogate	LCS/LCSD	MS/MSD	LD / FD	Tunes / ICAL CCV	LOQ & Quant. Correct	IS	%Solids
Acceptable										
Yes	√		√	√	NA	NA		√	√	NA
No		Negate (U) 1 result					Estimate (J or UJ) 8 results			

Other Issues: Qualifier Actions: 7"J" qualified lab results accepted as estimated (J) results

Selection of results for Reporting: not required.

Comments:

An EPA-compliant Stage 2B data validation review was performed on Quality Control forms associated with this data package, which involved evaluation of the following (where applicable): agreement of analyses conducted with COC requests; Holding times and sample preservation; Laboratory blank and field blank results compared to field sample results; Field Duplicate results; surrogate recoveries; LCS/LCSD (or equivalent) results; MS/MSD results; Laboratory Duplicate results; Quantitation limits compared to Project Action Limits; Instrument Tune acceptability; Initial and Continuing Calibration acceptability; and evaluation of laboratory qualifiers applied to the dataset. The project narrative was also reviewed to determine whether additional issues were found that weren't reported in the QC previously evaluated. No raw data was reviewed nor were any re-calculations of data performed. Data users should reference the EPA Stage 3 data validation performed on SDG 240-145042-1.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? Yes. A full data deliverable (called Level 4), including results, summary QC, and all raw data, was provided for review.
2. Were all result forms for all samples listed on the chain-of-custody present in data package? Yes, 1 Groundwater (GW), 2 Equipment Blanks (EB), and 1 Trip Blank (TB) received and reported.

Sample Receiving: 1 GW, 2 EBs (associated with soil samples), and 1 TB were received for VOC analysis at Eurofins TestAmerica - Canton lab on 3/2/2021, 6 & 8 days following sample collection. The cooler temperature at receipt was acceptable at < 6 °C. There were no sample receipt issues.

Selection of Results for Reporting: all samples were analyzed only once without additional dilution at the instrument. No Selection of results required.

Holding Time (HT) evaluation: All samples were verified to be at pH < 2 at the time of analysis and all samples were analyzed on 3/4/2021, within 14 days of sample collection. Therefore, HT acceptable - No Action required.

Blank Evaluation: Method Blank = MB 410-99336/6; Trip Blanks = TRIP BLANK; and Equipment Blank (EB) = none associated with GW collection. The attached Blank Action Worksheet indicates that 1 result was negated in MW-01 due to TB Action

***ACTION: Acetone negated (UJ) in MW-01 at the sample-specific LOQ**

Surrogates: all 4 surrogates (dibromofluoromethane, 1,2-dichloroethane-d4, toluene-d8, and 4-bromofluorobenzene) were recovered within lab acceptance criteria in all samples and QC - no action required.

LCS/LCSD: LCS 410-99336/4 - no LCSD performed. Lab used in-house limits to judge acceptability of LCS recovery; however, here, Caneel Bay SAP Criteria (Table 19) 70-130% used to judge accuracy. Lab spiked 50 target VOCs into LCS at 5 µg/L except for ketone, which were spiked at 25 or 37.5 µg/L. All LCS %Rec were within 70-130% recovery indicating acceptable accuracy for VOC analysis in the absence of the site matrix - No Action required.

MS/MSD: there were no MS/MSD analyses performed and not requested on the COC.

Field Duplicate (FD) samples: there were no FDs associated with the samples in this SDG.

BFB Tunes: Instrument 16334 Tunes (1 ICAL + 1 CCV). Method 8260C tune criteria was used even though lab cited Method 8260D as the method of analysis. Since Method 8260C criteria tighter than Method 8260D, this is acceptable. Both tunes met criteria and were acquired by summing 3 peaks across apex of BFB peak with background subtraction. All samples and standards were analyzed within 12 hours of BFB tune - No Action required.

ICALs: Instrument 16334 on 11/30/2020. 7-level ICAL performed from 0.2 or 2 to 25 or 250 µg/L. minimum RRFs in Form VI are not those in Table 4 of Method 8260C or Method 8260D; however, all compounds met min. RRF requirements listed in Table 4 of Method 8260D and all %RSD < 20%. Therefore, ICAL acceptable. ICAL contained more compounds than requested in Caneel Bay SAP Table 1. All project-specific compounds were included in the ICAL. ICV analyzed immediately following ICAL was acceptable. No Action required.

CCVs: CCVIS 410-99336/3on 3/3/2021. minimum RRFs and %D for all target compounds within ±20% except: chloromethane and dichlorodifluoromethane %D < -20% due to loss in instrument sensitivity on day of CCV as compared to sensitivity of these compounds in the ICAL.

***ACTION: Chloromethane and Dichlorodifluoromethane estimated (J or UJ) in MW-01, TRIP BLANK, EB-SOIL-20210222-01, and EB-SOIL-20210224 with possible low bias, unless other issues affect the data, due to low calibration verification**

Internal Standards (IS): Lab used Fluorobenzene (FB), Chlorobenzene-d5 (CBNZd5), and 1,4-Dichlorobenzene-d4 (DCBd4) areas and RTs were within criteria for all samples and QC - No Action required

%Solids: Not applicable

Compound List Reporting: Lab reported results for all 51 VOCs requested in SAP Table 2. The lab reported some compounds using a synonym for the compound (e.g., Ethylene dibromide (EDB) was reported as 1,2-dibromoethane). Table 2 identifies several common synonyms for the compounds of interest.

Sensitivity: the laboratory reported LOQs were the same as the Achievable Laboratory Limits of Quantitation given in Table 2. All non-detects were below the Project Groundwater Action Levels given in Table 2 of the SAP except: 1,1,2,2-Tetrachloroethane, 1,1,2-Trichloroethane, 1,2,4-Trichlorobenzene, 1,2-Dibromo-3-chloropropane, 1,2-Dichloroethane, 1,4-Dichlorobenzene, Benzene, Bromodichloromethane, Carbon disulfide, Carbon tetrachloride, Chloroform, cis-1,3-Dichloroethene, Ethylene dibromide, trans-1,3-Dichloroethene, Trichloroethene, and Vinyl Chloride, as expected, due to method limitations.

Data users will need to determine the usability of the 2 non-detected results with LOQs > PALs for project decisions.

Qualifier Action : there were 7 "J" results reported indicating the result reported was uncertain due to quantitation below the instrument calibration range (data accepted as "J" value with indeterminate bias due to result < LOQ).

***ACTION: 7 "J" results qualified by the lab were accepted as an estimated (J) results with indeterminate bias due to reporting at a level < LOQ.**

Narrative : There were no issues raised in the narrative not already addressed or which would have affected sample data quality - No additional action required.

EPA SW-846 Method 8260D, NFG, and Caneel Bay SAP requirements

Preservation:	Samples should be preserved following SW-846 Method 5035A (waters acid preserved, soils water & methanol preserved sample); received at 4±2°C. Low-level soils frozen to < -7°C within 48-hr of collection. If samples were not properly preserved, J det / J ND or J det / R ND based on professional judgment
HT:	water: pH < 2 - 14d < HT ≤ 28 d; J- det/ J NDs; HT > 28 d, J- det/R ND; pH > 2 - 7d < HT ≤ 14 d; J- det/ J NDs; HT > 14 d, J- det/R ND soil: 14d < HT ≤ 28 d; J det/ J NDs; HT > 28 d, J det/R ND
Surrogates:	70-130% Acceptance criteria; Recovery > 130%, J+ det/Accept ND; 10% ≤ Recovery < 70%, J- det/J NDs; Recovery < 10%, J- det/R NDs
LCS/LCSD:	70-130% / RPD ≤ 30% Acceptance criteria; Recovery > 130, J+ det/Accept ND; 10% ≤ Recovery < 70%, J- det/J NDs; Recovery < 10%, J- det/R NDs. LCS/LCSD RPD > 30%, J/UJ
MS/MSD:	70-130% / RPD ≤ 30% Acceptance criteria; %Rec < 10%, J- det/ R NDs; 10% ≤ %Rec < LCL, J- det/ J NDs; %Rec > UCL, J+ det/Accept NDs for Unspiked Sample only; MS/MSD RPD > 30%, J/UJ unspiked sample only
Lab Dup (LD):	If performed, RPD > 30% if value >2x LOQ, J det. Not required per Caneel Bay SAP.
FD:	Both Conc. > 2x LOQ, RPD > 30% J det; One result ND, other >2 x LOQ, J det/J NDs; Both Conc. < 2x LOQ; RPD > criteria, No Action
Tune:	Criteria per Table 3 8260D; acquisition of tune given as sum of 3 scans across peak with background subtraction. If criteria not met (Abundances out or analysis > 12 hrs from BFB injection and CCVs don't meet frequency & criteria); use professional judgment
ICAL:	≥ 5-Level, lowest level ≤ LOQ; min. RRF per Table 4 of Method 8260D. If min. RRF not met for lowest standard and/or average RRF, J- det/J ND; if %RSD across ICAL > 20% or r2 < 0.99; J det/ J ND.
CCV:	Analyzed at the beginning of each 12 hour shift. Min. RRF not met, J- det/ UJ NDs; %D or %Drift > +20%, J+ det/Accept ND; %D or %Drift > -20%, J- det/J ND (neg. %D = loss in sensitivity; positive %D = enhanced sensitivity)
Internal Standards (IS):	RT shift outside window (RT > ±30 of IS RT in CCV) or 20% ≤ Area < 50% of IS in CCV , J+ det/ UJ NDs; Area < 20% of CCAL, J+ det / R NDs; Area > 200% IS in CCV, J- det / Accept NDs. If it's suspected that IS outside criteria is due to poor IS addition to sample (i.e., mis-spike), then professional judgment used to J det/UJ NDs

EPA SW-846 Method 8260D, NFG, and SAP requirement - *continued*

Blanks:	<p>Non-Matrix related TB or EB Blank contamination, professional judgment used in comparing results to samples.</p> <p>Project-specific action: Lab Method Blank action taken first followed by Trip Blank and then Equipment Blank Action.</p> <p>If Blank is reported at < LOQ (or < 2x LOQ for methylene chloride, 2-butanone and acetone): all samples < LOQ negated (U) at sample LOQ and all samples > LOQ accepted without qualification</p> <p>If Blank ≥ LOQ (or > 2x LOQ for methylene chloride, 2-butanone and acetone): if sample is < LOQ, negate (U) at sample LOQ; if sample result is > LOQ but < BAL, negate result (U) at the level found in the sample; and if sample result is ≥ BAL, accept sample result without qualification.</p> <p>Where Blank Action Level (BAL) = Result reported in Blank x (Sample LOQ/Blank LOQ)</p>
LOQs & Reporting:	<p>If result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Verify LOQs are sample specific and that all compounds requested were reported.</p>
% Solids:	<p>If %Solids < 30%, J det / J ND; if %solids < 10%, J det / R NDs.</p>
Sensitivity:	<p>Identify non-detects > PALs given in Table 1 of the Caneel Bay SAP (Soil) or Table 2 of the Caneel Bay SAP (GW)</p>
TICs:	<p>Not requested for this project.</p>
DV Qualifier Definitions:	<p>U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; NJ = the analyte has been "tentatively identified" and the result is usable as an estimated value with indeterminate bias; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.</p>
References:	<p><i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP); USEPA National Functional Guidelines for Organic Superfund Methods Data Review, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-136, EPA-540-R-2017-002, January 2017; USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009; USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846), Third Edition, Revision 1, December 1996 and updates, Method 8260C Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS); Eurofins TestAmerica - Canton SOP NC-MS-019 Determination of Volatile Organics by GC/MS based on Methods 8260C, 8260B, and 8260A, Rev. 6, 7/23/18</i></p>

Blank Action Worksheet
 VOC Data
 VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

SDG: 240-145189-1
 AR-001958

Sample ID	Chemical Name	Result Value	Lab Qualifier	LOQ	Blank Action Level (BAL)	Action	DV Qualifier	Comment
METHOD BLANK ACTION								
MB 410-99336/6 was non-detect for all VOCs so no Method Blank Action required								
TRIP BLANK (TB) ACTION								
TRIP BLANK	Acetone	1.2	J	5				
MW-01	Acetone	1.2	J	5	10	Negate	U	Negated at the LOQ due to Trip Blank Action
TRIP BLANK	Methylene Chloride	0.098	J	0.5				
MW-01 and EBs were non-detect for Methylene Chloride so no additional Trip Blank Action required								

Metals Data Validation Checklist
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

Dates Sampled: 2/22/2021 & 2/24/2021
 Method of Analysis: ICP-MS Metals by 6020B; Mercury by 7470A

No. Samples: 1 + 2 EBs
 Matrix: Water

Data Validation Summary Table - EPA Stage 2B: Metals in Water

QC Met Criteria?+A 5:N14	HT & Preserve	Calibration ICV / CCV / LL check std %R	Calibration Interference Check Stds ICS / ICSAB %R	Lab Blanks MB / ICB / CCBs	Field Blanks	Lab Control Sample LCS %R	Matrix QC MS/MSD %R	Matrix QC MS/MSD RPD	Matrix QC Serial Dilution %D	Field Duplicate RPD	ICP-MS Tune & IS %R	Sensitivity Sample-Specific QLs	Calculation Verification
Yes	√	√	√		√	√	NA	NA	NA	NA	√		NA
No				Negate (U) 2 results	EBs assoc. with soil samples in other SDGs							3 nondetect results LOQ > PAL	

Other: Estimate (J) 2 results < LOQ
See DV Qualifier definitions and QC evaluation criteria listed at the end of this DV Checklist.

Data Validation Level / Scope:

An EPA-compliant Stage 2B data validation was performed in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009). This involved evaluation of the following (where applicable): data package completeness; agreement of analyses conducted with COC requests; Holding times and sample preservation; Calibration criteria (tunes, ICALS, etc.) as presented on summary QC Forms; Laboratory Blanks and Field Blanks compared to field sample results; Field duplicate results; Reporting Limits (RLs) and sample results; LCS/LCSD results; MS/MSD results; Laboratory duplicate results; Standard Reference Material (SRM) recoveries; and evaluation of laboratory qualifiers applied to the dataset. The laboratory project narrative was also reviewed to determine whether additional issues were found that were not reported in the QC previously evaluated. For the Stage 2B DV, no raw data was reviewed nor were any re-calculations of data performed. Data users should reference the EPA Stage 3 data validation performed on SDG 240-145024-1.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the QAPP and EPA DV guidance present in the data package? *Yes. A full deliverable, including summary QC, raw instrument data, and preparation information was provided.*
 2. Were all result forms for all samples listed on the chain-of-custody (COC) present in data package? *Yes. Groundwater (GW) and Equipment Blank (EB) samples received for Metals analysis. 14 project-specific Metals analyzed as follows: Method 6020B (ICP-MS) for Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Thallium, & Zinc and Method 7470A (CVAA) for Mercury.*
-

Sample Receipt & Preservation: 1 Groundwater & 2 EBs (associated with soil samples) were received for Metals analysis at Eurofins TestAmerica - Canton lab on 3/2/2021, 6 & 8 days following sample collection. These samples were reported by the lab in 1 laboratory data package SDG: #240-145189-1. The cooler temperature at receipt was acceptable at < 6 °C. No documentation was included in the data package about sample preservation pH <2; however, it was assumed that the samples were properly preserved based on the SAP preservation/container requirements and because no deviations were included in the lab narrative.

Holding Times:

ICP-MS 6020B Water: Prep Batch #98965 on 3/3/2021; Analysis 3/3/2021: Acceptable HT < 180 days
7470A Water: Prep Batch #98984 on 3/3/2021; Analysis 3/3/2021: Acceptable HT < 28 days

Lab Blank Actions: Lab Blank actions (method blanks and instrument blanks as reported on QC Summary Form 3) taken first, applied to all associated field samples. To calculate the sample-specific Blank Action Level (BAL), the ratio of the Sample QL/Blank QL is used since the QLs account for all of the sample-specific analysis factors (e.g. extraction volumes, extract final volume, dilution factors). See Blank evaluation criteria for DV Action at the end of this DV checklist for further details.

1 Method Blank (MB) was associated with the water samples in this SDG for 6020B analyses: MB 410-98965/1-A and 1 MB for 7470A for Mercury: MB 410-98984/1-A. MBs were nondetect for all 14 project-specific Metals by both methods of analysis except for Copper. For lab instrument blanks, blank actions were evaluated for sample(s) analyzed on the same day and associated time(s) as the ICB or CCB. Lab qualified Copper result for MW-1 "B" - this was removed based on blank action evaluation (see attached Blank Action Worksheet).

***ACTION: Negate (U) 2 results at the LOQ due to Method Blank Action as shown on the attached Blank Action Worksheet.**

Field Equipment blanks: The 2 EBs included in this SDG are associated with soils in other SDGs as follows: EB-SOIL-20210224, collected on 2/24/2021, associated with ISM soils and EB-SOIL-20210222-01, collected 2/22/2021, associated with Discrete soils. The EB represents the potential contamination from the soil drill bit used for sample collection for ISM Soil samples and from the sampling spoon for Discrete soil samples. The EBs were nondetect for all project-specific Metals except for Copper in both EBs and Chromium in EB-SOIL-20210222-01. The Copper results were negated (U) at the LOQ due to Method Blank Action, as described above and in the attached Blank Action Worksheet. No Field Blank Action required for Chromium associated with soil samples in other SDGs.

Initial & Continuing Calibration Check standards / Low Level Check Standards: All 6020B & 7470A ICV, CCV, and ICVL (low-level) calibration checks met SAP/QAPP acceptance criteria of 90-110%R for ICV/CCV and 70-130%R for the ICVL based on QC Summary Form 2A & 2B results. Low level check standards for Mercury met lab limits of 50-150% recovery - Professional judgment used to take no action because these lab control limits for 7470A are considered acceptable for this method even though slightly wider than QAPP limits. No Action required.

Interference Check Standards: All ICESA/AB results associated with the ISM Soil sample 6020B analyses were acceptable based on QA Summary Form 4A results. No Action required.

ICP-MS Internal Standards Relative Intensity (%RI) & Tune: All IS %RI were acceptable for 6020B ICP-MS based on QC Summary Form 15 results for the IS results associated with the water samples and QC. Tune acceptable as listed on QC Summary Form 14 (tune raw data are not reviewed at the EPA Stage 2B DV level). No Action required.

Laboratory Control Sample: 1 LCS performed for 6020B analyses associated with the ISM Soil samples in this SDG: LCS 410-98965/2-A and 1 LCS for 7470A for Mercury: LCS 410-98984/2-A. Recoveries for all 14 project-specific Metals by both methods of analysis were acceptable compared to SAP and EPA DV criteria. No LCSD (duplicate) was performed. These LCS results are an indication of acceptable accuracy for the lab performance of Metals by Methods 6020B & 7470A. No Action required.

Matrix Spike / Matrix Spike Duplicate: No MS/MSD was performed associated with the groundwater sample in this SDG and none was identified on the COC.

Serial Dilution: No Serial dilution was performed in this SDG since no MS/MSD identified.

Lab Narrative: No further issues were noted in the lab narrative of the pdf data package that were not already evaluated.

Field Duplicate Samples (FD): No FD included in this SDG associated with the groundwater sample.

Selection of Results for Reporting: The samples in this SDG were analyzed once (7470A for Mercury at dilution factor (DF) = 1 and 6020B Metals at DF=1) for each method and reported with only one result for each metal. No selection of results required.

Qualifier Action: Lab reported 153 results qualified "J" (result reported < LOQ but \geq MDL). One result was negated (U) due to blank action and the rest were accepted as estimated values due to uncertainty < LOQ. Other qualifiers (in addition to "U") added by the lab to the water results included: B. The additional lab qualifiers were removed during DV and replaced with appropriate DV qualifier, if required, as described in this DV Checklist.

***ACTION: 2 J-qualified lab results accepted as estimated (J) with indeterminate bias due to Result < LOQ.**

Sensitivity: The results and QLs for nondetected results for the 14 project-specific Metals by Methods 6020B & 7470AB were reported on a sample-specific basis in units of $\mu\text{g/L}$. Lab-achieved Quantitation Limit (QL) for nondetect results \leq SAP Project Action Level (PAL) listed in Table 2 for Metals in Groundwater with the following exceptions: Antimony, Mercury, & Thallium in MW-01 due to method limitations, as expected. Note that the validated EDD was updated to include the LOQ for Mercury consistent with the low-level standard in the calibration curve for 7470A analysis (at 0.2 $\mu\text{g/L}$). Lab "J" data are reported below the LOQ down to the MDL, to help meet project sensitivity needs (see Qualifier Action section, above).

Data users will need to determine the usability of the 2 non-detected results with LOQs > PALs for project decisions.

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment

QC Measure	Criteria / DV Actions
Preservation & Holding Time	Analysis: ICP/MS Metals Method 6020 / ICP-AES Metals Method 6010: HT = 180d to analysis (aq. & solids); CVAA for Mercury HT = 28d. Actions: >180d all 6020 Metals / >28d Mercury: J detects; Non-detects: R or UJ based on professional judgment if > 2x HT exceedance, may R non-detects. Temperature: outside control limits of ≤ 6°C: use professional judgment. Preservation: Aqueous Total: pH > 2: use professional judgment to qualify results.
Blanks - Lab & Field	Order of Blank Action = Lab Blank actions first, then Field Blank action Matrix-matched Lab Blanks (method and instrument blanks, MB/ICB/CCB) criteria: < LOQ. Only the highest associated lab blank result per batch per metal used to take blank actions; use professional judgment for multiple MBs, ICBs & CCBs per batch. If Blank is < QL: all samples detected < QL negate (U) at the sample-specific QL; all samples detected > QL accept without qualification If Blank is ≥ QL: all samples detected < QL negate (U) at the sample-specific QL; all samples detected > QL but < 10x Blank level, J+ (estimate with a high bias) at the value reported; all samples detected > 10x Blank level accept without qualification [EPA NFG*] If Blank is a negative value (negative drift): use professional judgment Blank Action Level (BAL) = Result reported in Blank x (Sample QL/Blank QL) Field Blanks: matrix-matched aqueous: same actions as for lab blanks Field Blanks: Non-matrix matched (aqueous EB with soil/sediment): convert EB/FB results to soil-equivalent or sediment-equivalent units to calculate BAL using sample prep factors and % solids for dry-weight conversion. Then follow same actions as for lab blanks. *NOTE: The EPA NFG action when MB > QL and sample result is > QL but < 10x MB to report at MB result and use professional judgment to qualify results as estimated high (J+) or unusable (R); however, professional judgment was used to take action as described above for this project.
LCS/LCSD	Aq 80-120%R / RPD ≤ 20%; Solid LCS/LCSD: use vendor or SRM limits. [Note: EPA NFG 70-130% all matrices]. %R<low end %: J- / UJ. %R > high end %: J+ detects. %Rec < 40%: J- detects / R nondetects; > 150% R detects [EPA NFG] RPD > 20%: J / UJ. Actions affect all samples in batch.
MS/MSD	75-125%R. %R < 75% but ≥ 30%(Aq) or ≥ 10%(So) : J- / UJ. %R > 125%: J+ detects; Aq %R < 30%: J- detects / R non-detects; Solid %R < 10%: -J detects / R non-detects. Note must be evaluated cumulatively with Post-digest spike recoveries [EPA NFG]. Actions affect all "similar" metals in batch, using professional judgment to determine affected results as allowed by EPA - may only affect unspiked (native) sample used for MS/MSD. Exception: sample conc. > 4x spike level: no action (spike-added is "swamped out"). Use professional judgment to take no action when only one spike (MS or MSD) was out of control, the other spike was in control, and MS/MSD precision was acceptable.
Post-Digest Spike	75-125%R. EPA NFG requires DV Actions for Post-digest spikes be evaluated cumulatively with MS/MSD recoveries for assessing bias (see above). If MS/MSD recoveries low + Post-digest spike low, J-; If MS/MSD recoveries high + Post-digest spike high, J+. Any other combinations of exceedances that are not comparable; therefore, estimate J with indeterminate bias. Exception: sample conc. > 4x spike level: no action (spike-added is "swamped out").

Metals Data Validation Checklist
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment - continued

QC Measure	Criteria / DV Actions
MD/MSD or Lab Duplicate	Aq Results > 5xRL: RPD > 20%: J / UJ affected results to be determined using professional judgment as allowed by EPA. Aq Results < 5xRL: difference > ±RL: J / UJ affected results Soil/Sed Results > 5xRL: RPD > 35%: J / UJ affected results to be determined using professional judgment as allowed by EPA. Soil/Sed Results < 5xRL: difference > ± 2xRL: J / UJ affected results
Field Duplicate [discrete samples only]	Aq Results > 2xQL: RPD > 30%, J / UJ FD results only [SAP Table 19] Aq Results < 2xQL: use professional judgment [consider: absolute difference > ±2xQL, J / UJ] Soil/Sed Results > 2xQL: RPD > 50%, J/UJ FD results only [SAP Table 19] Soil/Sed Results < 2xQL: use professional judgment [consider: absolute difference > ±4xQL, J / UJ]
ICV/CCV	6020B ICV/CCV: 90-110%R; 7471B/7470A ICV/CCV 85-115 %R: recoveries < low end%: J- / UJ; recoveries > high end%: J+ detects; if severe exceedance <75%: R non-detects & J-: detects; > 160%: may R detects.
Low-Level Check standard	Lab SOP limits: 70-130%R [no EPA NFG criteria]. If performed and tabulated in summary QC, use professional judgment to qualify data. Consider: Results < 2xLow-Level Check Standard: < low end: J- / UJ; > high end: J+ detects.
ICSA/AB [6020 only]	Control limits 80-120%R. %R > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects. Also check detected Metals > QL that were not spiked into the ICS: J+ detects. Potential false positives and false negatives: use professional judgment to evaluate (see lab IECs for ICP instrument) and in consideration of sample-specific interferent concentrations.
Serial Dil	Results > 50xMDL: % Difference > 10% for Aqueous and > 15% for Soil/Sed: J/UJ. Use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects [EPA NFG]
Tune [6020 only]	Tune not performed properly: use professional judgment. Resolution of mass calibration > ±0.1 μ or % RSD > 5%: UJ non-detects / J detects.
Internal Standard (IS) [6020 only]	IS criteria for ICP-MS 60-125% Relative Intensity (RI). %RI < 60% or > 125% and original sample reanalyzed at 2-fold dilution: J detects / UJ non-detects; original sample not reanalyzed: J/UJ or R - use professional judgment [EPA NFG]
ISM Replicates [A, B, C]	RSD ≤ 50% for results > 2x LOQ; exceedances J detects / UJ non-detects Results, 2x LOQ use professional judgment.
Sensitivity	Lab-achieved Quantitation Limit (QL) ≤ SAP Project Action Level (PAL) listed in Table 2 for 14 site-specific Metals in Groundwater. Several Metals are expected to exceed PALs for nondetected results based on lab/method limitations, including antimony, arsenic, cadmium, copper, mercury, silver, & thallium. Lab "J" data are reported below the LOQ down to the MDL, to help meet project sensitivity needs.

Summary of DV Criteria - based on Caneel Bay SAP (2021), USEPA NFG, Method Criteria, & professional judgment - *continued*

QC Measure	Criteria / DV Actions
EPA NFG DV Qualifiers - definitions from Table 22 of the Caneel Bay SAP (2021)	U = The analyte was analyzed for but was not detected above the level of the reported sample-specific LOQ. UJ = The analyte was not detected above the reported concentration. The reported quantitation limit QL is approximate and may be inaccurate or imprecise. J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. J+ = The result is an estimated quantity, but the result may be biased high. J- = The result is an estimated quantity, but the result may be biased low. R = The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified. LOQ = Level of Quantitation = quantitation limit (QL) for this project <i>Note: Data with DV qualifiers U, UJ, J, J+, and J- are generally usable; data qualified R are unusable for project objectives.</i>
References	<ul style="list-style-type: none"> ▪ <i>Sampling and Analysis Plan for Engineering Evaluation/Cost Analysis Site Investigation, Virgin Islands National Park, EDL #: 5SER3346, Caneel Bay Resort Site, prepared by VHB, February 2021, prepared for the National Park Service US Department of the Interior (Caneel Bay SAP).</i> ▪ <i>USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA, OLEM 9355.0-135, USEPA-540-R-2017-001, January 2017 (NFG).</i> ▪ <i>USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, OSWER No. 9200.1-85, EPA 540-R-08-005, January 13, 2009.</i> ▪ USEPA SW-846 Methods 6020B (ICP-MS for 13 Metals) & 7471B (CVAA for Mercury). ▪ Eurofins TestAmerica-Canton Lab SOP NC-MT-002: <i>Inductively Coupled Plasma - Mass Spectrometry, Rev. 12, 12/07/20;</i> SOP NC-IP-010 <i>Acid Digestion for Solid Samples, Rev. 9, 10/14/20;</i> SOP NC-MT-14: <i>Preparation and Analysis of Mercury in Aqueous and Solid Samples by Cold Vapor Atomic Absorption Spectroscopy, Rev. 11, 12/07/20.</i>

Metals Blank Action Worksheet
VHB: NPS - Caneel Bay Resort EE/CA, US Virgin Islands

#sys_sample_code	chemical_name	result_value	lab_qualifier	LOQ	dilution	BAL	Action	Validator_Qual	Validation_Note	
Method 6020B		µg/L		µg/L						
Lab Blank Actions										
MB 410-98965/1-A	Copper	0.478	J		1				Blank level ≤ LOQ; therefore BAL = LOQ	
EB-SOIL-20210222-01	Copper	0.45	JB		1		1	Negate	U	Negated at the LOQ due to Method Blank Action
EB-SOIL-20210224	Copper	0.4	JB		1		1	Negate	U	Negated at the LOQ due to Method Blank Action
MW-01	Copper	15	B		1		1	No Action		
<i>BAL = Blank Action Level (see DV Checklist for details)</i>										