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FINAL SOLID WASTE MANAGEMENT UNIT 1 (SWMU 1) 2019 ANNUAL STATUS REPORT, GROUNDWATER LONG TERM MONITORING AND OPERATIONS AND MAINTENANCE ATLANTIC FLEET WEAPONS TRAINING AREA AND FORMER NAVAL AMMUNITION SUPPORT DETACHMENT VIEQUES PUERTO RICO (PUBLIC DOCUMENT)

09/01/2019

CH2M HILL

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Atlantic
Norfolk, Virginia

Final

Solid Waste Management Unit 1
2019 Annual Status Report
Groundwater Long-Term Monitoring and Operations and Maintenance

Atlantic Fleet Weapons Training Area – Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico

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2019 Annual Status Report
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Atlantic Fleet Weapons Training Area – Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico

September 2019

Prepared for NAVFAC Atlantic
by CH2M HILL, Inc.
Virginia Beach, Virginia
Contract N62470-16-D-9000
CTO 0003

Executive Summary

This Annual Status Report for Groundwater Long-Term Monitoring (LTM) and Operations and Maintenance (O&M) presents the 2019 (year 4) annual groundwater monitoring and O&M activities at Solid Waste Management Unit (SWMU) 1, located within the former Vieques Naval Training Range (VNTR) in Vieques, Puerto Rico (**Figure ES-1**). SWMU 1 was an active landfill from 1954 to 1978 for the disposal of municipal waste from Camp Garcia. In accordance with the SWMU 1 Record of Decision (ROD) (NAVFAC, 2011), the selected remedy for SWMU 1 includes inspecting the landfill vegetative cover conditions; implementing, inspecting, and maintaining land use controls (LUCs); and groundwater LTM. The remedial action was completed in 2015; this Annual Status Report documents the 2019 groundwater LTM results and inspection findings (including checklist), routine maintenance tasks, and status of LUCs. The Report also includes historical analytical data to aid in LTM groundwater data evaluation. Details of the 2016 (year 1), 2017 (year 2), and 2018 (year 3) LTM events can be found in the 2016 Annual Status Report (CH2M, 2017a), 2017 Annual Status Report (CH2M, 2017b), and 2018 Annual Status Report (CH2M, 2018b), respectively.

In accordance with the SWMU 1 ROD (NAVFAC, 2011), a remedial action objective (RAO) for groundwater is not necessary because there is no groundwater contamination requiring remediation and no evidence that leaching is a concern. However, groundwater LTM is conducted to determine if a future release from the landfill occurs that results in groundwater contamination that may necessitate a groundwater remedy. If long-term monitoring indicates a groundwater remedy is warranted in the future, the ROD will be amended and a groundwater RAO(s) will be developed at that time.

In accordance with the SWMU 1 Revised Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan (CH2M, 2016), groundwater monitoring will occur every year for the first 5 years unless trend data suggest more, or less, frequent monitoring is warranted. The frequency of groundwater sampling will be continually evaluated and discussed in annual status reports and changes in the frequency of sampling will be recommended, as applicable (at a minimum in the fifth annual status report).

The specific objective of groundwater LTM is to evaluate groundwater conditions at SWMU 1, update the groundwater Conceptual Site Model (if necessary), and evaluate the potential for a release from the landfill to groundwater to migrate beyond the boundary of SWMU 1 at concentrations above project action levels (PALs).

The LTM approach for SWMU 1, as defined in the Revised Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan (CH2M, 2016), includes the collection and analysis of groundwater samples from six monitoring wells (five downgradient wells: MW-02, MW-03, MW-08, MW-10, MW-11, and one upgradient well: MW-13) as shown in **Figure ES-2**. Groundwater samples were collected for analysis of target compound list (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), TCL pesticides/polychlorinated biphenyls (PCBs), and target analyte list (TAL) metals.

Three RAOs were developed for the landfill debris, associated contamination, and potential exposure routes and receptors at SWMU 1. These RAOs, presented in the ROD and associated Explanation of Significant Differences (ESD), are as follows:

- Prevent direct contact with surface and subsurface landfill debris and associated contamination that would potentially pose an unacceptable risk to exposed receptors.
- Minimize the potential for erosion of landfill debris.
- Ensure land use (including the use of groundwater) within the landfill boundaries is controlled, unless or until additional action is implemented that mitigates potentially unacceptable risks associated with unrestricted land use.

NOTE: THIS SUMMARY IS PRESENTED IN ENGLISH AND SPANISH FOR THE CONVENIENCE OF THE READER. EVERY EFFORT HAS BEEN MADE FOR THE TRANSLATIONS TO BE AS ACCURATE AS REASONABLY POSSIBLE. HOWEVER, READERS SHOULD BE AWARE THAT THE ENGLISH VERSION OF THE TEXT IS THE OFFICIAL VERSION.

To ensure these RAOs are met, an annual visual inspection is conducted to look for surface debris and evidence of erosion, and evaluate the condition of drainage features, LTM monitoring wells, and fencing/signage. Additional inspections (and corrective actions) are to be conducted if events occur that may threaten the ability of the remedial action to meets its RAOs (i.e., hurricanes, fires, etc.).

The results of the fourth annual LTM and O&M event activities are as follows:

- In general, groundwater levels beneath the site have declined since Hurricanes Irma and Maria to levels above, but closer to, historical averages.
- No VOCs, SVOCs, pesticides, or PCBs were detected in the 2019 sampling event. The metals concentrations were generally less than the PALs, consistent with background, and/or comparable to historical concentrations. This information supports previous observations that the additional precipitation, abnormally high groundwater levels, and potential interaction of groundwater with the vertical extent of landfilled debris associated with Hurricanes Irma (Category 5) and Maria (Category 4) had no discernible impact on groundwater quality.
- The data collected during the 2016 through 2019 groundwater LTM events support the historical conclusions drawn for groundwater in the Remedial Investigation (RI) and documented in the ROD that leaching from the landfill is not a concern from a remedial action standpoint. Similarly, no increasing trends of chemicals were observed. A comparison of the data collected in 2019 with data collected in 2018, 2017, 2016 and previous events back to 2004 suggest the groundwater conditions beneath the landfill have remained relatively consistent over the last 15 years.
- As of the preparation of this annual report, all fencing, boundary demarcation monuments, and signs are in place and functioning as anticipated.

Based on the 2016 through 2019 data and inspection information, it is recommended inspections continue in accordance with the protocol defined in the SWMU 1 Revised Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan (CH2M, 2016), whereby the next scheduled inspection event will occur in early 2020. Given the consistency in groundwater constituent concentrations over time and in accordance with the Work Plan, an evaluation of monitoring parameters and frequency is warranted, which will be included in the 2020 Annual Status Report. As stated in the Revised Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan (CH2M, 2016), based on consistency observed in historical groundwater data, it is anticipated the frequency of groundwater monitoring will be adjusted to once every 5 years following the fifth year of monitoring, which will occur in 2020.

Resumen Ejecutivo

Este Informe Anual Sobre el Monitoreo a Largo Plazo (LTM, por sus siglas en inglés) de Aguas Subterráneas y Operaciones y Mantenimiento (O&M, por sus siglas en inglés), presenta las actividades anuales de monitoreo de aguas subterráneas y O&M del 2019 (Año 4) en la Unidad de Manejo de Desperdicios Sólidos (SWMU, por sus siglas en inglés) 1, la cual está localizada en el Antiguo Campo de Adiestramiento Naval de Vieques (VNTR, por sus siglas en inglés) en Vieques, Puerto Rico (Figura ES-1). SWMU 1 fue un vertedero activo desde 1954 hasta 1978 para la disposición de desperdicios municipales del Campamento García. De acuerdo con el Récord de Decisión (ROD, por sus siglas en inglés) para SWMU 1 (NAVFAC, 2011), el remedio seleccionado para SWMU 1 incluye la inspección de las condiciones de la cubierta vegetal del vertedero; la implementación, inspección y mantenimiento de los controles de uso del terreno (LUCs, por sus siglas en inglés); y LTM para el agua subterránea. La acción de remediación se completó en el 2015. Este Informe Anual documenta los resultados del LTM para las aguas subterráneas y los hallazgos de las inspecciones (incluyendo las hojas de cotejo), tareas de mantenimiento rutinario y el estado actual de los LUCs en el 2019. El Informe también incluye los datos históricos analíticos para ayudar con la evaluación de datos del LTM para agua subterránea. Los detalles de los eventos LTM del 2016 (Año 1), del 2017 (Año 2) y del año 2018 (año 3), se pueden encontrar en el Informe Anual del 2016, (CH2M, 2017a), el Informe Anual del 2017(CH2M, 2017b) y en el Informe Anual del 2018 (CH2M, 2018b), respectivamente.

De acuerdo con el ROD para SWMU 1 (NAVFAC, 2011), no es necesario un objetivo de acción de remediación (RAO, por sus siglas en inglés) para aguas subterráneas porque no hay contaminación de agua subterránea que requiera remediación y no hay evidencia de que la lixiviación sea una preocupación. Sin embargo, se lleva a cabo el monitoreo a largo plazo de agua subterráneas para determinar si podría ocurrir un escape futuro del vertedero que resulte en contaminación del agua subterránea, la cual requiera una remediación del agua. Si el monitoreo a largo plazo indica que fuera necesaria una acción de remediación del agua subterránea en el futuro, el ROD será enmendado y un RAO para el agua subterránea se desarrollará en ese momento.

De acuerdo con el Plan de Trabajo Revisado para Operaciones y Mantenimiento, Control de Uso de los Terrenos y Monitoreo a Largo Plazo para SWMU 1 (CH2M, 2016), el monitoreo de aguas subterráneas se llevará a cabo todos los años por los primeros cinco años, a menos que la tendencia de los datos sugiera que es necesario un monitoreo de mayor o menor frecuencia. La frecuencia del muestreo de aguas subterráneas será evaluada continuamente y discutida en los informes anuales donde se recomendarán cambios en la frecuencia del muestreo, según aplique (como mínimo en el quinto informe anual).

El objetivo específico para el LTM de agua subterránea es evaluar las condiciones del agua subterránea en SWMU 1, actualizar el Modelo Conceptual del Sitio para el agua subterránea (si es necesario) y evaluar el potencial de que se presente un escape desde el vertedero hacia el agua subterránea que migre fuera de los límites de SWMU 1 a concentraciones por encima de los niveles de acción del proyecto (PALs, por sus siglas en inglés).

El enfoque de LTM para SWMU 1, como se define en el Plan de Trabajo Revisado para las Operaciones y Mantenimiento, Control de Uso del Terreno y Monitoreo a Largo Plazo para SWMU 1 (CH2M, 2016), incluye la colección y el análisis de muestras de aguas subterráneas de seis pozos de monitoreo (cinco pozos de monitoreo gradiente abajo: MW-02, MW-03, MW-08, MW-10, MW-11 y un pozo gradiente arriba: MW-13) como se muestra en la Figura ES-2. Las muestras de aguas subterráneas se obtuvieron para el análisis de compuestos volátiles orgánicos (VOCs, por sus siglas en inglés) bajo la lista de compuestos clave (TCL, por sus siglas en inglés), compuestos orgánicos semivolátiles (SVOCs, por sus siglas en inglés) bajo la TCL, pesticidas/bifenilos policlorados (PCBs, por sus siglas en inglés) bajo la TCL, y metales bajo la lista de analitos claves (TAL, por sus siglas en inglés).

NOTA: ESTE RESUMEN SE PRESENTA EN INGLÉS Y EN ESPAÑOL PARA LA CONVENIENCIA DEL LECTOR. SE HAN HECHO TODOS LOS ESFUERZOS PARA QUE LA TRADUCCIÓN SEA PRECISA EN LO MÁS RAZONABLEMENTE POSIBLE. SIN EMBARGO, LOS LECTORES DEBEN ESTAR AL TANTO QUE EL TEXTO EN INGLÉS ES LA VERSIÓN OFICIAL.

Se desarrollaron tres RAOs para los escombros del vertedero, la contaminación asociada, las rutas de exposición potenciales y los receptores en SWMU 1. Estos RAOs, los cuales se presentan en el ROD y la Explicación de Diferencias Significativas (ESD, por sus siglas en inglés) asociada, son los siguientes:

- Prevenir el contacto directo con los escombros de la superficie y bajo la superficie del vertedero y la contaminación asociada que potencialmente representaría un riesgo inaceptable para los receptores expuestos.
- Minimizar el potencial de erosión de los escombros del vertedero.
- Asegurar que el uso de los terrenos (incluyendo el uso de agua subterránea) dentro de los límites del vertedero sea controlado, a menos o hasta que se implemente una acción adicional que mitigue los riesgos potencialmente inaceptables asociados con el uso de los terrenos sin restricciones.

Para asegurar que estos RAOs se cumplan, se lleva a cabo una inspección visual anual para determinar si hay desperdicios expuestos en la superficie y evidencia de erosión, y para evaluar la condición de las características del drenaje, los pozos de monitoreo de LTM, y las verjas/letreros. Se deberán realizar inspecciones adicionales (y acciones correctivas) si ocurren eventos que pudieran impedir la habilidad de la acción de remediación de cumplir con sus RAOs (es decir, huracanes, incendios, etc.).

Los resultados del cuarto evento anual de LTM y O&M son los siguientes:

- Posterior a los Huracanes Irma y María, los niveles del agua subterránea debajo del sitio han disminuido de forma general a niveles que sobrepasan, pero se aproximan, a los promedios históricos.
- En los muestreos del 2019 no se detectaron VOCs, SVOCs, pesticidas ni PCBs. Las concentraciones de metales por lo general eran menores que los PALs, consistentes con el trasfondo, y/o comparables a las concentraciones históricas. Esta información apoya las observaciones previas que tanto la precipitación adicional, niveles de agua subterránea anormalmente altos, y la interacción potencial entre el agua subterránea y la extensión vertical de escombros en el vertedero asociados a los Huracanes Irma (Categoría 5) y María (Categoría 4) no tuvieron un impacto apreciable sobre la calidad del agua subterránea.
- Los datos obtenidos durante los eventos de LTM de las aguas subterráneas del 2016 al 2019 apoyan las conclusiones históricas obtenidas para las aguas subterráneas en la Investigación para la Remediación (RI, por sus siglas en inglés) y se documenta en el ROD que la lixiviación del vertedero no es una preocupación desde el punto de vista de la acción de remediación. Asimismo, no se observó una tendencia de incrementación en cuanto a químicos. Una comparación de los datos colectados en 2019 con los datos del 2018, 2017 y 2016 con eventos anteriores que datan desde 2004, sugiere que las condiciones del agua subterránea debajo del vertedero han permanecido relativamente consistentes durante los últimos 15 años.
- Mientras se preparaba este informe anual, todas las verjas, demarcaciones de límites y los rótulos están instalados y funcionando según anticipado.

Basado en los datos del 2016 al 2019 y la información de la inspección, se recomienda que las inspecciones continúen de acuerdo al protocolo definido en el Plan de Trabajo Revisado para las Operaciones y Mantenimiento, Control de Uso del Terreno y Monitoreo a Largo Plazo para SWMU 1 (CH2M, 2016). Por lo tanto, el próximo evento de muestreo e inspección ocurrirá a principios del 2020. Dado a que las concentraciones del agua subterránea se han mantenido consistentes a través del tiempo y de acuerdo con el Plan de Trabajo antes mencionado, se justifica una evaluación de los parámetros y la frecuencia del monitoreo, cuyos resultados será incluidos en el Informe Anual del 2020. Según lo establecido en el Plan de Trabajo Revisado para las Operaciones y Mantenimiento, Control de Uso del Terreno y Monitoreo a Largo Plazo para SWMU 1 (CH2M, 2016), y de acuerdo a las observaciones históricamente consistentes de los datos del agua subterránea, se anticipa que la frecuencia del monitoreo del agua subterránea será modificada a una vez cada 5 años, luego del quinto año de monitoreo, lo cual ocurrirá en el 2020.

FIGURE ES-1
SWMU 1 Location
SWMU 1 Annual Status Report
Former Vieques Naval Training Range
Vieques, Puerto Rico

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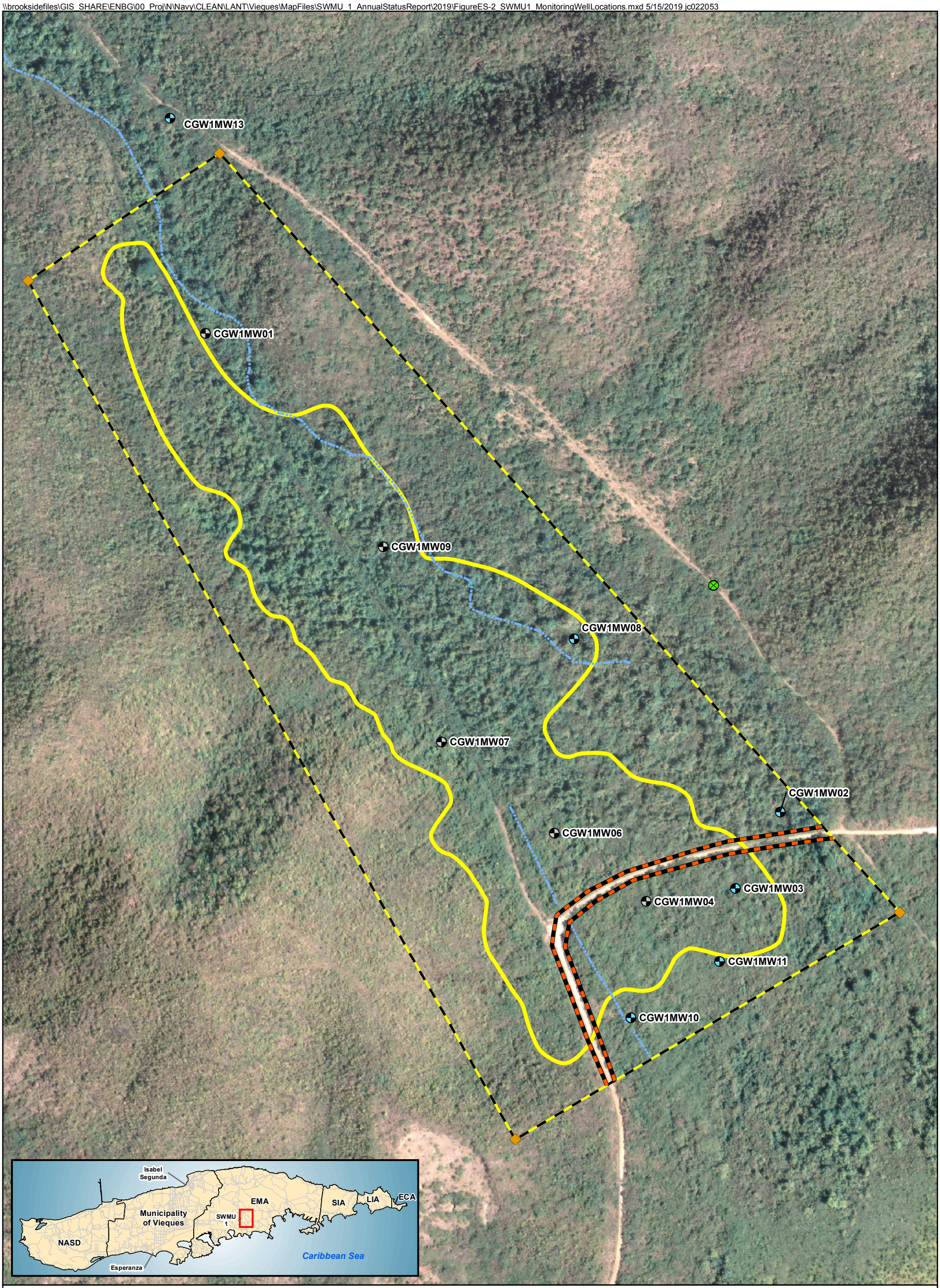

Legend

- Monitoring Well
- Long Term Monitoring Well
- Land Use Control Boundary Marker
- Monitoring Well Reference Marker
- Fence
- Ephemeral Stream
- Land Use Control Boundary
- SWMU 1 Boundary Revised

Land Use Control Boundary Coordinates
NW X - 245955.0300, Y - 2005840.5110
SW X - 246521.9610, Y - 2004840.6710
NE X - 246177.9737, Y - 2005988.6571
SE X - 246969.6030, Y - 2005104.8620

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Figure ES-2
Monitoring Well Locations
SWMU 1 Annual Status Report
Former Vieques Naval Training Range
Vieques, Puerto Rico

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Acronyms and Abbreviations

µg/L	microgram(s) per liter
µS/cm	microSiemen(s) per centimeter
ARAR	applicable or relevant and appropriate requirement
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action – Navy
CTO	Contract Task Order
DO	dissolved oxygen
EPA	Environmental Protection Agency
ERP	Environmental Restoration Program
ESD	Explanation of Significant Differences
FS	Feasibility Study
LTM	long-term monitoring
LUC	land use control
MCL	maximum contaminant level
ml/min	milliliter(s) per minute
MS	matrix spike
MSD	matrix spike duplicate
mV	millivolt
NAVFAC	Naval Facilities Engineering Command
NTU	nephelometric turbidity unit
O&M	operations and maintenance
ORP	oxidation-reduction potential
PAL	project action level
PCBs	polychlorinated biphenyls
pH	potential of hydrogen
PPE	personal protective equipment
PRDNER	Puerto Rico Department of Natural and Environmental Resources
PRWQS	Puerto Rico Water Quality Standards
QA	quality assurance
QC	quality control
RAO	remedial action objective
RI	Remedial Investigation
ROD	Record of Decision
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TAL	target analyte list
TCL	target compound list
USFWS	United States Fish and Wildlife Service
VNTR	Vieques Naval Training Range
VOC	volatile organic compound

SECTION 1

Introduction

This Annual Status Report for Groundwater Long-Term Monitoring (LTM) and Operations and Maintenance (O&M) presents the 2019 (year 4) annual groundwater monitoring and O&M activities at Solid Waste Management Unit (SWMU) 1, located within the former Vieques Naval Training Range (VNTR) in Vieques, Puerto Rico (**Figures 1-1 and 1-2**). SWMU 1 was an active landfill from 1954 to 1978 for the disposal of municipal waste from Camp Garcia. In accordance with the SWMU 1 Record of Decision (ROD) (NAVFAC, 2011), the selected remedy for SWMU 1 includes inspecting and maintaining the landfill cover conditions, implementing, inspecting, and maintaining land use controls (LUCs), and groundwater LTM. The remedial action was completed in 2015; this Annual Status Report documents the 2019 groundwater LTM results and inspection findings (including checklist), routine maintenance tasks, and status of LUCs. The Report also includes historical analytical data to aid in LTM groundwater data evaluation. Details of the 2016 (year 1), 2017 (year 2), and 2018 (year 3) LTM events can be found in the 2016 Annual Status Report (CH2M, 2017a), 2017 Annual Status Report (CH2M, 2017b), and 2018 Annual Status Report (CH2M, 2018b), respectively.

This Annual Status Report was prepared under the Comprehensive Long-Term Environmental Action—Navy (CLEAN) Contract No. N62470-16-D-9000, Contract Task Order (CTO) 0003, for submittal to Naval Facilities Engineering Command (NAVFAC) Atlantic, United States Environmental Protection Agency (EPA), Puerto Rico Department of Natural and Environmental Resources (PRDNER), and the United States Fish and Wildlife Service (USFWS). The Navy, EPA, PRDNER, and USFWS work jointly to implement the Vieques Environmental Restoration Program (ERP).

1.1 Objectives and Approach

In accordance with the SWMU 1 ROD (NAVFAC, 2011), a remedial action objective (RAO) for groundwater is not necessary because there is no groundwater contamination requiring remediation and no evidence that leaching is a concern. However, groundwater LTM is conducted to determine if a future release from the landfill occurs that results in groundwater contamination that may necessitate a groundwater remedy. If long-term monitoring indicates a groundwater remedy is warranted in the future, the ROD will be amended and a groundwater RAO(s) will be developed at that time.

In accordance with the SWMU 1 Revised Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan (CH2M, 2016), groundwater monitoring will occur every year for the first 5 years unless trend data suggest more or less frequent monitoring is warranted. The frequency of groundwater sampling will be continually evaluated and discussed in annual status reports and changes in the frequency of sampling will be recommended, as applicable (at a minimum in the fifth annual status report).

The specific objective of groundwater LTM is to evaluate groundwater conditions at SWMU 1, update the groundwater Conceptual Site Model (if necessary), and evaluate the potential for a release from the landfill to groundwater to migrate beyond the boundary of SWMU 1 at concentrations above project action levels (PALs).

The LTM approach for SWMU 1, as defined in the Revised Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan (CH2M, 2016), includes the collection and analysis of groundwater samples from six monitoring wells (five downgradient wells MW-02, MW-03, MW-08, MW-10, MW-11, and one upgradient well MW-13) as shown in **Figure 1-3**.

Three RAOs were developed for the landfill debris, associated contamination, and potential exposure routes and receptors at SWMU 1. These RAOs, presented in the ROD and associated Explanation of Significant Differences (ESD), are as follows:

- Prevent direct contact with surface and subsurface landfill debris and associated contamination that would potentially pose an unacceptable risk to exposed receptors.

- Minimize the potential for erosion of landfill debris.
- Ensure land use (including the use of groundwater) within the landfill boundaries is controlled, unless or until additional action is implemented that mitigates potentially unacceptable risks associated with unrestricted land use.

To ensure these RAOs are met, an annual visual inspection is conducted to look for surface debris and evidence of erosion, and evaluate the condition of drainage features, LTM monitoring wells, and fencing/signage. Additional inspections (and corrective actions) are to be conducted if events occur that may threaten the ability of the remedial action to meet its RAOs (i.e., hurricanes, fires, etc.).

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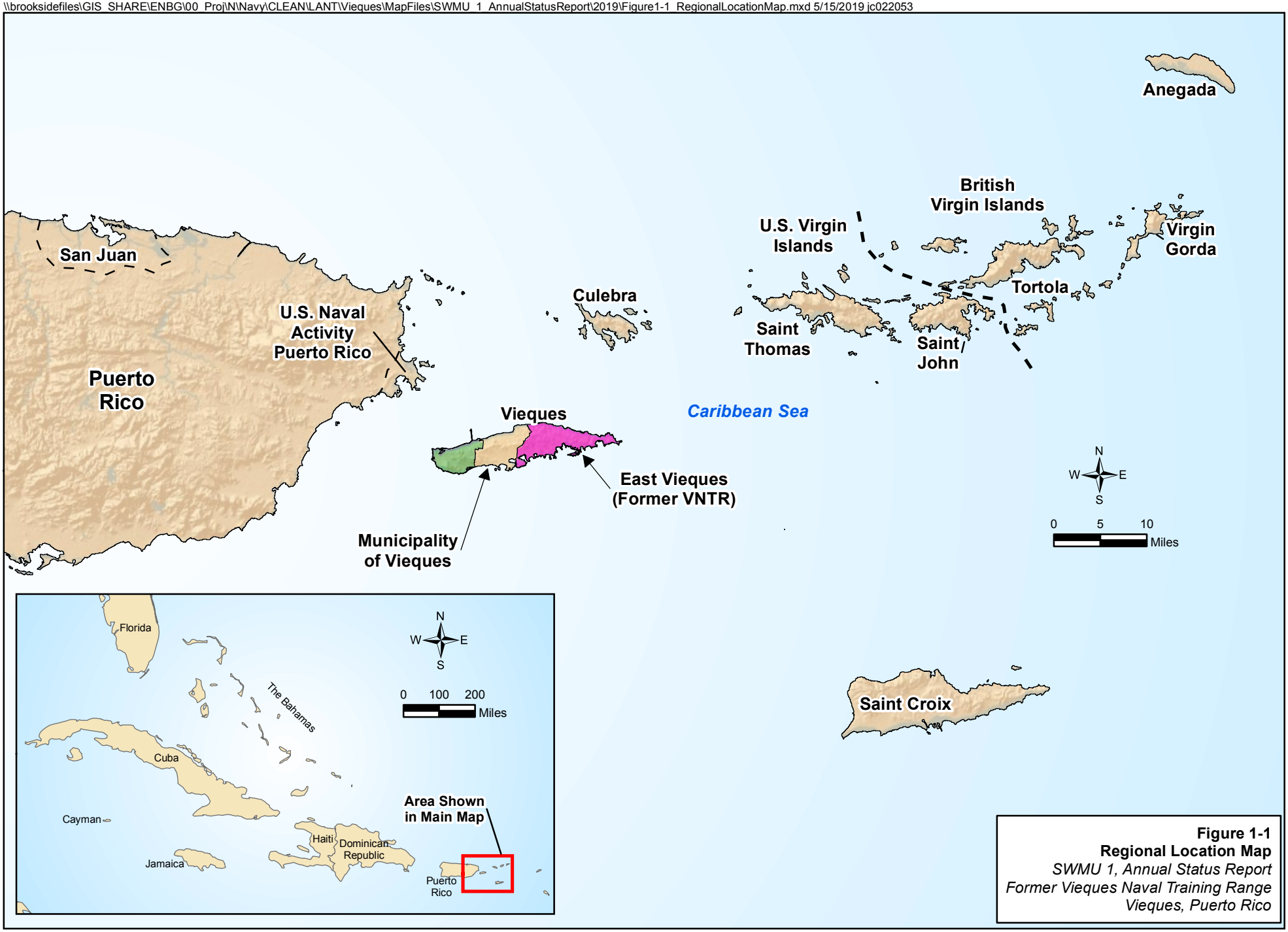

Figure 1-1
Regional Location Map
SWMU 1, Annual Status Report
Former Vieques Naval Training Range
Vieques, Puerto Rico

FIGURE 1-2
SWMU 1 Location
SWMU 1 Annual Status Report
Former Vieques Naval Training Range
Vieques, Puerto Rico

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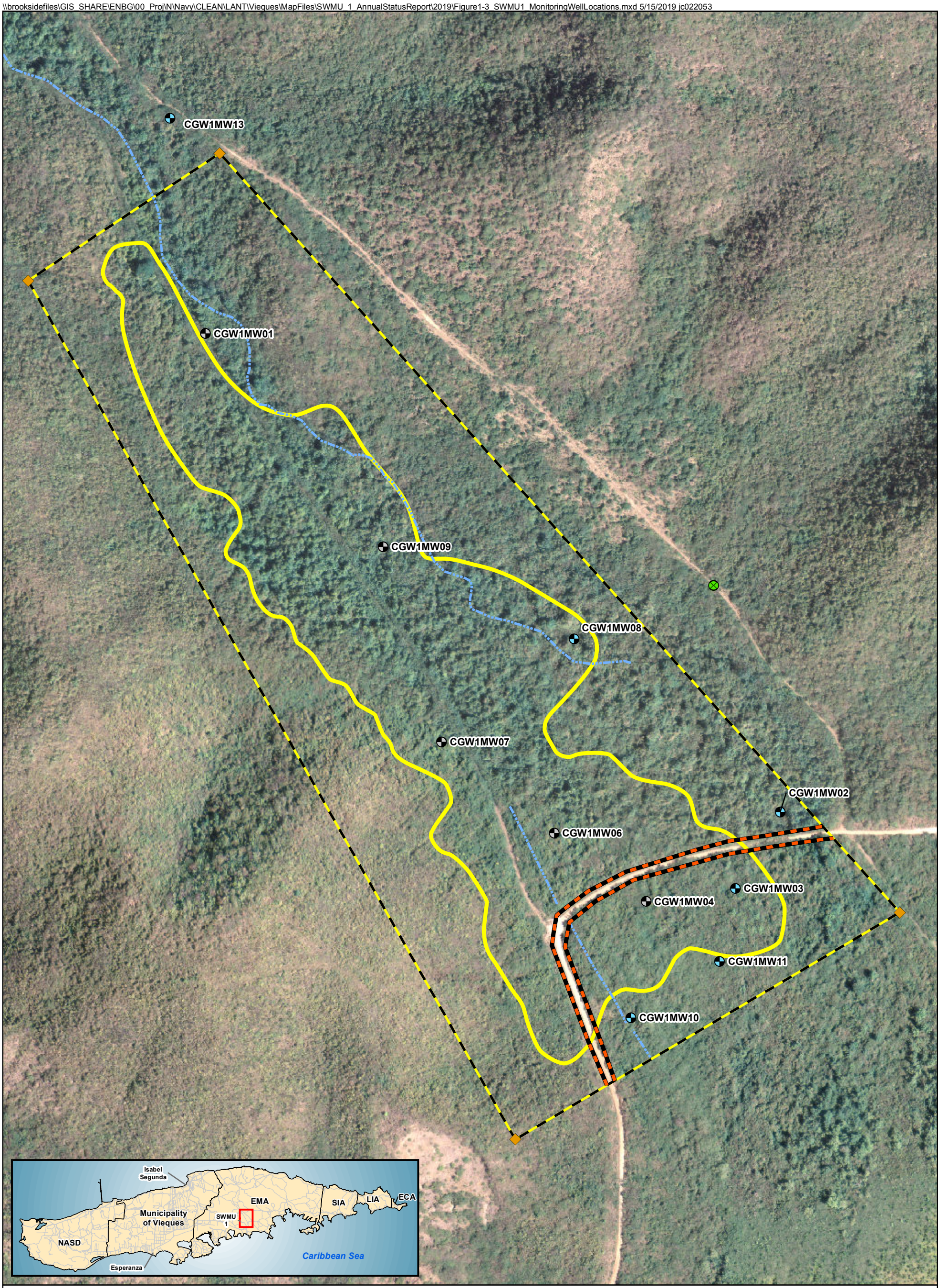

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Figure 1-3
Monitoring Well Locations
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Former Vieques Naval Training Range
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SECTION 2

Groundwater Sampling and Evaluation

This section provides a description of the LTM methodology and results for the 2019 annual groundwater LTM event. It also includes analytical results from historical sampling events to aid in the LTM data evaluation. The groundwater LTM field activities were conducted in accordance with the SWMU 1 Groundwater Long-Term Monitoring Sampling and Analysis Plan (SAP) contained within the Revised Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan (CH2M, 2016). As such, groundwater elevation measurements and groundwater sampling were conducted at six monitoring wells at SWMU 1. Because of the dense vegetation growth across the landfill, some vegetation trimming was needed to access each of the monitoring wells.

2.1 Groundwater Elevation Measurements

The depth to groundwater was gauged at six monitoring wells at SWMU 1 on January 7, 2019 (**Appendix A**). Water-level depths were used in conjunction with the top-of-casing survey data to calculate groundwater elevations at each of the six wells. An electronic water level meter was used to measure the depth to water from the top of casing to the nearest 0.01 foot. Groundwater elevations for the year 1 through year 4 LTM events are summarized in **Table 2-1** and shown in **Figures 2-1, 2-2, 2-3, and 2-4**, respectively. Despite the elevated water levels relative to historical levels, the groundwater flow direction to the south-southeast is consistent with previous years.

2.2 Groundwater Sampling

Groundwater sampling was conducted from January 7 to 10, 2019. Low-flow sampling techniques were employed using a peristaltic pump and a bladder pump for deeper wells. Flow rates for purging and sampling were maintained between 180 and 325 milliliters per minute (ml/min), which kept the drawdown in each well to approximately the target drawdown (i.e., less than or equal to about 0.3 foot) except in MW-10 which had a drawdown of 5.83 feet but stabilized during the last 6 readings (30 minutes of purging), similar to what has been observed previously.

While drawdown in excess of 0.3 foot introduces some uncertainty in the resulting data (due to the potential influences associated with non-laminar flow), there is sufficient data from other site wells sampled during the event, as well as historical groundwater data collected from MW-10 and other site wells, that indicate the recent data from MW-10 (and the other wells) are comparable to historical results. Differences in concentrations between sampling events is likely the result of normal groundwater fluctuations (i.e., concentrations are similar, no directional trend across analytes [some analytes display small increases while other show small decreases]). Therefore, any uncertainty in the data evaluation and associated conclusions drawn for the site due to the drawdown in excess of 0.3 foot is likely insignificant. Further, the physical conditions of certain water-bearing units (including those in the vicinity of well MW-10) may preclude the ability to sustain any pumping rate that does not produce drawdown in excess of 0.3 foot (i.e., the transmissivity of the formation at that location appears to be too low to sustain a drawdown <0.3 feet at the lowest feasible pumping rate). In these instances, the Standard Operating Procedure (SOP) is followed to the extent possible.

Dissolved oxygen (DO), potential of hydrogen (pH), specific conductance, temperature, oxidation/reduction potential (ORP), and turbidity were measured in the field prior to each sample collection using the procedures described in SOP B-1 entitled Groundwater Sampling Procedure, Low Stress (Low Flow) Purging and Sampling in the Master Standard Operating Procedures, Protocols, and Plans document (CH2M, 2018a) and shown in **Table 2-1**. Other than the drawdown discussed previously, no substantive deviations from the SOP occurred. Conductivity ranged from 2,680 to 12,814 microSiemens per centimeter (µS/cm), with the lowest value measured in the well furthest from the ocean (MW-13) and the highest value in the well closest to the ocean (MW-11). The range in values may be associated with localized conditions in the vicinity of MW-11. Alternatively, the elevated conductivity could be associated with the proximity, and therefore, influence, by the ocean. ORP ranged from 41.9

to 213.5 millivolts (mV) and, with the exception of MW-11, is within a normal range for groundwater that is under primarily aerobic conditions (greater than about 50 mV). Variations may be associated with factors such as the uneven distribution of organic carbon, varying amounts of rainwater infiltration from local storms or other influences.

Indicator parameters were taken at approximately 5-minute intervals. Other than the exceptions discussed here, groundwater samples were obtained when at least three consecutive readings were obtained that met the following criteria: pH within 0.1, conductivity within 3%, ORP within 10 mV, DO within 10%, and turbidity within 10%. Turbidity results during sampling ranged from 0.65 to 8.75 nephelometric turbidity units (NTU), below the required 10 NTU for metals and evidence of stability.

Volatile organic compound (VOC) samples were collected first, followed by semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), dissolved metals, and then total metals. Groundwater sampling logs are included in **Appendix A**. Groundwater samples were submitted to EMAX Laboratories, Inc. in Torrance, California, for analysis of VOCs, SVOCs, pesticides, PCBs, and metals (total and dissolved) under chain-of-custody. The laboratory analytical methods used are shown in **Table 2-2**. The complete set of laboratory analytical data is provided in **Appendix B**.

2.2.1 Sample Handling

Sample handling included sample documentation, nomenclature, packaging, shipping, and custody. Procedures followed are described in SOP H-1 Preparing Field Logbooks, SOP H-4 Chain-of-Custody, and SOP H-5 Packaging and Shipping Procedures for Samples Not Considered Dangerous Goods in the Master Standard Operating Procedures, Protocols, and Plans document (CH2M, 2018a).

2.2.2 Quality Assurance and Quality Control

Field quality assurance (QA) and quality control (QC) samples were collected during the LTM field activities in order to: (1) ensure that decontamination procedures were properly implemented (e.g., equipment rinsate samples); (2) evaluate field methodologies (e.g., field duplicates); and (3) evaluate whether cross-contamination occurred during shipping (e.g., trip blanks). The field QA/QC samples were collected in accordance with Worksheet 28 of the SWMU 1 Groundwater Long-Term Monitoring SAP contained within the Revised Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan (CH2M, 2016).

2.2.3 Decontamination

Equipment involved in the field sampling activities was decontaminated upon arrival at the site, between sampling locations, and at the conclusion of the LTM activities. Decontamination procedures followed are described in SOP E-1 Decontamination of Personnel and Equipment in the Master Standard Operating Procedures, Protocols, and Plans document (CH2M, 2018a).

2.2.4 Investigation-Derived Waste Handling and Disposal

Three types of potentially contaminated wastes were generated during the fieldwork: (1) used personal protective equipment (PPE); (2) fluids from the decontamination of sampling tools, other equipment, and PPE; and (3) purge and redevelopment water from groundwater sampling. The PPE was decontaminated and disposed of with normal trash. Five 5-gallon buckets were used to contain the purge and decontamination water. Due to the small volume of fluid produced, the purge water was allowed to evaporate.

2.3 Data Evaluation

This subsection presents information on the management and evaluation of analytical data collected during the 2019 LTM event, including data tracking and validation, non-site-related analytical results with respect to

laboratory contaminants and naturally occurring elements, and the federal and commonwealth criteria used to evaluate the analytical results.

2.3.1 Data Tracking, Validation, and Data Quality Evaluation

The management and tracking of data from the time of field collection to receipt of validated electronic analytical results is of primary importance and helps reflect the overall quality of the analytical results. Field samples and their corresponding analytical tests were recorded on chain-of-custody forms for submission to the laboratory. Chain-of-custody entries were checked to determine if all designated samples were collected and submitted for the appropriate analyses. Upon receipt of the samples by the laboratory, a comparison to the field information was made to determine if each sample was analyzed for the correct parameters. In addition, a check was made to ensure that the proper number of QA/QC samples was collected for each media and for each sampling episode. QA/QC samples include field blanks, equipment blanks, trip blanks, duplicates, matrix spike (MS)/matrix spike duplicate (MSD) samples, and laboratory blanks.

Analytical data reports for the 2019 LTM event were submitted to Environmental Data Services, Inc. for third-party data validation. The laboratory data are provided in **Appendix B** and the third-party data validation is presented in **Appendix C**. Data reports were submitted in hard copy and electronic versions to the third-party validator. Validation procedures were those listed in **Appendix D** Section 1.2 and are appropriate for EPA Region 2. These steps (third party validation and electronic data handling) serve to reduce inherent uncertainties associated with data authenticity and usability.

A data quality evaluation was performed on the analytical data in accordance with the SWMU 1 Groundwater LTM SAP included as an appendix in the Revised Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan (CH2M, 2016). Results of the evaluation are summarized in **Appendix D**.

2.3.2 Groundwater Analytical Results

The VOCs, SVOCs, pesticides, PCBs, and metals with at least one detection during the 2016 through 2019 LTM events are summarized in **Table 2-3**; all the detected constituents (above background for metals) are highlighted in gray. Additional shading is added to the table to represent exceedances of PALs, which are the criteria associated with the federal and commonwealth applicable or relevant and appropriate requirements (ARARs). The PALs for groundwater are the chemical specific ARARs, which comprise:

- Federal Safe Drinking Water Act (Title 40 of the Code of Federal Regulations [CFR], Part 141) primary maximum contaminant levels (MCLs)
- Drinking Water Quality Standards, Puerto Rico Water Quality Standards (PRWQS) Regulation, as amended April 2016

Metals data from upgradient monitoring well MW-13 are used to help distinguish constituents and constituent concentrations that may be attributable to material within the landfill from those attributable to other sources, such as background. However, it is important to note that the data from well MW-13 represent a single concentration (per metal) in the range of actual concentrations that represent true background (in other words, actual background is not a single concentration, but is a range of concentrations). Therefore, simply detecting a metal at a higher concentration than detected in well MW-13 does not necessarily indicate the metal concentration is associated with leaching from the landfill. It may simply be associated with the range of actual background concentrations. Therefore, multiple lines of evidence are used to help evaluate the metals data, including data from past sampling, which is why historical data are included in **Table 2-3**.

Any constituent for which an exceedance of PALs (and background for metals) was detected during any SWMU 1 LTM event is shown in **Figure 2-5**. Significant observations shown in **Table 2-3** and **Figure 2-5** are:

Volatile Organic Compounds

- No VOCs were detected during the 2019 sampling event

Semivolatile Organic Compounds

- No SVOCs were detected during the 2019 sampling event

Pesticides

- No pesticides were detected during the 2019 sampling event

Polychlorinated Biphenyls

- No PCBs were detected during the 2019 sampling event

Metals

- The metals data further support the evidence gathered from past LTM sampling, the other parameter analyses, and the information provided in the Streamlined Remedial Investigation (RI)/Feasibility Study (FS) Report (CH2M, 2011) that any release from the landfill to the underlying groundwater has been insignificant. In general, concentrations of metals detected during the 2019 event are comparable to (or less than) those detected during the 2016-2018 and previous (2004, 2009) events. Only one metal (mercury) was detected above background and a PAL (in this case, the PRWQS) during the 2019 sampling event.

  As shown in **Table 2-3** and **Figure 2-5**, mercury and dissolved mercury was detected in two wells (MW-02 and MW-8) above background and the PRWQS in 2019. The detections (mercury: 0.242J and 0.69J respectively, and dissolved mercury: 0.121J and 0.081J respectively) exceed the PRWQS (0.05 micrograms per liter [μg/L]) and background but are below the 2 μg/L limit set by MCL. Additionally, these concentrations are consistent with historical site results, as shown in **Figure 2-5**.

TABLE 2-1

Groundwater Elevation and Sampling Details

SWMU 1 Annual Status Report

Former Vieques Naval Training Range, Vieques, Puerto Rico

Well ID	Top of Casing Elevation[1] (ft amsl)	Ground Surface Elevation[1] (ft amsl)	Well Depth (ft bls)	Total Depth Below Top of Casing (ft)	Screen Interval Depth (ft bls)	Screen Interval Elevation (ft amsl)	Northing UTM NAD 83 Meters	Easting UTM NAD 83 Meters	Groundwater Elevation on 1/4/16 (ft amsl)	Groundwater Elevation on 1/16/17 (ft amsl)	Groundwater Elevation on 1/9/18 (ft amsl)	Groundwater Elevation on 1/7/19 (ft amsl)	Depth the Pump was Placed (ft bls)	Groundwater Sampling Flow Rate (mL/min)	Measured Drawdown during Sampling (ft)	pH	Conductivity (uS/cm)	Redox (ORP) (mV)	DO (mg/L)	Turbidity (NTU)
CGW1MW02	19.40	17.01	34.06	37	24.06 to 34.06	-7.05 to -17.05	2005221.9	246830.55	2.05	4.06	16.39	8.10	34.5	250	0.41	6.95	4810	131.0	4.80	3.2
CGW1MW03	15.69	13.21	29.98	32.55	19.98 to 29.98	-6.77 to -16.05	2005132.88	246777.97	0.79	2.17	10.39	4.03	29	285	0.10	6.96	4400	213.5	0.05	8.75
CGW1MW08	32.20	29.82	68.97	71.40	58.97 to 68.97	-29.15 to -39.15	2005423.64	246590.49	10.98	10.45	30.85	19.46	65	300	0.36	7.01	3450	203.3	0.7	6.76
CGW1MW10	14.68	12.17	50.16	52.60	40.16 to 50.16	-27.99 to -37.99	2004982.67	246656.32	5.09	5.33	NA	9.14	48	190	5.83	6.85	4913	53.0	0.3	0.65
CGW1MW11	14.45	11.95	28.06	30.57	18.06 to 28.06	-6.11 to -16.11	2005048.17	246759.7	0.7	2.43	9.70	4.12	26	250	0.01	6.73	12814	41.9	0.22	3.05
CGW1MW13	65.65	62.97	55.18	57.80	45.18 to 55.18	17.79 to 7.79	2006029.51	246119.83	31.65	29.38	45.25	44.12	51	225	0.36	7.03	2680	85.6	0.26	1.52

Notes:

[1] Top of casing elevations were obtained from surveys in 2004 and 2009

amsl = above mean sea level
bls = below land surface
DO = dissolved oxygen
ft = feet
mg/L = miligrams/Liter
mL/min = milliliter/minute
mV = millivolts
NTU = Nephelometric Turbidity Unit
ORP = oxidation-reduction potential
uS/cm = microSiemens/centemeter

TABLE 2-2

Laboratory Analytical Methods

SWMU 1 Annual Status Report

Former Vieques Naval Training Range, Vieques, Puerto Rico

Matrix	Parameter	Analytical Method
Monitoring well groundwater (Aqueous)	Select Volatile organic compounds (VOCs)	SW-846 8260B and 8260B_SIM
	Select Semivolatile organic compounds (SVOCs)	SW-846 8270D, 8270D_SIM, and Ultra-Low SIM PAHs
	Select Pesticides (PEST/PCBs)	SW-846 8081B
	Select Aroclors (PEST/PCBs)	SW-846 8082A
	Select Metals and field-filtered metals (METALs and FMETALs) including mercury	SW-846 6020A, 7470A
	Cyanide (METALs)	SW-846 9014

TABLE 2-3

Groundwater Detections and Exceedances

SWMU 1 Annual Status Report

Former Vieques Naval Training Range, Vieques, Puerto Rico

Station ID	**Background Well**				**Background Values**	**MCL-Groundwater**	**PR Water Quality Class SG**	CGW1MW02					
Sample ID	VEW01-MW13-0116	VEW01-MW13-0117	VEW01-MW13-0118	VEW01-MW13-0119				CGW1GW02-R01	VEW01-MW02-0509	VEW01-MW02-0116	VEW01-MW02-0117	VEW01-MW02-0118	VEW01-MW02-0119
Sample Date	01/07/16	01/17/17	01/11/18	01/09/19				02/05/04	05/04/09	01/11/16	01/17/17	01/10/18	01/08/19
Chemical Name													
Volatile Organic Compounds (UG/L)													
Trichloroethene	**0.12 J**	**0.12 J**	0.2 U	0.2 U	**0.12 J**	5	5	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
Semivolatile Organic Compounds (UG/L)													
2,4,6-Trichlorophenol	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	--	14	10.1 U	9 U	0.11 U	**0.12 J**	0.11 U	0.1 U
bis(2-Ethylhexyl)phthalate	1.3 U	1.4 U	1.6 U	1.4 U	1.6 U	6	12	10.1 U	1.9 UJ	**0.88 J**	1.3 U	1.5 U	1.2 U
Pesticide/Polychlorinated Biphenyls (UG/L)													
Endosulfan I	0.011 U	0.011 U	0.011 U	0.01 U	0.011 U	--	62	0.05 UJ	0.066 U	0.01 U	0.011 U	0.011 U	0.011 U
Total Metals (UG/L)													
Antimony	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	6	5.6	2.5 U	1 U	**0.338 J**	0.5 U	0.5 U	0.5 U
Arsenic	**0.292 J**	**0.302 J**	**0.22 J**	**0.26 J**	**0.302 J**	10	10	2.04 U	5 U	**0.425 J**	**0.483 J**	**0.366 J**	**0.167 J**
Barium	**18.9**	**18.2**	**18.5**	**19.8**	**19.8**	2,000	--	**47.8 J**	**34.4**	**28.4**	**28.2**	**25.7**	**24.1**
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4	--	**0.0973 J**	1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	5	5	**0.492 J**	1 U	0.2 U	0.2 U	0.2 U	0.2 U
Chromium	**1.69**	1.21 U	**0.134 J**	0.2 U	**1.69**	100	100	**20.2**	3 U	**5.46**	0.791 U	**0.656 J**	0.301 U
Copper	0.984 U	0.624 U	**0.361 J**	**0.495 J**	**0.495 J**	1,300	1,300	**3.83 J**	1 U	1.17 U	3.72 U	**0.624 J**	0.5 U
Cyanide	5 U	**13.2**	5 U	5 U	**13.2**	200	200	3.73 U	12 U	5 U	**40.2**	5 U	5 U
Lead	0.1 U	0.1 U	**0.0618 J**	0.1 U	**0.0618 J**	15	15	1.76 U	1 UJ	0.202 U	0.123 U	0.1 U	**0.053 J**
Mercury	**0.062 J**	0.11 U	0.55 U	0.11 U	**0.062 J**	2	0.05	**1.29**	**1.9**	**0.269 J**	**0.201 J**	**0.35 J**	**0.242 J**
Nickel	**1.06**	**0.877 J**	0.2 U	0.276 U	**1.06**	--	610	**15.5 J**	**4.9**	**3.72**	**1.06**	**0.751 J**	0.385 U
Selenium	**4.53**	**4.35**	**3.42**	**3.44**	**4.53**	50	50	**4.74 J**	5 U	**1.49**	**1.33**	**1.05**	**1.04**
Dissolved Metals (UG/L)													
Antimony, Dissolved	**0.453 J**	0.5 U	0.5 U	0.5 U	**0.453 J**	6	5.6	2.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
Arsenic, Dissolved	**0.336 J**	**0.298 J**	**0.25 J**	**0.253 J**	**0.336 J**	10	10	2.04 U	5 U	**0.385 J**	**0.417 J**	**0.347 J**	**0.309 J**
Barium, Dissolved	**20.9**	**17.9**	**18.3**	**19**	**20.9**	2,000	--	**39.6 J**	**33.3**	**25.5**	**25.5**	**24.5**	**23.7**
Beryllium, Dissolved	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4	--	0.0945 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium, Dissolved	**0.259 J**	0.2 U	0.2 U	0.2 U	**0.259 J**	5	5	0.356 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
Chromium, Dissolved	**11.4**	0.441 U	0.2 U	0.2 U	**11.4**	100	100	**9.93 J**	3 U	**0.901 J**	0.259 U	**0.109 J**	0.26 U
Copper, Dissolved	**12**	0.5 U	0.5 U	0.5 U	**12**	1,300	1,300	**3.25 J**	**1.3**	0.5 U	1.14 U	**0.716 J**	**0.764 J**
Lead, Dissolved	**1.64**	0.1 U	0.1 U	0.1 U	**1.64**	15	15	1.76 U	1 UJ	**0.0722 J**	0.1 U	0.1 U	0.1 U
Mercury, Dissolved	0.11 U	0.11 U	0.55 U	0.11 U	0.55 U	2	0.05	**0.461**	**0.09 J**	**0.087 J**	0.11 U	0.55 U	**0.121 J**
Nickel, Dissolved	**38.8**	**0.372 J**	0.2 U	0.2 U	**38.8**	--	610	**10.4 J**	**4.7**	1.91 U	**0.556 J**	**0.226 J**	0.772 U
Selenium, Dissolved	**4.38**	**4.27**	**3.58**	**3.39**	**4.38**	50	50	**3.62 J**	5 U	**1.54**	**1.28**	**1.17**	**0.99 J**

Notes:

Bolding indicates detection

Grey shading indicates a detection (detection above background for metals)

Yellow shading indicates a detection above the PRWQS (and background for metals)

Blue shading indicates a detection above the MCL and PRWQS (and background for metals)

Orange shading indicates a detection above the PRWQS

J - Analyte present, value may or may not be accurate or precise

MG/L - Milligrams per liter

NA - Not analyzed

NG/L - Nanograms per liter

R - Unreliable Result

U - The material was analyzed for, but not detected

UG/L - Micrograms per liter

UJ - Analyte not detected, quantitation limit may be inaccurate

TABLE 2-3

Groundwater Detections and Exceedances

SWMU 1 Annual Status Report

Former Vieques Naval Training Range, Vieques, Puerto Rico

Station ID	Background Well				Background Values	MCL-Groundwater	PR Water Quality Class SG	CGW1MW03					
Sample ID	VEW01-MW13-0116	VEW01-MW13-0117	VEW01-MW13-0118	VEW01-MW13-0119				CGW1GW03-R01	VEW01-MW03-0409	VEW01-MW03-0116	VEW01-MW03P-0116	VEW01-MW03-0117	VEW01-MW03P-0117
Sample Date	01/07/16	01/17/17	01/11/18	01/09/19				02/06/04	04/30/09	01/08/16	01/08/16	01/18/17	01/18/17
Chemical Name													
Volatile Organic Compounds (UG/L)													
Trichloroethene	**0.12 J**	**0.12 J**	0.2 U	0.2 U	**0.12 J**	5	5	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
Semivolatile Organic Compounds (UG/L)													
2,4,6-Trichlorophenol	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	--	14	10.1 U	10 U	0.11 U	0.1 U	0.11 U	0.1 U
bis(2-Ethylhexyl)phthalate	1.3 U	1.4 U	1.6 U	1.4 U	1.6 U	6	12	10.1 U	2 U	1.3 U	1.3 U	1.3 UJ	1.2 UJ
Pesticide/Polychlorinated Biphenyls (UG/L)													
Endosulfan I	0.011 U	0.011 U	0.011 U	0.01 U	0.011 U	--	62	0.06 U	0.067 U	0.0098 U	0.01 U	0.0097 U	0.0094 U
Total Metals (UG/L)													
Antimony	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	6	5.6	**3.25 J**	1 U	0.5 U	0.5 U	0.5 U	0.5 U
Arsenic	**0.292 J**	**0.302 J**	**0.22 J**	**0.26 J**	**0.302 J**	10	10	2.04 U	5 U	**1.29**	**0.843 J**	**0.472 J**	**0.501 J**
Barium	**18.9**	**18.2**	**18.5**	**19.8**	**19.8**	2,000	--	**238**	**111**	**486**	**522**	**91.1**	**89.7**
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4	--	0.0945 U	1 U	**0.834 J**	**0.196 J**	0.1 U	**0.0508 J**
Cadmium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	5	5	0.356 U	1 U	**0.351 J**	0.2 U	0.2 U	0.2 U
Chromium	**1.69**	1.21 U	**0.134 J**	0.2 U	**1.69**	100	100	**0.774 J**	3 U	**54.9 J**	**137 J**	3.36 U	3.15 U
Copper	0.984 U	0.624 U	**0.361 J**	**0.495 J**	**0.495 J**	1,300	1,300	**1.74 J**	**1.2**	**48.7 J**	**21 J**	4.29 U	3.87 U
Cyanide	5 U	**13.2**	5 U	5 U	**13.2**	200	200	NA	12 U	5 U	5 U	5 U	5 U
Lead	0.1 U	0.1 U	**0.0618 J**	0.1 U	**0.0618 J**	15	15	1.76 U	1 UJ	**6.61**	**1.81**	**0.315 J**	**0.275 J**
Mercury	**0.062 J**	0.11 U	0.55 U	0.11 U	**0.062 J**	2	0.05	**0.0507 J**	0.2 U	**0.182 J**	0.11 U	0.11 U	0.11 U
Nickel	**1.06**	**0.877 J**	0.2 U	0.276 U	**1.06**	--	610	**4.71 J**	**4.8**	**34.3 J**	**87.4 J**	1.81 U	1.69 U
Selenium	**4.53**	**4.35**	**3.42**	**3.44**	**4.53**	50	50	2.1 U	5 U	**0.956 J**	**0.924 J**	**1.06**	**1.01**
Dissolved Metals (UG/L)													
Antimony, Dissolved	**0.453 J**	0.5 U	0.5 U	0.5 U	**0.453 J**	6	5.6	**2.83 J**	1 U	0.5 U	0.5 U	0.5 U	0.5 U
Arsenic, Dissolved	**0.336 J**	**0.298 J**	**0.25 J**	**0.253 J**	**0.336 J**	10	10	2.04 U	**6.8**	**1.1**	**1.14**	**0.372 J**	**0.367 J**
Barium, Dissolved	**20.9**	**17.9**	**18.3**	**19**	**20.9**	2,000	--	**236**	**110**	**232**	**259**	**79.9**	**80.3**
Beryllium, Dissolved	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4	--	0.0945 U	1 U	**0.317 J**	**0.395 J**	0.1 U	0.1 U
Cadmium, Dissolved	**0.259 J**	0.2 U	0.2 U	0.2 U	**0.259 J**	5	5	0.356 U	1 U	**0.132 J**	**0.165 J**	0.2 U	0.2 U
Chromium, Dissolved	**11.4**	0.441 U	0.2 U	0.2 U	**11.4**	100	100	**0.595 J**	3 U	**26**	**28.7**	0.761 U	0.8 U
Copper, Dissolved	**12**	0.5 U	0.5 U	0.5 U	**12**	1,300	1,300	**1.96 J**	**1.2**	**22.7**	**27.6**	1.35 U	1.73 U
Lead, Dissolved	**1.64**	0.1 U	0.1 U	0.1 U	**1.64**	15	15	1.76 U	1 UJ	**2.76**	**3.11**	0.1 U	**0.0638 J**
Mercury, Dissolved	0.11 U	0.11 U	0.55 U	0.11 U	0.55 U	2	0.05	0.0162 U	0.2 U	0.11 U	0.11 U	0.11 U	0.11 U
Nickel, Dissolved	**38.8**	**0.372 J**	0.2 U	0.2 U	**38.8**	--	610	**4.36 J**	**4.3**	**14.8**	**16.2**	0.449 U	0.485 U
Selenium, Dissolved	**4.38**	**4.27**	**3.58**	**3.39**	**4.38**	50	50	2.1 U	5 U	**0.93 J**	**0.817 J**	**0.955 J**	**0.972 J**

Notes:

Bolding indicates detection

Grey shading indicates a detection (detection above background for metals)

Yellow shading indicates a detection above the PRWQS (and background for metals)

Blue shading indicates a detection above the MCL and PRWQS (and background for metals)

Orange shading indicates a detection above the PRWQS

J - Analyte present, value may or may not be accurate or precise

MG/L - Milligrams per liter

NA - Not analyzed

NG/L - Nanograms per liter

R - Unreliable Result

U - The material was analyzed for, but not detected

UG/L - Micrograms per liter

UJ - Analyte not detected, quantitation limit may be inaccurate

TABLE 2-3

Groundwater Detections and Exceedances

SWMU 1 Annual Status Report

Former Vieques Naval Training Range, Vieques, Puerto Rico

Station ID	**Background Well**				**Background Values**	**MCL-Groundwater**	**PR Water Quality Class SG**	CGW1MW03				CGW1MW08	
Sample ID	VEW01-MW13-0116	VEW01-MW13-0117	VEW01-MW13-0118	VEW01-MW13-0119				VEW01-MW03-0118	VEW01-MW03P-0118	VEW01-MW03-0119	VEW01-MW03P-0119	VEW01-MW08-0509	VEW01-MW08-0116
Sample Date	01/07/16	01/17/17	01/11/18	01/09/19				01/12/18	01/12/18	01/07/19	01/07/19	05/22/09	01/12/16
Chemical Name													
Volatile Organic Compounds (UG/L)													
Trichloroethene	**0.12 J**	**0.12 J**	0.2 U	0.2 U	**0.12 J**	5	5	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Semivolatile Organic Compounds (UG/L)													
2,4,6-Trichlorophenol	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	--	14	0.11 U	0.11 U	0.1 U	0.11 U	9 U	0.11 U
bis(2-Ethylhexyl)phthalate	1.3 U	1.4 U	1.6 U	1.4 U	1.6 U	6	12	1.7 U	1.3 U	1.2 U	1.3 U	1.9 UJ	1.3 U
Pesticide/Polychlorinated Biphenyls (UG/L)													
Endosulfan I	0.011 U	0.011 U	0.011 U	0.01 U	0.011 U	--	62	0.011 U	0.011 U	0.0096 U	0.01 U	0.066 U	**0.014 J**
Total Metals (UG/L)													
Antimony	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	6	5.6	0.5 U	0.5 U	0.5 U	2.5 U	1 U	0.5 U
Arsenic	**0.292 J**	**0.302 J**	**0.22 J**	**0.26 J**	**0.302 J**	10	10	**0.233 J**	**0.282 J**	**0.363 J**	1 U	5 U	**0.323 J**
Barium	**18.9**	**18.2**	**18.5**	**19.8**	**19.8**	2,000	--	**56.1**	**56.5**	**69.4**	**67.2**	**46.2**	**36.5**
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4	--	0.1 U	0.1 U	0.1 U	0.5 U	1 U	0.1 U
Cadmium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	5	5	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U
Chromium	**1.69**	1.21 U	**0.134 J**	0.2 U	**1.69**	100	100	0.239 U	0.271 U	0.361 U	1 U	3 U	0.399 U
Copper	0.984 U	0.624 U	**0.361 J**	**0.495 J**	**0.495 J**	1,300	1,300	0.5 U	0.5 U	0.5 U	2.5 U	**7.7**	0.5 U
Cyanide	5 U	**13.2**	5 U	5 U	**13.2**	200	200	5 U	5 U	5 U	5 U	12 U	5 U
Lead	0.1 U	0.1 U	**0.0618 J**	0.1 U	**0.0618 J**	15	15	0.1 U	0.1 U	0.1 U	0.5 U	1 U	0.1 U
Mercury	**0.062 J**	0.11 U	0.55 U	0.11 U	**0.062 J**	2	0.05	0.11 U	0.11 U	0.11 U	0.11 U	0.2 U	**0.201 J**
Nickel	**1.06**	**0.877 J**	0.2 U	0.276 U	**1.06**	--	610	0.2 U	0.2 U	0.477 U	1 U	**2.2**	**0.522 J**
Selenium	**4.53**	**4.35**	**3.42**	**3.44**	**4.53**	50	50	**1.08**	**1.11**	**1.13**	**1.22 J**	**2 J**	**2.49**
Dissolved Metals (UG/L)													
Antimony, Dissolved	**0.453 J**	0.5 U	0.5 U	0.5 U	**0.453 J**	6	5.6	0.5 U	0.5 U	0.5 U	2.5 U	1 U	**0.315 J**
Arsenic, Dissolved	**0.336 J**	**0.298 J**	**0.25 J**	**0.253 J**	**0.336 J**	10	10	**0.25 J**	**0.292 J**	**0.368 J**	1 U	5 U	**0.344 J**
Barium, Dissolved	**20.9**	**17.9**	**18.3**	**19**	**20.9**	2,000	--	**55.5**	**55.8**	**67.3**	**63.0**	**44.3**	**46.9**
Beryllium, Dissolved	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4	--	0.1 U	0.1 U	0.1 U	0.5 U	1 U	0.1 U
Cadmium, Dissolved	**0.259 J**	0.2 U	0.2 U	0.2 U	**0.259 J**	5	5	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U
Chromium, Dissolved	**11.4**	0.441 U	0.2 U	0.2 U	**11.4**	100	100	0.2 U	0.2 U	0.335 U	1 U	3 U	**3**
Copper, Dissolved	**12**	0.5 U	0.5 U	0.5 U	**12**	1,300	1,300	0.5 U	0.5 U	**1.98**	2.51 U	**1.4**	**5.17**
Lead, Dissolved	**1.64**	0.1 U	0.1 U	0.1 U	**1.64**	15	15	0.1 U	0.1 U	**0.0708 J**	0.5 U	1 U	0.445 U
Mercury, Dissolved	0.11 U	0.11 U	0.55 U	0.11 U	0.55 U	2	0.05	0.11 U	0.11 U	0.11 U	0.11 U	0.2 U	0.11 U
Nickel, Dissolved	**38.8**	**0.372 J**	0.2 U	0.2 U	**38.8**	--	610	**0.26 J**	0.2 U	0.441 U	1 U	**2.4**	**4.14**
Selenium, Dissolved	**4.38**	**4.27**	**3.58**	**3.39**	**4.38**	50	50	**1.04**	**1.04**	**1.12**	**1.22 J**	**2.6 J**	**2.6**

Notes:

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Orange shading indicates a detection above the PRWQS

J - Analyte present, value may or may not be accurate or precise

MG/L - Milligrams per liter

NA - Not analyzed

NG/L - Nanograms per liter

R - Unreliable Result

U - The material was analyzed for, but not detected

UG/L - Micrograms per liter

UJ - Analyte not detected, quantitation limit may be inaccurate

TABLE 2-3

Groundwater Detections and Exceedances

SWMU 1 Annual Status Report

Former Vieques Naval Training Range, Vieques, Puerto Rico

Station ID	**Background Well**				**Background Values**	**MCL-Groundwater**	**PR Water Quality Class SG**	CGW1MW08			CGW1MW10		
Sample ID	VEW01-MW13-0116	VEW01-MW13-0117	VEW01-MW13-0118	VEW01-MW13-0119				VEW01-MW08-0117	VEW01-MW08-0118	VEW01-MW08-0119	VEW01-MW10-0509	VEW01-MW10-0116	VEW01-MW10-0117
Sample Date	01/07/16	01/17/17	01/11/18	01/09/19				01/17/17	01/10/18	01/08/19	05/18/09	01/11/16	01/18/17
Chemical Name													
Volatile Organic Compounds (UG/L)													
Trichloroethene	**0.12 J**	**0.12 J**	0.2 U	0.2 U	**0.12 J**	5	5	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
Semivolatile Organic Compounds (UG/L)													
2,4,6-Trichlorophenol	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	--	14	**0.1 J**	0.12 U	0.11 U	9 U	0.11 U	0.11 U
bis(2-Ethylhexyl)phthalate	1.3 U	1.4 U	1.6 U	1.4 U	1.6 U	6	12	1.3 U	1.4 U	1.3 U	1.9 UJ	1.3 U	1.4 UJ
Pesticide/Polychlorinated Biphenyls (UG/L)													
Endosulfan I	0.011 U	0.011 U	0.011 U	0.01 U	0.011 U	--	62	0.011 U	0.0094 U	0.01 U	0.067 U	0.01 U	0.011 U
Total Metals (UG/L)													
Antimony	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	6	5.6	0.5 U	0.5 U	0.5 U	1 U	**0.486 J**	0.5 U
Arsenic	**0.292 J**	**0.302 J**	**0.22 J**	**0.26 J**	**0.302 J**	10	10	**0.343 J**	**0.255 J**	**0.266 J**	5 U	**0.279 J**	**0.304 J**
Barium	**18.9**	**18.2**	**18.5**	**19.8**	**19.8**	2,000	--	**39.8**	**39.5**	**34.6**	**39.4**	**51**	**48.2**
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4	--	0.1 U	0.1 U	0.1 U	1 U	0.1 U	0.1 U
Cadmium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	5	5	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
Chromium	**1.69**	1.21 U	**0.134 J**	0.2 U	**1.69**	100	100	0.488 U	**0.205 J**	0.415 U	3 U	**2.62**	0.721 U
Copper	0.984 U	0.624 U	**0.361 J**	**0.495 J**	**0.495 J**	1,300	1,300	0.5 U	0.5 U	**1.17**	**6.3**	1.7 U	1.66 U
Cyanide	5 U	**13.2**	5 U	5 U	**13.2**	200	200	5 U	5 U	5 U	12 U	5 U	**14.9**
Lead	0.1 U	0.1 U	**0.0618 J**	0.1 U	**0.0618 J**	15	15	0.1 U	0.1 U	**0.0637 J**	**0.21 J**	0.194 U	**0.0711 J**
Mercury	**0.062 J**	0.11 U	0.55 U	0.11 U	**0.062 J**	2	0.05	0.11 U	**0.53 J**	**0.69**	0.2 U	0.11 U	0.11 U
Nickel	**1.06**	**0.877 J**	0.2 U	0.276 U	**1.06**	--	610	**0.395 J**	**0.199 J**	0.288 U	**4.1**	**2.12**	0.558 U
Selenium	**4.53**	**4.35**	**3.42**	**3.44**	**4.53**	50	50	**1.88**	**2.48**	**2.27**	**2.9 J**	**2.92**	**2.93**
Dissolved Metals (UG/L)													
Antimony, Dissolved	**0.453 J**	0.5 U	0.5 U	0.5 U	**0.453 J**	6	5.6	0.5 U	0.5 U	0.5 U	1 U	**0.375 J**	0.5 U
Arsenic, Dissolved	**0.336 J**	**0.298 J**	**0.25 J**	**0.253 J**	**0.336 J**	10	10	**0.322 J**	**0.27 J**	**0.24 J**	5 U	**0.256 J**	**0.306 J**
Barium, Dissolved	**20.9**	**17.9**	**18.3**	**19**	**20.9**	2,000	--	**33.8**	**35.5**	**33.5**	**38.1**	**48.7**	**46.3**
Beryllium, Dissolved	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4	--	0.1 U	0.1 U	0.1 U	1 U	0.1 U	0.1 U
Cadmium, Dissolved	**0.259 J**	0.2 U	0.2 U	0.2 U	**0.259 J**	5	5	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U
Chromium, Dissolved	**11.4**	0.441 U	0.2 U	0.2 U	**11.4**	100	100	0.348 U	0.2 U	0.2 U	3 U	**0.425 J**	0.385 U
Copper, Dissolved	**12**	0.5 U	0.5 U	0.5 U	**12**	1,300	1,300	0.5 U	**0.271 J**	0.5 U	**1.6**	0.837 U	1.9 U
Lead, Dissolved	**1.64**	0.1 U	0.1 U	0.1 U	**1.64**	15	15	0.1 U	0.1 U	0.1 U	**0.06 J**	**0.0654 J**	0.1 U
Mercury, Dissolved	0.11 U	0.11 U	0.55 U	0.11 U	0.55 U	2	0.05	0.11 U	0.55 U	**0.081 J**	0.2 U	0.11 U	0.11 U
Nickel, Dissolved	**38.8**	**0.372 J**	0.2 U	0.2 U	**38.8**	--	610	**0.34 J**	0.2 U	0.316 U	**4**	0.673 U	0.39 U
Selenium, Dissolved	**4.38**	**4.27**	**3.58**	**3.39**	**4.38**	50	50	**1.86**	**2.5**	**2.3**	**2.6 J**	**2.9**	**2.85**

Notes:

Bolding indicates detection

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Orange shading indicates a detection above the PRWQS

J - Analyte present, value may or may not be accurate or precise

MG/L - Milligrams per liter

NA - Not analyzed

NG/L - Nanograms per liter

R - Unreliable Result

U - The material was analyzed for, but not detected

UG/L - Micrograms per liter

UJ - Analyte not detected, quantitation limit may be inaccurate

TABLE 2-3

Groundwater Detections and Exceedances

SWMU 1 Annual Status Report

Former Vieques Naval Training Range, Vieques, Puerto Rico

Station ID	**Background Well**				**Background Values**	**MCL-Groundwater**	**PR Water Quality Class SG**	CGW1MW10		CGW1MW11			
Sample ID	VEW01-MW13-0116	VEW01-MW13-0117	VEW01-MW13-0118	VEW01-MW13-0119				VEW01-MW10-0118	VEW01-MW10-0119	VEW01-MW11-0509	VEW01-MW11-0116	VEW01-MW11-0117	VEW01-MW11-0118
Sample Date	01/07/16	01/17/17	01/11/18	01/09/19				01/15/18	01/08/19	05/12/09	01/12/16	01/18/17	01/12/18
Chemical Name													
Volatile Organic Compounds (UG/L)													
Trichloroethene	**0.12 J**	**0.12 J**	0.2 U	0.2 U	**0.12 J**	5	5	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U
Semivolatile Organic Compounds (UG/L)													
2,4,6-Trichlorophenol	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	--	14	0.099 U	0.1 U	9 R	0.1 U	0.11 U	0.11 U
bis(2-Ethylhexyl)phthalate	1.3 U	1.4 U	1.6 U	1.4 U	1.6 U	6	12	1.3 U	1.3 U	1.9 UJ	1.2 U	1.3 UJ	1.5 U
Pesticide/Polychlorinated Biphenyls (UG/L)													
Endosulfan I	0.011 U	0.011 U	0.011 U	0.01 U	0.011 U	--	62	0.011 U	0.011 U	0.066 U	0.011 U	0.011 U	0.011 U
Total Metals (UG/L)													
Antimony	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	6	5.6	**0.325 J**	0.5 U	2 U	**0.332 J**	0.5 U	0.5 U
Arsenic	**0.292 J**	**0.302 J**	**0.22 J**	**0.26 J**	**0.302 J**	10	10	**0.188 J**	**0.298 J**	10 U	**1.01**	**0.725 J**	**0.471 J**
Barium	**18.9**	**18.2**	**18.5**	**19.8**	**19.8**	2,000	--	**41**	**45.5**	**410**	**121**	**130**	**95.4**
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4	--	0.1 U	0.1 U	2 U	0.1 U	0.5 U	0.1 U
Cadmium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	5	5	0.2 U	0.2 U	2 U	**0.239 J**	0.2 U	**0.444 J**
Chromium	**1.69**	1.21 U	**0.134 J**	0.2 U	**1.69**	100	100	0.272 U	0.569 U	6 U	**6.29**	0.59 U	0.504 U
Copper	0.984 U	0.624 U	**0.361 J**	**0.495 J**	**0.495 J**	1,300	1,300	**0.33 J**	**0.696 J**	**2.8**	2.4 U	2.1 U	**0.577 J**
Cyanide	5 U	**13.2**	5 U	5 U	**13.2**	200	200	5 U	5 U	12 U	5 U	5 U	5 U
Lead	0.1 U	0.1 U	**0.0618 J**	0.1 U	**0.0618 J**	15	15	**0.099 J**	0.1 U	2 U	**0.135 J**	**0.0649 J**	**0.11 J**
Mercury	**0.062 J**	0.11 U	0.55 U	0.11 U	**0.062 J**	2	0.05	0.11 U	0.11 U	0.2 U	0.11 U	0.11 U	0.11 U
Nickel	**1.06**	**0.877 J**	0.2 U	0.276 U	**1.06**	--	610	0.2 U	0.304 U	**21.6**	**4.43**	2.09 U	**1.41**
Selenium	**4.53**	**4.35**	**3.42**	**3.44**	**4.53**	50	50	**3.06**	**2.93**	10 U	**0.171 J**	0.3 U	**0.225 J**
Dissolved Metals (UG/L)													
Antimony, Dissolved	**0.453 J**	0.5 U	0.5 U	0.5 U	**0.453 J**	6	5.6	**0.401 J**	0.5 U	2 U	**0.348 J**	0.5 U	0.5 U
Arsenic, Dissolved	**0.336 J**	**0.298 J**	**0.25 J**	**0.253 J**	**0.336 J**	10	10	**0.264 J**	**0.273 J**	10 U	**0.857 J**	**0.793 J**	**0.526 J**
Barium, Dissolved	**20.9**	**17.9**	**18.3**	**19**	**20.9**	2,000	--	**40.9**	**45.7**	**400**	**111**	**129**	**91.2**
Beryllium, Dissolved	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4	--	0.1 U	0.1 U	2 U	0.1 U	0.5 U	0.1 U
Cadmium, Dissolved	**0.259 J**	0.2 U	0.2 U	0.2 U	**0.259 J**	5	5	0.2 U	0.2 U	2 U	**0.228 J**	0.2 U	**0.219 J**
Chromium, Dissolved	**11.4**	0.441 U	0.2 U	0.2 U	**11.4**	100	100	0.29 U	0.393 U	6 U	**0.62 J**	1.08 U	0.2 U
Copper, Dissolved	**12**	0.5 U	0.5 U	0.5 U	**12**	1,300	1,300	3.72 U	0.5 U	2.8 R	**2.93**	3.68 U	1.4 U
Lead, Dissolved	**1.64**	0.1 U	0.1 U	0.1 U	**1.64**	15	15	0.164 U	0.1 U	2 U	0.1 U	**0.0733 J**	0.1 U
Mercury, Dissolved	0.11 U	0.11 U	0.55 U	0.11 U	0.55 U	2	0.05	0.11 U	0.11 U	0.2 U	0.11 U	0.11 U	0.11 U
Nickel, Dissolved	**38.8**	**0.372 J**	0.2 U	0.2 U	**38.8**	--	610	**0.759 J**	0.709 U	**22.5**	**2.19**	2.31 U	**1.25**
Selenium, Dissolved	**4.38**	**4.27**	**3.58**	**3.39**	**4.38**	50	50	**3.11**	**3.03**	10 U	**0.18 J**	**0.162 J**	**0.213 J**

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TABLE 2-3

Groundwater Detections and Exceedances

SWMU 1 Annual Status Report

Former Vieques Naval Training Range, Vieques, Puerto Rico

Station ID	Background Well				Background Values	MCL-Groundwater	PR Water Quality Class SG	CGW1MW11	CGW1MW13		
Sample ID	VEW01-MW13-0116	VEW01-MW13-0117	VEW01-MW13-0118	VEW01-MW13-0119				VEW01-MW11-0119	VEW01-MW13-0509	VEW01-MW13P-0509	VEW01-MW13-0119
Sample Date	01/07/16	01/17/17	01/11/18	01/09/19				01/10/19	05/20/09	05/20/09	01/09/19
Chemical Name											
Volatile Organic Compounds (UG/L)											
Trichloroethene	**0.12 J**	**0.12 J**	0.2 U	0.2 U	**0.12 J**	5	5	0.2 U	1 U	1 U	0.2 U
Semivolatile Organic Compounds (UG/L)											
2,4,6-Trichlorophenol	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	--	14	0.11 U	9 U	9 U	0.12 U
bis(2-Ethylhexyl)phthalate	1.3 U	1.4 U	1.6 U	1.4 U	1.6 U	6	12	1.3 U	1.9 UJ	1.9 UJ	1.4 U
Pesticide/Polychlorinated Biphenyls (UG/L)											
Endosulfan I	0.011 U	0.011 U	0.011 U	0.01 U	0.011 U	--	62	0.0099 U	0.066 U	0.066 U	0.01 U
Total Metals (UG/L)											
Antimony	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	6	5.6	5 U	1 U	1 U	0.5 U
Arsenic	**0.292 J**	**0.302 J**	**0.22 J**	**0.26 J**	**0.302 J**	10	10	**1.36 J**	5 U	5 U	**0.26 J**
Barium	**18.9**	**18.2**	**18.5**	**19.8**	**19.8**	2,000	--	**98.4**	**19.2**	**18.7**	**19.8**
Beryllium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4	--	1 U	1 U	1 U	0.1 U
Cadmium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	5	5	2 U	1 U	1 U	0.2 U
Chromium	**1.69**	1.21 U	**0.134 J**	0.2 U	**1.69**	100	100	2 U	3 U	3 U	0.2 U
Copper	0.984 U	0.624 U	**0.361 J**	**0.495 J**	**0.495 J**	1,300	1,300	5 U	1 U	7.8 R	**0.495 J**
Cyanide	5 U	**13.2**	5 U	5 U	**13.2**	200	200	5 U	12 U	12 U	5 U
Lead	0.1 U	0.1 U	**0.0618 J**	0.1 U	**0.0618 J**	15	15	1 U	1 U	**0.08 J**	0.1 U
Mercury	**0.062 J**	0.11 U	0.55 U	0.11 U	**0.062 J**	2	0.05	0.11 U	0.2 U	0.2 U	0.11 U
Nickel	**1.06**	**0.877 J**	0.2 U	0.276 U	**1.06**	--	610	2.07 U	**1.8 J**	**2**	0.276 U
Selenium	**4.53**	**4.35**	**3.42**	**3.44**	**4.53**	50	50	3 U	**4.2 J**	**3.4 J**	**3.44**
Dissolved Metals (UG/L)											
Antimony, Dissolved	**0.453 J**	0.5 U	0.5 U	0.5 U	**0.453 J**	6	5.6	0.5 U	1 U	1 U	0.5 U
Arsenic, Dissolved	**0.336 J**	**0.298 J**	**0.25 J**	**0.253 J**	**0.336 J**	10	10	**1.26 J**	5 U	5 U	**0.253 J**
Barium, Dissolved	**20.9**	**17.9**	**18.3**	**19**	**20.9**	2,000	--	**101**	**18.4**	**18.8**	**19**
Beryllium, Dissolved	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4	--	1 U	1 U	1 U	0.1 U
Cadmium, Dissolved	**0.259 J**	0.2 U	0.2 U	0.2 U	**0.259 J**	5	5	2 U	1 U	1 U	0.2 U
Chromium, Dissolved	**11.4**	0.441 U	0.2 U	0.2 U	**11.4**	100	100	2 U	3 U	3 U	0.2 U
Copper, Dissolved	**12**	0.5 U	0.5 U	0.5 U	**12**	1,300	1,300	5 U	1.1 R	1 R	0.5 U
Lead, Dissolved	**1.64**	0.1 U	0.1 U	0.1 U	**1.64**	15	15	1 U	1 U	1 U	0.1 U
Mercury, Dissolved	0.11 U	0.11 U	0.55 U	0.11 U	0.55 U	2	0.05	0.11 U	0.2 U	0.2 U	0.11 U
Nickel, Dissolved	**38.8**	**0.372 J**	0.2 U	0.2 U	**38.8**	--	610	2.04 U	**2.5 J**	**1.9**	0.2 U
Selenium, Dissolved	**4.38**	**4.27**	**3.58**	**3.39**	**4.38**	50	50	3 U	**5.1 J**	**5**	**3.39**

Notes:

Bolding indicates detection

Grey shading indicates a detection (detection above background for metals)

Yellow shading indicates a detection above the PRWQS (and background for metals)

Blue shading indicates a detection above the MCL and PRWQS (and background for metals)

Orange shading indicates a detection above the PRWQS

J - Analyte present, value may or may not be accurate or precise

MG/L - Milligrams per liter

NA - Not analyzed

NG/L - Nanograms per liter

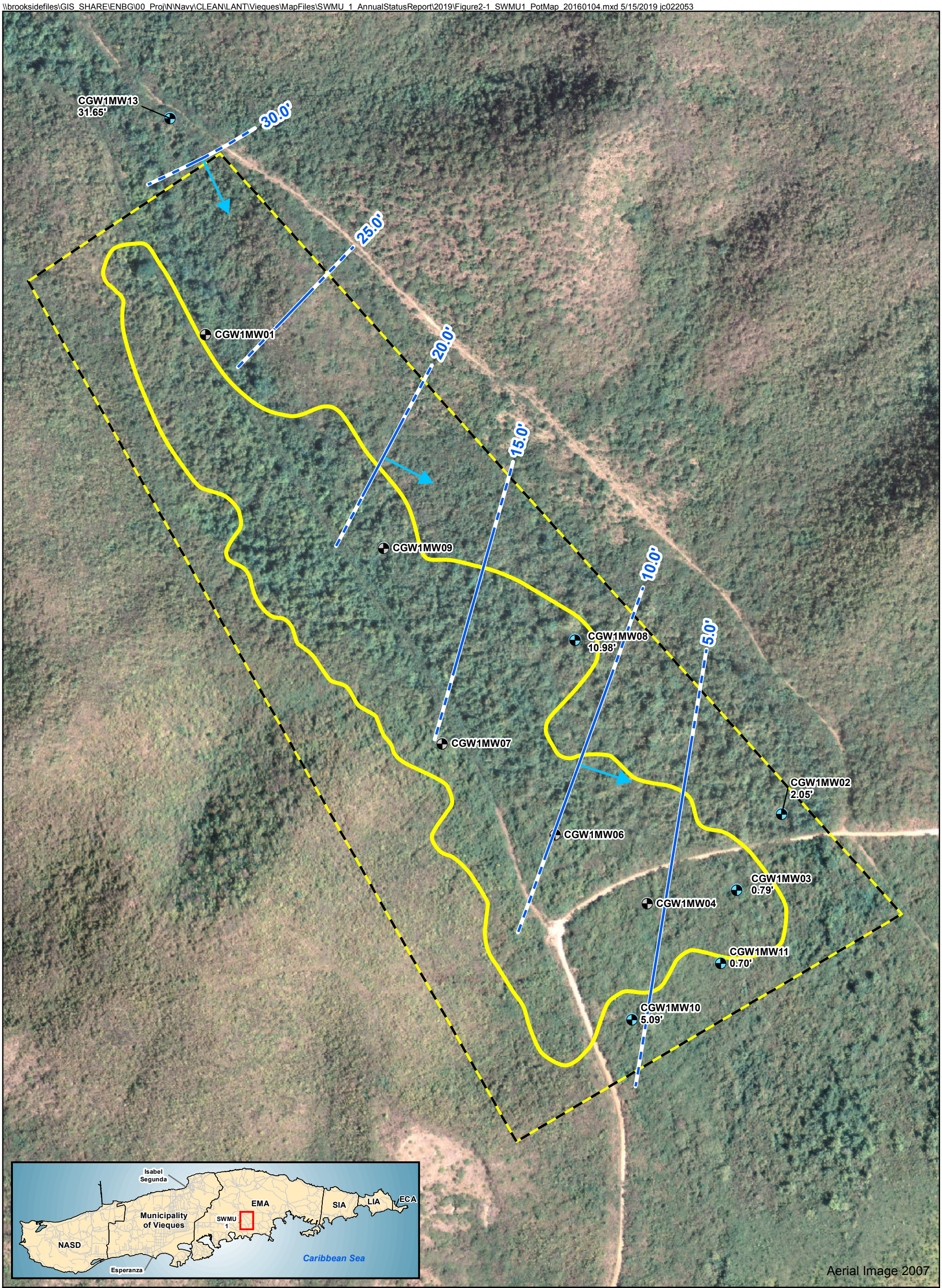
R - Unreliable Result

U - The material was analyzed for, but not detected

UG/L - Micrograms per liter

UJ - Analyte not detected, quantitation limit may be inaccurate

\\brooksidefiles\GIS_SHARE\ENBG\00_Proj\N\Navy\CLEAN\LANT\Vieques\MapFiles\SWMU_1_AnnualStatusReport\2019\Figure2-1_SWMU1_PotMap_20160104.mxd 5/15/2019 jc022053



Legend

- Monitoring Well Not Measured
- Long Term Monitoring Well
- All groundwater level readings shown in feet above mean sea level (ft amsl)
- Estimated Direction of Groundwater Flow
- Estimated Groundwater Contours, Dashed Where Inferred (5' Intervals)
- Land Use Control Boundary
- SWMU 1 Boundary Revised

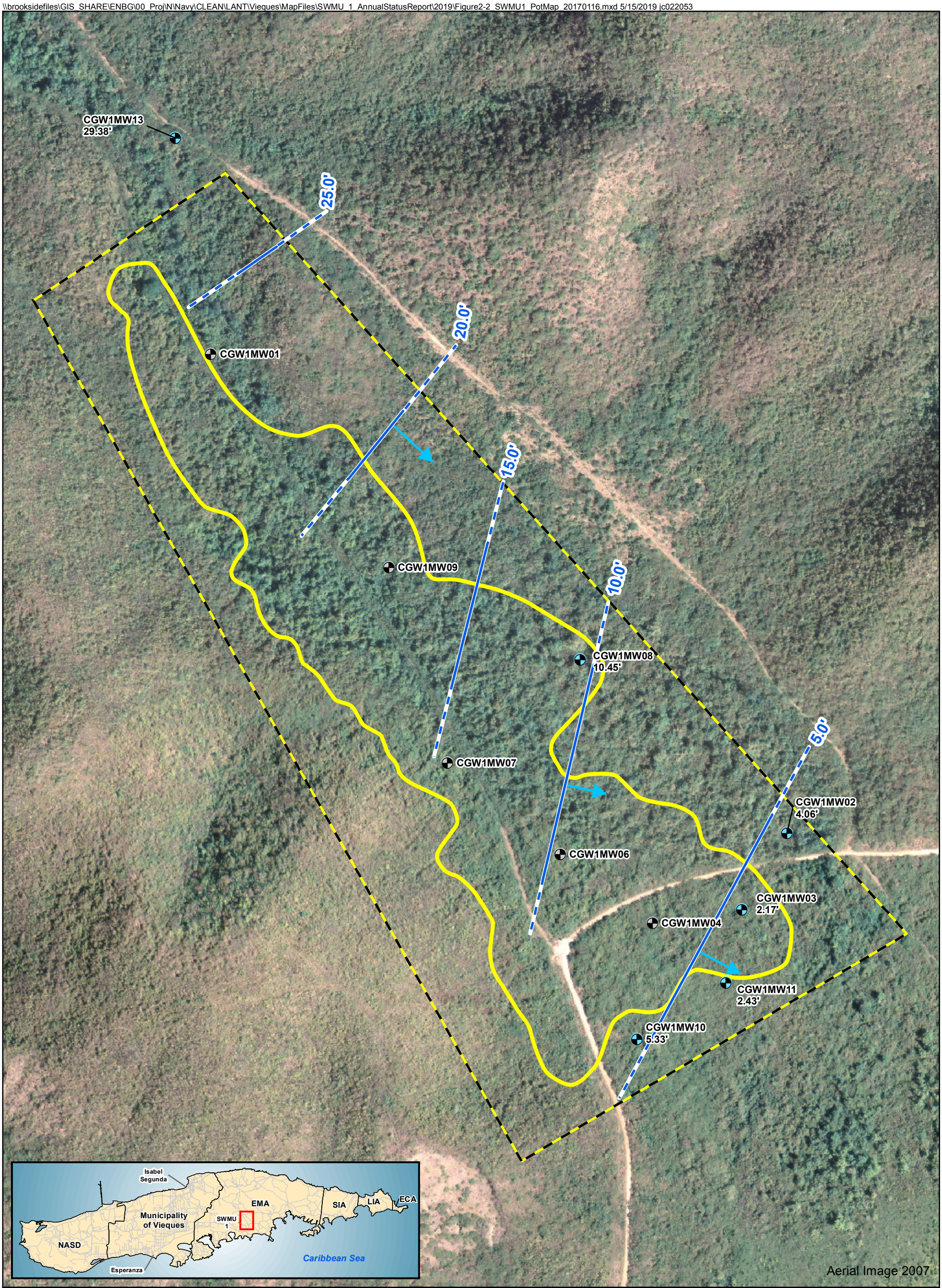
N W E S

0 175 350 Feet

Figure 2-1
Groundwater Elevations – January 4, 2016
SWMU 1 Annual Status Report
Former Vieques Naval Training Range
Vieques, Puerto Rico

Water Level Readings taken on 01/04/2016

\\brooksidefiles\GIS_SHARE\ENBG\00_Proj\N\Navy\CLEAN\LANT\Vieques\MapFiles\SWMU_1_AnnualStatusReport\2019\Figure2-2_SWMU1_PotMap_20170116.mxd 5/15/2019 jc022053



Legend

- Monitoring Well Not Measured
- Long Term Monitoring Well
- All groundwater level readings shown in feet above mean sea level (ft amsl)
- Estimated Direction of Groundwater Flow
- Estimated Groundwater Contours, Dashed Where Inferred (5' Intervals)
- Land Use Control Boundary
- SWMU 1 Boundary Revised

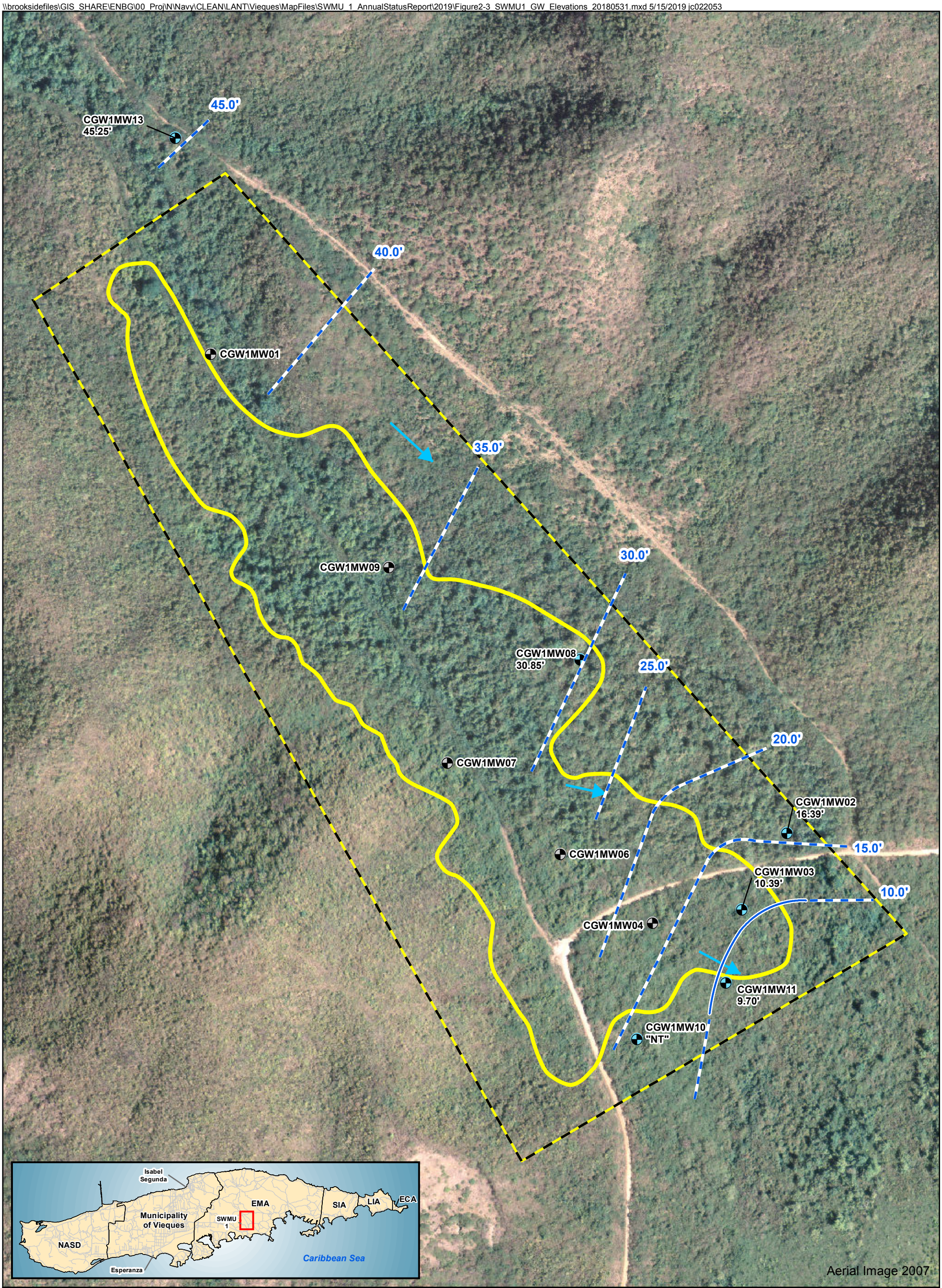
N
W E
S

0 175 350
Feet

Figure 2-2
Groundwater Elevations – January 16, 2017
SWMU 1 Annual Status Report
Former Vieques Naval Training Range
Vieques, Puerto Rico

Water Level Readings taken on 01/16/2017

\\brooksidefiles\GIS_SHARE\ENBG\00_Proj\N\Navy\CLEAN\LANT\Vieques\MapFiles\SWMU_1_AnnualStatusReport\2019\Figure2-3_SWMU1_GW_Elevations_20180531.mxd 5/15/2019 jc022053



Legend

- Monitoring Well Not Measured
- Long Term Monitoring Well
- All groundwater level readings shown in feet above mean sea level (ft amsl)
- Estimated Direction of Groundwater Flow
- Estimated Groundwater Contours, Dashed Where Inferred (5' Intervals)
- Land Use Control Boundary
- SWMU 1 Boundary Revised

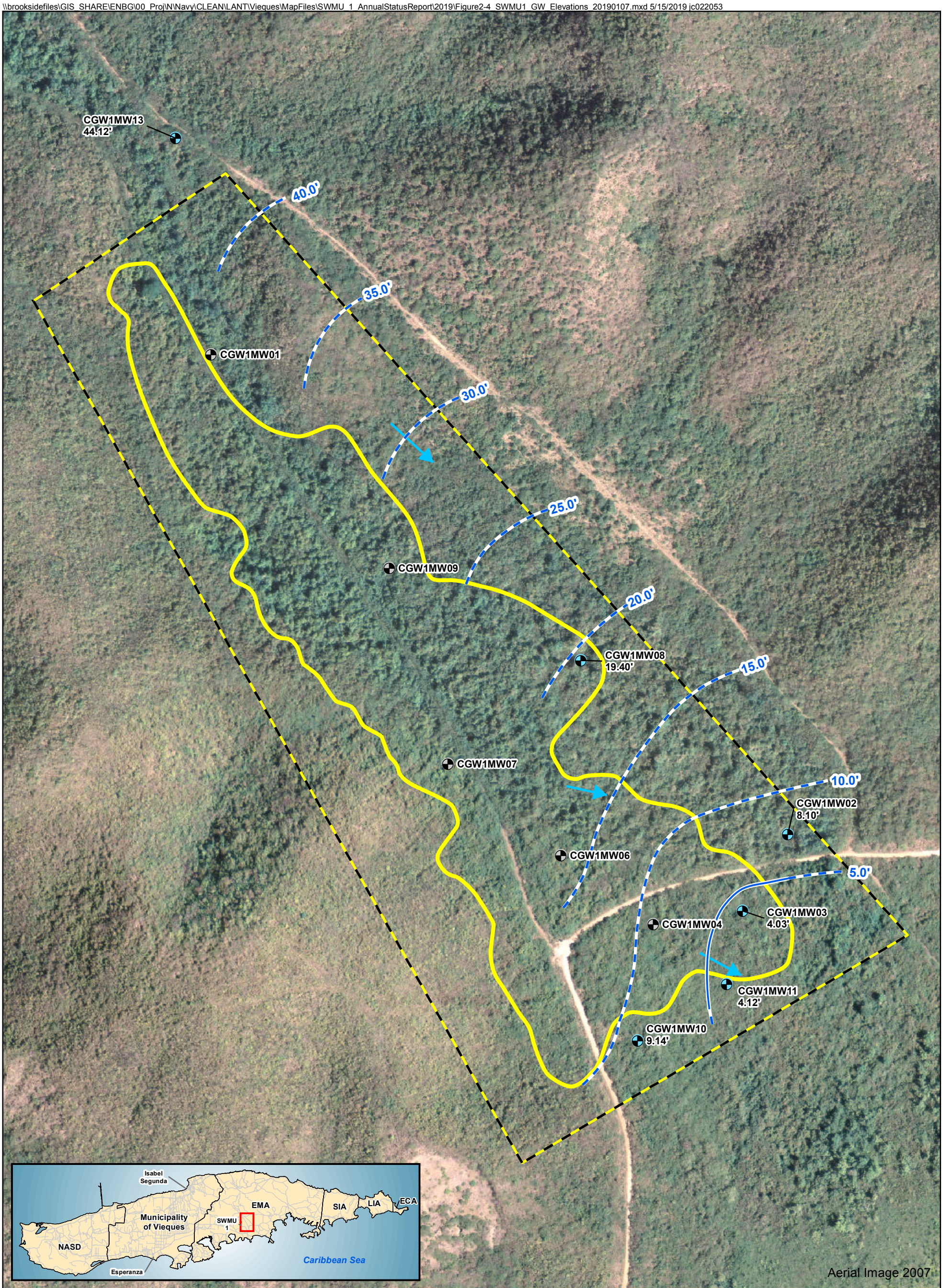
Water Level Readings taken on 01/09/2018
"NT" – Water level not taken. Above ground protective casing and monitoring well were filled to the top with water from hurricane Maria. Well was re-developed.

Figure 2-3
Groundwater Elevations – January 9, 2018
SWMU 1 Annual Status Report
Former Vieques Naval Training Range
Vieques, Puerto Rico

N W E S

0 175 350 Feet

\\brooksidefiles\GIS_SHARE\ENBG\00_Proj\N\Navy\CLEAN\LANT\Vieques\MapFiles\SWMU_1_AnnualStatusReport\2019\Figure2-4_SWMU1_GW_Elevations_20190107.mxd 5/15/2019 jc022053



Legend

- Monitoring Well Not Measured
- Long Term Monitoring Well
- All groundwater level readings shown in feet above mean sea level (ft amsl)
- Estimated Direction of Groundwater Flow
- Estimated Groundwater Contours, Dashed Where Inferred (5' Intervals)
- Land Use Control Boundary
- SWMU 1 Boundary Revised

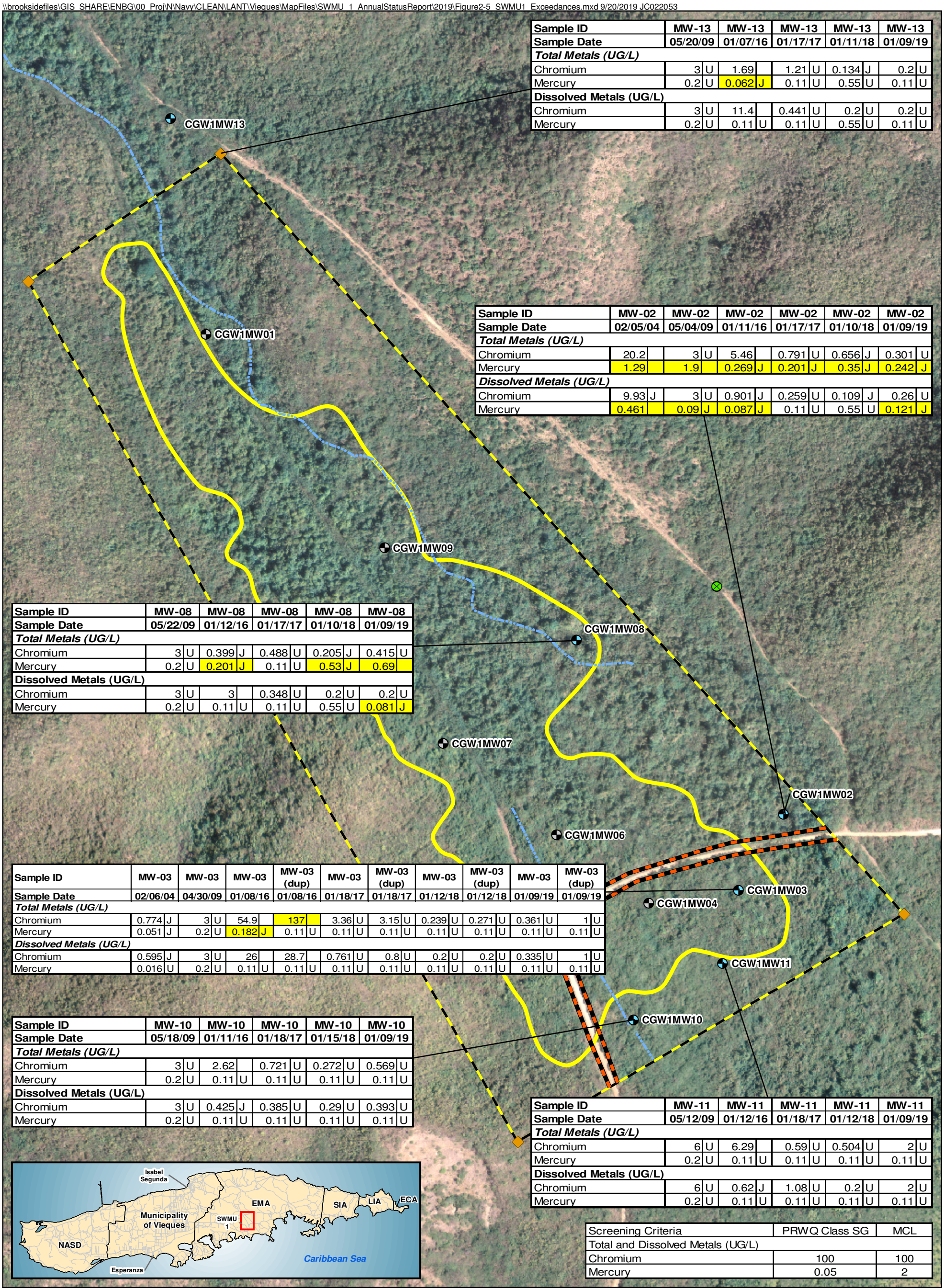
Water Level Readings taken on 01/09/2018
"NT" – Water level not taken. Above ground protective casing and monitoring well were filled to the top with water from hurricane Maria. Well was re-developed.

N W E S

0 175 350 Feet

Figure 2-4
Groundwater Elevations – January 7, 2019
SWMU 1 Annual Status Report
Former Vieques Naval Training Range
Vieques, Puerto Rico

\\brooksidefiles\GIS_SHARE\ENBG\00_Proj\N\Navy\CLEAN\LANT\Vieques\MapFiles\SWMU_1_AnnualStatusReport\2019\Figure2-5_SWMU1_Exceedances.mxd 9/20/2019 JC022053



Sample ID	MW-13		MW-13		MW-13		MW-13		MW-13	
Sample Date	05/20/09		01/07/16		01/17/17		01/11/18		01/09/19	
Total Metals (UG/L)										
Chromium	3	U	1.69		1.21	U	0.134	J	0.2	U
Mercury	0.2	U	0.062	J	0.11	U	0.55	U	0.11	U
Dissolved Metals (UG/L)										
Chromium	3	U	11.4		0.441	U	0.2	U	0.2	U
Mercury	0.2	U	0.11	U	0.11	U	0.55	U	0.11	U

Sample ID	MW-02		MW-02		MW-02		MW-02		MW-02		MW-02	
Sample Date	02/05/04		05/04/09		01/11/16		01/17/17		01/10/18		01/09/19	
Total Metals (UG/L)												
Chromium	20.2		3	U	5.46		0.791	U	0.656	J	0.301	U
Mercury	1.29		1.9		0.269	J	0.201	J	0.35	J	0.242	J
Dissolved Metals (UG/L)												
Chromium	9.93	J	3	U	0.901	J	0.259	U	0.109	J	0.26	U
Mercury	0.461		0.09	J	0.087	J	0.11	U	0.55	U	0.121	J

Sample ID	MW-08		MW-08		MW-08		MW-08		MW-08	
Sample Date	05/22/09		01/12/16		01/17/17		01/10/18		01/09/19	
Total Metals (UG/L)										
Chromium	3	U	0.399	J	0.488	U	0.205	J	0.415	U
Mercury	0.2	U	0.201	J	0.11	U	0.53	J	0.69	
Dissolved Metals (UG/L)										
Chromium	3	U	3		0.348	U	0.2	U	0.2	U
Mercury	0.2	U	0.11	U	0.11	U	0.55	U	0.081	J

Sample ID	MW-03		MW-03		MW-03		MW-03 (dup)		MW-03		MW-03 (dup)		MW-03		MW-03 (dup)		MW-03		MW-03 (dup)	
Sample Date	02/06/04		04/30/09		01/08/16		01/08/16		01/18/17		01/18/17		01/12/18		01/12/18		01/09/19		01/09/19	
Total Metals (UG/L)																				
Chromium	0.774	J	3	U	54.9		137		3.36	U	3.15	U	0.239	U	0.271	U	0.361	U	1	U
Mercury	0.051	J	0.2	U	0.182	J	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U
Dissolved Metals (UG/L)																				
Chromium	0.595	J	3	U	26		28.7		0.761	U	0.8	U	0.2	U	0.2	U	0.335	U	1	U
Mercury	0.016	U	0.2	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U

Sample ID	MW-10		MW-10		MW-10		MW-10		MW-10	
Sample Date	05/18/09		01/11/16		01/18/17		01/15/18		01/09/19	
Total Metals (UG/L)										
Chromium	3	U	2.62		0.721	U	0.272	U	0.569	U
Mercury	0.2	U	0.11	U	0.11	U	0.11	U	0.11	U
Dissolved Metals (UG/L)										
Chromium	3	U	0.425	J	0.385	U	0.29	U	0.393	U
Mercury	0.2	U	0.11	U	0.11	U	0.11	U	0.11	U

Sample ID	MW-11		MW-11		MW-11		MW-11		MW-11	
Sample Date	05/12/09		01/12/16		01/18/17		01/12/18		01/09/19	
Total Metals (UG/L)										
Chromium	6	U	6.29		0.59	U	0.504	U	2	U
Mercury	0.2	U	0.11	U	0.11	U	0.11	U	0.11	U
Dissolved Metals (UG/L)										
Chromium	6	U	0.62	J	1.08	U	0.2	U	2	U
Mercury	0.2	U	0.11	U	0.11	U	0.11	U	0.11	U

Screening Criteria	PRWQ Class SG	MCL
Total and Dissolved Metals (UG/L)		
Chromium	100	100
Mercury	0.05	2

Legend

- Monitoring Well
- Long Term Monitoring Well
- Land Use Control Boundary Marker
- Monitoring Well Reference Marker
- Fence
- Ephemeral Stream
- Land Use Control Boundary
- SWMU 1 Boundary Revised

N W E S

0 175 350 Feet

Note: Yellow shaded cells indicate an inorganic exceedance of screening criteria and background

Figure 2-5
Total and Dissolved Metals Exceedances in Groundwater
SWMU 1 Annual Status Report
Former Vieques Naval Training Range
Vieques, Puerto Rico

SECTION 3

Operations and Maintenance Activities

Long-term O&M activities comprised an annual visual inspection of the accessible areas of the landfill for surface debris and evidence of erosion, drainage features, LTM monitoring wells, and fencing/signage.

The first (baseline) annual visual inspection took place in January 2016 and the second annual event took place in January 2017. Following Hurricanes Irma and Maria in September 2017, a post-hurricane inspection of SWMU 1 was conducted in December 2017. The third annual inspection event took place in January 2018. The fourth annual inspection took place January 2019; the inspection forms and photographs are presented in **Appendix E**. During the 2019 annual inspection, there were no signs of erosion or exposure of debris. The inspection team re-evaluated the ephemeral stream, noted in 2018 SWMU 1 Report as a potential area of erosion, and found no evidence of eroded or exposed debris in the ephemeral stream. Additionally, the fencing, signs, boundary demarcation monuments, and gates were in place and functioning as anticipated. There was a fence post noted as being bent in the January 2019 inspection, which was repaired on July 25, 2019.

SECTION 4

Conclusions and Recommendations

This section presents the conclusions of the 2019 annual inspection, 2019 LTM data evaluation (including consideration of historical monitoring data), and recommendations for future LTM at SWMU 1.

4.1 Conclusions

- Water-level measurements collected in 2019 demonstrate groundwater elevations have generally declined since Hurricanes Irma and Maria to levels above, but closer to, historical levels.
- No VOCs, SVOCs, pesticides, or PCBs were detected in the 2019 sampling event. The metals concentrations were less than the PALs, consistent with background, and/or comparable to historical concentrations. In fact, only one metal (mercury) was detected in two wells at concentrations above the PRWQS; however, the concentrations were an order of magnitude or more below the MCL and comparable to historical concentrations. This information also supports previous observations that the additional precipitation, abnormally high groundwater levels, and potential interaction of groundwater with the vertical extent of landfilled debris associated with Hurricanes Irma (Category 5) and Maria (Category 4) had no discernible impact on groundwater quality.
- The data collected during the 2016 through 2019 groundwater LTM events support the historical conclusions drawn for groundwater in the RI and documented in the ROD that leaching from the landfill is not a concern from a remedial action standpoint. A comparison of the data collected in 2019 with data collected in events back to 2004, suggest the groundwater conditions beneath the landfill have remained relatively consistent over the last 15 years.
- No erosion potentially impacting the objective of the vegetative cover was observed during the site inspections.
- Signs, fencing, boundary demarcation monuments, and gates are in place and functioning as anticipated.

4.2 Recommendations

- Based on the data collected from 2016 through 2019, the consistency in groundwater constituent concentrations over time and in accordance with the SWMU 1 Revised Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan (CH2M, 2016), an evaluation of monitoring parameters and frequency is warranted, which will be included in the 2020 Annual Status Report. As stated in the Revised Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan (CH2M, 2016), based on consistency observed in historical groundwater data, it is anticipated the frequency of groundwater monitoring will be adjusted to once every 5 years following the fifth year of monitoring (with regulatory concurrence), which will occur in 2020.
- Based on the 2016 through 2019 inspections and O&M activities, it is recommended inspections continue in accordance with the protocol defined in the SWMU 1 Revised Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan (CH2M, 2016), whereby the next scheduled inspection event will occur in early 2020. The vegetative cover and LUCs are functioning as intended as RAOs continue to be met.

SECTION 5

References

CH2M HILL, Inc. (CH2M). 2011. *Streamlined Remedial Investigation/Feasibility Study Report, Solid Waste Management Unit 1 (SWMU 1), Former Vieques Naval Training Range, Vieques, Puerto Rico.* April.

CH2M. 2016. *Revised Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan, Solid Waste Management Unit 1, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico*. November.

CH2M. 2017a. *Solid Waste Management Unit 1, 2016 Annual Status Report, Groundwater Long-Term Monitoring, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico.* January.

CH2M. 2017b. *Solid Waste Management Unit 1, 2017 Annual Status Report, Groundwater Long-Term Monitoring, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico.* December.

CH2M. 2018a. *Master Standard Operating Procedures, Protocols, and Plans, Environmental Restoration Program, Vieques, Puerto Rico*. April.

CH2M. 2018b. *Solid Waste Management Unit 1, 2018 Annual Status Report, Groundwater Long-Term Monitoring, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico.* August.

Naval Facilities Engineering Command (NAVFAC). 2011. *Record of Decision, Solid Waste Management Unit (SWMU) 1, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico.* September.

Appendix A
Groundwater Sampling Logs

CH2MHILL

PROJECT NUMBER: 675884CH

WELL NUMBER: CGWIMW02

GROUNDWATER SAMPLING DATA SHEET

PROJECT: SWMU 1 GW Sampling

LOCATION: Vieques PR

DATE: 1/8/19

Weather: Hot, Humid

Sample Team: T. Horn

Total Depth: 36.75 FT.(BTOC) Measured

Depth to Water: (-) 11.4 FT.(BTOC) Measured

Water Column(h): (=) 25.35 FT. 2 IN.

Water Volume in Well 4.13 GAL (3.141593*h(in)*(wellDIA/2)^2*0.004329)

Pump Depth: ~34.5 FT.(BTOC) Measured

Purge Device/Equip: Peri Pump

Measuring Device/Equipment: YSI Pro Plus C-103270

Date and Time On Well: 1/8/19 0815

Pump Start Date and Time: 1/8/19 0828

Pump Finish Date and Time: 1/8/19 ~~0920~~ 1000

Date and Time Off Well: 1/8/19 1005

Air Monitoring Readings: 0.0

Total Purge Volume: 4.6 **GAL.**

SAMPLE INFORMATION

Sample ID: VEW01-GW02-0119

Parameters Colleced for: Metals (Filtered) PAH, PAH Sim, Pest SVOC, VOC, VOC Sim, CN, PCB

Sample Date/Time: 1/8/19 0920

Field Dup: YES/NO ID: NA

Parameters Colleced for: (FD) NA

FD Sample Date/Time: NA

MS/MSD: YES / NO

Sample Appearance: Clear

Were samples filtered? YES/NO

Field Test Kit Details: NA

If YES, Which samples? Dissolved Metals

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
0840	1	11.75	250	27	4767	2.54	17.2	1.35	6.96	165.3	29.9	Clear
0845	1.5	11.8	250	27	4765	2.54	13.1	1.03	6.95	157.6	28.4	
0850	1.8	11.78	250	27	4774	2.54	12.1	0.96	6.95	153.3	25.1	
0855	2.25	11.8	250	27	4782	2.55	10.0	0.76	6.95	147.6	16.1	
0900	2.6	11.81	250	27	4782	2.55	8.8	0.69	6.95	143	13.1	
0905	3.0	11.81	250	27.1	4790	2.55	7.5	0.59	6.95	140.7	11.4	
0910	3.4	11.81	250	27.1	4802	2.56	6.3	0.50	6.95	136.8	8.12	
0910	3.8	11.81	250	27.1	4808	2.56	5.3	0.42	6.95	133.3	6.27	
0915	4.2	11.81	250	27.1	4808	2.56	5.0	0.40	6.95	131.9	4.20	
0920	4.6	11.81	250	27.1	4810	2.56	4.8	0.38	6.95	131.0	3.20	Clear

Signature: [signature]

Date: 1/8/19

CH2MHILL

PROJECT NUMBER: 675884CH.FIFK

WELL NUMBER: CGW1 MW03

SHEET 1 OF 1

GROUNDWATER SAMPLING DATA SHEET

PROJECT: SWMU1 GW LTM

LOCATION: MW03

DATE: 1-7-19

Weather: partly cloudy 75°F

Sample Team: A. Shwartz, T. Horn

Total Depth: 33.14 FT.(BTOC) Measured

Depth to Water: (-) 11.66 FT.(BTOC) Measured

Date and Time On Well: 1-7-19 / 1007

Water Column(h): (=) 21 FT. 48 IN.

Pump Start Date and Time: ↓ 1017

Water Volume in Well: 3.50 GAL (3.141593*h(in)*(wellDIA/2)^2*0.004329)

Pump Finish Date and Time: ↓ 1230

Pump Depth: 29 FT.(BTOC) Measured

Date and Time Off Well: 1-7-19 / 1232

Purge Device/Equip: Peri pump # C-103198

Air Monitoring Readings: 0.0 ppm

Measuring Device/Equipment: YSI # C-103140

Total Purge Volume: 4 GAL.

SAMPLE INFORMATION

Sample ID: VEW01-GW03-0119

~~Parameters~~ ANALYSIS Colleced for: VOC, SVOC, PAH, PEST, PCB, Metals, ~~Diss~~ Diss Metals, CN

Sample Date/Time: 1-7-19 / 1110

Field Dup: YES/NO ID: VEW01-GW03P-0119

~~Parameters~~ ANALYSIS Colleced for: (FD) same as above

FD Sample Date/Time: 1-7-19 / 1115

MS/MSD: YES / NO

Sample Appearance: clear / colorless

Were samples filtered? YES/NO

Field Test Kit Details: N/A

If YES, Which samples? Metals

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
1020	0.01	11.69	285	27.9	4.47	2.36	3.1	0.25	6.95	230.1	14.4	BZ = 0.0 HS = 0.0 ppm
1025	0.05	11.75	285	28.0	4.51	2.36	1.6	0.12	6.96	226.5	30.9	Slightly turbid
1035	0.25	11.76	285	28.1	4.48	2.36	1.1	0.09	6.96	223.1	29.5	↓
1040	1.50	11.76	285	28.3	4.46	2.36	1.0	0.08	6.96	220.8	33.2	↓
1045	2.00	11.76	285	28.4	4.44	2.35	1.0	0.07	6.96	217.8	22.5	↓
1050	2.25	11.76	285	28.2	4.44	2.35	1.0	0.07	6.96	216.2	19.3	↓
1055	2.60	11.76	285	28.4	4.42	2.34	0.9	0.06	6.96	215.2	16.7	↓
11.00	3.00	11.76	285	28.5	4.42	2.34	0.8	0.06	6.96	214.4	13.9	↓
11.05	3.50	11.76	285	28.3	4.41	2.34	0.8	0.06	6.96	214.1	12.6	clear
11.10	4.00	11.76	285	28.4	4.40	2.33	0.7	0.05	6.96	213.5	8.75	clear

sample @ 1110

Signature: [signature]

Date: 1-7-19 / 1110

CH2MHILL

PROJECT NUMBER: 675884LH - FI.FK.S1

WELL NUMBER: CGW1 MW08

SHEET 1 OF 1

GROUNDWATER SAMPLING DATA SHEET

PROJECT: Vieques LTM

LOCATION: SWMU1

DATE: 1-8-19

Weather: sunny 77°F

Sample Team: A. Shwaat, T. Horn

Total Depth: 71.28 FT.(BTOC) Measured

Depth to Water: (-) 12.74 FT.(BTOC) Measured

Water Column(h): (=) 58.54 FT. 54 IN.

Water Volume in Well 9.54 GAL (3.141593*h(in)*(wellDIA/2)^2*0.004329)

Pump Depth: 65 FT.(BTOC) Measured

Purge Device/Equip: Geotech Bladder

Measuring Device/Equipment: YSI Quattro

Date and Time On Well: 1-8-19 0817

Pump Start Date and Time: 0834

Pump Finish Date and Time: 1014

Date and Time Off Well: 1022

Air Monitoring Readings: BZ=0.1 HS=4.0

Total Purge Volume: 4.40 GAL.

SAMPLE INFORMATION

Sample ID: VEW01-GW08-0119

Sample Date/Time: 1-8-19 / 0930

Field Dup: YES/NO ID: —

FD Sample Date/Time: —

MS/MSD: YES / NO

Were samples filtered? YES/NO

If YES, Which samples? Metals

~~Parameters~~ Analysis Colleced for: VOC, SVOC, PAH, PCB, Pests, Metals & CN

~~Parameters~~ Analysis Colleced for: (FD) N/A

Sample Appearance: clear / colorless, slight effervescent w/ HCL

Field Test Kit Details: N/A

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
0850	1.25	13.10	300	27.6	3.49	1.82	12.0	1.04	7.02	135.0	58.1	clear, colorless
0855	1.75	13.10	300	27.6	3.48	1.82	9.9	0.91	7.01	144.2	34.2	slight haze
0900	2.00	13.10	300	27.6	3.48	1.82	11.2	0.86	7.02	159.3	26.1	↓
0905	2.40	13.10	300	27.6	3.47	1.81	10.8	0.90	7.01	179.2	16.1	↓
0910	2.75	13.10	300	27.6	3.47	1.81	0.78	9.8	7.01	184.3	13.8	clear
0915	3.10	13.10	300	27.6	3.46	1.81	9.8	0.75	7.01	193.0	7.08	clear
0920	3.50	13.10	300	27.6	3.46	1.80	8.6	0.67	7.01	197.6	6.94	
0925	3.80	13.10	300	27.6	3.45	1.80	8.8	0.69	7.01	199.7	6.89	
0930	4.40	13.10	300	27.6	3.45	1.80	8.9	0.70	7.01	203.3	6.76	clear / colorless

sample @ 0930

Signature: [signature]

Date: 1-8-19

CH2MHILL

PROJECT NUMBER: 675884CH.FI.FK.S1

WELL NUMBER: GWIMW10

SHEET 1 OF 2

GROUNDWATER SAMPLING DATA SHEET

PROJECT: Vieques LTM

LOCATION: SWMU1

DATE: 1-8-19

Weather: sunny 82°F

Sample Team: A. SHWARTZ, T. HORN

Total Depth: 52.54 FT.(BTOC) Measured

Depth to Water: (-) 5.62 FT.(BTOC) Measured

Water Column(h): (=) 46 FT. 92 IN.

Water Volume in Well 7.65 GAL (3.141593*h(in)*(wellDIA/2)^2*0.004329)

Pump Depth: 48 FT.(BTOC) Measured

Purge Device/Equip: Peri # C103198

Measuring Device/Equipment: YSI # C103270

Date and Time On Well: 1-8-19/1254

Pump Start Date and Time: 1308

Pump Finish Date and Time: 1610

Date and Time Off Well: 1618

Air Monitoring Readings: BZ 0.0 ppm HS=0.0ppm

Total Purge Volume: 8 GAL.

SAMPLE INFORMATION

Sample ID: VEW01-GW10-0119

Sample Date/Time: 1-8-19 / 1520

Parameters Colleced for: SVOC, VOC, Pest, PAH, PCB, Metals, CN & Diss Metals

Field Dup: YES/NO ID: —

Parameters Colleced for: (FD) N/A

FD Sample Date/Time: —

MS/MSD: YES / NO

Sample Appearance: clear/colorless effervescent in HCL

Were samples filtered? YES/NO

Field Test Kit Details: N/A

If YES, Which samples? Metals

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
1310	0.1	6.91	325	28.0	4939	2.63	24.6	1.92	6.81	113.1	-	clear/colorless
1315	1	7.98	250	28.1	4922	2.62	16.3	1.25	6.81	95.7	-	reduce FR
1320	1.2	8.92	250	28.2	4919	2.62	9.4	0.73	6.82	84.7	3.55	
1325	1.45	9.36	250	28.2	4919	2.62	8.1	0.63	6.82	82.4	—	
1330	1.70	9.77	250	28.2	4913	2.62	6.6	0.51	6.84	77.1	3.85	
1335	2.20	10.17	250	28.1	4918	2.62	4.9	0.37	6.83	66.0	12.1	reduce FR
1340	2.50	10.20	190	28.1	4940	2.63	12.4	0.92	6.83	64.5	9.70	
1345	2.75	10.24	190	28.2	4939	2.63	9.9	0.75	6.83	62.7	5.62	
1350	3.00	10.28	190	28.1	4931	2.63	7.4	0.56	6.84	57.7	1.40	
1355	3.25	10.36	190	28.0	4928	2.63	6.2	0.48	6.85	54.0	1.50	think screen may be
1400	3.80	11.27	325	27.8	4920	2.62	5.2	0.41	6.82	52.0	3.81	clogged, turn pump
1405	4.20	11.45	380	27.9	4917	2.62	5.6	0.44	6.83	52.9	3.0	up high for a few
1410	4.50	11.26	180	27.9	4913	2.62	5.5	0.43	6.84	52.3	1.64	minutes & try to
1415	4.75	11.13	180	27.8	4911	2.62	4.5	0.35	6.84	51.8	1.20	break through then
1420	5.00	11.04	180	27.8	4907	2.62	4.5	0.35	6.84	51.5	1.25	low flow again
1425	5.25	11.11	180	27.8	4900	2.61	4.2	0.33	6.84	50.8	1.00	
1430	5.50	11.15	180	27.9	4901	2.61	4.0	0.31	6.84	49.7	1.99	
1435	5.75	11.22	180	28.0	4903	2.61	4.2	0.32	6.85	48.7	1.83	
1440	6.00	11.11	180	27.7	4952	2.64	12.1	0.94	6.85	50.2	1.87	pump stopped for a sec
1445	6.25	11.15	180	27.7	4944	2.64	10.7	0.78	6.84	49.3	1.97	
1450	6.50	11.40	180	27.7	4935	2.63	8.0	0.62	6.85	48.7	2.10	

Signature: [signature]

Date: 1-8-19 / 1520

CH2MHILL

PROJECT NUMBER: 675884 CA, FI, FK, S1

WELL NUMBER: CGWIMW10

GROUNDWATER SAMPLING DATA SHEET

PROJECT: SWMU1 LTM

LOCATION: SWMU1

DATE: 1-8-19

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
1455	6.75	11.40	190	27.5	4943	2.64	7.3	0.57	6.85	47.9	0.81	clear/colorless
1500	7.00	11.43	190	27.0	4915	2.62	4.7	0.57	6.83	48.7	0.78	
1505	7.25	11.45	190	27.0	4923	2.63	4.9	0.39	6.84	48.5	0.75	
1510	7.50	11.45	190	27.0	4925	2.63	4.1	0.32	6.84	48.7	0.62	
1515	7.75	11.45	190	27.1	4918	2.63	3.8	0.30	6.84	50.5	0.68	
1520	8.00	11.45	190	27.2	4913	2.62	4.1	0.30	6.85	53.0	0.65	clear colorless

sample @ 1520

ADS

DTW finally stabilized after much adjustment & beyond the 0.3 draw-down we try to achieve however, there were several instances where we demonstrated the well was recovering but if we turned the pump any lower it would shut off I feel confident a good sample was achieved regardless of the excessive drawdown

ADS

Signature: ADSHAZ

Date: 1-8-19

CH2MHILL

PROJECT NUMBER: 675884CH.F3.FK.S1

WELL NUMBER: CGWI MW11

SHEET 1 OF 1

GROUNDWATER SAMPLING DATA SHEET

PROJECT: Vieques LTM

LOCATION: SWMU1

DATE: 1-10-19

Weather: Sunny 73°F

Sample Team: A. Shwartz, T. Horn

Total Depth: 30.53 FT.(BTOC) Measured

Depth to Water: (-) 10.33 FT.(BTOC) Measured

Water Column(h): (=) 20.20 FT. ____ IN.

Water Volume in Well 3.29 GAL (3.141593*h(in)*(wellDIA/2)^2*0.004329)

Pump Depth: 27 FT.(BTOC) Measured

Purge Device/Equip: Peri # C103198

Measuring Device/Equipment: YSI Quatro #C103270

Date and Time On Well: 1-10-19/0738

Pump Start Date and Time: 0742

Pump Finish Date and Time: 0935

Date and Time Off Well: 0939

Air Monitoring Readings: BZ=0.0 ppm H2S=0.0ppm

Total Purge Volume: ____ GAL.

SAMPLE INFORMATION

Sample ID: VEW01-GW11-0119

Sample Date/Time: 1-10-19 / 0850

Field Dup: YES/NO ID: N/A

FD Sample Date/Time:

MS/MSD: YES / NO

Were samples filtered? YES/NO

If YES, Which samples? Metals

Parameters Colleced for: VOC, SVOC, PAH, PCB, PEST, Metals, Diss Metals, CN

Parameters Colleced for: (FD) N/A

Sample Appearance: clear/colorless

Field Test Kit Details: N/A

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
0750	0.25	10.34	200	27.4	14062	8.11	14.60	1.59	6.72	102.0	42.3	DO 8021.60
0755	0.75	10.34	200	27.7	14029	8.08	13.5	1.01	6.73	92.1	33.2	clear/yellowish
0800	1.00	10.34	200	27.8	13983	8.06	10.6	0.80	6.73	81.4	21.8	
0805	1.40	10.34	250	27.8	13915	8.01	8.7	0.65	6.73	66.2	15.1	
0810	1.70	10.34	250	27.8	13744	7.90	7.3	0.54	6.73	50.6	11.4	
0815	2.00	10.34	250	27.9	13544	7.78	5.7	0.43	6.73	40.5	7.47	
0820	2.40	10.34	250	27.9	13396	7.68	4.9	0.37	6.73	37.0	4.17	
0825	2.75	10.34	250	27.9	13275	7.61	4.3	0.32	6.74	37.5	3.38	clear/colorless
0830	3.10	10.34	250	27.9	13204	7.53	3.6	0.27	6.73	40.0	4.20	
0835	3.50	10.34	250	28.0	13144	7.48	3.4	0.26	6.73	40.3	2.70	
0840	3.75	10.34	250	28.0	13069	7.43	3.2	0.24	6.73	40.7	3.12	
0845	4.00	10.34	250	28.0	12944	7.41	2.9	0.22	6.73	41.7	2.48	
0850	4.60	10.34	250	28.0	12814	7.32	2.9	0.22	6.73	41.9	3.05	

sample @ 0850

Signature: [signature]

Date: 1-10-19

CH2MHILL

PROJECT NUMBER: 675884CH | WELL NUMBER: CGW1 MW13 | SHEET 1 OF 1

GROUNDWATER SAMPLING DATA SHEET

PROJECT: Vieques UTM 2019 | LOCATION: SWMW1 | DATE: 1-9-19

Weather: Sunny 75°F | Sample Team: A. Shumate, T. Horn

Total Depth: 56.54 FT.(BTOC) Measured

Depth to Water: (-) 21.51 FT.(BTOC) Measured | Date and Time On Well: 1-9-18 / 0806

Water Column(h): (=) 35 FT. 03 IN. | Pump Start Date and Time: 0818

Water Volume in Well 5.71 GAL (3.141593*h(in)*(wellDIA/2)^2*0.004329) | Pump Finish Date and Time: 1406

Pump Depth: 51 FT.(BTOC) Measured | Date and Time Off Well: 1411

Purge Device/Equip: Peri # C103198 | Air Monitoring Readings: BZ = 0.0ppm HS = 1.2ppm

Measuring Device/Equipment: YSI # C103270 | Total Purge Volume: 3.0 GAL.

SAMPLE INFORMATION

Sample ID: VEN01-GW13-0119 | Parameters Colleced for: VOC, SVOC, PEST, PCB, Metals, Diss Metals & CN, & PAH

Sample Date/Time: 1-9-18 / 0920

Field Dup: YES/NO ID: N/A | Parameters Colleced for: (FD) N/A

FD Sample Date/Time:

MS/MSD: YES / NO | Sample Appearance: clear / colorless

Were samples filtered? YES/NO | Field Test Kit Details: N/A

If YES, Which samples? Metals

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
0820	0.01	21.87	225	26.6	2690	1.39	30.0	2.35	7.04	139.6	5.26	clear / colorless
0825	0.25	21.87	225	26.6	2689	1.39	19.9	1.58	7.04	128.1	4.28	
0830	0.50	21.87	225	26.6	2688	1.38	14.7	1.16	7.04	112.1	4.2	
0835	0.75	21.87	225	26.7	2687	1.38	10.2	0.81	7.04	83.4	3.99	
0840	1.00	21.87	225	26.6	2683	1.38	7.5	0.59	7.04	72.6	3.16	
0845	1.25	21.87	225	26.6	2681	1.38	6.6	0.53	7.03	71.8	3.20	
0850	1.50	21.87	225	26.7	2679	1.38	5.7	0.45	7.03	72.1	3.26	
0855	1.75	21.87	225	26.7	2683	1.38	4.8	0.38	7.03	71.6	3.19	
0900	2.00	21.87	225	26.8	2679	1.38	4.4	0.34	7.03	74.6	2.06	
0905	2.25	21.87	225	26.5	2679	1.38	3.8	0.31	7.03	78.0	2.00	
0910	2.50	21.87	225	26.5	2684	1.38	3.5	0.28	7.03	81.2	1.95	
0915	2.75	21.87	225	26.7	2682	1.38	3.3	0.26	7.03	83.4	1.67	
0920	3.00	21.87	225	26.6	2680	1.38	3.1	0.26	7.03	85.6	1.52	

Sample @ 0920

Signature: [signature] Date: 1-9-18

Appendix B
Analytical Results Summary Tables

Appendix B, Table 1
Analytical Data from Monitoring Wells
SWMU 1 Annual Groundwater Monitoring Report
Former Vieques Naval Training Range, Vieques, Puerto Rico

Station ID	CGW1MW02						CGW1MW03							
Sample ID	CGW1GW02-R01	VEW01-MW02-0509	VEW01-MW02-0116	VEW01-MW02-0117	VEW01-MW02-0118	VEW01-MW02-0119	CGW1GW03-R01	VEW01-MW03-0409	VEW01-MW03-0116	VEW01-MW03P-0116	VEW01-MW03-0117	VEW01-MW03P-0117	VEW01-MW03-0118	VEW01-MW03P-0118
Sample Date	02/05/04	05/04/09	01/11/16	01/17/17	01/10/18	01/08/19	02/06/04	04/30/09	01/08/16	01/08/16	01/18/17	01/18/17	01/12/18	01/12/18
Chemical Name														
Volatile Organic Compounds (UG/L)														
1,1,1-Trichloroethane	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane	1 U	0.05 UJ	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.05 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloroethane	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	1 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trichlorobenzene	10.1 U	1 U	0.3 U	0.3 U	0.3 U	0.3 U	10.1 U	1 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,2-Dibromo-3-chloropropane	1 U	2 U	0.02 U	0.02 U	0.02 U	0.02 U	1 U	2 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dibromoethane	1 U	1 U	0.02 U	0.02 U	0.02 U	0.02 U	1 U	1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichlorobenzene	10.1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	10.1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	1 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloropropane	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichlorobenzene	10.1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	10.1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene	10.1 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	10.1 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Benzene	1 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromodichloromethane	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromoform	1 U	1 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U	1 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Bromomethane	1 U	2 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U	2 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Carbon tetrachloride	1 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroform	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,3-Dichloropropene	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dibromochloromethane	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
m- and p-Xylene	NA	2 U	0.4 U	0.4 U	0.4 U	0.4 U	NA	2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Methylene chloride	1 U	5 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U
o-Xylene	NA	1 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Styrene	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	1 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl chloride	1 U	0.15 U	0.02 U	0.02 U	0.02 U	0.02 U	1 U	0.15 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Semivolatile Organic Compounds (UG/L)														
2,4,6-Trichlorophenol	10.1 U	9 U	0.11 U	0.12 J	0.11 U	0.1 U	10.1 U	10 U	0.11 U	0.1 U	0.11 U	0.1 U	0.11 U	0.11 U
2,4-Dichlorophenol	10.1 U	12 U	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	13 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
2,4-Dimethylphenol	10.1 U	11 U	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	12 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
2,4-Dinitrophenol	50.5 UJ	42 U	5.3 U	5.6 U	5.6 U	5.1 U	50.5 U	44 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
2,4-Dinitrotoluene	2.5 U	9 U	5.3 U	5.6 U	5.6 U	5.1 U	2.5 U	10 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
2-Chloronaphthalene	10.1 U	0.19 UJ	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	0.2 UJ	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
2-Chlorophenol	10.1 U	10 U	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	11 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
3,3'-Dichlorobenzidine	20.2 U	9 U	5.3 U	5.6 U	5.6 U	5.1 U	20.2 U	10 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
4,6-Dinitro-2-methylphenol	50.5 U	24 U	5.3 U	5.6 U	5.6 U	5.1 U	50.5 U	24 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Acenaphthene	10.1 U	0.19 UJ	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	0.2 UJ	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Anthracene	10.1 U	0.19 UJ	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	0.2 UJ	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Atrazine	NA	9 U	5.3 U	5.6 U	5.6 U	5.1 U	NA	10 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Benzo(a)anthracene	10.1 U	0.19 UJ	0.0099 U	0.01 U	0.0099 U	0.012 U	10.1 U	0.2 UJ	0.011 U	0.01 U	0.0098 U	0.0095 U	0.01 U	0.011 U
Benzo(a)pyrene	10.1 U	0.19 UJ	0.0099 U	0.01 U	0.0099 U	0.012 U	10.1 U	0.2 UJ	0.011 U	0.01 U	0.0098 U	0.0095 U	0.01 U	0.011 U
Benzo(b)fluoranthene	10.1 U	0.25 UJ	0.0099 U	0.01 U	0.0099 U	0.012 U	10.1 U	0.26 UJ	0.011 U	0.01 U	0.0098 U	0.0095 U	0.01 U	0.011 U
Benzo(k)fluoranthene	10.1 U	0.19 UJ	0.0099 U	0.01 U	0.0099 U	0.012 U	10.1 U	0.2 UJ	0.011 U	0.01 U	0.0098 U	0.0095 U	0.01 U	0.011 U
bis(2-Chloroethyl)ether	10.1 U	9 U	0.11 U	0.11 U	0.11 U	0.1 U	10.1 U	10 U	0.11 U	0.1 U	0.11 U	0.1 U	0.11 U	0.11 U

Appendix B, Table 1
Analytical Data from Monitoring Wells
SWMU 1 Annual Groundwater Monitoring Report
Former Vieques Naval Training Range, Vieques, Puert

Station ID	CGW1MW03		CGW1MW08		CGW1MW08			CGW1MW10					CGW1MW11	
Sample ID	VEW01-MW03-0119	VEW01-MW03P-0119	VEW01-MW08-0509	VEW01-MW08-0116	VEW01-MW08-0117	VEW01-MW08-0118	VEW01-MW08-0119	VEW01-MW10-0509	VEW01-MW10-0116	VEW01-MW10-0117	VEW01-MW10-0118	VEW01-MW10-0119	VEW01-MW11-0509	VEW01-MW11-0116
Sample Date	01/07/19	01/07/19	05/22/09	01/12/16	01/17/17	01/10/18	01/08/19	05/18/09	01/11/16	01/18/17	01/15/18	01/08/19	05/12/09	01/12/16
Chemical Name														
Volatile Organic Compounds (UG/L)														
1,1,1-Trichloroethane	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
1,1,2,2-Tetrachloroethane	0.2 U	0.2 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	0.2 U
1,1,2-Trichloroethane	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
1,1-Dichloroethene	0.2 U	0.2 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.05 UJ	0.2 U
1,2,4-Trichlorobenzene	0.3 U	0.3 U	1 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U
1,2-Dibromo-3-chloropropane	0.02 U	0.02 U	2 U	0.02 U	0.02 U	0.02 U	0.02 U	2 U	0.02 U	0.02 U	0.02 U	0.02 U	2 U	0.02 U
1,2-Dibromoethane	0.02 U	0.02 U	1 U	0.02 U	0.02 U	0.02 U	0.02 U	1 U	0.02 U	0.02 U	0.02 U	0.02 U	1 U	0.02 U
1,2-Dichlorobenzene	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
1,2-Dichloroethane	0.2 U	0.2 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	0.2 U
1,2-Dichloropropane	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
1,3-Dichlorobenzene	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
1,4-Dichlorobenzene	0.2 U	0.2 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	0.2 U
Benzene	0.2 U	0.2 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U	0.05 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.014 J	0.2 U
Bromodichloromethane	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Bromoform	0.3 U	0.3 U	1 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U
Bromomethane	0.3 U	0.3 U	2 U	0.3 U	0.3 U	0.3 U	0.3 U	2 U	0.3 U	0.3 U	0.3 U	0.3 U	2 U	0.3 U
Carbon tetrachloride	0.2 U	0.2 U	0.05 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.05 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.05 UJ	0.2 U
Chlorobenzene	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Chloroform	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
cis-1,2-Dichloroethene	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
cis-1,3-Dichloropropene	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Dibromochloromethane	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Ethylbenzene	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
m- and p-Xylene	0.4 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U	2 U	0.4 U
Methylene chloride	1 U	1 U	5 U	1 U	1 U	1 U	1 U	5 UJ	1 U	1 U	1 U	1 U	5 U	1 U
o-Xylene	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Styrene	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U
Tetrachloroethene	0.2 U	0.2 U	0.05 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.05 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.05 UJ	0.2 U
Toluene	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
trans-1,2-Dichloroethene	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 UJ	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
trans-1,3-Dichloropropene	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Trichloroethene	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U
Vinyl chloride	0.02 U	0.02 U	0.15 U	0.02 U	0.02 U	0.02 U	0.02 U	0.15 UJ	0.02 U	0.02 U	0.02 U	0.02 U	0.15 UJ	0.02 U
Semivolatile Organic Compounds (UG/L)														
2,4,6-Trichlorophenol	0.1 U	0.11 U	9 U	0.11 U	0.1 J	0.12 U	0.11 U	9 U	0.11 U	0.11 U	0.099 U	0.1 U	9 R	0.1 U
2,4-Dichlorophenol	5 U	5.4 U	12 U	5.4 U	5.5 U	5.8 U	5.6 U	12 U	5.4 U	5.7 U	4.9 U	5.2 U	12 R	5.1 U
2,4-Dimethylphenol	5 U	5.4 U	11 U	5.4 U	5.5 U	5.8 U	5.6 U	11 U	5.4 U	5.7 U	4.9 U	5.2 U	11 R	5.1 U
2,4-Dinitrophenol	5 U	5.4 U	42 U	5.4 U	5.5 U	5.8 U	5.6 U	42 U	5.4 U	5.7 U	4.9 U	5.2 U	42 R	5.1 U
2,4-Dinitrotoluene	5 U	5.4 U	9 U	5.4 U	5.5 U	5.8 U	5.6 U	9 U	5.4 U	5.7 U	4.9 U	5.2 U	9 UJ	5.1 U
2-Chloronaphthalene	5 U	5.4 U	0.19 UJ	5.4 U	5.5 U	5.8 U	5.6 U	0.19 UJ	5.4 U	5.7 U	4.9 U	5.2 U	0.19 UJ	5.1 U
2-Chlorophenol	5 U	5.4 U	10 U	5.4 U	5.5 U	5.8 U	5.6 U	10 U	5.4 U	5.7 U	4.9 U	5.2 U	10 R	5.1 U
3,3'-Dichlorobenzidine	5 U	5.4 U	9 U	5.4 U	5.5 U	5.8 U	5.6 U	9 U	5.4 U	5.7 U	4.9 U	5.2 U	9 UJ	5.1 U
4,6-Dinitro-2-methylphenol	5 U	5.4 U	24 U	5.4 U	5.5 U	5.8 U	5.6 U	24 U	5.4 U	5.7 U	4.9 U	5.2 U	24 R	5.1 U
Acenaphthene	5 U	5.4 U	0.19 UJ	5.4 U	5.5 U	5.8 U	5.6 U	0.19 UJ	5.4 U	5.7 U	4.9 U	5.2 U	0.19 UJ	5.1 U
Anthracene	5 U	5.4 U	0.19 UJ	5.4 U	5.5 U	5.8 U	5.6 U	0.19 UJ	5.4 U	5.7 U	4.9 U	5.2 U	0.19 UJ	5.1 U
Atrazine	5 U	5.4 U	9 U	5.4 U	5.5 U	5.8 U	5.6 U	9 U	5.4 U	5.7 U	4.9 U	5.2 U	9 UJ	5.1 U
Benzo(a)anthracene	0.011 U	0.0099 U	0.19 UJ	0.01 U	0.011 U	0.01 U	0.01 U	0.19 UJ	0.01 U	0.01 U	0.011 U	0.01 U	0.19 UJ	0.0098 U
Benzo(a)pyrene	0.011 U	0.0099 U	0.19 UJ	0.01 U	0.011 U	0.01 U	0.01 U	0.19 UJ	0.01 U	0.01 U	0.011 U	0.01 U	0.19 UJ	0.0098 U
Benzo(b)fluoranthene	0.011 U	0.0099 U	0.25 UJ	0.01 U	0.011 U	0.01 U	0.01 U	0.25 UJ	0.01 U	0.01 U	0.011 U	0.01 U	0.25 UJ	0.0098 U
Benzo(k)fluoranthene	0.011 U	0.0099 U	0.19 UJ	0.01 U	0.011 U	0.01 U	0.01 U	0.19 UJ	0.01 U	0.01 U	0.011 U	0.01 U	0.19 UJ	0.0098 U
bis(2-Chloroethyl)ether	0.1 U	0.11 U	9 U	0.11 U	0.11 U	0.12 U	0.11 U	9 U	0.11 U	0.11 U	0.099 U	0.1 U	9 UJ	0.1 U

Appendix B, Table 1
Analytical Data from Monitoring Wells
SWMU 1 Annual Groundwater Monitoring Report
Former Vieques Naval Training Range, Vieques, Puert

Station ID	CGW1MW11			CGW1MW13					
Sample ID	VEW01-MW11-0117	VEW01-MW11-0118	VEW01-MW11-0119	VEW01-MW13-0509	VEW01-MW13P-0509	VEW01-MW13-0116	VEW01-MW13-0117	VEW01-MW13-0118	VEW01-MW13-0119
Sample Date	01/18/17	01/12/18	01/10/19	05/20/09	05/20/09	01/07/16	01/17/17	01/11/18	01/09/19
Chemical Name									
Volatile Organic Compounds (UG/L)									
1,1,1-Trichloroethane	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloroethane	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trichlorobenzene	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U	0.3 U	0.3 U	0.3 U
1,2-Dibromo-3-chloropropane	0.02 U	0.02 U	0.02 U	0.02 U	2 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dibromoethane	0.02 U	0.02 U	0.02 U	0.02 U	1 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichlorobenzene	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloropropane	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichlorobenzene	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U
Benzene	0.2 U	0.2 U	0.2 U	0.2 U	0.05 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromodichloromethane	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromoform	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U	0.3 U	0.3 U	0.3 U
Bromomethane	0.3 U	0.3 U	0.3 U	0.3 U	2 U	0.3 U	0.3 U	0.3 U	0.3 U
Carbon tetrachloride	0.2 U	0.2 U	0.2 U	0.2 U	0.05 UJ	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroform	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,3-Dichloropropene	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
Dibromochloromethane	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
m- and p-Xylene	0.4 U	0.4 U	0.4 U	0.4 U	2 U	0.4 U	0.4 U	0.4 U	0.4 U
Methylene chloride	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U
o-Xylene	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
Styrene	0.5 U	0.5 U	0.5 U	0.5 R	1 U	0.5 R	0.5 R	0.5 R	0.5 R
Tetrachloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.05 UJ	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.12 J	0.12 J	0.2 U	0.2 U
Vinyl chloride	0.02 U	0.02 U	0.05 U	0.02 U	0.012 J	0.02 U	0.02 U	0.014 J	0.02 U
Semivolatile Organic Compounds (UG/L)									
2,4,6-Trichlorophenol	0.11 U	0.11 U	0.11 U	9 U	9 U	0.11 U	0.12 U	0.12 U	0.12 U
2,4-Dichlorophenol	5.6 U	5.6 U	5.4 U	12 U	12 U	5.4 U	6 U	6 U	6 U
2,4-Dimethylphenol	5.6 U	5.6 U	5.4 U	11 U	11 U	5.4 U	6 U	6 U	6 U
2,4-Dinitrophenol	5.6 U	5.6 U	5.4 U	42 U	42 U	5.4 U	6 U	6 U	6 U
2,4-Dinitrotoluene	5.6 U	5.6 U	5.4 U	9 U	9 U	5.4 U	6 U	6 U	6 U
2-Chloronaphthalene	5.6 U	5.6 U	5.4 U	0.19 UJ	0.19 UJ	5.4 U	6 U	6 U	6 U
2-Chlorophenol	5.6 U	5.6 U	5.4 U	10 U	10 U	5.4 U	6 U	6 U	6 U
3,3'-Dichlorobenzidine	5.6 U	5.6 U	5.4 U	9 U	9 U	5.4 U	6 U	6 U	6 U
4,6-Dinitro-2-methylphenol	5.6 U	5.6 U	5.4 U	24 U	24 U	5.4 U	6 U	6 U	6 U
Acenaphthene	5.6 U	5.6 U	5.4 U	0.19 UJ	0.19 UJ	5.4 U	6 U	6 U	6 U
Anthracene	5.6 U	5.6 U	5.4 U	0.19 UJ	0.19 UJ	5.4 U	6 U	6 U	6 U
Atrazine	5.6 U	5.6 U	5.4 U	9 U	9 U	5.4 U	6 U	6 U	6 U
Benzo(a)anthracene	0.0097 U	0.011 U	0.011 U	0.19 UJ	0.19 UJ	0.0094 U	0.01 U	0.011 U	0.012 UJ
Benzo(a)pyrene	0.0097 U	0.011 U	0.011 U	0.19 UJ	0.19 UJ	0.0094 U	0.01 U	0.011 U	0.012 U
Benzo(b)fluoranthene	0.0097 U	0.011 U	0.011 U	0.25 UJ	0.25 UJ	0.0094 U	0.01 U	0.011 U	0.012 U
Benzo(k)fluoranthene	0.0097 U	0.011 U	0.011 U	0.19 UJ	0.19 UJ	0.0094 U	0.01 U	0.011 U	0.012 U
bis(2-Chloroethyl)ether	0.11 U	0.11 U	0.11 U	9 U	9 U	0.11 U	0.12 U	0.12 U	0.12 U

Appendix B, Table 1
Analytical Data from Monitoring Wells
SWMU 1 Annual Groundwater Monitoring Report
Former Vieques Naval Training Range, Vieques, Puerto Rico

Station ID	CGW1MW02						CGW1MW03							
Sample ID	CGW1GW02-R01	VEW01-MW02-0509	VEW01-MW02-0116	VEW01-MW02-0117	VEW01-MW02-0118	VEW01-MW02-0119	CGW1GW03-R01	VEW01-MW03-0409	VEW01-MW03-0116	VEW01-MW03P-0116	VEW01-MW03-0117	VEW01-MW03P-0117	VEW01-MW03-0118	VEW01-MW03P-0118
Sample Date	02/05/04	05/04/09	01/11/16	01/17/17	01/10/18	01/08/19	02/06/04	04/30/09	01/08/16	01/08/16	01/18/17	01/18/17	01/12/18	01/12/18
Chemical Name														
bis(2-Ethylhexyl)phthalate	10.1 U	1.9 UJ	0.88 J	1.3 U	1.5 U	1.2 U	10.1 U	2 U	1.3 U	1.3 U	1.3 UJ	1.2 UJ	1.7 U	1.3 U
Butylbenzylphthalate	10.1 U	9 U	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	10 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Chrysene	10.1 U	0.19 UJ	0.0099 U	0.01 U	0.0099 U	0.012 U	10.1 U	0.2 UJ	0.011 U	0.01 U	0.0098 U	0.0095 U	0.01 U	0.011 U
Dibenz(a,h)anthracene	10.1 U	0.2 UJ	0.0099 U	0.01 U	0.0099 U	0.012 U	10.1 U	0.2 UJ	0.011 U	0.01 U	0.0098 U	0.0095 U	0.01 U	0.011 U
Diethylphthalate	10.1 U	9 U	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	10 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Dimethyl phthalate	10.1 U	9 U	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	10 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Di-n-butylphthalate	10.1 U	2.4 UJ	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	2.4 UJ	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Fluoranthene	10.1 U	0.21 UJ	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	0.22 UJ	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Fluorene	10.1 U	0.19 UJ	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	0.2 UJ	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Hexachlorobenzene	10.1 U	0.19 UJ	0.11 U	0.11 U	0.11 U	0.1 U	10.1 U	0.2 UJ	0.11 U	0.1 U	0.11 U	0.1 U	0.11 U	0.11 U
Semivolatile Organic Compounds (UG/L) (continued)														
Hexachlorobutadiene	10.1 UJ	9 U	0.3 U	0.3 U	0.3 U	0.3 U	10.1 U	10 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Hexachlorocyclopentadiene	10.1 U	9 U	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	10 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Hexachloroethane	10.1 U	0.21 UJ	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	0.22 UJ	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Indeno(1,2,3-cd)pyrene	10.1 U	0.19 UJ	0.0099 U	0.01 U	0.0099 U	0.012 U	10.1 U	0.2 UJ	0.011 U	0.01 U	0.0098 U	0.0095 U	0.01 U	0.011 U
Isophorone	10.1 U	9 U	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	10 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
n-Nitroso-di-n-propylamine	10.1 U	9 U	0.11 U	0.11 U	0.11 U	0.1 U	10.1 U	10 U	0.11 U	0.1 U	0.11 U	0.1 U	0.11 U	0.11 U
n-Nitrosodiphenylamine	10.1 U	9 UJ	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	10 UJ	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Nitrobenzene	2.5 U	9 U	5.3 U	5.6 U	5.6 U	5.1 U	2.5 U	10 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Pentachlorophenol	50.5 U	0.94 R	0.85 U	0.89 U	0.9 U	0.82 U	50.5 U	0.98 R	0.89 U	0.84 U	0.85 U	0.82 U	0.88 U	0.86 U
Phenol	10.1 U	9 U	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	10 U	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Pyrene	10.1 U	0.19 UJ	5.3 U	5.6 U	5.6 U	5.1 U	10.1 U	0.2 UJ	5.6 U	5.2 U	5.3 U	5.1 U	5.5 U	5.4 U
Pesticide/Polychlorinated Biphenyls (UG/L)														
4,4'-DDD	0.1 U	0.094 U	0.01 U	0.011 U	0.011 U	0.011 U	0.12 U	0.095 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
4,4'-DDE	0.1 U	0.094 U	0.01 U	0.011 U	0.011 U	0.011 U	0.12 U	0.095 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
4,4'-DDT	0.1 U	0.094 U	0.01 U	0.011 U	0.011 U	0.011 U	0.12 U	0.095 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
Aldrin	0.05 U	0.1 U	0.01 U	0.011 U	0.011 U	0.011 U	0.06 U	0.1 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
alpha-BHC	0.05 U	0.066 U	0.01 U	0.011 U	0.011 U	0.011 U	0.06 U	0.067 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
alpha-Chlordane	0.05 UJ	0.085 U	0.01 U	0.011 U	0.011 U	0.011 U	0.06 U	0.086 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
Aroclor-1016	1 U	0.48 U	0.51 U	0.52 U	0.53 U	0.55 U	1.2 U	0.48 U	0.49 U	0.52 U	0.49 U	0.47 U	0.55 U	0.55 U
Aroclor-1221	2 U	1.1 U	0.51 U	0.52 U	0.53 U	0.55 U	2.4 U	1.1 U	0.49 U	0.52 U	0.49 U	0.47 U	0.55 U	0.55 U
Aroclor-1232	1 U	0.47 U	0.51 U	0.52 U	0.53 U	0.55 U	1.2 U	0.48 U	0.49 U	0.52 U	0.49 U	0.47 U	0.55 U	0.55 U
Aroclor-1242	1 U	0.71 U	0.51 U	0.52 U	0.53 U	0.55 U	1.2 U	0.71 U	0.49 U	0.52 U	0.49 U	0.47 U	0.55 U	0.55 U
Aroclor-1248	1 U	0.71 U	0.51 U	0.52 U	0.53 U	0.55 U	1.2 U	0.71 U	0.49 U	0.52 U	0.49 U	0.47 U	0.55 U	0.55 U
Aroclor-1254	1 U	0.79 U	0.51 U	0.52 U	0.53 U	0.55 U	1.2 U	0.8 U	0.49 U	0.52 U	0.49 U	0.47 U	0.55 U	0.55 U
Aroclor-1260	1 U	0.74 U	0.51 U	0.52 U	0.53 U	0.55 U	1.2 U	0.74 U	0.49 U	0.52 U	0.49 U	0.47 U	0.55 U	0.55 U
Aroclor-1262	NA	NA	0.51 U	0.52 U	0.53 U	0.55 U	NA	NA	0.49 U	0.52 U	0.49 U	0.47 U	0.55 U	0.55 U
Aroclor-1268	NA	NA	0.51 U	0.52 U	0.53 U	0.55 U	NA	NA	0.49 U	0.52 U	0.49 U	0.47 U	0.55 U	0.55 U
beta-BHC	0.05 U	0.075 U	0.01 U	0.011 U	0.011 U	0.011 U	0.06 U	0.076 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
Dieldrin	0.1 U	0.094 U	0.01 U	0.011 U	0.011 U	0.011 U	0.12 U	0.095 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
Endosulfan I	0.05 UJ	0.066 U	0.01 U	0.011 U	0.011 U	0.011 U	0.06 U	0.067 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
Endosulfan II	0.1 U	0.094 U	0.01 U	0.011 U	0.011 U	0.011 U	0.12 U	0.095 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
Endosulfan sulfate	0.1 U	0.094 U	0.01 U	0.011 U	0.011 U	0.011 U	0.12 U	0.095 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
Endrin	0.1 U	0.094 U	0.01 U	0.011 U	0.011 U	0.011 U	0.12 U	0.095 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
Endrin aldehyde	0.1 U	0.22 U	0.01 U	0.011 U	0.011 U	0.011 U	0.12 U	0.22 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
Endrin ketone	0.1 U	0.094 UJ	0.01 U	0.011 U	0.011 U	0.011 U	0.12 U	0.095 UJ	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
gamma-BHC (Lindane)	0.05 U	0.066 U	0.01 U	0.011 U	0.011 U	0.011 U	0.06 U	0.067 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
gamma-Chlordane	0.05 U	0.075 U	0.01 U	0.011 U	0.011 U	0.011 U	0.06 UJ	0.076 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
Heptachlor	0.05 U	0.094 U	0.01 U	0.011 U	0.011 U	0.011 U	0.06 U	0.095 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
Heptachlor epoxide	0.05 U	0.085 U	0.01 U	0.011 U	0.011 U	0.011 U	0.06 U	0.086 U	0.0098 U	0.01 U	0.0097 U	0.0094 U	0.011 U	0.011 U
Methoxychlor	0.5 UJ	0.47 U	0.1 UJ	0.1 U	0.11 U	0.11 U	0.6 U	0.48 U	0.098 UJ	0.1 UJ	0.097 U	0.094 U	0.11 U	0.11 U

Appendix B, Table 1
Analytical Data from Monitoring Wells
SWMU 1 Annual Groundwater Monitoring Report
Former Vieques Naval Training Range, Vieques, Puert

Station ID	CGW1MW03		CGW1MW08		CGW1MW08			CGW1MW10					CGW1MW11	
Sample ID	VEW01-MW03-0119	VEW01-MW03P-0119	VEW01-MW08-0509	VEW01-MW08-0116	VEW01-MW08-0117	VEW01-MW08-0118	VEW01-MW08-0119	VEW01-MW10-0509	VEW01-MW10-0116	VEW01-MW10-0117	VEW01-MW10-0118	VEW01-MW10-0119	VEW01-MW11-0509	VEW01-MW11-0116
Sample Date	01/07/19	01/07/19	05/22/09	01/12/16	01/17/17	01/10/18	01/08/19	05/18/09	01/11/16	01/18/17	01/15/18	01/08/19	05/12/09	01/12/16
Chemical Name														
bis(2-Ethylhexyl)phthalate	1.2 U	1.3 U	1.9 UJ	1.3 U	1.3 U	1.4 U	1.3 U	1.9 UJ	1.3 U	1.4 UJ	1.3 U	1.3 U	1.9 UJ	1.2 U
Butylbenzylphthalate	5 U	5.4 U	9 UJ	5.4 U	5.5 U	5.8 U	5.6 U	9 U	5.4 U	5.7 U	4.9 U	5.2 U	9 UJ	5.1 U
Chrysene	0.011 U	0.0099 U	0.19 UJ	0.01 U	0.011 U	0.01 U	0.01 U	0.19 UJ	0.01 U	0.01 U	0.011 U	0.01 U	0.19 UJ	0.0098 U
Dibenz(a,h)anthracene	0.011 U	0.0099 U	0.2 UJ	0.01 U	0.011 U	0.01 U	0.01 U	0.2 UJ	0.01 U	0.01 U	0.011 U	0.01 U	0.2 UJ	0.0098 U
Diethylphthalate	5 U	5.4 U	9 U	5.4 U	5.5 U	5.8 U	5.6 U	9 U	5.4 U	5.7 U	4.9 U	5.2 U	9 UJ	5.1 U
Dimethyl phthalate	5 U	5.4 U	9 U	5.4 U	5.5 U	5.8 U	5.6 U	9 U	5.4 U	5.7 U	4.9 U	5.2 U	9 UJ	5.1 U
Di-n-butylphthalate	5 U	5.4 U	2.4 UJ	5.4 U	5.5 U	5.8 U	5.6 U	2.4 UJ	5.4 U	5.7 U	4.9 U	5.2 U	2.4 UJ	5.1 U
Fluoranthene	5 U	5.4 U	0.21 UJ	5.4 U	5.5 U	5.8 U	5.6 U	0.21 UJ	5.4 U	5.7 U	4.9 U	5.2 U	0.21 UJ	5.1 U
Fluorene	5 U	5.4 U	0.19 UJ	5.4 U	5.5 U	5.8 U	5.6 U	0.19 UJ	5.4 U	5.7 U	4.9 U	5.2 U	0.19 UJ	5.1 U
Hexachlorobenzene	0.1 U	0.11 U	0.19 UJ	0.11 U	0.11 U	0.12 U	0.11 U	0.19 UJ	0.11 U	0.11 U	0.099 U	0.1 U	0.19 UJ	0.1 U
Semivolatile Organic Compounds (UG/L) (continued)														
Hexachlorobutadiene	0.3 U	0.3 U	9 U	0.3 U	0.3 U	0.3 U	0.3 U	9 U	0.3 U	0.3 U	0.3 U	0.3 U	9 UJ	0.3 U
Hexachlorocyclopentadiene	5 U	5.4 U	9 UJ	5.4 U	5.5 U	5.8 U	5.6 U	9 U	5.4 U	5.7 U	4.9 U	5.2 U	9 UJ	5.1 U
Hexachloroethane	5 U	5.4 U	0.21 UJ	5.4 U	5.5 U	5.8 U	5.6 U	0.21 UJ	5.4 U	5.7 U	4.9 U	5.2 U	0.21 UJ	5.1 U
Indeno(1,2,3-cd)pyrene	0.011 U	0.0099 U	0.19 UJ	0.01 U	0.011 U	0.01 U	0.01 U	0.19 UJ	0.01 U	0.01 U	0.011 U	0.01 U	0.19 UJ	0.0098 U
Isophorone	5 U	5.4 U	9 U	5.4 U	5.5 U	5.8 U	5.6 U	9 U	5.4 U	5.7 U	4.9 U	5.2 U	9 UJ	5.1 U
n-Nitroso-di-n-propylamine	0.1 U	0.11 U	9 U	0.11 U	0.11 U	0.12 U	0.11 U	9 U	0.11 U	0.11 U	0.099 U	0.1 U	9 UJ	0.1 U
n-Nitrosodiphenylamine	5 U	5.4 U	9 U	5.4 U	5.5 U	5.8 U	5.6 U	9 U	5.4 U	5.7 U	4.9 U	5.2 U	9 UJ	5.1 U
Nitrobenzene	5 U	5.4 U	9 U	5.4 U	5.5 U	5.8 U	5.6 U	9 U	5.4 U	5.7 U	4.9 U	5.2 U	9 UJ	5.1 U
Pentachlorophenol	0.81 U	0.86 U	0.94 R	0.87 U	0.88 U	0.93 U	0.89 U	0.94 R	0.86 U	0.91 U	0.79 U	0.84 U	0.94 R	0.82 U
Phenol	5 U	5.4 U	9 U	5.4 U	5.5 U	5.8 U	5.6 U	9 U	5.4 U	5.7 U	4.9 U	5.2 U	9 R	5.1 U
Pyrene	5 U	5.4 U	0.19 UJ	5.4 U	5.5 U	5.8 U	5.6 U	0.19 UJ	5.4 U	5.7 U	4.9 U	5.2 U	0.19 UJ	5.1 U
Pesticide/Polychlorinated Biphenyls (UG/L)														
4,4'-DDD	0.0096 U	0.01 U	0.094 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.095 U	0.01 U	0.011 U	0.011 U	0.011 U	0.094 U	0.011 U
4,4'-DDE	0.0096 U	0.01 U	0.094 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.095 U	0.01 U	0.011 U	0.011 U	0.011 U	0.094 U	0.011 U
4,4'-DDT	0.0096 U	0.01 U	0.094 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.095 U	0.01 U	0.011 U	0.011 U	0.011 U	0.094 U	0.011 U
Aldrin	0.0096 U	0.01 U	0.1 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.1 U	0.01 U	0.011 U	0.011 U	0.011 U	0.1 U	0.011 U
alpha-BHC	0.0096 U	0.01 U	0.066 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.067 U	0.01 U	0.011 U	0.011 U	0.011 U	0.066 U	0.011 U
alpha-Chlordane	0.0096 U	0.01 U	0.085 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.086 U	0.01 U	0.011 U	0.011 U	0.011 U	0.085 U	0.011 U
Aroclor-1016	0.48 U	0.51 U	0.48 U	0.48 U	0.56 U	0.47 U	0.52 U	0.48 U	0.51 U	0.57 U	0.55 U	0.52 U	0.48 U	0.54 U
Aroclor-1221	0.48 U	0.51 U	1.1 U	0.48 U	0.56 U	0.47 U	0.52 U	1.1 U	0.51 U	0.57 U	0.55 U	0.52 U	1.1 U	0.54 U
Aroclor-1232	0.48 U	0.51 U	0.47 U	0.48 U	0.56 U	0.47 U	0.52 U	0.48 U	0.51 U	0.57 U	0.55 U	0.52 U	0.47 U	0.54 U
Aroclor-1242	0.48 U	0.51 U	0.71 U	0.48 U	0.56 U	0.47 U	0.52 U	0.71 U	0.51 U	0.57 U	0.55 U	0.52 U	0.71 U	0.54 U
Aroclor-1248	0.48 U	0.51 U	0.71 U	0.48 U	0.56 U	0.47 U	0.52 U	0.71 U	0.51 U	0.57 U	0.55 U	0.52 U	0.71 U	0.54 U
Aroclor-1254	0.48 U	0.51 U	0.79 U	0.48 U	0.56 U	0.47 U	0.52 U	0.8 U	0.51 U	0.57 U	0.55 U	0.52 U	0.79 U	0.54 U
Aroclor-1260	0.48 U	0.51 U	0.74 U	0.48 U	0.56 U	0.47 U	0.52 U	0.74 U	0.51 U	0.57 U	0.55 U	0.52 U	0.74 U	0.54 U
Aroclor-1262	0.48 U	0.51 U	NA	0.48 U	0.56 U	0.47 U	0.52 U	NA	0.51 U	0.57 U	0.55 U	0.52 U	NA	0.54 U
Aroclor-1268	0.48 U	0.51 U	NA	0.48 U	0.56 U	0.47 U	0.52 U	NA	0.51 U	0.57 U	0.55 U	0.52 U	NA	0.54 U
beta-BHC	0.0096 U	0.01 U	0.075 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.076 U	0.01 U	0.011 U	0.011 U	0.011 U	0.075 U	0.011 U
Dieldrin	0.0096 U	0.01 U	0.094 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.095 U	0.01 U	0.011 U	0.011 U	0.011 U	0.094 U	0.011 U
Endosulfan I	0.0096 U	0.01 U	0.066 U	0.014 J	0.011 U	0.0094 U	0.01 U	0.067 U	0.01 U	0.011 U	0.011 U	0.011 U	0.066 U	0.011 U
Endosulfan II	0.0096 U	0.01 U	0.094 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.095 U	0.01 U	0.011 U	0.011 U	0.011 U	0.094 U	0.011 U
Endosulfan sulfate	0.0096 U	0.01 U	0.094 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.095 UJ	0.01 U	0.011 U	0.011 U	0.011 U	0.094 U	0.011 U
Endrin	0.0096 U	0.01 U	0.094 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.095 U	0.01 U	0.011 U	0.011 U	0.011 U	0.094 U	0.011 U
Endrin aldehyde	0.0096 U	0.01 U	0.22 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.22 U	0.01 U	0.011 U	0.011 U	0.011 U	0.22 U	0.011 U
Endrin ketone	0.0096 U	0.01 U	0.094 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.095 UJ	0.01 U	0.011 U	0.011 U	0.011 U	0.094 U	0.011 U
gamma-BHC (Lindane)	0.0096 U	0.01 U	0.066 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.067 U	0.01 U	0.011 U	0.011 U	0.011 U	0.066 U	0.011 U
gamma-Chlordane	0.0096 U	0.01 U	0.075 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.076 U	0.01 U	0.011 U	0.011 U	0.011 U	0.075 U	0.011 U
Heptachlor	0.0096 U	0.01 U	0.094 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.095 U	0.01 U	0.011 U	0.011 U	0.011 U	0.094 U	0.011 U
Heptachlor epoxide	0.0096 U	0.01 U	0.085 U	0.0095 U	0.011 U	0.0094 U	0.01 U	0.086 U	0.01 U	0.011 U	0.011 U	0.011 U	0.085 U	0.011 U
Methoxychlor	0.096 U	0.1 U	0.47 U	0.095 UJ	0.11 U	0.094 U	0.1 U	0.48 U	0.1 UJ	0.11 U	0.11 U	0.1 U	0.47 U	0.11 UJ

Appendix B, Table 1
Analytical Data from Monitoring Wells
SWMU 1 Annual Groundwater Monitoring Report
Former Vieques Naval Training Range, Vieques, Puert

Station ID	CGW1MW11			CGW1MW13					
Sample ID	VEW01-MW11-0117	VEW01-MW11-0118	VEW01-MW11-0119	VEW01-MW13-0509	VEW01-MW13P-0509	VEW01-MW13-0116	VEW01-MW13-0117	VEW01-MW13-0118	VEW01-MW13-0119
Sample Date	01/18/17	01/12/18	01/10/19	05/20/09	05/20/09	01/07/16	01/17/17	01/11/18	01/09/19
Chemical Name									
bis(2-Ethylhexyl)phthalate	1.3 UJ	1.5 U	1.3 U	1.9 UJ	1.9 UJ	1.3 U	1.4 U	1.6 U	1.4 U
Butylbenzylphthalate	5.6 U	5.6 U	5.4 U	9 U	9 UJ	5.4 U	6 U	6 U	6 U
Chrysene	0.0097 U	0.011 U	0.011 U	0.19 UJ	0.19 UJ	0.0094 U	0.01 U	0.011 U	0.012 UJ
Dibenz(a,h)anthracene	0.0097 U	0.011 U	0.011 U	0.2 UJ	0.2 UJ	0.0094 U	0.01 U	0.011 U	0.012 U
Diethylphthalate	5.6 U	5.6 U	5.4 U	9 U	9 U	5.4 U	6 U	6 U	6 U
Dimethyl phthalate	5.6 U	5.6 U	5.4 U	9 U	9 U	5.4 U	6 U	6 U	6 U
Di-n-butylphthalate	5.6 U	5.6 U	5.4 U	2.4 UJ	2.4 UJ	5.4 U	6 U	6 U	6 U
Fluoranthene	5.6 U	5.6 U	5.4 U	0.21 UJ	0.21 UJ	5.4 U	6 U	6 U	6 U
Fluorene	5.6 U	5.6 U	5.4 U	0.19 UJ	0.19 UJ	5.4 U	6 U	6 U	6 U
Hexachlorobenzene	0.11 U	0.11 U	0.11 U	0.19 UJ	0.19 UJ	0.11 U	0.12 U	0.12 U	0.12 U
Semivolatile Organic Compounds (UG/L) (continued)									
Hexachlorobutadiene	0.3 U	0.3 U	0.3 U	9 U	9 U	0.3 U	0.3 U	0.3 U	0.3 U
Hexachlorocyclopentadiene	5.6 U	5.6 U	5.4 U	9 U	9 UJ	5.4 U	6 U	6 U	6 U
Hexachloroethane	5.6 U	5.6 U	5.4 U	0.21 UJ	0.21 UJ	5.4 U	6 U	6 U	6 U
Indeno(1,2,3-cd)pyrene	0.0097 U	0.011 U	0.011 U	0.19 UJ	0.19 UJ	0.0094 U	0.01 U	0.011 U	0.012 U
Isophorone	5.6 U	5.6 U	5.4 U	9 U	9 U	5.4 U	6 U	6 U	6 U
n-Nitroso-di-n-propylamine	0.11 U	0.11 U	0.11 U	9 U	9 U	0.11 U	0.12 U	0.12 U	0.12 U
n-Nitrosodiphenylamine	5.6 U	5.6 U	5.4 U	9 U	9 U	5.4 U	6 U	6 U	6 U
Nitrobenzene	5.6 U	5.6 U	5.4 U	9 U	9 U	5.4 U	6 U	6 U	6 U
Pentachlorophenol	0.89 U	0.89 U	0.86 U	0.94 R	0.94 R	0.86 U	0.96 U	0.95 U	0.96 U
Phenol	5.6 U	5.6 U	5.4 U	9 U	9 U	5.4 U	6 U	6 U	6 U
Pyrene	5.6 U	5.6 U	5.4 U	0.19 UJ	0.19 UJ	5.4 U	6 U	6 U	6 U
Pesticide/Polychlorinated Biphenyls (UG/L)									
4,4'-DDD	0.011 U	0.011 U	0.0099 U	0.094 U	0.094 U	0.011 U	0.011 U	0.011 U	0.01 U
4,4'-DDE	0.011 U	0.011 U	0.0099 U	0.094 U	0.094 U	0.011 U	0.011 U	0.011 U	0.01 U
4,4'-DDT	0.011 U	0.011 U	0.0099 U	0.094 U	0.094 U	0.011 U	0.011 U	0.011 U	0.01 U
Aldrin	0.011 U	0.011 U	0.0099 U	0.1 U	0.1 U	0.011 U	0.011 U	0.011 U	0.01 U
alpha-BHC	0.011 U	0.011 U	0.0099 U	0.066 U	0.066 U	0.011 U	0.011 U	0.011 U	0.01 U
alpha-Chlordane	0.011 U	0.011 U	0.0099 U	0.085 U	0.085 U	0.011 U	0.011 U	0.011 U	0.01 U
Aroclor-1016	0.53 U	0.55 U	0.5 U	0.48 U	0.48 U	0.52 U	0.57 U	0.53 U	0.51 U
Aroclor-1221	0.53 U	0.55 U	0.5 U	1.1 U	1.1 U	0.52 U	0.57 U	0.53 U	0.51 U
Aroclor-1232	0.53 U	0.55 U	0.5 U	0.47 U	0.47 U	0.52 U	0.57 U	0.53 U	0.51 U
Aroclor-1242	0.53 U	0.55 U	0.5 U	0.71 U	0.71 U	0.52 U	0.57 U	0.53 U	0.51 U
Aroclor-1248	0.53 U	0.55 U	0.5 U	0.71 U	0.71 U	0.52 U	0.57 U	0.53 U	0.51 U
Aroclor-1254	0.53 U	0.55 U	0.5 U	0.79 U	0.79 U	0.52 U	0.57 U	0.53 U	0.51 U
Aroclor-1260	0.53 U	0.55 U	0.5 U	0.74 U	0.74 U	0.52 U	0.57 U	0.53 U	0.51 U
Aroclor-1262	0.53 U	0.55 U	0.5 U	NA	NA	0.52 U	0.57 U	0.53 U	0.51 U
Aroclor-1268	0.53 U	0.55 U	0.5 U	NA	NA	0.52 U	0.57 U	0.53 U	0.51 U
beta-BHC	0.011 U	0.011 U	0.0099 U	0.075 U	0.075 U	0.011 U	0.011 U	0.011 U	0.01 U
Dieldrin	0.011 U	0.011 U	0.0099 U	0.094 U	0.094 U	0.011 U	0.011 U	0.011 U	0.01 U
Endosulfan I	0.011 U	0.011 U	0.0099 U	0.066 U	0.066 U	0.011 U	0.011 U	0.011 U	0.01 U
Endosulfan II	0.011 U	0.011 U	0.0099 U	0.094 U	0.094 U	0.011 U	0.011 U	0.011 U	0.01 U
Endosulfan sulfate	0.011 U	0.011 U	0.0099 U	0.094 U	0.094 U	0.011 U	0.011 U	0.011 U	0.01 U
Endrin	0.011 U	0.011 U	0.0099 U	0.094 U	0.094 U	0.011 U	0.011 U	0.011 U	0.01 U
Endrin aldehyde	0.011 U	0.011 U	0.0099 U	0.22 U	0.22 U	0.011 U	0.011 U	0.011 U	0.01 U
Endrin ketone	0.011 U	0.011 U	0.0099 U	0.094 U	0.094 U	0.011 U	0.011 U	0.011 U	0.01 U
gamma-BHC (Lindane)	0.011 U	0.011 U	0.0099 U	0.066 U	0.066 U	0.011 U	0.011 U	0.011 U	0.01 U
gamma-Chlordane	0.011 U	0.011 U	0.0099 U	0.075 U	0.075 U	0.011 U	0.011 U	0.011 U	0.01 U
Heptachlor	0.011 U	0.011 U	0.0099 U	0.094 U	0.094 U	0.011 U	0.011 U	0.011 U	0.01 U
Heptachlor epoxide	0.011 U	0.011 U	0.0099 U	0.085 U	0.085 U	0.011 U	0.011 U	0.011 U	0.01 U
Methoxychlor	0.11 U	0.11 U	0.099 U	0.47 U	0.47 U	0.1 UJ	0.11 U	0.11 U	0.1 U

Appendix B, Table 1
Analytical Data from Monitoring Wells
SWMU 1 Annual Groundwater Monitoring Report
Former Vieques Naval Training Range, Vieques, Puerto Rico

Station ID	CGW1MW02						CGW1MW03							
Sample ID	CGW1GW02-R01	VEW01-MW02-0509	VEW01-MW02-0116	VEW01-MW02-0117	VEW01-MW02-0118	VEW01-MW02-0119	CGW1GW03-R01	VEW01-MW03-0409	VEW01-MW03-0116	VEW01-MW03P-0116	VEW01-MW03-0117	VEW01-MW03P-0117	VEW01-MW03-0118	VEW01-MW03P-0118
Sample Date	02/05/04	05/04/09	01/11/16	01/17/17	01/10/18	01/08/19	02/06/04	04/30/09	01/08/16	01/08/16	01/18/17	01/18/17	01/12/18	01/12/18
Chemical Name														
Toxaphene	5 R	0.94 U	0.51 U	0.52 U	0.53 U	0.55 U	6 U	0.95 U	0.49 U	0.52 U	0.49 U	0.47 U	0.55 U	0.55 U
Total Metals (UG/L)														
Antimony	2.5 U	1 U	0.338 J	0.5 U	0.5 U	0.5 U	3.25 J	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Arsenic	2.04 U	5 U	0.425 J	0.483 J	0.366 J	0.167 J	2.04 U	5 U	1.29	0.843 J	0.472 J	0.501 J	0.233 J	0.282 J
Barium	47.8 J	34.4	28.4	28.2	25.7	24.1	238	111	486	522	91.1	89.7	56.1	56.5
Beryllium	0.0973 J	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.0945 U	1 U	0.834 J	0.196 J	0.1 U	0.0508 J	0.1 U	0.1 U
Cadmium	0.492 J	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.356 U	1 U	0.351 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chromium	20.2	3 U	5.46	0.791 U	0.656 J	0.301 U	0.774 J	3 U	54.9 J	137 J	3.36 U	3.15 U	0.239 U	0.271 U
Copper	3.83 J	1 U	1.17 U	3.72 U	0.624 J	0.5 U	1.74 J	1.2	48.7 J	21 J	4.29 U	3.87 U	0.5 U	0.5 U
Cyanide	3.73 U	12 U	5 U	40.2	5 U	5 U	NA	12 U	5 U	5 U	5 U	5 U	5 U	5 U
Lead	1.76 U	1 UJ	0.202 U	0.123 U	0.1 U	0.053 J	1.76 U	1 UJ	6.61	1.81	0.315 J	0.275 J	0.1 U	0.1 U
Mercury	1.29	1.9	0.269 J	0.201 J	0.35 J	0.242 J	0.0507 J	0.2 U	0.182 J	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Nickel	15.5 J	4.9	3.72	1.06	0.751 J	0.385 U	4.71 J	4.8	34.3 J	87.4 J	1.81 U	1.69 U	0.2 U	0.2 U
Selenium	4.74 J	5 U	1.49	1.33	1.05	1.04	2.1 U	5 U	0.956 J	0.924 J	1.06	1.01	1.08	1.11
Thallium	5.08 J	1 UJ	0.2 U	0.2 U	0.2 U	0.2 U	2.99 J	1 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dissolved Metals (UG/L)														
Antimony, Dissolved	2.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	2.83 J	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Arsenic, Dissolved	2.04 U	5 U	0.385 J	0.417 J	0.347 J	0.309 J	2.04 U	6.8	1.1	1.14	0.372 J	0.367 J	0.25 J	0.292 J
Barium, Dissolved	39.6 J	33.3	25.5	25.5	24.5	23.7	236	110	232	259	79.9	80.3	55.5	55.8
Beryllium, Dissolved	0.0945 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.0945 U	1 U	0.317 J	0.395 J	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium, Dissolved	0.356 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.356 U	1 U	0.132 J	0.165 J	0.2 U	0.2 U	0.2 U	0.2 U
Chromium, Dissolved	9.93 J	3 U	0.901 J	0.259 U	0.109 J	0.26 U	0.595 J	3 U	26	28.7	0.761 U	0.8 U	0.2 U	0.2 U
Copper, Dissolved	3.25 J	1.3	0.5 U	1.14 U	0.716 J	0.764 J	1.96 J	1.2	22.7	27.6	1.35 U	1.73 U	0.5 U	0.5 U
Lead, Dissolved	1.76 U	1 UJ	0.0722 J	0.1 U	0.1 U	0.1 U	1.76 U	1 UJ	2.76	3.11	0.1 U	0.0638 J	0.1 U	0.1 U
Mercury, Dissolved	0.461	0.09 J	0.087 J	0.11 U	0.55 U	0.121 J	0.0162 U	0.2 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Nickel, Dissolved	10.4 J	4.7	1.91 U	0.556 J	0.226 J	0.772 U	4.36 J	4.3	14.8	16.2	0.449 U	0.485 U	0.26 J	0.2 U
Selenium, Dissolved	3.62 J	5 U	1.54	1.28	1.17	0.99 J	2.1 U	5 U	0.93 J	0.817 J	0.955 J	0.972 J	1.04	1.04
Thallium, Dissolved	2.99 J	1 UJ	0.2 U	0.2 U	0.2 U	0.2 U	2.54 U	1 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

Notes:

Shading indicates detections

J - Analyte present, value may or may not be accurate or precise

MG/L - Milligrams per liter

NA - Not analyzed

NG/L - Nanograms per liter

R - Unreliable Result

U - The material was analyzed for, but not detected

UG/L - Micrograms per liter

UJ - Analyte not detected, quantitation limit may be inaccurate

Appendix B, Table 1
Analytical Data from Monitoring Wells
SWMU 1 Annual Groundwater Monitoring Report
Former Vieques Naval Training Range, Vieques, Puert

Station ID	CGW1MW03		CGW1MW08		CGW1MW08			CGW1MW10					CGW1MW11	
Sample ID	VEW01-MW03-0119	VEW01-MW03P-0119	VEW01-MW08-0509	VEW01-MW08-0116	VEW01-MW08-0117	VEW01-MW08-0118	VEW01-MW08-0119	VEW01-MW10-0509	VEW01-MW10-0116	VEW01-MW10-0117	VEW01-MW10-0118	VEW01-MW10-0119	VEW01-MW11-0509	VEW01-MW11-0116
Sample Date	01/07/19	01/07/19	05/22/09	01/12/16	01/17/17	01/10/18	01/08/19	05/18/09	01/11/16	01/18/17	01/15/18	01/08/19	05/12/09	01/12/16
Chemical Name														
Toxaphene	0.48 U	0.51 U	0.94 U	0.48 U	0.56 U	0.47 U	0.52 U	0.95 U	0.51 U	0.57 U	0.55 U	0.52 U	0.94 U	0.54 U
Total Metals (UG/L)														
Antimony	0.5 U	2.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.486 J	0.5 U	0.325 J	0.5 U	2 U	0.332 J
Arsenic	0.363 J	1 U	5 U	0.323 J	0.343 J	0.255 J	0.266 J	5 U	0.279 J	0.304 J	0.188 J	0.298 J	10 U	1.01
Barium	69.4	67.2	46.2	36.5	39.8	39.5	34.6	39.4	51	48.2	41	45.5	410	121
Beryllium	0.1 U	0.5 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	2 U	0.1 U
Cadmium	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.239 J
Chromium	0.361 U	1 U	3 U	0.399 U	0.488 U	0.205 J	0.415 U	3 U	2.62	0.721 U	0.272 U	0.569 U	6 U	6.29
Copper	0.5 U	2.5 U	7.7	0.5 U	0.5 U	0.5 U	1.17	6.3	1.7 U	1.66 U	0.33 J	0.696 J	2.8	2.4 U
Cyanide	5 U	5 U	12 U	5 U	5 U	5 U	5 U	12 U	5 U	14.9	5 U	5 U	12 U	5 U
Lead	0.1 U	0.5 U	1 U	0.1 U	0.1 U	0.1 U	0.0637 J	0.21 J	0.194 U	0.0711 J	0.099 J	0.1 U	2 U	0.135 J
Mercury	0.11 U	0.11 U	0.2 U	0.201 J	0.11 U	0.53 J	0.69	0.2 U	0.11 U	0.11 U	0.11 U	0.11 U	0.2 U	0.11 U
Nickel	0.477 U	1 U	2.2	0.522 J	0.395 J	0.199 J	0.288 U	4.1	2.12	0.558 U	0.2 U	0.304 U	21.6	4.43
Selenium	1.13	1.22 J	2 J	2.49	1.88	2.48	2.27	2.9 J	2.92	2.93	3.06	2.93	10 U	0.171 J
Thallium	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.2 U
Dissolved Metals (UG/L)														
Antimony, Dissolved	0.5 U	2.5 U	1 U	0.315 J	0.5 U	0.5 U	0.5 U	1 U	0.375 J	0.5 U	0.401 J	0.5 U	2 U	0.348 J
Arsenic, Dissolved	0.368 J	1 U	5 U	0.344 J	0.322 J	0.27 J	0.24 J	5 U	0.256 J	0.306 J	0.264 J	0.273 J	10 U	0.857 J
Barium, Dissolved	67.3	63	44.3	46.9	33.8	35.5	33.5	38.1	48.7	46.3	40.9	45.7	400	111
Beryllium, Dissolved	0.1 U	0.5 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	2 U	0.1 U
Cadmium, Dissolved	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.228 J
Chromium, Dissolved	0.335 U	1 U	3 U	3	0.348 U	0.2 U	0.2 U	3 U	0.425 J	0.385 U	0.29 U	0.393 U	6 U	0.62 J
Copper, Dissolved	1.98	2.51 U	1.4	5.17	0.5 U	0.271 J	0.5 U	1.6	0.837 U	1.9 U	3.72 U	0.5 U	2.8 R	2.93
Lead, Dissolved	0.0708 J	0.5 U	1 U	0.445 U	0.1 U	0.1 U	0.1 U	0.06 J	0.0654 J	0.1 U	0.164 U	0.1 U	2 U	0.1 U
Mercury, Dissolved	0.11 U	0.11 U	0.2 U	0.11 U	0.11 U	0.55 U	0.081 J	0.2 U	0.11 U	0.11 U	0.11 U	0.11 U	0.2 U	0.11 U
Nickel, Dissolved	0.441 U	1 U	2.4	4.14	0.34 J	0.2 U	0.316 U	4	0.673 U	0.39 U	0.759 J	0.709 U	22.5	2.19
Selenium, Dissolved	1.12	1.22 J	2.6 J	2.6	1.86	2.5	2.3	2.6 J	2.9	2.85	3.11	3.03	10 U	0.18 J
Thallium, Dissolved	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.2 U

Notes:

Shading indicates detections

J - Analyte present, value may or may not be accurate or p

MG/L - Milligrams per liter

NA - Not analyzed

NG/L - Nanograms per liter

R - Unreliable Result

U - The material was analyzed for, but not detected

UG/L - Micrograms per liter

UJ - Analyte not detected, quantitation limit may be inaccu

Appendix B, Table 1
Analytical Data from Monitoring Wells
SWMU 1 Annual Groundwater Monitoring Report
Former Vieques Naval Training Range, Vieques, Puert

Station ID	CGW1MW11			CGW1MW13					
Sample ID	VEW01-MW11-0117	VEW01-MW11-0118	VEW01-MW11-0119	VEW01-MW13-0509	VEW01-MW13P-0509	VEW01-MW13-0116	VEW01-MW13-0117	VEW01-MW13-0118	VEW01-MW13-0119
Sample Date	01/18/17	01/12/18	01/10/19	05/20/09	05/20/09	01/07/16	01/17/17	01/11/18	01/09/19
Chemical Name									
Toxaphene	0.53 U	0.55 U	0.5 U	0.94 U	0.94 U	0.52 U	0.57 U	0.53 U	0.51 U
Total Metals (UG/L)									
Antimony	0.5 U	0.5 U	5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
Arsenic	0.725 J	0.471 J	1.36 J	5 U	5 U	0.292 J	0.302 J	0.22 J	0.26 J
Barium	130	95.4	98.4	19.2	18.7	18.9	18.2	18.5	19.8
Beryllium	0.5 U	0.1 U	1 U	1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	0.2 U	0.444 J	2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
Chromium	0.59 U	0.504 U	2 U	3 U	3 U	1.69	1.21 U	0.134 J	0.2 U
Copper	2.1 U	0.577 J	5 U	1 U	7.8 R	0.984 U	0.624 U	0.361 J	0.495 J
Cyanide	5 U	5 U	5 U	12 U	12 U	5 U	13.2	5 U	5 U
Lead	0.0649 J	0.11 J	1 U	1 U	0.08 J	0.1 U	0.1 U	0.0618 J	0.1 U
Mercury	0.11 U	0.11 U	0.11 U	0.2 U	0.2 U	0.062 J	0.11 U	0.55 U	0.11 U
Nickel	2.09 U	1.41	2.07 U	1.8 J	2	1.06	0.877 J	0.2 U	0.276 U
Selenium	0.3 U	0.225 J	3 U	4.2 J	3.4 J	4.53	4.35	3.42	3.44
Thallium	0.2 U	0.2 U	2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
Dissolved Metals (UG/L)									
Antimony, Dissolved	0.5 U	0.5 U	5 U	1 U	1 U	0.453 J	0.5 U	0.5 U	0.5 U
Arsenic, Dissolved	0.793 J	0.526 J	1.26 J	5 U	5 U	0.336 J	0.298 J	0.25 J	0.253 J
Barium, Dissolved	129	91.2	101	18.4	18.8	20.9	17.9	18.3	19
Beryllium, Dissolved	0.5 U	0.1 U	1 U	1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium, Dissolved	0.2 U	0.219 J	2 U	1 U	1 U	0.259 J	0.2 U	0.2 U	0.2 U
Chromium, Dissolved	1.08 U	0.2 U	2 U	3 U	3 U	11.4	0.441 U	0.2 U	0.2 U
Copper, Dissolved	3.68 U	1.4 U	5 U	1.1 R	1 R	12	0.5 U	0.5 U	0.5 U
Lead, Dissolved	0.0733 J	0.1 U	1 U	1 U	1 U	1.64	0.1 U	0.1 U	0.1 U
Mercury, Dissolved	0.11 U	0.11 U	0.11 U	0.2 U	0.2 U	0.11 U	0.11 U	0.55 U	0.11 U
Nickel, Dissolved	2.31 U	1.25	2.04 U	2.5 J	1.9	38.8	0.372 J	0.2 U	0.2 U
Selenium, Dissolved	0.162 J	0.213 J	3 U	5.1 J	5	4.38	4.27	3.58	3.39
Thallium, Dissolved	0.2 U	0.2 U	2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U

Notes:

Shading indicates detections
J - Analyte present, value may or may not be accurate or p
MG/L - Milligrams per liter
NA - Not analyzed
NG/L - Nanograms per liter
R - Unreliable Result
U - The material was analyzed for, but not detected
UG/L - Micrograms per liter
UJ - Analyte not detected, quantitation limit may be inaccu

Appendix B, Table 2
Analytical Data from QA/QC
SWMU 1 Annual Groundwater Monitoring Report
Former Vieques Naval Training Range, Vieques, Puerto Rico

Sample ID	VEW01-EB01-010716-GW	VEW01-EB01-010816-GW	VEW01-EB01-011116-GW	VEW01-EB01-011216-GW	VEW01-EB01-011717	VEW01-EB01-011817	VEW01-EB01-011118	VEW01-EB01-011518	VEW01-EB01-010719	VEW01-EB01-010919	VEW01-EB02-011118
Sample Date	1/7/16	1/8/16	1/11/16	1/12/16	1/17/17	1/18/17	1/11/18	1/15/18	01/07/19	01/09/19	1/11/18
Chemical Name											
Volatile Organic Compounds (UG/L)											
1,1,1-TRICHLOROETHANE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-TETRACHLOROETHANE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-TRICHLOROETHANE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-DICHLOROETHENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-TRICHLOROBENZENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,2-DIBROMO-3-CHLOROPROPANE	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-DIBROMOETHANE	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-DICHLOROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DICHLOROETHANE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DICHLOROPROPANE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DICHLOROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-DICHLOROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMODICHLOROMETHANE	0.11 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOFORM	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
BROMOMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CARBON TETRACHLORIDE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROFORM	37	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CIS-1,2-DICHLOROETHENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CIS-1,3-DICHLOROPROPENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
DIBROMOCHLOROMETHANE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
ETHYLBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
HEXACHLOROBUTADIENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
M- AND P-XYLENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
METHYLENE CHLORIDE	60	1.8 J	1.5 J	1.5 J	1 U	4.7	12	9.4	1 U	1 U	12
O-XYLENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
STYRENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TETRACHLOROETHENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TOLUENE	0.2 U	0.24 J	0.1 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 J	0.18 J	0.2 U
TRANS-1,2-DICHLOROETHENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRANS-1,3-DICHLOROPROPENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRICHLOROETHENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
VINYL CHLORIDE	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Semivolatile Organic Compounds (UG/L)											
2,4,6-TRICHLOROPHENOL	0.098 U	0.11 U	0.12 U	0.1 U	0.11 U	0.11 U	0.11 U	0.11 U	0.1 U	0.12 U	0.1 U
2,4-DICHLOROPHENOL	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
2,4-DIMETHYLPHENOL	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
2,4-DINITROPHENOL	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
2,4-DINITROTOLUENE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
2-CHLORONAPHTHALENE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
2-CHLOROPHENOL	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
3,3'-DICHLOROBENZIDINE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
4,6-DINITRO-2-METHYLPHENOL	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
ACENAPHTHENE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
ANTHRACENE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
ATRAZINE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
BENZO(A)ANTHRACENE	0.0096 U	0.01 U	0.0097 U	0.011 U	0.01 U	0.011 U	0.01 U	0.011 U	0.0097 U	0.011 U	0.01 U
BENZO(A)PYRENE	0.0096 U	0.01 U	0.0097 U	0.011 U	0.01 U	0.011 U	0.01 U	0.011 U	0.0097 U	0.011 U	0.01 U
BENZO(B)FLUORANTHENE	0.0096 U	0.01 U	0.0097 U	0.011 U	0.01 U	0.011 U	0.01 U	0.011 U	0.0097 U	0.011 U	0.01 U

Appendix B, Table 2
Analytical Data from QA/QC
SWMU 1 Annual Groundwater Monitoring Report
Former Vieques Naval Training Range, Vieques, Puert

Sample ID	VEW01-TB01-010716	VEW01-TB01-010816	VEW01-TB01-011116	VEW01-TB01-011216	VEW01-TB01-011717	VEW01-TB01-011817	VEW01-TB01-011118	VEW01-TB01-011518	VEW01-TB01-010719	VEW01-TB01-010819	VEW01-TB01-011019	VEW01-TB02-011118
Sample Date	1/7/16	1/8/16	1/11/16	1/12/16	1/17/17	1/18/17	1/11/18	1/15/18	01/07/19	01/08/19	01/10/19	1/11/18
Chemical Name												
Volatile Organic Compounds (UG/L)												
1,1,1-TRICHLOROETHANE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-TETRACHLOROETHANE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-TRICHLOROETHANE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-DICHLOROETHENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-TRICHLOROBENZENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,2-DIBROMO-3-CHLOROPROPANE	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-DIBROMOETHANE	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-DICHLOROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DICHLOROETHANE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DICHLOROPROPANE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DICHLOROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-DICHLOROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMODICHLOROMETHANE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.38 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOFORM	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1.6	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
BROMOMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CARBON TETRACHLORIDE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROFORM	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CIS-1,2-DICHLOROETHENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CIS-1,3-DICHLOROPROPENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
DIBROMOCHLOROMETHANE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.64	0.2 U	0.2 U	0.13 J	0.1 J	0.11 J	0.2 U
ETHYLBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
HEXACHLOROBUTADIENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
M- AND P-XYLENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
METHYLENE CHLORIDE	1 U	0.53 J	0.54 J	1.5 J	1 U	1 U	0.67 J	0.55 J	1 U	1 U	1 U	0.57 J
O-XYLENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
STYRENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TETRACHLOROETHENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TOLUENE	0.3 J	0.27 J	0.28 J	0.11 J	0.2 U	0.2 U	0.2 U	0.2 U	0.14 J	0.13 J	0.14 J	0.2 U
TRANS-1,2-DICHLOROETHENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRANS-1,3-DICHLOROPROPENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRICHLOROETHENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
VINYL CHLORIDE	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.012 J	0.011 J	0.01 J	0.02 U
Semivolatile Organic Compounds (UG/L)												
2,4,6-TRICHLOROPHENOL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2,4-DICHLOROPHENOL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2,4-DIMETHYLPHENOL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2,4-DINITROPHENOL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2,4-DINITROTOLUENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2-CHLORONAPHTHALENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2-CHLOROPHENOL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
3,3'-DICHLOROBENZIDINE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
4,6-DINITRO-2-METHYLPHENOL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ACENAPHTHENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ANTHRACENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ATRAZINE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
BENZO(A)ANTHRACENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
BENZO(A)PYRENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
BENZO(B)FLUORANTHENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Appendix B, Table 2
Analytical Data from QA/QC
SWMU 1 Annual Groundwater Monitoring Report
Former Vieques Naval Training Range, Vieques, Puerto Rico

Sample ID	VEW01-EB01-010716-GW	VEW01-EB01-010816-GW	VEW01-EB01-011116-GW	VEW01-EB01-011216-GW	VEW01-EB01-011717	VEW01-EB01-011817	VEW01-EB01-011118	VEW01-EB01-011518	VEW01-EB01-010719	VEW01-EB01-010919	VEW01-EB02-011118
Sample Date	1/7/16	1/8/16	1/11/16	1/12/16	1/17/17	1/18/17	1/11/18	1/15/18	01/07/19	01/09/19	1/11/18
Chemical Name											
BENZO(K)FLUORANTHENE	0.0096 U	0.01 U	0.0097 U	0.011 U	0.01 U	0.011 U	0.01 U	0.011 U	0.0097 U	0.011 U	0.01 U
BIS(2-CHLOROETHYL)ETHER	0.098 U	0.11 U	0.12 U	0.1 U	0.11 U	0.11 U	0.11 U	0.11 U	0.1 U	0.12 U	0.1 U
BIS(2-ETHYLHEXYL)PHTHALATE	1.2 U	1.4 U	1.4 U	1.2 U	2.6 J	3.4 J	1.7 U	1.3 U	1.2 U	1.4 U	1.3 U
BUTYLBENZYLPHTHALATE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
CHRYSENE	0.0096 U	0.01 U	0.0097 U	0.011 U	0.01 U	0.011 U	0.01 U	0.011 U	0.0097 U	0.011 U	0.01 U
DIBENZ(A,H)ANTHRACENE	0.0096 U	0.01 U	0.0097 U	0.011 U	0.01 U	0.011 U	0.01 U	0.011 U	0.0097 U	0.011 U	0.01 U
DIETHYLPHTHALATE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
DIMETHYL PHTHALATE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
Semivolatile Organic Compounds (UG/L) (continued)											
DI-N-BUTYLPHTHALATE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5.2 U	6 U	5.2 U
FLUORANTHENE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5.2 U	6 U	5.2 U
FLUORENE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5.2 U	6 U	5.2 U
HEXACHLOROBENZENE	0.098 U	0.11 U	0.12 U	0.1 U	0.11 U	0.11 U	0.11 U	0.11 U	0.1 U	0.12 U	0.1 U
HEXACHLOROCYCLOPENTADIENE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
HEXACHLOROETHANE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
INDENO(1,2,3-CD)PYRENE	0.0096 U	0.01 U	0.0097 U	0.011 U	0.01 U	0.011 U	0.01 U	0.011 U	0.0097 U	0.011 U	0.01 U
ISOPHORONE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
NITROBENZENE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
N-NITROSO-DI-N-PROPYLAMINE	0.098 U	0.11 U	0.12 U	0.1 U	0.11 U	0.11 U	0.11 U	0.11 U	0.1 U	0.12 U	0.1 U
N-NITROSODIPHENYLAMINE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
PENTACHLOROPHENOL	0.78 U	0.91 U	0.92 U	0.83 U	0.86 U	0.86 U	0.87 U	0.86 U	0.8 U	0.95 U	0.84 U
PHENOL	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
PYRENE	4.9 U	5.7 U	5.7 U	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5 U	6 U	5.2 U
Pesticide/Polychlorinated Biphenyls (UG/L)											
4,4'-DDD	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
4,4'-DDE	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
4,4'-DDT	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
ALDRIN	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
ALPHA-BHC	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
ALPHA-CHLORDANE	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
AROCLOR-1016	0.47 U	0.51 U	0.52 U	0.48 U	0.5 U	0.51 U	0.56 U	0.56 U	0.55 U	0.57 U	0.57 U
AROCLOR-1221	0.47 U	0.51 U	0.52 U	0.48 U	0.5 U	0.51 U	0.56 U	0.56 U	0.55 U	0.57 U	0.57 U
AROCLOR-1232	0.47 U	0.51 U	0.52 U	0.48 U	0.5 U	0.51 U	0.56 U	0.56 U	0.55 U	0.57 U	0.57 U
AROCLOR-1242	0.47 U	0.51 U	0.52 U	0.48 U	0.5 U	0.51 U	0.56 U	0.56 U	0.55 U	0.57 U	0.57 U
AROCLOR-1248	0.47 U	0.51 U	0.52 U	0.48 U	0.5 U	0.51 U	0.56 U	0.56 U	0.55 U	0.57 U	0.57 U
AROCLOR-1254	0.47 U	0.51 U	0.52 U	0.48 U	0.5 U	0.51 U	0.56 U	0.56 U	0.55 U	0.57 U	0.57 U
AROCLOR-1260	0.47 U	0.51 U	0.52 U	0.48 U	0.5 U	0.51 U	0.56 U	0.56 U	0.55 U	0.57 U	0.57 U
AROCLOR-1262	0.47 U	0.51 U	0.52 U	0.48 U	0.5 U	0.51 U	0.56 U	0.56 U	0.55 U	0.57 U	0.57 U
AROCLOR-1268	0.47 U	0.51 U	0.52 U	0.48 U	0.5 U	0.51 U	0.56 U	0.56 U	0.55 U	0.57 U	0.57 U
BETA-BHC	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
DIELDRIN	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
ENDOSULFAN I	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
ENDOSULFAN II	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
ENDOSULFAN SULFATE	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
ENDRIN	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
ENDRIN ALDEHYDE	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
ENDRIN KETONE	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
GAMMA-BHC (LINDANE)	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
GAMMA-CHLORDANE	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
HEPTACHLOR	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
HEPTACHLOR EPOXIDE	0.0094 U	0.01 U	0.011 U	0.0095 U	0.0099 U	0.01 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U
METHOXYCHLOR	0.094 UJ	0.1 UJ	0.1 UJ	0.095 UJ	0.099 U	0.1 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
TOXAPHENE	0.47 U	0.51 U	0.52 U	0.48 U	0.5 U	0.51 U	0.56 U	0.56 U	0.55 U	0.57 U	0.57 U

Appendix B, Table 2
Analytical Data from QA/QC
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Sample ID	VEW01-TB01-010716	VEW01-TB01-010816	VEW01-TB01-011116	VEW01-TB01-011216	VEW01-TB01-011717	VEW01-TB01-011817	VEW01-TB01-011118	VEW01-TB01-011518	VEW01-TB01-010719	VEW01-TB01-010819	VEW01-TB01-011019	VEW01-TB02-011118
Sample Date	1/7/16	1/8/16	1/11/16	1/12/16	1/17/17	1/18/17	1/11/18	1/15/18	01/07/19	01/08/19	01/10/19	1/11/18
Chemical Name												
BENZO(K)FLUORANTHENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
BIS(2-CHLOROETHYL)ETHER	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
BIS(2-ETHYLHEXYL)PHTHALATE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
BUTYLBENZYLPHTHALATE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CHRYSENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
DIBENZ(A,H)ANTHRACENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
DIETHYLPHTHALATE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
DIMETHYL PHTHALATE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Semivolatile Organic Compounds (UG/L) (continued)												
DI-N-BUTYLPHTHALATE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FLUORANTHENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
FLUORENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
HEXACHLOROBENZENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
HEXACHLOROCYCLOPENTADIENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
HEXACHLOROETHANE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
INDENO(1,2,3-CD)PYRENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ISOPHORONE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
NITROBENZENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
N-NITROSO-DI-N-PROPYLAMINE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
N-NITROSODIPHENYLAMINE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
PENTACHLOROPHENOL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
PHENOL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
PYRENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pesticide/Polychlorinated Biphenyls (UG/L)												
4,4'-DDD	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
4,4'-DDE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
4,4'-DDT	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ALDRIN	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ALPHA-BHC	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ALPHA-CHLORDANE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
AROCLOR-1016	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
AROCLOR-1221	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
AROCLOR-1232	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
AROCLOR-1242	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
AROCLOR-1248	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
AROCLOR-1254	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
AROCLOR-1260	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
AROCLOR-1262	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
AROCLOR-1268	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
BETA-BHC	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
DIELDRIN	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ENDOSULFAN I	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ENDOSULFAN II	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ENDOSULFAN SULFATE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ENDRIN	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ENDRIN ALDEHYDE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ENDRIN KETONE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GAMMA-BHC (LINDANE)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GAMMA-CHLORDANE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
HEPTACHLOR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
HEPTACHLOR EPOXIDE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
METHOXYCHLOR	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TOXAPHENE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Appendix B, Table 2
Analytical Data from QA/QC
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Former Vieques Naval Training Range, Vieques, Puerto Rico

Sample ID	VEW01-EB01-010716-GW	VEW01-EB01-010816-GW	VEW01-EB01-011116-GW	VEW01-EB01-011216-GW	VEW01-EB01-011717	VEW01-EB01-011817	VEW01-EB01-011118	VEW01-EB01-011518	VEW01-EB01-010719	VEW01-EB01-010919	VEW01-EB02-011118
Sample Date	1/7/16	1/8/16	1/11/16	1/12/16	1/17/17	1/18/17	1/11/18	1/15/18	01/07/19	01/09/19	1/11/18
Chemical Name											
Total Metals (UG/L)											
ANTIMONY	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ARSENIC	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BARIUM	0.5 U	0.316 J	0.381 J	0.5 U	0.481 J	0.5 U	0.275 J	0.5 U	0.5 U	0.279 J	0.327 J
BERYLLIUM	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CADMIUM	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHROMIUM	0.136 J	0.116 J	0.181 J	0.116 J	0.304 J	0.59 J	0.2 U	0.179 J	0.145 J	0.19 J	0.2 U
COPPER	1.67	0.704 J	0.768 J	0.28 J	0.727 J	1.16	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CYANIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
LEAD	0.0792 J	0.058 J	0.0858 J	0.1 U	0.0546 J	0.1 U	0.0874 J	0.1 U	0.1 U	0.0578 J	0.1 U
MERCURY	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.55 U	0.11 U	0.11 U	0.11 U	0.55 U
NICKEL	0.2 U	0.2 U	0.158 J	0.2 U	0.2 U	0.259 J	0.2 U	0.2 U	0.192 J	0.335 J	0.2 U
SELENIUM	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
THALLIUM	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dissolved Metals (UG/L)											
ANTIMONY	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ARSENIC	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BARIUM	0.5 U	0.5 U	0.255 J	0.5 U	0.5 U	0.5 U	0.5 U	0.255 J	0.5 U	0.252 J	0.277 J
BERYLLIUM	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CADMIUM	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHROMIUM	0.108 J	0.2 U	0.2 U	0.2 U	0.233 J	0.232 J	0.2 U	0.12 J	0.141 J	0.363 J	0.2 U
COPPER	1.15	0.443 J	1.4	0.5 U	1.31	1.39	0.5 U	1.52	0.5 U	0.5 U	0.251 J
LEAD	0.0578 J	0.0532 J	0.1 U	0.088 J	0.0557 J	0.1 U	0.1 U	0.558 J	0.1 U	0.1 U	0.0577 J
MERCURY	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.55 U	0.11 U	0.11 U	0.058 J	0.55 U
NICKEL	0.663 J	0.2 U	0.246 J	0.2 U	0.2 U	0.475 J	0.2 U	0.2 U	0.309 J	0.663 J	0.2 U
SELENIUM	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
THALLIUM	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

Notes:
J - Estimated.
NS - Not sampled
U - Non-detect
UG/L - Micrograms per liter
NA - Not analyzed
NG/L - Nanograms per liter
R - Unreliable Result
U - The material was analyzed for, but not detected
UG/L - Micrograms per liter
UJ - Analyte not detected, quantitation limit may be inaccurate

Appendix B, Table 2
Analytical Data from QA/QC
SWMU 1 Annual Groundwater Monitoring Report
Former Vieques Naval Training Range, Vieques, Puert

Sample ID	VEW01-TB01-010716	VEW01-TB01-010816	VEW01-TB01-011116	VEW01-TB01-011216	VEW01-TB01-011717	VEW01-TB01-011817	VEW01-TB01-011118	VEW01-TB01-011518	VEW01-TB01-010719	VEW01-TB01-010819	VEW01-TB01-011019	VEW01-TB02-011118
Sample Date	1/7/16	1/8/16	1/11/16	1/12/16	1/17/17	1/18/17	1/11/18	1/15/18	01/07/19	01/08/19	01/10/19	1/11/18
Chemical Name												
Total Metals (UG/L)												
ANTIMONY	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ARSENIC	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
BARIUM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
BERYLLIUM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CADMIUM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CHROMIUM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
COPPER	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CYANIDE	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
LEAD	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MERCURY	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
NICKEL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SELENIUM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
THALLIUM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Dissolved Metals (UG/L)												
ANTIMONY	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ARSENIC	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
BARIUM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
BERYLLIUM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CADMIUM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CHROMIUM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
COPPER	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
LEAD	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MERCURY	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
NICKEL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SELENIUM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
THALLIUM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:
J - Estimated.
NS - Not sampled
U - Non-detect
UG/L - Micrograms per liter
NA - Not analyzed
NG/L - Nanograms per liter
R - Unreliable Result
U - The material was analyzed for, but not detected
UG/L - Micrograms per liter
UJ - Analyte not detected, quantitation limit may be inaccu

Appendix C
Data Validation Reports

ENVIRONMENTAL
Data Services, Inc.

DATA VALIDATION SUMMARY REPORT
VIEQUES ISLAND, PUERTO RICO

Client: CH2M HILL, Inc., Chantilly, Virginia
SDG: 19A031
Laboratory: EMAX Laboratories, Inc., Torrance, California
Site: Vieques Island, CTO-013, SWMU 1, Puerto Rico
Date: March 4, 2019

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VEW01-EB01-010719	A031-01	Water
2	VEW01-MW03-0119	A031-02	Water
3	VEW01-MW03P-0119	A031-03	Water
3MS†	VEW01-MW03P-0119MS	A031-03MS	Water
3MSD†	VEW01-MW03P-0119MSD	A031-03MSD	Water
4*	VEW01-TB01-010719	A031-04	Water
5	VEW01-MW02-0119	A031-05	Water
6	VEW01-MW08-0119	A031-06	Water

* - VOC and VOC-SIM only † - Metals only

A full data validation was performed on the analytical data for four water samples, one aqueous equipment blank sample, and one aqueous trip blank sample collected on January 7-8, 2019 by CH2M HILL at the Vieques Island SWMU 1 site in Puerto Rico. The samples were analyzed under the *"Test Methods for the Evaluation of Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions" and the U.S. Department of Defense (DoD) Quality Systems Manual (QSM), Version 5.0 (DoD 2013).*

Specific method references are as follows:

Analysis	*Method References*
VOC	USEPA SW-846 Method 8260B
VOC SIM	USEPA SW-846 Method 8260B SIM
SVOC	USEPA SW-846 Method 8270D
SVOC SIM	USEPA SW-846 Method 8270D SIM
PAH SIM	USEPA SW-846 Method 8270D SIM
Pesticides	USEPA SW-846 Method 8081B
PCB	USEPA SW-846 Method 8082A
Total Metals/Hg/Cn	USEPA SW-846 Methods 6020A/7470A/9014
Dissolved Metals/Hg	USEPA SW-846 Methods 6020A/7470A

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Solid Waste Management Unit 1 Groundwater Long-Term Monitoring Sampling and Analysis Plan, July 2012, and the USEPA Region II Data Review Standard Operating Procedures (SOPs) as follows:

- SOP Number HW-33A, Revision 1, September 2016: Low/Medium Volatile Data Validation;
- SOP Number HW-35A, Revision 1, September 2016: Semivolatile Data Validation;
- SOP Number HW-36A, Revision 1, October 2016: Pesticide Data Validation;
- SOP Number HW-37A, Revision 0, July 2015: Polychlorinated Biphenyl (PCB) Aroclor Data Validation;
    - SOP Number HW-3b, Revision 1, September 2016: ICP-MS Data Validation;
- SOP Number HW-3c, Revision 1, September 2016: Mercury and Cyanide Data Validation;
- and the reviewer's professional judgment.

The following items/criteria were reviewed for this report:

Organics

- Holding times and sample preservation
- Gas Chromatography/Mass Spectrometry (GC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field blank contamination
- Surrogate Spike recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample (LCS) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Tentatively Identified Compounds (TICs)
- Field Duplicate sample precision

Inorganics

- Holding times and sample preservation
- ICP/MS Tuning
- Initial and continuing calibration verifications
- Method blank and field blank contamination
- ICP Interference Check Sample
- Laboratory Control Sample (LCS) recoveries
- Matrix Spike Analysis
- Duplicate Sample Analysis
- ICP Serial Dilution
- Compound Quantitation
- ICP/MS Internal standards
- Field Duplicate sample precision

Data Usability Assessment

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedences of QC criteria.

Volatile Organic Compounds (VOC)

Holding Times

- All samples were analyzed within 14 days for preserved water samples.

GC/MS Tuning

- All criteria were met.

Initial Calibration

- All %RSD and/or correlation coefficients and mean RRF criteria were met.

Continuing Calibration

- All %D and RRF criteria were met.

Method Blank

- The method blanks were free of contamination.

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010719	Toluene	0.30	None	All Associated ND
VEW01-TB01-010719	Dibromochloromethane	0.13	None	All Associated ND
	Toluene	0.14	None	

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- MS/MSD samples were not analyzed.

Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

- All criteria were met.

Tentatively Identified Compounds (TICs)

- TICs were not reported.

Field Duplicate Sample Precision

- Field duplicate results are summarized below. The precision was acceptable.

Compound	VEW01-MW03-0119 ug/L	VEW01-MW03P-0119 ug/L	RPD	Qualifier
None	ND	ND	-	-

Volatile Organic Compounds (VOC) by SIM

Holding Times

- All samples were analyzed within 14 days for preserved water samples.

GC/MS Tuning

- All criteria were met.

Initial Calibration

- All %RSD and/or correlation coefficients and mean RRF criteria were met.

Continuing Calibration

- All %D and RRF criteria were met.

Method Blank

- The method blanks were free of contamination.

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010719	None - ND	-	-	-
VEW01-TB01-010719	Vinyl Chloride	0.012	None	All Associated ND

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- MS/MSD samples were not analyzed.

Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

- All criteria were met.

Tentatively Identified Compounds (TICs)

- TICs were not reported.

Field Duplicate Sample Precision

- Field duplicate results are summarized below. The precision was acceptable.

Compound	VEW01-MW03-0119 ug/L	VEW01-MW03P-0119 ug/L	RPD	Qualifier
None	ND	ND	-	-

Semivolatile Organic Compounds (SVOCs)

Holding Times

- All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

GC/MS Tuning

- All criteria were met.

Initial Calibration

- All %RSD and/or correlation coefficients and mean RRF criteria were met.

Continuing Calibration

- All %D and RRF criteria were met.

Method Blank

- The method blanks were free of contamination.

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010719	None - ND	-	-	-

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- MS/MSD samples were not analyzed.

Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

- All criteria were met.

Tentatively Identified Compounds (TICs)

- TICs were not reported.

Field Duplicate Sample Precision

- Field duplicate results are summarized below. The precision was acceptable.

Compound	VEW01-MW03-0119 ug/L	VEW01-MW03P-0119 ug/L	RPD	Qualifier
None	ND	ND	-	-

Semivolatile Organic Compounds by SIM (SVOC-SIM)

Holding Times

- All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

GC/MS Tuning

- All criteria were met.

Initial Calibration

- All %RSD and/or correlation coefficients and mean RRF criteria were met.

Continuing Calibration

- All %D and RRF criteria were met.

Method Blank

- The method blanks were free of contamination.

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010719	None - ND	-	-	-

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- MS/MSD samples were not analyzed.

Laboratory Control Samples

- The LCS samples exhibited acceptable %R values.

Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

- All criteria were met.

Field Duplicate Sample Precision

- Field duplicate results are summarized below. The precision was acceptable.

Compound	VEW01-MW03-0119 ug/L	VEW01-MW03P-0119 ug/L	RPD	Qualifier
None	ND	ND	-	-

Polynuclear Aromatic Hydrocarbons by SIM

Holding Times

- All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

GC/MS Tuning

- All criteria were met.

Initial Calibration

- All %RSD and/or correlation coefficients and mean RRF criteria were met.

Continuing Calibration

- All %D and RRF criteria were met.

Method Blank

- The method blanks were free of contamination.

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010719	None - ND	-	-	-

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- MS/MSD samples were not analyzed.

Laboratory Control Samples

- The LCS samples exhibited acceptable %R values.

Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

- All criteria were met.

Field Duplicate Sample Precision

- Field duplicate results are summarized below. The precision was acceptable.

Compound	VEW01-MW03-0119 ug/L	VEW01-MW03P-0119 ug/L	RPD	Qualifier
None	ND	ND	-	-

Pesticides (Pest)

Holding Times

- All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Initial Calibration

- All %RSD and/or correlation coefficient criteria were met.

Continuing Calibration

- All %D criteria were met.

Method Blank

- The method blanks were free of contamination.

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010719	None - ND	-	-	-

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- MS/MSD samples were not analyzed.

Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

Compound Quantitation

- All criteria were met.

Field Duplicate Sample Precision

- Field duplicate results are summarized below. The precision was acceptable.

Compound	VEW01-MW03-0119 ug/L	VEW01-MW03P-0119 ug/L	RPD	Qualifier
None	ND	ND	-	-

GC Column Difference Results

- All criteria were met.

Polychlorinated Biphenyls (PCBs)

Holding Times

- All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Initial Calibration

- All %RSD and/or correlation coefficient criteria were met.

Continuing Calibration

- All %D criteria were met.

Method Blank

- The method blanks were free of contamination.

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010719	None - ND	-	-	-

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- MS/MSD samples were not analyzed.

Laboratory Control Samples

- The LCS samples exhibited acceptable %R values.

Compound Quantitation

- All criteria were met.

Field Duplicate Sample Precision

- Field duplicate results are summarized below. The precision was acceptable.

Compound	VEW01-MW03-0119 ug/L	VEW01-MW03P-0119 ug/L	RPD	Qualifier
None	ND	ND	-	-

GC Column Difference Results

- All criteria were met.

Total & Dissolved Metals, Mercury & Cyanide

Holding Times

- All samples were prepared and analyzed within 14 days for cyanide, 28 days for mercury and 180 days for all other metals.

ICP/MS Tuning

- All criteria were met.

Initial Calibration Verification

- All initial calibration criteria were met.

Continuing Calibration Verification

- All continuing calibration criteria were met.

Method Blank

- The method blanks were free of contamination.

Dissolved Metals				
Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
MBLK2W	Barium	0.361	None	All Associated >10X
	Copper	0.462	U	3D
	Lead	0.0689	None	All Associated ND

Field Blank

- The field QC samples exhibited the following contamination.

Total Metals				
Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010719	Chromium	0.145	U	2, 5, 6
	Nickel	0.192	U	

Dissolved Metals				
Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010719	Chromium	0.141	U	2D, 5D, 6D
	Nickel	0.309	U	

ICP Interference Check Sample

- The ICP interference check sample exhibited acceptable %R values.

Laboratory Control Samples

- The LCS sample exhibited acceptable recoveries.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable %R and RPD values.

ICP Serial Dilution

- The ICP serial dilution percent differences (%D) were within acceptable criteria.

Compound Quantitation

- All criteria were met.

ICP/MS Internal Standards

- All internal standards met relative intensity criteria.

Field Duplicate Sample Precision

- Field duplicate results are summarized below. The precision was acceptable.

Total Metals				
Compound	VEW01-MW03-0119 ug/L	VEW01-MW03P-0119 ug/L	RPD	Qualifier
Arsenic	0.363	ND	NC	None
Barium	69.4	67.2	3%	
Selenium	1.13	1.22	8%	

Dissolved Metals				
Compound	VEW01-MW03-0119 ug/L	VEW01-MW03P-0119 ug/L	RPD	Qualifier
Arsenic	0.368	ND	NC	None
Barium	67.3	63.0	7%	
Copper	1.98	2.51	24%	
Lead	0.0708	ND	NC	
Selenium	1.12	1.22	9%	

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver Dated: 3/7/19

Nancy Weaver
Senior Chemist

Data Qualifiers

U	=	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted Contract Required Quantitation Limit (CRQL) for sample and method.
UJ	=	The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
J	=	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the CRQL).
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 results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
NJ	=	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/07/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/14/19 19:17
Sample ID:	VEW01-EB01-010719	Date Analyzed:	01/14/19 19:17
Lab Samp ID:	A031-01	Dilution Factor:	1
Lab File ID:	RAR151	Matrix :	WATER
Ext Btch ID:	VOF3A09	% Moisture :	NA
Calib. Ref.:	RAR131	Instrument ID :	F3

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
BENZENE	ND	1.0	0.10	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROFORM	ND	1.0	0.10	0.20
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	ND	0.50	0.10	0.20
ETHYLBENZENE	ND	0.50	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
M- AND P-XYLENE	ND	2.0	0.21	0.40
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
O-XYLENE	ND	1.0	0.10	0.20
STYRENE	ND	1.0	0.25	0.50
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	0.30J	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	9.58	10.00	95.8	70-120
4-BROMOFLUOROBENZENE	10.0	10.00	100	75-120
TOLUENE-D8	10.6	10.00	106	85-120
DIBROMOFLUOROMETHANE	9.99	10.00	99.9	85-115

NW 3/4/19

2

METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/07/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/14/19 19:44
Sample ID:	VEW01-MW03-0119	Date Analyzed:	01/14/19 19:44
Lab Samp ID:	A031-02	Dilution Factor:	1
Lab File ID:	RAR152	Matrix :	WATER
Ext Btch ID:	VOF3A09	% Moisture :	NA
Calib. Ref.:	RAR131	Instrument ID :	F3

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
BENZENE	ND	1.0	0.10	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROFORM	ND	1.0	0.10	0.20
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	ND	0.50	0.10	0.20
ETHYLBENZENE	ND	0.50	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
M- AND P-XYLENE	ND	2.0	0.21	0.40
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
O-XYLENE	ND	1.0	0.10	0.20
STYRENE	ND	1.0	0.25	0.50
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	ND	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	9.69	10.00	96.9	70-120
4-BROMOFLUOROBENZENE	10.5	10.00	105	75-120
TOLUENE-D8	10.4	10.00	104	85-120
DIBROMOFLUOROMETHANE	10.2	10.00	102	85-115

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METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/07/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/14/19 20:11
Sample ID:	VEW01-MW03P-0119	Date Analyzed:	01/14/19 20:11
Lab Samp ID:	A031-03	Dilution Factor:	1
Lab File ID:	RAR153	Matrix :	WATER
Ext Btch ID:	VOF3A09	% Moisture :	NA
Calib. Ref.:	RAR131	Instrument ID :	F3

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
BENZENE	ND	1.0	0.10	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROFORM	ND	1.0	0.10	0.20
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	ND	0.50	0.10	0.20
ETHYLBENZENE	ND	0.50	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
M- AND P-XYLENE	ND	2.0	0.21	0.40
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
O-XYLENE	ND	1.0	0.10	0.20
STYRENE	ND	1.0	0.25	0.50
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	ND	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	9.69	10.00	96.9	70-120
4-BROMOFLUOROBENZENE	10.3	10.00	103	75-120
TOLUENE-D8	10.2	10.00	102	85-120
DIBROMOFLUOROMETHANE	10.0	10.00	100	85-115

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METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/07/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/14/19 18:49
Sample ID	: VEW01-TB01-010719	Date Analyzed:	01/14/19 18:49
Lab Samp ID	: A031-04	Dilution Factor:	1
Lab File ID	: RAR150	Matrix	: WATER
Ext Btch ID	: VOF3A09	% Moisture	: NA
Calib. Ref.	: RAR131	Instrument ID	: F3

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
BENZENE	ND	1.0	0.10	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROFORM	ND	1.0	0.10	0.20
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	0.13J	0.50	0.10	0.20
ETHYLBENZENE	ND	0.50	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
M- AND P-XYLENE	ND	2.0	0.21	0.40
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
O-XYLENE	ND	1.0	0.10	0.20
STYRENE	ND	1.0	0.25	0.50
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	0.14J	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	9.42	10.00	94.2	70-120
4-BROMOFLUOROBENZENE	10.3	10.00	103	75-120
TOLUENE-D8	10.4	10.00	104	85-120
DIBROMOFLUOROMETHANE	10.1	10.00	101	85-115

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METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client : CH2M HILL	Date Collected: 01/08/19
Project : CTO-013 VIEQUES_EAST SWMU-1	Date Received: 01/09/19
Batch No. : 19A031	Date Extracted: 01/14/19 20:38
Sample ID: VEW01-MW02-0119	Date Analyzed: 01/14/19 20:38
Lab Samp ID: A031-05	Dilution Factor: 1
Lab File ID: RAR154	Matrix : WATER
Ext Btch ID: VOF3A09	% Moisture : NA
Calib. Ref.: RAR131	Instrument ID : F3

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
BENZENE	ND	1.0	0.10	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROFORM	ND	1.0	0.10	0.20
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	ND	0.50	0.10	0.20
ETHYLBENZENE	ND	0.50	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
M- AND P-XYLENE	ND	2.0	0.21	0.40
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
O-XYLENE	ND	1.0	0.10	0.20
STYRENE	ND	1.0	0.25	0.50
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	ND	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	9.63	10.00	96.3	70-120
4-BROMOFLUOROBENZENE	10.1	10.00	101	75-120
TOLUENE-D8	10.5	10.00	105	85-120
DIBROMOFLUOROMETHANE	10.2	10.00	102	85-115

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METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/08/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/14/19 21:05
Sample ID:	VEW01-MW08-0119	Date Analyzed:	01/14/19 21:05
Lab Samp ID:	A031-06	Dilution Factor:	1
Lab File ID:	RAR155	Matrix :	WATER
Ext Btch ID:	VOF3A09	% Moisture :	NA
Calib. Ref.:	RAR131	Instrument ID :	F3

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
BENZENE	ND	1.0	0.10	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROFORM	ND	1.0	0.10	0.20
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	ND	0.50	0.10	0.20
ETHYLBENZENE	ND	0.50	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
M- AND P-XYLENE	ND	2.0	0.21	0.40
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
O-XYLENE	ND	1.0	0.10	0.20
STYRENE	ND	1.0	0.25	0.50
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	ND	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	9.67	10.00	96.7	70-120
4-BROMOFLUOROBENZENE	10.5	10.00	105	75-120
TOLUENE-D8	10.2	10.00	102	85-120
DIBROMOFLUOROMETHANE	10.2	10.00	102	85-115

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METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/07/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/18/19 17:04
Sample ID:	VEW01-EB01-010719	Date Analyzed:	01/18/19 17:04
Lab Samp ID:	A031-01	Dilution Factor:	1
Lab File ID:	RAY281	Matrix :	WATER
Ext Btch ID:	VOF5A13	% Moisture :	NA
Calib. Ref.:	RHY772	Instrument ID :	TOF5

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,2-DIBROMO-3-CHLOROPROPANE	ND	0.050	0.010	0.020
1,2-DIBROMOETHANE	ND	0.050	0.010	0.020
VINYL CHLORIDE	ND	0.050	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	0.485	0.5000	97.0	70-120
4-BROMOFLUOROBENZENE	0.441	0.5000	88.3	75-120
TOLUENE-D8	0.476	0.5000	95.2	85-120

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METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/07/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/18/19 17:28
Sample ID:	VEW01-MW03-0119	Date Analyzed:	01/18/19 17:28
Lab Samp ID:	A031-02	Dilution Factor:	1
Lab File ID:	RAY282	Matrix :	WATER
Ext Btch ID:	VOF5A13	% Moisture :	NA
Calib. Ref.:	RHY772	Instrument ID :	TOF5

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,2-DIBROMO-3-CHLOROPROPANE	ND	0.050	0.010	0.020
1,2-DIBROMOETHANE	ND	0.050	0.010	0.020
VINYL CHLORIDE	ND	0.050	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	0.511	0.5000	102	70-120
4-BROMOFLUOROBENZENE	0.435	0.5000	87.1	75-120
TOLUENE-D8	0.471	0.5000	94.2	85-120

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METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/07/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/18/19 17:52
Sample ID:	VEW01-MW03P-0119	Date Analyzed:	01/18/19 17:52
Lab Samp ID:	A031-03	Dilution Factor:	1
Lab File ID:	RAY283	Matrix :	WATER
Ext Btch ID:	VOF5A13	% Moisture :	NA
Calib. Ref.:	RHY772	Instrument ID :	TOF5

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,2-DIBROMO-3-CHLOROPROPANE	ND	0.050	0.010	0.020
1,2-DIBROMOETHANE	ND	0.050	0.010	0.020
VINYL CHLORIDE	ND	0.050	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	0.487	0.5000	97.4	70-120
4-BROMOFLUOROBENZENE	0.438	0.5000	87.7	75-120
TOLUENE-D8	0.478	0.5000	95.5	85-120

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METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/07/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/18/19 18:16
Sample ID:	VEW01-TB01-010719	Date Analyzed:	01/18/19 18:16
Lab Samp ID:	A031-04	Dilution Factor:	1
Lab File ID:	RAY284	Matrix :	WATER
Ext Btch ID:	VOF5A13	% Moisture :	NA
Calib. Ref.:	RHY772	Instrument ID :	TOF5

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,2-DIBROMO-3-CHLOROPROPANE	ND	0.050	0.010	0.020
1,2-DIBROMOETHANE	ND	0.050	0.010	0.020
VINYL CHLORIDE	0.012J	0.050	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	0.519	0.5000	104	70-120
4-BROMOFLUOROBENZENE	0.434	0.5000	86.9	75-120
TOLUENE-D8	0.466	0.5000	93.2	85-120

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METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/08/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/18/19 18:41
Sample ID:	VEW01-MW02-0119	Date Analyzed:	01/18/19 18:41
Lab Samp ID:	A031-05	Dilution Factor:	1
Lab File ID:	RAY285	Matrix :	WATER
Ext Btch ID:	VOF5A13	% Moisture :	NA
Calib. Ref.:	RHY772	Instrument ID :	TOF5

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,2-DIBROMO-3-CHLOROPROPANE	ND	0.050	0.010	0.020
1,2-DIBROMOETHANE	ND	0.050	0.010	0.020
VINYL CHLORIDE	ND	0.050	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	0.517	0.5000	103	70-120
4-BROMOFLUOROBENZENE	0.436	0.5000	87.1	75-120
TOLUENE-D8	0.478	0.5000	95.6	85-120

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METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/08/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/18/19 19:05
Sample ID:	VEW01-MW08-0119	Date Analyzed:	01/18/19 19:05
Lab Samp ID:	A031-06	Dilution Factor:	1
Lab File ID:	RAY286	Matrix :	WATER
Ext Btch ID:	VOF5A13	% Moisture :	NA
Calib. Ref.:	RHY772	Instrument ID :	TOF5

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,2-DIBROMO-3-CHLOROPROPANE	ND	0.050	0.010	0.020
1,2-DIBROMOETHANE	ND	0.050	0.010	0.020
VINYL CHLORIDE	ND	0.050	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	0.513	0.5000	103	70-120
4-BROMOFLUOROBENZENE	0.427	0.5000	85.3	75-120
TOLUENE-D8	0.463	0.5000	92.5	85-120

NW 3/4/19

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/07/19 14:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-EB01-010719	Date Analyzed:	01/15/19 14:25
Lab Samp ID:	19A031-01	Dilution Factor:	1
Lab File ID:	RAJ120	Matrix:	WATER
Ext Btch ID:	19SVA009W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
2,4-Dichlorophenol	ND	10	2.5	5.0
2,4-Dimethylphenol	ND	10	2.6	5.0
2,4-Dinitrophenol	ND	20	2.5	5.0
2,4-Dinitrotoluene	ND	10	2.5	5.0
2-Chloronaphthalene	ND	10	2.5	5.0
2-Chlorophenol	ND	10	2.5	5.0
3,3'-Dichlorobenzidine	ND	10	2.5	5.0
4,6-Dinitro-2-methylphenol	ND	20	2.5	5.0
Acenaphthene	ND	10	2.5	5.0
Anthracene	ND	10	2.5	5.0
Butylbenzylphthalate	ND	10	2.5	5.0
Diethylphthalate	ND	10	2.5	5.0
Dimethyl phthalate	ND	10	2.5	5.0
Di-n-butylphthalate	ND	10	2.5	5.0
Fluoranthene	ND	10	2.5	5.0
Fluorene	ND	10	2.5	5.0
Hexachloroethane	ND	10	2.5	5.0
Isophorone	ND	10	2.5	5.0
Nitrobenzene	ND	10	2.5	5.0
n-Nitrosodiphenylamine	ND	10	2.5	5.0
Phenol	ND	10	2.5	5.0
Pyrene	ND	10	2.5	5.0
Hexachlorocyclopentadiene	ND	10	2.5	5.0

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	30.1	60.0	50	40-125
2-Fluorobiphenyl	11.5	20.0	58	50-110
2-Fluorophenol	25.2	60.0	42	20-110
Nitrobenzene-d5	12.7	20.0	63	40-110
Phenol-d5	32.0	60.0	53	10-115
Terphenyl-d14	13.3	20.0	67	50-135

Notes:
(1): 4-Methylphenol cannot be separated from 3-Methylphenol
(2): n-nitrosodiphenylamine cannot be separated from Diphenylamine
(3): 1,2 Diphenylhydrazine analyzed as Azobenzene due to decomposition in injector

Detection limits are reported relative to sample result significant figures.
Sample Amount : 1000ml Final Volume : 2ml
Prepared by : JMuert Analyzed by : KV

NW 3/4/19

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS-App.IX

Client	: CH2M HILL	Date Collected:	01/07/19 14:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-EB01-010719	Date Analyzed:	01/15/19 14:25
Lab Samp ID	: 19A031-01	Dilution Factor:	1
Lab File ID	: RAJ120	Matrix:	WATER
Ext Btch ID	: 19SVA009W	% Moisture:	NA
Calib. Ref.	: RIJ148	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Atrazine	ND	10	2.5	5.0

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 1000ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KVu

NW 3/4/19

2

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/07/19 11:10
Project	: CTO-013 VIEQUES EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-MW03-0119	Date Analyzed:	01/15/19 14:44
Lab Samp ID:	19A031-02	Dilution Factor:	1
Lab File ID:	RAJ121	Matrix:	WATER
Ext Btch ID:	19SVA009W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
2,4-Dichlorophenol	ND	10	2.5	5.0
2,4-Dimethylphenol	ND	10	2.6	5.0
2,4-Dinitrophenol	ND	20	2.5	5.0
2,4-Dinitrotoluene	ND	10	2.5	5.0
2-Chloronaphthalene	ND	10	2.5	5.0
2-Chlorophenol	ND	10	2.5	5.0
3,3'-Dichlorobenzidine	ND	10	2.5	5.0
4,6-Dinitro-2-methylphenol	ND	20	2.5	5.0
Acenaphthene	ND	10	2.5	5.0
Anthracene	ND	10	2.5	5.0
Butylbenzylphthalate	ND	10	2.5	5.0
Diethylphthalate	ND	10	2.5	5.0
Dimethyl phthalate	ND	10	2.5	5.0
Di-n-butylphthalate	ND	10	2.5	5.0
Fluoranthene	ND	10	2.5	5.0
Fluorene	ND	10	2.5	5.0
Hexachloroethane	ND	10	2.5	5.0
Isophorone	ND	10	2.5	5.0
Nitrobenzene	ND	10	2.5	5.0
n-Nitrosodiphenylamine	ND	10	2.5	5.0
Phenol	ND	10	2.5	5.0
Pyrene	ND	10	2.5	5.0
Hexachlorocyclopentadiene	ND	10	2.5	5.0

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	28.4	60.6	47	40-125
2-Fluorobiphenyl	11.0	20.2	55	50-110
2-Fluorophenol	25.8	60.6	43	20-110
Nitrobenzene-d5	12.8	20.2	64	40-110
Phenol-d5	30.6	60.6	51	10-115
Terphenyl-d14	14.3	20.2	71	50-135

Notes:
(1): 4-Methylphenol cannot be separated from 3-Methylphenol
(2): n-nitrosodiphenylamine cannot be separated from Diphenylamine
(3): 1,2 Diphenylhydrazine analyzed as Azobenzene due to decomposition in injector

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 990ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KV

NW 3/4/19

2

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS-App.IX

Client	: CH2M HILL	Date Collected:	01/07/19 11:10
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-MW03-0119	Date Analyzed:	01/15/19 14:44
Lab Samp ID:	19A031-02	Dilution Factor:	1
Lab File ID:	RAJ121	Matrix:	WATER
Ext Btch ID:	19SVA009W	% Moisture:	NA
Calib. Ref.:	R1J148	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Atrazine	ND	10	2.5	5.0

Notes:

Detection limits are reported relative to sample result significant figures.
Sample Amount : 990ml Final Volume : 2ml
Prepared by : JMuert Analyzed by : KVu

NW 3/4/19

3

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/07/19 11:15
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-MW03P-0119	Date Analyzed:	01/15/19 15:03
Lab Samp ID:	19A031-03	Dilution Factor:	1
Lab File ID:	RAJ122	Matrix:	WATER
Ext Btch ID:	19SVA009W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
2,4-Dichlorophenol	ND	11	2.7	5.4
2,4-Dimethylphenol	ND	11	2.8	5.4
2,4-Dinitrophenol	ND	22	2.7	5.4
2,4-Dinitrotoluene	ND	11	2.7	5.4
2-Chloronaphthalene	ND	11	2.7	5.4
2-Chlorophenol	ND	11	2.7	5.4
3,3'-Dichlorobenzidine	ND	11	2.7	5.4
4,6-Dinitro-2-methylphenol	ND	22	2.7	5.4
Acenaphthene	ND	11	2.7	5.4
Anthracene	ND	11	2.7	5.4
Butylbenzylphthalate	ND	11	2.7	5.4
Diethylphthalate	ND	11	2.7	5.4
Dimethyl phthalate	ND	11	2.7	5.4
Di-n-butylphthalate	ND	11	2.7	5.4
Fluoranthene	ND	11	2.7	5.4
Fluorene	ND	11	2.7	5.4
Hexachloroethane	ND	11	2.7	5.4
Isophorone	ND	11	2.7	5.4
Nitrobenzene	ND	11	2.7	5.4
n-Nitrosodiphenylamine	ND	11	2.7	5.4
Phenol	ND	11	2.7	5.4
Pyrene	ND	11	2.7	5.4
Hexachlorocyclopentadiene	ND	11	2.7	5.4

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	27.9	64.8	43	40-125
2-Fluorobiphenyl	11.4	21.6	53	50-110
2-Fluorophenol	26.6	64.8	41	20-110
Nitrobenzene-d5	12.8	21.6	59	40-110
Phenol-d5	32.1	64.8	50	10-115
Terphenyl-d14	14.2	21.6	66	50-135

Notes:
(1): 4-Methylphenol cannot be separated from 3-Methylphenol
(2): n-nitrosodiphenylamine cannot be separated from Diphenylamine
(3): 1,2 Diphenylhydrazine analyzed as Azobenzene due to decomposition in injector

Detection limits are reported relative to sample result significant figures.
Sample Amount : 930ml Final Volume : 2ml
Prepared by : JMuert Analyzed by : KV

NW 3/4/19

3

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS-App.IX

Client	: CH2M HILL	Date Collected:	01/07/19 11:15
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-MW03P-0119	Date Analyzed:	01/15/19 15:03
Lab Samp ID:	19A031-03	Dilution Factor:	1
Lab File ID:	RAJ122	Matrix:	WATER
Ext Btch ID:	19SVA009W	% Moisture:	NA
Calib. Ref.:	RIJ148	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Atrazine	ND	11	2.7	5.4

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 930ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KVu

NW 3/4/19

5

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/08/19 09:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-MW02-0119	Date Analyzed:	01/15/19 15:21
Lab Samp ID:	19A031-05	Dilution Factor:	1
Lab File ID:	RAJ123	Matrix:	WATER
Ext Btch ID:	19SVA009W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
2,4-Dichlorophenol	ND	10	2.6	5.1
2,4-Dimethylphenol	ND	10	2.7	5.1
2,4-Dinitrophenol	ND	21	2.6	5.1
2,4-Dinitrotoluene	ND	10	2.6	5.1
2-Chloronaphthalene	ND	10	2.6	5.1
2-Chlorophenol	ND	10	2.6	5.1
3,3'-Dichlorobenzidine	ND	10	2.6	5.1
4,6-Dinitro-2-methylphenol	ND	21	2.6	5.1
Acenaphthene	ND	10	2.6	5.1
Anthracene	ND	10	2.6	5.1
Butylbenzylphthalate	ND	10	2.6	5.1
Diethylphthalate	ND	10	2.6	5.1
Dimethyl phthalate	ND	10	2.6	5.1
Di-n-butylphthalate	ND	10	2.6	5.1
Fluoranthene	ND	10	2.6	5.1
Fluorene	ND	10	2.6	5.1
Hexachloroethane	ND	10	2.6	5.1
Isophorone	ND	10	2.6	5.1
Nitrobenzene	ND	10	2.6	5.1
n-Nitrosodiphenylamine	ND	10	2.6	5.1
Phenol	ND	10	2.6	5.1
Pyrene	ND	10	2.6	5.1
Hexachlorocyclopentadiene	ND	10	2.6	5.1

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	26.0	61.8	42	40-125
2-Fluorobiphenyl	10.4	20.6	50	50-110
2-Fluorophenol	25.6	61.8	41	20-110
Nitrobenzene-d5	11.3	20.6	55	40-110
Phenol-d5	29.6	61.8	48	10-115
Terphenyl-d14	13.1	20.6	64	50-135

Notes:
(1): 4-Methylphenol cannot be separated from 3-Methylphenol
(2): n-nitrosodiphenylamine cannot be separated from Diphenylamine
(3): 1,2 Diphenylhydrazine analyzed as Azobenzene due to decomposition in injector

Detection limits are reported relative to sample result significant figures.
Sample Amount : 970ml Final Volume : 2ml
Prepared by : JMuert Analyzed by : KV

NW 3/4/19

5

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS-App.IX

Client	: CH2M HILL	Date Collected:	01/08/19 09:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-MW02-0119	Date Analyzed:	01/15/19 15:21
Lab Samp ID	: 19A031-05	Dilution Factor:	1
Lab File ID	: RAJ123	Matrix:	WATER
Ext Btch ID	: 19SVA009W	% Moisture:	NA
Calib. Ref.	: RIJ148	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Atrazine	ND	10	2.6	5.1

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 970ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KVu

NW 3/4/19

6

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/08/19 09:30
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-MW08-0119	Date Analyzed:	01/15/19 15:40
Lab Samp ID:	19A031-06	Dilution Factor:	1
Lab File ID:	RAJ124	Matrix:	WATER
Ext Btch ID:	19SVA009W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
2,4-Dichlorophenol	ND	11	2.8	5.6
2,4-Dimethylphenol	ND	11	2.9	5.6
2,4-Dinitrophenol	ND	22	2.8	5.6
2,4-Dinitrotoluene	ND	11	2.8	5.6
2-Chloronaphthalene	ND	11	2.8	5.6
2-Chlorophenol	ND	11	2.8	5.6
3,3'-Dichlorobenzidine	ND	11	2.8	5.6
4,6-Dinitro-2-methylphenol	ND	22	2.8	5.6
Acenaphthene	ND	11	2.8	5.6
Anthracene	ND	11	2.8	5.6
Butylbenzylphthalate	ND	11	2.8	5.6
Diethylphthalate	ND	11	2.8	5.6
Dimethyl phthalate	ND	11	2.8	5.6
Di-n-butylphthalate	ND	11	2.8	5.6
Fluoranthene	ND	11	2.8	5.6
Fluorene	ND	11	2.8	5.6
Hexachloroethane	ND	11	2.8	5.6
Isophorone	ND	11	2.8	5.6
Nitrobenzene	ND	11	2.8	5.6
n-Nitrosodiphenylamine	ND	11	2.8	5.6
Phenol	ND	11	2.8	5.6
Pyrene	ND	11	2.8	5.6
Hexachlorocyclopentadiene	ND	11	2.8	5.6

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	43.7	66.6	66	40-125
2-Fluorobiphenyl	16.7	22.2	75	50-110
2-Fluorophenol	42.8	66.6	64	20-110
Nitrobenzene-d5	18.7	22.2	84	40-110
Phenol-d5	48.4	66.6	73	10-115
Terphenyl-d14	16.1	22.2	72	50-135

Notes:
(1): 4-Methylphenol cannot be separated from 3-Methylphenol
(2): n-nitrosodiphenylamine cannot be separated from Diphenylamine
(3): 1,2 Diphenylhydrazine analyzed as Azobenzene due to decomposition in injector

Detection limits are reported relative to sample result significant figures.
Sample Amount : 900ml Final Volume : 2ml
Prepared by : JMuert Analyzed by : KV

NW 3/4/19

6

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS-App.IX

Client	: CH2M HILL	Date Collected:	01/08/19 09:30
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-MW08-0119	Date Analyzed:	01/15/19 15:40
Lab Samp ID:	19A031-06	Dilution Factor:	1
Lab File ID:	RAJ124	Matrix:	WATER
Ext Btch ID:	19SVA009W	% Moisture:	NA
Calib. Ref.:	RIJ148	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Atrazine	ND	11	2.8	5.6

Notes:

Detection limits are reported relative to sample result significant figures.
Sample Amount : 900ml Final Volume : 2ml
Prepared by : JMuert Analyzed by : KVu

MW 3/4/19

METHOD SW3520C/8270D SIM
SEMIVOLATILE ORGANICS BY GC/MS SIMS

Client	: CH2M HILL	Date Collected:	01/07/19 14:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-EB01-010719	Date Analyzed:	01/15/19 14:25
Lab Samp ID:	19A031-01	Dilution Factor:	1
Lab File ID:	RAJ120	Matrix:	WATER
Ext Btch ID:	19SVA009W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
bis(2-Chloroethyl)ether	ND	1.0	0.050	0.10
n-Nitroso-di-n-propylamine	ND	1.0	0.050	0.10
2,4,6-Trichlorophenol	ND	1.0	0.050	0.10
Pentachlorophenol	ND	2.0	0.40	0.80
bis(2-Ethylhexyl)phthalate	ND	3.0	0.57	1.2
Hexachlorobenzene	ND	1.0	0.050	0.10

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	33.7	60.0	56	40-125
2-Fluorobiphenyl	11.8	20.0	59	50-110
2-Fluorophenol	26.0	60.0	43	20-110
Nitrobenzene-d5	12.8	20.0	64	40-110
Phenol-d5	32.7	60.0	55	10-115
Terphenyl-d14	13.6	20.0	68	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 1000ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KV

NW 3/4/19

2

METHOD SW3520C/8270D SIM
SEMIVOLATILE ORGANICS BY GC/MS SIMS

Client	: CH2M HILL	Date Collected:	01/07/19 11:10
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-MW03-0119	Date Analyzed:	01/15/19 14:44
Lab Samp ID:	19A031-02	Dilution Factor:	1
Lab File ID:	RAJ121	Matrix:	WATER
Ext Btch ID:	19SVA009W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
bis(2-Chloroethyl)ether	ND	1.0	0.051	0.10
n-Nitroso-di-n-propylamine	ND	1.0	0.051	0.10
2,4,6-Trichlorophenol	ND	1.0	0.051	0.10
Pentachlorophenol	ND	2.0	0.41	0.81
bis(2-Ethylhexyl)phthalate	ND	3.0	0.57	1.2
Hexachlorobenzene	ND	1.0	0.051	0.10

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	31.7	60.6	52	40-125
2-Fluorobiphenyl	11.5	20.2	57	50-110
2-Fluorophenol	26.2	60.6	43	20-110
Nitrobenzene-d5	12.6	20.2	63	40-110
Phenol-d5	31.1	60.6	51	10-115
Terphenyl-d14	14.3	20.2	71	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 990ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KV

MW 3/4/19

3

METHOD SW3520C/8270D SIM
SEMIVOLATILE ORGANICS BY GC/MS SIMS

Client	: CH2M HILL	Date Collected:	01/07/19 11:15
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-MW03P-0119	Date Analyzed:	01/15/19 15:03
Lab Samp ID	: 19A031-03	Dilution Factor:	1
Lab File ID	: RAJ122	Matrix:	WATER
Ext Btch ID	: 19SVA009W	% Moisture:	NA
Calib. Ref.	: RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
bis(2-Chloroethyl)ether	ND	1.1	0.054	0.11
n-Nitroso-di-n-propylamine	ND	1.1	0.054	0.11
2,4,6-Trichlorophenol	ND	1.1	0.054	0.11
Pentachlorophenol	ND	2.2	0.43	0.86
bis(2-Ethylhexyl)phthalate	ND	3.2	0.61	1.3
Hexachlorobenzene	ND	1.1	0.054	0.11

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	31.5	64.8	49	40-125
2-Fluorobiphenyl	11.7	21.6	54	50-110
2-Fluorophenol	27.1	64.8	42	20-110
Nitrobenzene-d5	12.7	21.6	59	40-110
Phenol-d5	32.7	64.8	50	10-115
Terphenyl-d14	14.5	21.6	67	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 930ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KV

NW 3/4/19

5

METHOD SW3520C/8270D SIM
SEMIVOLATILE ORGANICS BY GC/MS SIMS

Client	: CH2M HILL	Date Collected:	01/08/19 09:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-MW02-0119	Date Analyzed:	01/15/19 15:21
Lab Samp ID:	19A031-05	Dilution Factor:	1
Lab File ID:	RAJ123	Matrix:	WATER
Ext Btch ID:	19SVA009W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
bis(2-Chloroethyl)ether	ND	1.0	0.052	0.10
n-Nitroso-di-n-propylamine	ND	1.0	0.052	0.10
2,4,6-Trichlorophenol	ND	1.0	0.052	0.10
Pentachlorophenol	ND	2.1	0.41	0.82
bis(2-Ethylhexyl)phthalate	ND	3.1	0.58	1.2
Hexachlorobenzene	ND	1.0	0.052	0.10

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	28.5	61.8	46	40-125
2-Fluorobiphenyl	11.0	20.6	53	50-110
2-Fluorophenol	26.4	61.8	43	20-110
Nitrobenzene-d5	11.8	20.6	57	40-110
Phenol-d5	30.4	61.8	49	10-115
Terphenyl-d14	13.3	20.6	65	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 970ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KV

MW 3/4/19

METHOD SW3520C/8270D SIM
SEMIVOLATILE ORGANICS BY GC/MS SIMS

Client	: CH2M HILL	Date Collected:	01/08/19 09:30
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/09/19 16:45
Sample ID	: VEW01-MW08-0119	Date Analyzed:	01/15/19 15:40
Lab Samp ID:	19A031-06	Dilution Factor:	1
Lab File ID:	RAJ124	Matrix:	WATER
Ext Btch ID:	19SVA009W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
bis(2-Chloroethyl)ether	ND	1.1	0.056	0.11
n-Nitroso-di-n-propylamine	ND	1.1	0.056	0.11
2,4,6-Trichlorophenol	ND	1.1	0.056	0.11
Pentachlorophenol	ND	2.2	0.45	0.89
bis(2-Ethylhexyl)phthalate	ND	3.3	0.63	1.3
Hexachlorobenzene	ND	1.1	0.056	0.11

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	48.3	66.6	73	40-125
2-Fluorobiphenyl	17.6	22.2	79	50-110
2-Fluorophenol	43.8	66.6	66	20-110
Nitrobenzene-d5	18.8	22.2	85	40-110
Phenol-d5	49.6	66.6	74	10-115
Terphenyl-d14	17.2	22.2	77	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 900ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KV

NW 3/4/19

METHOD SW3520C/8270D SIM
PAHs BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/07/19 14:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/14/19 10:15
Sample ID	: VEW01-EB01-010719	Date Analyzed:	01/18/19 17:41
Lab Samp ID:	19A031-01	Dilution Factor:	1
Lab File ID:	RAF097	Matrix:	WATER
Ext Btch ID:	19SVA015W	% Moisture:	NA
Calib. Ref.:	REF262	Instrument ID:	F0

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Benzo(a)anthracene	ND	0.019	0.0049	0.0097
Benzo(a)pyrene	ND	0.019	0.0049	0.0097
Benzo(b)fluoranthene	ND	0.019	0.0049	0.0097
Benzo(k)fluoranthene	ND	0.019	0.0049	0.0097
Chrysene	ND	0.019	0.0049	0.0097
Dibenz(a,h)anthracene	ND	0.019	0.0049	0.0097
Indeno(1,2,3-cd)pyrene	ND	0.019	0.0049	0.0097

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
Terphenyl-d14	0.360	0.485	74	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 1030ml	Final Volume	: 1ml
Prepared by	: JMuert	Analyzed by	: KVu

NW 3/4/19

2

METHOD SW3520C/8270D SIM
PAHs BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/07/19 11:10
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/14/19 10:15
Sample ID	: VEW01-MW03-0119	Date Analyzed:	01/18/19 18:04
Lab Samp ID:	19A031-02	Dilution Factor:	1
Lab File ID:	RAF098	Matrix:	WATER
Ext Btch ID:	19SVA015W	% Moisture:	NA
Calib. Ref.:	REF262	Instrument ID:	F0

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Benzo(a)anthracene	ND	0.022	0.0056	0.011
Benzo(a)pyrene	ND	0.022	0.0056	0.011
Benzo(b)fluoranthene	ND	0.022	0.0056	0.011
Benzo(k)fluoranthene	ND	0.022	0.0056	0.011
Chrysene	ND	0.022	0.0056	0.011
Dibenz(a,h)anthracene	ND	0.022	0.0056	0.011
Indeno(1,2,3-cd)pyrene	ND	0.022	0.0056	0.011

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
Terphenyl-d14	0.396	0.555	71	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 900ml	Final Volume	: 1ml
Prepared by	: JMuert	Analyzed by	: KVu

NW 3/4/19

3

METHOD SW3520C/8270D SIM
PAHs BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/07/19 11:15
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/14/19 10:15
Sample ID	: VEW01-MW03P-0119	Date Analyzed:	01/18/19 18:28
Lab Samp ID:	19A031-03	Dilution Factor:	1
Lab File ID:	RAF099	Matrix:	WATER
Ext Btch ID:	19SVA015W	% Moisture:	NA
Calib. Ref.:	REF262	Instrument ID:	FO

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Benzo(a)anthracene	ND	0.020	0.0049	0.0099
Benzo(a)pyrene	ND	0.020	0.0049	0.0099
Benzo(b)fluoranthene	ND	0.020	0.0049	0.0099
Benzo(k)fluoranthene	ND	0.020	0.0049	0.0099
Chrysene	ND	0.020	0.0049	0.0099
Dibenz(a,h)anthracene	ND	0.020	0.0049	0.0099
Indeno(1,2,3-cd)pyrene	ND	0.020	0.0049	0.0099

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
Terphenyl-d14	0.330	0.495	67	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 1010ml	Final Volume	: 1ml
Prepared by	: JMuert	Analyzed by	: KVu

MW 3/4/19

5

METHOD SW3520C/8270D SIM
PAHs BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/08/19 09:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/14/19 10:15
Sample ID	: VEW01-MW02-0119	Date Analyzed:	01/18/19 18:52
Lab Samp ID:	19A031-05	Dilution Factor:	1
Lab File ID:	RAF100	Matrix:	WATER
Ext Btch ID:	19SVA015W	% Moisture:	NA
Calib. Ref.:	REF262	Instrument ID:	F0

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Benzo(a)anthracene	ND	0.023	0.0058	0.012
Benzo(a)pyrene	ND	0.023	0.0058	0.012
Benzo(b)fluoranthene	ND	0.023	0.0058	0.012
Benzo(k)fluoranthene	ND	0.023	0.0058	0.012
Chrysene	ND	0.023	0.0058	0.012
Dibenz(a,h)anthracene	ND	0.023	0.0058	0.012
Indeno(1,2,3-cd)pyrene	ND	0.023	0.0058	0.012

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
Terphenyl-d14	0.444	0.580	76	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 860ml	Final Volume	: 1ml
Prepared by	: JMuert	Analyzed by	: KVu

NW 3/4/19

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METHOD SW3520C/8270D SIM
PAHs BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/08/19 09:30
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/14/19 10:15
Sample ID	: VEW01-MW08-0119	Date Analyzed:	01/18/19 19:16
Lab Samp ID:	19A031-06	Dilution Factor:	1
Lab File ID:	RAF101	Matrix:	WATER
Ext Btch ID:	19SVA015W	% Moisture:	NA
Calib. Ref.:	REF262	Instrument ID:	FO

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Benzo(a)anthracene	ND	0.021	0.0052	0.010
Benzo(a)pyrene	ND	0.021	0.0052	0.010
Benzo(b)fluoranthene	ND	0.021	0.0052	0.010
Benzo(k)fluoranthene	ND	0.021	0.0052	0.010
Chrysene	ND	0.021	0.0052	0.010
Dibenz(a,h)anthracene	ND	0.021	0.0052	0.010
Indeno(1,2,3-cd)pyrene	ND	0.021	0.0052	0.010

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
Terphenyl-d14	0.460	0.515	89	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 970ml	Final Volume	: 1ml
Prepared by	: JMuert	Analyzed by	: KVu

NW 3/4/19

METHOD 3520C/8081B
PESTICIDES

Client : CH2M HILL	Date Collected: 01/07/19
Project : CTO-013 VIEQUES_EAST SWMU-1	Date Received: 01/09/19
Batch No. : 19A031	Date Extracted: 01/10/19 13:45
Sample ID: VEW01-EB01-010719	Date Analyzed: 01/12/19 00:12
Lab Samp ID: A031-01	Dilution Factor: 1.1
Lab File ID: RA11028A	Matrix : WATER
Ext Btch ID: CPA015W	% Moisture : NA
Calib. Ref.: RA11027A	Instrument ID : F9

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ALPHA-BHC	(ND) | ND	0.11	0.0055	0.011
GAMMA-BHC (LINDANE)	(ND) | 0.0067J	0.11	0.0055	0.011
BETA-BHC	0.032J | (ND)	0.11	0.0077	0.011
HEPTACHLOR	(ND) | ND	0.11	0.0077	0.011
ALDRIN	(ND) | ND	0.11	0.0055	0.011
HEPTACHLOR EPOXIDE	(ND) | ND	0.11	0.0055	0.011
GAMMA-CHLORDANE	(ND) | ND	0.11	0.0055	0.011
ALPHA-CHLORDANE	(ND) | ND	0.11	0.0055	0.011
ENDOSULFAN I	(ND) | ND	0.11	0.0088	0.011
4,4'-DDE	(ND) | ND	0.11	0.0055	0.011
DIELDRIN	(ND) | ND	0.11	0.0055	0.011
ENDRIN	(ND) | ND	0.11	0.0088	0.011
4,4'-DDD	(ND) | ND	0.11	0.0055	0.011
ENDOSULFAN II	(ND) | ND	0.11	0.0055	0.011
4,4'-DDT	(ND) | ND	0.11	0.0055	0.011
ENDRIN ALDEHYDE	(ND) | ND	0.11	0.0055	0.011
ENDOSULFAN SULFATE	(ND) | ND	0.11	0.0055	0.011
ENDRIN KETONE	(ND) | ND	0.11	0.0055	0.011
METHOXYCHLOR	0.057J | (ND)	1.1	0.055	0.11
TOXAPHENE	(ND) | ND	2.2	0.28	0.55

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2,4,5,6-TETRACHLORO-META-XYLENE	0.3404 | (0.3483)	0.4400	77.4 | (79.2)	25-140
DECACHLOROBIPHENYL (209)	0.4367 | (0.4471)	0.4400	99.2 | (102)	30-135

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

NW 3/4/19

2

METHOD 3520C/8081B
PESTICIDES

Client	: CH2M HILL	Date Collected:	01/07/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/10/19 13:45
Sample ID:	VEW01-MW03-0119	Date Analyzed:	01/12/19 00:34
Lab Samp ID:	A031-02	Dilution Factor:	0.96
Lab File ID:	RA11029A	Matrix :	WATER
Ext Btch ID:	CPA015W	% Moisture :	NA
Calib. Ref.:	RA11027A	Instrument ID :	F9

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ALPHA-BHC	(ND) | ND	0.096	0.0048	0.0096
GAMMA-BHC (LINDANE)	(ND) | ND	0.096	0.0048	0.0096
BETA-BHC	0.019J | (ND)	0.096	0.0067	0.0096
HEPTACHLOR	(ND) | ND	0.096	0.0067	0.0096
ALDRIN	(ND) | ND	0.096	0.0048	0.0096
HEPTACHLOR EPOXIDE	(ND) | ND	0.096	0.0048	0.0096
GAMMA-CHLORDANE	(ND) | ND	0.096	0.0048	0.0096
ALPHA-CHLORDANE	(ND) | ND	0.096	0.0048	0.0096
ENDOSULFAN I	(ND) | ND	0.096	0.0077	0.0096
4,4'-DDE	(ND) | ND	0.096	0.0048	0.0096
DIELDRIN	(ND) | ND	0.096	0.0048	0.0096
ENDRIN	(ND) | ND	0.096	0.0077	0.0096
4,4'-DDD	(ND) | ND	0.096	0.0048	0.0096
ENDOSULFAN II	(ND) | ND	0.096	0.0048	0.0096
4,4'-DDT	(ND) | ND	0.096	0.0048	0.0096
ENDRIN ALDEHYDE	(ND) | ND	0.096	0.0048	0.0096
ENDOSULFAN SULFATE	(ND) | 0.0078J	0.096	0.0048	0.0096
ENDRIN KETONE	(ND) | ND	0.096	0.0048	0.0096
METHOXYCHLOR	(ND) | ND	0.96	0.048	0.096
TOXAPHENE	(ND) | ND	1.9	0.24	0.48

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2,4,5,6-TETRACHLORO-META-XYLENE	0.2464 | (0.2561)	0.3840	64.2 | (66.7)	25-140
DECACHLOROBIPHENYL (209)	0.3602 | (0.3699)	0.3840	93.8 | (96.3)	30-135

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

MW 3/4/19

3

METHOD 3520C/8081B
PESTICIDES

Client	: CH2M HILL	Date Collected:	01/07/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/10/19 13:45
Sample ID:	VEW01-MW03P-0119	Date Analyzed:	01/12/19 00:57
Lab Samp ID:	A031-03	Dilution Factor:	1.02
Lab File ID:	RA11030A	Matrix :	WATER
Ext Btch ID:	CPA015W	% Moisture :	NA
Calib. Ref.:	RA11027A	Instrument ID :	F9

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ALPHA-BHC	(ND) | ND	0.10	0.0051	0.010
GAMMA-BHC (LINDANE)	(ND) | ND	0.10	0.0051	0.010
BETA-BHC	0.019J | (ND)	0.10	0.0071	0.010
HEPTACHLOR	(ND) | ND	0.10	0.0071	0.010
ALDRIN	(ND) | ND	0.10	0.0051	0.010
HEPTACHLOR EPOXIDE	(ND) | ND	0.10	0.0051	0.010
GAMMA-CHLORDANE	(ND) | ND	0.10	0.0051	0.010
ALPHA-CHLORDANE	(ND) | ND	0.10	0.0051	0.010
ENDOSULFAN I	(ND) | ND	0.10	0.0082	0.010
4,4'-DDE	(ND) | ND	0.10	0.0051	0.010
DIELDRIN	(ND) | ND	0.10	0.0051	0.010
ENDRIN	(ND) | ND	0.10	0.0082	0.010
4,4'-DDD	(ND) | ND	0.10	0.0051	0.010
ENDOSULFAN II	(ND) | ND	0.10	0.0051	0.010
4,4'-DDT	(ND) | ND	0.10	0.0051	0.010
ENDRIN ALDEHYDE	(ND) | ND	0.10	0.0051	0.010
ENDOSULFAN SULFATE	(ND) | 0.0069J	0.10	0.0051	0.010
ENDRIN KETONE	(ND) | ND	0.10	0.0051	0.010
METHOXYCHLOR	0.056J | (ND)	1.0	0.051	0.10
TOXAPHENE	(ND) | ND	2.0	0.25	0.51

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2,4,5,6-TETRACHLORO-META-XYLENE	0.2790 | (0.2918)	0.4080	68.4 | (71.5)	25-140
DECACHLOROBIPHENYL (209)	0.3950 | (0.4033)	0.4080	96.8 | (98.8)	30-135

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

MW 3/4/19

METHOD 3520C/8081B
PESTICIDES

5

Client : CH2M HILL	Date Collected: 01/08/19
Project : CTO-013 VIEQUES_EAST SWMU-1	Date Received: 01/09/19
Batch No. : 19A031	Date Extracted: 01/10/19 13:45
Sample ID: VEW01-MW02-0119	Date Analyzed: 01/12/19 01:19
Lab Samp ID: A031-05	Dilution Factor: 1.09
Lab File ID: RA11031A	Matrix : WATER
Ext Btch ID: CPA015W	% Moisture : NA
Calib. Ref.: RA11027A	Instrument ID : F9

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ALPHA-BHC	(ND) | ND	0.11	0.0055	0.011
GAMMA-BHC (LINDANE)	(ND) | ND	0.11	0.0055	0.011
BETA-BHC	0.023J | (ND)	0.11	0.0076	0.011
HEPTACHLOR	(ND) | ND	0.11	0.0076	0.011
ALDRIN	(ND) | ND	0.11	0.0055	0.011
HEPTACHLOR EPOXIDE	(ND) | ND	0.11	0.0055	0.011
GAMMA-CHLORDANE	(ND) | ND	0.11	0.0055	0.011
ALPHA-CHLORDANE	(ND) | ND	0.11	0.0055	0.011
ENDOSULFAN I	(ND) | ND	0.11	0.0087	0.011
4,4'-DDE	(ND) | ND	0.11	0.0055	0.011
DIELDRIN	(ND) | ND	0.11	0.0055	0.011
ENDRIN	(ND) | ND	0.11	0.0087	0.011
4,4'-DDD	(ND) | ND	0.11	0.0055	0.011
ENDOSULFAN II	(ND) | ND	0.11	0.0055	0.011
4,4'-DDT	(ND) | ND	0.11	0.0055	0.011
ENDRIN ALDEHYDE	(ND) | ND	0.11	0.0055	0.011
ENDOSULFAN SULFATE	(ND) | ND	0.11	0.0055	0.011
ENDRIN KETONE	(ND) | ND	0.11	0.0055	0.011
METHOXYCHLOR	(ND) | ND	1.1	0.055	0.11
TOXAPHENE	(ND) | ND	2.2	0.27	0.55

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2,4,5,6-TETRACHLORO-META-XYLENE	0.2971 | (0.3075)	0.4360	68.1 | (70.5)	25-140
DECACHLOROBIPHENYL (209)	0.4431 | (0.4548)	0.4360	102 | (104)	30-135

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

NW 3/4/19

6

METHOD 3520C/8081B
PESTICIDES

Client : CH2M HILL	Date Collected: 01/08/19
Project : CTO-013 VIEQUES_EAST SWMU-1	Date Received: 01/09/19
Batch No. : 19A031	Date Extracted: 01/10/19 13:45
Sample ID: VEW01-MW08-0119	Date Analyzed: 01/12/19 01:41
Lab Samp ID: A031-06	Dilution Factor: 1.04
Lab File ID: RA11032A	Matrix : WATER
Ext Btch ID: CPA015W	% Moisture : NA
Calib. Ref.: RA11027A	Instrument ID : F9

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ALPHA-BHC	(ND) | ND	0.10	0.0052	0.010
GAMMA-BHC (LINDANE)	(ND) | ND	0.10	0.0052	0.010
BETA-BHC	0.024J | (ND)	0.10	0.0073	0.010
HEPTACHLOR	(ND) | ND	0.10	0.0073	0.010
ALDRIN	(ND) | ND	0.10	0.0052	0.010
HEPTACHLOR EPOXIDE	(ND) | ND	0.10	0.0052	0.010
GAMMA-CHLORDANE	(ND) | ND	0.10	0.0052	0.010
ALPHA-CHLORDANE	(ND) | ND	0.10	0.0052	0.010
ENDOSULFAN I	(ND) | ND	0.10	0.0083	0.010
4,4'-DDE	(ND) | ND	0.10	0.0052	0.010
DIELDRIN	(ND) | ND	0.10	0.0052	0.010
ENDRIN	(ND) | ND	0.10	0.0083	0.010
4,4'-DDD	(ND) | ND	0.10	0.0052	0.010
ENDOSULFAN II	(ND) | ND	0.10	0.0052	0.010
4,4'-DDT	(ND) | ND	0.10	0.0052	0.010
ENDRIN ALDEHYDE	(ND) | ND	0.10	0.0052	0.010
ENDOSULFAN SULFATE	(ND) | ND	0.10	0.0052	0.010
ENDRIN KETONE	(ND) | ND	0.10	0.0052	0.010
METHOXYCHLOR	0.062J | (ND)	1.0	0.052	0.10
TOXAPHENE	(ND) | ND	2.1	0.26	0.52

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2,4,5,6-TETRACHLORO-META-XYLENE	0.3058 | (0.3120)	0.4160	73.5 | (75.0)	25-140
DECACHLOROBIPHENYL (209)	0.4010 | (0.4093)	0.4160	96.4 | (98.4)	30-135

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

AW 3/4/19

METHOD SW3520C/8082A
PCBs

Client	: CH2M HILL	Date Collected:	01/07/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/10/19 13:45
Sample ID:	VEW01-EB01-010719	Date Analyzed:	01/15/19 12:24
Lab Samp ID:	A031-01	Dilution Factor:	1.10
Lab File ID:	KA14057A	Matrix :	WATER
Ext Btch ID:	CPA015W	% Moisture :	NA
Calib. Ref.:	KA14047A	Instrument ID :	GCT071

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
AROCLOR-1016	(ND) | ND	1.1	0.50	0.55
AROCLOR-1221	(ND) | ND	1.1	0.32	0.55
AROCLOR-1232	(ND) | ND	1.1	0.28	0.55
AROCLOR-1242	(ND) | ND	1.1	0.28	0.55
AROCLOR-1248	(ND) | ND	1.1	0.28	0.55
AROCLOR-1254	(ND) | ND	1.1	0.28	0.55
AROCLOR-1260	(ND) | ND	1.1	0.34	0.55
AROCLOR-1262	(ND) | ND	1.1	0.21	0.55
AROCLOR-1268	(ND) | ND	1.1	0.28	0.55

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.3079 | (0.3907)	0.4400	70.0 | (88.8)	50-140
DECACHLOROBIPHENYL	0.4935 | (0.5631)	0.4400	112 | (128)	40-135

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

NJ 3/4/19

2

METHOD SW3520C/8082A
PCBs

Client	: CH2M HILL	Date Collected:	01/07/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/10/19 13:45
Sample ID:	VEW01-MW03-0119	Date Analyzed:	01/15/19 12:44
Lab Samp ID:	A031-02	Dilution Factor:	0.96
Lab File ID:	KA14058A	Matrix :	WATER
Ext Btch ID:	CPA015W	% Moisture :	NA
Calib. Ref.:	KA14047A	Instrument ID :	GCT071

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
AROCLOR-1016	(ND) | ND	0.96	0.43	0.48
AROCLOR-1221	(ND) | ND	0.96	0.28	0.48
AROCLOR-1232	(ND) | ND	0.96	0.24	0.48
AROCLOR-1242	(ND) | ND	0.96	0.24	0.48
AROCLOR-1248	(ND) | ND	0.96	0.24	0.48
AROCLOR-1254	(ND) | ND	0.96	0.24	0.48
AROCLOR-1260	(ND) | ND	0.96	0.30	0.48
AROCLOR-1262	(ND) | ND	0.96	0.18	0.48
AROCLOR-1268	(ND) | ND	0.96	0.24	0.48

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.2282 | (0.2988)	0.3840	59.4 | (77.8)	50-140
DECACHLOROBIPHENYL	0.4094 | (0.4720)	0.3840	107 | (123)	40-135

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

NW 3/4/19

3

METHOD SW3520C/8082A
PCBs

Client	: CH2M HILL	Date Collected:	01/07/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/10/19 13:45
Sample ID:	VEW01-MW03P-0119	Date Analyzed:	01/15/19 13:05
Lab Samp ID:	A031-03	Dilution Factor:	1.02
Lab File ID:	KA14059A	Matrix :	WATER
Ext Btch ID:	CPA015W	% Moisture :	NA
Calib. Ref.:	KA14047A	Instrument ID :	GCT071

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
AROCLOR-1016	(ND) | ND	1.0	0.46	0.51
AROCLOR-1221	(ND) | ND	1.0	0.30	0.51
AROCLOR-1232	(ND) | ND	1.0	0.25	0.51
AROCLOR-1242	(ND) | ND	1.0	0.25	0.51
AROCLOR-1248	(ND) | ND	1.0	0.25	0.51
AROCLOR-1254	(ND) | ND	1.0	0.25	0.51
AROCLOR-1260	(ND) | ND	1.0	0.32	0.51
AROCLOR-1262	(ND) | ND	1.0	0.19	0.51
AROCLOR-1268	(ND) | ND	1.0	0.25	0.51

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.2589 | (0.3282)	0.4080	63.4 | (80.4)	50-140
DECACHLOROBIPHENYL	0.4777 | (0.5448)	0.4080	117 | (134)	40-135

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

NW 3/4/19

5

METHOD SW3520C/8082A
PCBs

Client	: CH2M HILL	Date Collected:	01/08/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/10/19 13:45
Sample ID:	VEW01-MW02-0119	Date Analyzed:	01/15/19 13:25
Lab Samp ID:	A031-05	Dilution Factor:	1.09
Lab File ID:	KA14060A	Matrix :	WATER
Ext Btch ID:	CPA015W	% Moisture :	NA
Calib. Ref.:	KA14047A	Instrument ID :	GCT071

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
AROCLOR-1016	(ND) | ND	1.1	0.49	0.55
AROCLOR-1221	(ND) | ND	1.1	0.32	0.55
AROCLOR-1232	(ND) | ND	1.1	0.27	0.55
AROCLOR-1242	(ND) | ND	1.1	0.27	0.55
AROCLOR-1248	(ND) | ND	1.1	0.27	0.55
AROCLOR-1254	(ND) | ND	1.1	0.27	0.55
AROCLOR-1260	(ND) | ND	1.1	0.34	0.55
AROCLOR-1262	(ND) | ND	1.1	0.21	0.55
AROCLOR-1268	(ND) | ND	1.1	0.27	0.55

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.2731 | (0.3669)	0.4360	62.6 | (84.2)	50-140
DECACHLOROBIPHENYL	(0.5881) | 0.7067)	0.4360	(135) | 162*	40-135

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

NW 3/4/19

6

METHOD SW3520C/8082A
PCBs

Client	: CH2M HILL	Date Collected:	01/08/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
Batch No.	: 19A031	Date Extracted:	01/10/19 13:45
Sample ID:	VEW01-MW08-0119	Date Analyzed:	01/15/19 13:46
Lab Samp ID:	A031-06	Dilution Factor:	1.04
Lab File ID:	KA14061A	Matrix :	WATER
Ext Btch ID:	CPA015W	% Moisture :	NA
Calib. Ref.:	KA14047A	Instrument ID :	GCT071

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
AROCLOR-1016	(ND) | ND	1.0	0.47	0.52
AROCLOR-1221	(ND) | ND	1.0	0.30	0.52
AROCLOR-1232	(ND) | ND	1.0	0.26	0.52
AROCLOR-1242	(ND) | ND	1.0	0.26	0.52
AROCLOR-1248	(ND) | ND	1.0	0.26	0.52
AROCLOR-1254	(ND) | ND	1.0	0.26	0.52
AROCLOR-1260	(ND) | ND	1.0	0.32	0.52
AROCLOR-1262	(ND) | ND	1.0	0.20	0.52
AROCLOR-1268	(ND) | ND	1.0	0.26	0.52

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.2750 | (0.3579)	0.4160	66.1 | (86.0)	50-140
DECACHLOROBIPHENYL	0.4663 | (0.5505)	0.4160	112 | (132)	40-135

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

NW 3/4/19

METHOD SW6020A
METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/07/19 14:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
SDG NO.	: 19A031	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-EB01-010719	Date Analyzed:	01/30/19 22:58
Lab Samp ID:	A031-01N	Dilution Factor:	1
Lab File ID:	F6A04058	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	F6A04054	Instrument ID:	F6

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Antimony	ND	1.00	0.250	0.500
Arsenic	ND	1.00	0.100	0.200
Barium	ND	1.00	0.250	0.500
Beryllium	ND	1.00	0.0500	0.100
Cadmium	ND	1.00	0.100	0.200
Chromium	0.145J	1.00	0.100	0.200
Copper	ND	1.00	0.250	0.500
Lead	ND	1.00	0.0500	0.100
Nickel	0.192J	1.00	0.100	0.200
Selenium	ND	1.00	0.150	0.300
Thallium	ND	1.00	0.100	0.200

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	GApero/THuang

NW 3/4/19

2

METHOD SW6020A
METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/07/19 11:10
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
SDG NO.	: 19A031	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-MW03-0119	Date Analyzed:	01/30/19 23:07
Lab Samp ID:	A031-02N	Dilution Factor:	1
Lab File ID:	F6A04060	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	F6A04054	Instrument ID:	F6

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	
Antimony	ND	1.00	0.250	0.500	
Arsenic	0.363J	1.00	0.100	0.200	
Barium	69.4	1.00	0.250	0.500	
Beryllium	ND	1.00	0.0500	0.100	
Cadmium	ND	1.00	0.100	0.200	
Chromium	0.361J U	1.00	0.100	0.200	EBL
Copper	ND	1.00	0.250	0.500	
Lead	ND	1.00	0.0500	0.100	
Nickel	0.477J U	1.00	0.100	0.200	EBL
Selenium	1.13	1.00	0.150	0.300	
Thallium	ND	1.00	0.100	0.200	

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	GApero/THuang

NW 3/4/19

3

METHOD SW6020A
METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/07/19 11:15
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
SDG NO.	: 19A031	Date Extracted:	02/04/19 11:42
Sample ID:	VEW01-MW03P-0119	Date Analyzed:	02/12/19 14:58
Lab Samp ID:	A031-03G	Dilution Factor:	5
Lab File ID:	98B06022	Matrix:	WATER
Ext Btch ID:	IMB004W	% Moisture:	NA
Calib. Ref.:	98B06017	Instrument ID:	98

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Antimony	ND	5.00	1.25	2.50
Arsenic	ND	5.00	0.500	1.00
Barium	67.2	5.00	1.25	2.50
Beryllium	ND	5.00	0.250	0.500
Cadmium	ND	5.00	0.500	1.00
Chromium	ND	5.00	0.500	1.00
Copper	ND	5.00	1.25	2.50
Lead	ND	5.00	0.250	0.500
Nickel	ND	5.00	0.500	1.00
Selenium	1.22J	5.00	0.750	1.50
Thallium	ND	5.00	0.500	1.00

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman/THuang	Analyzed by:	LVicto

NW 3/4/19

5

METHOD SW6020A
METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/08/19 09:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
SDG NO.	: 19A031	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-MW02-0119	Date Analyzed:	01/18/19 20:46
Lab Samp ID:	A031-05	Dilution Factor:	1
Lab File ID:	98A12049	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	98A12044	Instrument ID:	98

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	
Antimony	ND	1.00	0.250	0.500	
Arsenic	0.167J	1.00	0.100	0.200	
Barium	24.1	1.00	0.250	0.500	
Beryllium	ND	1.00	0.0500	0.100	
Cadmium	ND	1.00	0.100	0.200	
Chromium	0.301 ~~J~~ U	1.00	0.100	0.200	EBL
Copper	ND	1.00	0.250	0.500	
Lead	0.0530J	1.00	0.0500	0.100	
Nickel	0.385 ~~J~~ U	1.00	0.100	0.200	EBL
Selenium	1.04	1.00	0.150	0.300	
Thallium	ND	1.00	0.100	0.200	

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	THuang

NW 3/4/19

6

METHOD SW6020A
METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/08/19 09:30
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
SDG NO.	: 19A031	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-MW08-0119	Date Analyzed:	01/18/19 20:50
Lab Samp ID:	A031-06	Dilution Factor:	1
Lab File ID:	98A12050	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	98A12044	Instrument ID:	98

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Antimony	ND	1.00	0.250	0.500
Arsenic	0.266J	1.00	0.100	0.200
Barium	34.6	1.00	0.250	0.500
Beryllium	ND	1.00	0.0500	0.100
Cadmium	ND	1.00	0.100	0.200
Chromium	0.415 ~~J~~ U	1.00	0.100	0.200 CBL
Copper	1.17	1.00	0.250	0.500
Lead	0.0637J	1.00	0.0500	0.100
Nickel	0.288 ~~J~~ U	1.00	0.100	0.200 CBL
Selenium	2.27	1.00	0.150	0.300
Thallium	ND	1.00	0.100	0.200

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	THuang

NW 3/4/19

1D

METHOD SW6020A
DISSOLVED METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/07/19 14:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
SDG NO.	: 19A031	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-EB01-010719	Date Analyzed:	01/30/19 23:03
Lab Samp ID:	A031-01N	Dilution Factor:	1
Lab File ID:	F6A04059	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	F6A04054	Instrument ID:	F6

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Antimony	ND	1.00	0.250	0.500
Arsenic	ND	1.00	0.100	0.200
Barium	ND	1.00	0.250	0.500
Beryllium	ND	1.00	0.0500	0.100
Cadmium	ND	1.00	0.100	0.200
Chromium	0.141J	1.00	0.100	0.200
Copper	ND	1.00	0.250	0.500
Lead	ND	1.00	0.0500	0.100
Nickel	0.309J	1.00	0.100	0.200
Selenium	ND	1.00	0.150	0.300
Thallium	ND	1.00	0.100	0.200

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	GApero/THuang

NW 3/4/19

2D

METHOD SW6020A
DISSOLVED METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/07/19 11:10
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
SDG NO.	: 19A031	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-MW03-0119	Date Analyzed:	01/30/19 23:12
Lab Samp ID:	A031-02N	Dilution Factor:	1
Lab File ID:	F6A04061	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	F6A04054	Instrument ID:	F6

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	
Antimony	ND	1.00	0.250	0.500	
Arsenic	0.368J	1.00	0.100	0.200	
Barium	67.3	1.00	0.250	0.500	
Beryllium	ND	1.00	0.0500	0.100	
Cadmium	ND	1.00	0.100	0.200	
Chromium	0.335J U	1.00	0.100	0.200	EBL
Copper	1.98	1.00	0.250	0.500	
Lead	0.0708J	1.00	0.0500	0.100	
Nickel	0.441J U	1.00	0.100	0.200	EBL
Selenium	1.12	1.00	0.150	0.300	
Thallium	ND	1.00	0.100	0.200	

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	GApero/THuang

NW 3/4/19

3D

METHOD SW6020A
DISSOLVED METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/07/19 11:15
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
SDG NO.	: 19A031	Date Extracted:	02/04/19 11:42
Sample ID:	VEW01-MW03P-0119	Date Analyzed:	02/12/19 15:29
Lab Samp ID:	A031-03G	Dilution Factor:	5
Lab File ID:	98B06029	Matrix:	WATER
Ext Btch ID:	IMB004W	% Moisture:	NA
Calib. Ref.:	98B06024	Instrument ID:	98

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	
Antimony	ND	5.00	1.25	2.50	
Arsenic	ND	5.00	0.500	1.00	
Barium	63.0	5.00	1.25	2.50	
Beryllium	ND	5.00	0.250	0.500	
Cadmium	ND	5.00	0.500	1.00	
Chromium	ND	5.00	0.500	1.00	
Copper	2.51J U	5.00	1.25	2.50	MBL
Lead	ND	5.00	0.250	0.500	
Nickel	ND	5.00	0.500	1.00	
Selenium	1.22J	5.00	0.750	1.50	
Thallium	ND	5.00	0.500	1.00	

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman/THuang	Analyzed by:	LVicto

NW 3/4/19

5D

METHOD SW6020A
DISSOLVED METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/08/19 09:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
SDG NO.	: 19A031	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-MW02-0119	Date Analyzed:	01/18/19 21:09
Lab Samp ID:	A031-05	Dilution Factor:	1
Lab File ID:	98A12054	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	98A12044	Instrument ID:	98

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	
Antimony	ND	1.00	0.250	0.500	
Arsenic	0.309J	1.00	0.100	0.200	
Barium	23.7	1.00	0.250	0.500	
Beryllium	ND	1.00	0.0500	0.100	
Cadmium	ND	1.00	0.100	0.200	
Chromium	0.260~~J~~ U	1.00	0.100	0.200	EBL
Copper	0.764J	1.00	0.250	0.500	
Lead	ND	1.00	0.0500	0.100	
Nickel	0.772~~J~~ U	1.00	0.100	0.200	EBL
Selenium	0.990J	1.00	0.150	0.300	
Thallium	ND	1.00	0.100	0.200	

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	THuang

NW 3/4/19

6D

METHOD SW6020A
DISSOLVED METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/08/19 09:30
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/09/19
SDG NO.	: 19A031	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-MW08-0119	Date Analyzed:	01/18/19 21:13
Lab Samp ID:	A031-06	Dilution Factor:	1
Lab File ID:	98A12055	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	98A12044	Instrument ID:	98

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	
Antimony	ND	1.00	0.250	0.500	
Arsenic	0.240J	1.00	0.100	0.200	
Barium	33.5	1.00	0.250	0.500	
Beryllium	ND	1.00	0.0500	0.100	
Cadmium	ND	1.00	0.100	0.200	
Chromium	0.200 ~~0.145J~~ U	1.00	0.100	0.200	EBL
Copper	ND	1.00	0.250	0.500	
Lead	ND	1.00	0.0500	0.100	
Nickel	0.316 ~~J~~ U	1.00	0.100	0.200	EBL
Selenium	2.30	1.00	0.150	0.300	
Thallium	ND	1.00	0.100	0.200	

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	THuang

NW 3/4/19

METHOD SW7470A
MERCURY BY COLD VAPOR

Client : CH2M HILL
Project : CTO-013 VIEQUES_EAST SWMU-1
Batch No. : 19A031

Matrix : WATER
InstrumentID : 47

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/L)	DILT'N FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATE
MBLK1W	HGA011WB	ND	1	NA	0.500	0.0540	0.110	01/25/1914:38	01/24/1914:00	M47A011012	M47A011	19HGA011W	NA	NA
LCS1W	HGA011WL	2.38	1	NA	0.500	0.0540	0.110	01/25/1914:40	01/24/1914:00	M47A011013	M47A011	19HGA011W	NA	NA
LCD1W	HGA011WC	2.33	1	NA	0.500	0.0540	0.110	01/25/1914:42	01/24/1914:00	M47A011014	M47A011	19HGA011W	NA	NA
VEW01-EB01-010719	A031-01	ND	1	NA	0.500	0.0540	0.110	01/25/1915:09	01/24/1914:00	M47A011027	M47A011	19HGA011W	01/07/1914:20	01/09/19
VEW01-MW03-0119	A031-02	ND	1	NA	0.500	0.0540	0.110	01/25/1915:12	01/24/1914:00	M47A011028	M47A011	19HGA011W	01/07/1911:10	01/09/19
VEW01-MW03P-0119	A031-03	ND	1	NA	0.500	0.0540	0.110	01/25/1915:14	01/24/1914:00	M47A011029	M47A011	19HGA011W	01/07/1911:15	01/09/19
VEW01-MW02-0119	A031-05	0.242J	1	NA	0.500	0.0540	0.110	01/25/1915:16	01/24/1914:00	M47A011030	M47A011	19HGA011W	01/08/1909:20	01/09/19
VEW01-MW08-0119	A031-06	0.690	1	NA	0.500	0.0540	0.110	01/25/1915:19	01/24/1914:00	M47A011031	M47A011	19HGA011W	01/08/1909:30	01/09/19

Note: Detection limits are reported relative to sample result significant figures.

NW 3/4/19

METHOD SW7470A (DISSOLVED)
DISSOLVED MERCURY BY COLD VAPOR

Client : CH2M HILL
Project : CTO-013 VIEQUES_EAST SWMU-1
Batch No. : 19A031

Matrix : WATER
InstrumentID : 47

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/L)	DILT'N FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATE
MBLK1W	HGA011WB	ND	1	NA	0.500	0.0540	0.110	01/25/1914:38	01/24/1914:00	M47A011012	M47A011	19HGA011W	NA	NA
LCS1W	HGA011WL	2.38	1	NA	0.500	0.0540	0.110	01/25/1914:40	01/24/1914:00	M47A011013	M47A011	19HGA011W	NA	NA
LCD1W	HGA011WC	2.33	1	NA	0.500	0.0540	0.110	01/25/1914:42	01/24/1914:00	M47A011014	M47A011	19HGA011W	NA	NA
1 VEW01-EB01-010719	A031-01	ND	1	NA	0.500	0.0540	0.110	01/25/1915:21	01/24/1914:00	M47A011032	M47A011	19HGA011W	01/07/1914:20	01/09/19
2 VEW01-MW03-0119	A031-02	ND	1	NA	0.500	0.0540	0.110	01/25/1915:24	01/24/1914:00	M47A011033	M47A011	19HGA011W	01/07/1911:10	01/09/19
3 VEW01-MW03P-0119	A031-03	ND	1	NA	0.500	0.0540	0.110	01/25/1915:31	01/24/1914:00	M47A011036	M47A011	19HGA011W	01/07/1911:15	01/09/19
5 VEW01-MW02-0119	A031-05	0.121J	1	NA	0.500	0.0540	0.110	01/25/1915:33	01/24/1914:00	M47A011037	M47A011	19HGA011W	01/08/1909:20	01/09/19
6 VEW01-MW08-0119	A031-06	0.0810J	1	NA	0.500	0.0540	0.110	01/25/1915:35	01/24/1914:00	M47A011038	M47A011	19HGA011W	01/08/1909:30	01/09/19

Note: Detection limits are reported relative to sample result significant figures.

NW 3/4/19

METHOD SW9010B/9014
CYANIDE

Client : CH2M HILL
Project : CTO-013 VIEQUES_EAST SWMU-1
Batch No. : 19A031

Matrix : WATER
InstrumentID : 70

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/L)	DFxPREP FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATE
MBLK1W	CNA002WB	ND	1	NA	10	2.5	5	01/17/1916:33	01/17/1912:15	19CNA00210	19CNA002	CNA002W	NA	NA
LCS1W	CNA002WL	96.8	1	NA	10	2.5	5	01/17/1916:33	01/17/1912:15	19CNA00211	19CNA002	CNA002W	NA	NA
LCD1W	CNA002WC	95.1	1	NA	10	2.5	5	01/17/1916:33	01/17/1912:15	19CNA00212	19CNA002	CNA002W	NA	NA
VEW01-EB01-010719	A031-01	ND	1	NA	10	2.5	5	01/17/1916:33	01/17/1912:15	19CNA00217	19CNA002	CNA002W	01/07/1914:20	01/09/19
VEW01-MW03-0119	A031-02	ND	1	NA	10	2.5	5	01/17/1916:33	01/17/1912:15	19CNA00218	19CNA002	CNA002W	01/07/1911:10	01/09/19
VEW01-MW03P-0119	A031-03	ND	1	NA	10	2.5	5	01/17/1916:34	01/17/1912:15	19CNA00219	19CNA002	CNA002W	01/07/1911:15	01/09/19
VEW01-MW02-0119	A031-05	ND	1	NA	10	2.5	5	01/17/1916:34	01/17/1912:15	19CNA00222	19CNA002	CNA002W	01/08/1909:20	01/09/19
VEW01-MW08-0119	A031-06	ND	1	NA	10	2.5	5	01/17/1916:34	01/17/1912:15	19CNA00223	19CNA002	CNA002W	01/08/1909:30	01/09/19

NW 3/4/19

ENVIRONMENTAL
Data Services, Inc.

DATA VALIDATION SUMMARY REPORT
VIEQUES ISLAND, PUERTO RICO

Client: CH2M HILL, Inc., Chantilly, Virginia
SDG: 19A049
Laboratory: EMAX Laboratories, Inc., Torrance, California
Site: Vieques Island, CTO-013, SWMU 1, Puerto Rico
Date: March 4, 2019

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VEW01-EB01-010919	A049-01	Water
2	VEW01-MW10-0119	A049-02	Water
3	VEW01-MW13-0119	A049-03	Water
3MS	VEW01-MW13-0119MS	A049-03MS	Water
3MSD	VEW01-MW13-0119MSD	A049-03MSD	Water
4*	VEW01-TB01-010819	A049-04	Water
5*	VEW01-TB01-011019	A049-05	Water
6	VEW01-MW11-0119	A049-06	Water

* - VOC and VOC-SIM only

A full data validation was performed on the analytical data for three water samples, one aqueous equipment blank sample, and two aqueous trip blank samples collected on January 8-10, 2019 by CH2M HILL at the Vieques Island SWMU 1 site in Puerto Rico. The samples were analyzed under the *"Test Methods for the Evaluation of Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions" and the U.S. Department of Defense (DoD) Quality Systems Manual (QSM), Version 5.0 (DoD 2013).*

Specific method references are as follows:

Analysis	*Method References*
VOC	USEPA SW-846 Method 8260B
VOC SIM	USEPA SW-846 Method 8260B SIM
SVOC	USEPA SW-846 Method 8270D
SVOC SIM	USEPA SW-846 Method 8270D SIM
PAH SIM	USEPA SW-846 Method 8270D SIM
Pesticides	USEPA SW-846 Method 8081B
PCB	USEPA SW-846 Method 8082A
Total Metals/Hg/Cn	USEPA SW-846 Methods 6020A/7470A/9014
Dissolved Metals/Hg	USEPA SW-846 Methods 6020A/7470A

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Solid Waste Management Unit 1 Groundwater Long-Term Monitoring Sampling and Analysis Plan, July 2012, and the USEPA Region II Data Review Standard Operating Procedures (SOPs) as follows:

- SOP Number HW-33A, Revision 1, September 2016: Low/Medium Volatile Data Validation;
- SOP Number HW-35A, Revision 1, September 2016: Semivolatile Data Validation;
- SOP Number HW-36A, Revision 1, October 2016: Pesticide Data Validation;
- SOP Number HW-37A, Revision 0, July 2015: Polychlorinated Biphenyl (PCB) Aroclor Data Validation;
- SOP Number HW-3b, Revision 1, September 2016: ICP-MS Data Validation;
- SOP Number HW-3c, Revision 1, September 2016: Mercury and Cyanide Data Validation;
- and the reviewer's professional judgment.

The following items/criteria were reviewed for this report:

Organics

- Holding times and sample preservation
- Gas Chromatography/Mass Spectrometry (GC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field blank contamination
- Surrogate Spike recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample (LCS) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Tentatively Identified Compounds (TICs)
- Field Duplicate sample precision

Inorganics

- Holding times and sample preservation
- ICP/MS Tuning
- Initial and continuing calibration verifications
- Method blank and field blank contamination
- ICP Interference Check Sample
- Laboratory Control Sample (LCS) recoveries
- Matrix Spike Analysis
- Duplicate Sample Analysis
- ICP Serial Dilution
- Compound Quantitation
- ICP/MS Internal standards
- Field Duplicate sample precision

Data Usability Assessment

There were minor rejections of data. This data cannot be used in the decision-making process for this project.

- Styrene was rejected in one sample due to severely low MS/MSD recoveries.

Overall the remaining data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedences of QC criteria.

Volatile Organic Compounds (VOC)

Holding Times

- All samples were analyzed within 14 days for preserved water samples.

GC/MS Tuning

- All criteria were met.

Initial Calibration

- All %RSD and/or correlation coefficients and mean RRF criteria were met.

Continuing Calibration

- All %D and RRF criteria were met.

Method Blank

- The method blanks were free of contamination.

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010919	Toluene	0.18	None	All Associated ND
VEW01-TB01-010819	Dibromochloromethane	0.10	None	All Associated ND
	Toluene	0.13	None	

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-TB01-011019	Dibromochloromethane	0.11	None	All Associated ND
	Toluene	0.14	None	

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

EDS Sample ID	Compound	MS %R/MSD %R/RPD	Qualifier
3	Styrene	0%/0%/NC	R

Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

- All criteria were met.

Tentatively Identified Compounds (TICs)

- TICs were not reported.

Field Duplicate Sample Precision

- Field duplicate samples were not collected.

Volatile Organic Compounds (VOC) by SIM

Holding Times

- All samples were analyzed within 14 days for preserved water samples.

GC/MS Tuning

- All criteria were met.

Initial Calibration

- All %RSD and/or correlation coefficients and mean RRF criteria were met.

Continuing Calibration

- All %D and RRF criteria were met.

Method Blank

- The method blanks were free of contamination.

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010919	None - ND	-	-	-
VEW01-TB01-010819	Vinyl Chloride	0.011	U	3
VEW01-TB01-011019	Vinyl Chloride	0.010	U	6

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values.

Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

- All criteria were met.

Tentatively Identified Compounds (TICs)

- TICs were not reported.

Field Duplicate Sample Precision

- Field duplicate samples were not collected.

Semivolatile Organic Compounds (SVOCs)

Holding Times

- All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

GC/MS Tuning

- All criteria were met.

Initial Calibration

- All %RSD and/or correlation coefficients and mean RRF criteria were met.

Continuing Calibration

- All %D and RRF criteria were met.

Method Blank

- The method blanks were free of contamination.

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010919	None - ND	-	-	-

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values.

Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

- All criteria were met.

Tentatively Identified Compounds (TICs)

- TICs were not reported.

Field Duplicate Sample Precision

- Field duplicate samples were not collected.

Semivolatile Organic Compounds by SIM (SVOC-SIM)

Holding Times

- All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

GC/MS Tuning

- All criteria were met.

Initial Calibration

- All %RSD and/or correlation coefficients and mean RRF criteria were met.

Continuing Calibration

- All %D and RRF criteria were met.

Method Blank

- The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
MBLK1W	Bis(2-ethylhexyl)phthalate	11	None	All Associated ND

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010919	None - ND	-	-	-

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values.

Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

- All criteria were met.

Field Duplicate Sample Precision

- Field duplicate samples were not collected.

Polynuclear Aromatic Hydrocarbons by SIM

Holding Times

- All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

GC/MS Tuning

- All criteria were met.

Initial Calibration

- All %RSD and/or correlation coefficients and mean RRF criteria were met.

Continuing Calibration

- All %D and RRF criteria were met.

Method Blank

- The method blanks were free of contamination.

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010919	None - ND	-	-	-

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

EDS Sample ID	Compound	MS %R/MSD %R/RPD	Qualifier
3	Benzo(a)anthracene	49%/OK/OK	UJ
	Chrysene	53%/OK/OK	UJ

Laboratory Control Samples

- The LCS samples exhibited acceptable %R values.

Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

- All criteria were met.

Field Duplicate Sample Precision

- Field duplicate samples were not collected.

Pesticides (Pest)

Holding Times

- All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Initial Calibration

- All %RSD and/or correlation coefficient criteria were met.

Continuing Calibration

- All %D criteria were met.

Method Blank

- The method blanks were free of contamination.

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010919	None - ND	-	-	-

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values.

Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

Compound Quantitation

- All criteria were met.

Field Duplicate Sample Precision

- Field duplicate samples were not collected.

GC Column Difference Results

- All criteria were met.

Polychlorinated Biphenyls (PCBs)

Holding Times

- All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Initial Calibration

- All %RSD and/or correlation coefficient criteria were met.

Continuing Calibration

- All %D criteria were met.

Method Blank

- The method blanks were free of contamination.

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010919	None - ND	-	-	-

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values.

Laboratory Control Samples

- The LCS samples exhibited acceptable %R values.

Compound Quantitation

- All criteria were met.

Field Duplicate Sample Precision

- Field duplicate samples were not collected.

GC Column Difference Results

- All criteria were met.

Total & Dissolved Metals, Mercury & Cyanide

Holding Times

- All samples were prepared and analyzed within 14 days for cyanide, 28 days for mercury and 180 days for all other metals.

ICP/MS Tuning

- All criteria were met.

Initial Calibration Verification

- All initial calibration criteria were met.

Continuing Calibration Verification

- All continuing calibration criteria were met.

Method Blank

- The method blanks were free of contamination.

Field Blank

- The field QC samples exhibited the following contamination.

Total Metals				
Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010919	Barium	0.279	None	All Associated >10X
	Chromium	0.190	U	2, 3
	Lead	0.0578	U	2
	Nickel	0.335	U	2, 3, 6

Dissolved Metals				
Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VEW01-EB01-010919	Barium	0.252	None	All Associated >10X
	Chromium	0.363	U	2D, 3D
	Nickel	0.663	U	2D, 3D, 6D
	Mercury	0.0580	None	All ND

ICP Interference Check Sample

- The ICP interference check sample exhibited acceptable %R values.

Laboratory Control Samples

- The LCS sample exhibited acceptable recoveries.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable %R and RPD values.

ICP Serial Dilution

- The ICP serial dilution exhibited acceptable %D values.

Compound Quantitation

- EDS Sample ID 3 was reanalyzed for copper due to exceeding the linear range of the instrument in the original analysis. The reanalysis result was reported on the Form I.
- EDS Sample 6 was analyzed at a 10X dilution due to matrix interference. The reporting limits were adjusted accordingly. No action was required.

ICP/MS Internal Standards

- All internal standards met relative intensity criteria.

Field Duplicate Sample Precision

- Field duplicate samples were not collected.

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver Dated: 3/7/19

Nancy Weaver
Senior Chemist

Data Qualifiers

U	=	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted Contract Required Quantitation Limit (CRQL) for sample and method.
UJ	=	The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
J	=	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the CRQL).
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 results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
NJ	=	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/09/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/15/19 18:54
Sample ID	: VEW01-EB01-010919	Date Analyzed:	01/15/19 18:54
Lab Samp ID	: A049-01	Dilution Factor:	1
Lab File ID	: RAC373	Matrix :	WATER
Ext Btch ID	: V067A12	% Moisture :	NA
Calib. Ref.	: RKC454	Instrument ID :	67

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
BENZENE	ND	1.0	0.10	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROFORM	ND	1.0	0.10	0.20
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	ND	0.50	0.10	0.20
ETHYLBENZENE	ND	0.50	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
M- AND P-XYLENE	ND	2.0	0.21	0.40
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
O-XYLENE	ND	1.0	0.10	0.20
STYRENE	ND	1.0	0.25	0.50
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	0.18J	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	10.0	10.00	100	70-120
4-BROMOFLUOROBENZENE	9.73	10.00	97.3	75-120
TOLUENE-D8	9.31	10.00	93.1	85-120
DIBROMOFLUOROMETHANE	9.47	10.00	94.7	85-115

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METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/08/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/15/19 20:10
Sample ID:	VEW01-MW10-0119	Date Analyzed:	01/15/19 20:10
Lab Samp ID:	A049-02	Dilution Factor:	1
Lab File ID:	RAC376	Matrix	: WATER
Ext Btch ID:	V067A12	% Moisture	: NA
Calib. Ref.:	RKC454	Instrument ID	: 67

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
BENZENE	ND	1.0	0.10	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROFORM	ND	1.0	0.10	0.20
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	ND	0.50	0.10	0.20
ETHYLBENZENE	ND	0.50	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
M- AND P-XYLENE	ND	2.0	0.21	0.40
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
O-XYLENE	ND	1.0	0.10	0.20
STYRENE	ND	1.0	0.25	0.50
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	ND	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	10.2	10.00	102	70-120
4-BROMOFLUOROBENZENE	9.93	10.00	99.3	75-120
TOLUENE-D8	9.21	10.00	92.1	85-120
DIBROMOFLUOROMETHANE	9.37	10.00	93.7	85-115

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METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/09/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/15/19 19:45
Sample ID:	VEW01-MW13-0119	Date Analyzed:	01/15/19 19:45
Lab Samp ID:	A049-03	Dilution Factor:	1
Lab File ID:	RAC375	Matrix :	WATER
Ext Btch ID:	V067A12	% Moisture :	NA
Calib. Ref.:	RKC454	Instrument ID :	67

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
BENZENE	ND	1.0	0.10	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROFORM	ND	1.0	0.10	0.20
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	ND	0.50	0.10	0.20
ETHYLBENZENE	ND	0.50	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
M- AND P-XYLENE	ND	2.0	0.21	0.40
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
O-XYLENE	ND	1.0	0.10	0.20
STYRENE	~~ND~~ R	1.0	0.25	0.50 MSL
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	ND	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	10.2	10.00	102	70-120
4-BROMOFLUOROBENZENE	9.55	10.00	95.5	75-120
TOLUENE-D8	9.24	10.00	92.4	85-120
DIBROMOFLUOROMETHANE	9.50	10.00	95.0	85-115

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METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/08/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/15/19 19:19
Sample ID:	VEW01-TB01-010819	Date Analyzed:	01/15/19 19:19
Lab Samp ID:	A049-04	Dilution Factor:	1
Lab File ID:	RAC374	Matrix :	WATER
Ext Btch ID:	V067A12	% Moisture :	NA
Calib. Ref.:	RKC454	Instrument ID :	67

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
BENZENE	ND	1.0	0.10	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROFORM	ND	1.0	0.10	0.20
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	0.10J	0.50	0.10	0.20
ETHYLBENZENE	ND	0.50	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
M- AND P-XYLENE	ND	2.0	0.21	0.40
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
O-XYLENE	ND	1.0	0.10	0.20
STYRENE	ND	1.0	0.25	0.50
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	0.13J	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	9.72	10.00	97.1	70-120
4-BROMOFLUOROBENZENE	9.72	10.00	97.2	75-120
TOLUENE-D8	9.36	10.00	93.6	85-120
DIBROMOFLUOROMETHANE	9.26	10.00	92.6	85-115

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METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/10/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/16/19 13:30
Sample ID:	VEW01-TB01-011019	Date Analyzed:	01/16/19 13:30
Lab Samp ID:	A049-05	Dilution Factor:	1
Lab File ID:	RAC388	Matrix :	WATER
Ext Btch ID:	V067A13	% Moisture :	NA
Calib. Ref.:	RKC454	Instrument ID :	67

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
BENZENE	ND	1.0	0.10	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROFORM	ND	1.0	0.10	0.20
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	0.11J	0.50	0.10	0.20
ETHYLBENZENE	ND	0.50	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
M- AND P-XYLENE	ND	2.0	0.21	0.40
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
O-XYLENE	ND	1.0	0.10	0.20
STYRENE	ND	1.0	0.25	0.50
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	0.14J	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	9.39	10.00	93.9	70-120
4-BROMOFLUOROBENZENE	10.1	10.00	101	75-120
TOLUENE-D8	9.42	10.00	94.2	85-120
DIBROMOFLUOROMETHANE	9.06	10.00	90.6	85-115

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METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/10/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/15/19 20:36
Sample ID:	VEW01-MW11-0119	Date Analyzed:	01/15/19 20:36
Lab Samp ID:	A049-06	Dilution Factor:	1
Lab File ID:	RAC377	Matrix :	WATER
Ext Btch ID:	V067A12	% Moisture :	NA
Calib. Ref.:	RKC454	Instrument ID :	67

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
BENZENE	ND	1.0	0.10	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROFORM	ND	1.0	0.10	0.20
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	ND	0.50	0.10	0.20
ETHYLBENZENE	ND	0.50	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
M- AND P-XYLENE	ND	2.0	0.21	0.40
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
O-XYLENE	ND	1.0	0.10	0.20
STYRENE	ND	1.0	0.25	0.50
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	ND	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	10.3	10.00	103	70-120
4-BROMOFLUOROBENZENE	9.74	10.00	97.4	75-120
TOLUENE-D8	9.13	10.00	91.3	85-120
DIBROMOFLUOROMETHANE	9.52	10.00	95.2	85-115

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METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/09/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/18/19 13:50
Sample ID:	VEW01-EB01-010919	Date Analyzed:	01/18/19 13:50
Lab Samp ID:	A049-01	Dilution Factor:	1
Lab File ID:	RAY273	Matrix :	WATER
Ext Btch ID:	VOF5A13	% Moisture :	NA
Calib. Ref.:	RHY772	Instrument ID :	TOF5

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,2-DIBROMO-3-CHLOROPROPANE	ND	0.050	0.010	0.020
1,2-DIBROMOETHANE	ND	0.050	0.010	0.020
VINYL CHLORIDE	ND	0.050	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	0.477	0.5000	95.4	70-120
4-BROMOFLUOROBENZENE	0.466	0.5000	93.2	75-120
TOLUENE-D8	0.494	0.5000	98.7	85-120

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METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/08/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/18/19 14:14
Sample ID:	VEW01-MW10-0119	Date Analyzed:	01/18/19 14:14
Lab Samp ID:	A049-02	Dilution Factor:	1
Lab File ID:	RAY274	Matrix :	WATER
Ext Btch ID:	VOF5A13	% Moisture :	NA
Calib. Ref.:	RHY772	Instrument ID :	TOF5

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,2-DIBROMO-3-CHLOROPROPANE	ND	0.050	0.010	0.020
1,2-DIBROMOETHANE	ND	0.050	0.010	0.020
VINYL CHLORIDE	ND	0.050	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	0.484	0.5000	96.8	70-120
4-BROMOFLUOROBENZENE	0.437	0.5000	87.5	75-120
TOLUENE-D8	0.473	0.5000	94.5	85-120

NW 3/4/19

3

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/09/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/18/19 14:38
Sample ID	: VEW01-MW13-0119	Date Analyzed:	01/18/19 14:38
Lab Samp ID	: A049-03	Dilution Factor:	1
Lab File ID	: RAY275	Matrix :	WATER
Ext Btch ID	: VOF5A13	% Moisture :	NA
Calib. Ref.	: RHY772	Instrument ID :	TOF5

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	
1,2-DIBROMO-3-CHLOROPROPANE	ND	0.050	0.010	0.020	
1,2-DIBROMOETHANE	ND	0.050	0.010	0.020	
VINYL CHLORIDE	0.020 ~~0.018J~~ U	0.050	0.010	0.020	TBL

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	0.473	0.5000	94.7	70-120
4-BROMOFLUOROBENZENE	0.435	0.5000	87.1	75-120
TOLUENE-D8	0.476	0.5000	95.1	85-120

NW 3/4/19

4

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/08/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/18/19 16:15
Sample ID:	VEW01-TB01-010819	Date Analyzed:	01/18/19 16:15
Lab Samp ID:	A049-04	Dilution Factor:	1
Lab File ID:	RAY279	Matrix :	WATER
Ext Btch ID:	VOF5A13	% Moisture :	NA
Calib. Ref.:	RHY772	Instrument ID :	TOF5

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,2-DIBROMO-3-CHLOROPROPANE	ND	0.050	0.010	0.020
1,2-DIBROMOETHANE	ND	0.050	0.010	0.020
VINYL CHLORIDE	0.011J	0.050	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	0.507	0.5000	101	70-120
4-BROMOFLUOROBENZENE	0.461	0.5000	92.2	75-120
TOLUENE-D8	0.493	0.5000	98.5	85-120

NW 3/4/19

5

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/10/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/18/19 13:26
Sample ID:	VEW01-TB01-011019	Date Analyzed:	01/18/19 13:26
Lab Samp ID:	A049-05	Dilution Factor:	1
Lab File ID:	RAY272	Matrix :	WATER
Ext Btch ID:	VOF5A13	% Moisture :	NA
Calib. Ref.:	RHY772	Instrument ID :	TOF5

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,2-DIBROMO-3-CHLOROPROPANE	ND	0.050	0.010	0.020
1,2-DIBROMOETHANE	ND	0.050	0.010	0.020
VINYL CHLORIDE	0.010J	0.050	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	0.438	0.5000	87.6	70-120
4-BROMOFLUOROBENZENE	0.458	0.5000	91.6	75-120
TOLUENE-D8	0.482	0.5000	96.4	85-120

NW 3/4/19

6

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/10/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/18/19 16:39
Sample ID:	VEW01-MW11-0119	Date Analyzed:	01/18/19 16:39
Lab Samp ID:	A049-06	Dilution Factor:	1
Lab File ID:	RAY280	Matrix :	WATER
Ext Btch ID:	VOF5A13	% Moisture :	NA
Calib. Ref.:	RHY772	Instrument ID :	TOF5

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	
1,2-DIBROMO-3-CHLOROPROPANE	ND	0.050	0.010	0.020	
1,2-DIBROMOETHANE	ND	0.050	0.010	0.020	
VINYL CHLORIDE	0.050 U	0.050	0.010	0.020	TBL

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	0.513	0.5000	103	70-120
4-BROMOFLUOROBENZENE	0.430	0.5000	86.0	75-120
TOLUENE-D8	0.466	0.5000	93.2	85-120

NW 3/4/19

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/09/19 06:30
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 14:45
Sample ID	: VEW01-EB01-010919	Date Analyzed:	01/16/19 20:50
Lab Samp ID:	19A049-01	Dilution Factor:	1
Lab File ID:	RAJ156	Matrix:	WATER
Ext Btch ID:	19SVA016W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
2,4-Dichlorophenol	ND	12	3.0	6.0
2,4-Dimethylphenol	ND	12	3.1	6.0
2,4-Dinitrophenol	ND	24	3.0	6.0
2,4-Dinitrotoluene	ND	12	3.0	6.0
2-Chloronaphthalene	ND	12	3.0	6.0
2-Chlorophenol	ND	12	3.0	6.0
3,3'-Dichlorobenzidine	ND	12	3.0	6.0
4,6-Dinitro-2-methylphenol	ND	24	3.0	6.0
Acenaphthene	ND	12	3.0	6.0
Anthracene	ND	12	3.0	6.0
Butylbenzylphthalate	ND	12	3.0	6.0
Diethylphthalate	ND	12	3.0	6.0
Dimethyl phthalate	ND	12	3.0	6.0
Di-n-butylphthalate	ND	12	3.0	6.0
Fluoranthene	ND	12	3.0	6.0
Fluorene	ND	12	3.0	6.0
Hexachloroethane	ND	12	3.0	6.0
Isophorone	ND	12	3.0	6.0
Nitrobenzene	ND	12	3.0	6.0
n-Nitrosodiphenylamine	ND	12	3.0	6.0
Phenol	ND	12	3.0	6.0
Pyrene	ND	12	3.0	6.0
Hexachlorocyclopentadiene	ND	12	3.0	6.0

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	45.7	71.4	64	40-125
2-Fluorobiphenyl	17.8	23.8	75	50-110
2-Fluorophenol	39.3	71.4	55	20-110
Nitrobenzene-d5	19.5	23.8	82	40-110
Phenol-d5	49.5	71.4	69	10-115
Terphenyl-d14	17.1	23.8	72	50-135

Notes:
(1): 4-Methylphenol cannot be separated from 3-Methylphenol
(2): n-nitrosodiphenylamine cannot be separated from Diphenylamine
(3): 1,2 Diphenylhydrazine analyzed as Azobenzene due to decomposition in injector

Detection limits are reported relative to sample result significant figures.
Sample Amount : 840ml Final Volume : 2ml
Prepared by : JMuert Analyzed by : KV

NW 3/4/19

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS-App.IX

Client	: CH2M HILL	Date Collected:	01/09/19 06:30
Project	: CTO-013 VIEQUES EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 14:45
Sample ID	: VEW01-EB01-010919	Date Analyzed:	01/16/19 20:50
Lab Samp ID:	19A049-01	Dilution Factor:	1
Lab File ID:	RAJ156	Matrix:	WATER
Ext Btch ID:	19SVA016W	% Moisture:	NA
Calib. Ref.:	RIJ148	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Atrazine	ND	12	3.0	6.0

Notes:

Detection limits are reported relative to sample result significant figures.
Sample Amount : 840ml Final Volume : 2ml
Prepared by : JMuert Analyzed by : KVu

NW 3/4/19

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/08/19 15:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 14:45
Sample ID	: VEW01-MW10-0119	Date Analyzed:	01/16/19 21:08
Lab Samp ID:	19A049-02	Dilution Factor:	1
Lab File ID:	RAJ157	Matrix:	WATER
Ext Btch ID:	19SVA016W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
2,4-Dichlorophenol	ND	11	2.6	5.2
2,4-Dimethylphenol	ND	11	2.7	5.2
2,4-Dinitrophenol	ND	21	2.6	5.2
2,4-Dinitrotoluene	ND	11	2.6	5.2
2-Chloronaphthalene	ND	11	2.6	5.2
2-Chlorophenol	ND	11	2.6	5.2
3,3'-Dichlorobenzidine	ND	11	2.6	5.2
4,6-Dinitro-2-methylphenol	ND	21	2.6	5.2
Acenaphthene	ND	11	2.6	5.2
Anthracene	ND	11	2.6	5.2
Butylbenzylphthalate	ND	11	2.6	5.2
Diethylphthalate	ND	11	2.6	5.2
Dimethyl phthalate	ND	11	2.6	5.2
Di-n-butylphthalate	ND	11	2.6	5.2
Fluoranthene	ND	11	2.6	5.2
Fluorene	ND	11	2.6	5.2
Hexachloroethane	ND	11	2.6	5.2
Isophorone	ND	11	2.6	5.2
Nitrobenzene	ND	11	2.6	5.2
n-Nitrosodiphenylamine	ND	11	2.6	5.2
Phenol	ND	11	2.6	5.2
Pyrene	ND	11	2.6	5.2
Hexachlorocyclopentadiene	ND	11	2.6	5.2

SURROGATE PARAMETERS	RESULT	SPK AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	34.4	63.0	55	40-125
2-Fluorobiphenyl	13.6	21.0	65	50-110
2-Fluorophenol	31.7	63.0	50	20-110
Nitrobenzene-d5	15.3	21.0	73	40-110
Phenol-d5	39.7	63.0	63	10-115
Terphenyl-d14	14.2	21.0	68	50-135

Notes:
(1): 4-Methylphenol cannot be separated from 3-Methylphenol
(2): n-nitrosodiphenylamine cannot be separated from Diphenylamine
(3): 1,2 Diphenylhydrazine analyzed as Azobenzene due to decomposition in injector

Detection limits are reported relative to sample result significant figures.
Sample Amount : 950ml Final Volume : 2ml
Prepared by : JMuert Analyzed by : KV

2

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS-App.IX

Client	: CH2M HILL	Date Collected:	01/08/19 15:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 14:45
Sample ID	: VEW01-MW10-0119	Date Analyzed:	01/16/19 21:08
Lab Samp ID:	19A049-02	Dilution Factor:	1
Lab File ID:	RAJ157	Matrix:	WATER
Ext Btch ID:	19SVA016W	% Moisture:	NA
Calib. Ref.:	RIJ148	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Atrazine	ND	11	2.6	5.2

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 950ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KVu

NW 3/4/19

3

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/09/19 09:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 14:45
Sample ID	: VEW01-MW13-0119	Date Analyzed:	01/16/19 21:27
Lab Samp ID:	19A049-03	Dilution Factor:	1
Lab File ID:	RAJ158	Matrix:	WATER
Ext Btch ID:	19SVA016W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
2,4-Dichlorophenol	ND	12	3.0	6.0
2,4-Dimethylphenol	ND	12	3.1	6.0
2,4-Dinitrophenol	ND	24	3.0	6.0
2,4-Dinitrotoluene	ND	12	3.0	6.0
2-Chloronaphthalene	ND	12	3.0	6.0
2-Chlorophenol	ND	12	3.0	6.0
3,3'-Dichlorobenzidine	ND	12	3.0	6.0
4,6-Dinitro-2-methylphenol	ND	24	3.0	6.0
Acenaphthene	ND	12	3.0	6.0
Anthracene	ND	12	3.0	6.0
Butylbenzylphthalate	ND	12	3.0	6.0
Diethylphthalate	ND	12	3.0	6.0
Dimethyl phthalate	ND	12	3.0	6.0
Di-n-butylphthalate	ND	12	3.0	6.0
Fluoranthene	ND	12	3.0	6.0
Fluorene	ND	12	3.0	6.0
Hexachloroethane	ND	12	3.0	6.0
Isophorone	ND	12	3.0	6.0
Nitrobenzene	ND	12	3.0	6.0
n-Nitrosodiphenylamine	ND	12	3.0	6.0
Phenol	ND	12	3.0	6.0
Pyrene	ND	12	3.0	6.0
Hexachlorocyclopentadiene	ND	12	3.0	6.0

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	38.3	72.0	53	40-125
2-Fluorobiphenyl	14.0	24.0	58	50-110
2-Fluorophenol	33.5	72.0	47	20-110
Nitrobenzene-d5	15.6	24.0	65	40-110
Phenol-d5	41.2	72.0	57	10-115
Terphenyl-d14	16.6	24.0	69	50-135

Notes:
(1): 4-Methylphenol cannot be separated from 3-Methylphenol
(2): n-nitrosodiphenylamine cannot be separated from Diphenylamine
(3): 1,2 Diphenylhydrazine analyzed as Azobenzene due to decomposition in injector

Detection limits are reported relative to sample result significant figures.
Sample Amount : 830ml Final Volume : 2ml
Prepared by : JMuert Analyzed by : KV

NW 3/4/19

3

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS-App.IX

Client	: CH2M HILL	Date Collected:	01/09/19 09:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 14:45
Sample ID	: VEW01-MW13-0119	Date Analyzed:	01/16/19 21:27
Lab Samp ID:	19A049-03	Dilution Factor:	1
Lab File ID:	RAJ158	Matrix:	WATER
Ext Btch ID:	19SVA016W	% Moisture:	NA
Calib. Ref.:	RIJ148	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Atrazine	ND	12	3.0	6.0

Notes:

Detection limits are reported relative to sample result significant figures.
Sample Amount : 830ml Final Volume : 2ml
Prepared by : JMuert Analyzed by : KVu

NW 3/4/19

6

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS

Client	: CH2M HILL	Date Collected:	01/10/19 08:50
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 14:45
Sample ID	: VEW01-MW11-0119	Date Analyzed:	01/16/19 21:46
Lab Samp ID:	19A049-06	Dilution Factor:	1
Lab File ID:	RAJ159	Matrix:	WATER
Ext Btch ID:	19SVA016W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
2,4-Dichlorophenol	ND	11	2.7	5.4
2,4-Dimethylphenol	ND	11	2.8	5.4
2,4-Dinitrophenol	ND	22	2.7	5.4
2,4-Dinitrotoluene	ND	11	2.7	5.4
2-Chloronaphthalene	ND	11	2.7	5.4
2-Chlorophenol	ND	11	2.7	5.4
3,3'-Dichlorobenzidine	ND	11	2.7	5.4
4,6-Dinitro-2-methylphenol	ND	22	2.7	5.4
Acenaphthene	ND	11	2.7	5.4
Anthracene	ND	11	2.7	5.4
Butylbenzylphthalate	ND	11	2.7	5.4
Diethylphthalate	ND	11	2.7	5.4
Dimethyl phthalate	ND	11	2.7	5.4
Di-n-butylphthalate	ND	11	2.7	5.4
Fluoranthene	ND	11	2.7	5.4
Fluorene	ND	11	2.7	5.4
Hexachloroethane	ND	11	2.7	5.4
Isophorone	ND	11	2.7	5.4
Nitrobenzene	ND	11	2.7	5.4
n-Nitrosodiphenylamine	ND	11	2.7	5.4
Phenol	ND	11	2.7	5.4
Pyrene	ND	11	2.7	5.4
Hexachlorocyclopentadiene	ND	11	2.7	5.4

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	29.9	64.8	46	40-125
2-Fluorobiphenyl	11.0	21.6	51	50-110
2-Fluorophenol	20.4	64.8	31	20-110
Nitrobenzene-d5	12.0	21.6	56	40-110
Phenol-d5	28.4	64.8	44	10-115
Terphenyl-d14	14.7	21.6	68	50-135

Notes:
(1): 4-Methylphenol cannot be separated from 3-Methylphenol
(2): n-nitrosodiphenylamine cannot be separated from Diphenylamine
(3): 1,2 Diphenylhydrazine analyzed as Azobenzene due to decomposition in injector

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 930ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KV

NW 3/4/19

6

METHOD SW3520C/8270D
SEMI VOLATILE ORGANICS BY GC/MS-App.IX

Client	: CH2M HILL	Date Collected:	01/10/19 08:50
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 14:45
Sample ID	: VEW01-MW11-0119	Date Analyzed:	01/16/19 21:46
Lab Samp ID:	19A049-06	Dilution Factor:	1
Lab File ID:	RAJ159	Matrix:	WATER
Ext Btch ID:	19SVA016W	% Moisture:	NA
Calib. Ref.:	RIJ148	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Atrazine	ND	11	2.7	5.4

Notes:

Detection limits are reported relative to sample result significant figures.
Sample Amount : 930ml Final Volume : 2ml
Prepared by : JMuert Analyzed by : KVu

NW 3/4/19

METHOD SW3520C/8270D SIM
SEMIVOLATILE ORGANICS BY GC/MS SIMS

Client	: CH2M HILL	Date Collected:	01/09/19 06:30
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 14:45
Sample ID	: VEW01-EB01-010919	Date Analyzed:	01/16/19 20:50
Lab Samp ID:	19A049-01	Dilution Factor:	1
Lab File ID:	RAJ156	Matrix:	WATER
Ext Btch ID:	19SVA016W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
bis(2-Chloroethyl)ether	ND	1.2	0.059	0.12
n-Nitroso-di-n-propylamine	ND	1.2	0.059	0.12
2,4,6-Trichlorophenol	ND	1.2	0.059	0.12
Pentachlorophenol	ND	2.4	0.48	0.95
bis(2-Ethylhexyl)phthalate	ND	3.6	0.67	1.4
Hexachlorobenzene	ND	1.2	0.059	0.12

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	51.1	71.4	72	40-125
2-Fluorobiphenyl	18.4	23.8	77	50-110
2-Fluorophenol	40.1	71.4	56	20-110
Nitrobenzene-d5	19.7	23.8	83	40-110
Phenol-d5	50.7	71.4	71	10-115
Terphenyl-d14	17.5	23.8	73	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 840ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KV

NW 3/4/19

2

METHOD SW3520C/8270D SIM
SEMIVOLATILE ORGANICS BY GC/MS SIMS

Client	: CH2M HILL	Date Collected:	01/08/19 15:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 14:45
Sample ID	: VEW01-MW10-0119	Date Analyzed:	01/16/19 21:08
Lab Samp ID:	19A049-02	Dilution Factor:	1
Lab File ID:	RAJ157	Matrix:	WATER
Ext Btch ID:	19SVA016W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
bis(2-Chloroethyl)ether	ND	1.0	0.052	0.10
n-Nitroso-di-n-propylamine	ND	1.0	0.052	0.10
2,4,6-Trichlorophenol	ND	1.0	0.052	0.10
Pentachlorophenol	ND	2.1	0.42	0.84
bis(2-Ethylhexyl)phthalate	ND	3.1	0.59	1.3
Hexachlorobenzene	ND	1.0	0.052	0.10

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	39.7	63.0	63	40-125
2-Fluorobiphenyl	14.5	21.0	69	50-110
2-Fluorophenol	32.4	63.0	51	20-110
Nitrobenzene-d5	15.8	21.0	75	40-110
Phenol-d5	40.5	63.0	64	10-115
Terphenyl-d14	14.3	21.0	68	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 950ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KV

NW 3/4/19

3

METHOD SW3520C/8270D SIM
SEMIVOLATILE ORGANICS BY GC/MS SIMS

Client	: CH2M HILL	Date Collected:	01/09/19 09:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 14:45
Sample ID	: VEW01-MW13-0119	Date Analyzed:	01/16/19 21:27
Lab Samp ID:	19A049-03	Dilution Factor:	1
Lab File ID:	RAJ158	Matrix:	WATER
Ext Btch ID:	19SVA016W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
bis(2-Chloroethyl)ether	ND	1.2	0.060	0.12
n-Nitroso-di-n-propylamine	ND	1.2	0.060	0.12
2,4,6-Trichlorophenol	ND	1.2	0.060	0.12
Pentachlorophenol	ND	2.4	0.48	0.96
bis(2-Ethylhexyl)phthalate	ND	3.6	0.68	1.4
Hexachlorobenzene	ND	1.2	0.060	0.12

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	42.6	72.0	59	40-125
2-Fluorobiphenyl	14.8	24.0	62	50-110
2-Fluorophenol	34.4	72.0	48	20-110
Nitrobenzene-d5	15.7	24.0	66	40-110
Phenol-d5	41.8	72.0	58	10-115
Terphenyl-d14	17.4	24.0	73	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 830ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KV

NW 3/4/19

6

METHOD SW3520C/8270D SIM
SEMIVOLATILE ORGANICS BY GC/MS SIMS

Client	: CH2M HILL	Date Collected:	01/10/19 08:50
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 14:45
Sample ID	: VEW01-MW11-0119	Date Analyzed:	01/16/19 21:46
Lab Samp ID:	19A049-06	Dilution Factor:	1
Lab File ID:	RAJ159	Matrix:	WATER
Ext Btch ID:	19SVA016W	% Moisture:	NA
Calib. Ref.:	RHJ533	Instrument ID:	E4

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
bis(2-Chloroethyl)ether	ND	1.1	0.054	0.11
n-Nitroso-di-n-propylamine	ND	1.1	0.054	0.11
2,4,6-Trichlorophenol	ND	1.1	0.054	0.11
Pentachlorophenol	ND	2.2	0.43	0.86
bis(2-Ethylhexyl)phthalate	ND	3.2	0.61	1.3
Hexachlorobenzene	ND	1.1	0.054	0.11

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
2,4,6-Tribromophenol	33.3	64.8	51	40-125
2-Fluorobiphenyl	11.5	21.6	53	50-110
2-Fluorophenol	21.5	64.8	33	20-110
Nitrobenzene-d5	12.2	21.6	56	40-110
Phenol-d5	29.3	64.8	45	10-115
Terphenyl-d14	14.9	21.6	69	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 930ml	Final Volume	: 2ml
Prepared by	: JMuert	Analyzed by	: KV

NW 3/4/19

METHOD SW3520C/8270D SIM
PAHs BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/09/19 06:30
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 10:15
Sample ID	: VEW01-EB01-010919	Date Analyzed:	01/18/19 16:06
Lab Samp ID:	19A049-01	Dilution Factor:	1
Lab File ID:	RAF093	Matrix:	WATER
Ext Btch ID:	19SVA015W	% Moisture:	NA
Calib. Ref.:	REF262	Instrument ID:	F0

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Benzo(a)anthracene	ND	0.021	0.0053	0.011
Benzo(a)pyrene	ND	0.021	0.0053	0.011
Benzo(b)fluoranthene	ND	0.021	0.0053	0.011
Benzo(k)fluoranthene	ND	0.021	0.0053	0.011
Chrysene	ND	0.021	0.0053	0.011
Dibenz(a,h)anthracene	ND	0.021	0.0053	0.011
Indeno(1,2,3-cd)pyrene	ND	0.021	0.0053	0.011

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
Terphenyl-d14	0.447	0.530	84	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 940ml	Final Volume	: 1ml
Prepared by	: JMuert	Analyzed by	: KVu

NW 3/4/19

2

METHOD SW3520C/8270D SIM
PAHs BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/08/19 15:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 10:15
Sample ID	: VEW01-MW10-0119	Date Analyzed:	01/18/19 16:30
Lab Samp ID:	19A049-02	Dilution Factor:	1
Lab File ID:	RAF094	Matrix:	WATER
Ext Btch ID:	19SVA015W	% Moisture:	NA
Calib. Ref.:	REF262	Instrument ID:	FO

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Benzo(a)anthracene	ND	0.021	0.0052	0.010
Benzo(a)pyrene	ND	0.021	0.0052	0.010
Benzo(b)fluoranthene	ND	0.021	0.0052	0.010
Benzo(k)fluoranthene	ND	0.021	0.0052	0.010
Chrysene	ND	0.021	0.0052	0.010
Dibenz(a,h)anthracene	ND	0.021	0.0052	0.010
Indeno(1,2,3-cd)pyrene	ND	0.021	0.0052	0.010

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
Terphenyl-d14	0.347	0.515	67	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 970ml	Final Volume	: 1ml
Prepared by	: JMuert	Analyzed by	: KVu

NW 3/4/19

3

METHOD SW3520C/8270D SIM
PAHs BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/09/19 09:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 10:15
Sample ID	: VEW01-MW13-0119	Date Analyzed:	01/18/19 16:53
Lab Samp ID:	19A049-03	Dilution Factor:	1
Lab File ID:	RAF095	Matrix:	WATER
Ext Btch ID:	19SVA015W	% Moisture:	NA
Calib. Ref.:	REF262	Instrument ID:	FO

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	
Benzo(a)anthracene	~~ND~~ UJ	0.024	0.0060	0.012	MSL
Benzo(a)pyrene	ND	0.024	0.0060	0.012	
Benzo(b)fluoranthene	ND	0.024	0.0060	0.012	
Benzo(k)fluoranthene	ND	0.024	0.0060	0.012	
Chrysene	~~ND~~ UJ	0.024	0.0060	0.012	MSL
Dibenz(a,h)anthracene	ND	0.024	0.0060	0.012	
Indeno(1,2,3-cd)pyrene	ND	0.024	0.0060	0.012	

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
Terphenyl-d14	0.316	0.595	53	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount : 840ml Final Volume : 1ml
Prepared by : JMuert Analyzed by : KVu

NW 3/4/19

6

METHOD SW3520C/8270D SIM
PAHs BY GC/MS SIM

Client	: CH2M HILL	Date Collected:	01/10/19 08:50
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/14/19 10:15
Sample ID	: VEW01-MW11-0119	Date Analyzed:	01/18/19 17:17
Lab Samp ID:	19A049-06	Dilution Factor:	1
Lab File ID:	RAF096	Matrix:	WATER
Ext Btch ID:	19SVA015W	% Moisture:	NA
Calib. Ref.:	REF262	Instrument ID:	F0

PARAMETER	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Benzo(a)anthracene	ND	0.023	0.0057	0.011
Benzo(a)pyrene	ND	0.023	0.0057	0.011
Benzo(b)fluoranthene	ND	0.023	0.0057	0.011
Benzo(k)fluoranthene	ND	0.023	0.0057	0.011
Chrysene	ND	0.023	0.0057	0.011
Dibenz(a,h)anthracene	ND	0.023	0.0057	0.011
Indeno(1,2,3-cd)pyrene	ND	0.023	0.0057	0.011

SURROGATE PARAMETERS	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
Terphenyl-d14	0.426	0.570	75	50-135

Notes:

Detection limits are reported relative to sample result significant figures.

Sample Amount	: 880ml	Final Volume	: 1ml
Prepared by	: JMuert	Analyzed by	: KVu

NW 3/4/19

METHOD 3520C/8081B
PESTICIDES

Client	: CH2M HILL	Date Collected:	01/09/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/10/19 13:45
Sample ID:	VEW01-EB01-010919	Date Analyzed:	01/12/19 02:04
Lab Samp ID:	A049-01	Dilution Factor:	1.14
Lab File ID:	RA11033A	Matrix	: WATER
Ext Btch ID:	CPA015W	% Moisture	: NA
Calib. Ref.:	RA11027A	Instrument ID	: F9

PARAMETERS	RESULTS (ug/L)		LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ALPHA-BHC	(ND)	ND	0.11	0.0057	0.011
GAMMA-BHC (LINDANE)	(ND)	ND	0.11	0.0057	0.011
BETA-BHC	0.033J	(ND)	0.11	0.0080	0.011
HEPTACHLOR	(ND)	ND	0.11	0.0080	0.011
ALDRIN	(ND)	ND	0.11	0.0057	0.011
HEPTACHLOR EPOXIDE	(ND)	ND	0.11	0.0057	0.011
GAMMA-CHLORDANE	(ND)	ND	0.11	0.0057	0.011
ALPHA-CHLORDANE	(ND)	ND	0.11	0.0057	0.011
ENDOSULFAN I	(ND)	ND	0.11	0.0091	0.011
4,4'-DDE	(ND)	ND	0.11	0.0057	0.011
DIELDRIN	(ND)	ND	0.11	0.0057	0.011
ENDRIN	(ND)	ND	0.11	0.0091	0.011
4,4'-DDD	(ND)	ND	0.11	0.0057	0.011
ENDOSULFAN II	(ND)	ND	0.11	0.0057	0.011
4,4'-DDT	(ND)	ND	0.11	0.0057	0.011
ENDRIN ALDEHYDE	(ND)	ND	0.11	0.0057	0.011
ENDOSULFAN SULFATE	(ND)	ND	0.11	0.0057	0.011
ENDRIN KETONE	0.014J	(ND)	0.11	0.0057	0.011
METHOXYCHLOR	0.057J	(ND)	1.1	0.057	0.11
TOXAPHENE	(ND)	ND	2.3	0.28	0.57

SURROGATE PARAMETERS	RESULTS		SPK_AMT	% RECOVERY		QC LIMIT
2,4,5,6-TETRACHLORO-META-XYLENE	(0.3458)	0.3448	0.4560	(75.8)	75.6	25-140
DECACHLOROBIPHENYL (209)	0.4520	(0.4621)	0.4560	99.1	(101)	30-135

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

NW 3/4/19

2

METHOD 3520C/8081B
PESTICIDES

Client : CH2M HILL	Date Collected: 01/08/19
Project : CTO-013 VIEQUES_EAST SWMU-1	Date Received: 01/10/19
Batch No. : 19A049	Date Extracted: 01/10/19 13:45
Sample ID: VEW01-MW10-0119	Date Analyzed: 01/12/19 02:26
Lab Samp ID: A049-02	Dilution Factor: 1.05
Lab File ID: RA11034A	Matrix : WATER
Ext Btch ID: CPA015W	% Moisture : NA
Calib. Ref.: RA11027A	Instrument ID : F9

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ALPHA-BHC	(ND) | ND	0.10	0.0052	0.011
GAMMA-BHC (LINDANE)	(ND) | ND	0.10	0.0052	0.011
BETA-BHC	0.022J | (ND)	0.10	0.0074	0.011
HEPTACHLOR	(ND) | ND	0.10	0.0074	0.011
ALDRIN	(ND) | ND	0.10	0.0052	0.011
HEPTACHLOR EPOXIDE	(ND) | ND	0.10	0.0052	0.011
GAMMA-CHLORDANE	(ND) | ND	0.10	0.0052	0.011
ALPHA-CHLORDANE	(ND) | ND	0.10	0.0052	0.011
ENDOSULFAN I	(ND) | ND	0.10	0.0084	0.011
4,4'-DDE	(ND) | ND	0.10	0.0052	0.011
DIELDRIN	(ND) | ND	0.10	0.0052	0.011
ENDRIN	(ND) | ND	0.10	0.0084	0.011
4,4'-DDD	(ND) | ND	0.10	0.0052	0.011
ENDOSULFAN II	(ND) | ND	0.10	0.0052	0.011
4,4'-DDT	(ND) | ND	0.10	0.0052	0.011
ENDRIN ALDEHYDE	(ND) | ND	0.10	0.0052	0.011
ENDOSULFAN SULFATE	(ND) | ND	0.10	0.0052	0.011
ENDRIN KETONE	(ND) | ND	0.10	0.0052	0.011
METHOXYCHLOR	(ND) | ND	1.0	0.052	0.10
TOXAPHENE	(ND) | ND	2.1	0.26	0.52

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2,4,5,6-TETRACHLORO-META-XYLENE	0.3087 | (0.3155)	0.4200	73.5 | (75.1)	25-140
DECACHLOROBIPHENYL (209)	0.4222 | (0.4327)	0.4200	101 | (103)	30-135

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

MW 3/4/19

3

METHOD 3520C/8081B
PESTICIDES

Client	: CH2M HILL	Date Collected:	01/09/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/10/19 13:45
Sample ID:	VEW01-MW13-0119	Date Analyzed:	01/12/19 02:48
Lab Samp ID:	A049-03	Dilution Factor:	1.02
Lab File ID:	RA11035A	Matrix :	WATER
Ext Btch ID:	CPA015W	% Moisture :	NA
Calib. Ref.:	RA11027A	Instrument ID :	F9

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ALPHA-BHC	(ND) | ND	0.10	0.0051	0.010
GAMMA-BHC (LINDANE)	0.0061J | (ND)	0.10	0.0051	0.010
BETA-BHC	0.040J | (ND)	0.10	0.0071	0.010
HEPTACHLOR	(ND) | ND	0.10	0.0071	0.010
ALDRIN	0.0053J | (ND)	0.10	0.0051	0.010
HEPTACHLOR EPOXIDE	(ND) | ND	0.10	0.0051	0.010
GAMMA-CHLORDANE	(ND) | ND	0.10	0.0051	0.010
ALPHA-CHLORDANE	(ND) | ND	0.10	0.0051	0.010
ENDOSULFAN I	(ND) | ND	0.10	0.0082	0.010
4,4'-DDE	(ND) | ND	0.10	0.0051	0.010
DIELDRIN	(ND) | ND	0.10	0.0051	0.010
ENDRIN	(ND) | ND	0.10	0.0082	0.010
4,4'-DDD	(ND) | ND	0.10	0.0051	0.010
ENDOSULFAN II	(ND) | ND	0.10	0.0051	0.010
4,4'-DDT	(ND) | ND	0.10	0.0051	0.010
ENDRIN ALDEHYDE	(ND) | ND	0.10	0.0051	0.010
ENDOSULFAN SULFATE	(ND) | ND	0.10	0.0051	0.010
ENDRIN KETONE	(ND) | ND	0.10	0.0051	0.010
METHOXYCHLOR	0.053J | (ND)	1.0	0.051	0.10
TOXAPHENE	(ND) | ND	2.0	0.25	0.51

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2,4,5,6-TETRACHLORO-META-XYLENE	0.2887 | (0.3006)	0.4080	70.8 | (73.7)	25-140
DECACHLOROBIPHENYL (209)	0.4110 | (0.4257)	0.4080	101 | (104)	30-135

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

MW 3/4/19

METHOD 3520C/8081B
PESTICIDES

6

Client : CH2M HILL	Date Collected: 01/10/19
Project : CTO-013 VIEQUES_EAST SWMU-1	Date Received: 01/10/19
Batch No. : 19A049	Date Extracted: 01/15/19 14:30
Sample ID: VEW01-MW11-0119	Date Analyzed: 01/16/19 18:53
Lab Samp ID: A049-06	Dilution Factor: 0.99
Lab File ID: RA16016A	Matrix : WATER
Ext Btch ID: CPA022W	% Moisture : NA
Calib. Ref.: RA16014A	Instrument ID : F9

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ALPHA-BHC	(ND) | ND	0.099	0.0049	0.0099
GAMMA-BHC (LINDANE)	(ND) | ND	0.099	0.0049	0.0099
BETA-BHC	0.022J | (ND)	0.099	0.0069	0.0099
HEPTACHLOR	(ND) | ND	0.099	0.0069	0.0099
ALDRIN	(ND) | ND	0.099	0.0049	0.0099
HEPTACHLOR EPOXIDE	(ND) | ND	0.099	0.0049	0.0099
GAMMA-CHLORDANE	(ND) | ND	0.099	0.0049	0.0099
ALPHA-CHLORDANE	(ND) | ND	0.099	0.0049	0.0099
ENDOSULFAN I	(ND) | ND	0.099	0.0079	0.0099
4,4'-DDE	(ND) | ND	0.099	0.0049	0.0099
DIELDRIN	(ND) | ND	0.099	0.0049	0.0099
ENDRIN	(ND) | ND	0.099	0.0079	0.0099
4,4'-DDD	(ND) | ND	0.099	0.0049	0.0099
ENDOSULFAN II	(ND) | ND	0.099	0.0049	0.0099
4,4'-DDT	(ND) | ND	0.099	0.0049	0.0099
ENDRIN ALDEHYDE	(ND) | ND	0.099	0.0049	0.0099
ENDOSULFAN SULFATE	(ND) | ND	0.099	0.0049	0.0099
ENDRIN KETONE	(ND) | ND	0.099	0.0049	0.0099
METHOXYCHLOR	(ND) | ND	0.99	0.050	0.099
TOXAPHENE	(ND) | ND	2.0	0.25	0.50

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2,4,5,6-TETRACHLORO-META-XYLENE	0.3458 | (0.3725)	0.3960	87.3 | (94.1)	25-140
DECACHLOROBIPHENYL (209)	0.4468 | (0.4612)	0.3960	113 | (116)	30-135

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

MW 3/4/19

METHOD SW3520C/8082A
PCBs

Client	: CH2M HILL	Date Collected:	01/09/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/10/19 13:45
Sample ID:	VEW01-EB01-010919	Date Analyzed:	01/15/19 14:06
Lab Samp ID:	A049-01	Dilution Factor:	1.14
Lab File ID:	KA14062A	Matrix	: WATER
Ext Btch ID:	CPA015W	% Moisture	: NA
Calib. Ref.:	KA14047A	Instrument ID	: GCT071

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
AROCLOR-1016	(ND) | ND	1.1	0.51	0.57
AROCLOR-1221	(ND) | ND	1.1	0.33	0.57
AROCLOR-1232	(ND) | ND	1.1	0.28	0.57
AROCLOR-1242	(ND) | ND	1.1	0.28	0.57
AROCLOR-1248	(ND) | ND	1.1	0.28	0.57
AROCLOR-1254	(ND) | ND	1.1	0.28	0.57
AROCLOR-1260	(ND) | ND	1.1	0.35	0.57
AROCLOR-1262	(ND) | ND	1.1	0.22	0.57
AROCLOR-1268	(ND) | ND	1.1	0.28	0.57

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.3105 | (0.4176)	0.4560	68.1 | (91.6)	50-140
DECACHLOROBIPHENYL	(0.5980) | 0.7303	0.4560	(131) | 160*	40-135

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

NW 3/4/19

2

METHOD SW3520C/8082A
PCBs

Client : CH2M HILL	Date Collected: 01/08/19
Project : CTO-013 VIEQUES_EAST SWMU-1	Date Received: 01/10/19
Batch No. : 19A049	Date Extracted: 01/10/19 13:45
Sample ID: VEW01-MW10-0119	Date Analyzed: 01/15/19 14:26
Lab Samp ID: A049-02	Dilution Factor: 1.05
Lab File ID: KA14063A	Matrix : WATER
Ext Btch ID: CPA015W	% Moisture : NA
Calib. Ref.: KA14047A	Instrument ID : GCT071

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
AROCLOR-1016	(ND) | ND	1.0	0.47	0.52
AROCLOR-1221	(ND) | ND	1.0	0.30	0.52
AROCLOR-1232	(ND) | ND	1.0	0.26	0.52
AROCLOR-1242	(ND) | ND	1.0	0.26	0.52
AROCLOR-1248	(ND) | ND	1.0	0.26	0.52
AROCLOR-1254	(ND) | ND	1.0	0.26	0.52
AROCLOR-1260	(ND) | ND	1.0	0.33	0.52
AROCLOR-1262	(ND) | ND	1.0	0.20	0.52
AROCLOR-1268	(ND) | ND	1.0	0.26	0.52

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.2775 | (0.3708)	0.4200	66.1 | (88.3)	50-140
DECACHLOROBIPHENYL	(0.5150) | 0.6099	0.4200	(123) | 145	40-135

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

NW 3/4/19

3

METHOD SW3520C/8082A
PCBs

Client	: CH2M HILL	Date Collected:	01/09/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/10/19 13:45
Sample ID:	VEW01-MW13-0119	Date Analyzed:	01/15/19 14:46
Lab Samp ID:	A049-03	Dilution Factor:	1.02
Lab File ID:	KA14064A	Matrix :	WATER
Ext Btch ID:	CPA015W	% Moisture :	NA
Calib. Ref.:	KA14047A	Instrument ID :	GCT071

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
AROCLOR-1016	(ND) | ND	1.0	0.46	0.51
AROCLOR-1221	(ND) | ND	1.0	0.30	0.51
AROCLOR-1232	(ND) | ND	1.0	0.25	0.51
AROCLOR-1242	(ND) | ND	1.0	0.25	0.51
AROCLOR-1248	(ND) | ND	1.0	0.25	0.51
AROCLOR-1254	(ND) | ND	1.0	0.25	0.51
AROCLOR-1260	(ND) | ND	1.0	0.32	0.51
AROCLOR-1262	(ND) | ND	1.0	0.19	0.51
AROCLOR-1268	(ND) | ND	1.0	0.25	0.51

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.2675 | (0.3501)	0.4080	65.6 | (85.8)	50-140
DECACHLOROBIPHENYL	(0.4902) | 0.5837	0.4080	(120) | 143*	40-135

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

NW 3/4/19

6

METHOD SW3520C/8082A
PCBs

Client	: CH2M HILL	Date Collected:	01/10/19
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
Batch No.	: 19A049	Date Extracted:	01/15/19 14:30
Sample ID:	VEW01-MW11-0119	Date Analyzed:	01/18/19 20:12
Lab Samp ID:	A049-06	Dilution Factor:	0.99
Lab File ID:	KA17098A	Matrix :	WATER
Ext Btch ID:	CPA022W	% Moisture :	NA
Calib. Ref.:	KA17088A	Instrument ID :	GCT071

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
AROCLOR-1016	(ND) | ND	0.99	0.45	0.50
AROCLOR-1221	(ND) | ND	0.99	0.29	0.50
AROCLOR-1232	(ND) | ND	0.99	0.25	0.50
AROCLOR-1242	(ND) | ND	0.99	0.25	0.50
AROCLOR-1248	(ND) | ND	0.99	0.25	0.50
AROCLOR-1254	(ND) | ND	0.99	0.25	0.50
AROCLOR-1260	(ND) | ND	0.99	0.31	0.50
AROCLOR-1262	(ND) | ND	0.99	0.19	0.50
AROCLOR-1268	(ND) | ND	0.99	0.25	0.50

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.2864 | (0.3351)	0.3960	72.3 | (84.6)	50-140
DECACHLOROBIPHENYL	0.3283 | (0.3611)	0.3960	82.9 | (91.2)	40-135

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

NW 3/4/19

METHOD SW6020A
METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/09/19 06:30
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
SDG NO.	: 19A049	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-EB01-010919	Date Analyzed:	01/30/19 22:49
Lab Samp ID:	A049-01N	Dilution Factor:	1
Lab File ID:	F6A04056	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	F6A04054	Instrument ID:	F6

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Antimony	ND	1.00	0.250	0.500
Arsenic	ND	1.00	0.100	0.200
Barium	0.279J	1.00	0.250	0.500
Beryllium	ND	1.00	0.0500	0.100
Cadmium	ND	1.00	0.100	0.200
Chromium	0.190J	1.00	0.100	0.200
Copper	ND	1.00	0.250	0.500
Lead	0.0578J	1.00	0.0500	0.100
Nickel	0.335J	1.00	0.100	0.200
Selenium	ND	1.00	0.150	0.300
Thallium	ND	1.00	0.100	0.200

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	GApero/THuang

NW 3/4/19

2

METHOD SW6020A
METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/08/19 15:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
SDG NO.	: 19A049	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-MW10-0119	Date Analyzed:	01/30/19 23:34
Lab Samp ID:	A049-02N	Dilution Factor:	1
Lab File ID:	F6A04066	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	F6A04064	Instrument ID:	F6

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	
Antimony	ND	1.00	0.250	0.500	
Arsenic	0.298J	1.00	0.100	0.200	
Barium	45.5	1.00	0.250	0.500	
Beryllium	ND	1.00	0.0500	0.100	
Cadmium	ND	1.00	0.100	0.200	
Chromium	0.569~~J~~ U	1.00	0.100	0.200	EBL
Copper	0.696J	1.00	0.250	0.500	
Lead	0.100 ~~0.0613J~~ U	1.00	0.0500	0.100	EBL
Nickel	0.304~~J~~ U	1.00	0.100	0.200	EBL
Selenium	2.93	1.00	0.150	0.300	
Thallium	ND	1.00	0.100	0.200	

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	GApero/THuang

NW 3/4/19

3

METHOD SW6020A
METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/09/19 09:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
SDG NO.	: 19A049	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-MW13-0119	Date Analyzed:	01/30/19 23:53
Lab Samp ID:	A049-03N	Dilution Factor:	1
Lab File ID:	F6A04070	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	F6A04064	Instrument ID:	F6

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	
Antimony	ND	1.00	0.250	0.500	
Arsenic	0.260J	1.00	0.100	0.200	
Barium	19.8	1.00	0.250	0.500	
Beryllium	ND	1.00	0.0500	0.100	
Cadmium	ND	1.00	0.100	0.200	
Chromium	0.200 ~~0.181J~~ U	1.00	0.100	0.200	EBL
Lead	ND	1.00	0.0500	0.100	
Nickel	0.276 U	1.00	0.100	0.200	EBC
Selenium	3.44	1.00	0.150	0.300	
Thallium	ND	1.00	0.100	0.200	

Sample ID:	VEW01-MW13-0119	Date Analyzed:	01/18/19 21:49
Lab Samp ID:	A049-03	Dilution Factor:	1
Lab File ID:	98A12063	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	98A12056	Instrument ID:	98

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Copper	0.495J	1.00	0.250	0.500

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	THuang

NW 3/4/19

6

METHOD SW6020A
METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/10/19 08:50
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
SDG NO.	: 19A049	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-MW11-0119	Date Analyzed:	01/31/19 00:38
Lab Samp ID:	A049-06I	Dilution Factor:	10
Lab File ID:	F6A04080	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	F6A04075	Instrument ID:	F6

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Antimony	ND	10.0	2.50	5.00
Arsenic	1.36J	10.0	1.00	2.00
Barium	98.4	10.0	2.50	5.00
Beryllium	ND	10.0	0.500	1.00
Cadmium	ND	10.0	1.00	2.00
Chromium	ND	10.0	1.00	2.00
Copper	ND	10.0	2.50	5.00
Lead	ND	10.0	0.500	1.00
Nickel	2.07 ~~J~~ U	10.0	1.00	2.00 EBL
Selenium	ND	10.0	1.50	3.00
Thallium	ND	10.0	1.00	2.00

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	GApero/THuang

NW 3/4/19

ID

METHOD SW6020A
DISSOLVED METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/09/19 06:30
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
SDG NO.	: 19A049	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-EB01-010919	Date Analyzed:	01/30/19 22:54
Lab Samp ID:	A049-01N	Dilution Factor:	1
Lab File ID:	F6A04057	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	F6A04054	Instrument ID:	F6

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Antimony	ND	1.00	0.250	0.500
Arsenic	ND	1.00	0.100	0.200
Barium	0.252J	1.00	0.250	0.500
Beryllium	ND	1.00	0.0500	0.100
Cadmium	ND	1.00	0.100	0.200
Chromium	0.363J	1.00	0.100	0.200
Copper	ND	1.00	0.250	0.500
Lead	ND	1.00	0.0500	0.100
Nickel	0.663J	1.00	0.100	0.200
Selenium	ND	1.00	0.150	0.300
Thallium	ND	1.00	0.100	0.200

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	GApero/THuang

NW 3/4/19

2D

METHOD SW6020A
DISSOLVED METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/08/19 15:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
SDG NO.	: 19A049	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-MW10-0119	Date Analyzed:	01/31/19 00:02
Lab Samp ID:	A049-02N	Dilution Factor:	1
Lab File ID:	F6A04072	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	F6A04064	Instrument ID:	F6

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	
Antimony	ND	1.00	0.250	0.500	
Arsenic	0.273J	1.00	0.100	0.200	
Barium	45.7	1.00	0.250	0.500	
Beryllium	ND	1.00	0.0500	0.100	
Cadmium	ND	1.00	0.100	0.200	
Chromium	0.393 ~~J~~ U	1.00	0.100	0.200	EBL
Copper	ND	1.00	0.250	0.500	
Lead	ND	1.00	0.0500	0.100	
Nickel	0.709 ~~J~~ U	1.00	0.100	0.200	EBL
Selenium	3.03	1.00	0.150	0.300	
Thallium	ND	1.00	0.100	0.200	

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	GApero/THuang

NW 3/4/19

3D

METHOD SW6020A
DISSOLVED METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/09/19 09:20
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
SDG NO.	: 19A049	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-MW13-0119	Date Analyzed:	01/31/19 00:29
Lab Samp ID:	A049-03N	Dilution Factor:	1
Lab File ID:	F6A04078	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	F6A04075	Instrument ID:	F6

PARAMETERS		Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	
Antimony		ND	1.00	0.250	0.500	
Arsenic		0.253J	1.00	0.100	0.200	
Barium		19.0	1.00	0.250	0.500	
Beryllium		ND	1.00	0.0500	0.100	
Cadmium		ND	1.00	0.100	0.200	
Chromium	0.200	~~0.130J~~ U	1.00	0.100	0.200	EBL
Copper		ND	1.00	0.250	0.500	
Lead		ND	1.00	0.0500	0.100	
Nickel	0.200	~~0.197J~~ U	1.00	0.100	0.200	EBL
Selenium		3.39	1.00	0.150	0.300	
Thallium		ND	1.00	0.100	0.200	

Note: Detection limits are reported relative to sample result significant figures.

Sample Amount	: 50ml	Final Volume:	50ml
Prepared by	: LYaman	Analyzed by:	GApero/THuang

NW 3/4/19

GD

METHOD SW6020A
DISSOLVED METALS BY ICP-MS

Client	: CH2M HILL	Date Collected:	01/10/19 08:50
Project	: CTO-013 VIEQUES_EAST SWMU-1	Date Received:	01/10/19
SDG NO.	: 19A049	Date Extracted:	01/16/19 12:07
Sample ID:	VEW01-MW11-0119	Date Analyzed:	01/31/19 00:43
Lab Samp ID:	A049-06I	Dilution Factor:	10
Lab File ID:	F6A04081	Matrix:	WATER
Ext Btch ID:	IMA012W	% Moisture:	NA
Calib. Ref.:	F6A04075	Instrument ID:	F6

PARAMETERS	Result (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Antimony	ND	10.0	2.50	5.00
Arsenic	1.26J	10.0	1.00	2.00
Barium	101	10.0	2.50	5.00
Beryllium	ND	10.0	0.500	1.00
Cadmium	ND	10.0	1.00	2.00
Chromium	ND	10.0	1.00	2.00
Copper	ND	10.0	2.50	5.00
Lead	ND	10.0	0.500	1.00
Nickel	2.04 ~~J~~ U	10.0	1.00	2.00 EBL
Selenium	ND	10.0	1.50	3.00
Thallium	ND	10.0	1.00	2.00

Note: Detection limits are reported relative to sample result significant figures.
Sample Amount : 50ml Final Volume:50ml
Prepared by : LYaman Analyzed by:GApero/THuang

NW 3/4/19

METHOD SW7470A
MERCURY BY COLD VAPOR

Client : CH2M HILL
Project : CTO-013 VIEQUES_EAST SWMU-1
Batch No. : 19A049

Matrix : WATER
InstrumentID : 47

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/L)	DILT'N FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATE
MBLK1W	HGA011WB	ND	1	NA	0.500	0.0540	0.110	01/25/1914:38	01/24/1914:00	M47A011012	M47A011	19HGA011W	NA	NA
LCS1W	HGA011WL	2.38	1	NA	0.500	0.0540	0.110	01/25/1914:40	01/24/1914:00	M47A011013	M47A011	19HGA011W	NA	NA
LCD1W	HGA011WC	2.33	1	NA	0.500	0.0540	0.110	01/25/1914:42	01/24/1914:00	M47A011014	M47A011	19HGA011W	NA	NA
VEW01-EB01-010919	A049-01	ND	1	NA	0.500	0.0540	0.110	01/25/1915:37	01/24/1914:00	M47A011039	M47A011	19HGA011W	01/09/1906:30	01/10/19
VEW01-MW10-0119	A049-02	ND	1	NA	0.500	0.0540	0.110	01/25/1915:39	01/24/1914:00	M47A011040	M47A011	19HGA011W	01/08/1915:20	01/10/19
VEW01-MW13-0119	A049-03	ND	1	NA	0.500	0.0540	0.110	01/25/1915:44	01/24/1914:00	M47A011042	M47A011	19HGA011W	01/09/1909:20	01/10/19
VEW01-MW13-0119-MS	A049-03M	2.06	1	NA	0.500	0.0540	0.110	01/25/1915:49	01/24/1914:00	M47A011044	M47A011	19HGA011W	01/09/1909:20	01/10/19
VEW01-MW13-0119-MSD	A049-03S	2.07	1	NA	0.500	0.0540	0.110	01/25/1915:51	01/24/1914:00	M47A011045	M47A011	19HGA011W	01/09/1909:20	01/10/19
VEW01-MW11-0119	A049-06	ND	1	NA	0.500	0.0540	0.110	01/25/1915:57	01/24/1914:00	M47A011048	M47A011	19HGA011W	01/10/1908:50	01/10/19

Note: Detection limits are reported relative to sample result significant figures.

NW 3/4/19

METHOD SW7470A (DISSOLVED)
DISSOLVED MERCURY BY COLD VAPOR

Client : CH2M HILL
Project : CTO-013 VIEQUES_EAST SWMU-1
Batch No. : 19A049

Matrix : WATER
InstrumentID : 47

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/L)	DILT'N FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATE
MBLK1W	HGA011WB	ND	1	NA	0.500	0.0540	0.110	01/25/1914:38	01/24/1914:00	M47A011012	M47A011	19HGA011W	NA	NA
LCS1W	HGA011WL	2.38	1	NA	0.500	0.0540	0.110	01/25/1914:40	01/24/1914:00	M47A011013	M47A011	19HGA011W	NA	NA
LCD1W	HGA011WC	2.33	1	NA	0.500	0.0540	0.110	01/25/1914:42	01/24/1914:00	M47A011014	M47A011	19HGA011W	NA	NA
1 VEW01-EB01-010919	A049-01	0.0580J	1	NA	0.500	0.0540	0.110	01/25/1915:59	01/24/1914:00	M47A011049	M47A011	19HGA011W	01/09/1906:30	01/10/19
2 VEW01-MW10-0119	A049-02	ND	1	NA	0.500	0.0540	0.110	01/25/1916:02	01/24/1914:00	M47A011050	M47A011	19HGA011W	01/08/1915:20	01/10/19
3 VEW01-MW13-0119	A049-03	ND	1	NA	0.500	0.0540	0.110	01/25/1916:06	01/24/1914:00	M47A011052	M47A011	19HGA011W	01/09/1909:20	01/10/19
VEW01-MW13-0119-MS	A049-03M	2.18	1	NA	0.500	0.0540	0.110	01/25/1916:10	01/24/1914:00	M47A011054	M47A011	19HGA011W	01/09/1909:20	01/10/19
VEW01-MW13-0119-MSD	A049-03S	2.19	1	NA	0.500	0.0540	0.110	01/25/1916:12	01/24/1914:00	M47A011055	M47A011	19HGA011W	01/09/1909:20	01/10/19
C VEW01-MW11-0119	A049-06	ND	1	NA	0.500	0.0540	0.110	01/25/1916:14	01/24/1914:00	M47A011056	M47A011	19HGA011W	01/10/1908:50	01/10/19

Note: Detection limits are reported relative to sample result significant figures.

NW 3/4/19

METHOD SW9010B/9014
CYANIDE

Client : CH2M HILL
Project : CTO-013 VIEQUES_EAST SWMU-1
Batch No. : 19A049

Matrix : WATER
InstrumentID : 70

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/L)	DFxPREP FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATE
MBLK1W	CNA002WB	ND	1	NA	10	2.5	5	01/17/1916:33	01/17/1912:15	19CNA00210	19CNA002	CNA002W	NA	NA
LCS1W	CNA002WL	96.8	1	NA	10	2.5	5	01/17/1916:33	01/17/1912:15	19CNA00211	19CNA002	CNA002W	NA	NA
LCD1W	CNA002WC	95.1	1	NA	10	2.5	5	01/17/1916:33	01/17/1912:15	19CNA00212	19CNA002	CNA002W	NA	NA
1 VEW01-EB01-010919	A049-01	ND	1	NA	10	2.5	5	01/17/1916:34	01/17/1912:15	19CNA00224	19CNA002	CNA002W	01/09/1906:30	01/10/19
2 VEW01-MW10-0119	A049-02	ND	1	NA	10	2.5	5	01/17/1916:34	01/17/1912:15	19CNA00225	19CNA002	CNA002W	01/08/1915:20	01/10/19
3 VEW01-MW13-0119	A049-03	ND	1	NA	10	2.5	5	01/17/1916:35	01/17/1912:15	19CNA00226	19CNA002	CNA002W	01/09/1909:20	01/10/19
VEW01-MW13-0119DUP	A049-03D	ND	1	NA	10	2.5	5	01/17/1916:35	01/17/1912:15	19CNA00227	19CNA002	CNA002W	01/09/1909:20	01/10/19
VEW01-MW13-0119MS	A049-03M	96.8	1	NA	10	2.5	5	01/17/1916:35	01/17/1912:15	19CNA00228	19CNA002	CNA002W	01/09/1909:20	01/10/19
VEW01-MW13-0119MSD	A049-03S	90.8	1	NA	10	2.5	5	01/17/1916:35	01/17/1912:15	19CNA00229	19CNA002	CNA002W	01/09/1909:20	01/10/19
6 VEW01-MW11-0119	A049-06	ND	1	NA	10	2.5	5	01/17/1916:35	01/17/1912:15	19CNA00230	19CNA002	CNA002W	01/10/1908:50	01/10/19

NW 3/4/19

Appendix D
Data Quality Evaluation

Data Quality Evaluation for Solid Waste Management Unit 1 2019 Annual Status Report Groundwater Long-Term Monitoring and Operations and Maintenance

Atlantic Fleet Weapons Training Area – Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico

Contract Task Order 0003

September 2019

Prepared for

Department of the Navy
Naval Facilities Engineering Command
Atlantic

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Prepared by
CH2M HILL, Inc.
Virginia Beach, Virginia

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Acronyms and Abbreviations

µg/L	microgram per liter
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DL	detection limit
DOD	Department of Defense
DQE	Data Quality Evaluation
DQO	data quality objective
EPA	Environmental Protection Agency
GW	groundwater
ICP-MS	Inductively Coupled Plasma Mass Spectrometry
LCS	laboratory control sample
LOD	limit of detection
LOQ	limit of quantitation
MCL	maximum contaminant level
MS	matrix spike
MSD	matrix spike duplicate
NAVFAC	Naval Facilities Engineering Command
PAH	polycyclic aromatic hydrocarbon
PAL	project action limit
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PCB	polychlorinated biphenyls
PRWQS	Puerto Rico Water Quality Standards
QA	quality assurance
QC	quality control
RSL	regional screening level
SAP	Sampling and Analysis Plan
SIM	selected ion monitoring
SL	screening level
SOP	Standard Operating Procedure
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TAL	target analyte list
TCE	trichloroethene
TCL	target compound list
UFP	Uniform Federal Policy
VOC	volatile organic compound

SECTION 1

Data Quality Assessment

This Data Quality Evaluation (DQE) assesses the effect of the overall analytical process on the "availability" of the analytical data. "Availability" in this context refers to whether results can be used by the project team based on their analytical soundness. If a result is analytically sound, it is available for use for evaluating the potential releases, nature and extent of contamination, and estimating potentially associated human health and ecological risks. However, a particular result or group of results may not be "usable" for these purposes if other conditions apply. For example, if there were a hypothetical site where a trichloroethene (TCE) spill had occurred and the TCE data for many or all of the samples were rejected, the data may not be usable for making site-specific determinations even if all the non-TCE data were analytically sound and available for use by the project team. In order to avoid confusion of terms, this DQE differentiates the "availability" of results from "usability" of results. "Available" results are analytically sound and available for use by the project team to make decisions, even if they are not usable for a particular purpose.

The three major categories of data evaluation are laboratory performance, field collection performance (i.e. blank contamination), and matrix interferences. Evaluation of laboratory performance is a check for compliance with the method requirements; in other words, a check of whether the laboratory analyzed the samples within the limits of the analytical method. Additionally, a third-party validator (Environmental Data Services, Inc.) conducted a review of the laboratory data to assess whether the analytical methods were within required control limits at the time of analysis. Evaluation of potential matrix interferences involves the review of several areas of results, including surrogate spike recoveries, matrix spike recoveries, and duplicate sample results. Evaluation of field collection performance, such as blank contamination and field duplicates, involves the review of field quality control (QC) and the determination of their effect on the sample results.

The data evaluation and validation is a multi-tiered approach. The process begins with an internal laboratory review, continues with a review by a third-party data validator, and ends with an overall review by the Navy contractor project chemistry team. The process provides a medium for essential communication between the laboratory, validator, and project team, and allows for data quality to be thoroughly evaluated.

This document presents the results of the data quality evaluation performed on one data set:

- Vieques_ East Solid Waste Management Unit (SWMU) 1 January 2019
  - Activity: Vieques East
  - Site: SWMU 1
  - Matrices: groundwater (GW)
  - Date Range: January 2019
  - Data Use: Definitive

1.1 Laboratory Internal Quality Control Review

Prior to releasing the analytical data, the laboratory, EMAX Laboratories, reviewed both the sample and QC data to verify sample identity, instrument calibration, limits of quantitation (LOQs), dilution factors, numerical computations, accuracy of transcriptions, and chemical interpretations. In addition, the QC data were tabulated, and the results were reviewed to ascertain whether they were within the contract-required or laboratory-defined limits for accuracy and precision. Any non-conforming data were discussed in the data package cover letter and case narrative. The case narrative was then reviewed by the data validator and incorporated into the data validation report. If necessary, the exceedances were verified, and qualifiers were applied based on this information.

1.2 Data Validation

A third-party data validator reviewed all data packages using the validation criteria outlined in the site-specific Uniform Federal Policy (UFP) Sampling and Analysis Plan (SAP) Worksheets #34-36 (CH2M, 2012). For the most part, these Worksheets reference the appropriate Region 2 Standard Operating Procedure (SOP) if such an SOP exists for that analysis method. Then, UFP-SAP limits are used in place of those referenced in the SOP. If a Region 2 SOP does not exist for the analysis method, then the data are validated against the limits in the UFP-SAP. Guidance and qualifiers are taken from related Region 2 SOPs and guidance is taken from National Functional Guidelines. The following protocol was used for validation:

- For volatile organic compounds (VOCs) via SW-846 8260B and 8260B_SIM:
  - "Low/Medium Volatile Data Validation" (SOP HW-33A; Rev 1. September 2016)
- For semivolatile organic compounds (SVOCs) via SW_846 8270D and PAHS via SW_846 8270D SIM:
  - "Semivolatile Data Validation" (SOP HW-35A; Rev. 1; September 2016)
- For pesticides via SW_846 8081B:
  - "Pesticide Data Validation" (SOP HW-36A; Rev. 1; October 2016)
- For Polychlorinated Biphenyls (PCBs) via SW_846 8082A:
  - "Polychlorinated Biphenyl Aroclor Data Validation" (SOP HW-37A; Rev. 0; July 2015)
- For total and dissolved metals via SW_846 6020A:
  - "Inductively Coupled Plasma Mass Spectrometry (ICP-MS) Data Validation" (SOP HW-3B; Rev. 1; September 2016)
- For mercury and cyanide via SW_846 7470A and 9014:
  - "Mercury and Cyanide Data Validation" (SOP HW-3C; Rev. 1; September 2016)

As stated previously, the data validation process was separate from the laboratory's internal review. The process was specifically focused on the effects of the laboratory's performance and sample matrix on the analytical results.

Example areas of review include holding time compliance, surrogate recovery accuracy, matrix spiked sample precision and accuracy, blank contamination, initial and continuing calibration accuracy and precision, laboratory control sample accuracy, internal standard response and retention time accuracy, instrument tune criteria accuracy, and duplicate sample precision (laboratory replicates and field duplicates). Please refer to the complete data validation report for full areas of review.

Multiple analyses are most often the result of concentrations exceeding the calibration range or QC results outside of control limits. When multiple analyses were performed, the "best result" was selected for purposes of this data quality evaluation. Among multiple valid and/or invalid results, the "best result" is:

1. The non-rejected result
2. The result from the appropriate concentration range (dilution factor)
3. The detect when one or more result is detected, and one or more result is non-detect
4. The greater of detects, and
5. The lesser of non-detects (U-Values)

Qualification of data is not an unusual occurrence. To define a laboratory QC exceedance and when a laboratory QC exceedance occurs, the laboratory refers to its in-house SOPs. The SOPs are based on United States Department of Defense (DoD) requirements, the requested analytical method, and accumulated laboratory

experience. When a laboratory QC exceedance occurs, the situation may be acceptable, or it may require further action by the laboratory, such as application of a laboratory qualifier or re-extraction and/or reanalysis of the sample. The data validator uses a separate set of QC criteria, based on guidance from the Environmental Protection Agency (EPA) region that applies to the samples. A laboratory QC exceedance may not constitute a data validation exceedance and a data validation exceedance may not constitute a laboratory QC exceedance. Data validation criteria exceedances may result in the qualification of or rejection of data, as deemed appropriate by the data validator.

The data validator examines each data point and determines any effects that QC exceedances have had. Most often, these effects dictate that the result or limit of detection (LOD) should be considered estimated but is still available for use. The J-qualification, UJ-qualification, and U-qualification of results are common occurrences and have no adverse effect on the availability of that result to the project team for making decisions. J-qualified results are available, at the reported result, for use as detects as long as they are considered “estimated” by the project team. Human Health risk assessment guidance suggests that these qualifiers “indicate uncertainty in the reported concentration of the chemical, but not in its assigned identity. Therefore, these data can be used just as positive data with no qualifiers or codes.” In addition, the same risk assessment guidance (EPA, 1989) suggests that one should use “J-qualified concentrations the same way as positive data that do not have this qualifier.” U-qualified and UJ-qualified results are available, at the reported LOD or level, for use as non-detects as long as they are considered “non-detect or not detected at significantly greater than that in an associated blank” or “non-detect, estimated LOD,” as appropriate.

In extreme cases, a result is rejected and deemed to be unusable. “Unusable” in this instance is defined as a result that is not analytically sound and is not generally considered available for use by the project team. Rejected results are not usable, and the R-qualifier is the only qualifier that has an adverse effect on the availability of data.

In large data sets, rejected results are often inconsequential because there are sufficient non-rejected data available to the project team. If there are enough non-rejected data or the project team is able to infer results from adjacent sampling locations or there is other site-specific information that can provide additional lines of evidence, it may not be necessary to know the concentrations of some rejected constituents. It may also not be necessary to prove a constituent’s absence if there are sufficient additional lines of evidence.

1.3 Primary Data Validation Qualifiers

The following data validation qualifiers were applied to one or more analytical results:

- **U** - Not detected. Sample was analyzed for this parameter, but it was not detected at greater than the reported LOD. The data validator may also apply this qualifier to indicate that a concentration was not detected at significantly greater than that in an associated blank. Thus, this qualifier does not necessarily indicate a quality control exceedance.
- **UJ** - Not detected, LOD estimated. Sample was analyzed for this parameter, but it was not detected at greater than the reported LOD. The LOD for this parameter is estimated due to a quality control exceedance.
- **J** - Concentration estimated. The parameter was positively identified, and the associated numerical value is the approximate concentration of the parameter in the sample. Often, a J-qualifier is applied simply because the result was less than the LOQ and thus does not necessarily indicate a quality control exceedance.
- **R** - Rejected. The parameter was analyzed but a severe quality control exceedance necessitates its rejection. The result is not usable as a detection or as a non-detect.
- **[none]** - Detected. Qualification was not warranted.

1.4 Impact of Data Quality on Project Data Quality Objectives and Data Usability

The laboratories analyzed the samples in accordance with the respective analysis methods and standard operating procedures. The data packages were reviewed by a data validator taking guidance from EPA Region 2 validation procedures. Field QC samples were collected and analyzed at the planned frequencies. The laboratory utilized various qualifiers to represent “below reporting limit,” “non-detect,” and “detected.” Any other extraneous laboratory qualifiers were superseded by data validation qualifiers. The data validator utilized J-qualifiers and U-qualifiers to represent “estimated,” and “non-detect or not detected at significantly greater than that in an associated blank” respectively. The only time the data validator changed a result’s detect status was when J-qualifiers were changed to U-qualifiers (detect to non-detect) as a result of blank contamination.

The data validator utilized R-qualified to indicate results are “rejected.” The R-qualifier is the only one which negatively affects data availability. Rejected results are not usable as detections or as non-detects; their presentation is only to document that an analysis was performed.

The J- qualifiers indicate that some results are estimated. These qualifiers indicate that data are available for use as detects. These qualifiers do not necessarily indicate a problem that adversely affects the availability of data. For example, J-qualifiers are often applied simply because results are less than the LOQ.

Region 2 data validation guidance mandates the use of J- and UJ-qualifiers when quality assurance (QA)/QC exceedances dictate their necessity. In Region 2, if a result is attributable to blank contamination, it is U-qualified and is no longer distinguishable from results that are simply non-detect. The U-qualified value is elevated to the LOD if necessary. This supports the practice that J-qualified results, while estimated, are available for use as detects at their qualified concentration and U- and UJ-qualifiers are available for use as non-detects at their qualified LOD or level. In general, J-, UJ-, and U-qualified results are available for use as qualified for evaluating potential releases, the nature and extent of contamination, and estimating potentially associated human health and ecological risks.

It is a common occurrence for achieved LODs to be greater than screening levels (SLs) or for LODs to be elevated to greater than what was expected or requested. In many cases, SLs are simply unreasonably low, or the laboratory was forced, by the analytical method or sample matrices, to raise limits for various reasons. In the instance where non-detect LODs are greater than SLs, the results are available for use as non-detects, but their use adds uncertainty to the conclusions drawn. There are a variety of typical and potentially unavoidable reasons why the reporting limits of non-detect results may exceed SLs:

- If an SL is unreasonably low, current instrumentation technology may not be able to achieve an LOD less than the SL.
- The laboratory-specific limits may have been established at a time when the SL was higher (less stringent) or not present, but the reporting is being done using new (more stringent) criteria. Published screening levels, such as EPA regional screening levels (RSLs), may change periodically as toxicity values are updated.
- If a target compound or analyte is present at an elevated level, the laboratory will dilute the entire sample in order to report that concentration within the instrument’s linear calibration range. It may not be possible to analyze the sample at a lesser dilution if the target compound’s high concentration is likely to damage or saturate the instrument. The high concentration of a non-target compound or analyte may also necessitate initial dilution for the same reason.
- If matrix effects mask low concentrations, the laboratory may be forced to elevate their limits to demonstrate the fact that low concentrations cannot be detected.
- If matrix effects are particularly strong, the laboratory may be forced to analyze the sample at an initial dilution in an attempt to dilute the matrix effects.

- If historical concentrations warrant, the laboratory detects an odor, or the field team designates a sample as "expected high concentration," the laboratory may pre-screen the sample and initially dilute it.
- If the sample appearance indicates possible high concentrations, the laboratory may be forced to analyze the sample at a concentration range different from what is requested. For example, if a sample is designated as "groundwater," but is actually an emulsion or sludge, the laboratory may be forced to analyze the sample using the "medium" instead of the "low" or "selected ion monitoring (SIM)" concentration range.
- If the field team cannot provide the full sample volume, the laboratory may be forced to dilute the sample by adding water until the minimum volume is achieved.
- If a soil or sediment sample is characterized by high percent moisture, the reporting limits will be elevated such that the concentrations and quantitation limits are reported on a dry-weight basis.

1.5 Comparison of Non-detects to Screening Levels

When evaluating the data and making decisions, the project team compares detected sample results to SLs in order to determine exceedances. For this project, the SLs are as follows:

- GW samples are compared to:
  - Puerto Rico Water Quality Standards (PRWQS) for Groundwater (Class SG)
  - Federal maximum contaminant levels (MCLs)
  - Background concentrations measured from the upgradient monitoring well MW-13 and any other background well installed

Non-detect results are also compared to SLs, typically during a risk assessment or exceedance screening, by comparing one-half the LOD to the SL. However, this is only done when the same constituent was detected in another sample of the same matrix at the same site. The assumption is that, if the constituent is present in a given sample of a particular matrix at a site, then it may also be present at low concentrations (less than the LOD) in a non-detect sample of the same matrix from the same site. However, when a constituent was not detected in any samples of a particular matrix at a site, then it is considered not present at the site in that matrix. In this instance, it is important to compare the non-detect results to the SL. If the non-detect results (LODs) are not low enough when compared to the SL, then it may be possible that the constituent is present in a sample at greater than the SL but not detected or reported by the laboratory instrumentation. This situation is a common occurrence and is not cause for alarm. There are various typical reasons why this occurs and is expected. Please refer to Section 1.4. For this effort:

1. The majority of groundwater LODs greater than the minimum screening level are compounds which were not identified as contaminants of concern (COCs). Their analysis was included because they are part of a standard target compound list (TCL) of SVOCs, pesticides, and PCBs, or for metals. It is not necessary to demonstrate their absence at less than the screening levels
2. For the total and dissolved mercury data which are non-detect, it should be noted that the LOD (0.11 microgram per liter [µg/L]) is less than the MCL of 2 µg/L. Although the PRWQS and background screening level exceedances may suggest that a risk assessment should be conducted, site decisions are more likely to be made based on the MCLs. Additionally, mercury has not been identified as a contaminant of concern and was only included because it was part of the standard target analyte list (TAL) metals list; therefore, it is not necessary to demonstrate the absence at less than the PRWQS and background screening levels.
3. The non-detect total and dissolved thallium results reported for samples VEW01-MW03P-0119 and VEW01-MW11-0119 exceeded the PRWQS Class SG screening levels due to the samples requiring dilutions in order to eliminate matrix and/or high non-target analyte concentrations.

Additionally, the following discussion was generated for screening levels that were less than the detection limits (DLs):

1. For SVOCs in groundwater, the PRWQS screening level is less than the DL for 2,4-Dinitrotoluene; Hexachlorobenzene; and 3,3'-Dichlorobenzidine. In general, significantly lower-concentration methods are not available, and the laboratory is already utilizing three different concentration ranges (8270D, SIM, and Ultra Low PAH SIM) in order to achieve the project quantitation limit goals where they have that capability. 2,4-Dinitrotoluene is a precursor of trinitrotoluene and because explosives were not detected in soil within the landfill and below the landfill, this constituent is not likely to be a concern. Hexachlorobenzene is a fungicide formerly used as a seed treatment and is likely attributable to normal pesticide use and not a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) related release. 3,3'-Dichlorobenzidine was not detected in soil or groundwater at SWMU 1 and is likely not a concern.
2. For pesticides/PCBs (PEST/PCBs) in groundwater, the PRWQS and/or MCL screening levels are less than the DL for Heptachlor; Aldrin; Dieldrin; 4,4'- dichlorodiphenyldichloroethylene (DDE); 4,4'- dichlorodiphenyldichloroethane (DDD); 4,4'- dichlorodiphenyltrichloroethane (DDT), Toxaphene; and the Aroclors. For the pesticides, lower-concentration methods are not available. For the aroclors, lower-concentration methods are not available without analyzing PCB homologues or PCB congeners. Such a specialty analytical approach is not appropriate when there are no specific COCs. However, the DLs for the aroclors are less than the MCL and detects between the DL and LOQ will be reported as estimated. Therefore, this will not have an adverse impact on the data evaluation.
3. For metals (METALs) and dissolved metals (FMETALs) in groundwater, the PRWQS screening level is less than the DL for total and dissolved mercury. The laboratory-specific DL (0.0540 µg/L) is only marginally-greater than the PRWQS screening level (0.05 µg/L) and thus there is acceptable uncertainty surrounding such a non-detect result. A lower-concentration method is not available without analyzing ultra-trace mercury or methyl mercury. Such a specialty analytical approach is not appropriate when mercury is not a specific COC.

1.6 Laboratory Qualifications, Data Validation Qualifiers, Data Validation Reason Codes, Data Availability, and Data Use

Please refer to **Table 1**. For the complete data set, all combinations of final qualifier and reason code are provided. To help identify trends, for each combination, the count (number of results that possess this combination) is provided as well as the determination of whether such a result is affected by a bias, is available for use as reported, is available for use as qualified, or is not available for use (rejected). Totals for each are provided. A data point is fully usable if it is available for use and the reporting limits are appropriate.

A total of 96.68% of the data are available for use as reported by the laboratory. Another 3.2% of the data are available for use as qualified by the data validator. Only 0.11% of the data are not available for use. The data set is 99.88% complete and the UFP-SAP project completeness goal of 95% available data was met.

All results, except those R-qualified as "rejected," are available for use. The following was noted:

1. The result for Styrene in sample VEW01-MW13-0119 was rejected due to zero percent recovery of Styrene in the matrix spike (MS) and/or matrix spike duplicate (MSD) performed on these samples. This may be indicative of an extreme low bias.

1.7 Data Quality Evaluation

The purpose of this DQE is to summarize the findings of the data validation and any effects found concerning the availability of the data for the Vieques SWMU 1 long-term monitoring.

1.7.1 Groundwater Volatile Organics Data

Volatile organics were analyzed by SW-846 method 8260B and 8260B SIM. Excluding field QC samples, 238 distinct data points were generated. The VOC data set is 99.58% complete; 0.42% of results have been rejected and are not available for use as reported.

The validation process issued the following qualifiers for results in the VOCs fraction:

DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
U		235	98.74%	X			
U	TBL	2	0.84%		X		
R	MSL	1	0.42%			X	A, C
		238	100.00%	98.74%	0.84%	0.42%	

Please see **Table 1** for an explanation of qualifications and their impact on data usability.

The result for Styrene in sample VEW01-MW13-0119 was rejected due to zero percent recovery of Styrene in the MS and/or MSD performed on this sample. This is a commonly-rejected compound due to typical poor instrument response and is indicative of a potential extremely low bias for Styrene for this sample.

The remaining groundwater volatile results (237 of 238 results) for this site are available for use to the project team. Please refer to **Table 2** for a summary of rejected results.

1.7.2 Groundwater Semivolatile Organics Data

SVOCs/polycyclic aromatic hydrocarbons (PAHs) were analyzed by SW-846 methods 8270D and 8270D SIM. Excluding field QC samples, 259 distinct data points were generated. The SVOCs and PAHs data set is 100% complete; all results are available for use as reported or as qualified. The validation process issued the following qualifiers for results in the SVOCs/PAHs fraction:

DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified
U		257	99.23%	X	
UJ	MSL	2	0.77%		X
		259	100.00%	99.23%	0.77%

Please see **Table 1** for an explanation of qualifications and their impact on data usability.

1.7.3 Groundwater Pesticides and PCBs Data

Pesticides and PCBs were analyzed by SW-846 methods 8081B and 8082A, respectively. Excluding field QC samples, 203 distinct data points were generated. The pesticides and PCB data set is 100% complete; all results are available for use as reported. The validation process issued the following qualifiers for results in the Pesticides and PCBs fraction:

DV Qual	DV Qual Code	Count	Percent	Available as Reported
U		203	100.00%	X
		203	100.00%	100.00%

Please see **Table 1** for an explanation of qualifications and their impact on data usability.

1.7.4 Groundwater Total Metals Data

Total metals/cyanide were analyzed by SW-846 methods 6020A, 7470A, and 9014. Excluding field QC samples, 91 distinct data points were generated. The total metals (METALs)/cyanide data set is 100% complete; all results are available for use as reported or as qualified. The validation process issued the following qualifiers for results in the Total METALs/Cyanide fraction:

DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified
U		53	58.24%	X	
NONE		14	15.38%	X	
J		12	13.19%	X	
U	EBL	12	13.19%		X
		91	100.00%	86.81%	13.19%

Please see **Table 1** for an explanation of qualifications and their impact on data usability.

1.7.5 Groundwater Filtered Metals Data

Filtered metals were analyzed by SW-846 methods 6020A and 7470A. Excluding field QC samples, 84 distinct data points were generated. The filtered metals (FMETALs) data set is 100% complete; all results are available for use as reported or as qualified. The validation process issued the following qualifiers for results in the FMETALs fraction:

DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified
U		48	57.14%	X	
J		12	14.29%	X	
NONE		12	14.29%	X	
U	EBL	11	13.10%		X
U	MBL	1	1.19%		X
		84	100.00%	85.72%	14.29%

Please see **Table 1** for an explanation of qualifications and their impact on data usability.

SECTION 2

Precision, Accuracy, Representativeness, Completeness, and Comparability Considerations

2.1 Precision

Precision is defined as the agreement between duplicate results and was characterized by comparing duplicate matrix spike recoveries, laboratory replicates, and field duplicate sample results. There is no actual significant negative impact on precision because no data points were deemed unusable (rejected) due to precision exceedances.

2.2 Accuracy

Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. For organic analyses, each sample was spiked with surrogate compounds; and for organic and inorganic analyses, an MS/MSD and laboratory control sample (LCS) were spiked with a known parameter concentration before preparation. Internal standards also provide a measure of accuracy. Internal standards, surrogates, and MS/MSD provide a measure of the matrix effects on the analytical accuracy. LCS demonstrates accuracy of the method and the laboratory's ability to meet the method criteria. Accuracy is also assessed by calibration recoveries. Potential biases and trends were evaluated by first determining whether a QA/QC exceedance may indicate a potential bias or trend. If so, then the exceedance was examined to determine whether the bias or trend was significant enough to warrant rejection of data. A significant negative bias was identified as evidenced by the rejection of the non-detect styrene result for sample VEW01-MW13-0119 due to low matrix spike and matrix spike duplicate recoveries; therefore, 0.03% of the data points were R-qualified due to MS/MSD precision exceedances. Overall, 0.23% of the data points were UJ-qualified due to MS/MSD exceedances.

2.3 Representativeness

Representativeness is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition (in this case, nature and extent of contamination). Representativeness is a subjective parameter and is used to evaluate the efficacy of the sample planning design. In terms of data quality, representativeness was assured because the sampling team followed approved SOPs for sample collection and handling, and the laboratory followed approved SOPs for sample handling, preparation, and analysis. All field samples were collected and analyzed as proposed in the UFP-SAP.

2.4 Completeness

For purposes of this DQE, completeness is defined as the percentage of measurements that are judged to be valid; validity being defined by the data quality objectives (DQOs). Therefore, completeness is calculated as the number of analytically-sound results that are available for use compared to the total number of measurements made. The data validation guidance documents referenced in Section 1.2 designate all results except those R-qualified as "rejected" to be available for use as analytically-sound results. The R-qualifier is the only qualifier that negatively affects a data point's availability. Completeness is provided in Section 1.6.

2.5 Comparability

Comparability is a qualitative measure designed to express the confidence with which one data set may be compared to another. Factors that affect comparability are sample collection and handling techniques, sample matrix, and analytical methods. In this case, because approved standard operating procedures were used for sample collection and handling, a common sample matrix was evaluated (groundwater) and EPA SW-846 methods were utilized, the data user may express confidence in that fact that this data set is comparable to others of acceptable data quality. Comparability is controlled by the other Precision, Accuracy, Representativeness, Completeness, and Comparability (PARCC) parameters because data sets can be compared with confidence only when precision and accuracy are known. Precision and accuracy were demonstrated to be acceptable, and the data user may be confident that this data set is comparable to others of high data quality.

2.6 Sensitivity

Refer to Sections 1.4 and 1.5.

SECTION 3

References

CH2M HILL, Inc. (CH2M). 2012. *Remedial Action Implementation, Operations and Maintenance, Land Use Control, and Long-Term Monitoring Work Plan, Solid Waste Management Unit 1, Former Vieques Naval Training Range, Vieques, Puerto Rico.* Appendix D: SWMU 1 Groundwater Long-Term Monitoring Sampling and Analysis Plan. July.

CH2M. 2018. *Master Standard Operating Procedures, Protocols, and Plans, Environmental Restoration Program Vieques, Puerto Rico*. April.

Environmental Protection Agency (EPA). 1989. *Risk Assessment Guidance for Superfund: Volume I – Human Health Evaluation Manual.* EPA/540/1-89-002, Part A. October.

EPA Region 2. 2015. *Polychlorinated Biphenyl (PCB) Aroclor Data Validation*. SOP HW-37A. Rev 0. July.

EPA Region 2. 2016. *Inductively Coupled Plasma Mass Spectrometry (ICP-MS) Data Validation*. SOP HW-3B. Rev 1. September.

EPA Region 2. 2016. *Low/Medium Volatile Data Validation*. SOP HW-33A. Rev 1. September.

EPA Region 2. 2016. *Mercury and Cyanide Data Validation*. SOP HW-3C. Rev 1. September.

EPA Region 2. 2016. *Semivolatile Data Validation*. SOP HW-35A. Rev 1. September.

EPA Region 2. 2016. *Pesticides Data Validation*. SOP HW-36A. Rev 1. October.

Tables

TABLE 1
Qualifiers and Availability
SWMU 1 2019 Annual Status Report
Former Vieques Naval Training Range
Vieques, Puerto Rico

Flag	Reason Code	Count	Available as Reported	Available as Qualified	Not Available	Treat As	Potential Bias	Comments
U		796	90.97%			Non-detect		
None		26	2.97%			Detect		
J		24	2.74%			Detect		
U	EBL	23		2.63%		Non-detect		
U	TBL	2		0.23%		Non-detect		
UJ	MSL	2		0.23%		Non-detect		
U	MBL	1		0.11%		Non-detect		
R	MSL	1			0.11%		Extreme Low	Note 1
	Total:	**875**	**96.68%**	**3.2%**	**0.11%**			

Notes:

1. Constituent was analyzed for and may or may not have been present. The result was R-qualified as "rejected" due to recovery exceeding the lower limit in a matrix spike and/or matrix spike duplicate. Matrix spike recovery less than 10% often necessitates rejection and matrix spike recovery is sometimes 0% (no recovery). This is indicative of matrix effects or matrix interference and laboratory performance is often assured by acceptable laboratory control sample recoveries. The QA/QC exceedance (extreme low bias) was severe enough that the result should not be used as a detect or as a non-detect for any purpose. This has a negative impact on completeness and a negative impact on accuracy.

Table 2
Summary of Rejected Data
SWMU 1 2019 Annual Status Report
Former Vieques Naval Training Range
Vieques, Puerto Rico

Matrix	Sample_ID	Analysis_Group	Chem_Name	CAS_Number	Ana_Value	Lab_Qual	DV_Qual	DV_Qual_Code	Units
GW	VEW01-MW13-0119	VOC	Styrene	100-42-5	0.5	U	R	MSL	UG_L

Reason Codes (DV_Qual_Code)
MSL Matrix Spike/Matrix Spike Duplicate - Low Recovery

Appendix E
Annual Inspection Forms and Site Photographs

SWMU 1 (Annual Inspection)

DATE: **1/17/2019** **WEATHER CONDITIONS:** **Sunny and clear, 84°F** **INSPECTOR'S NAME:** **Ronny Fields**

Item	Potential Problems	Observations	Acceptable ?		Recommended Remedial Action	Date of Completion
			Yes	No		
Vegetative Cover	Dead or distressed vegetation; insufficient coverage; areas of exposed soil	**Vegetation cover is very thick all over the entire site.**	**Yes**		**None**	**1/17/2019**
Signs, Fencing, and Gates	Deterioration of signs, fence, or gates; Personnel unable to read sign due to obstruction; Observed signs of trespassing (noting the location)	**Signs and fencing in good order. All signs are present in designated locations and are clearly visible. The fence is intact and secures site. All posts are in good shape except for one that was bent during the semi-annual fence line vegetation clearing task. The post still maintains its integrity, but will be replaced with a new one. Field observations regarding the signs were captured in the Semi-annual Sign Inventory data application.**	**Yes**		**Replace bent fence post**	**1/17/2019**
Erosion	Exposed debris. Visible runoff patterns such as channels or gullies.	**No evidence of erosion onsite. No visible signs of runoff patterns. The low lying area on the north side of the road (where the ephemeral stream historically bisects the road) has thick vegetation growth deeming the area as non-passable without having heavy, thick vegetation removed. Vegetation growth over the entire site is very thick and continues to thicken throughout the season. Tree tops sheared off during the hurricane are growing back blooming with foliage.**	**Yes**		**None**	**1/17/2019**
Other Observations		**All areas accessed exhibited competent, dry ground in both the north and south areas of the site.**	**Yes**		**None**	**1/17/2019**

ADDITIONAL COMMENTS:

Date Submitted: 01/17/2019 11:05 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	746

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-1a
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign intact and legible

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	741

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-1b
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	744

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-2a
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	745

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-2b
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	742

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-3a
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	743

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-3b
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	739

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-4a
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	740

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-4b
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	737

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-5a
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	738

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-5b
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	735

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-6a
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	736

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-6b
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	734

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-7a
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	733

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-7b
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	731

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-8a
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

Date Submitted: 01/17/2019 11:04 AM
Submitted By: ronny.fields@jacobs.com

Vieques Sign Inventory

Sequence Number	732

Sign Region/Name

Sign Region	SWMU 1
LocationCode	swmu1-8b
Assessment Fiscal Quarter	2019 Q2 (JAN-MAR 2019)
Date of Assessment	01/17/2019

Sign Condition Assessment

Is Sign Present?	Yes
Is Pole/Post/Gate/Platform Present?	Yes
Is Sign Damaged?	No
If Damaged, Does Sign need to be repaired/replaced?	No
Is the Post Damaged?	No
Is Hardware In Place?	Yes
Is Hardware Causing Damage to Sign?	No
Additional Notes About this Sign	Sign legible and intact

Sign Photo(s)

Sign Pictures		

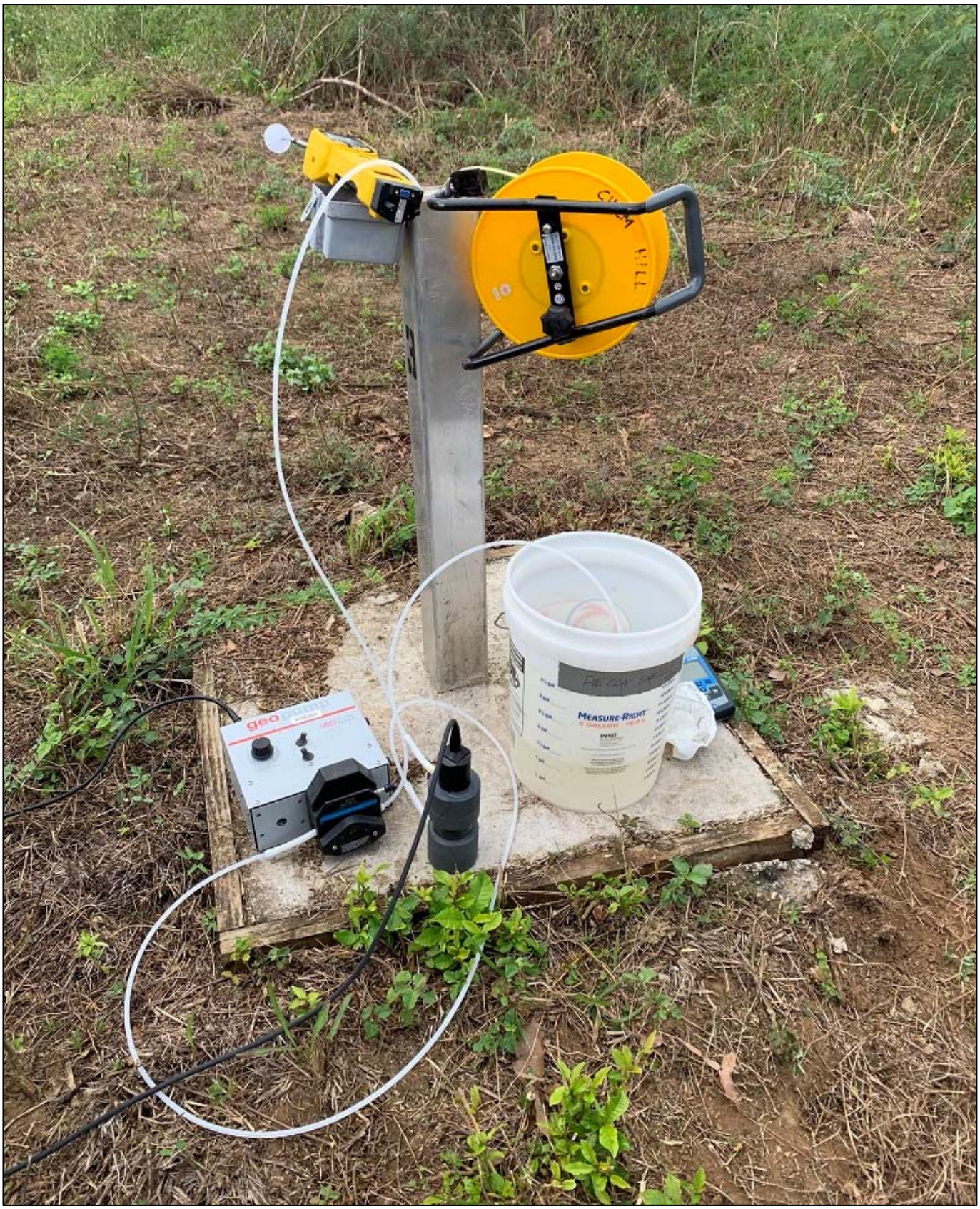
Fence facing south (1/17/2019)

Fence and signs facing west (1/17/2019)

Historical road overgrown facing north (1/17/2019)

MW-02 facing west (1/17/2019)

Groundwater sampling CGW1MW02 (1/8/2019)



Groundwater sampling CGW1MW03 (1/7/2019)

MW-03 facing north (1/17/2019)

MW-08 facing west (1/17/2019)

MW-10 facing west (1/17/2019)

MW-11 facing south (1/17/2019)

MW-13 facing west (1/17/2019)

Appendix F
Responses to Regulator Comments

Responses to EPA Comments on the Draft Solid Waste Management Unit 1, 2019 Annual Status Report Groundwater Long-Term Monitoring and Operations and Maintenance

Atlantic Fleet Weapons Training Area – Vieques Former Vieques Naval Training Range Vieques, Puerto Rico

1. The detection limit (DL) for mercury (0.11 in most cases) exceeds the Puerto Rico Water Quality Class Standard (PRWQS) of 0.05 µg/L. Recommend reducing the DL to below the PRWQS especially since mercury has been detected consistently above the PRWQS in two wells (MW-2 and MW-8) at the site.

   Navy Response: The DL is not 0.11 µg/L, but is 0.054 µg/L, which is essentially equal to the PRWQS. The Limit of Detection (LOD) is 0.11 µg/L. Therefore, mercury will be reported if present down to the PRWQS. Therefore, reducing the DL is not warranted.

   EPA Follow-up Comment (from 8/20/19 e-mail): Since the levels reported are estimated (i.e., below the Reporting Limit), then the Navy will need to run a calibration standard at the concentration level of the Puerto Rico Water Quality Class Standard. Linearity of the analytical calibration curve must be demonstrated.

   Navy Follow-up Response: The Navy feels EPA's request is not warranted for the following reasons:

   - While "J"-flagged concentrations are estimated because they are less than the LOQ, the actual concentrations would not be substantially different (in absolute terms) than the estimates (i.e., the actual concentrations would be between the DL [i.e., 0.054 µg/L] and the LOQ [0.5 µg/L]).
   - The objective of LTM at SWMU 1 is to determine if there is a release to groundwater warranting action. The mercury data, even when estimated, as well as the data for all other constituents collected during LTM and historical events (see Table 2-3), demonstrate there has not been a release warranting action, as evinced by:
     - Mercury data for SWMU 1 groundwater exist as far back as 2004 and over this time, mercury concentrations have been consistently low-to-non-detect, comparable to background, and demonstrating no upward trend indicative of a release.
     - The concentrations of other metals also demonstrate no trend indicative of a release.
     - The collective dataset (metals, VOCs, SVOCs, pesticides, PCBs), accumulated over many years, provides additional evidence that releases from the landfill warranting action have not and are not occurring. In other words, if there was a release occurring from the landfill, it is unlikely it would be limited to sporadic, low detections of mercury alone.
     - The SWMU 1 Record of Decision states: "An RAO for groundwater is not necessary because there is no groundwater contamination requiring remediation and no evidence that leaching is a concern." The data collected during LTM have been consistent with the data upon which that conclusion was drawn.
   - Continuing LTM using the existing LOD, LOQ, and DL for mercury will achieve the desired objective of determining whether a mercury release occurs warranting action because a continuing upward trend would be the release indication, not whether the concentrations are estimated. Lowering the DL from 0.054 µg/L to 0.05 µg/L will have no effect on the ability to meet that objective.

In addition, the analytical laboratory utilized for LTM is providing detection limits as low as possible given their current instrumentation and indicated a lower-concentration standard would not result in the desired outcome. Further, DLs are statistically-determined and, therefore, can change periodically. To achieve a DL below the PRWQS would therefore require a change to a different laboratory and amendment to the existing SAP and ultimately provide no enhanced benefit relative to the LTM objective.

2. The recommendation for reducing the frequency of sampling will be evaluated in the 2020 report.

   Navy Response: Comment noted.

Responses to PRDNER/PREQB Comments on the Draft Solid Waste Management Unit 1, 2019 Annual Status Report Groundwater Long-Term Monitoring and Operations and Maintenance

Atlantic Fleet Weapons Training Area – Vieques Former Vieques Naval Training Range Vieques, Puerto Rico

SPECIFIC COMMENTS

1. Page 2-1, Section 2.2 – Groundwater Sampling:

   a. Please clarify the parenthetical text in the last sentence of the second paragraph to read "…(i.e., the transmissivity of the formation at that location appears to be too low to sustain a drawdown < 0.3 feet at the lowest feasible pumping rate)…"

      Navy Response: Edit made as requested.

   b. According to the third paragraph, "Conductivity ranged from 2,680 to 12,814 microSiemens per centimeter (µS/cm), with the lowest value measured in the well furthest from the ocean (MW-13) and the highest value in the well closest to the ocean (MW-11). The range in values likely corresponds to proximity to and, therefore, influence, by the ocean." As indicated in prior comments, PREQB's position continues to be that the elevated conductivity observed at MW-11 could potentially be attributable to localized conditions related to the landfill. Please replace the second sentence of the text referenced above with the following language contained in the final Annual Status Report (2017): "The range in values may be associated with localized conditions in the vicinity of MW-11. Alternatively, the elevated conductivity could be associated with the proximity, and therefore, influence, by the ocean."

      Navy Response: Edit made as requested.

2. Page 2-2, Section 2.2 – Groundwater Sampling: Please revise the first complete sentence as follows to make the language less speculative in tone: "Variations may be associated with factors such as the uneven distribution of organic carbon, varying amounts of rainwater infiltration from local storms or other influences".

   Navy Response: Edit made as requested.

3. Page 2-3, Section 2.3.1 – Data Tracking, Validation, and Data Quality Evaluation: Please revise the cited validation procedures in the second paragraph to the RPA Region 2 Data Validation SOPs referenced in the data validation reports in Appendix C.

   Navy Response: Because the validation procedures are already properly listed in Appendix D, the following sentence was removed from the report paragraph: "Validation procedures established by the National Functional Guidelines for Organic (EPA, 1993) and Inorganic Data Review (EPA, 1994), as modified by EPA Region 3, were adhered to during the validation process."

4. Page 2-4, Section 2.3.2 – Groundwater Analytical Results: Please note that the dissolved mercury result in sample MW-8 does not exceed background and should therefore not be included as an exceedance in this section or on Table 2-3.

   Navy Response: When background is non-detect, any site detection is considered an exceedance of background, regardless of the reporting limit of the background non-detect result. Because dissolved

mercury of 0.081 J µg/L in VEW01-MW08-0119 exceeds both background (non-detect) and the Class SG standard (0.05 µg/L), a shaded exceedance is properly noted.

5. Figure 2-5 – Total and Dissolved Metals Exceedances in Groundwater:

   a. Please correct the spelling of chromium in the text boxes.

      Navy Response: Edit made as requested.

   b. According to the text box for monitoring well MW-03, the result for total chromium on February 6, 2004 is "NA"; however, Table 2-3 indicates that the result or total chromium in the sample collected from MW-03 on this date was 0.774 J micrograms per liter. Please clarify and correct the table or figure as appropriate.

      Navy Response: Table 2-3 is correct. Figure 2-5 has been edited to show the February 6, 2004, sample result for MW-03 as 0.774 J.

6. Appendix E – Annual Inspection Forms and Site Photographs: According to the inspection form, a bent fence post observed during the January 17, 2019 inspection at SWMU 1 will be replaced. Please clarify the schedule for replacing the fence post (assuming it has not already been replaced).

   Navy Response: The bent fence post was repaired on July 25, 2019. The details on the repair will be added as the last sentence in Section 3 as follows: "There was a fence post noted as being bent in the January 2019 inspection, which was repaired on July 25, 2019."