Atlantic
Norfolk, Virginia

Draft Final

UXO 17 Playa Caracas/Red Beach Remedial Investigation Quality Assurance Project Plan

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

August 2024

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Atlantic Fleet Weapons Training Area – Vieques
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August 2024

Prepared for NAVFAC Atlantic
by CH2M HILL, Inc.
Contract N62470-21-D-0007
CTO N6247021F4140

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Executive Summary

This Uniform Federal Policy (UFP) for Quality Assurance Project Plan (QAPP) was prepared by CH2M HILL, Inc. (CH2M), a subsidiary of Jacobs, under Naval Facilities Engineering Systems Command Atlantic (NAVFAC) Comprehensive Long-term Environmental Action–Navy (CLEAN) Contract Number N62470-21-D-0007, Contract Task Order N6247021F4140 to define the rationale and technical approach for a remedial investigation (RI) at UXO 17 Playa Caracas/Red Beach, located within the former Vieques Naval Training Range (VNTR) in Vieques, Puerto Rico (Figures ES-1 through ES-3). On behalf of NAVFAC, the QAPP is submitted to the United States Environmental Protection Agency (EPA), Puerto Rico Department of Natural and Environmental Resources (PRDNER), and the United States Fish and Wildlife Service (USFWS) for review and ultimately included in the Administrative Record file for the site. The Navy, EPA, PRDNER, and USFWS work jointly to implement the Vieques Environmental Restoration Program.

The former VNTR consists of approximately 14,600 acres that when operational was divided into four separate areas that from west to east comprised the 11,000-acre Eastern Maneuver Area (EMA), the 2,500-acre Surface Impact Area (SIA), the 900-acre Live Impact Area (LIA), and the 200-acre Eastern Conservation Area (ECA) (Figure ES-2). Military operations at the former VNTR included ground warfare and amphibious training for Marines, naval gunfire support training, and air to ground training. Following cessation of military operations, the former VNTR was transferred to the Department of the Interior (DOI) on April 30, 2003, to be operated and managed by USFWS as a National Wildlife Refuge.

There are three public use beaches within UXO 17: Playa Caracas/Red Beach, Playuela/Garcia Beach, and Playa La Chiva/Blue Beach (Figure ES-3); each beach is in a different place within the CERCLA process. Therefore, this RI QAPP addresses only Playa Caracas/Red Beach. Based on the information gathered from historical investigations and removal action(s), a Record of Decision for Potential Area of Concern EE, which includes Playa La Chiva/Blue Beach, is anticipated to be issued in fiscal year 2024. Additionally, the historical investigations and removal action at Playuela/Garcia Beach indicated no further investigation or action is warranted there, as documented in the UXO 17 TCRA Completion Report (CH2M, 2023). As such, a No Further Action Decision Document was planned. However, rather than producing a separate decision document, the Record of Decision for Playa Caracas/Red Beach will include Playuela/Garcia Beach. Therefore, the RI Report prepared following implementation of this QAPP will include not only Playa Caracas/Red Beach, but Playuela/Garcia Beach as well, including its conceptual site model that supports a no further action determination for that area.

Historical records (NAVFAC, 2003a) indicate Playa Caracas/Red Beach was used for military training activities similar to those at Playa La Chiva/Blue Beach. During a 2002 munitions investigation at Playa Caracas/Red Beach, no munitions and explosives of concern (MEC) were identified, and the beach was subsequently opened for public recreational use. However, because MEC were found at Playa La Chiva/Blue Beach during a more recent investigation, it was determined additional evaluation of Playa Caracas/Red Beach was warranted. Based on finding a single MEC item at Playa Caracas/Red Beach during the 2019 MEC Verification Evaluation, a Time-Critical Removal Action (TCRA) was performed to address potential remaining explosive hazards. The TCRA was completed in 2021 and no additional MEC were found; however, a diesel/motor oil drum and box of mosquito repellent canisters were encountered during the TCRA, which were determined to be potential sources of chemical contamination at Playa Caracas/Red Beach. Based on the information gathered during the MEC Verification Evaluation and TCRA, an RI was deemed warranted for Playa Caracas/Red Beach.

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.

The objective of the Playa Caracas/Red Beach RI is to:

- Sufficiently characterize the nature and extent of MEC such that:
  - Explosive hazards can be evaluated, and an associated final remedy determination can be made. MEC nature and extent characterization at Playa Caracas/Red Beach was accomplished via the MEC Verification Evaluation (CH2M, 2017 and 2019a) and TCRA (CH2M, 2020 and 2023). The MEC nature and extent and associated explosive hazard evaluation will be included in the Playa Caracas/Red Beach RI Report.
- Evaluate the nature and extent of contamination associated with possible releases from potential sources identified at the site (i.e., the drum and/or mosquito repellent canisters found during the Playa Caracas/Red Beach TCRA), and if so:
  - Whether site-related contamination, if present, poses unacceptable human risks warranting action based on current and anticipated land use/exposure potential.
    - There is no potential exposure to ecological receptors based on the locations and depths of the former drum and mosquito canisters.

  To achieve the second objective bulletized above, soil samples will be collected immediately below the location where the potential sources were encountered and analyzed as follows:
  - Former Drum Location: Volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs, including polycyclic aromatic hydrocarbons [PAHs]), and metals
  - Former Mosquito Canisters Location: VOCs, Pesticides, and metals

This QAPP was prepared in general accordance with the following guidance:

- Uniform Federal Policy for Quality Assurance Project Plans, Optimized UFP-QAPP Worksheets (IDQTF, 2012)

Resumen Ejecutivo

Esta Política Federal Uniforme (UFP, por sus siglas en inglés) para el Plan de Garantía de Calidad del Proyecto (QAPP, por sus siglas en inglés) fue preparada por CH2M HILL, Inc. (CH2M), una subsidiaria de Jacobs, bajo la Acción Ambiental Integral a Largo Plazo (CLEAN, por sus siglas en inglés) del Comando de Sistemas de Ingeniería de Instalaciones Navales del Atlántico (NAVFAC, por sus siglas en inglés) Número de contrato N62470-21-D-0007, Orden de Trabajo de Contrato N6247021F4140 para definir la justificación y el enfoque técnico para una Investigación de Remediación (RI, por sus siglas en inglés) en UXO 17 Playa Caracas/Red Beach, ubicada dentro del antiguo Campo de Adiestramiento Naval de Vieques (VNTR, por sus siglas en inglés)) en Vieques, Puerto Rico (Figuras ES-1 a ES-3). En nombre de NAVFAC, el QAPP se presenta a la Agencia de Protección Ambiental de los Estados Unidos (EPA, por sus siglas en inglés), al Departamento de Recursos Naturales y Ambientales de Puerto Rico (PRDNER, por sus siglas en inglés) y al Servicio de Pesca y Vida Silvestre de los Estados Unidos (USFWS, por sus siglas en inglés) para su revisión y finalmente se incluye en el Archivo de Registro Administrativo del sitio. La Marina, la EPA, el PRDNER y el USFWS trabajan conjuntamente para implementar el Programa de Restauración Ambiental de Vieques.

El antiguo VNTR consta de aproximadamente 14,600 acres que cuando estaba en funcionamiento se dividió en cuatro áreas separadas que de oeste a este comprendían el Área de Maniobra del Este (EMA, por sus siglas en inglés) de 11,000 acres, el Área de Impacto de Superficie (SIA, por sus siglas en inglés) de 2,500 acres, el Área de Impacto Vivo de 900 acres (LIA por sus siglas en inglés) y el Área de Conservación del Este (ECA por sus siglas en inglés) de 200 acres (Figura ES-2). Las operaciones militares en el antiguo VNTR incluyeron entrenamiento terrestre y anfibio para los Marines, entrenamiento de apoyo con disparos navales y entrenamiento aire-tierra. Tras el cese de las operaciones militares, el antiguo VNTR fue transferido al Departamento del Interior (DOI, por sus siglas en inglés) el 30 de abril de 2003, para ser operado y administrado por el USFWS como Refugio Nacional de Vida Silvestre.

Hay tres playas de uso público dentro de UXO 17: Playa Caracas/Red Beach, Playuela/Playa García y Playa La Chiva/Blue Beach (Figura ES-3); cada playa está en un paso diferente dentro del proceso CERCLA. Por lo tanto, este RI QAPP se dirige únicamente a Playa Caracas/Red Beach. Con base en la información recopilada de las investigaciones históricas y las acciones de remoción, se anticipa que se emitirá un Registro de Decisión para el Área Potencial de Preocupación EE, que incluye Playa La Chiva/Blue Beach, en el año fiscal 2024. Además, las investigaciones históricas y las acciones de remoción en Playuela/García Beach indicaron que no se justifica ninguna investigación o acción adicional allí, como se documenta en el Informe de Finalización de TCRA de UXO 17 (CH2M, 2023). Como tal, se planeó un Documento de Decisión de No Tomar Más Medidas. Sin embargo, en lugar de producir un documento de decisión separado, el Registro de Decisión para Playa Caracas/Red Beach incluirá Playuela/Playa García. Por lo tanto, el Informe de RI preparado luego de la implementación de este QAPP incluirá no solo Playa Caracas/Red Beach, sino también Playuela/Playa García, incluido su modelo de sitio conceptual que respalda la determinación de no tomar más medidas para esa área.

Los registros históricos (NAVFAC, 2003a) indican que Playa Caracas/Red Beach fue utilizada para actividades de entrenamiento militar similares a las de Playa La Chiva/Blue Beach. Durante una investigación de municiones en el 2002 en Playa Caracas/Red Beach, no se identificaron municiones ni explosivos de preocupación (MEC, por sus siglas en inglés), y posteriormente la playa se abrió para uso público recreativo. Sin embargo, debido a que se encontraron MEC en Playa La Chiva/Blue Beach durante una investigación más reciente, se determinó que se justificaba una evaluación adicional de Playa Caracas/Red Beach. Tras encontrar un solo artefacto de MEC en Playa Caracas/Red Beach durante la Evaluación de Verificación MEC del 2019, se realizó una Acción de Remoción

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.

en Tiempo Crítico (TCRA, por sus siglas en inglés) para abordar los posibles peligros explosivos restantes. La TCRA se completó en el 2021 y no se encontraron MEC adicionales; sin embargo, durante la TCRA se encontraron un bidón de diésel/aceite de motor y una caja de botes de repelente de mosquitos, que se determinó que eran posibles fuentes de contaminación química en Playa Caracas/Red Beach. Con base en la información recopilada durante la Evaluación de Verificación del MEC y la TCRA, se consideró justificado una RI para Playa Caracas/Red Beach.

El objetivo del RI de Playa Caracas/Red Beach es:

- Caracterizar suficientemente la naturaleza y extensión del MEC de modo que:
  - Se pueden evaluar los peligros de explosión y se pueda tomar una determinación de remedio final asociado. La caracterización de la naturaleza y extensión del MEC en Playa Caracas/Red Beach se logró mediante la Evaluación de Verificación del MEC (CH2M, 2017 y 2019a) y la TCRA (CH2M, 2020 y 2023). La naturaleza y extensión del MEC y la evaluación del peligro explosivo asociado se incluirán en el Informe de la RI de Playa Caracas/Red Beach.
- Evaluar la naturaleza y el alcance de la contaminación asociada con posibles liberaciones de posibles fuentes identificadas en el sitio (es decir, los bidones y/o los botes de repelente de mosquitos encontrados durante la TCRA de Playa Caracas/Red Beach), y de ser así:
  - Si la contaminación relacionada con el sitio, si está presente, plantea riesgos humanos inaceptables que justifican medidas basadas en el uso de la tierra/potencial de exposición actual y previsto.
    - No existe exposición potencial a receptores ecológicos debido a la ubicación y profundidad de los antiguos bidones y botes de mosquitos.

  Para lograr el segundo objetivo mencionado anteriormente, se recolectarán muestras de suelo inmediatamente debajo del lugar donde se encontraron las fuentes potenciales y se analizarán de la siguiente manera:
  - Ubicación anterior de los bidones: Compuestos Orgánicos Volátiles (VOCs, por sus siglas en inglés), compuestos orgánicos semivolátiles ([SVOCs, por sus siglas en inglés] incluidos los hidrocarburos aromáticos policíclicos [PAHs, por sus siglas en inglés]) y metales.
  - Ubicación de antiguos recipientes para mosquitos: VOCs, Pesticidas y metales

Este QAPP fue preparado en general de acuerdo con la siguiente guía:

- Política Federal Uniforme para Planes de Proyectos de Garantía de Calidad, Hojas de Trabajo Optimizadas de UFP-QAPP (IDQTF, 2012)

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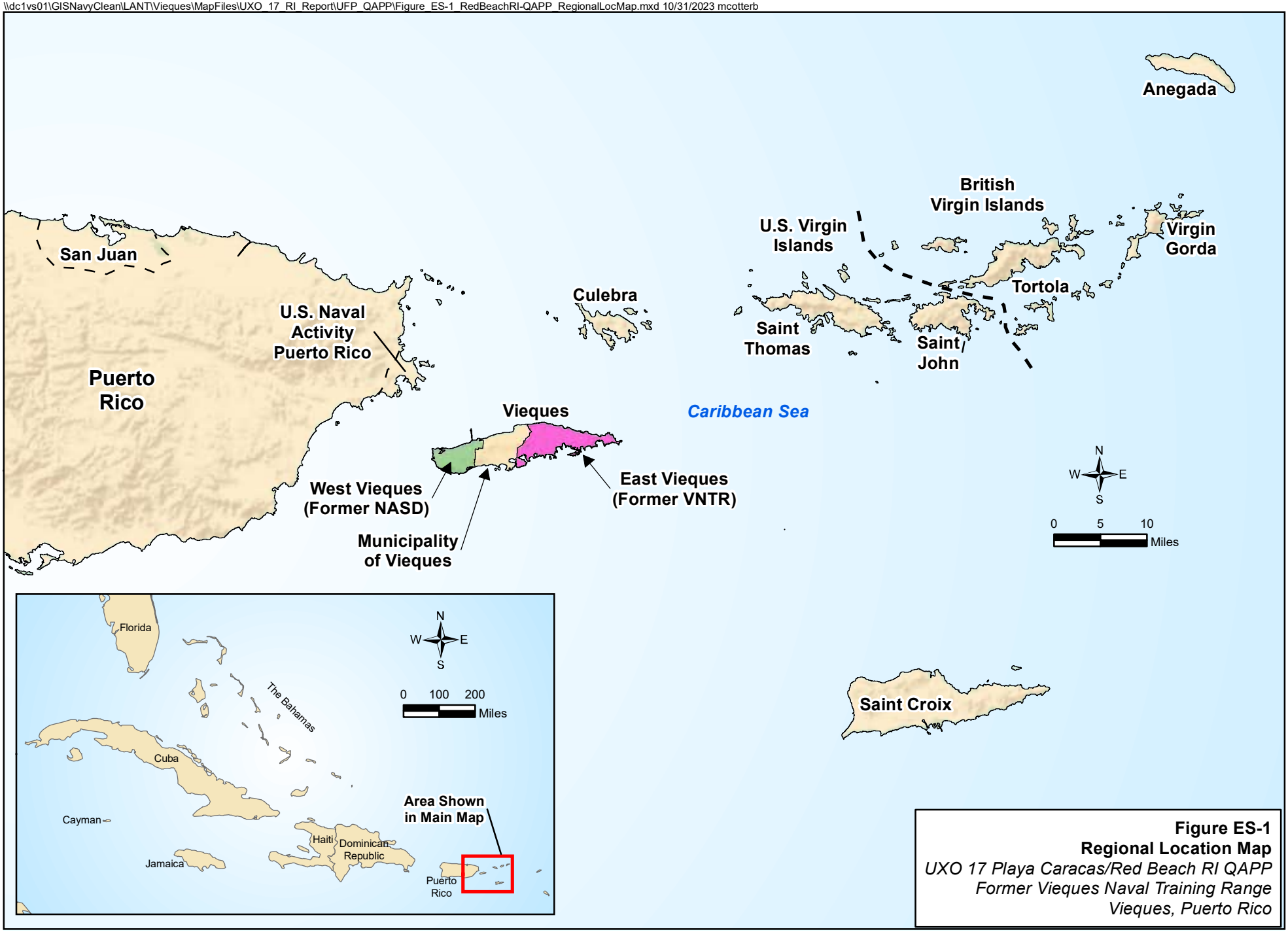

Figure ES-1
Regional Location Map
UXO 17 Playa Caracas/Red Beach RI QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

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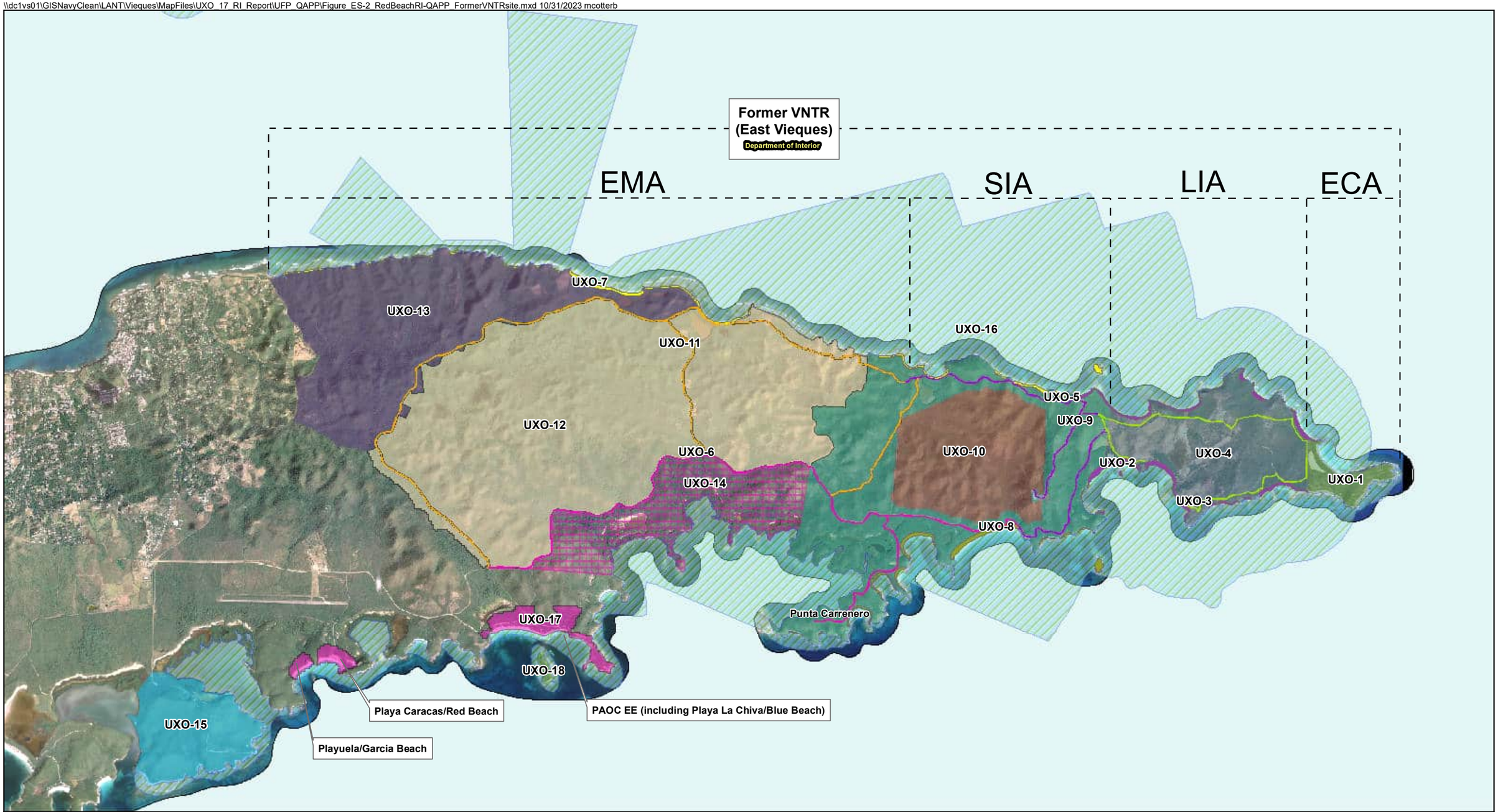

Legend

- UXO 1 - ECA
- UXO 2 - LIA Beaches
- UXO 3 - LIA Roads
- UXO 4 - LIA Interior
- UXO 5 - SIA Restricted Roads
- UXO 6 - EMA/SIA Planned Public Roads
- UXO 7 - EMA/SIA North Beaches
- UXO 8 - SIA South Beaches
- UXO 9 - SIA Exterior
- UXO 10 - SIA Interior
- UXO 11 - EMA Planned Public Roads
- UXO 12 - EMA Interior
- UXO 13 - EMA West
- UXO 14 - EMA South
- UXO 15 - Puerto Ferro (Expanded Site Inspection)
- UXO 16 - Underwater Areas
- UXO-17 - Public Use Beaches
- UXO 18 - Cayo de la Chiva

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Feet

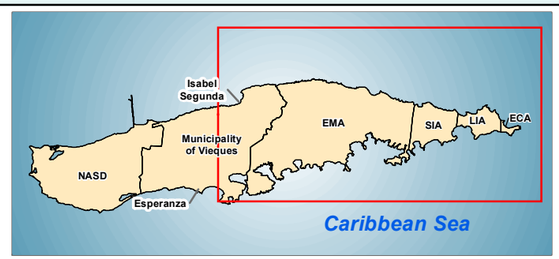

Figure ES-2
Former VNTR Site Map
UXO 17 Playa Caracas/Red Beach RI QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

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Legend

UXO 17 - Public Use Beaches

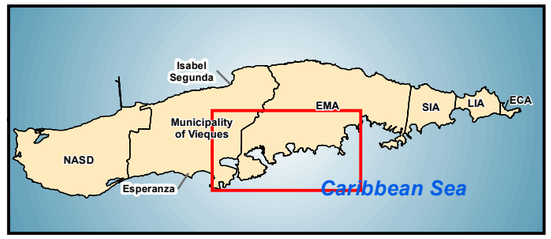

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Figure ES-3
Site Locations Map
UXO 17 Playa Caracas/Red Beach RI QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

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Acronyms and Abbreviations

°C	degrees Celsius
µg/kg	micrograms per kilogram
3Rs	Recognize, Retreat, Report Munitions Awareness Training
AGC	advanced geophysical classification
AHA	Activity Hazard Analysis
AM	Activity Manager
amu	atomic mass unit
bgs	below ground surface
CA	Corrective Action
CAS	Chemical Abstract Service
CCB	continuing calibration blank
CCV	continuing calibration verification
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M	CH2M HILL, Inc.
CLEAN	Comprehensive Long-term Environmental Action—Navy
cm	centimeter(s)
COC	contaminant of concern
CONUS	Continental United States
CPR	cardiopulmonary resuscitation
CSM	Conceptual Site Model
DDESB	Department of Defense Explosives Safety Board
DFW	definable feature of work
DL	Detection Limit
DoD	Department of Defense
DOI	Department of the Interior
DQE	Data Quality Evaluation
DQO	Data Quality Objective
DUA	Data Usability Assessment
EB	equipment blank
ECA	Eastern Conservation Area
EDD	electronic data deliverables
EICP	extracted ion current profile
ELAP	Environmental Laboratory Accreditation Program
ELLE	Eurofins Lancaster Laboratories Environment Testing, LLC
EMA	Eastern Maneuver Area
EPA	Environmental Protection Agency
FD	field duplicate
FFA	Federal Facility Agreement
FRC	Federal Records Center
FS	Feasibility Study
FTL	Field Team Leader

g	gram(s)
GC	gas chromatography
GC-ECD	gas chromatography-electron capture detector
GC-MS	gas chromatography-mass spectrometry
GIS	geographic information system
GPS	global positioning system
H&S	Health and Safety
HAZWOPER	Hazardous Waste Operations and Emergency Response (training)
HQ	hazard quotient
IC	ion chromatography
ICAL	initial calibration
ICB	initial calibration blank
ICP-MS	inductively coupled plasma mass spectrometry
ICS	interference check solution
ICV	initial calibration verification
ID	identification
IS	internal standards
LC-MS	liquid chromatography-mass spectrometry
LCS	laboratory control sample
LDR	linear dynamic range
LIA	Live Impact Area
LIMS	Laboratory Information Management System
LOD	limit of detection
LOQ	limit of quantitation
MB	method blank
MC	munitions constituent
MD	matrix duplicate
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
mL	milliliter(s)
mm	millimeter(s)
MPC	Measurement Performance Criteria
MS	matrix spike
MSD	matrix spike duplicate
N	normal (sample)
N/A	not applicable
NARA	National Archives and Records Administration
NAVFAC	Naval Facilities Engineering Systems Command Atlantic
Navy	Department of the Navy
NIRIS	Naval Installation Restoration Information Solution
No.	number
NPL	National Priorities List
OLEM	Office of Land and Emergency Management
OSHA	Occupational Safety and Health Administration
oz	ounce

PAH	polycyclic aromatic hydrocarbon
PAL	project action limit
PARCCS	Precision, Accuracy, Representativeness, Comparability, Completeness, and Sensitivity
PCE	tetrachloroethene
pdf	portable document format
PDM	Project Data Manager
pH	potential hydrogen
PDQM	Project Delivery and Quality Manager
PM	Project Manager
POC	point of contact
PRDNER	Puerto Rico Department of Natural and Environmental Resources
QA	quality assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual
RCA	Root Cause Analysis
RI	Remedial Investigation
RPD	relative percent difference
RPM	Remedial Project Manager
RRT	relative retention time
RSD	relative standard deviation
RSL	Regional Screening Level
RTK	real-time kinematic
S/N	signal-to-noise (ratio)
SD	standard deviation
SIA	Surface Impact Area
SIM	selected ion monitoring
SOP	Standard Operating Procedure
SSL	Soil Screening Level
SUXOS	Senior Unexploded Ordnance Supervisor
SVOC	semivolatile organic compound
TAT	turnaround time
TB	trip blank
TBD	to be determined
TCLP	Toxicity Characteristic Leaching Procedure
TCRA	Time-Critical Removal Action
TOI	target of interest
TP	Technical Paper
UFP	Uniform Federal Policy
USFWS	United States Fish and Wildlife Service
UTL	upper tolerance limit
VNTR	Vieques Naval Training Range
VOC	volatile organic compound

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Worksheet #1 & 2: Title and Approval Page

1. Project Identifying Information
   a. Regulatory Program/Site Name/Project Name: Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as reauthorized by Superfund Amendments and Reauthorization Act of 1986/ UXO 17 Playa Caracas/Red Beach, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range (VNTR)/UXO 17 Playa Caracas/Red Beach Remedial Investigation (RI)
   b. Site Location/Number: UXO 17 Playa Caracas/Red Beach, Former VNTR, Vieques, Puerto Rico
   c. Lead Organization: Department of the Navy (Navy), Naval Facilities Engineering Systems Command Atlantic (NAVFAC)
   d. RI Contractor: CH2M HILL, Inc (CH2M)
   e. Contract Number: N62470-21-D-0007, Contract Task Order N6247021F4140

2. Lead Organization (NAVFAC)
   a. NAVFAC Remedial Project Manager (RPM)
      Kevin Cloe
      _____
      (Signature/Date)
   b. NAVFAC Quality Assurance Officer (QAO)-Chemistry
      To be determined (TBD)
      Office: (757) 322-8341/(757) 322-4942
      _____
      (Signature/Date)

3. RI Contractor (CH2M)
   a. CH2M Activity Manager (AM)
      Bill Hannah
      _____
      (Signature/Date)
   b. CH2M Project Manager (PM)
      Dennis Ballam
      _____
      (Signature/Date)
   c. CH2M Project Delivery and Quality Manager (PDQM)
      Brett Doerr
      _____
      (Signature/Date)
   d. CH2M Health and Safety (H&S) Manager
      Stephen Brand
      _____
      (Signature/Date)

4. Federal Regulatory Agency (Environmental Protection Agency [EPA] Region 2)

   EPA RPM
   Jessica Mollin
   _____
   (Signature/Date)

   EPA QAO
   Lynn Arabia, CHMM
   _____
   (Signature/Date)

Worksheet #1 & 2: Title and Approval Page (continued)

5. Commonwealth Regulatory Agency (Puerto Rico Department of Natural and Environmental Resources [PRDNER])

   PRDNER RPM
   Juan Baba Peebles

   _____
   (Signature/Date)

6. Vieques National Wildlife Refuge System Supervisor (United States Fish and Wildlife Service [USFWS])

   USFWS RPM
   Silmarie Padron

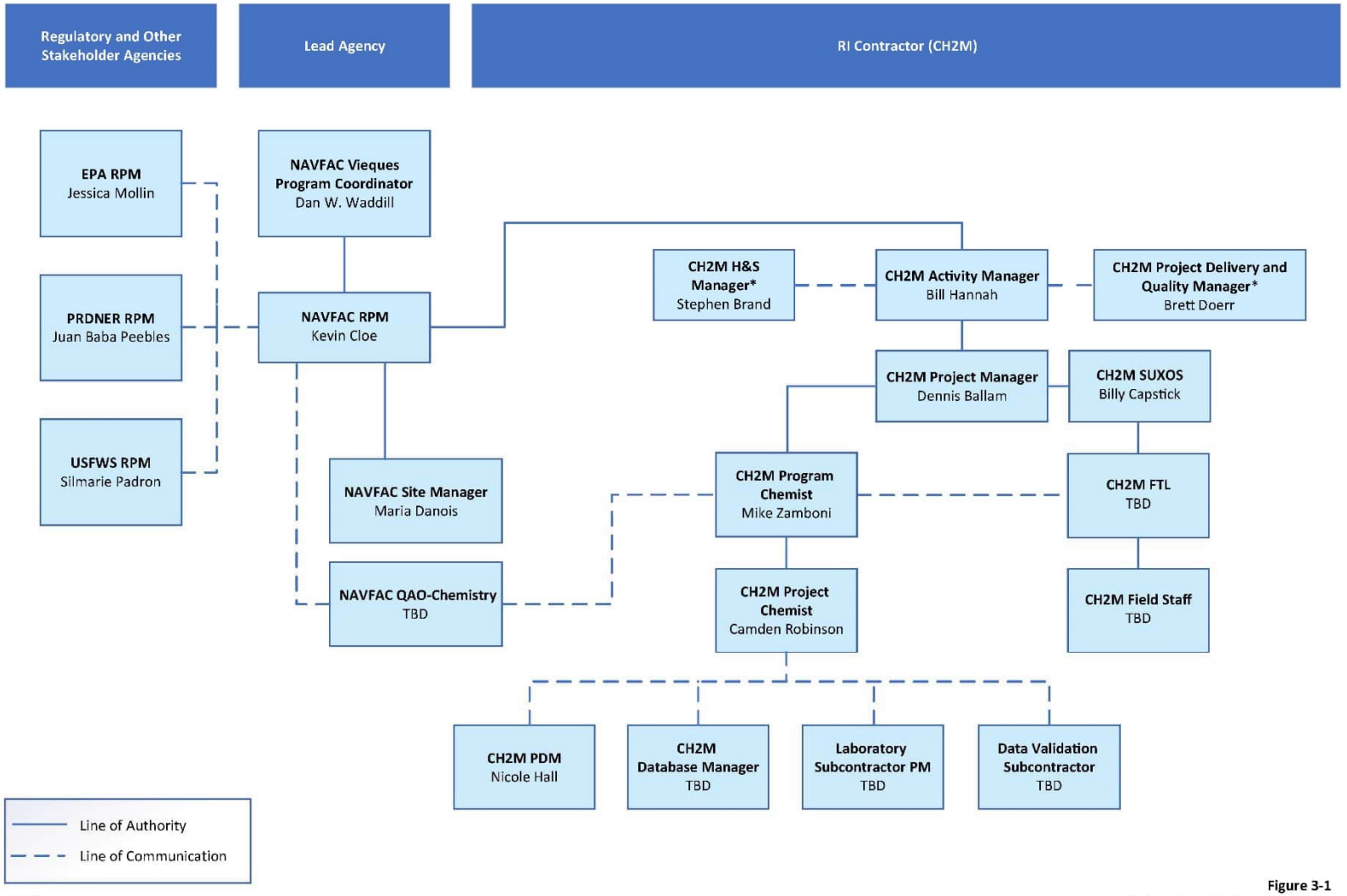
   _____
   (Signature/Date)

7. List of plans and reports from previous investigations relevant to this project:

- Preliminary Range Assessment Report, Vieques Naval Training Range, Vieques Island, Puerto Rico, Final Draft (NAVFAC, 2003a)
- Work Plan for MEC Verification Evaluation of Playa Caracas/Red Beach and Playuela/Garcia Beach, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range Vieques, Puerto Rico (CH2M, 2017)
- Master Standard Operating Procedures, Protocols, and Plans, Revision - 2018, Environmental Restoration Program, Vieques, Puerto Rico (CH2M, 2018)
- Red Beach Uniform Federal Policy Quality Assurance Project Plan Advanced Geophysical Classification for Munitions Response Remedial Investigations, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range Vieques, Puerto Rico (CH2M, 2019)
- UXO 17 Public Use Beaches, Uniform Federal Policy Quality Assurance Project Plan, Munitions Response Time-Critical Removal Action, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico (CH2M, 2020)
- UXO 17 Public Use Beaches, Playa Caracas/Red Beach and Playuela/Garcia Beach, Time-Critical Removal Action Completion Report, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico (CH2M, 2023)

Notes: As standard protocol for Vieques documents, the Quality Assurance Project Plan (QAPP) is loaded to the Vieques document repository once finalized and an email announcing its availability is sent to all RPMs. It is then the RPM's responsibility to communicate the availability within his/her stakeholder agency at his/her discretion. This protocol is consistent with green and sustainable practices by reducing the amount of paper and associated resources consumed for document preparation and distribution. It also reduces the burden on space allocation for document hardcopies. However, hardcopies can be provided to particular individuals at the RPM's request.

Worksheet #3 & 5: Project Organization and QAPP Distribution



Notes:
Names reflected in this figure are for QAPP preparation, but any individuals qualified to perform or otherwise appropriate for the roles may be substituted prior to or during project implementation. The QAPP will not be modified to update personnel changes. As warranted, those changes will be communicated to project team members.
* Denotes line of communication throughout project team, as applicable to specific role.

Figure 3-1
Project Organizational Structure
UXO 17 RI QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

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Worksheet #4, 7 & 8: Personnel Qualifications and Sign-off Sheet

Table 4-1. RI Contractor Personnel Qualifications

Name	Project Title	Education/Experience	Specialized Training[a]	Required Licenses/ Certifications/ Authorizations	Signature/Date[b]
Bill Hannah	CH2M AM	• 23 years of environmental remediation and munitions response experience	• 40-Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) with current 8-hour refresher • Cardiopulmonary Resuscitation (CPR) and First Aid Training	Not applicable (N/A)	
Dennis Ballam	CH2M PM	• 18 years of environmental remediation and munitions response experience	• 40-Hour HAZWOPER with current 8-hour refresher • CPR and First Aid Training • Unmanned aircraft systems – Part 107 Pilot's License	N/A	
Brett Doerr	CH2M Vieques Program PDQM	• 31 years of environmental remediation and munitions response experience	• 40-Hour HAZWOPER with current 8-hour refresher • CPR and First Aid Training • Professional Geologist (Virginia)	N/A	
Stephen Brand	CH2M H&S Manager	• 32 years of environmental remediation and munitions response experience	• Professional Geologist (Virginia) • Certified Safety Professional • Occupational Health and Safety Technician • 40-Hour HAZWOPER with current 8-hour refresher • 30-Hour Occupational Safety and Health Administration (OSHA) Construction Certification • CPR and First Aid Training	N/A	
Billy Capstick	CH2M Senior Unexploded Ordnance Supervisor (SUXOS)	• 33 years of munitions response experience	• 40-Hour HAZWOPER with current 8-hour refresher • CPR and First Aid Training • Qualified SUXOS in accordance with Department of Defense Explosives Safety Board (DDESB) Technical Paper (TP)-18	N/A	
Mike Zamboni	CH2M Program Chemist	• 21 years of experience in project chemistry and data validation	• 40-Hour HAZWOPER with current 8-hour refresher • CPR and First Aid Training	N/A	
Camden Robinson	CH2M Project Chemist	• 22 years of experience in project chemistry and data validation	• N/A	N/A	
Nicole Hall	CH2M Project Delivery Manager (PDM)	• 32 years of environmental database/data management experience	• N/A	N/A	
Bhavanna Reddy	CH2M Database Manager	• 25 years of environmental database/data management experience	• N/A	N/A	

Worksheet #4, 7 & 8: Personnel Qualifications and Sign-off Sheet (continued)

Table 4-1. RI Contractor Personnel Qualifications

Name	Project Title	Education/Experience	Specialized Training[a]	Required Licenses/ Certifications/ Authorizations	Signature/Date[b]
TBD	CH2M Field Team Leader (FTL)	• TBD	• 40-Hour HAZWOPER with current 8-hour refresher • CPR and First Aid Training • 3Rs (Recognize Retreat, Report) Munitions Awareness Training	N/A	

[a] Personnel training records are maintained by the RI Contractor in accordance with the organization's policies and procedures.

[b] Signatures indicate personnel have read and concur with this QAPP.

Table 4-2. Subcontractor Personnel Qualifications

Name	Project Title	Education/Experience	Specialized Training	Required Licenses/ Certifications/ Authorizations	Signature/Date[a]
Elizabeth Martin	Laboratory Subcontractor PM Eurofins Lancaster Laboratories Environment Testing, LLC (ELLE)	• 25 years of experience • B.S. Biological Sciences	N/A	Laboratory Accreditation Letter	
TBD	Data Validation Subcontractor PM	N/A	N/A	N/A	

[a] Signatures indicate personnel have read and concur with this QAPP.

Worksheet #6: Communication Pathways

Communication Driver	Initiator (Name, Project Title)	Recipient (Name, Project Title)	Procedure (Timing, Pathway, Documentation)
Regulatory agency interface	Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil	Jessica Mollin EPA RPM – Vieques mollin.jessica@epa.gov Juan Baba Peebles PRDNER RPM juanbaba@jca.pr.gov Silmarie Padron USFWS RPM silmarie_padron@fws.gov	NAVFAC RPM provides project updates to regulatory stakeholders via email, telephone, or meetings, as necessary; can delegate communication to other internal or external points of contact (POCs).
Communication to/from Navy from Vieques onsite contractors	Maria Danois NAVFAC Site Manager maria.m.danois.civ@us.navy.mil	Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil	NAVFAC Site Manager provides updates to NAVFAC RPM via email, telephone, hardcopy, or in-person, as warranted; can delegate communication to other internal and external POCs.
Navy Chemistry Quality Input	NAVFAC QAO – Chemistry Office: (757) 322-8341/ (757) 322-4942	Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil Dennis Ballam CH2M PM dennis.ballam@jacobs.com	Provides review comments to Navy contractor on chemistry aspects of the pre-draft QAPP via email through NAVFAC RPM. Provides periodic (as necessary) Navy policy or guidance regarding chemistry-related matters via direct communications with Navy contractor, as delegated.
Contractor communication to/from Navy (e.g., submission of QAPP for review; responses to comments, updates on project progress, etc.)	Dennis Ballam CH2M PM dennis.ballam@jacobs.com	Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil Maria Danois NAVFAC Site Manager maria.m.danois.civ@us.navy.mil	CH2M PMs provide documents and project updates to the Navy RPM via hardcopy, email, telephone, or meetings, as necessary.
Project administration and logistics	Dennis Ballam CH2M PM dennis.ballam@jacobs.com	Various contractor staff (CH2M)	Direct communication (via email, telephone, hardcopy, or in person, as needed) to/from contractor/subcontractor project staff to ensure appropriate project implementation.

Worksheet #6: Communication Pathways (continued)

Communication Driver	Initiator (Name, Project Title)	Recipient (Name, Project Title)	Procedure (Timing, Pathway, Documentation)
Daily field progress reports; including soil sampling documentation	CH2M FTL (TBD)	Dennis Ballam CH2M PM dennis.ballam@jacobs.com	At end of each day of fieldwork, CH2M FTL (or designee) provides daily soil sampling reports to CH2M PM. CH2M PM will then inform NAVFAC Site Manager and NAVFAC RPMs via email, telephone, hardcopy, or in-person, as applicable.
Stop work due to safety issues	For MPPEH discovery Billy Capstick CH2M SUXOS billy.capstick@jacobs.com For non-munitions safety issues CH2M FTL (TBD) Note: Any field personnel are empowered to stop work due to safety concern. In general, field staff will report the situation to the contractor PM and H&S Manager; contractor PM reports situation to NAVFAC Site Manager and RPMs.	Maria Danois NAVFAC Site Manager maria.m.danois.civ@us.navy.mil Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil Dennis Ballam CH2M PM dennis.ballam@jacobs.com Note: CH2M H&S Managers will be integral in the stop work communications, including development and implementation of corrective measures.	As soon as possible following identification of a safety issue, the CH2M SUXOS (for MPPEH discovery) or FTL (for non-munitions safety issues) informs the CH2M PM of safety issues warranting work stoppage and generates a follow-up Stop Work Memorandum. The CH2M PM will then inform the NAVFAC Site Manager and NAVFAC RPM. CH2M PM will also notify NAVFAC Site Manager and NAVFAC RPM when safety issue has been addressed (including root cause analysis, if necessary). Of note, CH2M field staff will also observe for potentially unsafe conditions and stop work if conditions/ activities deemed to be immediately dangerous to life or health are observed.
Resume work following a stop work	Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil	Dennis Ballam CH2M PM dennis.ballam@jacobs.com	NAVFAC RPMs will provide the CH2M PM (as applicable) written notice of approval to resume work in the event of a safety stop work.
Field Corrective Actions (CAs)	CH2M FTL (TBD)	Dennis Ballam CH2M PM dennis.ballam@jacobs.com Brett Doerr CH2M PDQM brett.doerr@jacobs.com	• Field issues requiring CA will be identified by the FTL and brought to the attention of the PM, who in turn will notify the PDQM before any decisions or actions are made. In general, the procedures defined under Minor QAPP changes and Substantive QAPP changes in this worksheet will be followed in determining the need for and implementing field CAs.

Worksheet #6: Communication Pathways (continued)

Communication Driver	Initiator (Name, Project Title)	Recipient (Name, Project Title)	Procedure (Timing, Pathway, Documentation)
			• Communications and decisions should be made daily and before conducting any actions that may be affected by such communications and decisions. • Communications with the PDQM will be in person or by phone, followed up with an email to document decisions and actions.
Management of analytical laboratory and data validation subcontractors; Analytical CAs/release of analytical data; Data tracking from field collection to database upload	Camden Robinson CH2M Project Chemist camden.robinson@jacobs.com	Dennis Ballam CH2M PM dennis.ballam@jacobs.com Brett Doerr CH2M PDQMr brett.doerr@jacobs.com Mike Zamboni CH2M Program Chemist michael.zamboni@jacobs.com	• Analytical laboratory CAs will be identified by, or brought to the attention of, the Project Chemist daily. • Facilitates resolution on a same-day basis after consulting with the CH2M PM and PDQM, CH2M Program Chemist, and the NAVFAC QAO (if changes in the SAP are warranted) to ensure SAP requirements are met by the laboratory. • Primary contact for laboratories' PMs; communicates with laboratory by phone, followed up with email to document decisions and actions. • Should analytical laboratory issues affect data usability by rendering a significant amount of rejected or unusable data such that the project completeness goal cannot be obtained, the Project Chemist will notify the PM. • Tracks data from sample collection through database upload. • Reports laboratory issues to the PM and Project Chemist by phone or email within 4 business hours.
Analytical data validation issues/data validation CAs	Data Validation PM (TBD)	Camden Robinson CH2M Project Chemist camden.robinson@jacobs.com	• Analytical data validation subcontractor notifies the Project Chemist within 2 business days and documents issues in the data validation report. • Analytical data validation CAs will be identified by, or brought to the attention of, the Project Chemist daily.

Worksheet #6: Communication Pathways (continued)

Communication Driver	Initiator (Name, Project Title)	Recipient (Name, Project Title)	Procedure (Timing, Pathway, Documentation)
			• Analytical data validation subcontractor may contact the laboratory directly to discuss issues/corrective actions. All issues discussed or noted will be documented and brought to the attention of the Project Chemist daily.
Minor QAPP changes (i.e., those that are unlikely to impact meeting the RI objectives) during soil sampling	Dennis Ballam CH2M PM dennis.ballam@jacobs.com	Maria Danois NAVFAC Site Manager maria.m.danois.civ@us.navy.mil Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil	Minor QAPP changes are common, such as making minor adjustments to a sample location based on field observations, and routinely have no impact on achieving the RI objectives. Minor QAPP changes will be made by the Navy and RI Contractor on an as-needed basis in order to maintain project continuity. Minor QAPP changes will be documented in the RI Report, together with the rationale for the changes and an evaluation of the potential impact on the data usability and/or RI objectives. Minor QAPP changers will be reported to the NAVFAC Site Manager and NAVFAC RPM, who will provide review and approval, as applicable. The NAVFAC RPM will notify stakeholders of minor QAPP changes as soon as practical.
Substantive QAPP changes (i.e., those that may impact meeting the RI objectives) during project execution	Dennis Ballam CH2M PM dennis.ballam@jacobs.com	Maria Danois NAVFAC Site Manager maria.m.danois.civ@us.navy.mil Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil	Substantive QAPP changes are not common or foreseen but may impact the ability to achieve the RI objectives, such as something that hinders the ability to collect the data necessary to sufficiently delineate the nature and extent of contamination. Like minor QAPP changes, substantive QAPP changes will be documented in the RI Report, together with the rationale for the changes and an evaluation of the potential impact on the data usability and/or RI objectives. Planned major QAPP changes will be reported to the NAVFAC Site Manager and NAVFAC RPM, who will notify the regulatory stakeholders within 24 hours or as soon as possible via email of the planned significant changes to the QAPP. Stakeholder review, consideration, and incorporation of any resulting regulatory comments will be done to the extent practicable

Worksheet #6: Communication Pathways (continued)

Communication Driver	Initiator (Name, Project Title)	Recipient (Name, Project Title)	Procedure (Timing, Pathway, Documentation)
			given the constraints commonly associated with a project undergoing implementation, especially in the field (e.g., equipment and other resource availability, staffing, weather, schedule, contract stipulations, etc.). Further, regulatory agencies will have the opportunity to review the changes associated with data collection, analysis, and evaluation, including discussion regarding the major QAPP change(s) and their potential impact on achieving the RI objectives in the RI Report.
Communications regarding QAPP changes associated with laboratory analysis	Mike Zamboni CH2M Program Chemist michael.zamboni@jacobs.com	NAVFAC QAO – Chemistry Office: (757) 322-8341/ (757) 322-4942 Laboratory Subcontractor PM Elizabeth Martin (ELLE) elizabeth.martin@et.eurofinsus.com (717) 205-3949 Data Validation Subcontractor PM (TBD)	Changes to the project that would prompt a potential QAPP change or update that would require Navy QAO-Chemistry approval and/or review and approval by the EPA QAO include: the addition of an analytical suite not previously included in the QAPP, the addition of an environmental matrix not previously included in the QAPP, laboratory accreditation to a new DoD Quality Systems Manual (QSM) version, inclusion of a new laboratory into the QAPP for any reason, or updates to the conceptual site model (CSM) that prompt new Data Quality Objectives (DQOs). If a QAPP addendum is required, it will be transmitted via Naval Installation Restoration Information Solution (NIRIS).Should analytical laboratory issues affect data usability by rendering a significant amount of rejected or unusable data such that the project completeness goal cannot be obtained, the program chemist will notify the NAVFAC QAO. Updated laboratory limits of quantitation (LOQ), limits of detection (LOD), and Detection Limit (DL) values will not prompt an QAPP update for NAVFAC QAO chemist review and approval unless those updates negatively impact the ability to meet project action levels (PALs).

Worksheet #6: Communication Pathways (continued)

Communication Driver	Initiator (Name, Project Title)	Recipient (Name, Project Title)	Procedure (Timing, Pathway, Documentation)
Quality control (QC) on laboratory data, release of analytical data for upload to database, data tracking from collection through upload to database	Camden Robinson CH2M Project Chemist camden.robinson@jacobs.com	Laboratory Subcontractor PM Elizabeth Martin (ELLE) elizabeth.martin@et.eurofinsus.com (717) 205-3949 Data Validation Subcontractor PM (TBD) Dennis Ballam CH2M PM dennis.ballam@jacobs.com Nicole Hall CH2M PDM nicole.hall@jacobs.com Bhavanna Reddy CH2M Database Manager bhavana.reddy@jacobs.com NAVFAC QAO-Chemistry Office: (757) 322-8341/ (757) 322-4942	See Worksheets #24, #25, and #28 for analytical CAs. Upon review of validated data to ensure adherence to project requirements, Project Chemist communicates via email to Project Data Manager (PDM) that data are ready for release (that is, upload to database). Will track data from sample collection through upload to database, ensuring QAPP requirements are met by laboratory and field staff. Tracking involves receipt of electronic and hardcopy data from laboratory and data validator. Communicates with the laboratory PM, and data validator PM, as warranted, to ensure adherence to project analysis and validation requirements. Should there be laboratory quality assurance (QA)/QC issues that may impact project objectives, completeness goals, or project schedule, the Project Chemist will communicate this information to the PM and NAVFAC QAO - Chemistry. Also coordinates data upload with CH2M PDM.
Uploading project analytical data and maintaining the database to ensure data are stored properly and may be retrieved by the CH2M PDM	Camden Robinson CH2M Project Chemist camden.robinson@jacobs.com	Nicole Hall CH2M PDM nicole.hall@jacobs.com	Once CH2M chemist ensures data are appropriate for upload to database, PDM submits data electronically to CH2M database manager, who uploads data to NIRIS.
Reporting lab data quality issues	Laboratory Subcontractor PM Elizabeth Martin (ELLE)	Camden Robinson CH2M Project Chemist camden.robinson@jacobs.com	All sample receipt variances and QA/QC issues with project field samples will be reported by the Laboratory PM to the CH2M PM, Project Chemist, and/or PDQM via email within 2

Worksheet #6: Communication Pathways (continued)

Communication Driver	Initiator (Name, Project Title)	Recipient (Name, Project Title)	Procedure (Timing, Pathway, Documentation)
	elizabeth.martin@et.eurofinsus.com (717) 205-3949 Data Validation Subcontractor PM (TBD)	Dennis Ballam CH2M PM dennis.ballam@jacobs.com Brett Doerr CH2M PDQM brett.doerr@jacobs.com	business days. The data validator will notify the project chemist of any serious analytical issues that may affect data usability that the laboratory may have missed. For "serious" analytical laboratory issues (i.e., those that may affect data usability such that meeting project objectives may be in jeopardy), the Project Chemist will notify the CH2M PM who will in turn notify the NAVFAC RPM as soon as practical once the issue is discovered.
Technical and quality support and reporting	Brett Doerr CH2M Project Delivery and Quality Manager brett.doerr@jacobs.com	Various contractor staff (CH2M)	Project delivery and quality support, including scope development, guidance, and technical/quality review.

Notes:

The names reflected in this table are current at the time of QAPP development, but any individual qualified to perform the roles may be substituted prior to or during project implementation. The names (including "TBD") reflected in this table are current (or not known) at the time of the QAPP development, but any individual or contractor/subcontractor qualified to perform the roles may perform them during project implementation. For all personnel/contractors/subcontractors, the QAPP review/endorsement requirements associated with any role listed as "TBD" or provided by personnel/contractors/subcontractors other than those listed will be required of them once identified.

As standard protocol for Vieques, all agency RPMs are responsible for contacting and disseminating information to other project personnel within the RPM's applicable agency.

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Worksheet #9: Project Planning Session Summary

Project Name: Red Beach RI QAPP

Site Name: Red Beach

Projected Date(s) of Field Activities: Spring 2024

Site Location: Vieques, Puerto Rico

Project Manager: Dennis Ballam

Date of Session: August 8, 2023

Scoping Session Purpose: Discuss and concur upon key elements of Red Beach RI to be included in QAPP

Name	Title	Affiliation	Email Address	Project Role
Dan Waddill	NAVFAC Vieques Program Coordinator	NAVFAC	dan.waddill@navy.mil	Navy Vieques Program Coordinator
Kevin Cloe	NAVFAC RPM	NAVFAC	kevin.cloe@navy.mil	NAVFAC RPM
Daniel Hood	NAVFAC RPM	NAVFAC	daniel.r.hood@navy.mil	NAVFAC RPM
Maria Danois	NAVFAC Site Manager	NAVFAC	maria.m.danois.civ@us.navy.mil	NAVFAC Site Manager
Doug Pocze	EPA Section Chief	EPA	pocze.doug@epa.gov	EPA Leadership
Angela Carpenter	EPA Branch Chief	EPA	carpenter.angela@epa.gov	EPA Leadership
Jessica Mollin	EPA RPM	EPA	mollin.jesseica@epa.gov	EPA RPM
Karyn Treinen	EPA RPM	EPA	treinen.karyn@epa.gov	EPA RPM
Zolymar Luna	EPA RPM	EPA	luna.zolymar@epa.gov	EPA Representative
Abbey States	EPA Risk Assessor	EPA	debofsky.abigail@epa.gov	EPA Risk Assessor
Rachel Griffiths	EPA Geologist	EPA	griffiths.Rachel@epa.gov	EPA Geologist
Abby DeBrofsky	EPA Technical Support	EPA	states.abbey@epa.gov	EPA Technical Support
Bill Hannah	CH2M AM	CH2M (contractor to Navy)	bill.hannah@jacobs.com	CH2M AM
Brett Doerr	CH2M PDQM	CH2M (contractor to Navy)	brett.doerr@jacobs.com	Project Delivery and Quality Management; including, scope development and technical review

Worksheet #9: Project Planning Session Summary (continued)

Name	Title	Affiliation	Email Address	Project Role
Dennis Ballam	CH2M PM	CH2M (contractor to Navy)	dennis.ballam@jacobs.com	CH2M PM
Jesse Clements	CH2M Geographic Information System (GIS) Lead	CH2M (contractor to Navy)	jesse.clements@jacobs.com	CH2M GIS Lead
Juan Baba Peebles	PRDNER RPM	PRDNER	juanbaba@jca.pr.gov	Federal Facilities Coordinator
Tom Bourque	Technical Support	UXOPro (technical support contractor to PRDNER)	tom@uxopro.com	PRDNER technical support contractor
Mike Barandiaran	Refuge Manager	USFWS	mike_barandiaran@fws.gov	No project-specific role
Mitsuka Bermudez		USFWS	mitsuka_bermudez@fws.gov	No project-specific role

Key Discussion Points

The Navy presented the Red Beach site history, previous investigations and removal actions, findings and assessments, and RI approach. The munitions and explosives of concern (MEC) verification evaluation and time-critical removal action (TCRA) defined the nature and extent of MEC so no additional MEC characterization is necessary as the data from those activities satisfy the RI data needs. Further, based on the results of the MEC Verification Evaluation and TCRA (i.e., so few munitions-related items found), no munitions constituent (MC) is proposed. Instead, subsurface soil sampling at the former location of the drum and mosquito canisters if proposed.

M. Barandiaran indicated stated subsurface clearance would not be desirable along the former concrete pipe debris areas since removal of the former piping would destroy habitat.

EPA will consult internally with technical staff regarding the proposal that no groundwater sampling or MC analysis is warranted.

Worksheet #10: Conceptual Site Model

Facility Profile: Former Vieques Naval Training Range

Location, Size, Facility History, and Ownership

The former VNTR is located in Vieques, Puerto Rico, in the Caribbean Sea, approximately 7 miles southeast across the Vieques Passage from the eastern tip of the main island of Puerto Rico (Figure 10-1). The former VNTR consists of approximately 14,600 acres and is divided into four separate operational areas that from west to east comprise: the 11,000-acre Eastern Maneuver Area (EMA), the 2,500-acre Surface Impact Area (SIA), the 900-acre Live Impact Area (LIA), and the 200-acre Eastern Conservation Area (ECA) (Figure 10-2). The former VNTR is bounded by the Caribbean Sea to the north, east, and south, and the Municipality of Vieques to the west.

Military operations at the former VNTR included ground warfare and amphibious training for Marines, naval gunfire support training, and air to ground training. Following cessation of military operations on the former VNTR, the Navy subdivided the former operational areas into smaller parcels based on considerations such as historic use, geographic features, and land use. The parcels, referred to as UXO sites, were delineated in such a way to make them more manageable for the purposes of prioritization, munitions removal, site characterization, and decision making.

On April 30, 2003, the former VNTR was transferred to the Department of the Interior (DOI) to be operated and managed by the USFWS as a National Wildlife Refuge and, in some places, a Wilderness Area, pursuant to Section 1049 of the National Defense Authorization Act for Fiscal Year 2002 (Public Law 107-107). Although the DOI is directed to protect and conserve the transferred land as a wildlife refuge, the Navy retains the responsibility for conducting the environmental investigations and cleanup of the property, as warranted.

In 2005, the former VNTR was placed on the National Priorities List (NPL). The NPL required all subsequent environmental restoration activities for Navy Installation Restoration sites on Vieques to be conducted under CERCLA unless and until removed from CERCLA authority.

The Navy, EPA, Commonwealth of Puerto Rico, and DOI entered into a Federal Facility Agreement (FFA) for the former VNTR in 2007, as a result of the NPL listing and pursuant to CERCLA. The FFA establishes the procedural framework and schedule for implementing the CERCLA response actions for Vieques environmental and munitions sites.

Site Profile: UXO 17 - Playa Caracas/Red Beach

Location

UXO 17 includes three public use beaches: Playa Caracas/Red Beach (hereafter referred to as “Red Beach”), Playuela/Garcia Beach (hereafter referred to as “Garcia Beach”), and Playa La Chiva/Blue Beach (hereafter referred to as “Blue Beach”). Red Beach is adjacent to Garcia Beach, both of which are to the west of Blue Beach, south of Camp Garcia, and east of UXO 15 Puerto Ferro (Figure 10-3). Each beach is in a different place within the CERCLA process. Therefore, this RI QAPP addresses only Red Beach. Based on the information gathered from historical investigations and removal action(s), a Record of Decision for Potential Area of Concern EE, which includes Blue Beach, is anticipated to be issued in fiscal year 2024. Additionally, the historical investigations and removal action at Playuela/Garcia Beach indicated no further investigation or action is warranted there, as documented in the UXO 17 TCRA Completion Report (CH2M, 2023). As such, a No Further Action Decision Document was planned. However, rather than producing a separate decision document, the Record of Decision for Playa Caracas/Red Beach will include Playuela/Garcia Beach. Therefore, the RI Report prepared following implementation of this QAPP will include not only Playa Caracas/Red Beach, but Playuela/Garcia Beach as well, including its conceptual site model that supports a no further action determination for that area.

Worksheet #10: Conceptual Site Model (continued)

Site History

In 2002, an archival records search indicated Blue Beach, Red Beach (formerly Red Beach East), and Garcia Beach (formally Red Beach West) had been used for military training activities, but that only blank ammunition was used on the beaches during training exercises (Tippetts et al., 1980). To help verify this information and in support of land transfer, an MEC investigation was conducted at these beaches that same year (NAVFAC, 2003b).The investigation comprised a visual and geophysical survey of approximately 100-percent of the sandy portions of the beach and the trails leading to the beaches. At Red Beach, 16 fired small arms blank cartridges and three expended smoke grenades were identified. No MEC were found at any of the three beaches and, as a result, these three beaches were recommended for no further action and opened to the public for recreational use as part of the Vieques National Wildlife Refuge under USFWS management.

Due to MEC findings at Blue Beach during a more recent investigation, an MEC Verification Evaluation was conducted at Red Beach in 2019 in accordance with the MEC Verification Evaluation Work Plan (CH2M, 2017) and associated QAPP (CH2M, 2019). The MEC verification Evaluation included the sandy portions of the beach and the public parking area. An advanced geophysical classification (AGC) sensor (MetalMapper 2x2) was utilized for both dynamic detection surveys and cued (static) surveys to detect and classify targets of interest (TOIs). Although the MEC Verification Evaluation was designed to remove all TOIs, not all TOIs were intrusively investigated at Red Beach because an 81-millimeter (mm) mortar (MEC) was encountered in the eastern part of the road/parking area (Figure 10-4), resulting in cessation of the MEC Verification Evaluation and initiation of a TCRA.

The TCRA was performed in 2021 at Red Beach in accordance with the UXO 17 TCRA QAPP (CH2M, 2020). The TCRA included use of an AGC sensor (MetalMapper 2x2) performing both dynamic detection surveys and cued surveys to detect and classify TOI within the beach area, an all-metals analog detector survey in the upland area, and intrusive investigation of TOI(s). The UXO 17 TCRA Completion Report (CH2M, 2023) details the methodologies, findings, and data evaluation for the TCRA. No MEC were found and only nine munitions debris (MD) items and two small arms were found during the TCRA. In addition, two items, a diesel/motor oil drum and a case containing 22 presumed mosquito repellent canisters, were encountered within the beach area of Red Beach (Figure 10-4).

The top of the diesel/motor oil drum (55-gallon) was encountered at approximately 12-inches below ground surface (bgs). The portion of the drum containing liquid was below 12 inches bgs and was observed to be intact with no indications of leaking or ground staining. Upon discovery, the liquid contents of the drum were sampled for Toxicity Characteristic Leaching Procedure (TCLP) analysis for disposal purposes and total chemical concentrations of various parameters for assessing the nature of the liquid (Attachment A). The contents were determined to be primarily diesel fuel and motor oil. The liquid contents were determined to be non-hazardous and the drum was dug up, placed in an overpack drum/casing, re-located to Camp Garcia, and disposed of accordingly. During the removal process at Red Beach, no indications of leaking or soil staining were observed post removal. It is assumed this drum was associated with the military training activities at Red Beach.

The mosquito repellent canisters were encountered between approximately 12 and 18-inches bgs and were observed to be intact with no indications of ground staining. Research into this type of canister indicated they were used to repel/kill mosquitos inside tents once set-up by military personnel. Most of the canisters (19 of 22) were noted as containing liquid in them with no indications of leaking or cracks/breaks. The remaining 3 did not contain liquid, but the absence of indications of leaking or cracks/breaks suggests they were used as intended. Upon discovery, the canisters were placed into a clean 55-gallon drum and re-located to Camp Garcia. Additionally, the liquid content of the 19 canisters were sampled for TCLP analysis (Attachment A). The liquid content was determined to be non-hazardous and disposed of accordingly.

Worksheet #10: Conceptual Site Model (continued)

Physical and Biological Characteristics

The Red Beach TCRA area comprises approximately 4-acres of open sandy beach area, a 3.5-acre grassy area, a 0.5-acre public parking area, and various hiking trails (6.8 acres) and roads (6.2 acres). Various recreational site features are present on the site, including gazebos, barbeque pits, trash cans, various signs, volleyball nets, concrete slabs, and outhouses (baños). The open beach vegetation includes palm trees and several clusters of other vegetation sporadically located throughout the beach area. The parking and grassy area comprise approximately 4 acres of gravel and light grassy areas with parking blocks and signs. A rocky topographical divide separates Red Beach and Garcia Beach.

Vegetation within and along the northern rim of Red Beach (including the parking area) includes various native and invasive species. The vegetated zones immediately adjacent to the beach generally exhibit extensive cover of railroad vine (*Ipomoea pes-caprae*), as well as some shoreline seapurslane (*Sesuvium portulacastrum*) and seashore dropseed (*Sporobolus virginicus*). The parking area of Red Beach is dominated by various low-cut grasses and sedges. Large trees and shrubs within the parking area and forested fringes of the upper beaches include sea grape (*Coccoloba uvifera*), coconut palm (*Cocos nucifera*), portia tree (*Thespesia populnea*), acacia (*Acacia* sp.), mesquite (*Prosopis juliflora*), and white leadtree (*Leucaena glauca*). There is the potential for hawksbill sea turtles (*Eretmochelys imbricata*), leatherback sea turtles (*Dermochelys coriacea*), and green sea turtles (*Chelonia mydas*) to nest along the beach habitat.

Some areas immediately north of the beach contains low lying mangrove and land crab habitat. The area including and surrounding the beach is underlain by primarily alluvial deposits (Qa), as well as marine sedimentary rocks (Tl). Soil overlying these geologic units are primarily sand (Cm) along the beaches and more loamy sand (Cf), loamy colluvium (Rockland - Rs), and swamp material (Ts) inland from the beaches (Figure 10-5). Based on these geological site conditions, the beach area tends to be covered with sand up to several feet thick and the road/trail (upland) areas contain a shallow-bedrock surface generally encountered within the top 12 inches bgs and are generally under a dense vegetation canopy.

Summary of Key Conceptual Site Model Characteristics Supporting the Remedial Investigation and Approach

Potential Sources of Environmental Contamination

As discussed in the stakeholder scoping session (see Worksheet #9), based on the type and very low quantity (1 MEC, 12 MD, and 30 small arms) and density of munitions-related items (relative to elsewhere within the former VNTR) found at the site during previous investigations (2002 and 2019) and the 2021 removal action (Table 10-1), and because the vast majority of metallic items found (i.e., over 1,000) were cultural debris, MC characterization is not warranted. Both soil and groundwater sampling throughout the former VNTR range sites, where orders of magnitude higher quantities and densities of MEC and MD than at Red Beach have been found, have consistently demonstrated explosives are generally non-detect and metals are mostly indistinguishable from background. Further, based on the findings at Red Beach, any potential contribution of metals to the surroundings would be insignificant relative to potential metal contribution from the cultural debris. Because these findings are the result of hundreds of samples comprising thousands of analyses, they provide strong evidence that because so few munitions were found at Red Beach, which were removed during the MEC Verification Evaluation and TCRA, the potential for MC contamination is negligible. Further, any potential contribution of metals to the surroundings from the few munitions-related items found at Red Beach would be insignificant relative to potential metal contribution from the cultural debris found there.

Worksheet #10: Conceptual Site Model (continued)

Although the drum and mosquito canisters were removed and no leaking and/or ground staining were observed, it is conservatively assumed the diesel/motor oil drum and mosquito canisters could have been point sources for environmental contamination.

Receptors and Exposure Scenarios

Red Beach is currently open to the public during the operational hours of the Vieques National Wildlife Refuge. Red Beach is a popular public beach and frequented by both local and tourist recreational users. Examples of current/potential future recreational uses include general beach activities, such as sunbathing, volleyball and other beach sports, picnics and parties at the sites' gazebos, hiking, and wildlife observation.

Other potential receptors are USFWS workers conducting refuge management activities in the area, such as sea turtle monitoring and beach/road/trail maintenance.

Direct contact with potential chemical constituents in soil beneath the ground surface is the primary exposure route for recreational users and/or USFWS workers if contaminants were released from the drum and/or canister.

No ecological receptors are anticipated based on the locations (i.e., inland of potential turtle nesting areas and not in land crab habitat) and encountered depths (i.e., deeper than 12 inches bgs) of the both the drum and canisters.

TABLE 10-1
MEC/Munitions-related Items Identified within UXO 17 Red Beach
UXO 17 Playa Caracas/Red Beach RI QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

Item Group	Munitions Investigation (2002)		MEC Verification Evaluation (2019)		TCRA (2021)		Surface Totals
	Number of Items	General Types of Items Identified	Number of Items	General Types of Items Identified	Number of Items	General Types of Items Identified	
MEC	0	-	1	81-mm Mortar	0	-	**1**
MD	3	Smoke Grenades (Expended)	0	-	9	Projectile lifting lugs, 105-mm projectile fragmentation case, arming cap, signal flare can, propellant charge cannister, cap for fuze well	**12**
SAA	16	Blank Ammunition (5.56-mm, 7.62-mm)	12	Blank Ammunition (5.56-mm, 0.50 caliber)	2	0.50 caliber blank and 0.30 caliber case	**30**
Other	0	-	0	-	2	Drum and mosquito canisters	**2**
TOTALS	**19**	**-**	**13**	**-**	**13**	**-**	**45**

Notes:
MD = Munitions Debris
MEC = Munitions and Explosives of Concern
mm = millimeter
SAA = Small Arms Ammunition
TCRA = Time-Critical Removal Action

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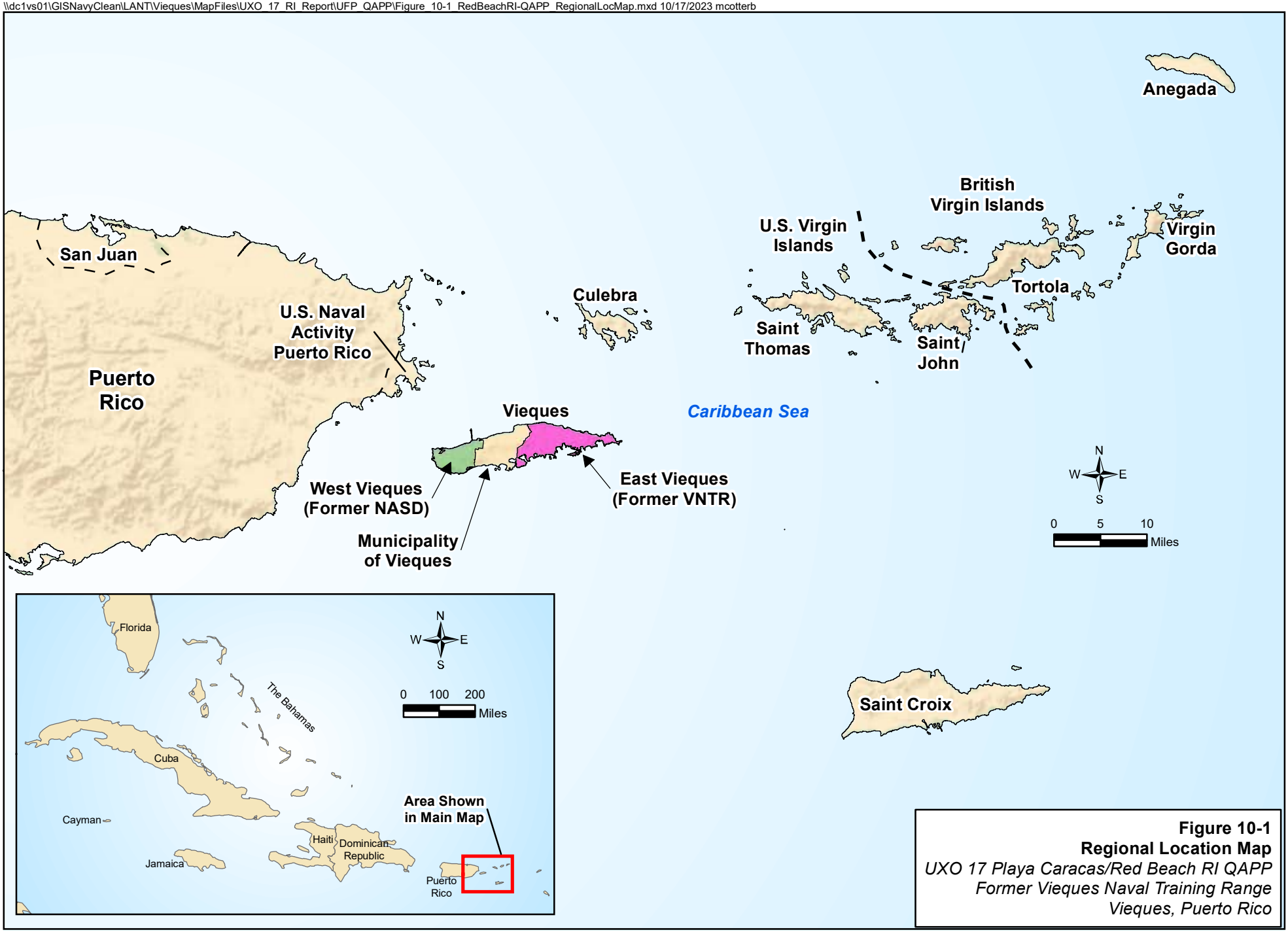

Figure 10-1
Regional Location Map
UXO 17 Playa Caracas/Red Beach RI QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

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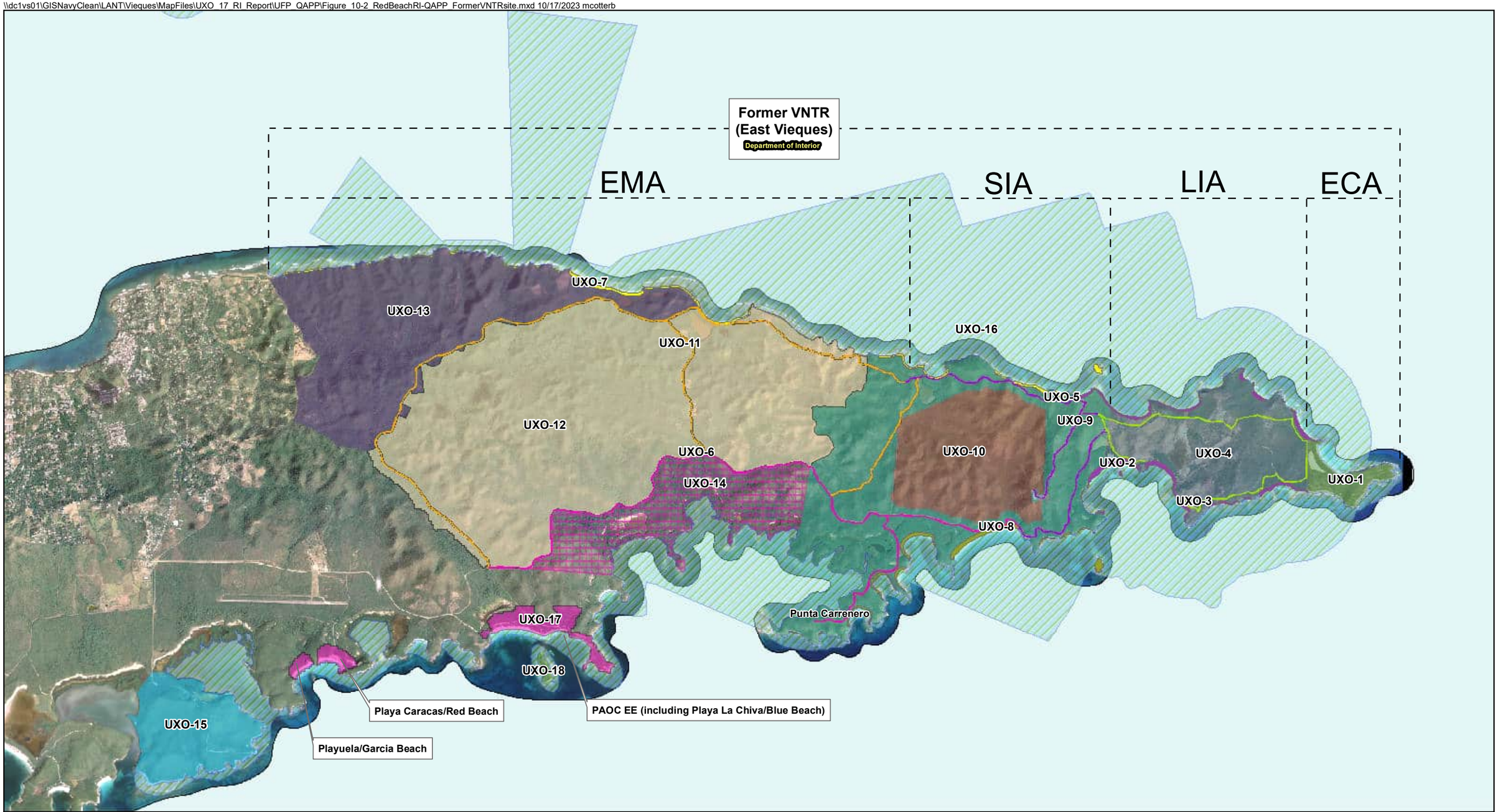

Legend

- UXO 1 - ECA
- UXO 2 - LIA Beaches
- UXO 3 - LIA Roads
- UXO 4 - LIA Interior
- UXO 5 - SIA Restricted Roads
- UXO 6 - EMA/SIA Planned Public Roads
- UXO 7 - EMA/SIA North Beaches
- UXO 8 - SIA South Beaches
- UXO 9 - SIA Exterior
- UXO 10 - SIA Interior
- UXO 11 - EMA Planned Public Roads
- UXO 12 - EMA Interior
- UXO 13 - EMA West
- UXO 14 - EMA South
- UXO 15 - Puerto Ferro (Expanded Site Inspection)
- UXO 16 - Underwater Areas
- UXO-17 - Public Use Beaches
- UXO 18 - Cayo de la Chiva

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Feet

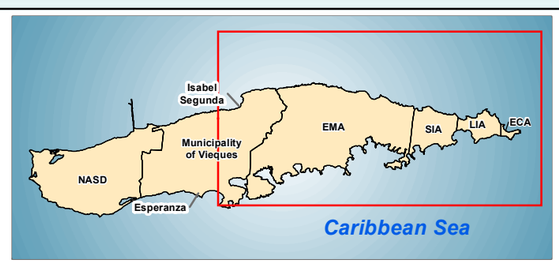

Figure 10-2
Former VNTR Site Map
UXO 17 Playa Caracas/Red Beach RI QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

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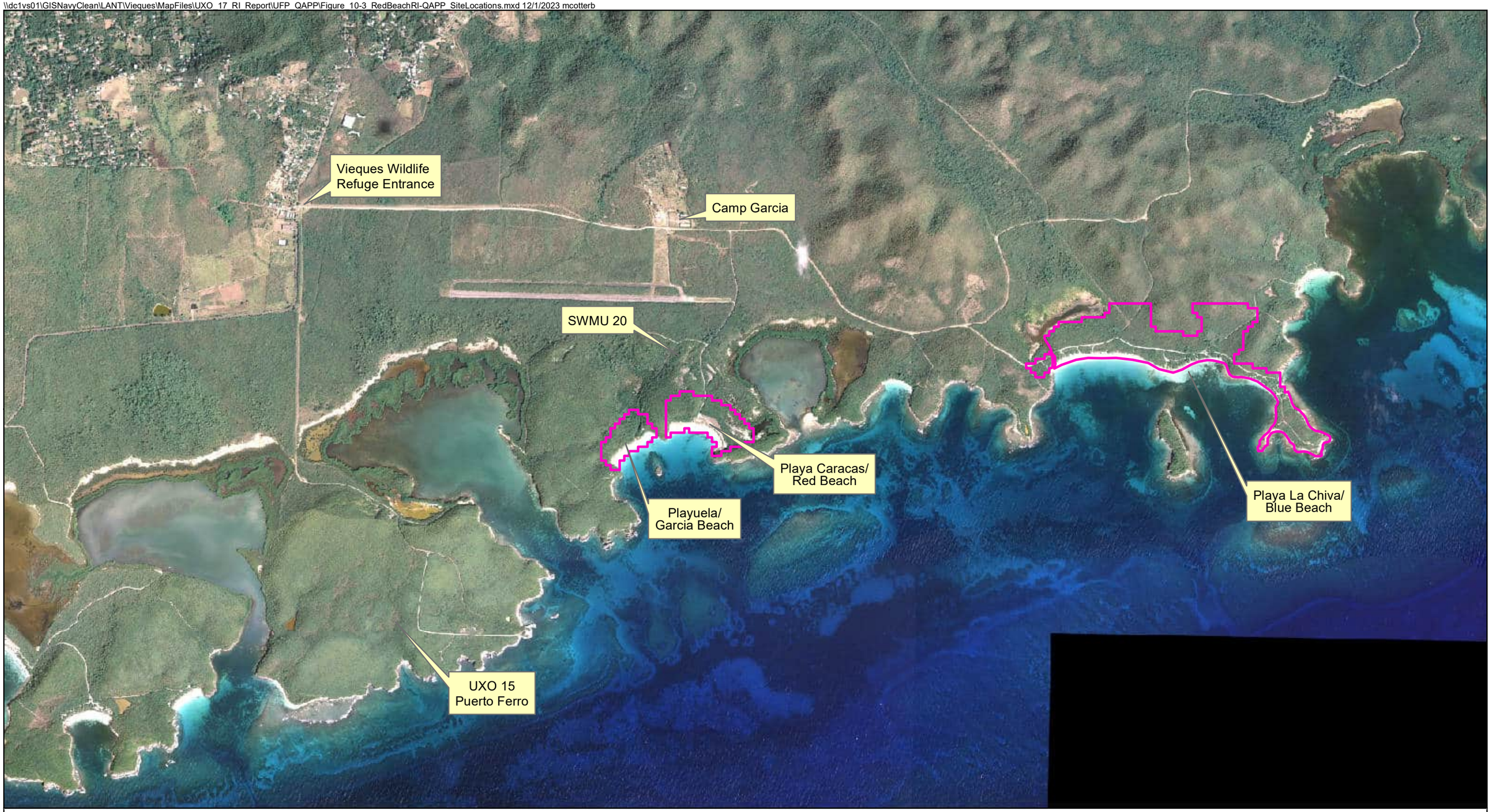

Legend

UXO 17 - Public Use Beaches

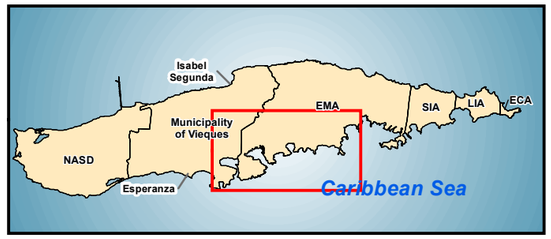

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Figure 10-3
Site Locations Map
UXO 17 Playa Caracas/Red Beach RI QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

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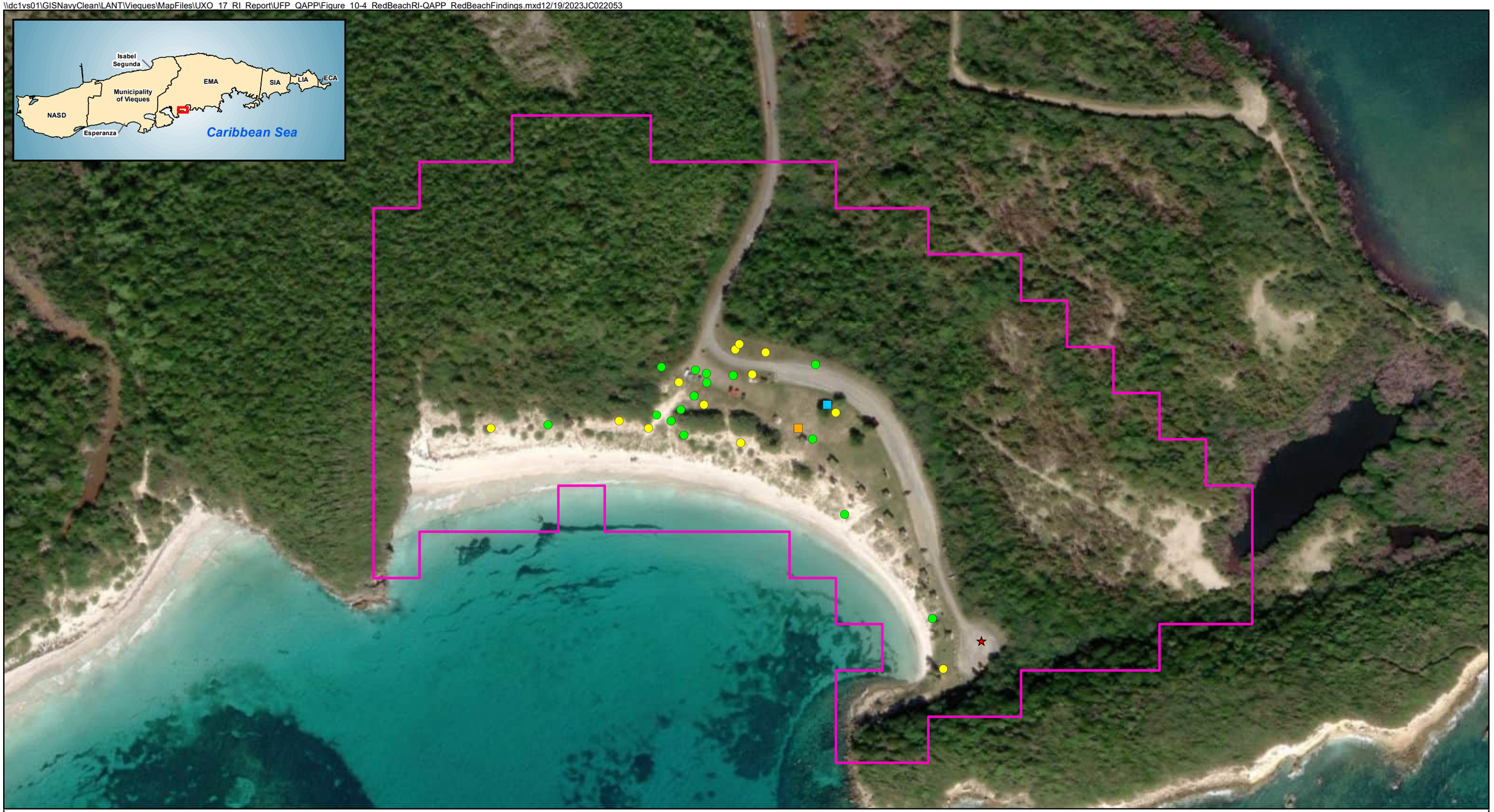

Legend

UXO 17 Playa Caracas/Red Beach

Munitions Findings:

- 81-mm Mortar (MEC)
- Munitions Debris
- Small Arms Ammunition

Other Findings:

- Mosquito Canisters
- Diesel/Motor Oil Drum

Notes:
Munitions findings shown are from the following:
- 2002 MEC Investigation
- 2019 MEC Verification Evaluation
- 2021 Time-Critical Removal Action

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Figure 10-4
UXO 17 Playa Caracas/Red Beach Findings
UXO 17 Playa Caracas/Red Beach RI QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

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Ts
Tl
Rs
Cf
Ts
Kv
DgF2
Qa
Ts
Cm
Qa
Cf
Playa Caracas/
Red Beach
Rs
Tl
Rs

Geologic Unit Description
Qa - Alluvial Deposits
Tl - Marine Sedimentary Rocks
Kv - Marine Sandstone, Lava Assemblage

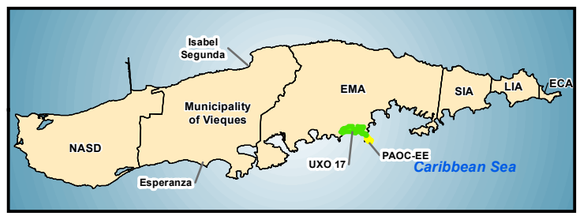
Soil Type Description
Cf - Catano loamy sand
Cm - Coastal beaches
DgF2 - Descalabrado and Guayama soils, 20 to 60 percent slopes, eroded
Rs - Rockland
Tf - Tidal flats
Ts - Tidal Swamp

Legend
Geologic Unit
UXO 17 Public Use Beaches

Notes:
Soil Data Source - U.S. Department of Agriculture and Natural Resources Conservation Service

Coordinate System - NAD 1983 UTM Zone 20 (Meters)

Imagery is a 2007 aerial and actual shorelines may have changed slightly over time



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2007 Aerial Imagery

Figure 10-5
UXO 17 Soil Horizons and Geologic Units
UXO 17 Playa Caracas/Red Beach RI QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

Worksheet #11: Project/Data Quality Objectives

This worksheet documents the DQOs following the EPA seven step Data Quality Objective Process (EPA, 2006) for characterizing soil at the two potential contaminant source locations at Red Beach.

DQO Step	Description
Step 1 State the Problem	MEC nature and extent characterization at Red Beach was accomplished via the MEC Verification Evaluation (CH2M, 2017 and 2019a) and TCRA (CH2M, 2020 and 2023). The MEC nature and extent and associated explosive hazard evaluation, together with the nature and extent and associated risk assessment for potential chemical contamination, if present, will be included in the Red Beach RI Report. As discussed in Worksheet #10, the potential for releases of MC is negligible based on findings of two investigations, a removal action, and MC information gathered across the former VNTR. Although the diesel/motor oil drum and mosquito repellent canisters were removed and no leaking and/or ground staining were observed, it is conservatively assumed they could have been point-sources for environmental contamination to which the receptors discussed in Worksheet #10 could be exposed.
Step 2 Identify the Goal	Goal: Characterize soil under the former drum and former mosquito canister locations such that: • Nature and extent of contamination in soil, if present, are sufficiently delineated to assess potential human health risks • If unacceptable risks attributable to releases from the former drum and former mosquito repellent canisters are assessed, final remedy determinations can be made regarding chemical constituents that support current and potential future uses at Red Beach Principle Study Questions: 1. Were there releases from the former drum and/or former mosquito repellent canisters and, if so, what are the nature and extent of that contamination in soil? This question will be answered via collection of subsurface soil samples for analysis of constituents likely or potentially associated with the drum and canister contents. 2. If release(s) is confirmed and delineated, what current and potential future risks may be posed to receptors exposed to contaminants attributable to site-related[1] release(s)? This question will be answered via quantitative human health risk assessment. 3. If unacceptable risk attributable to site-related release(s) is determined via quantitative risk assessment and contaminants of concern (COCs) are identified, what are remedial alternatives for mitigating and/or controlling unacceptable risk? As applicable, this question will be answered in the Red Beach Feasibility Study (FS) Report based, in part, on information gathered during the RI. Alternative Outcomes: Based on the Principal Study Questions, the potential outcomes are: • Chemical constituents attributable to site-related release(s) are not detected in the subsurface soil. If constituents attributable to site-related releases are not detected, no remedial action with respect to chemical contamination is warranted.

[1] Herein site-related constituents are defined as detected analytes (unless there are lines of evidence that demonstrate a particular detected analyte is not the result of a site-specific release [i.e., attributable to background, blank or laboratory contamination, normal application of pesticides, etc.]). How chemicals such as pesticides are evaluated with respect to site-specific releases is presented in the Vieques Master Standard Operating Procedures, Protocols, and Plans – Revision 2018 (CH2M, 2018).

Worksheet #11: Project/Data Quality Objectives (continued)

DQO Step	Description
Step 2 Identify the Goal	• Chemical constituents attributable to site-related release(s) are detected in the subsurface soil (and the nature and extent are delineated) and: – The concentrations are below risk-based screening criteria utilized in quantitative risk assessment and do not pose a leaching concern for groundwater[2]. In this case, no remedial action with respect to chemical contamination is warranted. – The concentrations are above risk-based screening criteria, but quantitative risk assessment indicates there is no unacceptable risk associated with exposure to soil. In this case, no remedial action with respect to chemical contamination is warranted assuming no leaching concern for groundwater is determined (see leaching bullet further below). – The concentrations are above risk-based screening criteria, and quantitative risk assessment indicates there is unacceptable risk associated with exposure to soil. In this case, remedial alternatives to address the unacceptable risk will be evaluated in an FS as will any unacceptable risk determined for groundwater (see leaching bullet below). – Leaching evaluation indicates there is a leaching concern for groundwater. In this case, the need to characterize groundwater will be discussed among the stakeholder agencies and, if deemed necessary, preparation of the RI Report will be paused and a QAPP addendum will be submitted to perform groundwater characterization, the results of which will be included in the data evaluation and risk assessment included in the RI Report. If unacceptable risks are determined for groundwater, remedial alternatives to address the unacceptable risk will be evaluated in an FS. • As part of the alternative outcome determinations and evaluation of the site, including observations made during sample collection, any additional pertinent information discovered during RI implementation will be evaluated to ensure the sample locations sufficiently represent the nature and extent of contamination. How Data will be Used in Solving the Problem: The data will be used to determine whether a release(s) of chemical contaminants occurred, the nature and extent of that release(s), associated risks, and whether additional investigation or action is warranted. As applicable, human health risk assessment will be used to quantify risks potentially posed by exposure to site-related contaminants. If additional investigation or action is deemed warranted, the data will also be used to help design the investigation or action approach.
Step 3 Identify Information Inputs	The information inputs for the Red Beach RI QAPP are: Current CSM (Worksheet #10), which includes historical information gathered during previous investigations/removals. Types of constituents potentially present at the former drum and former mosquito canisters locations. The geospatial locations (i.e., global positioning system [GPS] coordinates) and vertical depths bgs for the drum and canisters.

[2] Soil Screening Levels (SSLs) represent an indication of whether there may be a leaching concern for groundwater. However, the values do not represent nor are used in a quantitative determination of leaching concern, but instead are used to indicate whether further evaluation of leaching is warranted (i.e., soil concentrations greater than SSLs). If warranted, further evaluation may include consideration of factors that affect leaching, such as the area and estimated volume of contamination, soil matrix, etc.).

Worksheet #11: Project/Data Quality Objectives (continued)

DQO Step	Description
	Defensible analytical data such that determinations can be made as to whether a release(s) occurred, the nature and extent of that release(s), and whether there are exceedances of risk-based screening criteria such that quantitative risk assessment can be conducted. Defensible data will be achieved by implementing appropriate sampling and analytical protocols, validating the resulting data, including data for QA/QC samples, to verify proper sampling and analytical protocols were followed, and performing a Data Quality Evaluation (DQE) to assess the availability and usability of the data for the intended purposes. Worksheet #28 describes the Measurement Performance Criteria (MPC) for the data collected, and Worksheet #17 describes the specific data collection design.
Step 4 Define Spatial and Temporal Boundaries	Spatial Boundaries: Spatial boundaries include both the horizontal (lateral) area and vertical depths at which the drum and canisters were encountered and the extent of any contaminants attributable to a site-specific release(s). Horizontal Boundaries: The GPS coordinates associated with former drum and canister (Figure 10-4) will be used to re-locate where these items were encountered. While no signs/ indications of leaking and/or soil staining were observed for either the drum or the canisters, it is assumed that if there were a release(s) from the drum and/or canisters, it would be detected in the immediate area in which the items were found. Therefore, the horizontal boundaries will include "step-out" locations from the primary sample locations to ensure the horizontal extent of contamination is delineated sufficiently such that quantitative risk assessment can be performed (see Worksheet #17). Vertical Boundaries: The vertical boundary (at least initially) is the depth at which the items were encountered and the 24-inch interval directly below the encountered depth based on the assumption that any leaked/discharged constituents would preferentially migrate directly below the source and be present in the soil immediately below said source. Additionally, this approach is consistent with the soil sampling approach that has been followed at other former VNTR sites where potential point sources of contamination have been targeted for sampling. Based on this approach, the vertical boundaries are defined as follows: • Former drum – Encountered at 12 inches bgs, so vertical boundary for the primary sample is 46-70 inches bgs as the standard height of a 55-gallon drum is 34 inches (drum was found in the upright position). • Former canisters – Encountered between 12 inches and 18 inches bgs, therefore vertical boundary will be considered 18 inches to 42 inches bgs. The vertical boundaries will include "step-down" depths from the primary sample locations to ensure the vertical extent of contamination is delineated sufficiently such that quantitative risk assessment can be performed (see Worksheet #17). Temporal Boundaries: There are no substantial temporal boundaries that could impact the RI activities.
Step 5 Develop the Project Data Collection and Analysis Approach	The soil samples will be completed via hand-augering and submitted to an accredited analytical laboratory for analysis. Analytical results provided by the analytical laboratory will be validated by a third-party data validator. Both analytical results and data validation report will be included in the RI Report and discussed in the Data Usability Assessment (DUA). With respect to sample analysis, Worksheet #15 lists the applicable analyses for subsurface soil samples and Worksheet #17 provides the rationale for the type, number, and depth of samples and the associated analytical parameters. The PALs for this RI are:

Worksheet #11: Project/Data Quality Objectives (continued)

DQO Step	Description
	• Current Vieques human health screening values for soil (at the time the RI human health risk assessment is performed) Regional Screening Levels (RSLs) (adjusted for hazard quotient [HQ] of 0.1 for non-carcinogens) While not used to establish PALs, the following values will also be used during data evaluation: • East Vieques background soil inorganics upper tolerance limits (UTLs) (CH2M, 2007). These data may be used, together with other applicable lines of evidence, to help distinguish metals concentrations attributable to releases from the drum/canisters versus those attributable to natural and non-related anthropogenic sources. • Vieques soil-to-groundwater leaching screening values (SSL). As noted in various Vieques sampling and analysis plans and reports, SSLs have been consistently demonstrated on Vieques to be unreliable predictors (i.e., overly conservative) of leaching concerns for groundwater. For example, it has been demonstrated across the former VNTR that explosive constituents are largely absent in groundwater, even in areas with significantly higher densities of munitions (e.g., LIA), providing a line of evidence that while SSLs can help provide some perspective on leachability of constituents, they should not be considered threshold values upon which to draw conclusions about the utility of data or the need for action. Therefore, these values will not be used for establishing PALs.
Step 6 Specify Project-specific Measurement Performance Criteria	Worksheet #28 presents the project-specific MPC for the Red Beach RI QAPP. Project-specific MPC are the criteria that collected data must meet to satisfy the DQOs. Failure to achieve the MPC may have an impact on end uses of the data, which will be discussed in the DUA, as discussed in Worksheet #37.
Step 7 Sampling Design and Project Workflow	The MPC established during Step 6 of the DQO process (documented in Worksheet #28) were used to develop the Red Beach RI approach, which is described in Worksheet #17. The RI approach is broken down into a series of specific processes and data collection steps, termed definable feature of work (DFW). Figure 17-1 provides the decision tree that will be used in the execution of the RI to evaluate the conformance of the specific DFWs to established MPCs.

Worksheet #12: Measurement Performance Criteria

As a matter of convention for Vieques QAPP elements involving environmental media sampling, all MPC for field QC samples are provided in Worksheet #28.

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Worksheet #13: Secondary Data Uses and Limitations

Data Type	Source	Data Uses Relative to Current Project	Factors Affecting the Reliability of Data and Limitations on Data Use
Locations of Encountered Items and Associated Analytical Data	UXO 17 Public Use Beaches, Playa Caracas/Red Beach and Playuela/Garcia Beach, Time-Critical Removal Action Completion Report (CH2M, 2023)	Provides former drum and former mosquito canister details, including locations	There are no known reliability issues or limitations on the use of the data as presented in the historical data.

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Worksheet #14 & 16: Project Tasks & Schedule

DFW	Activity	Responsible Party	Planned Start Date	Planned Completion Date	Deliverable(s)[a]	Deliverable Due Date
1	Pre-mobilization Activities	RI Contractor	Estimated July 2024	Estimated August 2024	QAPP (interagency decision point) Notification to interagency team denoting anticipated start date Coordination with the Analytical Laboratory Coordination with the Data Validator	Documents accepted/ approved prior to field mobilization
2	Mobilization	RI Contractor	Estimated August 2024	Estimated August 2024	Daily Report	Daily
3	Site Preparations	RI Contractor	Estimated August 2024	Estimated August 2024	Daily Report	Daily
4	Soil Sampling	RI Contractor Laboratory Subcontractor Data Validation Subcontractor	Estimated August 2024 Estimated August 2024 Estimated October 2024	Estimated August 2024 Estimated October 2024 Estimated November 2024	Daily Report Lab data package/EDDs Data Validation Report	Daily
5	Demobilization	RI Contractor	Estimated August 2024	Estimated August 2024	N/A	N/A
6	Data Usability Assessment	RI Contractor	Estimated November 2024	Estimated December 2024	DUA Report	Within 30 days of upload of validated soil data into Vieques database

Worksheet #14 & 16: Project Tasks & Schedule (continued)

DFW	Activity	Responsible Party	Planned Start Date	Planned Completion Date	Deliverable(s)[a]	Deliverable Due Date
7	Red Beach RI Report Preparation	RI Contractor	Estimated January 2025	Estimated March 2025	DQE RI Report	Within 60 days of upload of validated soil data into Vieques database

[a] The QAPP and the Red Beach RI Report will be provided for regulatory review and represent interagency decision points. All other various deliverables, such as technical memoranda, data usability assessment report, data packages, etc., are interim, the information from which will not be provided separately for formal review and comment, but instead the information from them will be included in the Red Beach RI Report, as appropriate. Nonetheless, the Navy can provide various interim documentation to regulatory agencies for informational purposes and any feedback provided will be considered and incorporated to the extent practicable.

Worksheet #15-1: Project Action Limits and Laboratory-specific Detection/Quantitation Limits (VOCs in Soil)

(Uniform Federal Policy [UFP]-QAPP Manual Section 2.6.2.3)

Matrix: Soil
Analytical Method: SW-846 8260D
Analytical Group: VOA (micrograms per kilogram [µg/kg] unless otherwise specified)

Analyte	CAS No.[a]	PAL[b] (µg/kg)	PAL Limit Reference	LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)	LCS and MS/MSD Recovery Limits and RPD (%)[d]		
Acetone	67-64-1	7,000,000	RSL Residential Soil (HQ=0.1)	20	16	6.0	36	164	20
Benzene	71-43-2	1,200	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.50	77	121	20
Bromochloromethane	74-97-5	15,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.6	78	125	20
Bromodichloromethane	75-27-4	290	RSL Residential Soil (HQ=0.1)	5.0	1.0	0.70	75	127	20
Bromoform	75-25-2	19,000	RSL Residential Soil (HQ=0.1)	10	8.0	5.0	67	132	20
Bromomethane	74-83-9	680	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	53	143	20
Carbon disulfide	75-15-0	77,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.60	63	132	20
Carbon tetrachloride	56-23-5	650	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	70	135	20
Chlorobenzene	108-90-7	28,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	79	120	20
Chloroform	67-66-3	320	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.60	78	123	20
Chloromethane	74-87-3	11,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.60	50	136	20
Isopropylbenzene	98-82-8	190,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	68	134	20
Cyclohexane	110-82-7	120,000[c]	EPA Soil Saturation Concentration (Csat) (HQ=0.1)	5.0	2.0	0.70	67	131	20
1,2-Dibromo-3-chloropropane	96-12-8	5.3	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	61	132	20
Dibromochloromethane	124-48-1	8,300	RSL Residential Soil (HQ=0.1)	5.0	1.0	0.5	74	126	20
1,2-Dibromoethane	106-93-4	36	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	78	122	20

Worksheet #15-1: Project Action Limits and Laboratory-specific Detection/Quantitation Limits (VOCs in Soil) (continued)

Analyte	CAS No.[a]	PAL[b] (µg/kg)	PAL Limit Reference	LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)	LCS and MS/MSD Recovery Limits and RPD (%)[d]		
1,2-Dichlorobenzene	95-50-1	180,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	78	121	20
1,3-Dichlorobenzene	541-73-1	2.0	Lab LOD	5.0	2.0	0.70	77	121	20
1,4-Dichlorobenzene`	106-46-7	2,600	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	75	120	20
Dichlorodifluoromethane (Freon-12)	75-71-8	8,700	RSL Residential Soil (HQ=0.1)	5.0	2.0	1.0	29	149	20
1,1-Dichloroethane	75-34-3	3,600	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.50	76	125	20
1,2-Dichloroethane	107-06-2	460	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.60	73	128	20
1,1-Dichloroethene	75-35-4	23,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.50	70	131	20
cis-1,2-Dichloroethene	156-59-2	6,300	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.50	77	123	20
trans-1,2-Dichloroethene	156-60-5	7,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.50	74	125	20
1,2-Dichloropropane	78-87-5	1,600	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.50	76	123	20
Chloroethane	75-00-3	540,000	RSL Residential Soil (HQ=0.1)	5.0	4.0	1.0	59	139	20
Ethylbenzene	100-41-4	5,800	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	76	122	20
2-Hexanone	591-78-6	20,000	RSL Residential Soil (HQ=0.1)	10	4.0	2.0	53	145	20
2-Butanone	78-93-3	2,700,000	RSL Residential Soil (HQ=0.1)	10	4.0	2.0	51	148	20
4-Methyl-2-pentanone	108-10-1	3,300,000	RSL Residential Soil (HQ=0.1)	10	4.0	1.0	65	135	20
Methyl acetate	79-20-9	7,800,000	RSL Residential Soil (HQ=0.1)	5.0	4.0	1.0	53	144	20
Methyl-tert-butyl ether (MTBE)	1634-04-4	47,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.50	73	125	20
Methylene chloride	75-09-2	35,000	RSL Residential Soil (HQ=0.1)	5.0	4.0	2.0	70	128	20
Methylcyclohexane	108-87-2	9,800	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.7	66	133	20
Styrene	100-42-5	600,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	76	124	20

Worksheet #15-1: Project Action Limits and Laboratory-specific Detection/Quantitation Limits (VOCs in Soil) (continued)

Analyte	CAS No.[a]	PAL[b] (µg/kg)	PAL Limit Reference	LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)	LCS and MS/MSD Recovery Limits and RPD (%)[d]		
1,1,2,2-Tetrachloroethane	79-34-5	600	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	70	124	20
Tetrachloroethene	127-18-4	8,100	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	73	128	20
Toluene	108-88-3	490,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.60	77	121	20
1,2,3-Trichlorobenzene	87-61-6	6,300	RSL Residential Soil (HQ=0.1)	10	8.0	5.0	66	130	20
1,2,4-Trichlorobenzene	120-82-1	5,800	RSL Residential Soil (HQ=0.1)	5.0	2.5	1.3	67	129	20
1,1,1-Trichloroethane	71-55-6	640,000[c]	EPA Soil Saturation Concentration (Csat) (HQ=0.1)	5.0	2.0	0.60	73	130	20
1,1,2-Trichloroethane	79-00-5	150	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.50	78	121	20
Trichloroethene	79-01-6	410	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.50	77	123	20
Trichlorofluoromethane (Freon-11)	75-69-4	1,230,000[c]	RSL Residential Soil (HQ=0.1)	5.0	2.0	1.0	62	140	20
1,1,2-Trifluoro-1,2,2-trichloroethane (Freon-113)	76-13-1	670,000	RSL Residential Soil (HQ=0.1)	10	2.0	0.70	66	136	20
Vinyl chloride	75-01-4	59	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.60	56	135	20
Xylenes, Total	1330-20-7	58,000	RSL Residential Soil (HQ=0.1)	10	2.0	0.70	78	124	20
cis-1,3-Dichloropropene	10061-01-5	1,800	RSL Residential Soil (HQ=0.1)	5.0	1.0	0.40	74	126	20
trans-1,3-Dichloropropene	10061-02-6	1,800	RSL Residential Soil (HQ=0.1)	5.0	1.0	0.50	71	130	20
1,1-Dichloropropene	563-58-6	2.0	Lab LOD	5.0	2.0	0.50	76	125	20
Tertiary butyl alcohol	75-65-0	1,400,000	RSL Residential Soil (HQ=0.1)	100	40	15	68	133	20
1,2,4-Trimethylbenzene	95-63-6	30,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	75	123	20
1,3,5-Trimethylbenzene	108-67-8	27,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	73	124	20
1,1,1,2-Tetrachloroethane	630-20-6	2,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	78	125	20

Worksheet #15-1: Project Action Limits and Laboratory-specific Detection/Quantitation Limits (VOCs in Soil) (continued)

Analyte	CAS No.[a]	PAL[b] (µg/kg)	PAL Limit Reference	LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)	LCS and MS/MSD Recovery Limits and RPD (%)[d]		
1,3-Dichloropropane	142-28-9	160,000	RSL Residential Soil (HQ=0.1)	5.0	1.0	0.40	77	121	20
2,2-Dichloropropane	594-20-7	2.0	Lab LOD	5.0	2.0	0.70	67	133	20
2-Chlorotoluene	95-49-8	160,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	75	122	20
4-Chlorotoluene	106-43-4	160,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	72	124	20
Bromobenzene	108-86-1	29,000	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.70	78	121	20
Dibromomethane	74-95-3	2,400	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.50	78	125	20
n-butylbenzene	104-51-8	110,000[c]	EPA Soil Saturation Concentration (Csat) (HQ=0.1)	8.0	5.0	3.0	70	128	20
n-propylbenzene	103-65-1	260,000[c]	EPA Soil Saturation Concentration (Csat) (HQ=0.1)	5.0	2.0	0.70	73	125	20
p-isopropyltoluene	99-87-6	4.0	Lab LOD	5.0	4.0	2.0	73	127	20
sec-butylbenzene	135-98-8	150,000[c]	EPA Soil Saturation Concentration (Csat) (HQ=0.1)	5.0	4.0	2.0	73	126	20
tert-butylbenzene	98-06-6	180,000[c]	EPA Soil Saturation Concentration (Csat) (HQ=0.1)	5.0	2.0	0.80	73	125	20
1,2,3-trichloropropane	96-18-4	5.1	RSL Residential Soil (HQ=0.1)	5.0	2.0	0.60	73	125	20

[a] Some Chemical Abstract Service (CAS) numbers are contractor specific.

[b] PALs are the EPA RSLs, Residential Soil HQ = 0.1 (May 2024).Where no RSL exists, the laboratory's LOD value is listed as the PAL.

[c] In accordance with the Vieques HHRA protocol (CH2M, 2018), when establishing PAL limits, the Csat values on the EPA's RSL summary table are to be considered. Where Csat values are lower than the RSLs, the Csat values (to two decimal places) are utilized as the PALs. While Csat values are not used for risk assessment, including them as PALs (when less than the RSLs) provides a conservative mechanism by which the potential for NAPL presence can be assessed.

[d] QSM v5.4 (DoD/DOE, 2021) is the basis for the LCS and MS/MSD limits.

Worksheet #15-1: Project Action Limits and Laboratory-specific Detection/Quantitation Limits (VOCs in Soil) (continued)

Analyte	CAS No.[a]	PAL[b] (µg/kg)	PAL Limit Reference	LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)	LCS and MS/MSD Recovery Limits and RPD (%)[d]

LCS = laboratory control sample
MS/MSD = matrix spike/matrix spike duplicate
No. = number
RPD = relative percent difference

Worksheet #15-2: Project Action Limits and Laboratory-specific Detection/Quantitation Limits (SVOCs in Soil)

Matrix: Soil
Analytical Method: SW-846 8270E
Analytical Group: SVOA (µg/kg unless otherwise specified)

Analyte	CAS No.[a]	PAL[b] (µg/kg)	PAL Limit Reference	LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)	LCS and MS/MSD Recovery Limits and RPD (%)[c]		
Bis(2-Chloroethoxy)methane	111-91-1	19,000	RSL Residential Soil (HQ=0.1)	36.7	33.3	16.7	36	121	20
Bis(2-chloroethyl)ether	111-44-4	230	RSL Residential Soil (HQ=0.1)	36.7	33.3	16.7	31	120	20
1,1'-Biphenyl	92-52-4	4,700	RSL Residential Soil (HQ=0.1)	36.7	33.3	16.7	40	117	20
Acetophenone	98-86-2	780,000	RSL Residential Soil (HQ=0.1)	50	33.3	16.7	33	115	20
Atrazine	1912-24-9	2,400	RSL Residential Soil (HQ=0.1)	167	133	66.7	47	127	20
Benzoic Acid	65-85-0	25,000,000	RSL Residential Soil (HQ=0.1)	500	334	167	57	116	30
Benzyl Alcohol	100-51-6	630,000	RSL Residential Soil (HQ=0.1)	500	334	167	29	122	20
Benzaldehyde	100-52-7	170,000	RSL Residential Soil (HQ=0.1)	167	133	66.7	25	95	30
Butylbenzylphthalate	85-68-7	290,000	RSL Residential Soil (HQ=0.1)	167	248	124	48	132	20
Caprolactam	105-60-2	3,100,000	RSL Residential Soil (HQ=0.1)	167	66.7	33.3	46	117	20
4-Chloroaniline	106-47-8	2,700	RSL Residential Soil (HQ=0.1)	167	66.7	33.3	17	106	20
2-Chlorophenol	95-57-8	39,000	RSL Residential Soil (HQ=0.1)	36.7	33.3	16.7	34	121	20
2-Methylphenol	95-48-7	320,000	RSL Residential Soil (HQ=0.1)	50	40	20	32	122	20
4-Methylphenol	106-44-5	130,000	RSL Residential Soil (HQ=0.1)	50	33.3	16.7	42	126	20
4-Chloro-3-methylphenol	59-50-7	630,000	RSL Residential Soil (HQ=0.1)	50	40	20	45	122	20
3,3'-Dichlorobenzidine	91-94-1	1,200	RSL Residential Soil (HQ=0.1)	167	66.7	33.3	22	121	20
2,4-Dichlorophenol	120-83-2	19,000	RSL Residential Soil (HQ=0.1)	43.3	40	20	40	122	20
2,4-Dimethylphenol	105-67-9	130,000	RSL Residential Soil (HQ=0.1)	36.7	33.3	16.7	30	127	20
2,4-Dinitrophenol	51-28-5	13,000	RSL Residential Soil (HQ=0.1)	1000	333	167	36	130	20

Worksheet #15-2: Project Action Limits and Laboratory-specific Detection/Quantitation Limits (SVOCs in Soil) (continued)

Analyte	CAS No.[a]	PAL[b] (µg/kg)	PAL Limit Reference	LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)	LCS and MS/MSD Recovery Limits and RPD (%)[c]		
2,4-Dinitrotoluene	121-14-2	1,700	RSL Residential Soil (HQ=0.1)	167	66.7	33.3	48	126	20
2,6-Dinitrotoluene	606-20-2	360	RSL Residential Soil (HQ=0.1)	36.7	33.3	16.7	46	124	20
Dibenzofuran	132-64-9	7,800	RSL Residential Soil (HQ=0.1)	36.7	33.3	16.7	44	120	20
Hexachlorocyclopentadiene	77-47-4	180	RSL Residential Soil (HQ=0.1)	500	333	167	32	123	30
Hexachlorobutadiene	87-68-3	1,200	RSL Residential Soil (HQ=0.1)	50	40	20	32	123	20
Hexachloroethane	67-72-1	1,800	RSL Residential Soil (HQ=0.1)	167	66.7	33.3	28	117	20
Isophorone	78-59-1	570,000	RSL Residential Soil (HQ=0.1)	66.7	33.3	16.7	30	122	20
2-Nitroaniline	88-74-4	63,000	RSL Residential Soil (HQ=0.1)	50	33.3	16.7	44	127	20
4-Nitroaniline	100-01-6	25,000	RSL Residential Soil (HQ=0.1)	167	66.7	33.3	59	101	30
Nitrobenzene	98-95-3	5,100	RSL Residential Soil (HQ=0.1)	36.7	33.3	16.7	34	122	20
n-Nitrosodiphenylamine	86-30-6	110,000	RSL Residential Soil (HQ=0.1)	36.7	33.3	16.7	38	127	20
Pentachlorophenol	87-86-5	1,000	RSL Residential Soil (HQ=0.1)	167	133	66.7	25	133	20
Phenol	108-95-2	1,900,000	RSL Residential Soil (HQ=0.1)	36.7	33.3	16.7	34	121	20
bis(2-Ethylhexyl)phthalate	117-81-7	39,000	RSL Residential Soil (HQ=0.1)	167	133	66.7	51	133	20
Di-n-butylphthalate	84-74-2	630,000	RSL Residential Soil (HQ=0.1)	167	133	66.7	51	128	20
Diethylphthalate	84-66-2	5,100,000	RSL Residential Soil (HQ=0.1)	167	133	66.7	50	124	20
Di-n-octylphthalate	117-84-0	63,000	RSL Residential Soil (HQ=0.1)	167	133	66.7	45	140	20
4,6-Dinitro-2-methylphenol	534-52-1	510	RSL Residential Soil (HQ=0.1)	500	333	167	29	132	20
2-Chloronaphthalene	91-58-7	480,000	RSL Residential Soil (HQ=0.1)	33.3	26.7	13.3	41	114	20
2,4,5-Trichlorophenol	95-95-4	630,000	RSL Residential Soil (HQ=0.1)	36.7	33.3	16.7	41	124	20
2,4,6-Trichlorophenol	88-06-2	6,300	RSL Residential Soil (HQ=0.1)	36.7	33.3	16.7	39	126	20
4-Bromophenyl phenyl ether	101-55-3	33.3	Lab LOD	36.7	33.3	16.7	46	124	20

Worksheet #15-2: Project Action Limits and Laboratory-specific Detection/Quantitation Limits (SVOCs in Soil) (continued)

Analyte	CAS No.[a]	PAL[b] (µg/kg)	PAL Limit Reference	LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)	LCS and MS/MSD Recovery Limits and RPD (%)[c]		
Carbazole	86-74-8	33.3	Lab LOD	36.7	33.3	16.7	50	123	20
4-Chlorophenyl phenylether	7005-72-3	33.3	Lab LOD	36.7	33.3	16.7	45	121	20
Dimethylphthalate	131-11-3	133	Lab LOD	167	133	66.7	48	124	20
3-Nitroaniline	99-09-2	66.7	Lab LOD	167	66.7	33.3	33	119	20
2-Nitrophenol	88-75-5	40	Lab LOD	50	40	20	36	123	20
4-Nitrophenol	100-02-7	333	Lab LOD	500	333	167	30	132	20
Hexachlorobenzene	118-74-1	78	RSL Residential Soil (HQ=0.1)	16.7	13.3	6.67	45	122	20
2,2'-oxybis(1-chloropropane)	108-60-1	310,000	RSL Residential Soil (HQ=0.1)	43.3	40	20	33	131	20
n-Nitrosodi-n-propylamine	621-64-7	78	RSL Residential Soil (HQ=0.1)	66.7	50	33.3	36	120	20
1-Methylnaphthalene	90-12-0	18	RSL Residential Soil (HQ=0.1)	16.7	6.66	3.33	40	119	20
2-Methylnaphthalene	91-57-6	24,000	RSL Residential Soil (HQ=0.1)	16.7	9.99	5.0	38	122	20
Acenaphthene	83-32-9	360,000	RSL Residential Soil (HQ=0.1)	16.7	6.66	3.33	40	123	20
Acenaphthylene	208-96-8	8.0	Lab LOD	16.7	8.0	4.0	32	132	20
Anthracene	120-12-7	1,800,000	RSL Residential Soil (HQ=0.1)	16.7	6.66	3.33	47	123	20
Benzo(a)anthracene	56-55-3	1,100	RSL Residential Soil (HQ=0.1)	16.7	13.3	3.33	49	126	20
Benzo(a)pyrene	50-32-8	110	RSL Residential Soil (HQ=0.1)	16.7	6.66	3.33	45	129	20
Benzo(b)fluoranthene	205-99-2	1,100	RSL Residential Soil (HQ=0.1)	16.7	6.66	3.33	45	132	20
Benzo(g,h,i)perylene	191-24-2	6.66	Lab LOD	16.7	6.66	3.33	43	134	20
Benzo(k)fluoranthene	207-08-9	11,000	RSL Residential Soil (HQ=0.1)	16.7	6.66	3.33	47	132	20
Chrysene	218-01-9	110,000	RSL Residential Soil (HQ=0.1)	16.7	6.66	3.33	50	124	20
Dibenzo(a,h)anthracene	53-70-3	110	RSL Residential Soil (HQ=0.1)	16.7	13.3	6.67	45	134	20
Fluoranthene	206-44-0	240,000	RSL Residential Soil (HQ=0.1)	16.7	6.66	3.33	50	127	20

Worksheet #15-2: Project Action Limits and Laboratory-specific Detection/Quantitation Limits (SVOCs in Soil) (continued)

Analyte	CAS No.[a]	PAL[b] (µg/kg)	PAL Limit Reference	LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)	LCS and MS/MSD Recovery Limits and RPD (%)[c]		
Fluorene	86-73-7	240,000	RSL Residential Soil (HQ=0.1)	16.7	248	124	43	125	20
Indeno(1,2,3-cd)pyrene	193-39-5	1,100	RSL Residential Soil (HQ=0.1)	16.7	6.66	3.33	45	133	20
Naphthalene	91-20-3	2,000	RSL Residential Soil (HQ=0.1)	16.7	13.3	6.67	35	123	20
Phenanthrene	85-01-8	8.0	Lab LOD	16.7	8.0	4.0	50	121	20
Pyrene	129-00-0	180,000	RSL Residential Soil (HQ=0.1)	16.7	6.66	3.33	47	127	20

Notes:

Shading represents the case where the PAL is lower than the laboratory LOD, but above the laboratory's DL. Though non-detects will be reported at a level that is greater than the PAL, non-detects will not be considered exceedances. The resulting uncertainty will be discussed in the DQE.

[a] Some CAS numbers are contractor specific.

[b] PALs are the EPA RSLs, Residential Soil HQ = 0.1 (May 2024). Where no RSL exists, the laboratory's LOD value is listed as the PAL.

[c] QSM v5.4 (DoD/DOE, 2021) is the basis for the LCS and MS/MSD limits. Bolded values represent in-house limits when DoD QSM Version 5.4 limits do not exist.

Worksheet #15-3: Project Action Limits and Laboratory-specific Detection/Quantitation Limits (Pesticides in Soil)

(UFP-QAPP Manual Section 2.6.2.3)

Matrix: Soil
Analytical Method: SW-846 8081B
Analytical Group: PEST (µg/kg unless otherwise specified)

Analyte	CAS No.[a]	PAL[b] (µg/kg)	PAL Limit Reference	LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)	LCS and MS/MSD Recovery Limits and RPD (%)[c]		
Aldrin	309-00-2	39	RSL Residential Soil (HQ=0.1)	0.83	0.72	0.36	45	136	30
4,4'-DDD	72-54-8	2,300	RSL Residential Soil (HQ=0.1)	1.7	1.6	0.80	56	139	30
4,4'-DDE	72-55-9	2,000	RSL Residential Soil (HQ=0.1)	1.7	1.4	0.70	56	134	30
4,4'-DDT	50-29-3	1,900	RSL Residential Soil (HQ=0.1)	1.7	1.2	0.79	50	141	30
Dieldrin	60-57-1	34	RSL Residential Soil (HQ=0.1)	1.7	1.2	0.33	56	136	30
Endrin	72-20-8	1,900	RSL Residential Soil (HQ=0.1)	1.7	1.2	0.68	57	140	30
Heptachlor	76-44-8	130	RSL Residential Soil (HQ=0.1)	0.83	0.62	0.31	47	136	30
Heptachlor Epoxide	1024-57-3	70	RSL Residential Soil (HQ=0.1)	0.83	0.70	0.35	52	136	30
alpha-BHC	319-84-6	86	RSL Residential Soil (HQ=0.1)	0.83	0.76	0.38	45	137	30
beta-BHC	319-85-7	300	RSL Residential Soil (HQ=0.1)	1.0	0.90	0.44	50	136	30
gamma-BHC (Lindane)	58-89-9	570	RSL Residential Soil (HQ=0.1)	0.83	0.60	0.21	49	135	30
Methoxychlor	72-43-5	32,000	RSL Residential Soil (HQ=0.1)	6.7	5.9	1.8	52	143	30
Toxaphene	8001-35-2	490	RSL Residential Soil (HQ=0.1)	33	28	14	33	141	30
alpha-Chlordane	5103-71-9	3,600	RSL Residential Soil (HQ=0.1)	0.83	0.60	0.17	54	133	30
gamma-Chlordane	5103-74-2	3,600	RSL Residential Soil (HQ=0.1)	0.83	0.60	0.25	53	135	30
delta-BHC	319-86-8	300	RSL Residential Soil (HQ=0.1)	1.0	0.90	0.45	47	139	30

Worksheet #15-3: Project Action Limits and Laboratory-specific Detection/Quantitation Limits (Pesticides in Soil) (continued)

Analyte	CAS No.[a]	PAL[b] (µg/kg)	PAL Limit Reference	LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)	LCS and MS/MSD Recovery Limits and RPD (%)[c]		
Endosulfan I	959-98-8	47,000	RSL Residential Soil (HQ=0.1)	0.83	0.60	0.22	53	132	30
Endosulfan II	33213-65-9	47,000	RSL Residential Soil (HQ=0.1)	2.3	2.2	1.1	53	134	30
Endosulfan sulfate	1031-07-8	38,000	RSL Residential Soil (HQ=0.1)	1.7	1.2	0.33	55	136	30
Endrin aldehyde	7421-93-4	1,900	RSL Residential Soil (HQ=0.1)	1.7	1.2	0.33	35	137	30
Endrin ketone	53494-70-5	1,900	RSL Residential Soil (HQ=0.1)	2.0	1.8	0.60	55	136	30

[a] Some CAS numbers are contractor specific.

[b] PALs are the EPA RSLs, Residential Soil HQ = 0.1 (May 2024). Where no RSL exists, the laboratory's LOD value is listed as the PAL.

[c] QSM v5.4 (DoD/DOE, 2021) is the basis for the LCS and MS/MSD limits.

Worksheet #15-4: Project Action Limits and Laboratory-specific Detection/Quantitation Limits (Metals in Soil)

(UFP-QAPP Manual Section 2.6.2.3)

Matrix: Soil
Analytical Method: SW-846 6020B/7199
Analytical Group: METAL (milligrams per kilogram (mg/kg) unless otherwise specified)

Analyte	CAS No.[a]	Analytical Method	PAL[b] (mg/kg)	PAL Limit Reference	LOQ (mg/kg)	LOD (mg/kg)	DL (mg/kg)	LCS and MS/MSD Recovery Limits and RPD (%)[c]		
Aluminum	7429-90-5	6020B	7700	RSL Residential Soil (HQ=0.1)	10	9.9	4.95	78	124	20
Antimony	7440-36-0	6020B	3.1	RSL Residential Soil (HQ=0.1)	0.10	0.080	0.040	72	124	20
Arsenic	7440-38-2	6020B	0.68	RSL Residential Soil (HQ=0.1)	0.20	0.16	0.0669	82	118	20
Barium	7440-39-3	6020B	1,500	RSL Residential Soil (HQ=0.1)	0.20	0.18	0.0915	86	116	20
Beryllium	7440-41-7	6020B	16	RSL Residential Soil (HQ=0.1)	0.050	0.025	0.0119	80	120	20
Cadmium	7440-43-9	6020B	0.71	RSL Residential Soil (HQ=0.1)	0.050	0.040	0.020	84	116	20
Calcium	7440-70-2	6020B	19.6	Lab LOD	20	19.6	9.8	86	118	20
Chromium	7440-47-3	6020B	0.3	RSL Residential Soil (HQ=0.1)	0.20	0.19	0.095	83	119	20
Chromium (hexavalent)	18540-29-9	7199	0.3	RSL Residential Soil (HQ=0.1)	0.40	0.30	0.14	75	125	20
Cobalt	7440-48-4	6020B	2.3	RSL Residential Soil (HQ=0.1)	0.10	0.080	0.040	84	115	20
Copper	7440-50-8	6020B	310	RSL Residential Soil (HQ=0.1)	0.20	0.18	0.090	84	119	20
Iron	7439-89-6	6020B	5,500	RSL Residential Soil (HQ=0.1)	10	9.0	4.61	81	124	20
Lead	7439-92-1	6020B	200[d]	RSL Residential Soil (HQ=0.1)	0.10	0.080	0.038	84	118	20
Magnesium	7439-95-4	6020B	4.9	Lab LOD	5.0	4.9	2.45	80	123	20
Manganese	7439-96-5	6020B	180	RSL Residential Soil (HQ=0.1)	0.25	0.20	0.10	85	116	20
Nickel	7440-02-0	6020B	140	RSL Residential Soil (HQ=0.1)	0.20	0.19	0.095	84	119	20

Worksheet #15-4: Project Action Limits and Laboratory-specific Detection/Quantitation Limits (Metals in Soil) (continued)

Analyte	CAS No.[a]	Analytical Method	PAL[b] (mg/kg)	PAL Limit Reference	LOQ (mg/kg)	LOD (mg/kg)	DL (mg/kg)	LCS and MS/MSD Recovery Limits and RPD (%)[c]		
Potassium	7440-09-7	6020B	16	Lab LOD	20	16	8.0	85	119	20
Selenium	7782-49-2	6020B	39	RSL Residential Soil (HQ=0.1)	0.20	0.10	0.050	80	119	20
Silver	7440-22-4	6020B	39	RSL Residential Soil (HQ=0.1)	0.050	0.040	0.0203	83	118	20
Sodium	7440-23-5	6020B	24	Lab LOD	25	24	12	79	125	20
Thallium	7440-28-0	6020B	0.078	RSL Residential Soil (HQ=0.1)	0.050	0.040	0.0196	83	118	20
Vanadium	7440-62-2	6020B	39	RSL Residential Soil (HQ=0.1)	0.40	0.20	0.10	82	116	20
Zinc	7440-66-6	6020B	2,300	RSL Residential Soil (HQ=0.1)	15	4.0	2.0	82	119	20

[a] Some CAS numbers are contractor specific.

[b] PALs are the EPA RSLs, Residential Soil HQ = 0.1 (May 2024). Where no RSL exists, the laboratory's LOD value is listed as the PAL.

[c] QSM v5.4 (DoD/DOE, 2021) is the basis for the LCS and MS/MSD limits. Bolded values represent in-house limits when DoD QSM Version 5.4 limits do not exist.

[d] The Office of Land and Emergency Management (OLEM) memo signed on January 17, 2024 reduces the residential soil lead RSL to 200 mg/kg.

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Worksheet #17: Sampling Design and Rationale

This worksheet provides descriptions for each DFW associated with the Red Beach RI QAPP. It highlights soil sampling activities, QC/QA components, decision point, and key deliverables, as identified in Worksheet #14 & 16. Figure 17-1 provides the decision tree associated with the subsurface soil sampling approach.

DFW 1: Pre-mobilization Activities

Pre-mobilization activities include preparation of the various plans (including this QAPP) and establishing data collection protocol in advance of mobilization.

Planning Documents: Attachment B includes the CH2M (RI Contractor) Standard Operating Procedures (SOPs) associated with soil sampling methodologies. Note: CH2M is a wholly-owned subsidiary of Jacobs. As such, SOPs displaying the "Jacobs" designation are equally applicable to CH2M.

Data Management Systems:

Survey123 (Data Management Collector): Survey123 is a field data gathering solution that is part of the ArcGIS platform. It is anticipated that Survey123 will be developed and utilized for soil sample management. Location, identification, and coordinate information for sampling locations is communicated through and stored in Survey123. Within Survey123, forms (or surveys) are completed by the field team using an application on a tablet or computer in pre-authored forms that utilize various drop-down menus. Once completed, forms are submitted directly to ArcGIS online, where they can be viewed and analyzed. The uploaded information will be verified by QA personnel.

Coordination with the Analytical Laboratory: The project chemist will contact the analytical laboratory to prepare and schedule delivery of appropriate sample bottle ware for soil sample analysis for soil sampling locations prior to commencement of field operations.

Coordination with the Data Validator: The project chemist will contact the data validator to procure and schedule review/validation of the laboratory data reports for soil sampling locations prior to commencement of field operations.

Documentation: QAPP, Operational Readiness Checklist

Decision Points: Key decision points in the pre-mobilization process are interagency team decisions made through the scoping and QAPP review process. These decisions culminate in the technical approach included in the final approved version of this QAPP. The interagency decision point prior to mobilization will be approval of the QAPP. Upon approval, an anticipated start date will be determined and communicated to the interagency team.

DFW 2: Mobilization

Prior to the commencement of the fieldwork, the key project staff will meet to ensure all necessary equipment, tools, and safety items have been collected and are ready to ship. Additionally, key project staff will meet to ensure full understanding of the objectives and scope for the remedial actions and all necessary training to complete the fieldwork in accordance this QAPP. The following general activities will be performed as part of mobilization:

1. Identify/procure, package, ship, and inventory project field equipment.
2. Coordinate logistical support.
3. Verify emergency communication protocols and procedures.
4. Determine field operations schedule and coordinate any logistical support (e.g., USFWS).

Worksheet #17: Sampling Design and Rationale (continued)

5. Test and inspect equipment (see Worksheet #22 for details).
6. Assemble and transport the workforce.
7. Establish work zone.
8. Verify that forms and project documentation are in order, and that field project personnel understand their responsibilities regarding data collection and documentation requirements.

As part of the mobilization efforts, a kick-off and site safety meeting will be conducted. This meeting will include a review of the field-related elements of this QAPP. Additionally, it will include a review and acknowledgement of Health and Safety Plans by site personnel. Additional project and safety meetings will occur as needed, and as new personnel or visitors arrive at the site.

Documentation: Daily Report

Decision Points: Key decision points during mobilization activities include: (1) Has all equipment required to support sampling activities arrived onsite? (2) Is the equipment free of damage and working as expected?

DFW 3: Site Preparation

GPS Function Check: GPS equipment will be verified at an established control point once at the beginning of the day to ensure the equipment is functioning properly. Measured positions are to be within ±10-centimeters (cm) accuracy for real-time kinematic (RTK)-GPS equipment. If the observed coordinates are outside of the acceptable tolerance, the equipment will be checked, and the control point re-surveyed. Defective equipment will be repaired or removed from service and replaced.

The RTK-GPS base station will be established at a local benchmark or control point. GPS coordinates will reference UTM Zone 20N, NAD83 Continental United States (CONUS) (i.e., no local datum transform applied). The base station will transmit real-time corrections to the RTK-GPS receiver unit(s), which will be used to collect a geo-static point at a second local benchmark or control point. The observed coordinates will be compared to the known coordinates to confirm the tolerance is within the acceptable accuracy (see Worksheet #22).

Documentation: Daily Report (including GPS function check)

Decision Points: N/A

DFW 4: Soil Sampling

Although there was no visual evidence of releases from the former drum and mosquito canisters (i.e., containers were intact and holding liquid, no soil staining observed), as a conservative measure soil sampling will be conducted to ensure releases did not occur or, if they did, that the nature and extent are sufficiently delineated such that risk assessment can be conducted. A total of 16 subsurface soil samples (eight associated with the former drum location and eight associated with the former mosquito canisters location) will be collected within the respective vertical profile depths (see Worksheet #11). For each location (i.e., the former drum location and the former canisters location), two subsurface soil samples will be collected, a primary sample in the 2-foot interval directly below the former drum/canisters and a second sample in the 2-foot interval below the primary sample interval. Additionally, three evenly spaced, radial step-out locations, each consisting of two subsurface soil samples from depths as described above will be collected. This process will yield a total of eight samples at each of the drum and canisters locations. Additional details regarding the subsurface soil sample collection at both the former drum location and the former mosquito canisters location are as follows:

Worksheet #17: Sampling Design and Rationale (continued)

- Former Drum Location: The vertical profile for the primary sample is defined as 46 to 70 inches bgs (see Worksheet #11). The primary subsurface soil sample will be collected from this 2-foot interval directly below the base of the former drum. Additionally, a deeper, "step-down" subsurface soil sample will be collected within the 2-foot interval below the primary sample (i.e., 70-94 inches bgs) or to the depth of water table if encountered. At each of three "step-out" locations, approximately 2 feet out from the former drum location

  in a radial pattern, two subsurface soil samples will be collected from the same depths as the primary and "step-down" samples (Figure 17-2).

- Former Canisters Location: The vertical profile is defined as 18 to 42 inches bgs (see Worksheet #11). Soil sampling at this location will follow the same approach as that defined for the former drum location (Figure 17-2).

The soil samples will be analyzed for various constituents associated with the type of contents in the respective containers. The rationale for these analyses is as follows:

- Former Drum Location: Based on the total chemical concentration analyses, the former drum contents were determined to be diesel/motor oil. Therefore, the soil samples will be analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs, including polycyclic aromatic hydrocarbons [PAHs]), and metals.

- Former Mosquito Canisters Location: Based on information contained on the former canisters, the canisters contained an insecticide. Although TCLP analysis of the contents detected no pesticides, the soil samples will be analyzed for pesticides. The samples will also be analyzed for metals because various insecticide formulations of the era contained metals and because elevated barium was detected in the TCLP sample. The samples will also be analyzed for VOCs because a low concentration of tetrachloroethene (PCE) was detected in the TCLP sample.

Subsurface soil sampling and associated activities (i.e., shipping) will be conducted in general accordance with applicable SOPs (Attachment B). Prior to conducting sampling activities, all subsurface soil sampling equipment will be inspected and decontaminated as applicable.

Upon completion of the GPS function test, the GPS equipment will be used to re-acquire the former drum and former canisters locations. Once located, subsurface soil sampling will be collected via a hand auger within the respective intervals specified previously. While collecting the subsurface soil samples, regular depth measurements will be taken to ensure the respective sample intervals are collected. Should the borehole collapse while conducting hand augering, the collapsed soil will be removed to the depth of the last recorded depth measurement and hand augering continued until the respective interval is reached.

Immediately after soil is collected with the hand auger, soil for VOC analysis will be collected directly from the bottom of the hand auger with an Encore or TerraCore sampler before the soil is extruded, specifically to substantively eliminate the concern over volatile loss. The remaining subsurface soil will be placed directly into a stainless-steel bowl and homogenized using a stainless-steel spoon for the remaining analyses. Once homogenized, the sample team will place the subsurface soil in the laboratory provided bottle ware for the remaining sample analyses. During sample collection, the soil will be logged accordingly and any observation of soil discoloration or potential contamination noted. Sampling equipment will be decontaminated after use and prior to the next utilization. In general, decontamination will consist of cleaning any soil/debris with a brush and detergent, rinsed with water, sprayed with a 10-percent alcohol solution, and allowed to dry. Once dry, equipment will be wrapped in aluminum foil until ready to be used to prevent any cross-contamination from outside sources.

Worksheet #17: Sampling Design and Rationale (continued)

All samples will be maintained on ice in a cooler once collected until receipt by the laboratory. Samples will be documented on a chain of custody, which will be completed upon sample collection and included with the sample shipment. The chain of custody will be sent to the Project Chemist, who will coordinate with the analytical laboratory for sample tracking. All samples will be properly labelled (i.e., matching the chain of custody) and securely packaged in a cooler to avoid potential damage/breakage while in transit. Once correctly labeled, documented, and packaged in a cooler, the remaining void space will be filled with ice to meet laboratory sample receiving temperature metric (see Worksheet #19 & 30). The cooler will be taped shut, shipping air-bills secured, and tendered to a shipping courier (i.e., Federal Express) for delivery to the analytical laboratory for follow-on analysis. The shipment tracking number will also be provided to the Project Chemist for tracking purposes.

Analytical Parameters

Analyses are detailed in Worksheet #15. QC samples will be collected as detailed in Worksheet #18.

Contingency Samples

Prior to preparing the RI Report, the analytical results for the samples collected as described previously will be evaluated to determine if the nature and extent of contamination, if present, has been delineated sufficiently to perform risk assessment and, as applicable, make remedial action determinations. This determination will be made based on evaluation of detections (relative to background as applicable) and screening criteria exceedances (relative to background, as applicable) with consideration of the CSM. If this evaluation indicates additional sampling is warranted to make this determination, the proposed additional sampling and associated rationale will be discussed with the stakeholder agencies and included in an Addendum to this QAPP.

Documentation: Daily Report (including GPS function test, soil-logging description, chain-of-custody, and Additional Sampling Approach Addendum (if warranted)).

Decision Points: Determination if the (1) data is considered usable based on validation and evaluation, (2) data indicate any potential contamination (see Worksheet #11, step 2), and (3) need for further sampling on evaluation. Decision points for soil sampling will be discussed in the RI Report (which will involve interagency team discussions and agreement on final determination) or during Technical Subcommittee meetings (as warranted).

DFW 5: Demobilization

Prior to demobilization, the RI Contractor will perform completion inspections to verify all work has been completed and verify that the project objectives have been met. The RI Contractor will then inform the Navy that the sampling is complete and hand over all documents for final acceptance.

Upon final acceptance by the Navy, the RI Contractor will perform any necessary housekeeping of the site, including removing waste materials and other debris resulting from field activities.

Upon receiving final concurrence from the Navy, all equipment, personnel, facilities, and equipment will be demobilized from the site in an orderly manner.

Decision Points: N/A

DFW 6: Data Usability Assessment

The DUA Report will be prepared (refer to Worksheet #37 for detailed procedures) and provided to the Navy for review and concurrence.

Documentation: DUA Report, final CSM

Worksheet #17: Sampling Design and Rationale (continued)

Decision Points: Were the data collected of sufficient quality and quantity to support the project objectives and goals?

DFW 7: Red Beach RI Report Preparation

An RI Report will be prepared following completion of the RI implementation to provide a record of the activities/results, objective achievement, nature and extent of MEC (based on data collected during past investigations and action) and associated explosive hazard determination, nature and extent of chemical contamination and associated risk assessment, and recommendations. The results of the DUA (as discussed in Worksheet #37) will be included in the Red Beach RI Report, which will contain sufficient documentation to support the conclusions of the DUA.

Documentation: Red Beach RI Report

Decision Points: Whether the data support that the RI at Red Beach has been successfully implemented and if further action is warranted.

UXO 17 RI QAPP Decision Tree

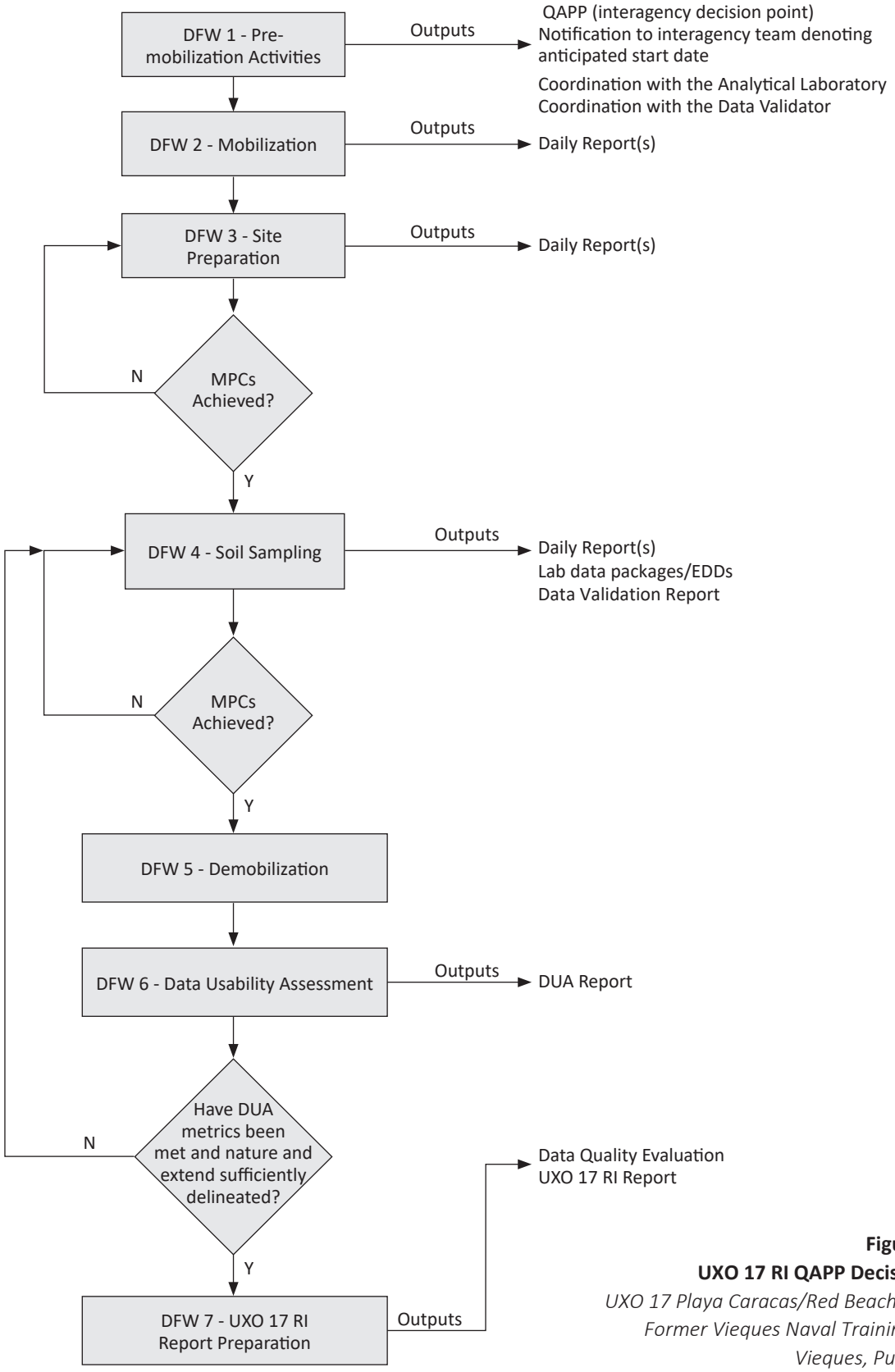

Figure 17-1.
UXO 17 RI QAPP Decision Tree
UXO 17 Playa Caracas/Red Beach RI QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

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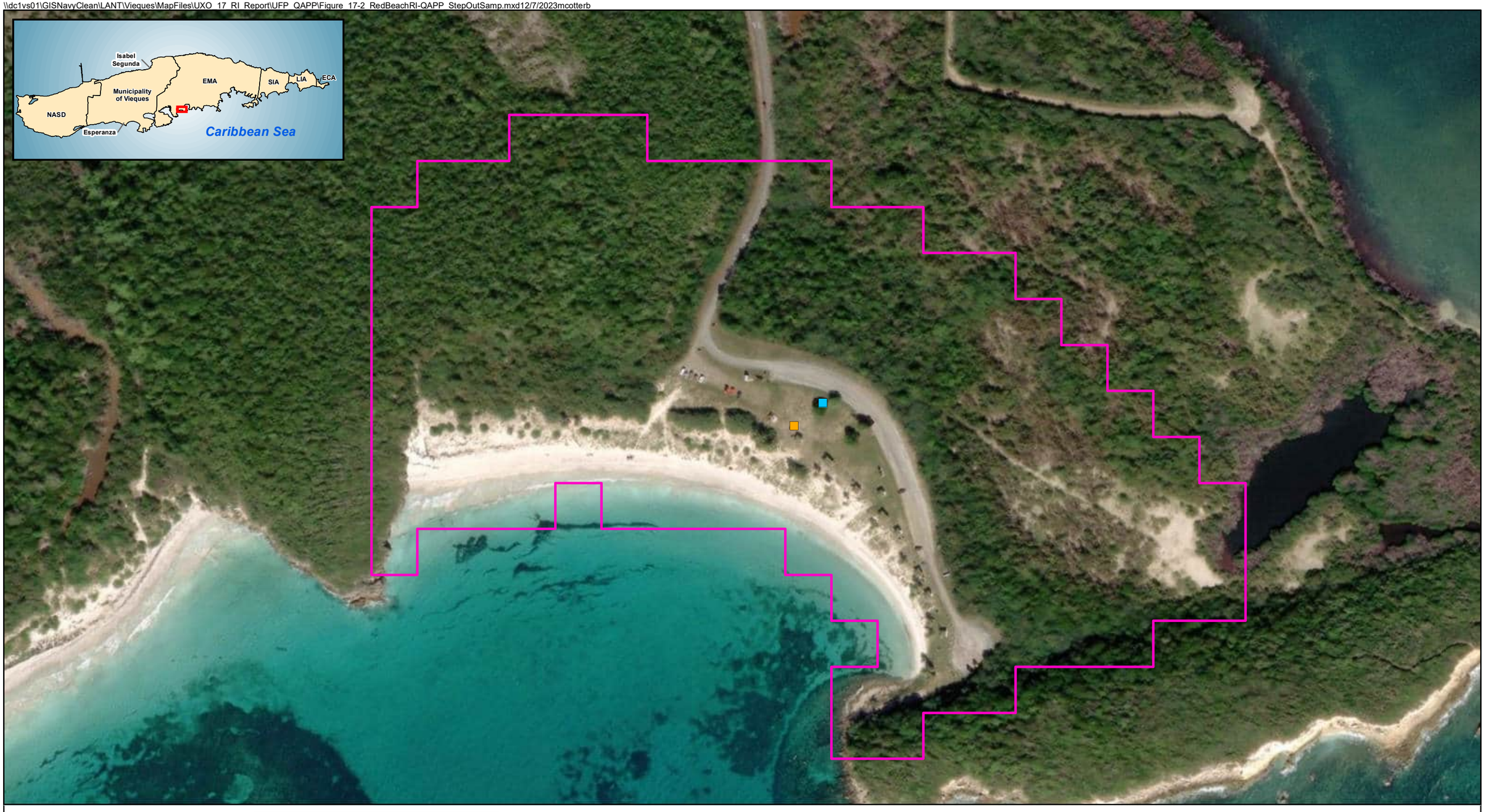

Legend

UXO 17 Playa Caracas/Red Beach

Sampling Locations:

- Mosquito Canisters
- Diesel/Motor Oil Drum

Sampling approach

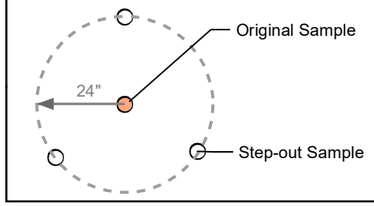

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Figure 17-2
UXO 17 Sampling Approach
UXO 17 Playa Caracas/Red Beach RI QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

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Worksheet #18: Sampling Locations and Methods

Quantities assume a single round of sampling.

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Sample Type/ Number of Samples	Sampling SOP Reference
Subsurface Soil Samples (Drum)					
UXO17-SO01 / UXO17-SB01-4670 UXO17-SO01 / UXO17-SB01P-4670	Soil	46-70 inches	VOC, SVOC, METALS	2 (N, FD)	SOP A-2 and SOP A-3 (Attachment B)
UXO17-SO02 / UXO17-SB02-7094	Soil	70-94 inches	VOC, SVOC, METALs	1 (N)	
UXO17-SO03 / UXO17-SB03-4670 UXO17-SO03 / UXO17-SB03-4670-MS UXO17-SO03 / UXO17-SB03-4670-MSD	Soil	46-70 inches	VOC, SVOC, METALs	3 (N, MS, MSD)	
UXO17-SO04 / UXO17-SB04-7094	Soil	70-94 inches	VOC, SVOC, METALs	1(N)	
UXO17-SO05 / UXO17-SB05-4670	Soil	46-70 inches	VOC, SVOC, METALs	1(N)	
UXO17-SO06 / UXO17-SB06-7094	Soil	70-94 inches	VOC, SVOC, METALs	1(N)	
UXO17-SO07 / UXO17-SB07-4670	Soil	46-70 inches	VOC, SVOC, METALs	1(N)	
UXO17-SO08 / UXO17-SB08-7094	Soil	70-94 inches	VOC, SVOC, METALs	1(N)	
Subsurface Soil Samples (Canisters)					
UXO17-SO09 / UXO17-SB09-1842 UXO17-SO09 / UXO17-SB09-1842-MS UXO17-SO09 / UXO17-SB09-1842-MSD	Soil	18-42 inches	VOC, PEST, METALS	3 (N, MS, MSD)	SOP A-2 and SOP A-3 (Attachment B)
UXO17-SO10 / UXO17-SB10-4266	Soil	42-66 inches	VOC, PEST, METALS	1 (N)	
UXO17-SO11 / UXO17-SB11-1842 UXO17-SO11 / UXO17-SB11P-1842	Soil	18-42 inches	VOC, PEST, METALS	2 (N, FD)	
UXO17-SO12 / UXO17-SB12-4266	Soil	42-66 inches	VOC, PEST, METALS	1 (N)	
UXO17-SO13 / UXO17-SB13-1842	Soil	18-42 inches	VOC, PEST, METALS	1 (N)	

Worksheet #18: Sampling Locations and Methods (continued)

Quantities assume a single round of sampling

Sampling Location/ID Number	Matrix	Depth	Analytical Group	Sample Type/ Number of Samples	Sampling SOP Reference
UXO17-SO14 / UXO17-SB14-4266	Soil	42-66 inches	VOC, PEST, METALS	1 (N)	SOP A-2 and SOP A-3 (Attachment B)
UXO17-SO15 / UXO17-SB15-1842	Soil	18-42 inches	VOC, PEST, METALS	1 (N)	
UXO17-SO16 / UXO17-SB16-4266	Soil	42-66 inches	VOC, PEST, METALS	1 (N)	
Field Quality Control (Drum)					
UXO17-QC / UXO17-EB01-MMDDYY	EB	--	VOC, METALS, SVOC	1 (EB)	SOP H-6 (Attachment B)
UXO17-QC / UXO17-TB01-MMDDYY	TB	--	VOC	1 (TB)	
Field Quality Control (Canisters)					
UXO17-QC / UXO17-EB01-MMDDYY	EB	--	VOC, PEST, METALS	1 (EB)	SOP H-6 (Attachment B)
UXO17-QC / UXO17-TB01-MMDDYY	TB	--	VOC	1 (TB)	

EB = equipment blank
FD = field duplicate
ID = identification
MMDDYY = Two-digit month, day, and year of sampling date
N = normal sample
TB = trip blank

Worksheet #19 & 30: Sample Containers, Preservation, and Hold Times

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC (ELLE)
2425 New Holland Pike, Lancaster, PA 17601
717-656-2300
POC: Elizabeth Martin

Accreditations/certifications: DoD Environmental Laboratory Accreditation Program (ELAP) for QSM v5.4

(UFP-QAPP Manual Section 3.1.2.2)

Analytical Group	Matrix	Analytical and Preparation Method /SOP Reference	Containers[a] (number, size & type per sample)	Accreditation Expiration Date	Sample Volume[b]	Preservation Requirements	Preparation Holding Time	Analytical Holding Time	Data Package Turnaround Time
VOA	Soil	SW-846 8260D; WI11170/ WI8236	TerraCore samplers plus 3 X 40 mL glass vials	11/30/2024	15 g	Methanol, DI water and/or Sodium Bisulfate; < 6ºC for methanol and sodium bisulfate samples; DI water samples must be frozen to ≤ 10ºC within 48 hours of collection.	14 days	14 days (please note that the combined holding time for the VOC analysis is 14 days)	Standard 28 calendar-day TAT
SVOA	Soil	SW-846 8270E / WI10928/WI9617	One of 8 oz glass jar	11/30/2024	100 g	< 6ºC	14 days	40 days	Standard 28 calendar-day TAT

Worksheet #19 & 30: Sample Containers, Preservation, and Hold Times (continued)

Analytical Group	Matrix	Analytical and Preparation Method /SOP Reference	Containers[a] (number, size & type per sample)	Accreditation Expiration Date	Sample Volume[b]	Preservation Requirements	Preparation Holding Time	Analytical Holding Time	Data Package Turnaround Time
PEST	Soil	SW-846 8081B / WI10926/WI9232	One of 8 oz glass jar	11/30/2024	100 g	< 6°C; extracts should be stored in the dark (i.e., protected from light)	14 days	40 days	Standard 28 calendar-day TAT
Metals	Soil	SW-846 6020B / WI8636/WI11933	One of 8 oz glass jar	11/30/2024	100 g	< 6°C	6 months	6 months	Standard 28 calendar-day TAT
Metals – Hexavalent Chromium	Soil	SW-846 7199 / WI10618/WI11625	One of 8 oz glass jar	11/30/2024	25 g	< 6°C	30 days	168 hours	Standard 28 calendar-day TAT

Notes:

If circumstances render the subcontracted laboratory unable to perform the analytical services, a backup laboratory will be contacted to confirm accreditations and quarterly LOD verification and, once subcontracted, the updated laboratory worksheets and current ELAP accreditation letter will be provided to the RPMs.

[a] Triple volume is provided for samples designated MS/MSD.

[b] Samples volumes shown are preparation amounts. Containers are filled to capacity.

°C = degree Celsius
g = gram(s)
mL = milliliter(s)
oz = ounce
TAT = turnaround time

Worksheet #20: Field Quality Control Summary

(UFP-QAPP Manual Section 3.1.1 and 3.1.2)

Matrix	Analytical Group	No. of Field Samples/ Sampling Locations	No. of Field Duplicates	No. of MS/MSD Pairs	No. of Equipment Rinsate Blanks	No. of Trip Blanks	Total No. of Samples to Lab
Soil	VOA	16	2	1	2	2	24
Soil	SVOA	8	1	1	1	0	12
Soil	Pesticides	8	1	1	1	0	12
Soil	Metals	16	2	1	2	0	22
Soil	Hexavalent Chromium	16	2	1	2	0	22

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Worksheet #21: Field Standard Operating Procedures

Reference numbers refer to the SOP number in the Master Protocols (CH2M, 2018).

SOP # or Reference	Title, Revision, Date, and URL (if available)	Originating Organization	SOP Option or Equipment Type	Modified for Project Work? (Y/N)	Comments
SOP A-2	Soil Sampling, April 2018	CH2M	SOP to be used for soil sampling procedures (via hand-auger) in Attachment B.	N	N/A
SOP A-3	Homogenization of Soil and Sediment Samples, April 2018	CH2M	Stainless steel bowls, stainless steel spoons	N	N/A
SOP H-1	Preparing Field Logbooks, April 2018	CH2M	Bound logbook, indelible pen	N	N/A
SOP H-4	Chain-of-Custody, April 2018	CH2M	Paper chain-of-custody form (provided by laboratory)	N	N/A
SOP H-5	Packaging and Shipping Procedures for Samples Not Considered Dangerous Goods, April 2018	CH2M	SOP to be used for packaging and shipping procedures in Attachment B.	N	N/A
SOP H-6	Equipment Blank Preparation, April 2018	CH2M	Blank liquid, sample bottles, gloves	N	N/A

All SOPs for the RI Contractor are provided in Attachments B. It is important to note that while the SOPs in Attachments B are at least partly applicable to this QAPP, only those elements that are applicable to this QAPP will be followed. Further, if there is text provided in the QAPP that is inconsistent with text provided in a SOP, the text in the QAPP takes precedence, including references within SOPs to other SOPs that are not included in Attachment B. In these circumstances, the text provided in the QAPP fulfills the substantive content of an SOP.

Analytical SOPs are listed in Worksheet #23.

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Worksheet #22: Field Equipment Calibration, Maintenance, Testing, and Inspection

Field Equipment	Activity	SOP Reference	Title or position of responsible person	Frequency	Acceptance Criteria	Corrective Action
RTK-GPS Unit Function Test	Calibrate	N/A	FTL	Beginning of each day of use	± 10-cm accuracy objective	Make necessary adjustment (e.g., to provide better satellite coverage) and remeasure point as needed until acceptance criteria met.

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Worksheet #23: Analytical Standard Operating Procedures

(UFP-QAPP Manual Section 3.2.1)

Lab SOP Number	Title, Revision Date, and/or Number	Date last Revisited if not Revised[a]	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis[b]	Modified for Project Work?
WI8236	VOCs and GRO by GC/MS in Soils by Method 8260C/D, Rev 11, effective 6/23/2023	--	Definitive	Solid GC/MS VOCs	GC-MS	ELLE	N
WI11170	Preparation of Soils for Volatile Analysis by EPA SW-846 Method 5035 and Method 5035A, Rev 21, effective 06/13/23	--	N/A	Organic Solids Preparation SW-846 5035,5030A, 5035A	N/A	ELLE	N
WI9617	Semivolatile Organic Compounds by Method 8270D/E in Aqueous and Non-Aqueous Matrices using GC-MS, Version 14, effective 06/26/2023	--	Definitive	Solid GC/MS SVOCs	GC-MS	ELLE	N
WI10928	Microwave Extraction by Method 3546 for Semivolatiles, Version 14, effective 04/15/2022 (reviewed 05.09.2023, no changes needed)	Verified In Process on 1/26/2024	N/A	Method 3546 microwave (standard and SIM) prep	N/A	ELLE	N
WI9232	Analysis of Pesticides by 8081B in Solid Samples using GC-ECD, Version 9, effective 12/02/2022 (last reviewed 07/25/2023)	07/25/2023	Definitive	Solid/Pesticides	GC	ELLE	N
WI10926	Microwave Extraction Method 3546 for Pesticides in a Solid Matrix, Version 12, effective 08/30/2023	--	N/A	Organic Preparation Method 3546	N/A	ELLE	N

Worksheet #23: Analytical Standard Operating Procedures (continued)

Lab SOP Number	Title, Revision Date, and/or Number	Date last Revisited if not Revised[a]	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis[b]	Modified for Project Work?
WI8636	Sample Preparation of Sediments, Sludges, and Soils by SW846 3050B for ICP and ICP-MS, Version 28, effective 07/11/2023		N/A	Solid Inorganic Preparation SW-846 3050B	N/A	ELLE	N
WI11933	Metals by ICPMS by Methods SW-846 6020/6020A/6020B(waters, solid,) and EPA 200.8 (waters) and EPA 200.8 (aqueous), Version 13, effective 07/27/2022 (last reviewed 07.19.2023)	07/19/2023	Definitive	Solid, liquid, Metals	ICP-MS	ELLE	N
WI11625	Hexavalent Chromium by Ion Chromatography in Solids and Waters SW-846 7199 and Waters by EPA 218.6 Version 16, effective 04/13/2021	Verified In Process on 1/26/2024	Definitive	Water and Soil Hexavalent Chromium	IC	ELLE	N
WI10618	Digestion of Hexavalent Chromium in Solids by SW-846 3060A, Version 20, 11/02/2022	Verified In Process on 1/26/2024	N/A	Organic Preparation Method 3550C	N/A	ELLE	N
WI10725	Environmental Sample Receipt and Unpacking; Revision 24, 05/19/2023		NA	NA	NA	ELLE	N
WI12042	Automated Storage, Retrieval, and Discarding of Samples; Version 15, 04/10/2023		NA	NA	NA	ELLE	N

[a] Non-analytical SOPs do not require an annual review cycle. Worksheet #23 is a snapshot as it pertains to laboratory SOPs.

[b] ELLE's DoD ELAP accreditation through American Association for Laboratory Accreditation (QSM Version 5.4) is granted to 11/30/2024. Refer to Attachment C.

GC = gas chromatography
GC-MS = gas chromatography-mass spectrometry
IC = ion chromatography
ICP-MS = inductively coupled plasma mass spectrometry
SIM = selected ion monitoring

Worksheet #24: Analytical Instrument Calibration

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
GC/MS (VOC/SVOC)	Tune check	Prior to ICAL and prior to each 12-hour period of sample analysis.	Specific ion abundance criteria of BFB or DFTPP from method.	Retune instrument and verify.	Analyst/ Supervisor	WI8236 WI9617
	Performance check (Method 8270 only)	At the beginning of each 12-hour run period, prior to sample analysis.	8270: Degradation ≤ 20% for DDT. Benzidine and pentachlorophenol shall be present at their normal responses and shall not exceed a tailing factor of 2.	Correct problem, then repeat performance checks. No samples will be analyzed until performance check is within criteria. DDT breakdown and tailing factor checks can be acquired as a full scan.		
	Initial calibration (ICAL) for all analytes (including surrogates)	At instrument setup and after ICV or CCV failure, prior to sample analysis.	For VOCs/SVOCs: Each analyte must meet one of the three options below: Option 1: Relative standard deviation (RSD) for each analyte ≤ 15%; Option 2: linear least squares regression for each analyte: r2 ≥ 0.99; Option 3: non-linear least squares regression (quadratic) for each analyte: r2 ≥ 0.99.	Correct problem then repeat ICAL.		
	Retention Time window position establishment	Once per ICAL and at the beginning of the analytical sequence.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	N/A		
	Evaluation of Relative Retention Times (RRTs)	With each sample.	For VOCs/SVOCs: RRT of each reported analyte within ± 0.06 RRT units.	Correct problem, then re-run ICAL.		
	Initial Calibration Verification (ICV)	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes within ± 20% of true value.	Correct problem. Re-run ICV. If that fails, repeat ICAL. No samples will be analyzed until calibration has been verified with a second source.		
	Continuing Calibration Verification (CCV)	Daily before sample analysis; after every 12 hours of analysis time; and at the end of the analytical batch run.	For VOCs/SVOCs: All reported analytes and surrogates within ± 20% of true value. All reported analytes and surrogates within ± 50% for end of analytical batch CCV.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails or if two consecutive CCVs cannot be run, perform CAs and repeat CCV and all associated samples since last successful CCV. Alternately, recalibrate if necessary; then reanalyze all associated samples since the last acceptable CCV.		

Worksheet #24: Analytical Instrument Calibration (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
GC (Pesticide)	Breakdown check (Endrin/DDT Method 8081 only)	Before sample analysis and at the beginning of each 12-hour shift.	Degradation of DDT and Endrin must each be ≤15%.	Correct problem, then repeat breakdown checks.	Analyst/ Supervisor	WI9232
	RT window position establishment	Once per ICAL and at the beginning of the analytical sequence.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	N/A		
	RT window width	At method setup and after major maintenance (for example, column change).	RT width is ± 3 times standard deviation for each analyte RT from the 72-hour study or 0.03 minute, whichever is greater.	N/A		
	ICAL for all analytes (including surrogates)	At instrument setup and after ICV or CCV failure, prior to sample analysis.	ICAL must meet one of the three options below: Option 1: RSD for each analyte ≤ 20%; Option 2: linear least squares regression for each analyte: r2 ≥ 0.99; Option 3: non-linear least squares regression (quadratic) for each analyte: r2 ≥ 0.99.	Correct problem then repeat ICAL.		
	ICV	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes within established RT windows. All reported analytes within ± 20% of true value.	Correct problem, re-run ICV. If that fails, repeat ICAL. No samples shall be analyzed until calibration has been verified with a second source.		
	CCV	Before sample analysis, after every 10 field samples, and at the end of the analysis sequence with the exception of CCVs for pesticides multi-component analytes (i.e., Toxaphene, Chlordane), which are only required before sample analysis.	All reported analytes and surrogates within established RT windows. All reported analytes and surrogates within ± 20% of true value.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, or if two consecutive CCVs cannot be run, perform corrective action(s), and repeat CCV and all associated samples since last successful CCV. Alternately, recalibrate if necessary; then reanalyze all associated samples since the last acceptable CCV.		
ICP-MS (Metal excluding mercury and hexavalent chromium)	Tuning	Prior to ICAL.	Mass calibration ≤ 0.1 atomic mass unit (amu) from the true value; Resolution < 0.9 amu full width at 10% peak height.	Retune instrument and verify.	Analyst/ Supervisor	WI11933
	ICAL for all analytes	Daily ICAL prior to sample analysis.	If more than one calibration standard is used, r2 ≥ 0.99.	Correct problem, then repeat ICAL.		
	ICV	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes within ± 10% of true value.	Correct problem. Re-run ICV. If that fails, repeat ICAL		
	CCV	After every 10 field samples, and at the end of the analysis sequence.	All reported analytes within ± 10% of the true value.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails or if two consecutive CCVs cannot be run, perform corrective action(s), and repeat CCV and all associated samples since last successful CCV.		

Worksheet #24: Analytical Instrument Calibration (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
				Alternately, recalibrate if necessary; then reanalyze all associated samples since the last acceptable CCV.		
	Initial Calibration Blank (ICB)/Continuing Calibration Blank (CCB)	Immediately after the ICV and immediately after every CCV.	The absolute values of all analytes must be < 1/2 LOQ or < 1/10th the amount measured in any sample.	ICB: Correct problem and repeat ICV/ICB analysis. If that fails, rerun ICAL. All samples following the last acceptable calibration blank must be reanalyzed. CCBs may not be reanalyzed without reanalysis of the associated samples and CCV(s).		
	Low-level Calibration Check Standard (Low-level ICV)	Daily.	All reported analytes within ± 20% of true value.	Correct problem and repeat ICAL.		
	Interference Check Solutions (ICS) (also called Spectral Interference Checks)	After ICAL and prior to sample analysis.	ICS-A: Absolute value of concentration for all non-spiked project analytes <1/2 LOQ (unless they are a verified trace impurity from one of the spiked analytes); ICS-AB: Within ± 20% of true value.	Terminate analysis, locate and correct problem, reanalyze ICS, reanalyze all samples.		
	Linear Dynamic Range (LDR) or high-level check standard	At initial setup and checked every 6 months with a high standard at the upper limit of the range.	Within ± 10% of true value.	Dilute samples within the calibration range or re-establish/verify the LDR.		
IC (Hexavalent Chromium)	RT window position establishment	Once per multipoint calibration.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	N/A	Analyst/Supervisor	WI11625
	RT window width	At method setup and after major maintenance (for example, column change).	RT width is ± 3 times standard deviation for each analyte RT over a 24-hour period.	N/A		
	ICAL	ICAL prior to sample analysis.	r2 ≥ 0.99.	Correct problem, then repeat ICAL.		
	ICV	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes within established RT windows. All project analytes within ±10% of expected value.	Correct problem. Re-run ICV. If that fails, repeat ICAL.		
	CCV	Before sample analysis; after every 10 field samples; and at the end of the analysis sequence.	All reported analytes within established RT windows. All project analytes within ±10% of expected value.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails or if two consecutive CCVs cannot be run, perform corrective action(s), and repeat CCV and all associated samples since last successful CCV. Alternately, recalibrate if necessary; then reanalyze all associated samples since the last acceptable CCV.		
	CCB (QSM Table B-12 only includes a Calibration Blank with no criteria. Criteria presented are based on the laboratory SOP)	Prior to sample analysis, after every 10 field samples or 20 injections, and at the end of the sequence, and if the instrument has been idle for more than 4 hours in a day.	CCB: ≤ LOQ	Diagnose problem. Prepare fresh standard and reanalyze CCV to rule out standard degradation or inaccurate injection. If problem persists, perform instrument adjustment and/or maintenance to correct the problem. Reanalyze all samples since last successful CCV. If problem persists, repeat ICAL.		

Worksheet #24: Analytical Instrument Calibration (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference

Notes:

The specifications in this table meet the requirements of DoD QSM Version 5.4 (DoD/DOE, 2021) except for:

Hexavalent chromium - Table B-12 in QSM Version 5.4 has a comment that specifies analyzing a calibration blank; however, it does not include acceptance or frequency criteria. CCB criteria for Hexavalent chromium are based on the laboratory SOP.

> = greater than or equal to
< = less than or equal to
BFB = bromofluorobenzene
LC-MS = liquid chromatography mass spectrometry

Worksheet #25: Analytical Instrument and Equipment Maintenance, Testing, and Inspection

(UFP-QAPP Manual Section 3.2.3)

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
GC/MS (VOC)	As needed, replacement of components	CCV and BFB per 12 hour tune period	Visual inspection of components	As needed	Initial calibration or continuing calibration verification passes method criteria	Perform additional maintenance prior to instrument calibration or CCV	Analysts	WI8236
GC/MS (SVOC)	As needed, replacement of components (Injection port; column, ion source; other)	Continuing calibration verification (CCV) and DFTPP per 12 hour tune period	Visual inspection of components	Daily routine maintenance (injection port); as needed for other components	Initial calibration or continuing calibration verification passes method criteria	Perform maintenance again; re-calibration if necessary	Analysts	WI19617
GC-ECD (Pesticides)	Injection port maintenance; ECD maintenance	Calibration Check All analytes within +/- 20% of the nominal concentration and within established retention time windows	Visual Inspection	As needed	Initial calibration after maintenance is within specifications	Perform maintenance again	GC analyst	WI19232
ICP-MS (Agilent 7700X)	As needed replacement of components	Calibration checks	Visual inspection of components	As needed maintenance/ calibration checks every 10 injections	90-110% for the calibration checks	Recalibration	ELLE Analyst	WI11933
ICP-MS (Agilent 7500 CE)	As needed replacement of components	Calibration checks	Visual inspection of components	As needed maintenance/ calibration checks every 10 injections	90-110% for the calibration checks	Recalibration	ELLE Analyst	WI11933
IC	As needed replacement of components	Calibration checks	Visual inspection of components	As needed maintenance/calibration checks every 10 injections	90-110% for calibration checks	Recalibration	ELLE Analyst	WI11625

GC-ECD = gas chromatography-electron capture detector

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Worksheet #26 & 27: Sample Handling, Custody, and Disposal

(UFP-QAPP Manual Section 3.3)

Sampling Organization: CH2M
Laboratory: ELLE
Method of sample delivery (shipper/carrier): FedEx
Number of days from reporting until sample disposal: 90 days

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT	
Sample Collection (Personnel/Organization):	FTL/CH2M
Sample Packaging (Personnel/Organization):	Sample processor or field team member/CH2M
Coordination of Shipment (Personnel/Organization):	Sample processor or field team member/CH2M
Type of Shipment/Carrier:	Overnight/FedEx
SAMPLE RECEIPT AND ANALYSIS	
Sample Receipt (Personnel/Organization):	Sample receipt personnel/ELLE
Sample Custody and Storage (Personnel/Organization):	Same personnel as for sample receipt
Sample Preparation (Personnel/Organization):	Preparations personnel/ELLE
Sample Determinative Analysis (Personnel/Organization):	Analyst/ELLE
SAMPLE ARCHIVING	
Field Sample Storage (Number of days from sample collection):	90 Days
Sample Extract/Digestate Storage (Number of days from extraction/digestion):	Extracts and digestates may be disposed of 90 days after extraction
Biological Sample Storage (Number of days from sample collection):	N/A
SAMPLE DISPOSAL	
Personnel/Organization:	Environmental H&S Officer/ELLE
Number of Days from Analysis:	Samples may be disposed of 90 days after report mail date

Sample Labeling

Sample labels will include, at a minimum, client name, site, sample ID, date/time collected, analysis group or method, preservative, and sampler's initials. Labels will be taped to the containers, so they do not separate.

Worksheet #26 & 27: Sample Handling, Custody, and Disposal (continued)

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory)

Samples will be collected by field team members under the supervision of the FTL. As samples are collected, they will be placed into containers and labeled, as outlined previously. Samples will be cushioned with packaging material and placed into coolers containing enough ice to keep the samples at less than or equal to 6°C, but not freezing, until they are received by the laboratory. The chain-of-custody will also be placed into the cooler. Coolers will be shipped to the laboratory via FedEx, with the air bill number indicated on the chain-of-custody (to relinquish custody). Upon delivery, the laboratory will log in each cooler and report the status of the samples.

All fractions are sent directly to ELLE the laboratory performing the analysis.

Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal)

Please refer to WI10725 for Environmental Sample Receipt and Unpacking, and WI12042 for Automated Storage, Retrieval, and Discarding of Samples at ELLE.

Sample Identification Procedures

Upon opening the cooler, the receiving clerk signs the chain-of-custody and then takes the temperature using the temperature blank (if absent, then a sample container or infrared thermometer is used). The sample containers in the cooler are unpacked and checked against the client's chain-of-custody, and any discrepancies or breakage is noted on the chain-of-custody. Next, if any soil samples require preservative, the clerk will check the potential hydrogen (pH) values to see if they are in the acceptable pH range. For purgeable fractions, pH is checked following analysis. The clerk will deliver the chain-of-custody (and any other paperwork, e.g., temperature or pH QA notice) to the project manager for Laboratory Information System (LIMS) entry and client contact (if needed).

The field logbook will identify the sample ID with the location, depth, date/time collected, and the parameters requested. The laboratory will assign each field sample a laboratory sample ID based on information in the chain-of-custody. The laboratory will send sample login forms to the project chemist to check sample IDs and parameters are correct.

Chain-of-Custody Procedures

Chains-of-custody will include, at a minimum, laboratory contact information, client contact information, sample information, and relinquished by/received by information. Sample information will include sample ID, date/time collected, number and type of containers, preservative information, analysis method, and comments. The chain-of-custody also will have the sampler's name and signature. The chain-of-custody will link location of the sample from the field logbook to the laboratory receipt of the sample. The laboratory will use the sample information to populate the LIMS database for each sample.

Worksheet #28-1: Analytical Quality Control and Corrective Action (VOCs in Soil)

Matrix: Soil
Analytical Group: VOCs
Analytical Method/SOP Reference: SW-846 8260D/WI8236

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
Method Blank (MB)	One per preparatory batch	No analytes detected > 1/2 LOQ or >1/10 sample concentration or >1/10 regulatory limit. For common laboratory contaminants, no analytes detected >LOQ.	Correct problem. If required, re-prep and reanalyze MB and all samples processed with the contaminated blank.	Analyst/Supervisor	Bias/Contamination	Same as Method/SOP QC Acceptance Limits
LCS	One per preparatory batch	Table 15-1	Correct problem, then re-prep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.		Accuracy/Bias	
MS/MSD			Examine the project-specific requirements. Contact the client as to additional measures to be taken.		Accuracy/Bias/ Precision	
Internal Standard	Every field sample, standard, and QC sample	RT within ± 10 seconds from RT of the midpoint standard in the ICAL; extracted ion current profile (EICP) area within – 50% to +100% of ICAL midpoint standard. On days when ICAL is not performed, the daily initial CCV can be used.	Inspect mass spectrometer and GC for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is mandatory.		Accuracy/Bias	
Surrogates	All field and QC samples	1,2-Dichloroethane-d4 Soil: 71-136% 4-Bromofluorobenzene Soil: 79-119% Dibromofluoromethane Soil: 78-119% Toluene-d8 Soil: 85-116%	Correct problem, then re-prep and reanalyze all failed samples for all surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference is present, reanalysis may not be necessary, but the client must be notified prior to reporting data and the failures must be discussed in the Case Narrative.	Analyst/ Supervisor	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
LOD verification	Quarterly for every analyte	Spike a quality system matrix at concentration 2 to 4 times the DL. Must meet 3:1 signal to noise (S/N), or for data systems that do not measure noise, results must be at least 3 standard deviations (SDs) greater than the mean MB concentration.	If verification fails, the DL determination must be repeated and a LOD verification. Alternatively, pass two consecutive LOD verifications at a higher spike and set the LOD at the higher concentration.		Accuracy	
LOQ verification	Quarterly for every analyte	Spike a quality system matrix at a concentration equal to or greater than the low point of the calibration curve.	Must meet laboratory-specified precision and bias limits. If LOQ fails repeat at a higher level until limits are met.		Precision/Bias	
Field QA/QC Samples						
Field Duplicate	One per 10 normal field samples per matrix	If both the original and duplicate results are > LOQ, the relative percent difference (RPD) must be < 30%. If either result is < LOQ, use professional judgment.	Assess precision. Examine laboratory replicate. Qualify as per Worksheet #36.	FTL, Data Validator	Precision	Same as Method/SOP QC Acceptance Limits

Worksheet #28-1: Analytical Quality Control and Corrective Action (VOCs in Soil) (continued)

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
Equipment Blank	One per day per equipment type (when decontaminated). One per event per equipment type (when disposable)	Same as method blank (see above)	Assess decontamination procedures. Consider recollection if the exceedance may cause a significant data quality issue. Qualify as per Worksheet #36.	Laboratory PM, PM/FTL, Data Validator	Contamination	Same as Method/SOP QC Acceptance Limits
Trip Blank	One per cooler containing VOCs	Same as method blank (see above)	Assess sample container preparation and sample transport contamination procedures. Consider recollection if the exceedance may cause a significant data quality issue. Qualify as per Worksheet #36.	Laboratory PM, FTL, Data Validator	Contamination	Same as Method/SOP QC Acceptance Limits
Temperature Blank	One per cooler	≤ 6°C but not frozen	Notify project chemist. Assess sample packaging and shipment procedures. Consider recollection if the exceedance may cause data rejection. Qualify as per Worksheet #36.	Laboratory PM, FTL, Data Validator	Representativeness	Same as Method/SOP QC Acceptance Limits

Worksheet #28-2: Analytical Quality Control and Corrective Action (SVOCs in Soil)

Matrix: Soil
Analytical Group: SVOC
Analytical Method/SOP Reference: SW-846 8270E/WI9617

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
MB	One per preparatory batch	No analytes detected > 1/2 LOQ or > 1/10 sample concentration or > 1/10 regulatory limit. For common laboratory contaminants, no analytes detected > LOQ.	Correct problem. If required, re-prep and reanalyze MB and all samples processed with the contaminated blank.	Analyst/ Supervisor	Bias/Contamination	Same as Method/ SOP QC Acceptance Limits
LCS	One per preparatory batch	Table 15-2	Correct problem, then re-prep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.		Accuracy/Bias	
MS/MSD	One per preparatory batch		Examine the project-specific requirements. Contact the client as to additional measures to be taken.		Accuracy/Bias/ Precision	
Internal Standard	Every field sample, standard, and QC sample	RT within ± 10 seconds from RT of the midpoint standard in the ICAL; EICP area within – 50% to +100% of ICAL midpoint standard. On days when ICAL is not performed, the daily initial CCV can be used.	Inspect mass spectrometer and GC for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is mandatory.		Accuracy/Bias	
Surrogates	Each field and QC sample	2,4,6-Tribromophenol Soil: 39-132% 2-Fluorobiphenyl Soil: 44-115% 2-Fluorophenol Soil: 35-115% Nitrobenzene-d5 Soil: 37-122% Phenol-d5 Soil: 33-122% Terphenyl-d14 Soil: 54-127%	Correct problem, then re-prep and reanalyze all failed samples for all surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference is present, reanalysis may not be necessary, but the client must be notified prior to reporting data and the failures must be discussed in the Case Narrative.	Analyst/ Supervisor	Accuracy/Bias	Same as Method/ SOP QC Acceptance Limits
LOD verification	Quarterly for every analyte	Spike a quality system matrix at concentration 2-4 times the DL. Must meet 3:1 S/N, or for data systems that do not measure noise, results must be at least 3 SDs greater than the mean MB concentration.	If verification fails, the DL determination must be repeated and a LOD verification. Alternatively pass two consecutive LOD verification at a higher spike and set the LOD at the higher concentration.		Accuracy	
LOQ verification	Quarterly for every analyte	Spike a quality system matrix at a concentration equal to or greater than the low point of the calibration curve.	Must meet laboratory-specified precision and bias limits. If LOQ fails repeat at a higher level until limits are met.		Precision/Bias	
Field QA/QC Samples						
Field Duplicate	One per 10 normal field samples per matrix	If both the original and duplicate results are > LOQ, the relative percent difference (RPD) must be < 30%. If either result is < LOQ, use professional judgment.	Assess laboratory homogenization procedures and precision. Examine laboratory replicate. Assess field homogenization procedures. Qualify as per Worksheet #36.	FTL, Data Validator	Precision	Same as Method/SOP QC Acceptance Limits
Equipment Blank	One per day per equipment type (when decontaminated). One per event per equipment type (when disposable)	Same as method blank (see above)	Assess decontamination procedures. Consider recollection if the exceedance may cause a significant data quality issue. Qualify as per Worksheet #36.	Laboratory PM, PM/FTL, Data Validator	Contamination	Same as Method/SOP QC Acceptance Limits
Temperature Blank	One per cooler	≤ 6°C but not frozen	Notify project chemist. Assess sample packaging and shipment procedures. Consider recollection if the exceedance may cause data rejection. Qualify as per Worksheet #36.	Laboratory PM, FTL, Data Validator	Representativeness	Same as Method/SOP QC Acceptance Limits

Worksheet #28-3: Analytical Quality Control and Corrective Action (Pesticides in Soil)

Matrix: Soil
Analytical Group: Pesticides
Analytical Method/SOP Reference: SW-846 8081B/WI9232

QC Sample	Frequency/Number	Acceptance Criteria	Corrective Action	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
MB	One per preparatory batch	No analytes detected > 1/2 LOQ, and > 1/10 sample concentration or > 1/10 regulatory limit, whichever is greater.	Correct problem. If required, re-prep and reanalyze MB and all samples processed with the contaminated blank.	Analyst/ Supervisor	Bias/ Contamination	Same as Method/SOP QC Acceptance Limits
LCS	One per preparatory batch	Table 15-3	Correct problem, then re-prep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.		Accuracy/Bias	
MS/MSD	One per preparatory batch		Examine the project-specific requirements. Contact the client as to additional measures to be taken.		Accuracy/Bias/ Precision	
Surrogates	Each field and QC sample	Soil: TCMX: 42-129% DCBP: 46-152	Correct problem, then re-prep and reanalyze all failed samples for all surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference is present, reanalysis may not be necessary, but the client must be notified prior to reporting data, and the failures must be discussed in the Case Narrative.		Accuracy/Bias	
Confirmation of positive results (second column)	All results greater than the DL must be confirmed	Calibration and QC criteria same as for initial or primary column analysis. Results between primary and second column RPD ≤ 40%.	Flag appropriately.	Analyst/ Supervisor	Accuracy	Same as Method/SOP QC Acceptance Limits
LOD verification	Quarterly for every analyte	Spike a quality system matrix at concentration 2 to 4 times the DL. Must meet 3:1 S/N, or for data systems that do not measure noise, results must be at least 3 SDs greater than the mean MB concentration.	If verification fails, the DL determination must be repeated and a LOD verification. Alternatively, pass two consecutive LOD verification at a higher spike and set the LOD at the higher concentration.		Accuracy	
LOQ verification	Quarterly for every analyte	Spike a quality system matrix at a concentration equal to or greater than the low point of the calibration curve.	Must meet laboratory-specified precision and bias limits. If LOQ fails repeat at a higher level until limits are met.		Precision/Bias	
Field QA/QC Samples						
Field Duplicate	One per 10 normal field samples per matrix	If both the original and duplicate results are > LOQ, the relative percent difference (RPD) must be < 30%. If either result is < LOQ, use professional judgment.	Assess laboratory homogenization procedures and precision. Examine laboratory replicate. Assess field homogenization procedures. Qualify as per Worksheet #36.	FTL, Data Validator	Precision	Same as Method/SOP QC Acceptance Limits
Equipment Blank	One per day per equipment type (when decontaminated). One per event per equipment type (when disposable)	Same as method blank (see above)	Assess decontamination procedures. Consider recollection if the exceedance may cause a significant data quality issue. Qualify as per Worksheet #36.	Laboratory PM, PM/FTL, Data Validator	Contamination	Same as Method/SOP QC Acceptance Limits
Temperature Blank	One per cooler	≤ 6°C but not frozen	Notify project chemist. Assess sample packaging and shipment procedures. Consider recollection if the exceedance may cause data rejection. Qualify as per Worksheet #36.	Laboratory PM, FTL, Data Validator	Representativeness	Same as Method/ SOP QC Acceptance Limits

> = greater than

Worksheet #28-4: Analytical Quality Control and Corrective Action (Metals in Soil)

Matrix: Soil
Analytical Group: Metals (excluding mercury)
Analytical Method/SOP Reference: SW-846 6020B/WI11933

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
MB	One per preparatory batch	The absolute values of all analytes must be < ½ LOQ or < 1/10th the amount measured in any sample or 1/10th the regulatory limit, whichever is greater.	Correct problem. If required, re-prep and reanalyze MB and all samples processed with the contaminated blank.	Analyst/Supervisor	Bias/Contamination	Same as Method/SOP QC Acceptance Limits
LCS	One per preparatory batch	Table 15-4	Correct problem, then re-prep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes if sufficient sample material is available.		Accuracy/Bias	
Dilution Test	One is performed for each preparation batch with sample concentration(s) > 50 times the LOQ when MS/MSD fails	Five-fold dilution must agree within ± 10% of the original measurement. Only applicable for samples with concentrations > 50 times the LOQ (prior to dilution). Use along with MS/MSD and post digestion spike data to confirm matrix effects.	Qualify the results.		Accuracy/Bias	
Post-Digestion Spike	Perform if MS/MSD fails. One per preparatory batch (using the same sample as used for the MS/MSD if possible)	Recovery within 80-120%. Criteria applies for samples with concentrations < 50 times the LOQ prior to dilution.	Qualify the results.	Analyst/Supervisor	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Method of Standard Additions	When dilution or post-digestion spike fails and if the required by project	N/A	N/A		Accuracy/ Bias	
MS/MSD	One per preparatory batch	Table 15-4	Examine the project-specific requirements. Contact the client as to additional measures to be taken.		Accuracy/Bias/ Precision	
Internal Standard (IS) (6020B analysis only)	Every field sample, standard, and QC sample	IS intensity in the samples within 30-120% of the intensity of the IS in the ICAL blank.	If recoveries are acceptable for QC samples, but not field samples, the field samples may be considered to suffer from a matrix effect. Reanalyze samples at 5-fold dilutions until criteria is met. For failed QC samples, correct problem, and re-run all associated failed field samples.		Accuracy/Bias	
LOD verification	Quarterly for every analyte	Spike a quality system matrix at concentration 2 to 4 times the DL. Must meet 3:1 S/N, or for data systems that do not measure noise, results must be at least 3 SDs greater than the mean MB concentration.	If verification fails, the DL determination must be repeated and a LOD verification. Alternatively, pass two consecutive LOD verification at a higher spike and set the LOD at the higher concentration.	Analyst/Supervisor	Accuracy	Same as Method/SOP QC Acceptance Limits

Worksheet #28-4: Analytical Quality Control and Corrective Action (Metals in Soil) (continued)

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
LOQ verification	Quarterly for every analyte	Spike a quality system matrix at a concentration equal to or greater than the low point of the calibration curve.	Must meet laboratory-specified precision and bias limits. If LOQ fails repeat at a higher level until limits are met.		Precision/Bias	
Field QA/QC Samples						
Field Duplicate	One per 10 normal field samples per matrix	If both the original and duplicate results are > LOQ, the relative percent difference (RPD) must be < 30%. If either result is < LOQ, use professional judgment.	Assess laboratory homogenization procedures and precision. Examine laboratory replicate. Assess field homogenization procedures. Qualify as per Worksheet #36.	FTL, Data Validator	Precision	Same as Method/SOP QC Acceptance Limits
Equipment Blank	One per day per equipment type (when decontaminated). One per event per equipment type (when disposable)	Same as method blank (see above)	Assess decontamination procedures. Consider recollection if the exceedance may cause a significant data quality issue. Qualify as per Worksheet #36.	Laboratory PM, PM/FTL, Data Validator	Contamination	Same as Method/SOP QC Acceptance Limits
Temperature Blank	One per cooler	≤ 6°C but not frozen	Notify project chemist. Assess sample packaging and shipment procedures. Consider recollection if the exceedance may cause data rejection. Qualify as per Worksheet #36.	Laboratory PM, FTL, Data Validator	Representativeness	Same as Method/SOP QC Acceptance Limits

< = less than

Worksheet #28-5: Analytical Quality Control and Corrective Action (Hexavalent Chromium in Soil)

Matrix: Soil
Analytical Group: Metals (Hexavalent Chromium)
Analytical Method/SOP Reference: SW-846 7199/WI11625

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
MB	1 per batch of 20 or fewer samples	No target compounds should be >1/2 LOQ	Correct problem. If required, re-prep and reanalyze MB and all samples associated with the contaminated blank.	Analyst/ Supervisor	Bias/ Contamination	Same as Method/SOP QC Acceptance Limits
LCS	1 per batch of 20 or fewer samples	Table 15-4	Correct problem, then re-prep and reanalyze the LCS and all samples in the associated preparatory batch for all reported analytes if sufficient sample material is available.		Accuracy/Bias	
MS(soluble and insoluble)	1 per batch of 20 or fewer samples	Table 15-4	If LCS passed, no action.		Accuracy/Bias	
Laboratory Replicate (or MSD)	1 per batch of 20 or fewer samples	MSD or MD: RPD of all analytes ≤ 20% (between MS and MSD or sample and MD). MSD must be spiked at the LOQ.	If LCS passed, no action.		Precision	
LOD verification	Quarterly for every analyte	Spike a quality system matrix at concentration 2 to 3 times the DL. Must meet 3:1 S/N, or for data systems that do not measure noise, results must be at least 3 SDs greater than the mean MB concentration.	If verification fails, the DL determination must be repeated and a LOD verification. Alternatively, pass two consecutive LOD verification at a higher spike and set the LOD at the higher concentration.		Accuracy	
LOQ verification	Quarterly for every analyte	Spike a quality system matrix at a concentration equal to or greater than the low point of the calibration curve.	Must meet laboratory-specified precision and bias limits. If LOQ fails repeat at a higher level until limits are met.	Analyst/Supervisor	Precision/Bias	Same as Method/SOP QC Acceptance Limits
Field QA/QC Samples						
Field Duplicate	One per 10 normal field samples per matrix	If both the original and duplicate results are > LOQ, the relative percent difference (RPD) must be < 30%. If either result is < LOQ, use professional judgment.	Assess laboratory homogenization procedures and precision. Examine laboratory replicate. Assess field homogenization procedures. Qualify as per Worksheet #36.	FTL, Data Validator	Precision	Same as Method/SOP QC Acceptance Limits
Equipment Blank	One per day per equipment type (when decontaminated). One per event per equipment type (when disposable)	Same as method blank (see above)	Assess decontamination procedures. Consider recollection if the exceedance may cause a significant data quality issue. Qualify as per Worksheet #36.	Laboratory PM, PM/FTL, Data Validator	Contamination	Same as Method/SOP QC Acceptance Limits
Temperature Blank	One per cooler	≤ 6°C but not frozen	Notify project chemist. Assess sample packaging and shipment procedures. Consider recollection if the exceedance may cause data rejection. Qualify as per Worksheet #36.	Laboratory PM, FTL, Data Validator	Representativeness	Same as Method/SOP QC Acceptance Limits

Note:

The limits are based on the laboratory's in-house limits. QSM only lists limits based on SW-846 7196, which employs different technologies from SW-846 7199. The project team has accepted these limits.

≤ = less than or equal to
> = greater than

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Worksheet #29: Project Documents and Records

Document/Record	Generation	Verification	Format/Storage Location/Archive Requirements
Sample Collection and Field Records			
Photographic documentation, as warranted	Field sampler/TBD	FTL/TBD	Digital/CH2M network and secure SharePoint library/project file and computer server
Field Change Request forms	PM	AM and Project Delivery and Quality Manger	Digital/CH2M network and secure SharePoint library/project file and computer server
Field logbook/various field measurements/field equipment calibration information	Field sampler/TBD	FTL/TBD	Digital/CH2M network and secure SharePoint library/project file and computer server
Daily Report	FTL/TBD	PM/Dennis Ballam	Digital/CH2M network and secure SharePoint library/project file and computer server
Chain-of-Custody records	Project Chemist/Camden Robinson	FTL/TBD	Electronic portable document format (pdf) copies in the project file; hardcopy in the project file; archived at project closeout
Air bills	Field sampler/TBD	FTL/TBD	Hardcopy in the project file; archived at project closeout
Corrective Action Reports	Project Chemist/Camden Robinson FTL/TBD	PM/Dennis Ballam	Electronic pdf copies in the project file; hardcopy in the project file; archived at project closeout
Beyond Zero Observations	FTL/TBD	H&S Manager/Stephen Brand PM/Dennis Ballam	Recorded in Field Notebook; hardcopy in the project file; archived at project closeout
Signed H&S Plan, associated Activity Hazard Analysis (AHA), and Point of Work Risk Assessment forms	H&S Officer/Stephen Brand	FTL/TBD PM/Dennis Ballam	Recorded in Field Notebook; hardcopy in the project file; archived at project closeout

Worksheet #29: Project Documents and Records (continued)

Document/Record	Generation	Verification	Format/Storage Location/Archive Requirements
Project Assessment			
Field Sampling and Fixed Laboratory Audit Checklists	Field Auditor/TBD	PM/Dennis Ballam	Hardcopy in the project file; archived at project closeout
Data Verification Checklists	Data Validator/TBD	Project Chemist/Camden Robinson	If completed, hardcopy in the project file; archived at project closeout
Data Validation Reports and DQE	Data Validator/TBD	Project Chemist/Camden Robinson	Electronic pdf copies in the project file; hardcopy stored with the data package; archived at project closeout
DUA Report	Project Chemist/Camden Robinson	PM/Dennis Ballam	Digital/CH2M network and secure SharePoint library/project file and computer server
Final Data Archives	Project Chemist/Camden Robinson	PM/Dennis Ballam	Digital/CH2M network and secure SharePoint library/Project file and computer server
Red Beach RI Report	TBD	PM/Dennis Ballam	Electronic PDF copies in the project file. Hardcopy stored with the data package. Archived at project closeout.
Laboratory Records			
Sample receipt, custody, and tracking records	Sample receipt personnel/ELLE	Project Chemist/Camden Robinson	Electronic pdf copies in the project file; hardcopy in the full data package
Equipment Calibration Logs	Analyst/ELLE	QAO/ELLE – Ken Boley	Hardcopy in the full data package[a]; archived at project closeout
Sample Preparation Logs	Digestion personnel/ELLE	QAO/ELLE – Ken Boley Data Validator/TBD	Hardcopy in the full data package[a]; archived at project closeout
Run logs	Analyst/ELLE	QAO/ELLE – Ken Boley Data Validator/TBD	Hardcopy in the full data package[a]; archived at project closeout
Reported field sample results	Analyst/ELLE	QAO/ELLE – Ken Boley Data Validator/TBD	Electronic pdf copies in the project file; hardcopy in the full data package[a]; archived at project closeout

Worksheet #29: Project Documents and Records (continued)

Document/Record	Generation	Verification	Format/Storage Location/Archive Requirements
Reported results for standards, QC checks, and QC samples	Analyst/ELLE	QAO/ELLE – Ken Boley Data Validator/TBD	Hardcopy in the full data package[a]; archived at project closeout
Instrument printouts (raw data) for field samples, standards, QC checks, and QC samples	Analyst/ELLE	QAO/ELLE – Ken Boley Data Validator/TBD	Hardcopy in the full data package[a]; archived at project closeout
Sample disposal records	Environmental H&S Officer/ELLE	QAO/ELLE – Ken Boley Laboratory Manager/ELLE	Maintained by the laboratory
Extraction/cleanup records	Extraction personnel/ELLE	QAO/ELLE – Ken Boley Data Validator/TBD	Hardcopy in the full data package[a]
Raw data	Analyst/ELLE	QAO/ELLE – Ken Boley Data Validator/TBD	Hardcopy in the full data package[a]; archived at project closeout

Notes:

After completion of the project, the hard copy pertinent documents shall be shipped to the appropriate local Federal Records Center (FRC) or another National Archives and Records Administration (NARA) certified document storage facility, as directed by the Navy.

[a] CH2M requires a "Level 4" package.

Worksheet #29: Project Documents and Records (continued)

Laboratory Data Deliverables	
Document/Record	
Case Narrative	X
Sample ID cross reference sheet (Lab IDs and Client IDs)	X
Chain-of-custody	X
Sample preparation (extraction/digestion) logs	X
Copies of Nonconformance Memos and Corrective Actions	X
Sample results	X
Post Spike Recovery Summary	X
MS/MSD Accuracy and Precision Summary	X
LCS Accuracy Summary	X
Instrument and Method Blank Summary	X
Initial Calibration Summary (including concentration levels of standards)	X
Continuing Calibration Summary	X
Analytical sequence	X
Quantitation Reports	X
Compound Identification Summary	X
Chromatograms	X

Worksheet #31, 32 & 33: Assessments and Corrective Action

Table 31-1: Planned Project Assessments

Assessment Type	Organization Performing Assessment	Frequency	Assessment Deliverable	Person(s) Responsible for Performing Assessment (title and organizational affiliation)	Person(s) Responsible for Responding to Assessment Findings (title and organizational affiliation)	Person(s) Responsible for Identifying and Implementing CAs (title and organizational affiliation)	Person(s) Responsible for Monitoring Effectiveness of CA (title and organizational affiliation)
Pre-Task Safety Analysis	RI Contractor	One per day during field activities	Daily Report	FTL/RI Contractor	PM/RI Contractor	H&S Officer/RI Contractor	H&S Officer/RI Contractor
Beyond Zero Observations	RI Contractor	One per week during field activities	Daily Report - Safe Work Observation	FTL/RI Contractor	PM/RI Contractor	H&S Officer/RI Contractor	H&S Officer/RI Contractor

Table 32-1: Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (name, title, organization)	Timeframe of Notification	Nature of CA Response Documentation	Individual(s) Receiving CA Response (name, title, organization)	Timeframe for Response
Field Performance Audit	Field Performance Audit Checklist	Field team PM	Within one week of audit	Verbal and CA Form	FTL PM	Within one week of receipt of CA Form
Beyond Zero Observations	Beyond Zero Observations computer based or phone app form	FTL Field team PM H&S Officer	Immediately (person involved or observed person) H&S Officer. Following day (field team).	On Beyond Zero Observation electronic form either on phone or computer	FTL and individual being observed, and the PM and H&S Officer	Corrected in the field immediately, and within 1 week if elevated

Worksheet #31, 32 & 33: Assessments and Corrective Action (continued)

Table 33-1: QA Management Reports

Type of Report	Frequency (Daily, Weekly, Monthly, Quarterly, Annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliations)
Field Audit Report	One for each audit performed	Submitted with report in which data are analyzed and presented	PM: Monitoring and QA performed by CH2M	H&S Manager: Monitoring and QA performed by CH2M; included in project files
Data Validation Reports	Once, after analysis by laboratory, for all laboratory analytical data except wet chemistry (WCHEM) analyses	Submitted by the data validator within 14 calendar-days of notification to begin)	PM: Monitoring and QA performed by CH2M	PC: Monitoring and QA performed by CH2M PM: Monitoring and QA performed by CH2M
DUAs (DQE)	Once, as an appendix to the report in which data are analyzed and presented	Along with the project report	Project Chemist: Monitoring and QA performed by CH2M	Vieques EPA RPM and Vieques PRDNER RPM

Laboratory Corrective Action Form

Person initiating CA _____ Date: _____

Description of problem and when identified: _____

Cause of problem, if known or suspected: _____

Sequence of CA (including date implemented, action planned, and personnel/data affected): _____

CA implemented by: _____ Date: _____

CA initially approved by: _____ Date: _____

Follow-up date: _____

Final CA approved by: _____ Date: _____

Information copies to:

Mike Zamboni, CH2M Program Chemist

Soil Sampling Field Performance Audit Checklist

Project Responsibilities

Project No.: _____ Date: _____

Project Location: Signature:

Team Members			
Yes	No	1)	Is the approved work plan being followed?
		Comments:	
Yes	No	2)	Was a briefing held for project participants?
		Comments:	
Yes	No	3)	Were additional instructions given to project participants?
		Comments:	
Sample Collection			
Yes	No	1)	Is there a written list of sampling locations and descriptions?
		Comments:	
Yes	No	2)	Are samples collected as stated in the Master SOPs?
		Comments:	
Yes	No	3)	Are samples collected in the type of containers specified in the work plan?
		Comments:	
Yes	No	4)	Are samples preserved as specified in the work plan?
		Comments:	
Yes	No	5)	Are the number, frequency, and type of samples collected as specified in the work plan?
		Comments:	
Yes	No	6)	Are QA checks performed as specified in the work plan?
		Comments:	
Yes	No	7)	Are photographs taken and documented?
		Comments:	
Document Control			
Yes	No	1)	Have any accountable documents been lost?
		Comments:	
Yes	No	2)	Have any accountable documents been voided?
		Comments:	

Soil Sampling Field Performance Audit Checklist

Yes	No	3)	Have any accountable documents been disposed of? Comments:
Yes	No	4)	Are the samples identified with sample tags? Comments:
Yes	No	5)	Are blank and duplicate samples properly identified? Comments:
Yes	No	6)	Are samples listed on a chain-of-custody record? Comments:
Yes	No	7)	Is chain-of-custody documented and maintained? Comments:

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Worksheet #34, 35 & 36: Data Verification and Validation (Steps I & IIa/IIb)

Table 34-1. Data Verification, Validation, and Usability Inputs

Item	Description	Verification (completeness)	Validation (conformance to specifications)
1	Daily Reports	X	X
2	Instrument Assembly Checklists	X	X
3	Field Logbooks	X	X
4	Corrective Action Reports	X	X
5	Site Preparation Technical Memorandum	N/A	N/A
6	Project QC Database	X	X
7	Data Validation Reports	X	X
8	Assessment Reports and responses	X	X

Table 35-1. Data Verification and Validation Procedures

Activity and Records Reviewed	Requirements/ Specifications	Process Description/Frequency	Responsible Person	Documentation
Field logbook	QAPP, SOPs	All information is complete for each day of field activities. Any changes/exceptions are documented and reported in accordance with requirements. Required signatures are present.	FTL/TBD	Daily logbook/ digital forms/Daily Report

(UFP-QAPP Manual Section 5.2.1), (UFP-QAPP Manual Section 5.2.2), (Figure 37 UFP-QAPP Manual), (Table 9 UFP-QAPP Manual)

Records Reviewed	Process Description	Responsible Person, Organization	Internal/ External	Step I / IIa / IIb[a]
Field Notes	Field notes will be reviewed internally and placed into the project file for archival at project closeout.	FTL (TBD)/CH2M	Internal	Step I
Chains-of-custody and shipping forms	Chain-of custody forms and shipping documentation will be reviewed internally upon their completion and verified against the packed sample coolers they represent. The shipper's signature on the chain-of-custody will be initialed by the reviewer, a copy of the chain-of-custody retained in the site file, and the original and remaining copies taped inside the cooler for shipment.	FTL, Lab QA Manager, Project Chemist, and Data Validator	Internal/ External	Step I

Worksheet #34, 35 & 36: Data Verification and Validation (Steps I & IIa/IIb) (continued)

Records Reviewed	Process Description	Responsible Person, Organization	Internal/ External	Step I / IIa / IIb[a]
Sample condition upon receipt	Any discrepancies, missing, or leaking containers will be communicated to the Project Chemist in the form of laboratory logins.	Lab QA Manager, Laboratory PM, Project Chemist, and Data Validator	External	Step I
Documentation of laboratory method deviations	Laboratory Method Deviations are not allowed for this project. Laboratory method deviations not included in the laboratory SOP and therefore not part of the DoD ELAP Accreditation process must be submitted to the DoD ELAP accrediting body for review and approval prior to commencement of project work.	Lab QA Manager and Project Chemist	External	Step I
Electronic data deliverables (EDD)	EDD will be compared against hardcopy laboratory results (10% check). Should discrepancies be identified a 25% check of the EDD against the hardcopy out on the sample delivery group in which the discrepancy was found, if additional discrepancies are found a 100% check will be completed.	Lab QA Manager and Project Chemist	External	Step I
Case Narrative	Case Narratives will be reviewed by the data validator during the data validation process. This is verification that they were generated and are applicable to the data packages.	Data Validator: TBD	External	Step I
Laboratory data	All laboratory data packages will be verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal.	Laboratory PM Elizabeth Martin (ELLE)	Internal	Step I
Laboratory data	The data will be verified for completeness by the Project Chemist. To ensure completeness, EDDs will be compared to Worksheet #18. This is verification that all samples were included in the laboratory data and that correct analyte lists were reported.	Lab QA Manager, Project Chemist, and Data Validator	External	Step I
Audit Reports	Upon report completion, a copy of all audit reports will be placed in the site file. If CAs are required, a	PM: Dennis Ballam/CH2M	Internal/ External	Step I

Worksheet #34, 35 & 36: Data Verification and Validation (Steps I & IIa/IIb) (continued)

Records Reviewed	Process Description	Responsible Person, Organization	Internal/ External	Step I / IIa / IIb[a]
	copy of the documented corrective action taken will be attached to the appropriate audit report in the QA site file. Periodically, and at the completion of site work, site file audit reports and CA forms will be reviewed internally to ensure that all appropriate CAs have been taken and that CA reports are attached. If CAs have not been taken, the site manager will be notified to ensure action is taken.	Project Chemist: Camden Robinson/CH2M	External	Step I
CA reports	Upon report completion, a copy of all audit reports will be placed in the site file. If CAs are required, a copy of the documented CA taken will be attached to the appropriate audit report in the QA site file. Periodically, and at the completion of site work, site file audit reports and CA forms will be reviewed internally to ensure that all appropriate CAs have been taken and that CA reports are attached. If CAs have not been taken, the site manager will be notified to ensure action is taken.	Lab QA Manager and PM Lab QA Manager and Project Chemist	Internal/ External	Step I
	CA reports will be reviewed by the Project Chemist or PM and placed into the project file for archival at project closeout.	CH2M PM CH2M Project Chemist	External	Step I
Laboratory Methods	Ensure the laboratory analyzed samples using the correct and accredited methods.	Lab QA Manager and Project Chemist	External	Step IIa
Target compound list and target analyte list	Ensure the laboratory reported all analytes from each analysis group as described in Worksheet #15.	Lab QA Manager and Project Chemist	External	Step IIa
Reporting limits	Ensure the laboratory met the project-designated reporting limits as per Worksheet #15. If reporting limits were not met, the reason will be determined and documented. Often times the reason for discrepancy is the quarterly update of the LOD.	Lab QA Manager and Project Chemist	External	Step IIb
Laboratory SOPs	Ensure that approved analytical laboratory SOPs were followed.	Data Validator: TBD	External	Step IIa

Worksheet #34, 35 & 36: Data Verification and Validation (Steps I & IIa/IIb) (continued)

Records Reviewed	Process Description	Responsible Person, Organization	Internal/ External	Step I / IIa / IIb[a]
Sample chronology	Holding times from collection to extraction or analysis and from extraction to analysis will be considered by the data validator during the data validation process.	Data Validator: TBD	External	Step IIa / IIb
Raw data	10% Stage 4, remainder Stage 2B plus EDD.	Data Validator: TBD	External	Step IIa
Onsite screening	All non-analytical field data will be reviewed against QAPP requirements for completeness and accuracy based on the field calibration records.	FTL (TBD)	External	Step IIa / IIb
Documentation of method QC results	Establish that all required QC samples were run and met limits.	Data Validator (TBD)	External	Step IIa
Documentation of field QC sample results	Establish that all required QAPP QC samples were run and met limits.	Lab QA Manager and Project Chemist Data Validator (TBD)	External	Step IIb
VOCs, SVOCs, Pesticides, and Metals	For definitive data, analytical methods, and laboratory SOPs, as presented in this QAPP, will be used to evaluate compliance against QA/QC criteria. QA/QC criteria for field QC samples are presented in Worksheet #28, reporting limits and screening levels are presented in Worksheet #15, QA/QC criteria for calibrations are presented in Worksheet #24, and QA/QC criteria for laboratory QC samples are presented in Worksheet #28. Data may be qualified if QA/QC exceedances have occurred. Guidance and qualifiers from DoD General Data Validation Guidelines (DoD, 2019) and Data Validation Guidelines Module 1: Data Validation Procedure for Organic Analysis by GC/MS (DoD, 2020), Data Validation Guidelines Module 4: Data Validation Procedure for Organic Analysis by GC (DoD, 2021), Data Validation Guidelines Module 5: Data Validation Procedure for Metals by ICP-MS (DoD, 2022b), and Data Validation Guidelines Modules 1, 2, 3, and 4 Revised Table for Sample Qualification in the Presence of Blank Contamination (DoD, 2022a) will be applied as appropriate.	Data Validator: TBD	External	Step IIa / IIb

Worksheet #34, 35 & 36: Data Verification and Validation (Steps I & IIa/IIb) (continued)

Records Reviewed	Process Description	Responsible Person, Organization	Internal/ External	Step I / IIa / IIb[a]
	The data validator can supplement notated guidance with the National Functional Guidelines for Organic and Inorganic Data Review and Validator's Professional Judgement, as necessary.			

a I = verification
IIa = compliance with methods, procedures, and contracts [see Table 10, page 117, UFP-QAPP manual, V.1, March 2005. (IDQTF, 2005)]
IIb = comparison with measurement performance criteria in the UFP-QAPP [see Table 11, page 118, UFP-QAPP manual, V.1, March 2005. (IDQTF, 2005)]

Worksheet #34, 35 & 36: Data Verification and Validation (Steps I & IIa/IIb) (continued)

Data Validator: TBD

Analytical Group/Method	VOCs by SW-846 8260D; SVOCs by SW-846 8270E	Pesticides by SW-846 8081B	Metals by SW-846 6020B; Hexavalent Chromium by SW-846 7199
Data deliverable requirements:	Stage 4 plus EDDs	Stage 4 plus EDDs	Stage 4 plus EDDs
Analytical specifications:	Worksheets #15-1, #15-2, #24, #28-1, #28-2	Worksheets #15-3, #24, #28-3,	Worksheets #15-4, #24, #28-4, #28-5
Measurement performance criteria:	Worksheets #15-1, #15-2, #28-1, #28-2	Worksheets #15-3, #28-3	Worksheets #15-4, #24, #28-4, #28-5
Percent of data packages to be validated:	100%	100%	100%
Percent of raw data reviewed:	10%	10%	10%
Percent of results to be recalculated:	10%	10%	10%
Validation procedure[a]:	"United States Department of Defense Data Validation Guidelines Module 1 - Data Validation Procedure for Organic Analysis by GC/MS", (DoD, May 2020) and Data Validation Guidelines Modules 1, 2, 3, and 4 Revised Table for Sample Qualification in the Presence of Blank Contamination (DoD, 2022a)	"United States Department of Defense Data Validation Guidelines Module 4: Data Validation Procedure for Organic Analysis by GC (DoD, 2021) and Data Validation Guidelines Modules 1, 2, 3, and 4 Revised Table for Sample Qualification in the Presence of Blank Contamination (DoD, 2022a)	"United States Department of Defense Data Validation Guidelines Module 5: Data Validation Procedure for Metals by ICP-MS (DoD, 2022b) and Data Validation Guidelines Modules 1, 2, 3, and 4 Revised Table for Sample Qualification in the Presence of Blank Contamination (DoD, 2022a)
Electronic validation program/version:	--	--	--

[a] Data Validator can supplement notated guidance with the National Functional Guidelines for Organic and Inorganic Data Review and Validator's Professional Judgement, as necessary.

Worksheet #37: Data Usability Assessment

Data usability evaluation comprises critical assessment of the data with respect to the project objective. Given that the primary objective of the RI is to determine if a release exists, the comprehensive datasets from the offsite analytical laboratory, validated as applicable, and from the field measurements will be reviewed to determine if they are adequate for making the project-specific determinations.

Some specific examples of data availability and usability protocol are:

- The third-party data validator is the only party that may apply qualifiers to the data. Minor QC exceedances will result in "estimated" data, represented by J, NJ, and UJ qualifiers. Major QC exceedances will be represented by a X qualifier due to the presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a Project Chemist), but exclusion of the data is recommended. An R qualifier "rejected" data will be applied once the project team has decided that the result is not reliable. The effect on availability and usability of rejected results will be evaluated.
- The use of "estimated" data will be discussed in the report. "Estimated" data are generally considered usable for all purposes. For results reported between the DL and LOQ the laboratory will apply J-flags.
- While all non-rejected data are available for use to the project team, non-detect (and attributable to blank contamination) results may not be useful if the LOD is greater than the associated PAL. In these cases, the project team will determine whether or not the laboratory would likely have detected the contaminant if present at or above the PAL (i.e., evaluation of the PAL versus the DL).
- Ten percent of hardcopy analytical data will be checked against the electronic data to identify discrepancies. This check will be performed manually. The check will verify results and qualifiers. This process is intended to identify discrepancies between the hardcopy and electronic data. If any discrepancies are identified during the ten percent verification, the laboratory will be contacted, the discrepancies will be communicated, and the laboratory will resolve the discrepancies.
- If significant deviation is evident between parent samples and their field or laboratory duplicate, the cause will be investigated. The possibility of a switched sample will be examined. Field duplicates are expected to exhibit greater deviation than laboratory duplicates. Field duplicate and laboratory duplicate reproducibility is outlined in Worksheet #28.
- Significant biases may be evident based on LCS, MS/MSD, and spiked surrogate exceedances. The third-party data validator will consider QC exceedances and biases when applying qualifiers to data. The project team will consider the direction of bias when determining the usability of qualified data compared to PALs. Low biases are expected to occur more frequently than high biases. In the case of rejected non-detect data, low biases represent the inability of the laboratory to detect contaminants that may or may not be present at the site. The project team will act conservatively and understand that it is not known whether or not the specific analyte is below, at, or above the PAL. High biases indicate that a result may be lower than it is reported. When high-biased data are greater than a PAL, the project team will examine the proximity of the result to the PAL to determine whether additional data are needed or if the result should simply be considered a PAL exceedance.
- After completion of the data validation, the distribution of applied data validation qualifiers will be examined to determine if there are patterns that negatively affect the usability of data. This information will be compiled into a DQE.

Worksheet #37: Data Usability Assessment (continued)

- Deviations from the QAPP sampling and analytical protocols will be reviewed to ascertain whether or not they are significant enough to negatively affect the usability of data.

Data Quality Indicators

The PARCCS criteria (Precision, Accuracy, Representativeness, Comparability, Completeness, and Sensitivity) will be qualitative and quantitative indicators of data quality. The PARCCS criteria are defined and discussed as follows:

- Precision is accessed via percent difference or relative percent difference. Percent difference is typically used when one value is considered theoretically correct and relative percent difference is typically used when both values are experimental. Percent difference is calculated by taking the absolute value of the difference divided by the theoretical value. This is also expressed as

  $$((|X_1 - X_2|) / X_1) * 100$$

  where X1 is the theoretical value and X2 is the experimental value. If it is necessary to imply the direction of a bias, such as for percent drift, the absolute value need not be considered. Relative percent difference is calculated by taking the absolute value of the difference divided by the mean. This is also expressed as

  $$((|X_1 - X_2|) / ((X_1 + X_2)/2)) * 100$$

  where X1 and X2 are both measured values. Percent difference and relative percent difference often have upper control limits for precision.

- Accuracy is accessed via percent recovery. This is calculated by taking the measured value divided by the theoretical value. This is also expressed as

  $$(X_2 / X_1) * 100$$

  where X1 is the theoretical value and X2 is the experimental value, both positive numbers because they are 'amounts' or concentrations. Percent recovery can be negative, such as for MS and MSD recovery, if X2 is calculated by subtracting a parent concentration from an experimental recovery. Percent recovery often has upper and lower control limits for accuracy.

Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions. Analytical DV and data quality assessment will determine which data will be valid and which data will be rejected. Percent completeness will be defined as follows:

$$\textit{Percent Completeness} = \frac{V}{T} \times 100$$

where:

V = Number of valid (not rejected) measurements over a given time
T = Total number of planned measurements

The completeness goal for this project will be 95 percent for valid, usable data. If the completeness goal of the project is not achieved, a discussion on the limitations on the use of the project data will be included in the Usability Assessment section of the final reports.

Worksheet #37: Data Usability Assessment (continued)

If significant biases are detected with laboratory QA/QC samples they will be evaluated to assess impacts on decision-making. Low biases will be described in detail as they represent a possible inability to detect compounds that may be present at the site.

If significant deviations are noted between laboratory and field precision the cause will be further evaluated to assess impact on decision-making.

Representativeness

Representativeness is the reliability with which a measurement or measurement system reflects the true conditions under investigation. Representativeness is influenced by the number and location of the sampling points, sampling timing and frequency of monitoring efforts, and the field and laboratory procedures. The representativeness of data will be maintained by the use of established field and laboratory procedures and their consistent application.

Comparability

Comparability expresses the confidence with which one data set can be compared to another based on using USEPA-defined procedures, where available. If USEPA procedures are not available, the procedures have been defined or referenced in this SAP.

Sensitivity

Sensitivity is the measure of a concentration at which an analytical method can positively identify and report analytical results. The sensitivity of an analytical method will be indicated by the project-required reporting limits, as compared to the PALs.

Notes:

1. Discussions of precision, accuracy, representativeness (qualitative), completeness, and comparability (qualitative) will be included in the data quality review to describe the impact of data quality on project data quality objectives and data usability. Sensitivity is assessed by comparing non-detect results, LODs, and DLs to the screening levels.

Personnel (Organization and Position/Title) Responsible for Participating in the DUA

- RI Contractor, Bill Hannah, CH2M AM
- RI Contractor, Brett Doerr, CH2M Project Delivery and Quality Manager
- RI Contractor, Dennis Ballam, CH2M PM
- RI Contractor, Camden Robinson, CH2M Project Chemist
- RI Contractor, TBD, CH2M FTL

Documents Used as Input to Each Phase of the DUA

- QAPP
- Daily Reports
- Assessment Reports
- Data Validation Report

Worksheet #37: Data Usability Assessment (continued)

How will the DUA be Documented?

Data usability will be discussed in the DUA Technical Memorandum, which will contain sufficient documentation to support conclusions of the DUA. The following steps describe the documentation and processes that will be used during the DUA and notes how DUA results will be presented so they identify trends, relationships (correlations), and anomalies. Field personnel will submit field data daily for initial QC verification and processing. The QC PM will review the data and submit them as deliverables. Copies of original paper forms will be maintained on site for reference, and the originals will be forwarded to the data coordinator for review, inclusion in the project database, and final storage in the central project files. The documents used as inputs to the DUA include the QAPP, daily field notes, and Data Validation Reports.

How the DUA will be Documented

Step 1 Review the project's objectives and sampling design.

Review the DQOs. Are underlying assumptions valid? Were the project boundaries appropriate? Were sources of uncertainty accounted for and appropriately managed? Summarize any deviations from the planned sampling design and describe their impacts on the DQOs.

Step 2 Review the data verification/validation outputs and evaluate conformance to MPCs documented on Worksheet #28.

Review the data verification/validation reports and supporting data, if necessary (e.g., daily/ weekly QC reports, assessment reports, and corrective action reports. Was the Root Cause Analysis (RCA)/CA effective? Evaluate the implications of unacceptable QC results.

- Evaluate conformance to MPCs documented on Worksheet #28.
- Evaluate data completeness. Were all data inputs satisfied? Identify data gaps.

Step 3 Document data usability, update the CSM, apply decision rules, and draw conclusions.

Assess the performance of the sampling design and Identify any limitations on data use. Considering the implications of any deviations and data gaps, can the data be used as intended? Are the data sufficient to answer the study questions?

- Update the CSMs, apply decision rules, and document conclusions.

Step 4 Document lessons learned and make recommendations.

Summarize lessons learned and make recommendations for changes to DQOs or the sampling design for the next phase of investigation or future investigations.

Prepare the data usability summary report.

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Attachment A
TCLP Analysis

TCLP PESTICIDES 8081B

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

Attn: Camden Robinson

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Project: UXO17 TCRA

ARF: 96859

Sample ID: VE-UXO17-EB01-071521

APPL ID: BA36269

Sample Collection Date: 07/15/21

QCG: #TCLPP-210722A-267475

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8081B/T	4,4'-DDT	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	ALPHA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	ENDRIN	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	GAMMA-BHC (LINDANE)	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	GAMMA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	HEPTACHLOR	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	HEPTACHLOR EPOXIDE	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	METHOXYCHLOR	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	TOXAPHENE	0.40 U	1.0	0.40	0.20	ug/L	07/22/21	08/25/21
EPA 8081B/T	SURROGATE: TETRACHLORO-M-XYLE	50.0	44-124			%	07/22/21	08/25/21

Gamma Chlordane CAS 5566-34-7 is reported as Trans-Chlordane CAS 5103-74-2, based on CRM available for laboratory use. See most recent version of EPA 8081 for more information.

Quant Method:	OCL0824.M
Run #:	0824044
Instrument:	Ethel
Sequence:	210824
Dilution Factor:	1
Initials:	MA

Printed: 9/22/2021 9:51:38 AM

APPL-F1-SC-NoMC-REG MDLs-DOD

TCLP PESTICIDES 8081B

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson
Project: UXO17 TCRA
ARF: 96859
Sample ID: VE-UXO17-CANISTER-01
APPL ID: BA36271
Sample Collection Date: 07/15/21
QCG: #TCLPP-210728A-267547

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8081B/T	4,4'-DDT	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	ALPHA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	ENDRIN	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	GAMMA-BHC (LINDANE)	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	GAMMA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	HEPTACHLOR	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	HEPTACHLOR EPOXIDE	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	METHOXYCHLOR	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	TOXAPHENE	0.40 U	1.0	0.40	0.20	ug/L	07/28/21	09/01/21
EPA 8081B/T	SURROGATE: TETRACHLORO-M-XYLE	49.8	44-124			%	07/28/21	09/01/21

Gamma Chlordane CAS 5566-34-7 is reported as Trans-Chlordane CAS 5103-74-2, based on CRM available for laboratory use. See most recent version of EPA 8081 for more information.

Quant Method:	OCL0901.M
Run #:	0901028
Instrument:	Ethel
Sequence:	210901
Dilution Factor:	1
Initials:	MA

Printed: 9/22/2021 9:51:38 AM
APPL-F1-SC-NoMC-REG MDLs-DOD

Method Blank
TCLP PESTICIDES 8081B

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210722W-36269 - 267475**
Batch ID: #TCLPP-210722A

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	4,4'-DDT	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	ALPHA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	ENDRIN	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	GAMMA-BHC (LINDANE)	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	GAMMA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	HEPTACHLOR	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	HEPTACHLOR EPOXIDE	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	METHOXYCHLOR	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	TOXAPHENE	0.40 U	1.0	0.40	0.20	ug/L	7/22/2021	8/25/2021
BLANK	SURROGATE: TETRACHLORO-M	46.1	44-124			%	7/22/2021	8/25/2021

Gamma Chlordane CAS 5566-34-7 is reported as Trans-Chlordane CAS 5103-74-2, based on CRM available for laboratory use. See most recent version of EPA 8081 for more information.

Quant Method: OCL0824.M
Run #: 0824038
Instrument: Ethel
Sequence: 210824
Initials: MA

GC SC-Blank-REG MDLs-DOD
Printed: 9/22/2021 9:51:43 AM

Method Blank
TCLP PESTICIDES 8081B

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210728S-36271 - 267547**
Batch ID: #TCLPP-210728A

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	4,4'-DDT	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	ALPHA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	ENDRIN	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	GAMMA-BHC (LINDANE)	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	GAMMA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	HEPTACHLOR	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	HEPTACHLOR EPOXIDE	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	METHOXYCHLOR	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	TOXAPHENE	0.40 U	1.0	0.40	0.20	ug/L	7/28/2021	9/1/2021
BLANK	SURROGATE: TETRACHLORO-M	25.6 #	44-124			%	7/28/2021	9/1/2021

= Recovery (or RPD) is outside QC limits.
Gamma Chlordane CAS 5566-34-7 is reported as Trans-Chlordane CAS 5103-74-2, based on CRM available for laboratory use. See most recent version of EPA 8081 for more information.

Quant Method: OCL0901.M
Run #: 0901023
Instrument: Ethel
Sequence: 210901
Initials: MA

GC SC-Blank-REG MDLs-DOD
Printed: 9/22/2021 9:51:43 AM

Laboratory Control Spike Recovery
TCLP PESTICIDES 8081B

APPL ID: **210722W-36269 LCS - 267475**
Batch ID: #TCLPP-210722A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
4,4'-DDT	0.300	0.248	82.7	50-150
ALPHA-CHLORDANE	0.300	0.220	73.3	60-129
ENDRIN	0.300	0.312	104	60-138
GAMMA-BHC (LINDANE)	0.300	0.257	85.7	56-136
GAMMA-CHLORDANE	0.300	0.207	69.0	56-136
HEPTACHLOR	0.300	0.201	67.0	54-130
HEPTACHLOR EPOXIDE	0.300	0.313	104	61-133
METHOXYCHLOR	0.300	0.286	95.3	54-145
TOXAPHENE	2.00	1.55	77.5	33-134
SURROGATE: TETRACHLORO-M-XYLE	0.300	0.138	46.0	44-124

Comments:

Primary	SPK
Quant Method :	OCL0824.M
Extraction Date :	7/22/2021
Analysis Date :	8/25/2021
Instrument :	Ethel
Run :	0824039
Initials :	MA

Printed: 9/22/2021 9:51:26 AM

APPL Standard LCS

Laboratory Control Spike Recovery
TCLP PESTICIDES 8081B

APPL ID: **210728S-36271 LCS - 267547**
Batch ID: #TCLPP-210728A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
4,4'-DDT	0.300	0.264	88.0	50-150
ALPHA-CHLORDANE	0.300	0.194	64.7	60-129
ENDRIN	0.300	0.295	98.3	60-138
GAMMA-BHC (LINDANE)	0.300	0.273	91.0	56-136
GAMMA-CHLORDANE	0.300	0.195	65.0	56-136
HEPTACHLOR	0.300	0.115	38.3 #	54-130
HEPTACHLOR EPOXIDE	0.300	0.251	83.7	61-133
METHOXYCHLOR	0.300	0.349	116	54-145
TOXAPHENE	2.00	1.10	55.0	33-134
SURROGATE: TETRACHLORO-M-XYLE	0.300	0.134	44.7	44-124

= Recovery is outside QC limits.

Comments:

Primary	SPK
Quant Method :	OCL0901.M
Extraction Date :	7/28/2021
Analysis Date :	9/1/2021
Instrument :	Ethel
Run :	0901024
Initials :	MA

Printed: 9/22/2021 9:51:27 AM

APPL Standard LCS

908 North Temperance Ave. ∇ Clovis, CA 93611 ∇ Phone 559-275-2175 ∇ Fax 559-275-4422

Certification Number: CA1312
NELAP Certification number: CA00046
DoD-ELAP Certificate number:4064.01

Data Validation Report

September 3, 2021

CH2M Hill
4000 Embassy Row, #600
Atlanta, Georgia 30328

Attn: Camden Robinson

Title: Report of Data: Case 96859

Project: UXO17 TCRA

Contract #: 10006-7-108210

Dear Ms. Robinson:

Two water and one soil samples were received July 19, 2021. Written results for the requested analyses are being provided on this September 3, 2021.

Results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

If you have any questions or require further information, please contact your APPL Project Manager, Libby Cheeseborough, libby@applinc.com at your convenience. Thank you for choosing APPL, Inc.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. These test results meet all requirements of NELAC and DoD QSM. Release of the hard copy has been authorized by the Laboratory Manager or her designee, as verified by the following signature.

Paula McCartney for

Paula McCartney, Laboratory Director
APPL, Inc.

PM/lac
Enclosure
cc: File

Data Validatable Package
for
UXO17 TCRA
ARF 96859
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CASE NARRATIVE

Case Narrative

ARF: 96859

Project: UXO17 TCRA

Sample Receipt Information:

Two water and one soil samples were received July 19, 2021, at 2.1°C. The samples were assigned Analytical Request Form (ARF) number 96859. The sample numbers and requested analyses were compared to the chains of custody and email communication. No exception was encountered.

Sample Preparation and Analysis:

For the EPA 8081B TCLP analysis, the sample was leached according to EPA method 1311 and the leachate was extracted according to EPA method 3510C.

For the EPA 8151A TCLP analysis, the sample was leached according to EPA method 1311 and the leachate was extracted according the method.

For the EPA 8270D TCLP analysis, the sample was leached according to EPA method 1311 and the leachate was extracted according to EPA method 3510C.

For the EPA 8260B TCLP analysis, the samples were leached according to EPA method 1311 and the leachate was purged according to EPA method 5030B.

For the EPA 6010C TCLP analysis, the sample was leached according to EPA method 1311 and the leachate was digested according to EPA method 3010A.

For the EPA 7470A TCLP analysis, the samples were leached according to EPA method 1311 and the leachate was digested and analyzed according to the method.

Only the portion of the injection log relative to these samples is included. A full sequence log is available upon request. Measurement uncertainty can be reported upon request.

Exceptions, Abnormalities and Deviations:

EPA 8081B: For TCLP extraction, one surrogate recovers below the control limit in the Method Blank. The LCS recovers Heptachlor below the lower control limit.

EPA 8151A: For the TCLP extraction, the surrogate recovers below the lower control limit in the Method Blank.

EPA 8270D: For the TCLP extraction, the surrogate recovers below the lower control limit in the Method Blank. The LCS recovers Pyridine below the lower control limit.

SDG	Received	Client ID	APPL ID	Collected DateTime	Matrix	Method	Method Description
88381	03/16/19	19Q1SS035-SD0201-SO-0	AZ88086	03/14/19 10:57:00 AM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD0201-SO-0	AZ88086	03/14/19 10:57:00 AM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD0201-SO-0	AZ88086	03/14/19 10:57:00 AM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD0201-SO-0	AZ88086	03/14/19 10:57:00 AM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD0201-SO-0	AZ88086	03/14/19 10:57:00 AM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD0201-SO-0	AZ88086	03/14/19 10:57:00 AM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD0201-SO-0	AZ88086	03/14/19 10:57:00 AM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD0201-SO-0	AZ88086	03/14/19 10:57:00 AM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD0201-SO-0	AZ88086	03/14/19 10:57:00 AM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD0201-SO-0	AZ88086	03/14/19 10:57:00 AM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD0201-SO-0	AZ88086	03/14/19 10:57:00 AM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD0201-SO-0	AZ88086	03/14/19 10:57:00 AM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD0202-SO-0	AZ88087	03/14/19 11:10:00 AM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD0202-SO-0	AZ88087	03/14/19 11:10:00 AM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD0202-SO-0	AZ88087	03/14/19 11:10:00 AM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD0202-SO-0	AZ88087	03/14/19 11:10:00 AM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD0202-SO-0	AZ88087	03/14/19 11:10:00 AM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD0202-SO-0	AZ88087	03/14/19 11:10:00 AM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD0202-SO-0	AZ88087	03/14/19 11:10:00 AM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD0202-SO-0	AZ88087	03/14/19 11:10:00 AM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD0202-SO-0	AZ88087	03/14/19 11:10:00 AM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD0202-SO-0	AZ88087	03/14/19 11:10:00 AM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD0202-SO-0	AZ88087	03/14/19 11:10:00 AM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD0202-SO-0	AZ88087	03/14/19 11:10:00 AM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD0901-SO-0	AZ88088	03/14/19 9:28:00 AM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD0901-SO-0	AZ88088	03/14/19 9:28:00 AM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD0901-SO-0	AZ88088	03/14/19 9:28:00 AM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD0901-SO-0	AZ88088	03/14/19 9:28:00 AM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD0901-SO-0	AZ88088	03/14/19 9:28:00 AM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD0901-SO-0	AZ88088	03/14/19 9:28:00 AM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD0901-SO-0	AZ88088	03/14/19 9:28:00 AM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD0901-SO-0	AZ88088	03/14/19 9:28:00 AM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD0901-SO-0	AZ88088	03/14/19 9:28:00 AM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD0901-SO-0	AZ88088	03/14/19 9:28:00 AM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD0901-SO-0	AZ88088	03/14/19 9:28:00 AM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD0901-SO-0	AZ88088	03/14/19 9:28:00 AM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD0902-SO-0	AZ88089	03/14/19 9:45:00 AM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD0902-SO-0	AZ88089	03/14/19 9:45:00 AM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD0902-SO-0	AZ88089	03/14/19 9:45:00 AM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD0902-SO-0	AZ88089	03/14/19 9:45:00 AM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD0902-SO-0	AZ88089	03/14/19 9:45:00 AM	SOIL	EPA 8082A	EPA 8082A SOIL

88381	03/16/19	19Q1SS035-SD0902-SO-0	AZ88089	03/14/19 9:45:00 AM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD0902-SO-0	AZ88089	03/14/19 9:45:00 AM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD0902-SO-0	AZ88089	03/14/19 9:45:00 AM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD0902-SO-0	AZ88089	03/14/19 9:45:00 AM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD0902-SO-0	AZ88089	03/14/19 9:45:00 AM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD0902-SO-0	AZ88089	03/14/19 9:45:00 AM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD0902-SO-0	AZ88089	03/14/19 9:45:00 AM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD2101-SO-0	AZ88090	03/14/19 1:05:00 PM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD2101-SO-0	AZ88090	03/14/19 1:05:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD2101-SO-0	AZ88090	03/14/19 1:05:00 PM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD2101-SO-0	AZ88090	03/14/19 1:05:00 PM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD2101-SO-0	AZ88090	03/14/19 1:05:00 PM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD2101-SO-0	AZ88090	03/14/19 1:05:00 PM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD2101-SO-0	AZ88090	03/14/19 1:05:00 PM	SOIL	EPA 8260C	EPA 8260C SOIL RE-ANALYSIS
88381	03/16/19	19Q1SS035-SD2101-SO-0	AZ88090	03/14/19 1:05:00 PM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD2101-SO-0	AZ88090	03/14/19 1:05:00 PM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD2101-SO-0	AZ88090	03/14/19 1:05:00 PM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD2101-SO-0	AZ88090	03/14/19 1:05:00 PM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD2101-SO-0	AZ88090	03/14/19 1:05:00 PM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD2101-SO-0	AZ88090	03/14/19 1:05:00 PM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD2102-SO-0	AZ88091	03/14/19 12:45:00 PM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD2102-SO-0	AZ88091	03/14/19 12:45:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD2102-SO-0	AZ88091	03/14/19 12:45:00 PM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD2102-SO-0	AZ88091	03/14/19 12:45:00 PM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD2102-SO-0	AZ88091	03/14/19 12:45:00 PM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD2102-SO-0	AZ88091	03/14/19 12:45:00 PM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD2102-SO-0	AZ88091	03/14/19 12:45:00 PM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD2102-SO-0	AZ88091	03/14/19 12:45:00 PM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD2102-SO-0	AZ88091	03/14/19 12:45:00 PM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD2102-SO-0	AZ88091	03/14/19 12:45:00 PM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD2102-SO-0	AZ88091	03/14/19 12:45:00 PM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD2102-SO-0	AZ88091	03/14/19 12:45:00 PM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD2102-SO-1	AZ88092	03/14/19 12:45:00 PM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD2102-SO-1	AZ88092	03/14/19 12:45:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD2102-SO-1	AZ88092	03/14/19 12:45:00 PM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD2102-SO-1	AZ88092	03/14/19 12:45:00 PM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD2102-SO-1	AZ88092	03/14/19 12:45:00 PM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD2102-SO-1	AZ88092	03/14/19 12:45:00 PM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD2102-SO-1	AZ88092	03/14/19 12:45:00 PM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD2102-SO-1	AZ88092	03/14/19 12:45:00 PM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD2102-SO-1	AZ88092	03/14/19 12:45:00 PM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD2102-SO-1	AZ88092	03/14/19 12:45:00 PM	SOIL	EPA 7471B	MERCURY BY EPA 7471B

88381	03/16/19	19Q1SS035-SD2102-SO-1	AZ88092	03/14/19 12:45:00 PM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD2102-SO-1	AZ88092	03/14/19 12:45:00 PM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD2103-SO-0	AZ88093	03/14/19 1:45:00 PM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD2103-SO-0	AZ88093	03/14/19 1:45:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD2103-SO-0	AZ88093	03/14/19 1:45:00 PM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD2103-SO-0	AZ88093	03/14/19 1:45:00 PM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD2103-SO-0	AZ88093	03/14/19 1:45:00 PM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD2103-SO-0	AZ88093	03/14/19 1:45:00 PM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD2103-SO-0	AZ88093	03/14/19 1:45:00 PM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD2103-SO-0	AZ88093	03/14/19 1:45:00 PM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD2103-SO-0	AZ88093	03/14/19 1:45:00 PM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD2103-SO-0	AZ88093	03/14/19 1:45:00 PM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD2103-SO-0	AZ88093	03/14/19 1:45:00 PM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD2103-SO-0	AZ88093	03/14/19 1:45:00 PM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD2201-SO-0	AZ88094	03/14/19 2:20:00 PM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD2201-SO-0	AZ88094	03/14/19 2:20:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD2201-SO-0	AZ88094	03/14/19 2:20:00 PM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD2201-SO-0	AZ88094	03/14/19 2:20:00 PM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD2201-SO-0	AZ88094	03/14/19 2:20:00 PM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD2201-SO-0	AZ88094	03/14/19 2:20:00 PM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD2201-SO-0	AZ88094	03/14/19 2:20:00 PM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD2201-SO-0	AZ88094	03/14/19 2:20:00 PM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD2201-SO-0	AZ88094	03/14/19 2:20:00 PM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD2201-SO-0	AZ88094	03/14/19 2:20:00 PM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD2201-SO-0	AZ88094	03/14/19 2:20:00 PM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD2201-SO-0	AZ88094	03/14/19 2:20:00 PM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD2202-SO-0	AZ88095	03/14/19 2:15:00 PM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD2202-SO-0	AZ88095	03/14/19 2:15:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD2202-SO-0	AZ88095	03/14/19 2:15:00 PM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD2202-SO-0	AZ88095	03/14/19 2:15:00 PM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD2202-SO-0	AZ88095	03/14/19 2:15:00 PM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD2202-SO-0	AZ88095	03/14/19 2:15:00 PM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD2202-SO-0	AZ88095	03/14/19 2:15:00 PM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD2202-SO-0	AZ88095	03/14/19 2:15:00 PM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD2202-SO-0	AZ88095	03/14/19 2:15:00 PM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD2202-SO-0	AZ88095	03/14/19 2:15:00 PM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD2202-SO-0	AZ88095	03/14/19 2:15:00 PM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD2202-SO-0	AZ88095	03/14/19 2:15:00 PM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD2203-SO-0	AZ88096	03/14/19 3:00:00 PM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD2203-SO-0	AZ88096	03/14/19 3:00:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD2203-SO-0	AZ88096	03/14/19 3:00:00 PM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD2203-SO-0	AZ88096	03/14/19 3:00:00 PM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS

88381	03/16/19	19Q1SS035-SD2203-SO-0	AZ88096	03/14/19 3:00:00 PM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD2203-SO-0	AZ88096	03/14/19 3:00:00 PM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD2203-SO-0	AZ88096	03/14/19 3:00:00 PM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD2203-SO-0	AZ88096	03/14/19 3:00:00 PM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD2203-SO-0	AZ88096	03/14/19 3:00:00 PM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD2203-SO-0	AZ88096	03/14/19 3:00:00 PM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD2203-SO-0	AZ88096	03/14/19 3:00:00 PM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD2203-SO-0	AZ88096	03/14/19 3:00:00 PM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	3060A/7199	3060A/7199 HEXAVALENT CHROMIUM IN SOIL
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	EPA 9045C	pH in soils by SW846 9045C
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	WalkBlk	TOC soil by Walkley Black
88381	03/16/19	19Q1SS035-SD1801-SO-0	AZ88097	03/14/19 9:56:00 AM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	EPA 8081B	EPA 8081B OCL SOIL RE-EXTRACTION
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	EPA 8260C	EPA 8260C SOIL RE-ANALYSIS
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD1901-SO-0	AZ88098	03/14/19 12:05:00 PM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD2001-SO-0	AZ88099	03/14/19 2:30:00 PM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD2001-SO-0	AZ88099	03/14/19 2:30:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD2001-SO-0	AZ88099	03/14/19 2:30:00 PM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD2001-SO-0	AZ88099	03/14/19 2:30:00 PM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS

88381	03/16/19	19Q1SS035-SD2001-SO-0	AZ88099	03/14/19 2:30:00 PM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD2001-SO-0	AZ88099	03/14/19 2:30:00 PM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD2001-SO-0	AZ88099	03/14/19 2:30:00 PM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD2001-SO-0	AZ88099	03/14/19 2:30:00 PM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD2001-SO-0	AZ88099	03/14/19 2:30:00 PM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD2001-SO-0	AZ88099	03/14/19 2:30:00 PM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD2001-SO-0	AZ88099	03/14/19 2:30:00 PM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD2001-SO-0	AZ88099	03/14/19 2:30:00 PM	SOIL	WalkBlk	TOC soil by Walkley Black
88381	03/16/19	19Q1SS035-SD2001-SO-0	AZ88099	03/14/19 2:30:00 PM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD2301-SO-0	AZ88100	03/14/19 3:35:00 PM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD2301-SO-0	AZ88100	03/14/19 3:35:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD2301-SO-0	AZ88100	03/14/19 3:35:00 PM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD2301-SO-0	AZ88100	03/14/19 3:35:00 PM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD2301-SO-0	AZ88100	03/14/19 3:35:00 PM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD2301-SO-0	AZ88100	03/14/19 3:35:00 PM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SD2301-SO-0	AZ88100	03/14/19 3:35:00 PM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD2301-SO-0	AZ88100	03/14/19 3:35:00 PM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD2301-SO-0	AZ88100	03/14/19 3:35:00 PM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD2301-SO-0	AZ88100	03/14/19 3:35:00 PM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD2301-SO-0	AZ88100	03/14/19 3:35:00 PM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD2301-SO-0	AZ88100	03/14/19 3:35:00 PM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SDTB02L	AZ88101	03/14/19 8:00:00 AM	SOIL	EPA 8260C	EPA 8260C SOIL
88381	03/16/19	19Q1SS035-SDTB01W	AZ88102	03/12/19 8:00:00 AM	WATER	EPA 8260C	EPA 8260C WATER
88381	03/16/19	19Q1SS035-SDTB01W	AZ88102	03/12/19 8:00:00 AM	WATER	AK101	AK101 MS GASOLINE RANGE ORGANICS W
88381	03/16/19	19Q1SS035-SDEB01	AZ88105	03/12/19 6:00:00 PM	WATER	EPA 537m	EPA 537-M PFAS IN WASTEWATER
88381	03/16/19	19Q1SS035-SDEB01	AZ88105	03/12/19 6:00:00 PM	WATER	6020A/3010A	EPA 6020A WATER TOTAL
88381	03/16/19	19Q1SS035-SDEB01	AZ88105	03/12/19 6:00:00 PM	WATER	EPA 7199	Hexavalent Cr by EPA 7199
88381	03/16/19	19Q1SS035-SDEB01	AZ88105	03/12/19 6:00:00 PM	WATER	EPA 8081B	EPA 8081B WATER
88381	03/16/19	19Q1SS035-SDEB01	AZ88105	03/12/19 6:00:00 PM	WATER	EPA 8081B	EPA 8081B WATER RE-EXTRACT
88381	03/16/19	19Q1SS035-SDEB01	AZ88105	03/12/19 6:00:00 PM	WATER	EPA 8290A	EPA 8290A - DIOXINS & FURANS
88381	03/16/19	19Q1SS035-SDEB01	AZ88105	03/12/19 6:00:00 PM	WATER	EPA 8082A	EPA 8082A WATER
88381	03/16/19	19Q1SS035-SDEB01	AZ88105	03/12/19 6:00:00 PM	WATER	EPA 8260C	EPA 8260C WATER
88381	03/16/19	19Q1SS035-SDEB01	AZ88105	03/12/19 6:00:00 PM	WATER	EPA 8270D	EPA 8270D WATER
88381	03/16/19	19Q1SS035-SDEB01	AZ88105	03/12/19 6:00:00 PM	WATER	AK101	AK101 MS GASOLINE RANGE ORGANICS W
88381	03/16/19	19Q1SS035-SDEB01	AZ88105	03/12/19 6:00:00 PM	WATER	AK102	AK102 DRO IN WATER
88381	03/16/19	19Q1SS035-SDEB01	AZ88105	03/12/19 6:00:00 PM	WATER	AK103	AK103 RRO IN WATER
88381	03/16/19	19Q1SS035-SDEB01	AZ88105	03/12/19 6:00:00 PM	WATER	7470A/7470A	EPA 7470A TOTAL MERCURY
88381	03/16/19	19Q1SS035-SDEB01	AZ88105	03/12/19 6:00:00 PM	WATER	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SDEB02	AZ88106	03/13/19 4:22:00 PM	WATER	EPA 537m	EPA 537-M PFAS IN WASTEWATER
88381	03/16/19	19Q1SS035-SDEB02	AZ88106	03/13/19 4:22:00 PM	WATER	6020A/3010A	EPA 6020A WATER TOTAL
88381	03/16/19	19Q1SS035-SDEB02	AZ88106	03/13/19 4:22:00 PM	WATER	EPA 7199	Hexavalent Cr by EPA 7199
88381	03/16/19	19Q1SS035-SDEB02	AZ88106	03/13/19 4:22:00 PM	WATER	EPA 8081B	EPA 8081B WATER

88381	03/16/19	19Q1SS035-SDEB02	AZ88106	03/13/19 4:22:00 PM	WATER	EPA 8081B	EPA 8081B WATER RE-EXTRACT
88381	03/16/19	19Q1SS035-SDEB02	AZ88106	03/13/19 4:22:00 PM	WATER	EPA 8290A	EPA 8290A - DIOXINS & FURANS
88381	03/16/19	19Q1SS035-SDEB02	AZ88106	03/13/19 4:22:00 PM	WATER	EPA 8082A	EPA 8082A WATER
88381	03/16/19	19Q1SS035-SDEB02	AZ88106	03/13/19 4:22:00 PM	WATER	EPA 8260C	EPA 8260C WATER
88381	03/16/19	19Q1SS035-SDEB02	AZ88106	03/13/19 4:22:00 PM	WATER	EPA 8270D	EPA 8270D WATER
88381	03/16/19	19Q1SS035-SDEB02	AZ88106	03/13/19 4:22:00 PM	WATER	AK101	AK101 MS GASOLINE RANGE ORGANICS W
88381	03/16/19	19Q1SS035-SDEB02	AZ88106	03/13/19 4:22:00 PM	WATER	AK102	AK102 DRO IN WATER
88381	03/16/19	19Q1SS035-SDEB02	AZ88106	03/13/19 4:22:00 PM	WATER	AK103	AK103 RRO IN WATER
88381	03/16/19	19Q1SS035-SDEB02	AZ88106	03/13/19 4:22:00 PM	WATER	7470A/7470A	EPA 7470A TOTAL MERCURY
88381	03/16/19	19Q1SS035-SDEB02	AZ88106	03/13/19 4:22:00 PM	WATER	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SDEB03	AZ88107	03/14/19 3:00:00 PM	WATER	EPA 537m	EPA 537-M PFAS IN WASTEWATER
88381	03/16/19	19Q1SS035-SDEB03	AZ88107	03/14/19 3:00:00 PM	WATER	6020A/3010A	EPA 6020A WATER TOTAL
88381	03/16/19	19Q1SS035-SDEB03	AZ88107	03/14/19 3:00:00 PM	WATER	EPA 8081B	EPA 8081B WATER
88381	03/16/19	19Q1SS035-SDEB03	AZ88107	03/14/19 3:00:00 PM	WATER	EPA 8081B	EPA 8081B WATER RE-EXTRACT
88381	03/16/19	19Q1SS035-SDEB03	AZ88107	03/14/19 3:00:00 PM	WATER	EPA 8290A	EPA 8290A - DIOXINS & FURANS
88381	03/16/19	19Q1SS035-SDEB03	AZ88107	03/14/19 3:00:00 PM	WATER	EPA 8082A	EPA 8082A WATER
88381	03/16/19	19Q1SS035-SDEB03	AZ88107	03/14/19 3:00:00 PM	WATER	EPA 8260C	EPA 8260C WATER
88381	03/16/19	19Q1SS035-SDEB03	AZ88107	03/14/19 3:00:00 PM	WATER	EPA 8270D	EPA 8270D WATER
88381	03/16/19	19Q1SS035-SDEB03	AZ88107	03/14/19 3:00:00 PM	WATER	AK101	AK101 MS GASOLINE RANGE ORGANICS W
88381	03/16/19	19Q1SS035-SDEB03	AZ88107	03/14/19 3:00:00 PM	WATER	AK102	AK102 DRO IN WATER
88381	03/16/19	19Q1SS035-SDEB03	AZ88107	03/14/19 3:00:00 PM	WATER	AK103	AK103 RRO IN WATER
88381	03/16/19	19Q1SS035-SDEB03	AZ88107	03/14/19 3:00:00 PM	WATER	7470A/7470A	EPA 7470A TOTAL MERCURY
88381	03/16/19	19Q1SS035-SDEB03	AZ88107	03/14/19 3:00:00 PM	WATER	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD1301-SO-0	AZ88108	03/13/19 10:55:00 AM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD1301-SO-0	AZ88108	03/13/19 10:55:00 AM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD1301-SO-0	AZ88108	03/13/19 10:55:00 AM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD1301-SO-0	AZ88108	03/13/19 10:55:00 AM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD1301-SO-0	AZ88108	03/13/19 10:55:00 AM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD1301-SO-0	AZ88108	03/13/19 10:55:00 AM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD1301-SO-0	AZ88108	03/13/19 10:55:00 AM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD1301-SO-0	AZ88108	03/13/19 10:55:00 AM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD1301-SO-0	AZ88108	03/13/19 10:55:00 AM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD1301-SO-0	AZ88108	03/13/19 10:55:00 AM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD1301-SO-0	AZ88108	03/13/19 10:55:00 AM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD1302-SO-0	AZ88109	03/13/19 11:15:00 AM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD1302-SO-0	AZ88109	03/13/19 11:15:00 AM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD1302-SO-0	AZ88109	03/13/19 11:15:00 AM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD1302-SO-0	AZ88109	03/13/19 11:15:00 AM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD1302-SO-0	AZ88109	03/13/19 11:15:00 AM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD1302-SO-0	AZ88109	03/13/19 11:15:00 AM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD1302-SO-0	AZ88109	03/13/19 11:15:00 AM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD1302-SO-0	AZ88109	03/13/19 11:15:00 AM	SOIL	AK103	AK103 RRO IN SOIL

88381	03/16/19	19Q1SS035-SD1302-SO-0	AZ88109	03/13/19 11:15:00 AM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD1302-SO-0	AZ88109	03/13/19 11:15:00 AM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD1302-SO-0	AZ88109	03/13/19 11:15:00 AM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD1601-SO-0	AZ88110	03/13/19 9:05:00 AM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD1601-SO-0	AZ88110	03/13/19 9:05:00 AM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD1601-SO-0	AZ88110	03/13/19 9:05:00 AM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD1601-SO-0	AZ88110	03/13/19 9:05:00 AM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD1601-SO-0	AZ88110	03/13/19 9:05:00 AM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD1601-SO-0	AZ88110	03/13/19 9:05:00 AM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD1601-SO-0	AZ88110	03/13/19 9:05:00 AM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD1601-SO-0	AZ88110	03/13/19 9:05:00 AM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD1601-SO-0	AZ88110	03/13/19 9:05:00 AM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD1601-SO-0	AZ88110	03/13/19 9:05:00 AM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD1601-SO-0	AZ88110	03/13/19 9:05:00 AM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD1602-SO-0	AZ88111	03/13/19 9:20:00 AM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD1602-SO-0	AZ88111	03/13/19 9:20:00 AM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD1602-SO-0	AZ88111	03/13/19 9:20:00 AM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD1602-SO-0	AZ88111	03/13/19 9:20:00 AM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD1602-SO-0	AZ88111	03/13/19 9:20:00 AM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD1602-SO-0	AZ88111	03/13/19 9:20:00 AM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD1602-SO-0	AZ88111	03/13/19 9:20:00 AM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD1602-SO-0	AZ88111	03/13/19 9:20:00 AM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD1602-SO-0	AZ88111	03/13/19 9:20:00 AM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD1602-SO-0	AZ88111	03/13/19 9:20:00 AM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD1602-SO-0	AZ88111	03/13/19 9:20:00 AM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD0101-SO-0	AZ88112	03/13/19 4:25:00 PM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD0101-SO-0	AZ88112	03/13/19 4:25:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD0101-SO-0	AZ88112	03/13/19 4:25:00 PM	SOIL	3060A/7199	3060A/7199 HEXAVALENT CHROMIUM IN SOIL
88381	03/16/19	19Q1SS035-SD0101-SO-0	AZ88112	03/13/19 4:25:00 PM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD0101-SO-0	AZ88112	03/13/19 4:25:00 PM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD0101-SO-0	AZ88112	03/13/19 4:25:00 PM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD0101-SO-0	AZ88112	03/13/19 4:25:00 PM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD0101-SO-0	AZ88112	03/13/19 4:25:00 PM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD0101-SO-0	AZ88112	03/13/19 4:25:00 PM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD0101-SO-0	AZ88112	03/13/19 4:25:00 PM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD0101-SO-0	AZ88112	03/13/19 4:25:00 PM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD0101-SO-0	AZ88112	03/13/19 4:25:00 PM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD0501-SO-0	AZ88113	03/13/19 1:00:00 PM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD0501-SO-0	AZ88113	03/13/19 1:00:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD0501-SO-0	AZ88113	03/13/19 1:00:00 PM	SOIL	3060A/7199	3060A/7199 HEXAVALENT CHROMIUM IN SOIL
88381	03/16/19	19Q1SS035-SD0501-SO-0	AZ88113	03/13/19 1:00:00 PM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD0501-SO-0	AZ88113	03/13/19 1:00:00 PM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS

88381	03/16/19	19Q1SS035-SD0501-SO-0	AZ88113	03/13/19 1:00:00 PM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD0501-SO-0	AZ88113	03/13/19 1:00:00 PM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD0501-SO-0	AZ88113	03/13/19 1:00:00 PM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD0501-SO-0	AZ88113	03/13/19 1:00:00 PM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD0501-SO-0	AZ88113	03/13/19 1:00:00 PM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD0501-SO-0	AZ88113	03/13/19 1:00:00 PM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD0501-SO-0	AZ88113	03/13/19 1:00:00 PM	SOIL	CLP MOIST	Moisture
88381	03/16/19	19Q1SS035-SD0601-SO-0	AZ88114	03/13/19 11:40:00 AM	SOIL	EPA 537m	EPA 537-M PFAS IN SOIL
88381	03/16/19	19Q1SS035-SD0601-SO-0	AZ88114	03/13/19 11:40:00 AM	SOIL	6020A/3050B	EPA 6020A SOIL
88381	03/16/19	19Q1SS035-SD0601-SO-0	AZ88114	03/13/19 11:40:00 AM	SOIL	EPA 8081B	EPA 8081B OCL SOIL
88381	03/16/19	19Q1SS035-SD0601-SO-0	AZ88114	03/13/19 11:40:00 AM	SOIL	EPA 8290A	EPA 8290A - DIOXINS AND FURANS
88381	03/16/19	19Q1SS035-SD0601-SO-0	AZ88114	03/13/19 11:40:00 AM	SOIL	EPA 8082A	EPA 8082A SOIL
88381	03/16/19	19Q1SS035-SD0601-SO-0	AZ88114	03/13/19 11:40:00 AM	SOIL	EPA 8270D	EPA 8270D SOILS
88381	03/16/19	19Q1SS035-SD0601-SO-0	AZ88114	03/13/19 11:40:00 AM	SOIL	AK102	AK102 DRO IN SOIL
88381	03/16/19	19Q1SS035-SD0601-SO-0	AZ88114	03/13/19 11:40:00 AM	SOIL	AK103	AK103 RRO IN SOIL
88381	03/16/19	19Q1SS035-SD0601-SO-0	AZ88114	03/13/19 11:40:00 AM	SOIL	EPA 7471B	MERCURY BY EPA 7471B
88381	03/16/19	19Q1SS035-SD0601-SO-0	AZ88114	03/13/19 11:40:00 AM	SOIL	8270D-SIM	EPA 8270D SIM
88381	03/16/19	19Q1SS035-SD0601-SO-0	AZ88114	03/13/19 11:40:00 AM	SOIL	CLP MOIST	Moisture

Abbreviations and Flags

FLAG	DESCRIPTION
#	Recovery or RPD outside control limits
*	Recovery or RPD outside control limits
B	Analyte detected in associated method blank
C1	Reason for correction: wrote incorrect response
C2	Reason for correction: calculated incorrectly
C3	Reason for correction: needs to be rechecked
C4	Reason for correction: data not usable
DO	Diluted out
E	Exceeds linear range
F	Estimated value
G1	Includes a wide range of hydrocarbons which does not match our gasoline standard
G10	Includes a match to hydrocarbon profiles within the range of mineral spirits
G11	Includes a match to hydrocarbon profiles within the range of JP-4
G12	Pattern does not match the gasoline standard; the carbon range for this sample is consistent with JP8
G13	Closely resembles the hydrocarbon profile of aviation gasoline
G14	Analyte concentration may be biased due to carry over
G2	Closely resembles the boiling point hydrocarbon profile consistent with weathered gasoline
G3	Includes higher boiling hydrocarbons
G4	Includes dominant peak(s) not indicative of petroleum hydrocarbons
G5	Is mainly dominant peak(s) not indicative of petroleum hydrocarbons
G6	Contains recognizable contaminant peak(s) which has been removed from quantitation
G7	Is mainly a match to hydrocarbons within the range of gasoline
G8	Closely resembles the boiling point hydrocarbon profile consistent with weathered gasoline
G9	Includes hydrocarbons within the range of kerosene
J	Estimated value
M	Matrix effect
MI1	Manual integration: integration does not follow baseline
MI2	Manual integration: non-target peak interference
MI3	Manual integration: to split a peak that was integrated as one peak by the computer
MI4	Manual integration: to integrate a split peak
MI5	Manual integration: the whole peak or part of the peak was not integrated
MI6	Manual integration: computer integrated wrong peak
MI7	Manual integration: other - explain
MDL	Method detection limit
ND	Not detected
NT	Non-target
Q	Acceptance criteria not met
T1 I	Includes wide range of hydrocarbons not indicative of diesel
T1 M	Is mainly wide range of hydrocarbons not necessarily indicative of diesel
T2 I	Includes lower boiling hydrocarbons, i.e. mineral spirits, kerosene, stoddard solvent, white gas
T2 M	Is mainly lower boiling hydrocarbons, i.e. mineral spirits, kerosene, stoddard solvent, white gas
T3 I	Includes higher boiling hydrocarbons, i.e. asphaltene, waster oil, motor oil, or weathered diesel fuel
T3 M	Is mainly higher boiling hydrocarbons, i.e. asphaltene, waster oil, motor oil, or weathered diesel fuel
T4 I	Includes dominant peak(s) not indicative of hydrocarbons
T4 M	Is mainly dominant peak(s) not indicative of hydrocarbons
T5	Contains recognizable contaminant peak(s) which has been removed from quantitation
T6	Is mainly a match to hydrocarbons within range of diesel fuel
T7	Closely resembles the boiling point hydrocarbon profile consistent with diesel fuel
T8	Includes a match to hydrocarbon profiles within range of diesel and kerosene fuel
T9 I	Includes non-diesel hydrocarbons within boiling point range of diesel fuel
T9 M	Is mainly non-diesel hydrocarbons within boiling point range of diesel fuel.
Y	Percent difference between primary and confirmation column > 40%

SAMPLE MANAGEMENT RECORDS

CHAIN OF CUSTODY,

ARF, CRF, AND

CLIENT COMMUNICATION

APPL - Analysis Request Form

96859

Client: CH2M Hill
Address: 400 Embassy Row, #600
Atlanta, GA 30328-7001
Attn: Camden Robinson
Phone: 770-439-8363 Fax: 770-604-9182 ce
Job: UXO17 TCRA
PO #: TO Award # 10006-7-108210
Chain of Custody (Y/N): Y # 071621
RAD Screen (Y/N): Y pH (Y/N): Y
Turn Around Type: STD

Received by: MSA
Date Received: 07/19/21 Time: 09:30
Delivered by: FEDEX
Shuttle Custody Seals (Y/N): Y Time Zone: -4
Chest Temp(s): 2.1°C
Color: VFRG/E-Br/MM-PLB/SUB
Samples Chilled until Placed in Refrig/Freezer: Y
Project Manager: Libby Cheesebor
QC Report Type: DVP3DOD/SNEDD/PR
Due Date: 08/09/21

Comments:
RC: login to Camden.Robinson@jacobs.com
AN: Pkg Style 1; Level 3 DoD QSM v5; Forms: U prints LOD database; J flag parent for MS/MSD failures

FR: pdf of final report to Camden.Robinson@jacobs.com

EDD: SNEDD to Camden.Robinson@jacobs.com

Sample Distribution:
GC: 2-$TCLPHDOD5, 2-$TCLPPBLS, 2-$TCLPSDOD5, 2-$TOXW
Extractions: 2-_SEP002, 2-_SEP004, 2-_SEP025, 2-_TCLP808, 2-_TCLP815, 2-_TCLP827
VOA: 3-$TCLPVDOD5
Metals: 2-$61CTCLP50(As,Ba,Cd,Cr,Pb,Se,Ag), 2-$TCLPGDOD50(As,Ba,Cd,Cr,Pb,Se,Ag)
Wetlab: 1-MOIST
Other: 2-_M3010TCLP, 2-_M7470TCLP, 2-SUB

Charges:

Invoice To:
CH2M HILL INC A/P
PO Box 241329
Denver, CO 80224
APINVOICES@CH2M.com

	Client ID	APPL ID	Sampled	Analyses Requested
1.	VE-UXO17-EB01-071521	BA36269W	07/15/21 08:45	$61CTCLP50(As,Ba,Cd,Cr,Pb,Se,Ag), $TCLPGDOD50(As,Ba,Cd,Cr,Pb,Se,Ag), $TCLPHDOD5, $TCLPPBLS, $TCLPSDOD5, $TCLPVDOD5, $TOXW, SUB
2.	VE-UXO17-TB01-071521	BA36270W	07/15/21 09:00	$TCLPVDOD5
3.	VE-UXO17-CANISTER-01	BA36271S	07/15/21 09:15	$61CTCLP50(As,Ba,Cd,Cr,Pb,Se,Ag), $TCLPGDOD50(As,Ba,Cd,Cr,Pb,Se,Ag), $TCLPHDOD5, $TCLPPBLS, $TCLPSDOD5, $TCLPVDOD5, $TOXW, MOIST, SUB

Note: All times, excluding sample collection times, are Pacific Time Zone unless noted otherwise. Collection times are in: -4 UTC

APPL Sample Receipt Form

ARF# **96859**

Sample	Container Type	Count	p
BA36269	[6] PL 500mL - HNO3	1	1.3
	[11] PL 250mL - NaOH	1	13
	[15] VOAs - NP	3	NA
	[17] Amber Liter	2	NA
	[39] Amber Liter, HCL prsvd	2	1.3
BA36270	[13] VOAs - HCL	4	NA
BA36271	[21] 8oz Jar	2	NA
	[22] 16oz Jar	2	NA

Sample	Container Type	Count	p

960859

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611

ELECTRONIC CHAIN OF CUSTODY RECORD

Phone: (559) 275-2175
Fax: (559) 275-4422
C.O.C. 20210715-APPL-01

Report to: PLEASE PRINT		Invoice to: PLEASE PRINT	
Company Name: CH2MHILL	Phone: 770.439-8363	Company Name: See Contact	Phone:
Address: 400 Embassy Row #600		Address:	
Atlanta GA	Fax:		Fax:
Attn: Camden Robinson		Attn:	

Project Name/Number	Sampler (Print)	Analysis Requested/Method Number	Date Shipped: 7/16/2021
UXO 17 TCRA	Dennis Ballam / Ronny Fields		Carrier: FedEx
Purchase Order Number	Sampler (Signature)		Waybill No.: 774270104538

Sample Identification	Location	Date Collected	Time Collected	Time Zone	No. of Containers	Matrix: Aq	Sed.	Soil		TCLP SW-846 8260C	TCLP SW-846 8270D	TCLP SW-846 8081B	TCLP SW-846 8151A	TCLP SW-846 8010 / 7470	SW-846 9014 Reactivity to Cyanide	SW-846 7.3.4.2 reactivity to Sulfide	Ignitibility					Comments:
VE-UXO17-EB01-071521	QC	7/15/21	08:45	AST	6	✓				X	X	X	X	X	X	X						equipment blank
VE-UXO17-TB01-071521	QC	7/15/21	09:00	AST	4	✓				X												trip blank
VE-UXO17-CANISTER-01	VE-UXO17	7/15/21	09:15	AST	4			✓		X	X	X	X	X	X	X	X					canister
									✓													
									✓													
									✓													
									✓													
									✓													
									✓													
									✓													
									✓													

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Shuttle Temperature:	Turnaround Requested: Check one	Sample Disposal:			
R3C4.0/2.1°C	☑ Standard 2-3 wk ☐ One week ☐ 24/48 Hrs. ☐ Other	☐ Return to client ☐ Disposal by Lab (30-day retention)	not applicable		
Relinquished by sampler:	Date 7/16/21 Time 07:15	Received by:	Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date 7-19-21	Time 9:30	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

Note: The first sampled date of the AFF will be used as the COC number unless indicated otherwise.

COOLER RECEIPT FORM **ARF: 96859**

1) Project: UXO17 TCRA Date Received: 07/19/21

2) Coolers: Number of Coolers: 1

3) YES Were custody seals present and intact?
How many? 1 Name/Date on seal? NOT SALVAGEABLE

4) YES Was there a shipping slip? Carrier name: FEDEX

5) Type of packing in cooler: X bubble wrap __popcorn __foam X plastic bags __other
X wet ice __dry ice __no ice __gel ice

6) YES Were cooler temperatures acceptable?

7) Serial number of calibrated thermometer used: R3 CF:-1.9°C

8) Cooler temp(s): In °C. Thermometer Temp / Corrected Temp
1: 4.0/2.1 2: _____ 3: _____ 4: _____ 5: _____ 6: _____
7: _____ 8: _____ 9: _____ 10: _____ 11: _____ 12: _____

Chain of custody:

9) YES Was a chain of custody received?

10) YES Were the custody papers complete/signed in the appropriate places?

Sample Labels:

11) YES Were all sample labels complete (sample ID, date/time of sampling, etc.)?

12) YES Did all container labels agree with custody papers?

Sample Containers:

13) YES Were all containers sealed in separate bags?

14) YES Did all containers arrive in good condition:(unbroken, no leakage, no cracked/broken lids)?

15) YES Were correct containers and preservatives used for the tests indicated?

16) YES Was a sufficient amount of sample sent for tests indicated?

17) Yes Were bubbles present in volatile samples?
If yes, the following were received with air bubbles:
Larger than a pea: BA36270w04
Smaller than a pea: _____

Preservation Hold time:

18) Yes Was a sufficient amount of holding time remaining to analyze the samples?

19) Yes Was the pH taken of all non-VOA preserved samples and written on the sample container?

20) Yes Was the pH of acid preserved non-VOA samples < 2?

21) Yes Was the pH of the "basic" preserved samples for Cyanide > 12, Sulfide >9, Hexchrom >9?

22) NO Were unpreserved VOA Vials received for VOA Dept analysis?

23) NA If "yes", are the unpreserved VOA vials noted in the ADD TEST FIELD on the ARF?
pH strip lot number: HC029115,HC863463
Lab notified if pH was not adequate: _____

Notes/Deficiencies:

Personnel receiving samples: MS Second reviewer: _____
Personnel labeling samples: MS
Project manager notified: _____ Date/Time of notification _____
Name of client notified: _____ Date/Time of notification _____

Revision: 22, November 5, 2013

SAMPLE RESULTS

TCLP PESTICIDES 8081B

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

Attn: Camden Robinson

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Project: UXO17 TCRA

ARF: 96859

Sample ID: VE-UXO17-EB01-071521

APPL ID: BA36269

Sample Collection Date: 07/15/21

QCG: #TCLPP-210722A-267475

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8081B/T	ALPHA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	ENDRIN	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	GAMMA-BHC (LINDANE)	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	GAMMA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	HEPTACHLOR	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	HEPTACHLOR EPOXIDE	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	METHOXYCHLOR	0.010 U	0.05	0.010	0.005	ug/L	07/22/21	08/25/21
EPA 8081B/T	TOXAPHENE	0.40 U	1.0	0.40	0.20	ug/L	07/22/21	08/25/21
EPA 8081B/T	SURROGATE: TETRACHLORO-M-XYLE	50.0	44-124			%	07/22/21	08/25/21

Gamma Chlordane CAS 5566-34-7 is reported as Trans-Chlordane CAS 5103-74-2, based on CRM available for laboratory use. See most recent version of EPA 8081 for more information.

Quant Method:	OCL0824.M
Run #:	0824044
Instrument:	Ethel
Sequence:	210824
Dilution Factor:	1
Initials:	MA

Printed: 9/2/2021 11:32:32 AM

APPL-F1-SC-NoMC-REG MDLs-DOD

TCLP PESTICIDES 8081B

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

Attn: Camden Robinson

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Project: UXO17 TCRA

ARF: 96859

Sample ID: VE-UXO17-CANISTER-01

APPL ID: BA36271

Sample Collection Date: 07/15/21

QCG: #TCLPP-210728A-267547

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8081B/T	ALPHA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	ENDRIN	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	GAMMA-BHC (LINDANE)	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	GAMMA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	HEPTACHLOR	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	HEPTACHLOR EPOXIDE	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	METHOXYCHLOR	0.010 U	0.05	0.010	0.005	ug/L	07/28/21	09/01/21
EPA 8081B/T	TOXAPHENE	0.40 U	1.0	0.40	0.20	ug/L	07/28/21	09/01/21
EPA 8081B/T	SURROGATE: TETRACHLORO-M-XYLE	49.8	44-124			%	07/28/21	09/01/21

Gamma Chlordane CAS 5566-34-7 is reported as Trans-Chlordane CAS 5103-74-2, based on CRM available for laboratory use. See most recent version of EPA 8081 for more information.

Quant Method:	OCL0901.M
Run #:	0901028
Instrument:	Ethel
Sequence:	210901
Dilution Factor:	1
Initials:	MA

Printed: 9/2/2021 11:32:32 AM

APPL-F1-SC-NoMC-REG MDLs-DOD

TCLP HERBICIDES 8151A

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

Attn: Camden Robinson

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Project: UXO17 TCRA

ARF: 96859

Sample ID: VE-UXO17-EB01-071521

APPL ID: BA36269

Sample Collection Date: 07/15/21

QCG: #TCLPH-210722A-267337

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8151A/T	2,4,5-TP	0.090 U	0.30	0.090	0.045	ug/L	07/22/21	08/10/21
EPA 8151A/T	2,4-D	0.450 U	0.50	0.450	0.152	ug/L	07/22/21	08/10/21
EPA 8151A/T	SURROGATE: 2,4-DCAA (S)	84.2	32-138			%	07/22/21	08/10/21

Quant Method:	HRB0712.M
Run #:	0809H049
Instrument:	Herbie
Sequence:	210809
Dilution Factor:	1
Initials:	JPR

Printed: 8/26/2021 1:44:36 PM

APPL-F1-SC-NoMC-REG MDLs-DOD

TCLP HERBICIDES 8151A

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

Attn: Camden Robinson

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Project: UXO17 TCRA

ARF: 96859

Sample ID: VE-UXO17-CANISTER-01

APPL ID: BA36271

Sample Collection Date: 07/15/21

QCG: #TCLPH-210728A-267346

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8151A/T	2,4,5-TP	0.090 U	0.30	0.090	0.045	ug/L	07/28/21	08/10/21
EPA 8151A/T	2,4-D	0.450 U	0.50	0.450	0.152	ug/L	07/28/21	08/10/21
EPA 8151A/T	SURROGATE: 2,4-DCAA (S)	35.8	32-138			%	07/28/21	08/10/21

Quant Method:	HRB0712.M
Run #:	0809H058
Instrument:	Herbie
Sequence:	210809
Dilution Factor:	1
Initials:	JPR

Printed: 8/26/2021 1:44:36 PM

APPL-F1-SC-NoMC-REG MDLs-DOD

TCLP SEMIVOLATILE 8270D

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson
Project: UXO17 TCRA
ARF: 96859
Sample ID: VE-UXO17-EB01-071521
APPL ID: BA36269
Sample Collection Date: 07/15/21
QCG: #TCLPS-210721A-267359

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8270D/T	1,4-DICHLOROBENZENE	5.00 U	10.0	5.00	1.10	ug/L	07/21/21	08/02/21
EPA 8270D/T	2,4,5-TRICHLOROPHENOL	5.00 U	10.0	5.00	2.30	ug/L	07/21/21	08/02/21
EPA 8270D/T	2,4,6-TRICHLOROPHENOL	5.00 U	10.0	5.00	2.50	ug/L	07/21/21	08/02/21
EPA 8270D/T	2,4-DINITROTOLUENE	5.00 U	10.0	5.00	2.50	ug/L	07/21/21	08/02/21
EPA 8270D/T	2-METHYLPHENOL	5.00 U	10.0	5.00	1.90	ug/L	07/21/21	08/02/21
EPA 8270D/T	3/4-METHYLPHENOL	5.00 U	10.0	5.00	1.70	ug/L	07/21/21	08/02/21
EPA 8270D/T	HEXACHLOROBENZENE	5.00 U	10.0	5.00	2.50	ug/L	07/21/21	08/02/21
EPA 8270D/T	HEXACHLOROBUTADIENE	5.00 U	10.0	5.00	0.90	ug/L	07/21/21	08/02/21
EPA 8270D/T	HEXACHLOROETHANE	5.00 U	10.0	5.00	0.80	ug/L	07/21/21	08/02/21
EPA 8270D/T	NITROBENZENE	5.00 U	10.0	5.00	2.10	ug/L	07/21/21	08/02/21
EPA 8270D/T	PENTACHLOROPHENOL	5.00 U	50.0	5.00	2.50	ug/L	07/21/21	08/02/21
EPA 8270D/T	PHENOL	5.00 U	10.0	5.00	1.00	ug/L	07/21/21	08/02/21
EPA 8270D/T	PYRIDINE	5.00 U	15.0	5.00	2.50	ug/L	07/21/21	08/02/21
EPA 8270D/T	SURROGATE: 2,4,6-TRIBROMOPHENO	65.3	43-140			%	07/21/21	08/02/21
EPA 8270D/T	SURROGATE: 2-FLUORBIPHENYL (S)	58.2	44-119			%	07/21/21	08/02/21
EPA 8270D/T	SURROGATE: 2-FLUOROPHENOL (S)	45.4	19-119			%	07/21/21	08/02/21
EPA 8270D/T	SURROGATE: NITROBENZENE-D5 (S)	69.5	44-120			%	07/21/21	08/02/21
EPA 8270D/T	SURROGATE: PHENOL (S)	30.1	10-115			%	07/21/21	08/02/21
EPA 8270D/T	SURROGATE: TERPHENYL-D14 (S)	70.6	50-134			%	07/21/21	08/02/21

Quant Method: Y0730.M
Run #: 0730Y034
Instrument: Yoda
Sequence: Y210730
Dilution Factor: 1
Initials: MA

Printed: 8/26/2021 5:04:15 PM
APPL-F1-SC-NoMC-REG MDLs-DOD

TCLP SEMIVOLATILE 8270D

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson
Project: UXO17 TCRA
ARF: 96859
Sample ID: VE-UXO17-CANISTER-01
APPL ID: BA36271
Sample Collection Date: 07/15/21
QCG: #TCLPS-210728A-266892

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8270D/T	1,4-DICHLOROBENZENE	5.00 U	10.0	5.00	1.10	ug/L	07/28/21	08/05/21
EPA 8270D/T	2,4,5-TRICHLOROPHENOL	5.00 U	10.0	5.00	2.30	ug/L	07/28/21	08/05/21
EPA 8270D/T	2,4,6-TRICHLOROPHENOL	5.00 U	10.0	5.00	2.50	ug/L	07/28/21	08/05/21
EPA 8270D/T	2,4-DINITROTOLUENE	5.00 U	10.0	5.00	2.50	ug/L	07/28/21	08/05/21
EPA 8270D/T	2-METHYLPHENOL	5.00 U	10.0	5.00	1.90	ug/L	07/28/21	08/05/21
EPA 8270D/T	3/4-METHYLPHENOL	5.00 U	10.0	5.00	1.70	ug/L	07/28/21	08/05/21
EPA 8270D/T	HEXACHLOROBENZENE	5.00 U	10.0	5.00	2.50	ug/L	07/28/21	08/05/21
EPA 8270D/T	HEXACHLOROBUTADIENE	5.00 U	10.0	5.00	0.90	ug/L	07/28/21	08/05/21
EPA 8270D/T	HEXACHLOROETHANE	5.00 U	10.0	5.00	0.80	ug/L	07/28/21	08/05/21
EPA 8270D/T	NITROBENZENE	5.00 U	10.0	5.00	2.10	ug/L	07/28/21	08/05/21
EPA 8270D/T	PENTACHLOROPHENOL	5.00 U	50.0	5.00	2.50	ug/L	07/28/21	08/05/21
EPA 8270D/T	PHENOL	5.00 U	10.0	5.00	1.00	ug/L	07/28/21	08/05/21
EPA 8270D/T	PYRIDINE	5.00 U J	15.0	5.00	2.50	ug/L	07/28/21	08/05/21
EPA 8270D/T	SURROGATE: 2,4,6-TRIBROMOPHENO	73.3	43-140			%	07/28/21	08/05/21
EPA 8270D/T	SURROGATE: 2-FLUORBIPHENYL (S)	51.9	44-119			%	07/28/21	08/05/21
EPA 8270D/T	SURROGATE: 2-FLUOROPHENOL (S)	68.4	19-119			%	07/28/21	08/05/21
EPA 8270D/T	SURROGATE: NITROBENZENE-D5 (S)	78.5	44-120			%	07/28/21	08/05/21
EPA 8270D/T	SURROGATE: PHENOL (S)	51.1	10-115			%	07/28/21	08/05/21
EPA 8270D/T	SURROGATE: TERPHENYL-D14 (S)	71.0	50-134			%	07/28/21	08/05/21

J = Estimated value.

Quant Method: Y0730.M
Run #: 0730Y104
Instrument: Yoda
Sequence: Y210730
Dilution Factor: 1
Initials: MA

Printed: 8/26/2021 5:04:15 PM
APPL-F1-SC-NoMC-REG MDLs-DOD

TCLP 8260C

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson
Project: UXO17 TCRA
ARF: 96859
Sample ID: VE-UXO17-EB01-071521
APPL ID: BA36269
Sample Collection Date: 07/15/21
QCG: #TCLPV-210728AM-267591

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8260C/T	1,1-DICHLOROETHENE	0.50 U	1.0	0.50	0.25	ug/L	07/28/21	07/28/21
EPA 8260C/T	1,2-DICHLOROETHANE	0.30 U	1.0	0.30	0.14	ug/L	07/28/21	07/28/21
EPA 8260C/T	1,4-DICHLOROBENZENE	0.30 U	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	2-BUTANONE (MEK)	2.00 U	10.0	2.00	0.60	ug/L	07/28/21	07/28/21
EPA 8260C/T	BENZENE	0.30 U	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	CARBON TETRACHLORIDE	0.30 U	1.0	0.30	0.10	ug/L	07/28/21	07/28/21
EPA 8260C/T	CHLOROBENZENE	0.50 U	1.0	0.50	0.21	ug/L	07/28/21	07/28/21
EPA 8260C/T	CHLOROFORM	0.30 U	1.0	0.30	0.16	ug/L	07/28/21	07/28/21
EPA 8260C/T	TETRACHLOROETHENE	0.30 U	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	TRICHLOROETHENE	0.30 U	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	VINYL CHLORIDE	0.30 U	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	SURROGATE: 1,2-DICHLOROETHANE-	112	81-118			%	07/28/21	07/28/21
EPA 8260C/T	SURROGATE: 4-BROMOFLUOROBENZ	99.0	85-114			%	07/28/21	07/28/21
EPA 8260C/T	SURROGATE: DIBROMOFLUOROMETH	103	80-119			%	07/28/21	07/28/21
EPA 8260C/T	SURROGATE: TOLUENE-D8 (S)	102	89-112			%	07/28/21	07/28/21

Quant Method: M0721W.M
Run #: 0728M17
Instrument: Max
Sequence: 210721
Dilution Factor: 1
Initials: DA

Printed: 9/3/2021 2:17:36 PM
APPL-F1-SC-NoMC-REG MDLs-DOD

TCLP 8260C

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson
Project: UXO17 TCRA
ARF: 96859
Sample ID: VE-UXO17-TB01-071521
APPL ID: BA36270
Sample Collection Date: 07/15/21
QCG: #TCLPV-210728AM-267591

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8260C/T	1,1-DICHLOROETHENE	0.50 U	1.0	0.50	0.25	ug/L	07/28/21	07/28/21
EPA 8260C/T	1,2-DICHLOROETHANE	0.30 U	1.0	0.30	0.14	ug/L	07/28/21	07/28/21
EPA 8260C/T	1,4-DICHLOROBENZENE	0.30 U	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	2-BUTANONE (MEK)	2.00 U	10.0	2.00	0.60	ug/L	07/28/21	07/28/21
EPA 8260C/T	BENZENE	0.30 U	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	CARBON TETRACHLORIDE	0.30 U	1.0	0.30	0.10	ug/L	07/28/21	07/28/21
EPA 8260C/T	CHLOROBENZENE	0.50 U	1.0	0.50	0.21	ug/L	07/28/21	07/28/21
EPA 8260C/T	CHLOROFORM	0.30 U	1.0	0.30	0.16	ug/L	07/28/21	07/28/21
EPA 8260C/T	TETRACHLOROETHENE	0.30 U	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	TRICHLOROETHENE	0.30 U	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	VINYL CHLORIDE	0.30 U	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	SURROGATE: 1,2-DICHLOROETHANE-	111	81-118			%	07/28/21	07/28/21
EPA 8260C/T	SURROGATE: 4-BROMOFLUOROBENZ	94.4	85-114			%	07/28/21	07/28/21
EPA 8260C/T	SURROGATE: DIBROMOFLUOROMETH	108	80-119			%	07/28/21	07/28/21
EPA 8260C/T	SURROGATE: TOLUENE-D8 (S)	100	89-112			%	07/28/21	07/28/21

Quant Method: M0721W.M
Run #: 0728M11
Instrument: Max
Sequence: 210721
Dilution Factor: 1
Initials: DA

Printed: 9/3/2021 2:17:36 PM
APPL-F1-SC-NoMC-REG MDLs-DOD

TCLP 8260C

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson
Project: UXO17 TCRA
ARF: 96859
Sample ID: VE-UXO17-CANISTER-01
APPL ID: BA36271
Sample Collection Date: 07/15/21
QCG: #TCLPV-210728AM-267591

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8260C/T	1,1-DICHLOROETHENE	0.50 U	1.0	0.50	0.25	ug/L	07/28/21	07/28/21
EPA 8260C/T	1,2-DICHLOROETHANE	0.30 U	1.0	0.30	0.14	ug/L	07/28/21	07/28/21
EPA 8260C/T	1,4-DICHLOROBENZENE	0.30 U	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	2-BUTANONE (MEK)	2.00 U	10.0	2.00	0.60	ug/L	07/28/21	07/28/21
EPA 8260C/T	BENZENE	0.30 U	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	CARBON TETRACHLORIDE	0.30 U	1.0	0.30	0.10	ug/L	07/28/21	07/28/21
EPA 8260C/T	CHLOROBENZENE	0.50 U	1.0	0.50	0.21	ug/L	07/28/21	07/28/21
EPA 8260C/T	CHLOROFORM	0.30 U	1.0	0.30	0.16	ug/L	07/28/21	07/28/21
EPA 8260C/T	TETRACHLOROETHENE	1.7	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	TRICHLOROETHENE	0.30 U	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	VINYL CHLORIDE	0.30 U	1.0	0.30	0.15	ug/L	07/28/21	07/28/21
EPA 8260C/T	SURROGATE: 1,2-DICHLOROETHANE-	113	81-118			%	07/28/21	07/28/21
EPA 8260C/T	SURROGATE: 4-BROMOFLUOROBENZ	103	85-114			%	07/28/21	07/28/21
EPA 8260C/T	SURROGATE: DIBROMOFLUOROMETH	110	80-119			%	07/28/21	07/28/21
EPA 8260C/T	SURROGATE: TOLUENE-D8 (S)	101	89-112			%	07/28/21	07/28/21

Quant Method: M0721W.M
Run #: 0728M18
Instrument: Max
Sequence: 210721
Dilution Factor: 1
Initials: DA

Printed: 9/3/2021 2:17:36 PM
APPL-F1-SC-NoMC-REG MDLs-DOD

Metals Analysis

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

Attn: Camden Robinson
Project: UXO17 TCRA
Sample ID: VE-UXO17-EB01-071521
Sample Collection Date: 7/15/2021

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

ARF: 96859
APPL ID: BA36269

Method	Analyte	Result	LOQ	LOD	DL	Units	DF	Prep Date	Analysis Date
6010C/TCLP^	ARSENIC (AS)	50.00 U	250.0	50.00	22.00	ug/L	5	8/5/2021	8/5/2021
6010C/TCLP^	BARIUM (BA)	5.0 J	250.0	20.00	3.80	ug/L	5	8/5/2021	8/5/2021
6010C/TCLP^	CADMIUM (CD)	15.00 U	250.0	15.00	2.50	ug/L	5	8/5/2021	8/5/2021
6010C/TCLP^	CHROMIUM (CR)	20.00 U	250.0	20.00	6.80	ug/L	5	8/5/2021	8/5/2021
6010C/TCLP^	LEAD (PB)	20.00 U	500.0	20.00	7.90	ug/L	5	8/5/2021	8/5/2021
6010C/TCLP^	SELENIUM (SE)	50.00 U	250.0	50.00	23.00	ug/L	5	8/5/2021	8/5/2021
6010C/TCLP^	SILVER (AG)	4.50 U	50.0	4.50	2.30	ug/L	5	8/5/2021	8/5/2021

J = Estimated value.

Printed: 9/2/2021 12:21:02 PM
APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

Attn: Camden Robinson
Project: UXO17 TCRA
Sample ID: VE-UXO17-CANISTER-01
Sample Collection Date: 7/15/2021

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

ARF: 96859
APPL ID: BA36271

Method	Analyte	Result	LOQ	LOD	DL	Units	DF	Prep Date	Analysis Date
6010C/TCLP^	ARSENIC (AS)	50.00 U	250.0	50.00	22.00	ug/L	5	8/3/2021	8/5/2021
6010C/TCLP^	BARIUM (BA)	1910	250.0	20.00	3.80	ug/L	5	8/3/2021	8/5/2021
6010C/TCLP^	CADMIUM (CD)	8.2 J	250.0	15.00	2.50	ug/L	5	8/3/2021	8/5/2021
6010C/TCLP^	CHROMIUM (CR)	20.00 U	250.0	20.00	6.80	ug/L	5	8/3/2021	8/5/2021
6010C/TCLP^	LEAD (PB)	26.9 J	500.0	20.00	7.90	ug/L	5	8/3/2021	8/5/2021
6010C/TCLP^	SELENIUM (SE)	50.00 U	250.0	50.00	23.00	ug/L	5	8/3/2021	8/5/2021
6010C/TCLP^	SILVER (AG)	4.50 U	50.0	4.50	2.30	ug/L	5	8/3/2021	8/5/2021

J = Estimated value.

Printed: 9/2/2021 12:21:02 PM
APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson
Project: UXO17 TCRA

ARF: 96859

Sample ID: VE-UXO17-EB01-071521

APPL ID: BA36269

Sample Collection Date: 07/15/21

Method	Analyte	Result	LOQ	LOD	DL	Units	DF	Prep Date	Analysis Date
7470A/TCLP	MERCURY (HG)	0.15 U	0.2	0.15	0.06	ug/L	1	08/02/21	08/02/21

Printed: 08/03/21 11:31:51 AM

APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson
Project: UXO17 TCRA

ARF: 96859

Sample ID: VE-UXO17-CANISTER-01

APPL ID: BA36271

Sample Collection Date: 07/15/21

Method	Analyte	Result	LOQ	LOD	DL	Units	DF	Prep Date	Analysis Date
7470A/TCLP	MERCURY (HG)	0.15 U	0.2	0.15	0.06	ug/L	1	08/02/21	08/02/21

Printed: 08/03/21 11:31:51 AM

APPL-F1-SC-NoMC-REG MDLs

Wetlab Results

ARF: 96859

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

Attn: Camden Robinson

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
APPL ID: BA36271	-Client Sample ID: VE-UXO17-CANISTER-01	-Sample Collection Date: 07/15/21	Project: UXO17 TCRA				
CLP MOIST	MOISTURE	18.2	2.0		%	07/21/21	07/22/21

Printed: 07/22/21 3:17:09 PM

QC FORMS

EPA 8081B/TCLP

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 8/25/2021

Matrix: WATER Instrument: Ethel

APPL ID.	Client Sample No.	SURROGATE: TETRACHLORO-M-XYLENE (S)					
		Limits	Result	Qualifier	Limits	Result	Qualifier
210722A-BLK	Blank	44-124	46.1				
210722A-LCS	Lab Control Spike	44-124	46.0				
BA36269	VE-UXO17-EB01-071521	44-124	50.0				

Comments: Batch: #TCLPP-210722A

EPA 8081B/TCLP

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 9/1/2021

Matrix: SOIL Instrument: Ethel

APPL ID.	Client Sample No.	SURROGATE: TETRACHLORO-M-XYLENE (S)					
		Limits	Result	Qualifier	Limits	Result	Qualifier
210728A-BLK	Blank	44-124	25.6	#			
210728A-LCS	Lab Control Spike	44-124	44.7				
BA36271	VE-UXO17-CANISTER-01	44-124	49.8				

Comments: Batch: #TCLPP-210728A

= Recovery outside of Control Limits on Sample.

EPA 8081B/TC

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	8/25/2021
Matrix:	WATER	Instrument:	Ethel
Blank ID:	210722A-BLK	Time Analyzed:	0442

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210722A-BLK	Blank	0824038	8/25/2021 0442
210722A-LCS	Lab Control Spike	0824039	8/25/2021 0504
BA36269	VE-UXO17-EB01-071521	0824044	8/25/2021 0656

Comments: Batch: #TCLPP-210722A

EPA 8081B/TC

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	9/1/2021
Matrix:	SOIL	Instrument:	Ethel
Blank ID:	210728A-BLK	Time Analyzed:	1922

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210728A-BLK	Blank	0901023	9/1/2021 1922
210728A-LCS	Lab Control Spike	0901024	9/1/2021 1945
BA36271	VE-UXO17-CANISTER-01	0901028	9/1/2021 2115

Comments: Batch: #TCLPP-210728A

Method Blank
TCLP PESTICIDES 8081B

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210722W-36269 - 267475**
Batch ID: #TCLPP-210722A

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	ALPHA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	ENDRIN	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	GAMMA-BHC (LINDANE)	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	GAMMA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	HEPTACHLOR	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	HEPTACHLOR EPOXIDE	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	METHOXYCHLOR	0.010 U	0.05	0.010	0.005	ug/L	7/22/2021	8/25/2021
BLANK	TOXAPHENE	0.40 U	1.0	0.40	0.20	ug/L	7/22/2021	8/25/2021
BLANK	SURROGATE: TETRACHLORO-M	46.1	44-124			%	7/22/2021	8/25/2021

Gamma Chlordane CAS 5566-34-7 is reported as Trans-Chlordane CAS 5103-74-2, based on CRM available for laboratory use. See most recent version of EPA 8081 for more information.

Quant Method: OCL0824.M
Run #: 0824038
Instrument: Ethel
Sequence: 210824
Initials: MA

GC SC-Blank-REG MDLs-DOD
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Method Blank
TCLP PESTICIDES 8081B

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210728S-36271 - 267547**
Batch ID: #TCLPP-210728A

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	ALPHA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	ENDRIN	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	GAMMA-BHC (LINDANE)	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	GAMMA-CHLORDANE	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	HEPTACHLOR	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	HEPTACHLOR EPOXIDE	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	METHOXYCHLOR	0.010 U	0.05	0.010	0.005	ug/L	7/28/2021	9/1/2021
BLANK	TOXAPHENE	0.40 U	1.0	0.40	0.20	ug/L	7/28/2021	9/1/2021
BLANK	SURROGATE: TETRACHLORO-M	25.6 #	44-124			%	7/28/2021	9/1/2021

= Recovery (or RPD) is outside QC limits.
Gamma Chlordane CAS 5566-34-7 is reported as Trans-Chlordane CAS 5103-74-2, based on CRM available for laboratory use. See most recent version of EPA 8081 for more information.

Quant Method: OCL0901.M
Run #: 0901023
Instrument: Ethel
Sequence: 210901
Initials: MA

GC SC-Blank-REG MDLs-DOD
Printed: 9/3/2021 1:07:27 PM

EPA 8081B/TC

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	8/25/2021
Matrix:	WATER	Instrument:	Ethel
LCS ID:	210722A-LCS	Time Analyzed:	0504

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210722A-BLK	Blank	0824038	8/25/2021 0442
210722A-LCS	Lab Control Spike	0824039	8/25/2021 0504
BA36269	VE-UXO17-EB01-071521	0824044	8/25/2021 0656

Comments: Batch: #TCLPP-210722A

EPA 8081B/TC

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	9/1/2021
Matrix:	SOIL	Instrument:	Ethel
LCS ID:	210728A-LCS	Time Analyzed:	1945

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210728A-BLK	Blank	0901023	9/1/2021 1922
210728A-LCS	Lab Control Spike	0901024	9/1/2021 1945
BA36271	VE-UXO17-CANISTER-01	0901028	9/1/2021 2115

Comments: Batch: #TCLPP-210728A

Laboratory Control Spike Recovery
TCLP PESTICIDES 8081B

APPL ID: **210722W-36269 LCS - 267475**
Batch ID: #TCLPP-210722A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
ALPHA-CHLORDANE	0.300	0.220	73.3	60-129
ENDRIN	0.300	0.312	104	60-138
GAMMA-BHC (LINDANE)	0.300	0.257	85.7	56-136
GAMMA-CHLORDANE	0.300	0.207	69.0	56-136
HEPTACHLOR	0.300	0.201	67.0	54-130
HEPTACHLOR EPOXIDE	0.300	0.313	104	61-133
METHOXYCHLOR	0.300	0.286	95.3	54-145
TOXAPHENE	2.00	1.55	77.5	33-134
SURROGATE: TETRACHLORO-M-XYLE	0.300	0.138	46.0	44-124

Comments:

Primary	SPK
Quant Method :	OCL0824.M
Extraction Date :	7/22/2021
Analysis Date :	8/25/2021
Instrument :	Ethel
Run :	0824039
Initials :	MA

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APPL Standard LCS

Laboratory Control Spike Recovery
TCLP PESTICIDES 8081B

APPL ID: **210728S-36271 LCS - 267547**
Batch ID: #TCLPP-210728A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
ALPHA-CHLORDANE	0.300	0.194	64.7	60-129
ENDRIN	0.300	0.295	98.3	60-138
GAMMA-BHC (LINDANE)	0.300	0.273	91.0	56-136
GAMMA-CHLORDANE	0.300	0.195	65.0	56-136
HEPTACHLOR	0.300	0.115	38.3 #	54-130
HEPTACHLOR EPOXIDE	0.300	0.251	83.7	61-133
METHOXYCHLOR	0.300	0.349	116	54-145
TOXAPHENE	2.00	1.10	55.0	33-134
SURROGATE: TETRACHLORO-M-XYLE	0.300	0.134	44.7	44-124

= Recovery is outside QC limits.

Comments:

Primary	SPK
Quant Method :	OCL0901.M
Extraction Date :	7/28/2021
Analysis Date :	9/1/2021
Instrument :	Ethel
Run :	0901024
Initials :	MA

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APPL Standard LCS

EPA 8151A/TCLP

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 8/10/2021

Matrix: WATER Instrument: Herbie

APPL ID.	Client Sample No.	SURROGATE: 2,4-DCAA (S)					
		Limits	Result	Qualifier	Limits	Result	Qualifier
210722A-BLK	Blank	32-138	45.0				
210722A-LCS	Lab Control Spike	32-138	84.7				
BA36269	VE-UXO17-EB01-071521	32-138	84.2				

Comments: Batch: #TCLPH-210722A

EPA 8151A/TCLP

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 8/10/2021

Matrix: SOIL Instrument: Herbie

APPL ID.	Client Sample No.	SURROGATE: 2,4-DCAA (S)					
		Limits	Result	Qualifier	Limits	Result	Qualifier
210728A-BLK	Blank	32-138	31.0	#			
210728A-LCS	Lab Control Spike	32-138	41.9				
BA36271	VE-UXO17-CANISTER-01	32-138	35.8				

Comments: Batch: #TCLPH-210728A

= Recovery outside of Control Limits on Sample.

EPA 8151A/TC

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	8/10/2021
Matrix:	WATER	Instrument:	Herbie
Blank ID:	210722A-BLK	Time Analyzed:	1059

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210722A-BLK	Blank	0809H045	8/10/2021 1059
210722A-LCS	Lab Control Spike	0809H046	8/10/2021 1121
BA36269	VE-UXO17-EB01-071521	0809H049	8/10/2021 1229

Comments: Batch: #TCLPH-210722A

EPA 8151A/TC

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	8/10/2021
Matrix:	SOIL	Instrument:	Herbie
Blank ID:	210728A-BLK	Time Analyzed:	1444

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210728A-BLK	Blank	0809H055	8/10/2021 1444
210728A-LCS	Lab Control Spike	0809H056	8/10/2021 1507
BA36271	VE-UXO17-CANISTER-01	0809H058	8/10/2021 1552

Comments: Batch: #TCLPH-210728A

Method Blank
TCLP HERBICIDES 8151A

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210722W-36269 - 267337**
Batch ID: #TCLPH-210722A

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	2,4,5-TP	0.090 U	0.30	0.090	0.045	ug/L	7/22/2021	8/10/2021
BLANK	2,4-D	0.450 U	0.50	0.450	0.152	ug/L	7/22/2021	8/10/2021
BLANK	SURROGATE: 2,4-DCAA (S)	45.0	32-138			%	7/22/2021	8/10/2021

Quant Method: HRB0712.M
Run #: 0809H045
Instrument: Herbie
Sequence: 210809
Initials: JPR

GC SC-Blank-REG MDLs-DOD
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Method Blank
TCLP HERBICIDES 8151A

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210728S-36271 - 267346**
Batch ID: #TCLPH-210728A

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	2,4,5-TP	0.090 U	0.30	0.090	0.045	ug/L	7/28/2021	8/10/2021
BLANK	2,4-D	0.450 U	0.50	0.450	0.152	ug/L	7/28/2021	8/10/2021
BLANK	SURROGATE: 2,4-DCAA (S)	31.0 #	32-138			%	7/28/2021	8/10/2021

= Recovery (or RPD) is outside QC limits.

Quant Method: HRB0712.M
Run #: 0809H055
Instrument: Herbie
Sequence: 210809
Initials: JPR

GC SC-Blank-REG MDLs-DOD
Printed: 8/28/2021 3:40:56 PM

EPA 8151A/TC

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	8/10/2021
Matrix:	WATER	Instrument:	Herbie
LCS ID:	210722A-LCS	Time Analyzed:	1121

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210722A-BLK	Blank	0809H045	8/10/2021 1059
210722A-LCS	Lab Control Spike	0809H046	8/10/2021 1121
BA36269	VE-UXO17-EB01-071521	0809H049	8/10/2021 1229

Comments: Batch: #TCLPH-210722A

EPA 8151A/TC

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	8/10/2021
Matrix:	SOIL	Instrument:	Herbie
LCS ID:	210728A-LCS	Time Analyzed:	1507

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210728A-BLK	Blank	0809H055	8/10/2021 1444
210728A-LCS	Lab Control Spike	0809H056	8/10/2021 1507
BA36271	VE-UXO17-CANISTER-01	0809H058	8/10/2021 1552

Comments: Batch: #TCLPH-210728A

Laboratory Control Spike Recovery
TCLP HERBICIDES 8151A

APPL ID: **210722W-36269 LCS - 267337**
Batch ID: #TCLPH-210722A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
2,4,5-TP	0.640	0.542	84.7	51-134
2,4-D	3.20	2.78	86.9	45-152
SURROGATE: 2,4-DCAA (S)	3.20	2.71	84.7	32-138

Comments:

Primary	SPK
Quant Method :	HRB0712.M
Extraction Date :	7/22/2021
Analysis Date :	8/10/2021
Instrument :	Herbie
Run :	0809H046
Initials :	JPR

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APPL Standard LCS

Laboratory Control Spike Recovery
TCLP HERBICIDES 8151A

APPL ID: **210728S-36271 LCS - 267346**
Batch ID: #TCLPH-210728A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
2,4,5-TP	0.640	0.695	109	51-134
2,4-D	3.20	4.12	129	45-152
SURROGATE: 2,4-DCAA (S)	3.20	1.34	41.9	32-138

Comments:

Primary	SPK
Quant Method :	HRB0712.M
Extraction Date :	7/28/2021
Analysis Date :	8/10/2021
Instrument :	Herbie
Run :	0809H056
Initials :	JPR

Printed: 8/28/2021 2:19:29 PM
APPL Standard LCS

EPA 8270D/TCLP

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 8/2/2021

Matrix: WATER Instrument: Yoda

APPL ID.	Client Sample No.	SURROGATE: 2,4,6-TRIBROMOPHENOL (S)			SURROGATE: 2-FLUORBIPHENYL (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210721A-BLK	Blank	43-140	77.0		44-119	52.9	
210721A-LCS	Lab Control Spike	43-140	87.0		44-119	68.6	
BA36269	VE-UXO17-EB01-071521	43-140	65.3		44-119	58.2	

Comments: Batch: #TCLPS-210721A

EPA 8270D/TCLP

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 8/2/2021

Matrix: WATER Instrument: Yoda

APPL ID.	Client Sample No.	SURROGATE: 2-FLUOROPHENOL (S)			SURROGATE: NITROBENZENE-D5 (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210721A-BLK	Blank	19-119	70.2		44-120	104	
210721A-LCS	Lab Control Spike	19-119	63.5		44-120	92.1	
BA36269	VE-UXO17-EB01-071521	19-119	45.4		44-120	69.5	

Comments: Batch: #TCLPS-210721A

EPA 8270D/TCLP

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 8/2/2021

Matrix: WATER Instrument: Yoda

APPL ID.	Client Sample No.	SURROGATE: PHENOL (S)			SURROGATE: TERPHENYL-D14 (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210721A-BLK	Blank	10-115	46.8		50-134	71.3	
210721A-LCS	Lab Control Spike	10-115	42.9		50-134	84.8	
BA36269	VE-UXO17-EB01-071521	10-115	30.1		50-134	70.6	

Comments: Batch: #TCLPS-210721A

EPA 8270D/TCLP

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 8/5/2021

Matrix: SOIL Instrument: Yoda

APPL ID.	Client Sample No.	SURROGATE: 2,4,6-TRIBROMOPHENOL (S)			SURROGATE: 2-FLUORBIPHENYL (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210728A-BLK	Blank	43-140	68.7		44-119	43.2	#
BA36271	VE-UXO17-CANISTER-01	43-140	73.3		44-119	51.9	
210728A-LCS	Lab Control Spike	43-140	88.5		44-119	58.6	

Comments: Batch: #TCLPS-210728A

= Recovery outside of Control Limits on Sample.

EPA 8270D/TCLP

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 8/5/2021

Matrix: SOIL Instrument: Yoda

APPL ID.	Client Sample No.	SURROGATE: 2-FLUOROPHENOL (S)			SURROGATE: NITROBENZENE-D5 (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210728A-BLK	Blank	19-119	80.7		44-120	81.7	
BA36271	VE-UXO17-CANISTER-01	19-119	68.4		44-120	78.5	
210728A-LCS	Lab Control Spike	19-119	65.0		44-120	80.1	

Comments: Batch: #TCLPS-210728A

EPA 8270D/TCLP

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 8/5/2021

Matrix: SOIL Instrument: Yoda

APPL ID.	Client Sample No.	SURROGATE: PHENOL (S)			SURROGATE: TERPHENYL-D14 (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210728A-BLK	Blank	10-115	64.3		50-134	71.6	
BA36271	VE-UXO17-CANISTER-01	10-115	51.1		50-134	71.0	
210728A-LCS	Lab Control Spike	10-115	46.0		50-134	81.0	

Comments: Batch: #TCLPS-210728A

EPA 8270D/TC

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	8/2/2021
Matrix:	WATER	Instrument:	Yoda
Blank ID:	210721A-BLK	Time Analyzed:	1219

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210721A-BLK	Blank	0730Y018	8/2/2021 1219
210721A-LCS	Lab Control Spike	0730Y020	8/2/2021 1309
BA36269	VE-UXO17-EB01-071521	0730Y034	8/2/2021 1908

Comments: Batch: #TCLPS-210721A

EPA 8270D/TC

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	8/5/2021
Matrix:	SOIL	Instrument:	Yoda
Blank ID:	210728A-BLK	Time Analyzed:	1152

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210728A-BLK	Blank	0730Y101	8/5/2021 1152
BA36271	VE-UXO17-CANISTER-01	0730Y104	8/5/2021 1309
210728A-LCS	Lab Control Spike	0730Y106	8/5/2021 1400

Comments: Batch: #TCLPS-210728A

Method Blank
TCLP SEMIVOLATILE 8270D

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210728S-36271 - 266892**
Batch ID: #TCLPS-210728A

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	1,4-DICHLOROBENZENE	5.00 U	10.0	5.00	1.10	ug/L	7/28/2021	8/5/2021
BLANK	2,4,5-TRICHLOROPHENOL	5.00 U	10.0	5.00	2.30	ug/L	7/28/2021	8/5/2021
BLANK	2,4,6-TRICHLOROPHENOL	5.00 U	10.0	5.00	2.50	ug/L	7/28/2021	8/5/2021
BLANK	2,4-DINITROTOLUENE	5.00 U	10.0	5.00	2.50	ug/L	7/28/2021	8/5/2021
BLANK	2-METHYLPHENOL	5.00 U	10.0	5.00	1.90	ug/L	7/28/2021	8/5/2021
BLANK	3/4-METHYLPHENOL	5.00 U	10.0	5.00	1.70	ug/L	7/28/2021	8/5/2021
BLANK	HEXACHLOROBENZENE	5.00 U	10.0	5.00	2.50	ug/L	7/28/2021	8/5/2021
BLANK	HEXACHLOROBUTADIENE	5.00 U	10.0	5.00	0.90	ug/L	7/28/2021	8/5/2021
BLANK	HEXACHLOROETHANE	5.00 U	10.0	5.00	0.80	ug/L	7/28/2021	8/5/2021
BLANK	NITROBENZENE	5.00 U	10.0	5.00	2.10	ug/L	7/28/2021	8/5/2021
BLANK	PENTACHLOROPHENOL	5.00 U	50.0	5.00	2.50	ug/L	7/28/2021	8/5/2021
BLANK	PHENOL	5.00 U	10.0	5.00	1.00	ug/L	7/28/2021	8/5/2021
BLANK	PYRIDINE	5.00 U	15.0	5.00	2.50	ug/L	7/28/2021	8/5/2021
BLANK	SURROGATE: 2,4,6-TRIBROMOP	68.7	43-140			%	7/28/2021	8/5/2021
BLANK	SURROGATE: 2-FLUORBIPHENY	43.2 #	44-119			%	7/28/2021	8/5/2021
BLANK	SURROGATE: 2-FLUOROPHENO	80.7	19-119			%	7/28/2021	8/5/2021
BLANK	SURROGATE: NITROBENZENE-	81.7	44-120			%	7/28/2021	8/5/2021
BLANK	SURROGATE: PHENOL (S)	64.3	10-115			%	7/28/2021	8/5/2021
BLANK	SURROGATE: TERPHENYL-D14 (	71.6	50-134			%	7/28/2021	8/5/2021

= Recovery (or RPD) is outside QC limits.

Quant Method: Y0730.M
Run #: 0730Y101
Instrument: Yoda
Sequence: Y210730
Initials: MA

GC SC-Blank-REG MDLs-DOD
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Method Blank
TCLP SEMIVOLATILE 8270D

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210721W-36269 - 267359**
Batch ID: #TCLPS-210721A

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	1,4-DICHLOROBENZENE	5.00 U	10.0	5.00	1.10	ug/L	7/21/2021	8/2/2021
BLANK	2,4,5-TRICHLOROPHENOL	5.00 U	10.0	5.00	2.30	ug/L	7/21/2021	8/2/2021
BLANK	2,4,6-TRICHLOROPHENOL	5.00 U	10.0	5.00	2.50	ug/L	7/21/2021	8/2/2021
BLANK	2,4-DINITROTOLUENE	5.00 U	10.0	5.00	2.50	ug/L	7/21/2021	8/2/2021
BLANK	2-METHYLPHENOL	5.00 U	10.0	5.00	1.90	ug/L	7/21/2021	8/2/2021
BLANK	3/4-METHYLPHENOL	5.00 U	10.0	5.00	1.70	ug/L	7/21/2021	8/2/2021
BLANK	HEXACHLOROBENZENE	5.00 U	10.0	5.00	2.50	ug/L	7/21/2021	8/2/2021
BLANK	HEXACHLOROBUTADIENE	5.00 U	10.0	5.00	0.90	ug/L	7/21/2021	8/2/2021
BLANK	HEXACHLOROETHANE	5.00 U	10.0	5.00	0.80	ug/L	7/21/2021	8/2/2021
BLANK	NITROBENZENE	5.00 U	10.0	5.00	2.10	ug/L	7/21/2021	8/2/2021
BLANK	PENTACHLOROPHENOL	5.00 U	50.0	5.00	2.50	ug/L	7/21/2021	8/2/2021
BLANK	PHENOL	5.00 U	10.0	5.00	1.00	ug/L	7/21/2021	8/2/2021
BLANK	PYRIDINE	5.00 U	15.0	5.00	2.50	ug/L	7/21/2021	8/2/2021
BLANK	SURROGATE: 2,4,6-TRIBROMOP	77.0	43-140			%	7/21/2021	8/2/2021
BLANK	SURROGATE: 2-FLUORBIPHENY	52.9	44-119			%	7/21/2021	8/2/2021
BLANK	SURROGATE: 2-FLUOROPHENO	70.2	19-119			%	7/21/2021	8/2/2021
BLANK	SURROGATE: NITROBENZENE-	104	44-120			%	7/21/2021	8/2/2021
BLANK	SURROGATE: PHENOL (S)	46.8	10-115			%	7/21/2021	8/2/2021
BLANK	SURROGATE: TERPHENYL-D14 (	71.3	50-134			%	7/21/2021	8/2/2021

Quant Method: Y0730.M
Run #: 0730Y018
Instrument: Yoda
Sequence: Y210730
Initials: MA

GC SC-Blank-REG MDLs-DOD
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EPA 8270D/TC

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	8/2/2021
Matrix:	WATER	Instrument:	Yoda
LCS ID:	210721A-LCS	Time Analyzed:	1309

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210721A-BLK	Blank	0730Y018	8/2/2021 1219
210721A-LCS	Lab Control Spike	0730Y020	8/2/2021 1309
BA36269	VE-UXO17-EB01-071521	0730Y034	8/2/2021 1908

Comments: Batch: #TCLPS-210721A

EPA 8270D/TC

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	8/5/2021
Matrix:	SOIL	Instrument:	Yoda
LCS ID:	210728A-LCS	Time Analyzed:	1400

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210728A-BLK	Blank	0730Y101	8/5/2021 1152
BA36271	VE-UXO17-CANISTER-01	0730Y104	8/5/2021 1309
210728A-LCS	Lab Control Spike	0730Y106	8/5/2021 1400

Comments: Batch: #TCLPS-210728A

Laboratory Control Spike Recovery
TCLP SEMIVOLATILE 8270D

APPL ID: **210721W-36269 LCS - 267359**
Batch ID: #TCLPS-210721A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
1,4-DICHLOROBENZENE	50.0	21.4	42.8	29-112
2,4,5-TRICHLOROPHENOL	50.0	43.0	86.0	53-123
2,4,6-TRICHLOROPHENOL	50.0	43.0	86.0	50-125
2,4-DINITROTOLUENE	50.0	47.2	94.4	57-128
2-METHYLPHENOL	50.0	39.4	78.8	30-117
3/4-METHYLPHENOL	100	78.7	78.7	29-110
HEXACHLOROBENZENE	50.0	39.4	78.8	53-125
HEXACHLOROBUTADIENE	50.0	14.6	29.2	22-124
HEXACHLOROETHANE	50.0	15.8	31.6	21-115
NITROBENZENE	50.0	45.2	90.4	45-121
PENTACHLOROPHENOL	50.0	42.7	85.4	35-138
PHENOL	50.0	23.5	47.0	10-115
PYRIDINE	50.0	25.9	51.8	48-108
SURROGATE: 2,4,6-TRIBROMOPHENOL	200	174	87.0	43-140
SURROGATE: 2-FLUORBIPHENYL (S)	100	68.6	68.6	44-119
SURROGATE: 2-FLUOROPHENOL (S)	200	127	63.5	19-119
SURROGATE: NITROBENZENE-D5 (S)	100	92.1	92.1	44-120
SURROGATE: PHENOL (S)	200	85.7	42.9	10-115
SURROGATE: TERPHENYL-D14 (S)	100	84.8	84.8	50-134

Comments:

Primary	SPK
Quant Method :	Y0730.M
Extraction Date :	7/21/2021
Analysis Date :	8/2/2021
Instrument :	Yoda
Run :	0730Y020
Initials :	MA

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APPL Standard LCS

Laboratory Control Spike Recovery
TCLP SEMIVOLATILE 8270D

APPL ID: **210728S-36271 LCS - 266892**
Batch ID: #TCLPS-210728A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
1,4-DICHLOROBENZENE	50.0	20.2	40.4	29-112
2,4,5-TRICHLOROPHENOL	50.0	35.7	71.4	53-123
2,4,6-TRICHLOROPHENOL	50.0	35.5	71.0	50-125
2,4-DINITROTOLUENE	50.0	38.3	76.6	57-128
2-METHYLPHENOL	50.0	32.8	65.6	30-117
3/4-METHYLPHENOL	100	65.6	65.6	29-110
HEXACHLOROBENZENE	50.0	33.8	67.6	53-125
HEXACHLOROBUTADIENE	50.0	14.7	29.4	22-124
HEXACHLOROETHANE	50.0	15.8	31.6	21-115
NITROBENZENE	50.0	35.7	71.4	45-121
PENTACHLOROPHENOL	50.0	35.9	71.8	35-138
PHENOL	50.0	20.4	40.8	10-115
PYRIDINE	50.0	21.0	42.0 #	48-108
SURROGATE: 2,4,6-TRIBROMOPHENOL	200	177	88.5	43-140
SURROGATE: 2-FLUORBIPHENYL (S)	100	58.6	58.6	44-119
SURROGATE: 2-FLUOROPHENOL (S)	200	130	65.0	19-119
SURROGATE: NITROBENZENE-D5 (S)	100	80.1	80.1	44-120
SURROGATE: PHENOL (S)	200	91.9	46.0	10-115
SURROGATE: TERPHENYL-D14 (S)	100	81.0	81.0	50-134

= Recovery is outside QC limits.

Comments:

Primary	SPK
Quant Method :	Y0730.M
Extraction Date :	7/28/2021
Analysis Date :	8/5/2021
Instrument :	Yoda
Run :	0730Y106
Initials :	MA

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APPL Standard LCS

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No:
Matrix: Water
ID: 0730Y003.D

SDG No:
Date Analyzed: 7/30/2021
Instrument: Yoda
Time Analyzed: 10:41

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		4 ug/mL 07/16/21	0730Y004.D	7/30/2021 10:56
2		5 ug/mL 07/16/21	0730Y005.D	7/30/2021 11:22
3		10 ug/mL 07/16/21	0730Y006.D	7/30/2021 11:48
4		20 ug/mL 07/16/21	0730Y007.D	7/30/2021 12:13
5		40 ug/mL 07/16/21	0730Y008.D	7/30/2021 12:39
6		50 ug/mL 07/16/21	0730Y009.D	7/30/2021 13:04
7		60 ug/mL 07/16/21	0730Y010.D	7/30/2021 13:29
8		80 ug/mL 07/16/21	0730Y011.D	7/30/2021 13:55
9		100 ug/mL 07/16/21	0730Y012.D	7/30/2021 14:20
10		SS 50 ug/mL 07/16/21	0730Y013.D	7/30/2021 14:45
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80.04% of mass 198	35.8
68	0 - 2% of mass 69	0.0
70	0 - 2.4% of mass 69	0.5
127	10 - 80% of mass 198	56.5
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.8
275	10 - 60% of mass 198	28.8
365	1 - 100% of mass 198	3.8
441	0.01 - 24% of mass 442	15.7
442	50 - 500% of mass 198	125.7
443	15 - 24% of mass 442	19.0

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 96859
Matrix: Water
ID: 0730Y016.D

SDG No: 96859
Date Analyzed: 8/2/2021
Instrument: Yoda
Time Analyzed: 11:26

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		50 ug/mL 07/16/21	0730Y017.D	8/2/2021 11:41
2	Blank	210721A BLK 1/1000	0730Y018.D	8/2/2021 12:19
3	Lab Control Spike	210721A LCS-1 1/1000	0730Y020.D	8/2/2021 13:09
4	VE-UXO17-EB01-071521	BA36269W01 1/1030	0730Y034.D	8/2/2021 19:08
5		50 ug/mL 07/16/21 (2	0730Y035.D	8/2/2021 19:33
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80.04% of mass 198	36.1
68	0 - 2% of mass 69	0.0
70	0 - 2.4% of mass 69	0.6
127	10 - 80% of mass 198	56.9
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.7
275	10 - 60% of mass 198	28.1
365	1 - 100% of mass 198	3.6
441	0.01 - 24% of mass 442	16.6
442	50 - 500% of mass 198	114.8
443	15 - 24% of mass 442	19.2

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 96859
Matrix: Water
ID: 0730Y097.D

SDG No: 96859
Date Analyzed: 8/5/2021
Instrument: Yoda
Time Analyzed: 10:13

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		50 ug/mL 07/16/21 (3	0730Y098.D	8/5/2021 10:28
2	Blank	210728A BLK 1/1000	0730Y101.D	8/5/2021 11:52
3	VE-UXO17-CANISTER-01	BA36271S01 1/1000	0730Y104.D	8/5/2021 13:09
4	Lab Control Spike	210728A LCS-1 1/1000	0730Y106.D	8/5/2021 14:00
5		50 ug/mL 07/16/21 (3	0730Y125.D	8/5/2021 22:09
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80.04% of mass 198	37.2
68	0 - 2% of mass 69	0.0
70	0 - 2.4% of mass 69	0.4
127	10 - 80% of mass 198	57.0
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.8
275	10 - 60% of mass 198	27.1
365	1 - 100% of mass 198	3.4
441	0.01 - 24% of mass 442	16.3
442	50 - 500% of mass 198	109.0
443	15 - 24% of mass 442	19.3

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract:

Lab Code: SDG No.:

Lab File ID (Standard): 0730Y017.D Date Analyzed: 2 Aug 21 11:41

Instrument ID: Yoda Time Analyzed: 2 Aug 21 11:41

GC Column: ID: Heated Purge: (Y/N)

		1,4-dichlorobenzene-D4(IS)		Napthalene-D8(IS)		Acenaphthene-D10(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	992951	5.08	4068310	6.49	2138170	8.51
	UPPER LIMIT	1985902	5.25	8136620	6.66	4276340	8.68
	LOWER LIMIT	496476	4.91	2034155	6.32	1069085	8.34
	SAMPLE NO.						
01	210721A BLK 1/1000	657972	5.08	2702400	6.49	1895620	8.50
02	210721A LCS-1 1/1000	867799	5.07	3566330	6.49	2069580	8.51
03	BA36269W01 1/1030	1085700	5.08	4412340	6.49	2371660	8.50
04	50 ug/mL 07/16/21 (2)	907515	5.08	4158190	6.50	2253930	8.51
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
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21							
22							

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract:

Lab Code: SDG No.:

Lab File ID (Standard): 0730Y017.D Date Analyzed: 2 Aug 21 11:41

Instrument ID: Yoda Time Analyzed: 2 Aug 21 11:41

GC Column: ID: Heated Purge: (Y/N)

		Phenanthrene-D10(IS)		Chrysene-D12(IS)		Perylene-D12(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	3731820	10.24	3027000	13.32	3005150	15.02
	UPPER LIMIT	7463640	10.41	6054000	13.49	6010300	15.19
	LOWER LIMIT	1865910	10.07	1513500	13.15	1502575	14.85
	SAMPLE NO.						
01	210721A BLK 1/1000	3842440	10.23	3197000	13.31	3111360	15.01
02	210721A LCS-1 1/1000	3802860	10.24	3116960	13.32	3091940	15.01
03	BA36269W01 1/1030	4161060	10.23	3470170	13.31	3357560	15.01
04	50 ug/mL 07/16/21 (2)	3949750	10.24	3250950	13.32	3127870	15.01
05							
06							
07							
08							
09							
10							
11							
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19							
20							
21							
22							

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract:

Lab Code: SDG No.:

Lab File ID (Standard): 0730Y098.D Date Analyzed: 5 Aug 21 10:28

Instrument ID: Yoda Time Analyzed: 5 Aug 21 10:28

GC Column: ID: Heated Purge: (Y/N)

		1,4-dichlorobenzene-D4(IS)		Napthalene-D8(IS)		Acenaphthene-D10(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	863964	5.08	3499380	6.49	1908450	8.50
	UPPER LIMIT	1727928	5.25	6998760	6.66	3816900	8.67
	LOWER LIMIT	431982	4.91	1749690	6.32	954225	8.33
	SAMPLE NO.						
01	210728A BLK 1/1000	638906	5.07	2960940	6.49	1921810	8.51
02	BA36271S01 1/1000	659140	5.07	2801870	6.49	1671350	8.50
03	210728A LCS-1 1/1000	758714	5.07	3166410	6.49	1747050	8.51
04	50 ug/mL 07/16/21 (3)	871688	5.08	3572420	6.49	1964700	8.51
05							
06							
07							
08							
09							
10							
11							
12							
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AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract:

Lab Code: SDG No.:

Lab File ID (Standard): 0730Y098.D Date Analyzed: 5 Aug 21 10:28

Instrument ID: Yoda Time Analyzed: 5 Aug 21 10:28

GC Column: ID: Heated Purge: (Y/N)

		Phenanthrene-D10(IS)		Chrysene-D12(IS)		Perylene-D12(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	3358640	10.23	2799370	13.31	2845040	15.01
	UPPER LIMIT	6717280	10.40	5598740	13.48	5690080	15.18
	LOWER LIMIT	1679320	10.06	1399685	13.14	1422520	14.84
	SAMPLE NO.						
01	210728A BLK 1/1000	3391060	10.24	2860390	13.31	2837480	15.01
02	BA36271S01 1/1000	2974600	10.23	2508570	13.31	2500890	15.01
03	210728A LCS-1 1/1000	3150370	10.24	2604400	13.31	2677180	15.01
04	50 ug/mL 07/16/21 (3)	3501420	10.24	2876390	13.32	2911140	15.01
05							
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07							
08							
09							
10							
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21							
22							

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

EPA 8260C/TCLP

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 7/28/2021

Matrix: WATER Instrument: Max

APPL ID.	Client Sample No.	SURROGATE: 1,2-DICHLOROETHANE-D4 (S)			SURROGATE: 4-BROMOFLUOROBENZENE (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210728AM-LCS	Lab Control Spike	81-118	113		85-114	102	
210728AM-LCSD	Lab Control SpikeD	81-118	111		85-114	100	
210728AM-BLK	Blank	81-118	114		85-114	100	
BA36270	VE-UXO17-TB01-071521	81-118	111		85-114	94.4	
BA36269	VE-UXO17-EB01-071521	81-118	112		85-114	99.0	
BA36271	VE-UXO17-CANISTER-01	81-118	113		85-114	103	

Comments: Batch: #TCLPV-210728AM

EPA 8260C/TCLP

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 7/28/2021

Matrix: WATER Instrument: Max

APPL ID.	Client Sample No.	SURROGATE: DIBROMOFLUOROMETHANE (S)			SURROGATE: TOLUENE-D8 (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210728AM-LCS	Lab Control Spike	80-119	109		89-112	101	
210728AM-LCSD	Lab Control SpikeD	80-119	109		89-112	100	
210728AM-BLK	Blank	80-119	106		89-112	100	
BA36270	VE-UXO17-TB01-071521	80-119	108		89-112	100	
BA36269	VE-UXO17-EB01-071521	80-119	103		89-112	102	
BA36271	VE-UXO17-CANISTER-01	80-119	110		89-112	101	

Comments: Batch: #TCLPV-210728AM

EPA 8260C/TC

Form 4

Blank Summary

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 7/28/2021

Matrix: WATER Instrument: Max

Blank ID: 210728AM-BLK Time Analyzed: 1351

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210728AM-LCS	Lab Control Spike	0728M07	7/28/2021 1255
210728AM-LCSD	Lab Control SpikeD	0728M08	7/28/2021 1323
210728AM-BLK	Blank	0728M09	7/28/2021 1351
BA36270	VE-UXO17-TB01-071521	0728M11	7/28/2021 1447
BA36269	VE-UXO17-EB01-071521	0728M17	7/28/2021 1735
BA36271	VE-UXO17-CANISTER-01	0728M18	7/28/2021 1803

Comments: Batch: #TCLPV-210728AM

Method Blank
TCLP 8260C

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210728W-36269 - 267591**
Batch ID: #TCLPV-210728AM

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	1,1-DICHLOROETHENE	0.50 U	1.0	0.50	0.25	ug/L	7/28/2021	7/28/2021
BLANK	1,2-DICHLOROETHANE	0.30 U	1.0	0.30	0.14	ug/L	7/28/2021	7/28/2021
BLANK	1,4-DICHLOROBENZENE	0.30 U	1.0	0.30	0.15	ug/L	7/28/2021	7/28/2021
BLANK	2-BUTANONE (MEK)	2.00 U	10.0	2.00	0.60	ug/L	7/28/2021	7/28/2021
BLANK	BENZENE	0.30 U	1.0	0.30	0.15	ug/L	7/28/2021	7/28/2021
BLANK	CARBON TETRACHLORIDE	0.30 U	1.0	0.30	0.10	ug/L	7/28/2021	7/28/2021
BLANK	CHLOROBENZENE	0.50 U	1.0	0.50	0.21	ug/L	7/28/2021	7/28/2021
BLANK	CHLOROFORM	0.30 U	1.0	0.30	0.16	ug/L	7/28/2021	7/28/2021
BLANK	TETRACHLOROETHENE	0.30 U	1.0	0.30	0.15	ug/L	7/28/2021	7/28/2021
BLANK	TRICHLOROETHENE	0.30 U	1.0	0.30	0.15	ug/L	7/28/2021	7/28/2021
BLANK	VINYL CHLORIDE	0.30 U	1.0	0.30	0.15	ug/L	7/28/2021	7/28/2021
BLANK	SURROGATE: 1,2-DICHLOROET	114	81-118			%	7/28/2021	7/28/2021
BLANK	SURROGATE: 4-BROMOFLUOR	100	85-114			%	7/28/2021	7/28/2021
BLANK	SURROGATE: DIBROMOFLUOR	106	80-119			%	7/28/2021	7/28/2021
BLANK	SURROGATE: TOLUENE-D8 (S)	100	89-112			%	7/28/2021	7/28/2021

Quant Method: M0721W.M
Run #: 0728M09
Instrument: Max
Sequence: 210721
Initials: DA

GC SC-Blank-REG MDLs-DOD
Printed: 9/3/2021 2:18:03 PM

EPA 8260C/TC

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	7/28/2021
Matrix:	WATER	Instrument:	Max
LCS ID:	210728AM-LCS	Time Analyzed:	1255

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210728AM-LCS	Lab Control Spike	0728M07	7/28/2021 1255
210728AM-LCSD	Lab Control SpikeD	0728M08	7/28/2021 1323
210728AM-BLK	Blank	0728M09	7/28/2021 1351
BA36270	VE-UXO17-TB01-071521	0728M11	7/28/2021 1447
BA36269	VE-UXO17-EB01-071521	0728M17	7/28/2021 1735
BA36271	VE-UXO17-CANISTER-01	0728M18	7/28/2021 1803

Comments: Batch: #TCLPV-210728AM

Laboratory Control Spike Recoveries
TCLP 8260C

APPL ID: **210728W-36269 LCS - 267591**
Batch ID: #TCLPV-210728AM

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Lvl ug/L	SPK Result ug/L	DUP Result ug/L	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
1,1-DICHLOROETHENE	10.00	10.2	11.4	102	114	71-131	11.1	20
1,2-DICHLOROETHANE	10.00	10.6	10.8	106	108	73-128	1.9	20
1,4-DICHLOROBENZENE	10.00	9.76	10.3	97.6	103	79-118	5.4	20
2-BUTANONE (MEK)	50.0	53.1	53.3	106	107	56-143	0.38	20
BENZENE	10.00	9.55	9.59	95.5	95.9	79-120	0.42	20
CARBON TETRACHLORIDE	10.00	11.3	10.5	113	105	72-136	7.3	20
CHLOROBENZENE	10.00	10.6	10.4	106	104	82-118	1.9	20
CHLOROFORM	10.00	11.0	10.7	110	107	79-124	2.8	20
TETRACHLOROETHENE	10.00	9.58	10.0	95.8	100	74-129	4.3	20
TRICHLOROETHENE	10.00	10.2	9.24	102	92.4	79-123	9.9	20
VINYL CHLORIDE	10.00	9.41	9.51	94.1	95.1	58-137	1.1	20
SURROGATE: 1,2-DICHLOROETHANE-D	25.0	28.3	27.7	113	111	81-118		
SURROGATE: 4-BROMOFLUOROBENZE	25.0	25.4	25.1	102	100	85-114		
SURROGATE: DIBROMOFLUOROMETH	25.0	27.3	27.3	109	109	80-119		
SURROGATE: TOLUENE-D8 (S)	25.0	25.3	25.1	101	100	89-112		

Comments:

Primary	SPK	DUP
Quant Method :	M0721W.M	M0721W.M
Extraction Date :	7/28/2021	7/28/2021
Analysis Date :	7/28/2021	7/28/2021
Instrument :	Max	Max
Run :	0728M07	0728M08
Initials :	DA	

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No:
Matrix: Water
ID: 0721M01.D

SDG No:
Date Analyzed: 7/21/2021
Instrument: Max
Time Analyzed: 13:42

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		0.3ug/L VOC STD 7/21	0721M02.D	7/21/2021 14:09
2		0.5ug/L VOC STD 7/21	0721M03.D	7/21/2021 14:38
3		1ug/L VOC STD 7/21/2	0721M04.D	7/21/2021 15:06
4		2ug/L VOC STD 7/21/2	0721M05.D	7/21/2021 15:34
5		5ug/L VOC STD 7/21/2	0721M06.D	7/21/2021 16:02
6		10ug/L VOC STD 7/21/	0721M07.D	7/21/2021 16:30
7		20ug/L VOC STD 7/21/	0721M08.D	7/21/2021 16:58
8		40ug/L VOC STD 7/21/	0721M09.D	7/21/2021 17:26
9		100ug/L VOC STD 7/21	0721M10.D	7/21/2021 17:54
10		(SS) 10ug/L VOC STD	0721M12.D	7/21/2021 18:50
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
50	15 - 40% of mass 95	17.5
75	30 - 60.04% of mass 95	52.4
95	100 - 200% of mass 95	100.0
96	5 - 9% of mass 95	6.9
173	0 - 2% of mass 174	0.0
174	50 - 200% of mass 95	112.6
175	5 - 9.02% of mass 174	7.5
176	94.9 - 101% of mass 174	99.0
177	5 - 9% of mass 176	6.4

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 96859
Matrix: Water
ID: 0728M01.D

SDG No: 96859
Date Analyzed: 7/28/2021
Instrument: Max
Time Analyzed: 10:08

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1	Lab Control Spike	210728A TCLP CCV/LCS	0728M07.D	7/28/2021 12:55
2	Lab Control SpikeD	210728A TCLP LCSD 10	0728M08.D	7/28/2021 13:23
3	Blank	210728A TCLP BLK	0728M09.D	7/28/2021 13:51
4	VE-UXO17-TB01-071521	BA36270W01	0728M11.D	7/28/2021 14:47
5	VE-UXO17-EB01-071521	BA36269W07	0728M17.D	7/28/2021 17:35
6	VE-UXO17-CANISTER-01	BA36271S01 TCLP	0728M18.D	7/28/2021 18:03
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
50	15 - 40% of mass 95	18.7
75	30 - 60.04% of mass 95	56.5
95	100 - 200% of mass 95	100.0
96	5 - 9% of mass 95	5.9
173	0 - 2% of mass 174	0.0
174	50 - 200% of mass 95	127.0
175	5 - 9.02% of mass 174	7.7
176	94.9 - 101% of mass 174	100.1
177	5 - 9% of mass 176	7.1

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract:

Lab Code: SDG No.:

Lab File ID (Standard): 0721M08.D Date Analyzed: 07/21/21

Instrument ID: Max Time Analyzed: 16:58

GC Column: ID: Heated Purge: (Y/N)

		Fluorobenzene (IS)		Chlorobenzene-D5 (IS)		1,4-Dichlorobenzene-D (IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	233519	6.25	202149	9.44	132094	11.78
	UPPER LIMIT	467038	6.42	404298	9.61	264188	11.95
	LOWER LIMIT	116760	6.08	101075	9.27	66047	11.61
	SAMPLE NO.						
01	(SS) 10ug/L VOC STD 7	248283	6.25	210517	9.44	132422	11.78
02	210728A TCLP CCV/LC	184823	6.25	165966	9.44	110632	11.78
03	210728A BLK	181477	6.26	159089	9.45	101186	11.78
04	BA36270W01	182309	6.25	159751	9.45	104162	11.78
05	BA36269W07	181327	6.25	156650	9.45	96166	11.78
06	BA36271S01 TCLP	171072	6.25	150357	9.45	98620	11.78
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

6010C/TCLP

Form 4

Blank Summary

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 8/5/2021

Matrix: SOIL Instrument: Cyrus

Blank ID: 210803A-BLK Time Analyzed: 1748

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210803A-LCS	Lab Control Spike	210805A	8/5/2021 1752
210803A-BLK	Blank	210805A	8/5/2021 1748
BA36271	VE-UXO17-CANISTER-01	210805A	8/5/2021 1801

Comments: Batch: #61CTC-210803A

6010C/TCLP

Form 4

Blank Summary

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 8/5/2021

Matrix: WATER Instrument: Cyrus

Blank ID: 210805A-BLK Time Analyzed: 1854

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210805A-LCS	Lab Control Spike	210805A	8/5/2021 1859
210805A-BLK	Blank	210805A	8/5/2021 1854
BA36269	VE-UXO17-EB01-071521	210805A	8/5/2021 1903

Comments: Batch: #61CTC-210805A

Printed: 9/2/2021 12:20:13 PM
Form 4, Blank Summary

METALS BLANK

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Analyte	Result	LOQ	LOD	DL	Units	Prep Date	Analysis Date	QC Group
6010C	ARSENIC (AS)	10.00 U	50.0	10.00	4.30	ug/L	08/05/21	08/05/21	#61CTC-210805A-BA36269
6010C	BARIUM (BA)	4.00 U	50.0	4.00	0.75	ug/L	08/05/21	08/05/21	#61CTC-210805A-BA36269
6010C	CADMIUM (CD)	3.00 U	50.0	3.00	0.51	ug/L	08/05/21	08/05/21	#61CTC-210805A-BA36269
6010C	CHROMIUM (CR)	4.00 U	50.0	4.00	1.37	ug/L	08/05/21	08/05/21	#61CTC-210805A-BA36269
6010C	LEAD (PB)	4.00 U	100.0	4.00	1.58	ug/L	08/05/21	08/05/21	#61CTC-210805A-BA36269
6010C	SELENIUM (SE)	10.00 U	50.0	10.00	4.60	ug/L	08/05/21	08/05/21	#61CTC-210805A-BA36269
6010C	SILVER (AG)	0.90 U	10.0	0.90	0.45	ug/L	08/05/21	08/05/21	#61CTC-210805A-BA36269
6010C	ARSENIC (AS)	10.00 U	50.0	10.00	4.30	ug/L	08/03/21	08/05/21	#61CTC-210803A-BA36271
6010C	BARIUM (BA)	11.4 J	50.0	4.00	0.75	ug/L	08/03/21	08/05/21	#61CTC-210803A-BA36271
6010C	CADMIUM (CD)	3.00 U	50.0	3.00	0.51	ug/L	08/03/21	08/05/21	#61CTC-210803A-BA36271
6010C	CHROMIUM (CR)	4.00 U	50.0	4.00	1.37	ug/L	08/03/21	08/05/21	#61CTC-210803A-BA36271
6010C	LEAD (PB)	4.00 U	100.0	4.00	1.58	ug/L	08/03/21	08/05/21	#61CTC-210803A-BA36271
6010C	SELENIUM (SE)	10.00 U	50.0	10.00	4.60	ug/L	08/03/21	08/05/21	#61CTC-210803A-BA36271
6010C	SILVER (AG)	0.90 U	10.0	0.90	0.45	ug/L	08/03/21	08/05/21	#61CTC-210803A-BA36271

J = Estimated value.

Metals SC-Blank-REG MDLs
Printed: 9/2/2021 12:21:06 PM

6010C/TCLP

Form 4

LCS Summary

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 8/5/2021

Matrix: SOIL Instrument: Cyrus

LCS ID: 210803A-LCS Time Analyzed: 1752

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210803A-LCS	Lab Control Spike	210805A	8/5/2021 1752
210803A-BLK	Blank	210805A	8/5/2021 1748
BA36271	VE-UXO17-CANISTER-01	210805A	8/5/2021 1801

Comments: Batch: #61CTC-210803A

Printed: 9/2/2021 12:20:10 PM
Form 4, LCS Summary

Laboratory Control Spike Recovery

METALS

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits	Extract Date	Analysis Date	QC Group
EPA 6010C	ARSENIC (AS)	250	251	100	87-113	8/3/2021	8/5/2021	#61CTC-210803A-BA36271
EPA 6010C	BARIUM (BA)	250	254	102	88-113	8/3/2021	8/5/2021	#61CTC-210803A-BA36271
EPA 6010C	CADMIUM (CD)	50.0	47.0	94.0	88-113	8/3/2021	8/5/2021	#61CTC-210803A-BA36271
EPA 6010C	CHROMIUM (CR)	250	240	96.0	90-113	8/3/2021	8/5/2021	#61CTC-210803A-BA36271
EPA 6010C	LEAD (PB)	250	238	95.2	86-113	8/3/2021	8/5/2021	#61CTC-210803A-BA36271
EPA 6010C	SELENIUM (SE)	250	248	99.2	83-114	8/3/2021	8/5/2021	#61CTC-210803A-BA36271
EPA 6010C	SILVER (AG)	100.0	103	103	84-115	8/3/2021	8/5/2021	#61CTC-210803A-BA36271

Comments: _____

6010C/TCLP

Form 4

LCS Summary

Lab Name: APPL, Inc. SDG No: 96859

Case No: 96859 Date Analyzed: 8/5/2021

Matrix: WATER Instrument: Cyrus

LCS ID: 210805A-LCS Time Analyzed: 1859

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210805A-LCS	Lab Control Spike	210805A	8/5/2021 1859
210805A-BLK	Blank	210805A	8/5/2021 1854
BA36269	VE-UXO17-EB01-071521	210805A	8/5/2021 1903

Comments: Batch: #61CTC-210805A

Printed: 9/2/2021 12:20:10 PM
Form 4, LCS Summary

Laboratory Control Spike Recovery

METALS

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits	Extract Date	Analysis Date	QC Group
EPA 6010C	ARSENIC (AS)	250	248	99.2	87-113	8/5/2021	8/5/2021	#61CTC-210805A-BA36269
EPA 6010C	BARIUM (BA)	250	251	100	88-113	8/5/2021	8/5/2021	#61CTC-210805A-BA36269
EPA 6010C	CADMIUM (CD)	50.0	47.9	95.8	88-113	8/5/2021	8/5/2021	#61CTC-210805A-BA36269
EPA 6010C	CHROMIUM (CR)	250	247	98.8	90-113	8/5/2021	8/5/2021	#61CTC-210805A-BA36269
EPA 6010C	LEAD (PB)	250	244	97.6	86-113	8/5/2021	8/5/2021	#61CTC-210805A-BA36269
EPA 6010C	SELENIUM (SE)	250	229	91.6	83-114	8/5/2021	8/5/2021	#61CTC-210805A-BA36269
EPA 6010C	SILVER (AG)	100.0	99.1	99.1	84-115	8/5/2021	8/5/2021	#61CTC-210805A-BA36269

Comments: _____

7470A/TCLP

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	08/02/21
Matrix:	SOIL	Instrument:	Freddie
Blank ID:	210802A-BLK	Time Analyzed:	1257

APPL ID.	Client Sample No.	File ID.	Date Analyzed
BA36271	VE-UXO17-CANISTER-01	210802W	08/02/21 1307
210802A-LCSD	Lab Control SpikeD	210802W	08/02/21 1300
210802A-LCS	Lab Control Spike	210802W	08/02/21 1259
210802A-BLK	Blank	210802W	08/02/21 1257

Comments: Batch: #TCLPG-210802A

7470A/TCLP

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	08/02/21
Matrix:	WATER	Instrument:	Freddie
Blank ID:	210802A1-BLK	Time Analyzed:	1302

APPL ID.	Client Sample No.	File ID.	Date Analyzed
BA36269	VE-UXO17-EB01-071521	210802W	08/02/21 1314
210802A1-LCSD	Lab Control SpikeD	210802W	08/02/21 1305
210802A1-LCS	Lab Control Spike	210802W	08/02/21 1304
210802A1-BLK	Blank	210802W	08/02/21 1302

Comments: Batch: #TCLPG-210802A1

METALS BLANK

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Analyte	Result	LOQ	LOD	DL	Units	Prep Date	Analysis Date	QC Group
7470A	MERCURY (HG)	0.15 U	0.2	0.15	0.06	ug/L	08/02/21	08/02/21	ǂTCLPG-210802A1-BA36269
7470A	MERCURY (HG)	0.15 U	0.2	0.15	0.06	ug/L	08/02/21	08/02/21	#TCLPG-210802A-BA36271

Metals SC-Blank-REG MDLs
Printed: 08/03/21 11:32:13 AM

7470A/TCLP

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	08/02/21
Matrix:	SOIL	Instrument:	Freddie
LCS ID:	210802A-LCS	Time Analyzed:	1259

APPL ID.	Client Sample No.	File ID.	Date Analyzed
BA36271	VE-UXO17-CANISTER-01	210802W	08/02/21 1307
210802A-LCSD	Lab Control SpikeD	210802W	08/02/21 1300
210802A-LCS	Lab Control Spike	210802W	08/02/21 1259
210802A-BLK	Blank	210802W	08/02/21 1257

Comments: Batch: #TCLPG-210802A

7470A/TCLP

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96859
Case No:	96859	Date Analyzed:	08/02/21
Matrix:	WATER	Instrument:	Freddie
LCS ID:	210802A1-LCS	Time Analyzed:	1304

APPL ID.	Client Sample No.	File ID.	Date Analyzed
BA36269	VE-UXO17-EB01-071521	210802W	08/02/21 1314
210802A1-LCSD	Lab Control SpikeD	210802W	08/02/21 1305
210802A1-LCS	Lab Control Spike	210802W	08/02/21 1304
210802A1-BLK	Blank	210802W	08/02/21 1302

Comments: Batch: #TCLPG-210802A1

Laboratory Control Spike Recoveries

METALS

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Lvl ug/L	SPK Res ug/L	DUP Res ug/L	SPK % Recov	DUP % Recov	RPD	RPD Max	QC Limits	Extract Date-Spk	Analysis Date-Spk	Extract Date-Dup	Analysis Date-Dup	QC Group
EPA 7470A	MERCURY (HG)	4.00	3.9	3.9	97.5	97.5	0.0	20	82-119	08/02/21	08/02/21	08/02/21	08/02/21	#TCLPG-210802A1-BA362

Comments:

Laboratory Control Spike Recoveries

METALS

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Lvl ug/L	SPK Res ug/L	DUP Res ug/L	SPK % Recov	DUP % Recov	RPD	RPD Max	QC Limits	Extract Date-Spk	Analysis Date-Spk	Extract Date-Dup	Analysis Date-Dup	QC Group
EPA 7470A	MERCURY (HG)	4.00	3.9	3.9	97.5	97.5	0.0	20	82-119	08/02/21	08/02/21	08/02/21	08/02/21	#TCLPG-210802A-BA3627

Comments:

ORGANICS

Calibration Data

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0824

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 8/24/2021
Matrix: Water Instrument: Ethel Initials:

		Compound	0824003.D	0824004.D	0824005.D	0824006.D	0824007.D	0824008.D	0824009.D	0824010.D			Avg	%RSD	Type	r^2	Q
1	S	TCMX		142804000	156183000	123835600	126079065	129714610	124656963	126236166			132787058	9.2	S		
2	TM	HEXACHLOROBENZENE	176486000	160484167	201473100	154943210	156891320	155193557	154281073	156223728			164497019	10	TM		
3	TM	A-BHC	47420500	47037667	57667000	48380920	52567955	54664087	55489740	60330350			52944777	9.4	TM		
4	TM	B-BHC		26290333	45077300	31455910	31234350	31899180	31225065	32474948			32808155	18	TM		
5	TM	G-BHC(LINDANE)	42538500	42508167	50344400	44159050	46878455	48957510	48753173	52726004			47108157	8.0	TM		
6	TM	D-BHC	52226000	49647500	58278950	48797215	50838050	51619135	50120154	53006189			51816649	5.7	TM		
7	TM	HEPTACHLOR	58911500	57641667	73063800	63997930	67075260	69123967	68509743	72626894			66368845	8.7	TM		
8	TM	ALDRIN	154207000	145451500	185835600	174525840	193165300	199596830	200149505	205456176			182298469	12	TM		
9	TM	HEPTACHLOR EPOXIDE	104421500	105108500	135023300	112355870	118191340	120450063	119231493	123658640			117305088	8.6	TM		
10	TM	G-CHLORDANE	132785000	125856500	156950400	134192450	142121510	144911193	144206883	148811062			141229375	7.0	TM		
11	TM	A-ENDOSULFAN	82518000	81934583	99786800	88786360	93251778	95043170	93341708	97576813			91529901	7.2	TM		
12	TM	A-CHLORDANE	126592000	129190500	160440500	135650390	141508895	143284977	141686670	145711132			140508133	7.5	TM		
13	TM	P,P-DDE	117039000	106599667	139169100	125066840	135530290	140819887	140999775	147676508			131612633	11	TM		
14	TM	DIELDRIN	119183500	115330500	145871300	129043220	137391545	141071890	140478833	147359126			134466239	8.9	TM		
15	TM	ENDRIN	75278500	80531167	95600800	79456350	82319760	84476490	83608340	88465844			83717156	7.4	TM		
16	TM	B-ENDOSULFAN	52862500	49678000	60050300	49932620	49448580	49206963	47153723	50904444			51154641	7.7	TM		
17	TM	P,P-DDD	76009000	72696000	89310700	73472720	74600085	74834220	74141355	77235368			76537431	7.0	TM		
18	TM	ENDRIN ALDEHYDE	97270000	78199000	99242900	80672310	79075730	77089890	74042600	77825716			82927268	12	TM		
19	TM	P,P-DDT	93583500	80431500	103663600	83993500	87992130	89276670	87437825	94439578			90102288	7.9	TM		
20	TM	ENDOSULFAN SULFATE	73782000	85188500	96317100	80664630	79289470	80534143	79495193	83438298			82338667	8.0	TM		
21	TM	ENDRIN KETONE	54642000	47929000	59875200	49264920	48795475	49121070	45913940	50356132			50737217	8.8	TM		
22	TM	METHOXYCHLOR	39990500	34166167	41595100	33328650	32465430	32699993	30097528	33023078			34670806	11	TM		
23	S	DECA	231873500	173799667	207064900	154963570	149242135	146799010	141816075	142941926			168562598	20	S		
24		Signal #2											0	0			
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6.304809

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0824

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 8/24/2021
Matrix: Water Instrument: Ethel Initials:

			0824003.D	0824004.D	0824005.D	0824006.D	0824007.D	0824008.D	0824009.D	0824010.D								
		Compound	1	2	3	4	5	6	7	8			Avg	%RSD	Type	r^2	Q
36	S	TCMX #2	308360500	280020833	339969300	265318310	267643855	261065743	258347593	259859856			280073249	10	S		
37	TM	HEXACHLOROBENZENE #2	429884000	354402000	449391600	328095370	317768710	316016040	306942595	309703748			351525508	16	TM		
38	TM	A-BHC #2	232438500	203596500	245059500	200093150	203875020	203836830	201451063	206364596			212089395	8.0	TM		
39	TM	B-BHC #2	146790000	108172667	144223900	103143500	105984660	104012243	102813480	104132824			114909159	17	TM		
40	TM	G-BHC(LINDANE) #2	180250000	188579833	222716900	181696770	183273095	182578810	179236410	183962810			187786829	7.7	TM		
41	TM	D-BHC #2	181127000	156889833	201798300	164656960	162993575	161217423	156711275	159097512			168061485	9.3	TM		
42	TM	HEPTACHLOR #2	157406500	163133833	209099900	171328190	171391855	169053980	165981693	169126796			172065343	9.1	TM		
43	TM	ALDRIN #2	263292000	214931333	287036200	216889700	209977915	204183060	195178873	198110906			223699998	15	TM		
44	TM	HEPTACHLOR EPOXIDE #2	307513500	297618833	349026700	285124490	281158075	274150843	263596228	267667826			290732062	9.5	TM		
45	TM	G-CHLORDANE #2	260761000	311404667	357918400	295683490	294745380	287513767	278095453	282084346			296025813	9.8	TM		
46	TM	A-ENDOSULFAN #2	267414500	214006000	278411400	229607400	231205735	223760013	222318208	226981312			236713071	9.8	TM		
47	TM	A-CHLORDANE #2	133707250	224583083	278670100	229218770	221616650	219815817	207245709	208246735			215388014	19	TM		
48	TM	P,P-DDE #2		295118333	363149300	300841720	298213600	298105033	287630763	289469924			304646953	8.6	TM		
49	TM	DIELDRIN #2	271346500	247747667	301348700	249930100	248035240	250800213	238882033	240257116			256043446	8.1	TM		
50	TM	ENDRIN #2	74879000	115084667	144424500	120409960	119516745	117744933	114002135	115703646			115220698	17	TM		
51	TM	B-ENDOSULFAN #2	114296000	137851833	205965000	177056620	172130785	168640187	163219450	165775988			163116983	17	TM		
52	TM	P,P-DDD #2	169173000	168409833	229838100	187316470	184816325	183993853	176643893	181773896			185245671	10	TM		
53	TM	ENDRIN ALDEHYDE #2		108628000	141465400	123159100	120070245	118686673	113817588	116696212			120360460	8.6	TM		
54	TM	P,P-DDT #2		138161667	176596900	163111660	159231300	158788293	154908090	158785256			158511881	7.2	TM		
55	TM	ENDOSULFAN SULFATE #2		157984167	193246100	175303750	170759835	173296567	167393968	165866482			171978695	6.4	TM		
56	TM	ENDRIN KETONE #2		72034083	100353700	93151780	90381080	88125932	84028508	84767229			87548902	10	TM		
57	TM	METHOXYCHLOR #2		63091500	82564000	78398830	76577935	75344137	72565805	73854070			74628040	8.1	TM		
58	S	DECA #2		197870167	284727300	233748530	229134440	222859280	215178810	216442572			228565871	12	S		
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Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0824

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8/24/2021
Instrument: Ethel
Initial Cal. Date: 8/24/2021
Data File: 0824011.D

		Compound	MEAN	CCRF	%D		%Drift
1	TM	HEXACHLOROBENZENE	164497000	161597000	1.8	TM	
2	TM	A-BHC	52944800	52768700	0.33	TM	
3	TM	B-BHC	32808200	33362600	1.7	TM	
4	TM	G-BHC(LINDANE)	47108200	49130200	4.3	TM	
5	TM	D-BHC	51816600	50871500	1.8	TM	
6	TM	HEPTACHLOR	66368800	72235800	8.8	TM	
7	TM	ALDRIN	182298000	149554000	18	TM	
8	TM	HEPTACHLOR EPOXIDE	117305000	119784000	2.1	TM	
9	TM	G-CHLORDANE	141229000	139843000	0.98	TM	
10	TM	A-ENDOSULFAN	91529900	96059100	4.9	TM	
11	TM	A-CHLORDANE	140508000	143037000	1.8	TM	
12	TM	P,P-DDE	131613000	137405000	4.4	TM	
13	TM	DIELDRIN	134466000	139573000	3.8	TM	
14	TM	ENDRIN	83717200	83460600	0.31	TM	
15	TM	B-ENDOSULFAN	51154600	49649500	2.9	TM	
16	TM	P,P-DDD	76537400	76739100	0.26	TM	
17	TM	ENDRIN ALDEHYDE	82927300	80003400	3.5	TM	
18	TM	P,P-DDT	90102300	89840200	0.29	TM	
19	TM	ENDOSULFAN SULFATE	82338700	80248000	2.5	TM	
20	TM	ENDRIN KETONE	50737200	49143500	3.1	TM	
21	TM	METHOXYCHLOR	34670800	34056700	1.8	TM	
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		Average			3.3		

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0824

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8/24/2021
Instrument: Ethel
Cal. Date: 8/24/2021
Data File: 0824011.D

		Compound	MEAN	CCRF	%D		%Drift
41	TM	HEXACHLOROBENZENE	351526000	334452000	4.9	TM	
42	TM	A-BHC	212089000	209721000	1.1	TM	
43	TM	B-BHC	114909000	110289000	4.0	TM	
44	TM	G-BHC(LINDANE)	187787000	193730000	3.2	TM	
45	TM	D-BHC	168061000	164659000	2.0	TM	
46	TM	HEPTACHLOR	172065000	174743000	1.6	TM	
47	TM	ALDRIN	223700000	212155000	5.2	TM	
48	TM	HEPTACHLOR EPOXIDE	290732000	278736000	4.1	TM	
49	TM	G-CHLORDANE	296026000	285957000	3.4	TM	
50	TM	A-ENDOSULFAN	236713000	229660000	3.0	TM	
51	TM	A-CHLORDANE	215388000	227205000	5.5	TM	
52	TM	P,P-DDE	304647000	303886000	0.25	TM	
53	TM	DIELDRIN	256043000	252098000	1.5	TM	
54	TM	ENDRIN	115221000	122301000	6.1	TM	
55	TM	B-ENDOSULFAN	163117000	177701000	8.9	TM	
56	TM	P,P-DDD	185246000	190428000	2.8	TM	
57	TM	ENDRIN ALDEHYDE	120360000	125041000	3.9	TM	
58	TM	P,P-DDT	158512000	163759000	3.3	TM	
59	TM	ENDOSULFAN SULFATE	171979000	173629000	0.96	TM	
60	TM	ENDRIN KETONE	87548900	89076900	1.7	TM	
61	TM	METHOXYCHLOR	74628000	77643300	4.0	TM	
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		Average			3.4		

Toxaphene analysis by
EPA Method 608/8081 TOXF0824

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 8/24/2021
Matrix: Water Instrument: Ethel Initials:

		Compound	0824012.D 1	0824013.D 2	0824014.D 3	0824015.D 4	0824016.D 5	0824017.D 6	0824018.D 7	0824019.D 8			Avg	%RSD	Type	r^2	Q
1	ANM	Toxaphene Total		1780470	2015655	1697758	1593886	1848495	1809376	1642740			1769769	8.0	ANM		
2	L2AK	Toxaphene	656275	428777	533927	428287	406376	485264	471905	424844			479457	17	L2AK		
3	L2AK	Toxaphene {2}		430210	446560	302908	319462	373749	391696	355597			374312	14	L2AK		
4	L2AK	Toxaphene {3}		268230	411685	413026	327947	383031	374216	345046			360454	14	L2AK		
5	L2AK	Toxaphene {4}			229170	160748	160451	182093	157987	142545			172166	18	L2AK		
6	L2AK	Toxaphene {5}	525459	405481	394317	392787	379649	424359	413572	374709			413792	12	L2AK		
7		Signal #2											0	0			
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2.377181

Toxaphene analysis by
EPA Method 608/8081 TOXF0824

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 8/24/2021
Matrix: Water Instrument: Ethel Initials:

		Compound	1	2	3	4	5	6	7	8			Avg	%RSD	Type	r^2	Q
			0824012.D	0824013.D	0824014.D	0824015.D	0824016.D	0824017.D	0824018.D	0824019.D							
36	ANM	Toxaphene Total #2		3454280	3832410	3181862	3179186	3723071	3534087				3484149	7.8	ANM		
37	L2AKL	Toxaphene #2		507950	599310	396050	404768	466533					474922	18	L2AK	0.991	
38	L2AK	Toxaphene {2} #2	670980	636738	586496	498236	485458	561022	510815	468583			552291	13	L2AK		
39	L2AK	Toxaphene {3} #2	610495	1138745	1226006	1026939	970068	1128220	1057673	984790			1017867	18	L2AK		
40	L2AKL	Toxaphene {4} #2	487980	559970	737295	615496	680111	781498					643725	17	L2AK	0.995	
41	L2AK	Toxaphene {5} #2		610880	683305	645140	638780	785798	697664	599801			665910	9.5	L2AK		
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2.391771

Toxaphene analysis by
EPA Method 608/8081 TOXF0824

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8/24/2021
Instrument: Ethel
Initial Cal. Date: 8/24/2021
Data File: 0824020.D

		Compound	MEAN	CCRF	%D		%Drift
1	ANM	Toxaphene Total	1769770	2049040	16	ANM	
2	L2AK	Toxaphene	479457	530056	11	L2AK	
3	L2AK	Toxaphene {2}	374312	424062	13	L2AK	
4	L2AK	Toxaphene {3}	360454	421654	17	L2AK	
5	L2AK	Toxaphene {4}	172166	211799	23	L2AK	
6	L2AK	Toxaphene {5}	413792	461467	12	L2AK	
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		Average			15.3		

Toxaphene analysis by
EPA Method 608/8081 TOXF0824

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8/24/2021
Instrument: Ethel
Cal. Date: 8/24/2021
Data File: 0824020.D

		Compound	MEAN	CCRF	%D		%Drift
41	ANM	Toxaphene Total	3484150	4002110	15	ANM	
42	L2AKL	Toxaphene	474922	526603	11	L2AKL	18
43	L2AK	Toxaphene {2}	552291	632555	15	L2AK	
44	L2AK	Toxaphene {3}	1017870	1253110	23	L2AK	
45	L2AKL	Toxaphene {4}	643725	831180	29	L2AKL	16
46	L2AK	Toxaphene {5}	665910	758664	14	L2AK	
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		Average			17.8		

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0901

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 9/1/2021
Matrix: Water Instrument: Ethel Initials:

		Compound	1	2	4	5	6	7	8			Avg	%RSD	Type	r^2	Q
			0901004.D	0901005.D	0901007.D	0901008.D	0901009.D	0901010.D	0901011.D							
1	S	TCMX	114404500	98432833	98642160	101161390	105460563	108702668	111129246			105419051	6.0	S		
2	TM	HEXACHLOROBENZENE		133555667	107245030	103942790	104840460	106014713	107939536			110589699	10	TM		
3	TM	A-BHC		69232667	72175780	80547815	88435147	95262523	99791068			84240833	15	TM		
4	TM	B-BHC		51575667	36351890	36830520	38754050	39285345	40726098			40587262	14	TM		
5	TM	G-BHC(LINDANE)	70346500	62722333	50552930	54782545	59260923	62272200	66184666			60874585	11	TM		
6	TM	D-BHC		65958000	55398040	57790858	62491940	64037906	67184249			62143499	7.5	TM		
7	TM	HEPTACHLOR		45459333	30794110	30739765	32207393	32437998	33810132			34241455	16	TM		
8	TM	ALDRIN		140559333	128726330	136496840	145299697	149693428	155968428			142790676	6.8	TM		
9	TM	HEPTACHLOR EPOXIDE		96815500	79024380	81435420	84939043	86539603	90106924			86476812	7.4	TM		
10	TM	G-CHLORDANE		108933500	93334030	95235650	98549073	100566775	104129280			100124718	5.8	TM		
11	TM	A-ENDOSULFAN	83735750	61875250	59251580	61897538	65412448	66648376	68978047			66828427	12	TM		
12	TM	A-CHLORDANE	147008000	114291167	93990330	95284795	99740110	101710560	105359470			108197776	17	TM		
13	TM	P,P-DDE	139548000	94242333	91993020	94944085	102696757	105600673	110292028			105616699	16	TM		
14	TM	DIELDRIN	118640500	102382667	93637400	96246475	101271307	103349730	107309522			103262514	7.9	TM		
15	TM	ENDRIN	35251500	58457000	50993330	50523000	52168057	52061250	54203656			50522542	14	TM		
16	TM	B-ENDOSULFAN	97394000	80120000	73776610	74775065	75911963	77565243	80231946			79967832	10	TM		
17	TM	P,P-DDD		53958000	49641840	51515335	53056430	54488318	57139058			53299830	4.8	TM		
18	TM	ENDRIN ALDEHYDE		58140333	54501420	57584745	58560727	59747528	62893538			58571382	4.7	TM		
19	TM	P,P-DDT		37152500	36498480	38164390	39048260	39427033	41043896			38555760	4.3	TM		
20	TM	ENDOSULFAN SULFATE		50986667	56398650	56201950	56495167	58037508	58978890			56183138	4.9	TM		
21	TM	ENDRIN KETONE		41601667	51008180	57189495	54236583	55052725	56588302			52612825	11	TM		
22	TM	METHOXYCHLOR		16325833	16399140	17087335	17000787	17632668	18105128			17091815	4.0	TM		
23	S	DECA		50913167	84098210	84520635	83852503	82026415	83791040			78200328	17	S		
24		Signal #2										0	0			
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level 3 was deleted because it is a bad prepa

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Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0901

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 9/1/2021
Matrix: Water Instrument: Ethel Initials:

		Compound	1	2	4	5	6	7	8			Avg	%RSD	Type	r^2	Q
			0901004.D	0901005.D	0901007.D	0901008.D	0901009.D	0901010.D	0901011.D							
36	S	TCMX #2	179554500	155415333	149659530	143518080	145954093	149940745	152754258			153828077	7.8	S		
37	TM	HEXACHLOROBENZENE #2	219491000	194254833	176612040	161352610	164424507	162682490	164634860			177636049	12	TM		
38	TM	A-BHC #2	202331000	188970667	203867190	198820015	209796437	214498070	221048268			205618807	5.1	TM		
39	TM	B-BHC #2	108268500	99578333	99514940	91955300	92727450	92336505	94013964			96913570	6.2	TM		
40	TM	G-BHC(LINDANE) #2	190855500	174585000	186808990	179630440	186834733	190535248	194654264			186272025	3.7	TM		
41	TM	D-BHC #2	177721500	167328000	183963820	177559880	186059773	189394655	194722920			182392935	5.0	TM		
42	TM	HEPTACHLOR #2	228244500	210555667	206407140	188987470	194448890	195553873	199564948			203394641	6.5	TM		
43	TM	ALDRIN #2	267144000	247645500	252860510	240402695	246777037	248701158	253059122			250941432	3.3	TM		
44	TM	HEPTACHLOR EPOXIDE #2	220960000	203567000	196917860	181547605	182822147	183098820	184520922			193347765	7.6	TM		
45	TM	G-CHLORDANE #2	239434500	211243500	201248430	186727640	188386883	188882183	191929772			201121844	9.5	TM		
46	TM	A-ENDOSULFAN #2	204550000	201059500	199963510	187572030	189959240	187795640	190965138			194552151	3.6	TM		
47	TM	A-CHLORDANE #2	213199750	201876667	191441370	176177408	176247095	174831990	175681464			187065106	8.3	TM		
48	TM	P,P-DDE #2	188044500	174849000	195747400	184542470	190162863	191034090	196368032			188678336	3.9	TM		
49	TM	DIELDRIN #2	214726000	197726167	196522620	184583385	187381223	188117563	191891992			194421279	5.2	TM		
50	TM	ENDRIN #2	170608000	152670833	132809440	120361505	102765147	121322833	123758662			132042346	17	TM		
51	TM	B-ENDOSULFAN #2	197507000	190093833	173759030	160037245	158785637	164620595	162417978			172460188	9.0	TM		
52	TM	P,P-DDD #2	165986000	146292667	153861000	145264970	119857777	148870753	152503092			147519465	9.5	TM		
53	TM	ENDRIN ALDEHYDE #2	121770000	135722833	126719460	119729260	118294173	120204545	123594648			123719274	4.8	TM		
54	TM	P,P-DDT #2	161022500	162814167	170824920	160489075	164370557	166956603	168389786			164981087	2.4	TM		
55	TM	ENDOSULFAN SULFATE #2	191988500	184794000	171689010	155903970	156891757	157054035	157127148			167921203	9.0	TM		
56	TM	ENDRIN KETONE #2	167362000	158409167	161721860	149977243	151495160	137732708	154771813			154495707	6.2	TM		
57	TM	METHOXYCHLOR #2	114992500	119191167	105645490	94186320	91759337	89547768	90303680			100803752	12	TM		
58	S	DECA #2	182899500	206542167	193778940	152736810	170561593	164518143	162212872			176178575	11	S		
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level 3 was deleted because it is a bad prep

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Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0901

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 9/1/2021
Instrument: Ethel
Initial Cal. Date: 9/1/2021
Data File: 0901012.D

		Compound	MEAN	CCRF	%D		%Drift
1	S	TCMX	105419000	111317000	5.6	S	
2	TM	HEXACHLOROBENZENE	110590000	114545000	3.6	TM	
3	TM	A-BHC	84240800	88140500	4.6	TM	
4	TM	B-BHC	40587300	41230000	1.6	TM	
5	TM	G-BHC(LINDANE)	60874600	62223500	2.2	TM	
6	TM	D-BHC	62143500	64260600	3.4	TM	
7	TM	HEPTACHLOR	34241500	34221100	0.06	TM	
8	TM	ALDRIN	142791000	115719000	19	TM	
9	TM	HEPTACHLOR EPOXIDE	86476800	86759100	0.33	TM	
10	TM	G-CHLORDANE	100125000	99347800	0.78	TM	
11	TM	A-ENDOSULFAN	66828400	65019600	2.7	TM	
12	TM	A-CHLORDANE	108198000	103293000	4.5	TM	
13	TM	P,P-DDE	105617000	104423000	1.1	TM	
14	TM	DIELDRIN	103263000	104356000	1.1	TM	
15	TM	ENDRIN	50522500	53016300	4.9	TM	
16	TM	B-ENDOSULFAN	79967800	78817400	1.4	TM	
17	TM	P,P-DDD	53299800	55023800	3.2	TM	
18	TM	ENDRIN ALDEHYDE	58571400	63335300	8.1	TM	
19	TM	P,P-DDT	38555800	39669100	2.9	TM	
20	TM	ENDOSULFAN SULFATE	56183100	59109900	5.2	TM	
21	TM	ENDRIN KETONE	52612800	55111100	4.7	TM	
22	TM	METHOXYCHLOR	17091800	17812900	4.2	TM	
23	S	DECA	78200300	89475800	14	S	
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		Average			4.3		

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0901

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 9/1/2021
Instrument: Ethel
Cal. Date: 9/1/2021
Data File: 0901012.D

		Compound	MEAN	CCRF	%D		%Drift
41	S	TCMX	153828000	158821000	3.2	S	
42	TM	HEXACHLOROBENZENE	177636000	178080000	0.25	TM	
43	TM	A-BHC	205619000	213801000	4.0	TM	
44	TM	B-BHC	96913600	99374300	2.5	TM	
45	TM	G-BHC(LINDANE)	186272000	197711000	6.1	TM	
46	TM	D-BHC	182393000	191678000	5.1	TM	
47	TM	HEPTACHLOR	203395000	205707000	1.1	TM	
48	TM	ALDRIN	250941000	204804000	18	TM	
49	TM	HEPTACHLOR EPOXIDE	193348000	191218000	1.1	TM	
50	TM	G-CHLORDANE	201122000	192590000	4.2	TM	
51	TM	A-ENDOSULFAN	194552000	192580000	1.0	TM	
52	TM	A-CHLORDANE	187065000	186295000	0.41	TM	
53	TM	P,P-DDE	188678000	198458000	5.2	TM	
54	TM	DIELDRIN	194421000	197514000	1.6	TM	
55	TM	ENDRIN	132042000	124646000	5.6	TM	
56	TM	B-ENDOSULFAN	172460000	168532000	2.3	TM	
57	TM	P,P-DDD	147519000	149637000	1.4	TM	
58	TM	ENDRIN ALDEHYDE	123719000	130450000	5.4	TM	
59	TM	P,P-DDT	164981000	168892000	2.4	TM	
60	TM	ENDOSULFAN SULFATE	167921000	164878000	1.8	TM	
61	TM	ENDRIN KETONE	154496000	154903000	0.26	TM	
62	TM	METHOXYCHLOR	100804000	96541300	4.2	TM	
63	S	DECA	176179000	184382000	4.7	S	
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		Average			3.6		

Toxaphene analysis by
EPA Method 608/8081 TOXF0901

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 9/1/2021
Matrix: Water Instrument: Ethel Initials:

			0901013.D	0901014.D	0901015.D	0901016.D	0901017.D	0901018.D	0901019.D	0901020.D							
		Compound	1	2	3	4	5	6	7	8			Avg	%RSD	Type	r^2	Q
1	ANM	Toxaphene Total	967780	913220	1324610	1113710	1154678	1462642					1156107	18	ANM		
2	L2AK	Toxaphene	484920	385580	487605	423272	469158	618248					478131	17	L2AK		
3	L2AK	Toxaphene {2}	118320	226230	215025	176998	189114	266564					198709	25	L2AK		
4	L2AK	Toxaphene {3}	139200	110100	242515	212162	180838	213222					183006	27	L2AK		
5	L2AK	Toxaphene {4}	79300	76630	148325	104186	109553	130676					108112	26	L2AK		
6	L2AK	Toxaphene {5}	146060	114680	231140	197092	206015	233933					188153	26	L2AK		
7		Signal #2												0			
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Toxaphene analysis by
EPA Method 608/8081 TOXF0901

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 9/1/2021
Matrix: Water Instrument: Ethel Initials:

		Compound	1	2	3	4	5	6	7	8			Avg	%RSD	Type	r^2	Q
			0901013.D	0901014.D	0901015.D	0901016.D	0901017.D	0901018.D	0901019.D	0901020.D							
36	ANML	Toxaphene Total #2	7277800	4716540	5210900	3678708	3892039	4178325					4825719	27	ANM	0.996	
37	L2AKL	Toxaphene #2	1069680	469110	624895	405970	466451	476720					585471	42	L2AK	0.996	
38	L2AKL	Toxaphene {2} #2	1012160	743300	802080	532800	580300	638485					718188	24	L2AK	0.989	
39	L2AKL	Toxaphene {3} #2	2046220	1387890	1512730	1123496	1097498	1178661					1391082	26	L2AK	0.995	
40	L2AKL	Toxaphene {4} #2	1405900	897820	1003345	708032	803621	873381					948683	26	L2AK	0.995	
41	L2AKL	Toxaphene {5} #2	1743840	1218410	1267850	908410	944169	1011078					1182293	26	L2AK	0.997	
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Toxaphene analysis by
EPA Method 608/8081 TOXF0901

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 9/1/2021
Instrument: Ethel
Initial Cal. Date: 9/1/2021
Data File: 0901021.D

		Compound	MEAN	CCRF	%D		%Drift
1	ANM	Toxaphene Total	1156110	1343830	16	ANM	
2	L2AK	Toxaphene	478131	536225	12	L2AK	
3	L2AK	Toxaphene {2}	198709	219561	10	L2AK	
4	L2AK	Toxaphene {3}	183006	231399	26	L2AK	
5	L2AK	Toxaphene {4}	108112	129434	20	L2AK	
6	L2AK	Toxaphene {5}	188153	227213	21	L2AK	
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		Average			17.5		

Toxaphene analysis by
EPA Method 608/8081 TOXF0901

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 9/1/2021
Instrument: Ethel
Cal. Date: 9/1/2021
Data File: 0901021.D

		Compound	MEAN	CCRF	%D	%Drift	
41	ANML	Toxaphene Total	4825720	4861990	0.75	ANML	17
42	L2AKL	Toxaphene	585471	713022	22	L2AKL	49
43	L2AKL	Toxaphene {2}	718188	707371	1.5	L2AKL	12
44	L2AKL	Toxaphene {3}	1391080	1362670	2.0	L2AKL	14
45	L2AKL	Toxaphene {4}	948683	939631	0.95	L2AKL	11
46	L2AKL	Toxaphene {5}	1182290	1139300	3.6	L2AKL	13
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		Average			5.1		

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0824

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8/25/2021
Instrument: Ethel
Initial Cal. Date: 8/24/2021
Data File: 0824034.D

		Compound	MEAN	CCRF	%D	%Drift		
1	S	TCMX	132787000	122084000	8.1	S		
2	TM	HEXACHLOROBENZENE	164497000	159567000	3.0	TM		
3	TM	A-BHC	52944800	54930300	3.8	TM		
4	TM	B-BHC	32808200	41081900	25	TM		*see back
5	TM	G-BHC(LINDANE)	47108200	52576600	12	TM		
6	TM	D-BHC	51816600	51289800	1.0	TM		
7	TM	HEPTACHLOR	66368800	88089000	33	TM		*see back
8	TM	ALDRIN	182298000	199536000	9.5	TM		
9	TM	HEPTACHLOR EPOXIDE	117305000	136375000	16	TM		
10	TM	G-CHLORDANE	141229000	150796000	6.8	TM		
11	TM	A-ENDOSULFAN	91529900	112593000	23	TM		*see back
12	TM	A-CHLORDANE	140508000	146496000	4.3	TM		
13	TM	P,P-DDE	131613000	140081000	6.4	TM		
14	TM	DIELDRIN	134466000	143431000	6.7	TM		
15	TM	ENDRIN	83717200	88956700	6.3	TM		
16	TM	B-ENDOSULFAN	51154600	53538400	4.7	TM		
17	TM	P,P-DDD	76537400	80545600	5.2	TM		
18	TM	ENDRIN ALDEHYDE	82927300	78793800	5.0	TM		
19	TM	P,P-DDT	90102300	102085000	13	TM		
20	TM	ENDOSULFAN SULFATE	82338700	79209100	3.8	TM		
21	TM	ENDRIN KETONE	50737200	48579000	4.3	TM		
22	TM	METHOXYCHLOR	34670800	35849200	3.4	TM		
23	S	DECA	168563000	160670000	4.7	S		
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		Average				9.1		

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0824

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8/25/2021
Instrument: Ethel
Cal. Date: 8/24/2021
Data File: 0824034.D

		Compound	MEAN	CCRF	%D		%Drift
41	S	TCMX	280073000	270343000	3.5	S	
42	TM	HEXACHLOROBENZENE	351526000	324620000	7.7	TM	
43	TM	A-BHC	212089000	247045000	16	TM	
44	TM	B-BHC	114909000	123205000	7.2	TM	
45	TM	G-BHC(LINDANE)	187787000	219350000	17	TM	
46	TM	D-BHC	168061000	177920000	5.9	TM	
47	TM	HEPTACHLOR	172065000	196780000	14	TM	
48	TM	ALDRIN	223700000	224431000	0.33	TM	
49	TM	HEPTACHLOR EPOXIDE	290732000	297300000	2.3	TM	
50	TM	G-CHLORDANE	296026000	304466000	2.9	TM	
51	TM	A-ENDOSULFAN	236713000	258445000	9.2	TM	
52	TM	A-CHLORDANE	215388000	240164000	12	TM	
53	TM	P,P-DDE	304647000	305857000	0.40	TM	
54	TM	DIELDRIN	256043000	272813000	6.5	TM	
55	TM	ENDRIN	115221000	132388000	15	TM	
56	TM	B-ENDOSULFAN	163117000	196389000	20	TM	
57	TM	P,P-DDD	185246000	200833000	8.4	TM	
58	TM	ENDRIN ALDEHYDE	120360000	131399000	9.2	TM	
59	TM	P,P-DDT	158512000	171561000	8.2	TM	
60	TM	ENDOSULFAN SULFATE	171979000	179918000	4.6	TM	
61	TM	ENDRIN KETONE	87548900	93751900	7.1	TM	
62	TM	METHOXYCHLOR	74628000	80087000	7.3	TM	
63	S	DECA	228566000	239530000	4.8	S	
64							
65							
66							
67							
68							
69							
70							
71							
72							
73							
74							
75							
76							
77							
78							
79							
80							
		Average			8.2		

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0824

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8/25/2021
Instrument: Ethel
Initial Cal. Date: 8/24/2021
Data File: 0824045.D

		Compound	MEAN	CCRF	%D	%Drift		
1	S	TCMX	132787000	123398000	7.1	S		
2	TM	HEXACHLOROBENZENE	164497000	163528000	0.59	TM		
3	TM	A-BHC	52944800	59005200	11	TM		
4	TM	B-BHC	32808200	45624900	39	TM		*see back
5	TM	G-BHC(LINDANE)	47108200	58236200	24	TM		*
6	TM	D-BHC	51816600	55294000	6.7	TM		
7	TM	HEPTACHLOR	66368800	95727700	44	TM		*
8	TM	ALDRIN	182298000	206742000	13	TM		
9	TM	HEPTACHLOR EPOXIDE	117305000	144266000	23	TM		*see back
10	TM	G-CHLORDANE	141229000	157279000	11	TM		
11	TM	A-ENDOSULFAN	91529900	120135000	31	TM		*see back
12	TM	A-CHLORDANE	140508000	153022000	8.9	TM		
13	TM	P,P-DDE	131613000	146783000	12	TM		
14	TM	DIELDRIN	134466000	150280000	12	TM		
15	TM	ENDRIN	83717200	92351100	10	TM		
16	TM	B-ENDOSULFAN	51154600	59823700	17	TM		
17	TM	P,P-DDD	76537400	86405300	13	TM		
18	TM	ENDRIN ALDEHYDE	82927300	85562500	3.2	TM		
19	TM	P,P-DDT	90102300	108979000	21	TM		*see back
20	TM	ENDOSULFAN SULFATE	82338700	82279600	0.07	TM		
21	TM	ENDRIN KETONE	50737200	52333400	3.1	TM		
22	TM	METHOXYCHLOR	34670800	38013400	9.6	TM		
23	S	DECA	168563000	166181000	1.4	S		
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
		Average			14.0			

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0824

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8/25/2021
Instrument: Ethel
Cal. Date: 8/24/2021
Data File: 0824045.D

		Compound	MEAN	CCRF	%D		%Drift	
41	S	TCMX	280073000	278781000	0.46	S		
42	TM	HEXACHLOROBENZENE	351526000	336350000	4.3	TM		
43	TM	A-BHC	212089000	265895000	25	TM		*see front
44	TM	B-BHC	114909000	130912000	14	TM		
45	TM	G-BHC(LINDANE)	187787000	237686000	27	TM		*
46	TM	D-BHC	168061000	191151000	14	TM		
47	TM	HEPTACHLOR	172065000	215408000	25	TM		*
48	TM	ALDRIN	223700000	236535000	5.7	TM		
49	TM	HEPTACHLOR EPOXIDE	290732000	308829000	6.2	TM		
50	TM	G-CHLORDANE	296026000	317051000	7.1	TM		
51	TM	A-ENDOSULFAN	236713000	272250000	15	TM		
52	TM	A-CHLORDANE	215388000	251471000	17	TM		
53	TM	P,P-DDE	304647000	319421000	4.8	TM		
54	TM	DIELDRIN	256043000	289636000	13	TM		
55	TM	ENDRIN	115221000	141654000	23	TM		*see front
56	TM	B-ENDOSULFAN	163117000	211171000	29	TM		*see front
57	TM	P,P-DDD	185246000	214149000	16	TM		
58	TM	ENDRIN ALDEHYDE	120360000	147933000	23	TM		*see front
59	TM	P,P-DDT	158512000	181376000	14	TM		
60	TM	ENDOSULFAN SULFATE	171979000	187176000	8.8	TM		
61	TM	ENDRIN KETONE	87548900	100497000	15	TM		
62	TM	METHOXYCHLOR	74628000	83586200	12	TM		
63	S	DECA	228566000	249331000	9.1	S		
64								
65								
66								
67								
68								
69								
70								
71								
72								
73								
74								
75								
76								
77								
78								
79								
80								
		Average			14.3			

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0901

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 9/2/2021
Instrument: Ethel
Initial Cal. Date: 9/1/2021
Data File: 0901046.D

		Compound	MEAN	CCRF	%D		%Drift
1	S	TCMX	105419000	109228000	3.6	S	
2	TM	HEXACHLOROBENZENE	110590000	111990000	1.3	TM	
3	TM	A-BHC	84240800	90192000	7.1	TM	
4	TM	B-BHC	40587300	41878200	3.2	TM	
5	TM	G-BHC(LINDANE)	60874600	62929400	3.4	TM	
6	TM	D-BHC	62143500	63731600	2.6	TM	
7	TM	HEPTACHLOR	34241500	36096300	5.4	TM	
8	TM	ALDRIN	142791000	148822000	4.2	TM	
9	TM	HEPTACHLOR EPOXIDE	86476800	87911000	1.7	TM	
10	TM	G-CHLORDANE	100125000	103354000	3.2	TM	
11	TM	A-ENDOSULFAN	66828400	66897000	0.10	TM	
12	TM	A-CHLORDANE	108198000	105483000	2.5	TM	
13	TM	P,P-DDE	105617000	103911000	1.6	TM	
14	TM	DIELDRIN	103263000	102712000	0.53	TM	
15	TM	ENDRIN	50522500	51706500	2.3	TM	
16	TM	B-ENDOSULFAN	79967800	76826100	3.9	TM	
17	TM	P,P-DDD	53299800	55178500	3.5	TM	
18	TM	ENDRIN ALDEHYDE	58571400	65913800	13	TM	
19	TM	P,P-DDT	38555800	40639800	5.4	TM	
20	TM	ENDOSULFAN SULFATE	56183100	61633600	9.7	TM	
21	TM	ENDRIN KETONE	52612800	56811500	8.0	TM	
22	TM	METHOXYCHLOR	17091800	19530000	14	TM	
23	S	DECA	78200300	88605400	13	S	
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			4.9		

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0901

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 9/2/2021
Instrument: Ethel
Cal. Date: 9/1/2021
Data File: 0901046.D

		Compound	MEAN	CCRF	%D		%Drift
41	S	TCMX	153828000	146054000	5.1	S	
42	TM	HEXACHLOROBENZENE	177636000	171351000	3.5	TM	
43	TM	A-BHC	205619000	214561000	4.3	TM	
44	TM	B-BHC	96913600	99746700	2.9	TM	
45	TM	G-BHC(LINDANE)	186272000	194317000	4.3	TM	
46	TM	D-BHC	182393000	186988000	2.5	TM	
47	TM	HEPTACHLOR	203395000	204898000	0.74	TM	
48	TM	ALDRIN	250941000	254082000	1.3	TM	
49	TM	HEPTACHLOR EPOXIDE	193348000	191910000	0.74	TM	
50	TM	G-CHLORDANE	201122000	197893000	1.6	TM	
51	TM	A-ENDOSULFAN	194552000	207080000	6.4	TM	
52	TM	A-CHLORDANE	187065000	188273000	0.65	TM	
53	TM	P,P-DDE	188678000	200937000	6.5	TM	
54	TM	DIELDRIN	194421000	197199000	1.4	TM	
55	TM	ENDRIN	132042000	125940000	4.6	TM	
56	TM	B-ENDOSULFAN	172460000	170875000	0.92	TM	
57	TM	P,P-DDD	147519000	153307000	3.9	TM	
58	TM	ENDRIN ALDEHYDE	123719000	141344000	14	TM	
59	TM	P,P-DDT	164981000	172857000	4.8	TM	
60	TM	ENDOSULFAN SULFATE	167921000	169962000	1.2	TM	
61	TM	ENDRIN KETONE	154496000	161203000	4.3	TM	
62	TM	METHOXYCHLOR	100804000	99188200	1.6	TM	
63	S	DECA	176179000	190323000	8.0	S	
64							
65							
66							
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76							
77							
78							
79							
80							
		Average			3.7		

ORGANICS

Raw Data

Organic Extraction Worksheet

Method	OCL OP/Triazine Sep Funnel Low 3510C	Extraction Set	210728A	Extraction Method	SEP025	Units	mL

Spiked ID 1	OCLHX Spike 4/26/21-4/26/22		Surrogate ID 1	OCL/OP Water Surrogate 3/9/21-10/14/21	
Spiked ID 2	TOX Spike 6/23/21-6/23/22		Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	07/28/21 16:17	
Spiked ID 8			Ext. End Time:	08/03/21 8:23	
			GC Requires Extract By:		

pH1			Water Bath Temp 1 °C	
pH2			Water Bath Temp 2 °C	
pH3			Water Bath Temp 3 °C	

Spiked By: SB **Date** 07/28/21 **Witnessed By:** SR **Date** 07/28/21

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	210728A Blk				0.100	1 equip	500	1	7	07/28/21 16:17	TCLP
2	210728A LCS-1		0.030	1	0.100	1 equip	500	1	7	07/28/21 16:17	
3	210728A LCS-2		0.020	2	0.100	1 equip	500	1	7	07/28/21 16:17	
4	210728A LCSD-1		0.030	1	0.100	1 equip	500	1	7	07/28/21 16:17	
5	210728A LCSD-2		0.020	2	0.100	1 equip	500	1	7	07/28/21 16:17	
6	BA36271	BA36271S01			0.100	1 equip	500	1	7	07/28/21 16:17	96859

Solvent and Lot#	
PH STRIPS	HC155968
NaCL (30g)	20K305207
Dichloromethane (60mLs)	61117
Filter paper	400181
Soduim Sulfate	2020120870
Hexane	244808

Extraction COC Transfer	
Extraction lab employee Initials	
GC analyst's initials	CW
Date	8-3-21
Time	23:00
Refrigerator	Hobart

	Technician's Initials
Scanned By	SB
Sample Preparation	SB
Extraction	SB
Concentration	SR,YL

Modified	08/03/21 6:58:23 AM

Reviewed By: **Date**

Organic Extraction Worksheet

Method	8081 TCLP EXTRACTION	Extraction Set	210720A	Extraction Method	TCLP808 TCLP	Units	mL

Spiked ID 1			Surrogate ID 1		
Spiked ID 2			Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	07/20/21 16:00	
Spiked ID 8			Ext. End Time:	07/21/21 10:52	
			GC Requires Extract By:		
			pH1		Water Bath Temp 1 °C 22,22,22,22 °C
			pH2		Water Bath Temp 2 °C
			pH3		Water Bath Temp 3 °C

Spiked By: **Date** **Witnessed By:** **Date**

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	210720A Blk					equip	500	500	NA	07/20/21 16:00	
2	210720A LCS-1					equip	500	500	NA	07/20/21 16:00	
3	210720A LCS-2					equip	500	500	NA	07/20/21 16:00	
4	210720A LCSD-1					equip	500	500	NA	07/20/21 16:00	
5	210720A LCSD-2		weight	pH1	pH2	equip	500	500	NA	07/20/21 16:00	
6	BA36269	BA36269W02				equip	330	330	7	07/22/21 13:05	96859 WATER SAMPLE See ID: 71893
7	BA36271	BA36271S02	5.10g	8.49	5.45	equip	100.25	2005.00	NA	07/20/21 16:00	96859

Solvent and Lot#	
Scale Balance	eb1
Di Water	7-20-21
pH Meter	thing one
1N HCL Prep	6-23-21
RPM Tumber 30+/-2 rpm	29
TCLP Room thermo ID	tclp#1
Fluid Prep 2	7-20-21

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	
Date	
Time	
Refrigerator	

	Technician's Initials
Scanned By	YL
Sample Preparation	YL
Extraction	YL
Concentration	YL

Modified	7/22/2021 1:48:19 PM

Reviewed By: KY **Date** 7/21/2021

Organic Extraction Worksheet

Method	OCL OP/Triazine Sep Funnel Low 3510C	Extraction Set	210722A	Extraction Method	SEP025	Units	mL

Spiked ID 1	OCLHX Spike		Surrogate ID 1	OCL/OP Water Surrogate	
Spiked ID 2	TOX Spike		Surrogate ID 2		
Spiked ID 3	Tech-Chlordane StK		Surrogate ID 3		
Spiked ID 4	PCB SPIKE		Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	07/22/21 13:05	
Spiked ID 8			Ext. End Time:		
			GC Requires Extract By:		

pH1			Water Bath Temp 1 °C	
pH2			Water Bath Temp 2 °C	
pH3			Water Bath Temp 3 °C	

Spiked By: KY **Date** 7/22/2021 **Witnessed By:** CFM **Date** 7/22/2021

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	210722A Blk				0.100	1 equip	500	1	7	07/22/21 13:05	
2	210722A LCS-1		0.030	1	0.100	1 equip	500	1	7	07/22/21 13:05	
3	210722A LCS-2		0.020,0.050	2,3	0.100	1 equip	500	1	7	07/22/21 13:05	
4	210722A LCS-3		0.040	4	0.100	1 equip	500	1	7	07/22/21 13:05	
5	210722A LCSD-1		0.030	1	0.100	1 equip	500	1	7	07/22/21 13:05	
6	210722A LCSD-2		0.020,0.050	2,3	0.100	1 equip	500	1	7	07/22/21 13:05	
7	210722A LCSD-3		0.040	4	0.100	1 equip	500	1	7	07/22/21 13:05	
8	BA36174	BA36174W05			0.100	1 equip	490	1	7	07/22/21 13:05	96842 LTD VOLUME
9	BA36269	BA36269W02			0.100	1 equip	330	1	7	07/22/21 13:05	96859 LTD VOLUME

Solvent and Lot#	
PH STRIPS	.
NaCL (30g)	.
Dichloromethane (60mLs)	.
Filter paper	.
Soduim Sulfate	.
Hexane	.

Extraction COC Transfer	
Extraction lab employee Initials	
GC analyst's initials	CW
Date	7-26-21
Time	11:40
Refrigerator	Hobart

	Technician's Initials
Scanned By	
Sample Preparation	
Extraction	
Concentration	

Modified	7/22/2021 1:30:20 PM

Reviewed By: **Date**

Injection Log

Directory: G:\ETHEL\DATA\210824\

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	2	0824002.D	1	OCLHX Deg Check 10/01/20	water	8-24-21 15:17:14
2	3	0824003.D	1	Custom 8081 Mix/HCB - 1 7/29/21	water	8-24-21 15:39:36
3	4	0824004.D	1	Custom 8081 Mix/HCB - 2 7/29/21	water	8-24-21 16:02:01
4	5	0824005.D	1	Custom 8081 Mix/HCB - 3 7/29/21	water	8-24-21 16:24:23
5	6	0824006.D	1	Custom 8081 Mix/HCB - 4 7/29/21	water	8-24-21 16:46:41
6	7	0824007.D	1	Custom 8081 Mix/HCB - 5 7/29/21	water	8-24-21 17:09:08
7	8	0824008.D	1	Custom 8081 Mix/HCB - 6 7/29/21	water	8-24-21 17:31:27
8	9	0824009.D	1	Custom 8081 Mix/HCB - 7 7/29/21	water	8-24-21 17:53:48
9	10	0824010.D	1	Custom 8081 Mix/HCB - 8 7/29/21	water	8-24-21 18:16:17
10	11	0824011.D	1	Custom 8081 Mix/HCB Second Source 7	water	8-24-21 18:38:36
11	12	0824012.D	1	TOX/TCH - 1 06/30/21	water	8-24-21 19:00:56
12	13	0824013.D	1	TOX/TCH - 2 06/30/21	water	8-24-21 19:23:21
13	14	0824014.D	1	TOX/TCH - 3 06/30/21	water	8-24-21 19:45:40
14	15	0824015.D	1	TOX/TCH - 4 06/30/21	water	8-24-21 20:08:00
15	16	0824016.D	1	TOX/TCH - 5 06/30/21	water	8-24-21 20:30:24
16	17	0824017.D	1	TOX/TCH - 6 06/30/21	water	8-24-21 20:52:44
17	18	0824018.D	1	TOX - 7 06/30/21	water	8-24-21 21:15:04
18	19	0824019.D	1	TOX - 8 06/30/21	water	8-24-21 21:37:29
19	20	0824020.D	1	TOX/TCH Second Source 04/19/21	water	8-24-21 21:59:48
20	34	0824034.D	1	Custom 8081 Mix/HCB - 5 7/29/21	water	8-25-21 3:13:07
21	38	0824038.D	10	210722A BLK 1/500 DF5	water	8-25-21 4:42:37
22	39	0824039.D	10	210722A LCS-1 1/500 DF5	water	8-25-21 5:04:57
23	41	0824041.D	10	210722A LCS-2 1/500 DF5	water	8-25-21 5:49:44
24	44	0824044.D	15.1515	BA36269W02 1/330 DF5	water	8-25-21 6:56:48
25	45	0824045.D	1	Custom 8081 Mix/HCB - 5 7/29/21	water	8-25-21 7:19:10

Directory: G:\ETHEL\DATA\210901\

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	3	0901003.D	1	OCLHX Deg Check 10/01/20	water	9-1-21 11:01:38
2	4	0901004.D	1	8081 Mix/HCB - 1 7/29/21	water	9-1-21 11:24:11
3	5	0901005.D	1	8081 Mix/HCB - 2 7/29/21	water	9-1-21 11:46:39
4	7	0901007.D	1	8081 Mix/HCB - 4 7/29/21	water	9-1-21 12:31:41
5	8	0901008.D	1	8081 Mix/HCB - 5 7/29/21	water	9-1-21 12:54:09
6	9	0901009.D	1	8081 Mix/HCB - 6 7/29/21	water	9-1-21 13:16:38
7	10	0901010.D	1	8081 Mix/HCB - 7 7/29/21	water	9-1-21 13:39:11
8	11	0901011.D	1	8081 Mix/HCB - 8 7/29/21	water	9-1-21 14:01:38
9	12	0901012.D	1	Mix/HCB Second Source 7/21/21	water	9-1-21 14:24:06
10	13	0901013.D	1	TOX/TCH - 1 06/30/21	water	9-1-21 15:00:25
11	14	0901014.D	1	TOX/TCH - 2 06/30/21	water	9-1-21 15:22:50
12	15	0901015.D	1	TOX/TCH - 3 06/30/21	water	9-1-21 15:45:16
13	16	0901016.D	1	TOX/TCH - 4 06/30/21	water	9-1-21 16:07:49
14	17	0901017.D	1	TOX/TCH - 5 06/30/21	water	9-1-21 16:30:15
15	18	0901018.D	1	TOX/TCH - 6 06/30/21	water	9-1-21 16:52:43
16	21	0901021.D	1	TOX/TCH Second Source 04/19/21	water	9-1-21 18:32:18
17	22	0901022.D	1	OCLHX Deg Check 10/01/20	water	9-1-21 19:00:12
18	23	0901023.D	10	210728A BLK 1/500 df5	water	9-1-21 19:22:41
19	24	0901024.D	10	210728A LCS-1 1/500 df5	water	9-1-21 19:45:15
20	25	0901025.D	10	210728A LCS-2 1/500 df5	water	9-1-21 20:07:41
21	28	0901028.D	10	BA36271S01 1/500 df5	water	9-1-21 21:15:10
22	46	0901046.D	1	8081 Mix/HCB - 5 7/29/21	water	9-2-21 4:00:12

ORGANICS

Calibration Data

EPA METHOD 8151A/515
METHOD

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 7/12/2021
Matrix: Water Instrument: Herbie
Initials: MA

			7060079.D	7060081.D	7060085.D	7060082.D	7060083.D	7060084.D									
		Compound	1	2	3	4	5	6					Avg	%RSD	Type	r^2	Q
1	TM	Dalapon	308003	317987	320791	304807	303546	316872					312001	2.38	TM		
2	TM	3,5-Dichlorobenzoic Acid	338474	390602	397941	366355	360236	368100.5859					370285	5.81	TM		
3	TM	4-Nitrophenol	169698	217888	215944	194773	188094	189966					196060	9.32	TM		
4	S	2, 4-DCAA (S)	261083	285705	300192	267795	261012	265511					273550	5.82	S		
5	TM	Dicamba	1036947	1199266	1054359	1002236	997010	1027236					1052843	7.11	TM		
6	TML	MCPP	281	572	636	623	644	676					572	25.63	TM	0.9986	
7	TML	MCPA	517	852	950	946	996	1058					886	21.80	TM	0.9976	
8	TM	Dichlorprop	299844	307481	301479	269327	268746	276471					287225	6.13	TM		
9	TM	2,4-D	346505	363498	358250	324626	324203	333628					341785	4.96	TM		
10	TM	Pentachlorophenol (PCP)	4035605	4551336	4764816	4528586	4602697	4755736					4539796	5.88	TM		
11	TM	2,4,5-TP (Silvex)	1808658	2021539	2066914	1919846	1943048	1993490					1958916	4.63	TM		
12	TM	Dinitro-o-cresol (DNOC)	1738013	1910820	1934697	1846786	1886509	1924607					1873572	3.92	TM		
13	TM	2,4,5-T	1786789	1883320	1941512	1747275	1747431	1801417					1817957	4.31	TM		
14	TM	Chloramben	1244703	1354569	1409797	1310957	1317037	1351380					1331407	4.14	TM		
15	TM	Dinoseb	1164406	1284803	1305423	1203739	1224538	1269399					1242051	4.32	TM		
16	TM	2,4-DB	178896	201572	205846	190050	193097	205594					195842	5.39	TM		
17	TM	Bentazon	183397.9592	208946.9	204382.8	186400.4	188200.0	192859.2					194031	5.34	TM		
18	TM	DCPA (Dacthal)	2360184.211	2549156.25	2610667.969	2429507.813	2466632.813	2532446.289					2491432.56	3.63	TM		
19	TM	Picloram	2177632	2545789	2519727	2402693	2453719	2536123					2439280	5.72	TM		
20	TM	Acifluorfen	1928760.417	2195381.25	2207939.063	2095672.656	2165594.792	2233649.609					2.14E+06	5.28	TM		
21		Signal #2											0	0			
22																	
23																	
24																	
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4.04

EPA METHOD 8151A/515
METHOD

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 7/12/2021
Matrix: Water Instrument: Herbie
Initials: MA

			7060079.D	7060081.D	7060085.D	7060082.D	7060083.D	7060084.D									
		Compound	1	2	3	4	5	6					Avg	%RSD	Type	r^2	Q
36	TM	Dalapon #2	1305072.917	1280418.75	1320251.172	1227134.766	1204426.302	1250997.363					1.26E+06	3.57	TM		
37	TM	3,5-Dichlorobenzoic Acid #2	1194368.421	1274812.5	1278085.938	1188537.109	1170735.677	1184940.43					1.22E+06	3.95	TM		
38	CM	4-Nitrophenol #2	502927.0833	566971.875	597870.3125	568892.9688	565319.7917	571126.1719					562184.701	5.59	CM		
39	S	2, 4-DCAA (S) #2	736307.2917	743190.625	738784.375	670192.5781	669033.0729	684522.4609					707005.067	5.09	S		
40	TM	Dicamba #2	2592789.474	2744414.063	2803488.281	2637593.75	2750569.01	2849868.164					2.73E+06	3.58	TM		
41	TML	MCPP #2	727.916667	1576.125	1872.28125	1929.759766	2008.335938	2102.182617					1702.76687	29.94	TM	0.999	
42	TML	MCPA #2	978.802083	2027.257813	2463.582031	2503.513672	2588.070313	2699.743164					2210.16151	29.20	TM	0.9992	
43	TM	Dichlorprop #2	862713.5417	879431.25	815991.4063	887002.3438	881522.1354	858627.7344					864214.735	3.02	TM		
44	TM	2,4-D #2	1088536.458	1503484.375	1371005.469	1155947.656	1079274.219	1045326.758					1.21E+06	15.45	TM		
45	TM	Pentachlorophenol (PCP) #2	13713342.11	15032687.5	14863546.88	13911343.75	13683651.04	13797097.66					1.42E+07	4.32	TM		
46	TM	2,4,5-TP (Silvex) #2	5859649.123	6101125	5974645.833	5651103.516	5581083.333	5646008.789					5.80E+06	3.60	TM		
47	TM	Dinitro-o-cresol (DNOC) #2	5859649.123	6101125	5974645.833	5651103.516	5581083.333	5646008.789					5.80E+06	3.60	TM		
48	TM	2,4,5-T #2	7123289.474	6939203.125	6582753.906	6030474.609	5828134.115	5900407.227					6.40E+06	8.73	TM		
49	TM	Chloramben #2	3951687.5	4126160.938	4057381.25	3781572.266	3726408.073	3761738.867					3.90E+06	4.32	TM		
50	TM	Dinoseb #2	4088322.917	4256025	4224750	3786217.969	3738279.688	3731818.75					3.97E+06	6.22	TM		
51	TM	2,4-DB #2	572486.9792	580609.375	610250	554518.75	559605.3385	572372.3633					574973.801	3.43	TM		
52	TM	Bentazon #2	520312.5	533567.1875	545149.2188	502136.3281	503272.6563	524585.5469					521503.906	3.23	TM		
53	TM	DCPA (Dacthal) #2	7589763.158	8343882.813	8752285.156	7910294.922	7880933.594	7936658.203					8.07E+06	5.11	TM		
54	TM	Picloram #2	7017105.263	7861898.438	7998835.938	7600898.438	7542010.417	7582573.242					7.60E+06	4.45	TM		
55	TM	Acifluorfen #2	5833656.25	6525243.75	6471254.688	6247957.813	6122651.563	6204933.594					6.23E+06	4.02	TM		
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4.30

EPA METHOD 8151A/515
HERB0706

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 7/12/2021
Instrument: Herbie
Initial Cal. Date: 7/12/2021
Data File: 7060086.D

		Compound	MEAN	CCRF	%D		%Drift
1	TM	Dalapon	312001	270114	13	TM	
2	TM	3,5-Dichlorobenzoic Acid	370285	337184	8.9	TM	
3	TM	4-Nitrophenol	196060	160942	18	TM	
4	S	2, 4-DCAA (S)	273550	259370	5.2	S	
5	TM	Dicamba	1052840	911457	13	TM	
6	TML	MCPP	572	639	12	TML	3.8
7	TML	MCPA	886	1122	27	TML	17
8	TM	Dichlorprop	287225	256100	11	TM	
9	TM	2,4-D	341785	307115	10	TM	
10	TM	Pentachlorophenol (PCP)	4539800	3878000	15	TM	
11	TM	2,4,5-TP (Silvex)	1958920	1792490	8.5	TM	
12	TM	Dinitro-o-cresol (DNOC)	1873570	1612600	14	TM	
13	TM	2,4,5-T	1817960	1604950	12	TM	
14	TM	Chloramben	1331410	1178680	11	TM	
15	TM	Dinoseb	1242050	1045060	16	TM	
16	TM	2,4-DB	195842	168522	14	TM	
17	TM	Bentazon	194031	187280	3.5	TM	
18	TM	DCPA (Dacthal)	2491430	2168380	13	TM	
19	TM	Picloram	2439280	2096830	14	TM	
20	TM	Acifluorfen	2137830	1867940	13	TM	
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40							
		Average			12.6		

EPA METHOD 8151A/515
HERB0706

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 7/12/2021
Instrument: Herbie
Cal. Date: 7/12/2021
Data File: 7060086.D

		Compound	MEAN	CCRF	%D		%Drift	
41	TM	Dalapon	1264720	1124150	11	TM		
42	TM	3,5-Dichlorobenzoic Acid	1215250	1076230	11	TM		
43	CM	4-Nitrophenol	562185	491083	13	CM		
44	S	2, 4-DCAA (S)	707005	623702	12	S		
45	TM	Dicamba	2729790	2321630	15	TM		
46	TML	MCPP	1703	1835	7.8	TML	0.79	
47	TML	MCPA	2210	2425	9.7	TML	0.78	
48	TM	Dichlorprop	864215	744545	14	TM		
49	TM	2,4-D	1207260	917784	24	TM		*
50	TM	Pentachlorophenol (PCP)	14166900	11942700	16	TM		
51	TM	2,4,5-TP (Silvex)	5802270	4925570	15	TM		
52	TM	Dinitro-o-cresol (DNOC)	5802270	4925570	15	TM		
53	TM	2,4,5-T	6400710	5179460	19	TM		
54	TM	Chloramben	3900820	3390410	13	TM		
55	TM	Dinoseb	3970900	3579300	9.9	TM		
56	TM	2,4-DB	574974	492305	14	TM		
57	TM	Bentazon	521504	501997	3.7	TM		
58	TM	DCPA (Dacthal)	8068970	7039570	13	TM		
59	TM	Picloram	7600550	6768820	11	TM		
60	TM	Acifluorfen	6234280	5390390	14	TM		
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71								
72								
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80								
		Average			13.1			

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8/10/2021
Instrument: Herbie
Initial Cal. Date: 7/12/2021
Data File: 0809H044.D

		Compound	MEAN	CCRF	%D		%Drift
1	TM	Dalapon	312001	293598	5.9	TM	
2	TM	3,5-Dichlorobenzoic Acid	370285	374586	1.2	TM	
3	TM	4-Nitrophenol	196060	185448	5.4	TM	
4	S	2, 4-DCAA (S)	273550	259219	5.2	S	
5	TM	Dicamba	1052840	998510	5.2	TM	
6	TML	MCPP	572	681	19	TML	5.0
7	TML	MCPA	886	1082	22	TML	7.7
8	TM	Dichlorprop	287225	271976	5.3	TM	
9	TM	2,4-D	341785	324836	5.0	TM	
10	TM	Pentachlorophenol (PCP)	4539800	4447630	2.0	TM	
11	TM	2,4,5-TP (Silvex)	1958920	1868220	4.6	TM	
12	TM	Dinitro-o-cresol (DNOC)	1873570	1882160	0.46	TM	
13	TM	2,4,5-T	1817960	1709040	6.0	TM	
14	TM	Chloramben	1331410	1297300	2.6	TM	
15	TM	Dinoseb	1242050	1241330	0.06	TM	
16	TM	2,4-DB	195842	193556	1.2	TM	
17	TM	Bentazon	194031	185805	4.2	TM	
18	TM	DCPA (Dacthal)	2491430	2376610	4.6	TM	
19	TM	Picloram	2439280	2287390	6.2	TM	
20	TM	Acifluorfen	2137830	2148420	0.50	TM	
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38							
39							
40							
		Average			5.3		

EPA METHOD 8151A/515
0

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8/10/2021
Instrument: Herbie
Cal. Date: 7/12/2021
Data File: 0809H044.D

		Compound	MEAN	CCRF	%D		%Drift	
41	TM	Dalapon	1264720	1224680	3.2	TM		
42	TM	3,5-Dichlorobenzoic Acid	1215250	1249130	2.8	TM		
43	CM	4-Nitrophenol	562185	623395	11	CM		
44	S	2, 4-DCAA (S)	707005	701849	0.73	S		
45	TM	Dicamba	2729790	2723030	0.25	TM		
46	TML	MCPP	1703	1968	16	TML	1.3	
47	TML	MCPA	2210	2879	30	TML	11	
48	TM	Dichlorprop	864215	814462	5.8	TM		
49	TM	2,4-D	1207260	956216	21	TM		*
50	TM	Pentachlorophenol (PCP)	14166900	13714800	3.2	TM		
51	TM	2,4,5-TP (Silvex)	5802270	5712820	1.5	TM		
52	TM	Dinitro-o-cresol (DNOC)	5802270	5712820	1.5	TM		
53	TM	2,4,5-T	6400710	5826330	9.0	TM		
54	TM	Chloramben	3900820	3677530	5.7	TM		
55	TM	*Dinoseb*	3970900	3858800	2.8	TM		
56	TM	2,4-DB	574974	554521	3.6	TM		
57	TM	Bentazon	521504	540686	3.7	TM		
58	TM	DCPA (Dacthal)	8068970	7074010	12	TM		
59	TM	Picloram	7600550	7116720	6.4	TM		
60	TM	Acifluorfen	6234280	5924880	5.0	TM		
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71								
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80								
		Average			7.3			

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8/10/2021
Instrument: Herbie
Initial Cal. Date: 7/12/2021
Data File: 0809H062.D

		Compound	MEAN	CCRF	%D		%Drift
1	TM	Dalapon	312001	316504	1.4	TM	
2	TM	3,5-Dichlorobenzoic Acid	370285	395256	6.7	TM	
3	TM	4-Nitrophenol	196060	194470	0.81	TM	
4	S	2, 4-DCAA (S)	273550	272722	0.30	S	
5	TM	Dicamba	1052840	1047550	0.50	TM	
6	TML	MCPP	572	705	23	TML	8.5
7	TML	MCPA	886	1137	28	TML	13
8	TM	Dichlorprop	287225	284110	1.1	TM	
9	TM	2,4-D	341785	342277	0.14	TM	
10	TM	Pentachlorophenol (PCP)	4539800	4676750	3.0	TM	
11	TM	2,4,5-TP (Silvex)	1958920	1948230	0.55	TM	
12	TM	Dinitro-o-cresol (DNOC)	1873570	1940110	3.6	TM	
13	TM	2,4,5-T	1817960	1743740	4.1	TM	
14	TM	Chloramben	1331410	1349750	1.4	TM	
15	TM	Dinoseb	1242050	1262320	1.6	TM	
16	TM	2,4-DB	195842	199705	2.0	TM	
17	TM	Bentazon	194031	195745	0.88	TM	
18	TM	DCPA (Dacthal)	2491430	2412670	3.2	TM	
19	TM	Picloram	2439280	2390830	2.0	TM	
20	TM	Acifluorfen	2137830	2162830	1.2	TM	
21							
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		Average			4.3		

EPA METHOD 8151A/515
0

Form 7

Continuing Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Date Analyzed: 8/10/2021
Matrix: Water Instrument: Herbie
Cal. Date: 7/12/2021
Data File: 0809H062.D

		Compound	MEAN	CCRF	%D		%Drift	
41	TM	Dalapon	1264720	1232150	2.6	TM		
42	TM	3,5-Dichlorobenzoic Acid	1215250	1253540	3.2	TM		
43	CM	4-Nitrophenol	562185	624556	11	CM		
44	S	2, 4-DCAA (S)	707005	713875	0.97	S		
45	TM	Dicamba	2729790	2738380	0.31	TM		
46	TML	MCPP	1703	1944	14	TML	2.4	
47	TML	MCPA	2210	2935	33	TML	13	
48	TM	Dichlorprop	864215	612804	29	TM		*
49	TM	2,4-D	1207260	842032	30	TM		*
50	TM	Pentachlorophenol (PCP)	14166900	11193800	21	TM		*
51	TM	2,4,5-TP (Silvex)	5802270	4532530	22	TM		*
52	TM	Dinitro-o-cresol (DNOC)	5802270	4532530	22	TM		*
53	TM	2,4,5-T	6400710	4010140	37	TM		*
54	TM	Chloramben	3900820	3132290	20	TM		
55	*TM*	*Dinoseb*	*3970900*	*3488600*	*12*	*TM*		
56	TM	2,4-DB	574974	512155	11	TM		
57	TM	Bentazon	521504	499149	4.3	TM		
58	TM	DCPA (Dacthal)	8068970	6894690	15	TM		
59	TM	Picloram	7600550	6823500	10	TM		
60	TM	Acifluorfen	6234280	5577810	11	TM		
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80								
		Average			15.5			

ORGANICS

Raw Data

Organic Extraction Worksheet

Method	Herbicide Separatory Funnel 8151A	Extraction Set	210728A	Extraction Method	SEP002	Units	mL

Spiked ID 1	HERB SPIKE 6/21/21-6/21/22		Surrogate ID 1	HERB SURROGATE 5/13/21-5/13/22	
Spiked ID 2			Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	07/28/21 16:20	
Spiked ID 8			Ext. End Time:	07/31/21 15:30	
			GC Requires Extract By:		

pH1	14		Water Bath Temp 1 °C	
pH2	2		Water Bath Temp 2 °C	
pH3			Water Bath Temp 3 °C	

Spiked By: **Date** **Witnessed By:** **Date**

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	210728A Blk				0.020	1 equip	1000	5	14/	07/28/21 16:20	TCLP
2	210728A LCS-1		0.020	1	NA	NA equip	1000	5	14/	07/28/21 16:20	
3	210728A LCSD-1		0.020	1	NA	NA equip	1000	5	14/	07/28/21 16:20	
4	BA36271	BA36271S02			0.020	1 equip	1000	5	14/	07/28/21 16:20	96859

Solvent and Lot#	
NaCl (250g)	20K305207
10N NaOH(10mL) / ph Strip	06/21/22-/HCl
1+1 H2SO4 (17mL)	04/04/21-04/07/
Dichloromethane 60mL	61117
Acidified Na2SO4	02/23/21-02/23/
MTBE / MeOH (0.250)	60038/60042
Diazomethane (1-2mL)	6-12-21
Silicic Acid	142756

Extraction COC Transfer	
Extraction lab employee Initials	
GC analyst's initials	CW
Date	8/2/21
Time	1050
Refrigerator	Hobart

	Technician's Initials
Scanned By	SR
Sample Preparation	SR
Extraction	SR
Concentration	SR

Modified	8/3/2021 7:47:31 AM

Reviewed By: **Date**

Organic Extraction Worksheet

Method	Herbicide Separatory Funnel 8151A	Extraction Set	210722A	Extraction Method	SEP002	Units	mL

Spiked ID 1	HERB SPIKE 5/13/21-8/15/22		Surrogate ID 1	HERB SURROGATE 5/13/21-5/13/22	
Spiked ID 2			Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	07/22/21 11:03	
Spiked ID 8			Ext. End Time:	07/31/21 15:40	
			GC Requires Extract By:		

pH1	14		Water Bath Temp 1 °C	
pH2	2		Water Bath Temp 2 °C	
pH3			Water Bath Temp 3 °C	

Spiked By: **Date** **Witnessed By:** **Date**

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	210722A Blk				0.020	1 equip	1000	5	14/	07/22/21 11:03	
2	210722A LCS-1		0.020	1	NA	NA equip	1000	5	14/	07/22/21 11:03	
3	210722A LCSD-1		0.020	1	NA	NA equip	1000	5	14/	07/22/21 11:03	
4	BA36174	BA36174W08			0.020	1 equip	1070	5	14/	07/22/21 11:03	96842 LTD VOLUME
5	BA36269	BA36269W02			0.020	1 equip	330	5	14/	07/22/21 11:03	96859 LTD VOLUME

Solvent and Lot#	
NaCl (250g)	20I165203
10N NaOH(10mL) / ph Strip	04/03/21//HC1
1+1 H2SO4 (17mL)	04/07/21
Dichloromethane (60mL)	60338
Acidified Na2SO4	02/23/21
MTBE / MeOH (0.250)	60038/60042
Diazomethane (1-2mL)	06/12/21
Silicic Acid	142756

Extraction COC Transfer	
Extraction lab employee Initials	
GC analyst's initials	CW
Date	7/8/21
Time	1050
Refrigerator	Hobart

	Technician's Initials
Scanned By	KA
Sample Preparation	KA
Extraction	KA EO
Concentration	SR

Modified	7/22/2021 1:27:36 PM

Reviewed By: **Date**

Injection Log

Directory: G:\HERBIE\DATA\210809

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	-6144	7060079.D	1	HERB-1 CCV	water	7/12/21 15:10
2	-8324	7060080.D	1	HERB-2 CCV	water	7/12/21 15:35
3	-8324	7060082.D	1	HERB-4 07/06/21	water	7/12/21 16:21
4	-8324	7060083.D	1	HERB-5 07/06/21	water	7/12/21 16:44
5	-8324	7060084.D	1	HERB-6 07/06/21	water	7/12/21 17:07
6	-8324	7060085.D	1	HERB-3 07/06/21	water	7/12/21 17:34
7	-8324	7060086.D	1	HERB-SS 07/06/22	water	7/12/21 17:56
8	0	0809H044.D	1	HERB-4 07/06/21	Water	8/10/21 10:09
9	2048	0809H045.D	5	210722A BLK 5/1000	soil	8/10/21 10:59
10	-8324	0809H046.D	5	210722A LCS-1 5/1000	soil	8/10/21 11:21
11	0	0809H049.D	15.15152	BA36269W02 5/330	Water	8/10/21 12:29
12	0	0809H055.D	5	210728A BLK 5/1000	Water	8/10/21 14:44
13	-8324	0809H056.D	5	210728A LCS-1 5/1000	Water	8/10/21 15:07
14	-8324	0809H058.D	5	BA36271S02 5/1000	Water	8/10/21 15:52
15	-6144	0809H062.D	1	HERB-4 07/06/21	Water	8/10/21 17:22

ORGANICS

Calibration Data

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 07/30/21
Matrix: Instrument: Yoda Initials: MA

0721Y004.D 0721Y005.D 0730Y006.D 0730Y007.D 0730Y008.D 0730Y009.D 0730Y010.D 0730Y011.D 0730Y012.D

		Compound	4	5	10	20	40	50	60	80	100		Avg	%RSD	Type	r^2	Q	MRF
1	I	1,4-dichlorobenzene-D4(IS)	ISTD															
2		1,4-Dioxane		0.2283	0.1943	0.1747	0.2091	0.1709	0.1824	0.1896	0.2145		0.20	10				
3	TM	n-Nitrosodimethylamine		0.4078	0.3176	0.3360	0.3093	0.3126	0.3055	0.3150	0.3043		0.33	11	TM			
4	TM	Pyridine		0.9125	0.8235	0.8663	0.8430	0.8809	0.8377	0.8601	0.8498		0.86	3.2	TM			
5	S	2-Fluorophenol (S)		1.419	1.444	1.417	1.388	1.403	1.355	1.360	1.348		1.4	2.5	S			
6	S	Phenol-D6 (S)		1.775	1.802	1.768	1.698	1.715	1.652	1.678	1.636		1.7	3.5	S			
7	*TM	Phenol		2.126	2.056	2.093	2.054	2.070	1.987	2.013	1.931		2.0	3.0	*TM			0.800
8	TM	Aniline			1.967	1.688	1.697	1.617	1.596	1.356	1.319		1.6	14	TM			
9	TM	Bis (2-chloroethyl) ether		0.9847	0.9602	0.9465	0.9431	0.9483	0.9105	0.9223	0.9129		0.94	2.7	TM			0.700
10	TM	2-Chlorophenol		1.549	1.481	1.518	1.513	1.541	1.485	1.500	1.494		1.5	1.7	TM			0.800
11	TM	1,3-DCB		1.636	1.582	1.596	1.589	1.598	1.549	1.568	1.561		1.6	1.7	TM			
12	*TM	1,4-DCB		1.638	1.578	1.620	1.599	1.623	1.549	1.566	1.564		1.6	2.0	*TM			
13	TM	Benzyl alcohol		0.9490	0.8829	0.9026	0.8992	0.9054	0.8743	0.8982	0.8955		0.90	2.4	TM			
14	TM	1,2-DCB		1.573	1.499	1.493	1.495	1.501	1.461	1.466	1.471		1.5	2.4	TM			
15	TM	2-Methylphenol		3.141	3.096	3.037	2.921	2.986	2.828	2.901	2.836		3.0	3.9	TM			0.700
16	TM	Bis (2-chloroisopropyl) ether		1.401	1.375	1.370	1.326	1.336	1.292	1.295	1.256		1.3	3.7	TM			0.010
17	TM	Acetophenone		1.997	1.920	1.919	1.881	1.879	1.814	1.844	1.823		1.9	3.2	TM			0.010
18	TM	3&4-Methylphenol		1.570	1.548	1.518	1.461	1.493	1.414	1.451	1.418		1.5	3.9	TM			0.600
19	**TM	n-Nitrosodi-n-propylamine		1.158	1.129	1.125	1.084	1.089	1.049	1.072	1.048		1.1	3.6	**TM			0.500
20	TM	Hexachloroethane		0.6111	0.5803	0.5929	0.5941	0.6014	0.5897	0.5996	0.5957		0.60	1.5	TM			0.300
21	I	Napthalene-D8(IS)	ISTD															
22	S	Nitrobenzene-D5(S)		0.3720	0.3896	0.3858	0.3801	0.3853	0.3778	0.3771	0.3743		0.38	1.6	S			
23	TM	Nitrobenzene		0.4045	0.3839	0.3986	0.3909	0.3913	0.3838	0.3805	0.3789		0.39	2.3	TM			0.200
24	TM	Isophorone		0.7020	0.6650	0.6932	0.6850	0.6728	0.6598	0.6569	0.6536		0.67	2.7	TM			0.400
25	*TM	2-Nitrophenol		0.1718	0.1761	0.1919	0.1971	0.1996	0.1966	0.1978	0.2017		0.19	5.9	*TM			0.100
26	TM	2,4-Dimethylphenol		0.3314	0.3206	0.3338	0.3241	0.3240	0.3156	0.3150	0.3140		0.32	2.3	TM			0.200
27	TM	Benzoic acid		0.0110	0.0093	0.0095	0.0088	0.0090	0.0092	0.0088	0.0111		0.01	9.9	TM			
28	TM	Bis (2-chloroethoxy) methane		0.4389	0.4156	0.4275	0.4174	0.4125	0.4027	0.3996	0.3974		0.41	3.5	TM			0.300
29	*TM	2,4-Dichlorophenol		0.2934	0.2744	0.2905	0.2821	0.2856	0.2836	0.2842	0.2845		0.28	2.0	*TM			0.200
30	TM	1,2,4-Trichlorobenzene		0.3058	0.2953	0.3015	0.3004	0.2979	0.2930	0.2937	0.2927		0.30	1.6	TM			
31	TM	3,4-Dimethylphenol		0.4383	0.4334	0.4514	0.4412	0.4418	0.4370	0.4365	0.4393		0.44	1.2	TM			
32	TM	Naphthalene		1.042	1.001	1.035	1.014	1.007	0.9996	0.9321	0.9121		0.99	4.7	TM			0.700
33	TM	4-Chloroaniline		0.4295	0.4070	0.4331	0.4100	0.4009	0.3907	0.3679	0.3455		0.40	7.5	TM			0.010
34	TM	2,6-Dichlorophenol		0.2736	0.2661	0.2746	0.2700	0.2731	0.2671	0.2656	0.2667		0.27	1.4	TM			
35	TM	Hexachloropropene		0.1709	0.1695	0.1839	0.1844	0.1914	0.1896	0.1907	0.1903		0.18	4.8	TM			

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 07/30/21
Matrix: Instrument: Yoda Initials: MA

		Compound	4	5	10	20	40	50	60	80	100		Avg	%RSD	Type		Q	
36	*TM	Hexachlorobutadiene		0.1590	0.1487	0.1522	0.1521	0.1536	0.1540	0.1505	0.1507		0.15	2.0	*TM			0.010
37	TM	Caprolactum		0.0083	0.0074	0.0068	0.0070	0.0066	0.0065	0.0065	0.0061		0.01	10	TM			0.010
38	*TM	4-Chloro-3-methylphenol		0.3219	0.3090	0.3249	0.3219	0.3218	0.3140	0.3203	0.3175		0.32	1.6	*TM			0.200
39	TM	2-Methylnaphthalene		0.7213	0.7031	0.7277	0.7002	0.7068	0.6992	0.6841	0.6885		0.70	2.1	TM			0.400
40	TM	1-Methylnaphthalene		0.6844	0.6555	0.6871	0.6704	0.6752	0.6677	0.6537	0.6534		0.67	2.0	TM			
41	I	Acenaphthene-D10(IS)	ISTD															
42	**TM	Hexachlorocyclopentadiene				0.2855	0.2635	0.3420	0.3402	0.3093	0.3341		0.31	10	**TM			0.050
43	TM	1,2,4,5-Tetrachlorobenzene		0.5198	0.4940	0.4990	0.4891	0.5091	0.4905	0.4784	0.4889		0.50	2.6	TM			0.010
44	*TM	2,4,6-Trichlorophenol		0.3540	0.3550	0.3742	0.3710	0.3800	0.3736	0.3721	0.3799		0.37	2.7	*TM			0.200
45	TM	2,4,5-Trichlorophenol		0.3891	0.3771	0.3936	0.3945	0.3996	0.3937	0.3870	0.3962		0.39	1.8	TM			0.200
46	S	2-Fluorobiphenyl(S)		1.355	1.417	1.360	1.317	1.345	1.310	1.278	1.308		1.3	3.2	S			
47	TM	1,1'-Biphenyl		1.590	1.527	1.521	1.501	1.538	1.513	1.474	1.369		1.5	4.2	TM			0.010
48	TM	2-Chloronaphthalene		1.204	1.165	1.180	1.171	1.180	1.158	1.120	1.114		1.2	2.7	TM			0.800
49	TM	2-Nitroaniline		0.3341	0.3399	0.3595	0.3542	0.3673	0.3586	0.3563	0.3562		0.35	3.1	TM			0.010
50	TM	Dimethyl phthalate		1.442	1.348	1.381	1.377	1.395	1.373	1.349	1.340		1.4	2.4	TM			0.010
51	TM	2,6-DNT		0.2434	0.2488	0.2797	0.2891	0.3058	0.2953	0.2925	0.2973		0.28	8.2	TM			0.200
52	TM	Acenaphthylene		1.987	1.918	1.972	1.939	1.920	1.905	1.769	1.711		1.9	5.2	TM			0.900
53	TM	3-Nitroaniline		0.3447	0.3422	0.3702	0.3680	0.3759	0.3731	0.3623	0.3541		0.36	3.6	TM			0.010
54	*TM	Acenaphthene		1.254	1.182	1.196	1.197	1.202	1.154	1.143	1.125		1.2	3.4	*TM			0.900
55	**TMQ	2,4-Dinitrophenol				0.0263	0.0498	0.0694	0.0823	0.1016	0.1196		0.07	45	**TM	0.999		0.010
56	**TM	4-Nitrophenol		0.0280	0.0287	0.0344	0.0320	0.0347	0.0321	0.0326	0.0326		0.03	7.5	**TM			0.010
57	TM	Dibenzofuran		1.711	1.643	1.646	1.610	1.641	1.598	1.548	1.503		1.6	4.0	TM			0.800
58	TM	2,4-DNT		0.3221	0.3382	0.3921	0.3954	0.4113	0.3994	0.3978	0.4013		0.38	8.6	TM			0.200
59	TM	2,3,4,6-Tetrachlorophenol		0.2250	0.2443	0.2742	0.2854	0.2903	0.2889	0.2851	0.2919		0.27	9.1	TM			0.010
60	TM	Diethyl phthalate		1.495	1.407	1.447	1.416	1.445	1.416	1.361	1.394		1.4	2.8	TM			0.010
61	TM	4-Chlorophenyl phenyl ether		0.6474	0.6261	0.6265	0.6146	0.6203	0.6125	0.5938	0.6079		0.62	2.5	TM			0.400
62	TM	Fluorene		1.402	1.345	1.378	1.352	1.373	1.353	1.301	1.314		1.4	2.5	TM			0.900
63	TM	4-Nitroaniline		0.3645	0.3651	0.3907	0.3778	0.3855	0.3865	0.3660	0.3708		0.38	2.8	TM			0.010
64	S	2,4,6-Tribromophenol(S)		0.1498	0.1641	0.1655	0.1630	0.1680	0.1651	0.1666	0.1779		0.16	4.6	S			
65	I	Phenanthrene-D10(IS)	ISTD															
66	TML	4,6-Dinitro-2-methylphenol				0.0499	0.0794	0.0948	0.1008	0.1088	0.1158		0.09	26	TM	0.998		0.010
67	TM	Diphenyl amine		0.6242	0.6243	0.6123	0.6136	0.6186	0.5980	0.5565	0.5720		0.60	4.2	TM			
68	*TM	n-Nitrosodiphenylamine		0.6242	0.6243	0.6123	0.6136	0.6186	0.5980	0.5565	0.5720		0.60	4.2	*TM			0.010
69	TM	1,2-Diphenylhydrazine		0.1627	0.1489	0.1534	0.1505	0.1541	0.1479	0.1446	0.1385		0.15	4.8	TM			
70	TM	4-Bromophenyl phenyl ether		0.2115	0.1989	0.2048	0.2061	0.2086	0.2039	0.2015	0.2019		0.20	2.0	TM			0.100

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 07/30/21
Matrix: Instrument: Yoda Initials: MA

		Compound	4	5	10	20	40	50	60	80	100		Avg	%RSD	Type		Q	
71	TM	Hexachlorobenzene		0.2015	0.2015	0.2000	0.2024	0.2050	0.1983	0.1964	0.1983		0.20	1.4	TM			0.100
72	TM	Atrazine		0.1969	0.1962	0.2067	0.2115	0.2159	0.2039	0.2059	0.2052		0.21	3.2	TM			0.010
73	*TM	Pentachlorophenol				0.1128	0.1305	0.1387	0.1383	0.1427	0.1454		0.13	8.8	*TM			0.050
74	TM	Phenanthrene		1.159	1.115	1.134	1.142	1.147	1.102	1.003	0.9462		1.1	7.0	TM			0.700
75	TM	Anthracene		1.173	1.166	1.174	1.188	1.189	1.146	1.135	1.034		1.2	4.4	TM			0.700
76	TM	Carbazol		1.107	1.054	1.092	1.085	1.096	1.055	1.026	0.9968		1.1	3.6	TM			0.010
77	TM	Di-n-butylphthalate		1.384	1.351	1.381	1.388	1.417	1.302	1.166	0.9879		1.3	11	TM			0.010
78	*TM	Fluoranthene		1.168	1.138	1.165	1.154	1.177	1.147	1.054	1.016		1.1	5.2	*TM			0.600
79	I	Chrysene-D12(IS)	ISTD															
80	TM	Benzidine		0.4963	0.4982	0.5232	0.4691	0.4802	0.4511	0.4435	0.4165		0.47	7.3	TM			
81	TM	Pyrene		1.443	1.395	1.461	1.438	1.460	1.413	1.384	1.337		1.4	3.0	TM			0.600
82	S	Terphenyl-D14(S)		1.038	1.088	1.072	1.043	1.066	1.021	1.014	1.001		1.0	2.9	S			
83	TM	Butyl benzylphthalate		0.7276	0.7142	0.7493	0.7336	0.7753	0.7352	0.7237	0.7162		0.73	2.7	TM			0.010
84	TM	3,3'-Dichlorobenzidine		0.4614	0.4556	0.4800	0.4567	0.4689	0.4433	0.4342	0.4224		0.45	4.1	TM			0.010
85	TM	Benz (a) anthracene		1.320	1.262	1.280	1.278	1.330	1.265	1.268	1.237		1.3	2.4	TM			0.800
86	TM	Bis (2-ethylhexyl) phthalate		0.9919	0.9772	0.9993	1.021	1.038	1.007	0.9623	0.9124		0.99	3.9	TM			0.010
87	TM	Chrysene		1.263	1.235	1.280	1.241	1.251	1.220	1.153	1.198		1.2	3.2	TM			0.700
88	*TM	Di-n-octylphthalate		1.663	1.585	1.827	1.762	1.819	1.700	1.499	1.343		1.6	10	*TM			0.010
89	I	Perylene-D12(IS)	ISTD															
90	TM	Benzo (b) fluoranthene		1.198	1.109	1.252	1.243	1.358	1.262	1.288	1.230		1.2	5.8	TM			0.700
91	TM	Benzo (k) fluoranthene		1.273	1.284	1.268	1.269	1.216	1.205	1.172	1.242		1.2	3.2	TM			0.700
92	*TM	Benzo (a) pyrene	1.050	1.135	1.108	1.162	1.179	1.217	1.168	1.167	1.163		1.1	4.2	*TM			0.700
93	TM	Indeno (1,2,3-cd) pyrene		1.209	1.164	1.230	1.229	1.260	1.221	1.223	1.215		1.2	2.2	TM			0.500
94	TM	Dibenz (a,h) anthracene		1.081	1.046	1.116	1.115	1.132	1.099	1.103	1.094		1.1	2.4	TM			0.400
95	TM	Benzo (g,h,i) perylene		1.097	1.052	1.099	1.098	1.123	1.089	1.090	1.082		1.1	1.8	TM			0.500
96																		
97																		
98																		
99																		
100																		
101																		
102																		
103																		
104																		
105																		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 07/30/21
Instrument: Yoda
Initial Cal. Date: 07/30/21
Data File: 0730Y013.D

		Compound	MEAN	CCRF	%D		%Drift
1		1,4-Dioxane	0.1955	0.2138	9.4		
2	TM	n-Nitrosodimethylamine	0.3260	0.3298	1.2	TM	
3	TM	Pyridine	0.8592	0.8919	3.8	TM	
4	*TM	Phenol	2.041	2.099	2.8	*TM	
5	TM	Aniline	1.606	1.534	4.5	TM	
6	TM	Bis (2-chloroethyl) ether	0.9411	0.9735	3.4	TM	
7	TM	2-Chlorophenol	1.510	1.527	1.1	TM	
8	TM	1,3-DCB	1.585	1.631	2.9	TM	
9	*TM	1,4-DCB	1.592	1.646	3.4	*TM	
10	TM	Benzyl alcohol	0.9009	0.9363	3.9	TM	
11	TM	1,2-DCB	1.495	1.563	4.6	TM	
12	TM	2-Methylphenol	2.968	3.084	3.9	TM	
13	TM	Bis (2-chloroisopropyl) ether	1.331	1.354	1.7	TM	
14	TM	Acetophenone	1.885	1.917	1.7	TM	
15	TM	3&4-Methylphenol	1.484	1.542	3.9	TM	
16	**TM	n-Nitrosodi-n-propylamine	1.094	1.121	2.5	**TM	
17	TM	Hexachloroethane	0.5956	0.6281	5.5	TM	
18	TM	Nitrobenzene	0.3891	0.4005	2.9	TM	
19	TM	Isophorone	0.6735	0.6886	2.2	TM	
20	*TM	2-Nitrophenol	0.1916	0.2016	5.2	*TM	
21	TM	2,4-Dimethylphenol	0.3223	0.3262	1.2	TM	
22	TM	Benzoic acid	0.0096	0.0088	7.6	TM	
23	TM	Bis (2-chloroethoxy) methane	0.4140	0.4259	2.9	TM	
24	*TM	2,4-Dichlorophenol	0.2848	0.2863	0.54	*TM	
25	TM	1,2,4-Trichlorobenzene	0.2975	0.3086	3.7	TM	
26	TM	3,4-Dimethylphenol	0.4399	0.4569	3.9	TM	
27	TM	Naphthalene	0.9929	1.012	1.9	TM	
28	TM	4-Chloroaniline	0.3981	0.4040	1.5	TM	
29	TM	2,6-Dichlorophenol	0.2696	0.2779	3.1	TM	
30	TM	Hexachloropropene	0.1839	0.1953	6.2	TM	
31	*TM	Hexachlorobutadiene	0.1526	0.1583	3.7	*TM	
32	TM	Caprolactum	0.0069	0.0065	5.1	TM	
33	*TM	4-Chloro-3-methylphenol	0.3189	0.3267	2.4	*TM	
34	TM	2-Methylnaphthalene	0.7038	0.6888	2.1	TM	
35	TM	1-Methylnaphthalene	0.6684	0.7054	5.5	TM	
36	**TM	Hexachlorocyclopentadiene	0.3124	0.3179	1.7	**TM	
37	TM	1,2,4,5-Tetrachlorobenzene	0.4961	0.5051	1.8	TM	
38	*TM	2,4,6-Trichlorophenol	0.3700	0.3826	3.4	*TM	
39	TM	2,4,5-Trichlorophenol	0.3914	0.4076	4.1	TM	
40	TM	1,1'-Biphenyl	1.504	1.562	3.8	TM	
		Average			3.4		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 07/30/21
Instrument: Yoda
Cal. Date: 07/30/21
Data File: 0730Y013.D

		Compound	MEAN	CCRF	%D		%Drift
41	TM	2-Chloronaphthalene	1.161	1.202	3.5	TM	
42	TM	2-Nitroaniline	0.3533	0.3721	5.3	TM	
43	TM	Dimethyl phthalate	1.376	1.421	3.3	TM	
44	TM	2,6-DNT	0.2815	0.3141	12	TM	
45	TM	Acenaphthylene	1.890	1.952	3.3	TM	
46	TM	3-Nitroaniline	0.3613	0.3713	2.8	TM	
47	*TM	Acenaphthene	1.181	1.198	1.4	*TM	
48	**TMQ	2,4-Dinitrophenol	0.0748	0.0839	12	**TMQ	11
49	**TM	4-Nitrophenol	0.0319	0.0342	7.3	**TM	
50	TM	Dibenzofuran	1.613	1.646	2.1	TM	
51	TM	2,4-DNT	0.3822	0.4323	13	TM	
52	TM	2,3,4,6-Tetrachlorophenol	0.2731	0.2977	9.0	TM	
53	TM	Diethyl phthalate	1.423	1.455	2.3	TM	
54	TM	4-Chlorophenyl phenyl ether	0.6186	0.6392	3.3	TM	
55	TM	Fluorene	1.352	1.382	2.2	TM	
56	TM	4-Nitroaniline	0.3759	0.4008	6.6	TM	
57	TML	4,6-Dinitro-2-methylphenol	0.0916	0.0993	8.4	TML	3.0
58	TM	Diphenyl amine	0.6025	0.6218	3.2	TM	
59	*TM	n-Nitrosodiphenylamine	0.6025	0.6218	3.2	*TM	
60	TM	1,2-Diphenylhydrazine	0.1501	0.1520	1.3	TM	
61	TM	4-Bromophenyl phenyl ether	0.2046	0.2081	1.7	TM	
62	TM	Hexachlorobenzene	0.2004	0.2084	4.0	TM	
63	TM	Atrazine	0.2053	0.2090	1.8	TM	
64	*TM	Pentachlorophenol	0.1347	0.1381	2.5	*TM	
65	TM	Phenanthrene	1.094	1.138	4.1	TM	
66	TM	Anthracene	1.151	1.174	2.0	TM	
67	TM	Carbazol	1.064	1.072	0.72	TM	
68	TM	Di-n-butylphthalate	1.297	1.432	10	TM	
69	*TM	Fluoranthene	1.127	1.166	3.4	*TM	
70	TM	Benzidine	0.4723	0.5290	12	TM	
71	TM	Pyrene	1.416	1.438	1.5	TM	
72	TM	Butyl benzylphthalate	0.7344	0.7598	3.5	TM	
73	TM	3,3'-Dichlorobenzidine	0.4528	0.4770	5.4	TM	
74	TM	Benz (a) anthracene	1.280	1.388	8.4	TM	
75	TM	Bis (2-ethylhexyl) phthalate	0.9886	1.038	5.0	TM	
76	TM	Chrysene	1.230	1.253	1.9	TM	
77	*TM	Di-n-octylphthalate	1.650	1.794	8.8	*TM	
78	TM	Benzo (b) fluoranthene	1.242	1.223	1.6	TM	
79	TM	Benzo (k) fluoranthene	1.241	1.268	2.1	TM	
80	*TM	Benzo (a) pyrene	1.150	1.208	5.0	*TM	
		Average			4.8		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 07/30/21
Instrument: Yoda
Cal. Date: 07/30/21
Data File: 0730Y013.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Indeno (1,2,3-cd) pyrene	1.219	1.303	6.9	TM	
82	TM	Dibenz (a,h) anthracene	1.098	1.128	2.7	TM	
83	TM	Benzo (g,h,i) perylene	1.091	1.108	1.5	TM	
84							
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		Average			3.7		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Date Analyzed: 2 Aug 21 11:41
Matrix: Instrument: Yoda
Initial Cal. Date: 07/30/21
Data File: 0730Y017.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	1,4-dichlorobenzene-D4(IS)	ISTD			I	
2		1,4-Dioxane	0.1955	0.1753	10		
3	TM	n-Nitrosodimethylamine	0.3260	0.3167	2.8	TM	
4	TM	Pyridine	0.8592	0.8591	0.02	TM	
5	S	2-Fluorophenol (S)	1.392	1.431	2.8	S	
6	S	Phenol-D6 (S)	1.716	1.721	0.34	S	
7	*TM	Phenol	2.041	2.083	2.0	*TM	
8	TM	Aniline	1.606	1.607	0.07	TM	
9	TM	Bis (2-chloroethyl) ether	0.9411	0.9657	2.6	TM	
10	TM	2-Chlorophenol	1.510	1.548	2.5	TM	
11	TM	1,3-DCB	1.585	1.588	0.17	TM	
12	*TM	1,4-DCB	1.592	1.594	0.12	*TM	
13	TM	Benzyl alcohol	0.9009	0.9209	2.2	TM	
14	TM	1,2-DCB	1.495	1.516	1.4	TM	
15	TM	2-Methylphenol	2.968	2.977	0.30	TM	
16	TM	Bis (2-chloroisopropyl) ether	1.331	1.341	0.75	TM	
17	TM	Acetophenone	1.885	1.885	0.00	TM	
18	TM	3&4-Methylphenol	1.484	1.489	0.30	TM	
19	**TM	n-Nitrosodi-n-propylamine	1.094	1.082	1.1	**TM	
20	TM	Hexachloroethane	0.5956	0.6021	1.1	TM	
21	I	Napthalene-D8(IS)	ISTD			I	
22	S	Nitrobenzene-D5(S)	0.3803	0.3826	0.62	S	
23	TM	Nitrobenzene	0.3891	0.3972	2.1	TM	
24	TM	Isophorone	0.6735	0.6777	0.62	TM	
25	*TM	2-Nitrophenol	0.1916	0.1960	2.3	*TM	
26	TM	2,4-Dimethylphenol	0.3223	0.3262	1.2	TM	
27	TM	Benzoic acid	0.0096	0.0085	11	TM	
28	TM	Bis (2-chloroethoxy) methane	0.4140	0.4137	0.07	TM	
29	*TM	2,4-Dichlorophenol	0.2848	0.2846	0.05	*TM	
30	TM	1,2,4-Trichlorobenzene	0.2975	0.3043	2.3	TM	
31	TM	3,4-Dimethylphenol	0.4399	0.4412	0.29	TM	
32	TM	Naphthalene	0.9929	1.011	1.8	TM	
33	TM	4-Chloroaniline	0.3981	0.4183	5.1	TM	
34	TM	2,6-Dichlorophenol	0.2696	0.2697	0.02	TM	
35	TM	Hexachloropropene	0.1839	0.1846	0.40	TM	
36	*TM	Hexachlorobutadiene	0.1526	0.1533	0.44	*TM	
37	TM	Caprolactum	0.0069	0.0068	1.7	TM	
38	*TM	4-Chloro-3-methylphenol	0.3189	0.3205	0.51	*TM	
39	TM	2-Methylnaphthalene	0.7038	0.7048	0.14	TM	
40	TM	1-Methylnaphthalene	0.6684	0.6638	0.69	TM	
		Average			1.6		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 2 Aug 21 11:41
Instrument: Yoda
Cal. Date: 07/30/21
Data File: 0730Y017.D

		Compound	MEAN	CCRF	%D		%Drift
41	I	Acenaphthene-D10(IS)	ISTD			I	
42	**TM	Hexachlorocyclopentadiene	0.3124	0.3111	0.41	**TM	
43	TM	1,2,4,5-Tetrachlorobenzene	0.4961	0.5025	1.3	TM	
44	*TM	2,4,6-Trichlorophenol	0.3700	0.3795	2.6	*TM	
45	TM	2,4,5-Trichlorophenol	0.3914	0.3865	1.2	TM	
46	S	2-Fluorobiphenyl(S)	1.336	1.332	0.32	S	
47	TM	1,1'-Biphenyl	1.504	1.548	2.9	TM	
48	TM	2-Chloronaphthalene	1.161	1.195	2.9	TM	
49	TM	2-Nitroaniline	0.3533	0.3715	5.2	TM	
50	TM	Dimethyl phthalate	1.376	1.406	2.2	TM	
51	TM	2,6-DNT	0.2815	0.3039	8.0	TM	
52	TM	Acenaphthylene	1.890	1.937	2.5	TM	
53	TM	3-Nitroaniline	0.3613	0.3693	2.2	TM	
54	*TM	Acenaphthene	1.181	1.201	1.6	*TM	
55	**TMQ	2,4-Dinitrophenol	0.0748	0.0892	19	**TMQ	15
56	**TM	4-Nitrophenol	0.0319	0.0333	4.4	**TM	
57	TM	Dibenzofuran	1.613	1.623	0.64	TM	
58	TM	2,4-DNT	0.3822	0.4117	7.7	TM	
59	TM	2,3,4,6-Tetrachlorophenol	0.2731	0.2832	3.7	TM	
60	TM	Diethyl phthalate	1.423	1.432	0.65	TM	
61	TM	4-Chlorophenyl phenyl ether	0.6186	0.6160	0.43	TM	
62	TM	Fluorene	1.352	1.367	1.1	TM	
63	TM	4-Nitroaniline	0.3759	0.3838	2.1	TM	
64	S	2,4,6-Tribromophenol(S)	0.1650	0.1615	2.1	S	
65	I	Phenanthrene-D10(IS)	ISTD			I	
66	TML	4,6-Dinitro-2-methylphenol	0.0916	0.0991	8.2	TML	2.9
67	TM	Diphenyl amine	0.6025	0.6111	1.4	TM	
68	*TM	n-Nitrosodiphenylamine	0.6025	0.6111	1.4	*TM	
69	TM	1,2-Diphenylhydrazine	0.1501	0.1521	1.4	TM	
70	TM	4-Bromophenyl phenyl ether	0.2046	0.2065	0.88	TM	
71	TM	Hexachlorobenzene	0.2004	0.1962	2.1	TM	
72	TM	Atrazine	0.2053	0.2037	0.74	TM	
73	*TM	Pentachlorophenol	0.1347	0.1399	3.8	*TM	
74	TM	Phenanthrene	1.094	1.125	2.9	TM	
75	TM	Anthracene	1.151	1.167	1.4	TM	
76	TM	Carbazol	1.064	1.072	0.80	TM	
77	TM	Di-n-butylphthalate	1.297	1.367	5.4	TM	
78	*TM	Fluoranthene	1.127	1.135	0.65	*TM	
79	I	Chrysene-D12(IS)	ISTD			I	
80	TM	Benzidine	0.4723	0.4817	2.0	TM	
		Average			2.9		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 2 Aug 21 11:41
Instrument: Yoda
Cal. Date: 07/30/21
Data File: 0730Y017.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Pyrene	1.416	1.452	2.5	TM	
82	S	Terphenyl-D14(S)	1.043	1.059	1.6	S	
83	TM	Butyl benzylphthalate	0.7344	0.7569	3.1	TM	
84	TM	3,3'-Dichlorobenzidine	0.4528	0.4625	2.2	TM	
85	TM	Benz (a) anthracene	1.280	1.323	3.3	TM	
86	TM	Bis (2-ethylhexyl) phthalate	0.9886	1.033	4.5	TM	
87	TM	Chrysene	1.230	1.256	2.1	TM	
88	*TM	Di-n-octylphthalate	1.650	1.735	5.2	*TM	
89	I	Perylene-D12(IS)	ISTD			I	
90	TM	Benzo (b) fluoranthene	1.242	1.310	5.4	TM	
91	TM	Benzo (k) fluoranthene	1.241	1.226	1.3	TM	
92	*TM	Benzo (a) pyrene	1.150	1.195	4.0	*TM	
93	TM	Indeno (1,2,3-cd) pyrene	1.219	1.230	0.89	TM	
94	TM	Dibenz (a,h) anthracene	1.098	1.101	0.23	TM	
95	TM	Benzo (g,h,i) perylene	1.091	1.085	0.52	TM	
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		Average			2.6		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 2 Aug 21 19:33
Instrument: Yoda
Initial Cal. Date: 07/30/21
Data File: 0730Y035.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	1,4-dichlorobenzene-D4(IS)	ISTD			I	
2		1,4-Dioxane	0.1955	0.1134	42		
3	TM	n-Nitrosodimethylamine	0.3260	0.3174	2.6	TM	
4	TM	Pyridine	0.8592	0.6697	22	TM	
5	S	2-Fluorophenol (S)	1.392	1.421	2.1	S	
6	S	Phenol-D6 (S)	1.716	1.878	9.4	S	
7	*TM	Phenol	2.041	2.272	11	*TM	
8	TM	Aniline	1.606	1.749	9.0	TM	
9	TM	Bis (2-chloroethyl) ether	0.9411	1.061	13	TM	
10	TM	2-Chlorophenol	1.510	1.653	9.5	TM	
11	TM	1,3-DCB	1.585	1.578	0.45	TM	
12	*TM	1,4-DCB	1.592	1.627	2.2	*TM	
13	TM	Benzyl alcohol	0.9009	1.028	14	TM	
14	TM	1,2-DCB	1.495	1.548	3.6	TM	
15	TM	2-Methylphenol	2.968	3.357	13	TM	
16	TM	Bis (2-chloroisopropyl) ether	1.331	1.510	13	TM	
17	TM	Acetophenone	1.885	2.112	12	TM	
18	TM	3&4-Methylphenol	1.484	1.678	13	TM	
19	**TM	n-Nitrosodi-n-propylamine	1.094	1.238	13	**TM	
20	TM	Hexachloroethane	0.5956	0.6015	0.99	TM	
21	I	Napthalene-D8(IS)	ISTD			I	
22	S	Nitrobenzene-D5(S)	0.3803	0.3866	1.7	S	
23	TM	Nitrobenzene	0.3891	0.3981	2.3	TM	
24	TM	Isophorone	0.6735	0.6942	3.1	TM	
25	*TM	2-Nitrophenol	0.1916	0.2011	5.0	*TM	
26	TM	2,4-Dimethylphenol	0.3223	0.3312	2.8	TM	
27	TM	Benzoic acid	0.0096	0.0085	11	TM	
28	TM	Bis (2-chloroethoxy) methane	0.4140	0.4202	1.5	TM	
29	*TM	2,4-Dichlorophenol	0.2848	0.2908	2.1	*TM	
30	TM	1,2,4-Trichlorobenzene	0.2975	0.2980	0.17	TM	
31	TM	3,4-Dimethylphenol	0.4399	0.4582	4.2	TM	
32	TM	Naphthalene	0.9929	1.001	0.78	TM	
33	TM	4-Chloroaniline	0.3981	0.4266	7.2	TM	
34	TM	2,6-Dichlorophenol	0.2696	0.2718	0.83	TM	
35	TM	Hexachloropropene	0.1839	0.1734	5.7	TM	
36	*TM	Hexachlorobutadiene	0.1526	0.1538	0.77	*TM	
37	TM	Caprolactum	0.0069	0.0077	11	TM	
38	*TM	4-Chloro-3-methylphenol	0.3189	0.3303	3.6	*TM	
39	TM	2-Methylnaphthalene	0.7038	0.7219	2.6	TM	
40	TM	1-Methylnaphthalene	0.6684	0.6880	2.9	TM	
		Average			7.2		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Date Analyzed: 2 Aug 21 19:33
Matrix: 0 Instrument: Yoda
Cal. Date: 07/30/21
Data File: 0730Y035.D

		Compound	MEAN	CCRF	%D		%Drift
41	I	Acenaphthene-D10(IS)	ISTD			I	
42	**TM	Hexachlorocyclopentadiene	0.3124	0.2751	12	**TM	
43	TM	1,2,4,5-Tetrachlorobenzene	0.4961	0.4947	0.27	TM	
44	*TM	2,4,6-Trichlorophenol	0.3700	0.3746	1.3	*TM	
45	TM	2,4,5-Trichlorophenol	0.3914	0.3755	4.1	TM	
46	S	2-Fluorobiphenyl(S)	1.336	1.336	0.06	S	
47	TM	1,1'-Biphenyl	1.504	1.563	3.9	TM	
48	TM	2-Chloronaphthalene	1.161	1.191	2.5	TM	
49	TM	2-Nitroaniline	0.3533	0.3824	8.3	TM	
50	TM	Dimethyl phthalate	1.376	1.427	3.7	TM	
51	TM	2,6-DNT	0.2815	0.3084	9.6	TM	
52	TM	Acenaphthylene	1.890	1.930	2.1	TM	
53	TM	3-Nitroaniline	0.3613	0.3781	4.6	TM	
54	*TM	Acenaphthene	1.181	1.206	2.1	*TM	
55	**TMQ	2,4-Dinitrophenol	0.0748	0.0925	24	**TMQ	17
56	**TM	4-Nitrophenol	0.0319	0.0323	1.5	**TM	
57	TM	Dibenzofuran	1.613	1.631	1.2	TM	
58	TM	2,4-DNT	0.3822	0.4161	8.9	TM	
59	TM	2,3,4,6-Tetrachlorophenol	0.2731	0.2806	2.7	TM	
60	TM	Diethyl phthalate	1.423	1.461	2.7	TM	
61	TM	4-Chlorophenyl phenyl ether	0.6186	0.6241	0.88	TM	
62	TM	Fluorene	1.352	1.381	2.1	TM	
63	TM	4-Nitroaniline	0.3759	0.4032	7.3	TM	
64	S	2,4,6-Tribromophenol(S)	0.1650	0.1632	1.1	S	
65	I	Phenanthrene-D10(IS)	ISTD			I	
66	TML	4,6-Dinitro-2-methylphenol	0.0916	0.1001	9.3	TML	3.6
67	TM	Diphenyl amine	0.6025	0.6276	4.2	TM	
68	*TM	n-Nitrosodiphenylamine	0.6025	0.6276	4.2	*TM	
69	TM	1,2-Diphenylhydrazine	0.1501	0.1547	3.1	TM	
70	TM	4-Bromophenyl phenyl ether	0.2046	0.2074	1.4	TM	
71	TM	Hexachlorobenzene	0.2004	0.2007	0.14	TM	
72	TM	Atrazine	0.2053	0.1659	19	TM	
73	*TM	Pentachlorophenol	0.1347	0.1278	5.2	*TM	
74	TM	Phenanthrene	1.094	1.129	3.3	TM	
75	TM	Anthracene	1.151	1.170	1.7	TM	
76	TM	Carbazol	1.064	1.084	1.9	TM	
77	TM	Di-n-butylphthalate	1.297	1.407	8.5	TM	
78	*TM	Fluoranthene	1.127	1.158	2.7	*TM	
79	I	Chrysene-D12(IS)	ISTD			I	
80	TM	Benzidine	0.4723	0.2960	37	TM	
		Average			5.6		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 2 Aug 21 19:33
Instrument: Yoda
Cal. Date: 07/30/21
Data File: 0730Y035.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Pyrene	1.416	1.469	3.7	TM	
82	S	Terphenyl-D14(S)	1.043	1.059	1.5	S	
83	TM	Butyl benzylphthalate	0.7344	0.7616	3.7	TM	
84	TM	3,3'-Dichlorobenzidine	0.4528	0.4746	4.8	TM	
85	TM	Benz (a) anthracene	1.280	1.324	3.4	TM	
86	TM	Bis (2-ethylhexyl) phthalate	0.9886	1.041	5.3	TM	
87	TM	Chrysene	1.230	1.221	0.71	TM	
88	*TM	Di-n-octylphthalate	1.650	1.756	6.5	*TM	
89	I	Perylene-D12(IS)	ISTD			I	
90	TM	Benzo (b) fluoranthene	1.242	1.356	9.1	TM	
91	TM	Benzo (k) fluoranthene	1.241	1.223	1.5	TM	
92	*TM	Benzo (a) pyrene	1.150	1.208	5.1	*TM	
93	TM	Indeno (1,2,3-cd) pyrene	1.219	1.242	1.9	TM	
94	TM	Dibenz (a,h) anthracene	1.098	1.120	2.0	TM	
95	TM	Benzo (g,h,i) perylene	1.091	1.106	1.3	TM	
96							
97							
98							
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117							
118							
119							
120							
		Average			3.6		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 5 Aug 21 10:28
Instrument: Yoda
Initial Cal. Date: 07/30/21
Data File: 0730Y098.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	1,4-dichlorobenzene-D4(IS)	ISTD			I	
2		1,4-Dioxane	0.1955	0.1941	0.70		
3	TM	n-Nitrosodimethylamine	0.3260	0.3331	2.2	TM	
4	TM	Pyridine	0.8592	0.9230	7.4	TM	
5	S	2-Fluorophenol (S)	1.392	1.394	0.13	S	
6	S	Phenol-D6 (S)	1.716	1.688	1.6	S	
7	*TM	Phenol	2.041	2.032	0.48	*TM	
8	TM	Aniline	1.606	1.678	4.5	TM	
9	TM	Bis (2-chloroethyl) ether	0.9411	0.9501	0.96	TM	
10	TM	2-Chlorophenol	1.510	1.527	1.1	TM	
11	TM	1,3-DCB	1.585	1.599	0.92	TM	
12	*TM	1,4-DCB	1.592	1.627	2.2	*TM	
13	TM	Benzyl alcohol	0.9009	0.9133	1.4	TM	
14	TM	1,2-DCB	1.495	1.501	0.45	TM	
15	TM	2-Methylphenol	2.968	3.000	1.1	TM	
16	TM	Bis (2-chloroisopropyl) ether	1.331	1.302	2.2	TM	
17	TM	Acetophenone	1.885	1.915	1.6	TM	
18	TM	3&4-Methylphenol	1.484	1.500	1.1	TM	
19	**TM	n-Nitrosodi-n-propylamine	1.094	1.107	1.2	**TM	
20	TM	Hexachloroethane	0.5956	0.6210	4.3	TM	
21	I	Napthalene-D8(IS)	ISTD			I	
22	S	Nitrobenzene-D5(S)	0.3803	0.3961	4.2	S	
23	TM	Nitrobenzene	0.3891	0.4011	3.1	TM	
24	TM	Isophorone	0.6735	0.6913	2.6	TM	
25	*TM	2-Nitrophenol	0.1916	0.2058	7.4	*TM	
26	TM	2,4-Dimethylphenol	0.3223	0.3290	2.1	TM	
27	TM	Benzoic acid	0.0096	0.0085	11	TM	
28	TM	Bis (2-chloroethoxy) methane	0.4140	0.4196	1.4	TM	
29	*TM	2,4-Dichlorophenol	0.2848	0.2914	2.3	*TM	
30	TM	1,2,4-Trichlorobenzene	0.2975	0.3048	2.5	TM	
31	TM	3,4-Dimethylphenol	0.4399	0.4520	2.8	TM	
32	TM	Naphthalene	0.9929	1.033	4.1	TM	
33	TM	4-Chloroaniline	0.3981	0.4107	3.2	TM	
34	TM	2,6-Dichlorophenol	0.2696	0.2793	3.6	TM	
35	TM	Hexachloropropene	0.1839	0.1996	8.6	TM	
36	*TM	Hexachlorobutadiene	0.1526	0.1589	4.2	*TM	
37	TM	Caprolactum	0.0069	0.0069	0.61	TM	
38	*TM	4-Chloro-3-methylphenol	0.3189	0.3381	6.0	*TM	
39	TM	2-Methylnaphthalene	0.7038	0.7338	4.3	TM	
40	TM	1-Methylnaphthalene	0.6684	0.6916	3.5	TM	
		Average			3.0		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 5 Aug 21 10:28
Instrument: Yoda
Cal. Date: 07/30/21
Data File: 0730Y098.D

		Compound	MEAN	CCRF	%D		%Drift	
41	I	Acenaphthene-D10(IS)	ISTD			I		
42	**TM	Hexachlorocyclopentadiene	0.3124	0.2568	18	**TM		
43	TM	1,2,4,5-Tetrachlorobenzene	0.4961	0.5013	1.1	TM		
44	*TM	2,4,6-Trichlorophenol	0.3700	0.3806	2.9	*TM		
45	TM	2,4,5-Trichlorophenol	0.3914	0.4047	3.4	TM		
46	S	2-Fluorobiphenyl(S)	1.336	1.349	0.95	S		
47	TM	1,1'-Biphenyl	1.504	1.518	0.90	TM		
48	TM	2-Chloronaphthalene	1.161	1.181	1.7	TM		
49	TM	2-Nitroaniline	0.3533	0.3699	4.7	TM		
50	TM	Dimethyl phthalate	1.376	1.417	3.0	TM		
51	TM	2,6-DNT	0.2815	0.2986	6.1	TM		
52	TM	Acenaphthylene	1.890	1.936	2.4	TM		
53	TM	3-Nitroaniline	0.3613	0.3735	3.4	TM		
54	*TM	Acenaphthene	1.181	1.206	2.1	*TM		
55	**TMQ	2,4-Dinitrophenol	0.0748	0.1117	49	**TMQ	30	* NT HA 8/26/21
56	**TM	4-Nitrophenol	0.0319	0.0339	6.5	**TM		
57	TM	Dibenzofuran	1.613	1.630	1.1	TM		
58	TM	2,4-DNT	0.3822	0.4136	8.2	TM		
59	TM	2,3,4,6-Tetrachlorophenol	0.2731	0.2910	6.6	TM		
60	TM	Diethyl phthalate	1.423	1.447	1.7	TM		
61	TM	4-Chlorophenyl phenyl ether	0.6186	0.6228	0.67	TM		
62	TM	Fluorene	1.352	1.353	0.04	TM		
63	TM	4-Nitroaniline	0.3759	0.3916	4.2	TM		
64	S	2,4,6-Tribromophenol(S)	0.1650	0.1650	0.00	S		
65	I	Phenanthrene-D10(IS)	ISTD			I		
66	TML	4,6-Dinitro-2-methylphenol	0.0916	0.1098	20	TML	11	
67	TM	Diphenyl amine	0.6025	0.6151	2.1	TM		
68	*TM	n-Nitrosodiphenylamine	0.6025	0.6151	2.1	*TM		
69	TM	1,2-Diphenylhydrazine	0.1501	0.1486	1.0	TM		
70	TM	4-Bromophenyl phenyl ether	0.2046	0.2056	0.44	TM		
71	TM	Hexachlorobenzene	0.2004	0.1961	2.2	TM		
72	TM	Atrazine	0.2053	0.2161	5.3	TM		
73	*TM	Pentachlorophenol	0.1347	0.1415	5.0	*TM		
74	TM	Phenanthrene	1.094	1.126	3.0	TM		
75	TM	Anthracene	1.151	1.170	1.6	TM		
76	TM	Carbazol	1.064	1.084	1.9	TM		
77	TM	Di-n-butylphthalate	1.297	1.408	8.6	TM		
78	*TM	Fluoranthene	1.127	1.175	4.3	*TM		
79	I	Chrysene-D12(IS)	ISTD			I		
80	TM	Benzidine	0.4723	0.4802	1.7	TM		
		Average			5.1			

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 5 Aug 21 10:28
Instrument: Yoda
Cal. Date: 07/30/21
Data File: 0730Y098.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Pyrene	1.416	1.474	4.0	TM	
82	S	Terphenyl-D14(S)	1.043	1.047	0.38	S	
83	TM	Butyl benzylphthalate	0.7344	0.7808	6.3	TM	
84	TM	3,3'-Dichlorobenzidine	0.4528	0.4715	4.1	TM	
85	TM	Benz (a) anthracene	1.280	1.292	0.90	TM	
86	TM	Bis (2-ethylhexyl) phthalate	0.9886	1.055	6.8	TM	
87	TM	Chrysene	1.230	1.266	3.0	TM	
88	*TM	Di-n-octylphthalate	1.650	1.887	14	*TM	
89	I	Perylene-D12(IS)	ISTD			I	
90	TM	Benzo (b) fluoranthene	1.242	1.256	1.1	TM	
91	TM	Benzo (k) fluoranthene	1.241	1.278	3.0	TM	
92	*TM	Benzo (a) pyrene	1.150	1.199	4.2	*TM	
93	TM	Indeno (1,2,3-cd) pyrene	1.219	1.275	4.6	TM	
94	TM	Dibenz (a,h) anthracene	1.098	1.153	5.0	TM	
95	TM	Benzo (g,h,i) perylene	1.091	1.137	4.2	TM	
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118							
119							
120							
		Average			4.4		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 5 Aug 21 22:09
Instrument: Yoda
Initial Cal. Date: 07/30/21
Data File: 0730Y125.D

		Compound	MEAN	CCRF	%D	%Drift	
1	I	1,4-dichlorobenzene-D4(IS)	ISTD			I	
2		1,4-Dioxane	0.1955	0.1991	1.9		
3	TM	n-Nitrosodimethylamine	0.3260	0.3372	3.4	TM	
4	TM	Pyridine	0.8592	0.9245	7.6	TM	
5	S	2-Fluorophenol (S)	1.392	1.444	3.8	S	
6	S	Phenol-D6 (S)	1.716	1.769	3.1	S	
7	*TM	Phenol	2.041	2.114	3.6	*TM	
8	TM	Aniline	1.606	1.574	2.0	TM	
9	TM	Bis (2-chloroethyl) ether	0.9411	0.9649	2.5	TM	
10	TM	2-Chlorophenol	1.510	1.568	3.9	TM	
11	TM	1,3-DCB	1.585	1.648	4.0	TM	
12	*TM	1,4-DCB	1.592	1.657	4.1	*TM	
13	TM	Benzyl alcohol	0.9009	0.9392	4.3	TM	
14	TM	1,2-DCB	1.495	1.559	4.3	TM	
15	TM	2-Methylphenol	2.968	3.076	3.6	TM	
16	TM	Bis (2-chloroisopropyl) ether	1.331	1.348	1.3	TM	
17	TM	Acetophenone	1.885	1.939	2.9	TM	
18	TM	3&4-Methylphenol	1.484	1.538	3.6	TM	
19	**TM	n-Nitrosodi-n-propylamine	1.094	1.129	3.2	**TM	
20	TM	Hexachloroethane	0.5956	0.6216	4.4	TM	
21	I	Napthalene-D8(IS)	ISTD			I	
22	S	Nitrobenzene-D5(S)	0.3803	0.4012	5.5	S	
23	TM	Nitrobenzene	0.3891	0.4033	3.7	TM	
24	TM	Isophorone	0.6735	0.7028	4.4	TM	
25	*TM	2-Nitrophenol	0.1916	0.2078	8.5	*TM	
26	TM	2,4-Dimethylphenol	0.3223	0.3382	4.9	TM	
27	TM	Benzoic acid	0.0096	0.0085	11	TM	
28	TM	Bis (2-chloroethoxy) methane	0.4140	0.4345	5.0	TM	
29	*TM	2,4-Dichlorophenol	0.2848	0.2970	4.3	*TM	
30	TM	1,2,4-Trichlorobenzene	0.2975	0.3117	4.8	TM	
31	TM	3,4-Dimethylphenol	0.4399	0.4552	3.5	TM	
32	TM	Naphthalene	0.9929	1.041	4.9	TM	
33	TM	4-Chloroaniline	0.3981	0.4038	1.4	TM	
34	TM	2,6-Dichlorophenol	0.2696	0.2837	5.2	TM	
35	TM	Hexachloropropene	0.1839	0.1949	6.0	TM	
36	*TM	Hexachlorobutadiene	0.1526	0.1612	5.7	*TM	
37	TM	Caprolactum	0.0069	0.0073	5.3	TM	
38	*TM	4-Chloro-3-methylphenol	0.3189	0.3394	6.4	*TM	
39	TM	2-Methylnaphthalene	0.7038	0.7428	5.5	TM	
40	TM	1-Methylnaphthalene	0.6684	0.6966	4.2	TM	
		Average			4.4		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 5 Aug 21 22:09
Instrument: Yoda
Cal. Date: 07/30/21
Data File: 0730Y125.D

		Compound	MEAN	CCRF	%D		%Drift	
41	I	Acenaphthene-D10(IS)	ISTD			I		
42	**TM	Hexachlorocyclopentadiene	0.3124	0.2937	6.0	**TM		
43	TM	1,2,4,5-Tetrachlorobenzene	0.4961	0.5086	2.5	TM		
44	*TM	2,4,6-Trichlorophenol	0.3700	0.3883	5.0	*TM		
45	TM	2,4,5-Trichlorophenol	0.3914	0.3921	0.20	TM		
46	S	2-Fluorobiphenyl(S)	1.336	1.349	0.97	S		
47	TM	1,1'-Biphenyl	1.504	1.565	4.0	TM		
48	TM	2-Chloronaphthalene	1.161	1.182	1.8	TM		
49	TM	2-Nitroaniline	0.3533	0.3754	6.3	TM		
50	TM	Dimethyl phthalate	1.376	1.436	4.4	TM		
51	TM	2,6-DNT	0.2815	0.3077	9.3	TM		
52	TM	Acenaphthylene	1.890	1.953	3.3	TM		
53	TM	3-Nitroaniline	0.3613	0.3720	3.0	TM		
54	*TM	Acenaphthene	1.181	1.210	2.4	*TM		
55	**TMQ	2,4-Dinitrophenol	0.0748	0.1103	47	**TMQ	29	*
56	**TM	4-Nitrophenol	0.0319	0.0345	8.2	**TM		
57	TM	Dibenzofuran	1.613	1.654	2.6	TM		
58	TM	2,4-DNT	0.3822	0.4251	11	TM		
59	TM	2,3,4,6-Tetrachlorophenol	0.2731	0.2902	6.2	TM		
60	TM	Diethyl phthalate	1.423	1.479	3.9	TM		
61	TM	4-Chlorophenyl phenyl ether	0.6186	0.6290	1.7	TM		
62	TM	Fluorene	1.352	1.379	2.0	TM		
63	TM	4-Nitroaniline	0.3759	0.3922	4.4	TM		
64	S	2,4,6-Tribromophenol(S)	0.1650	0.1650	0.03	S		
65	I	Phenanthrene-D10(IS)	ISTD			I		
66	TML	4,6-Dinitro-2-methylphenol	0.0916	0.1028	12	TML	5.7	
67	TM	Diphenyl amine	0.6025	0.6129	1.7	TM		
68	*TM	n-Nitrosodiphenylamine	0.6025	0.6129	1.7	*TM		
69	TM	1,2-Diphenylhydrazine	0.1501	0.1470	2.1	TM		
70	TM	4-Bromophenyl phenyl ether	0.2046	0.2058	0.55	TM		
71	TM	Hexachlorobenzene	0.2004	0.1977	1.4	TM		
72	TM	Atrazine	0.2053	0.2115	3.1	TM		
73	*TM	Pentachlorophenol	0.1347	0.1380	2.4	*TM		
74	TM	Phenanthrene	1.094	1.157	5.8	TM		
75	TM	Anthracene	1.151	1.183	2.8	TM		
76	TM	Carbazol	1.064	1.088	2.2	TM		
77	TM	Di-n-butylphthalate	1.297	1.410	8.7	TM		
78	*TM	Fluoranthene	1.127	1.170	3.8	*TM		
79	I	Chrysene-D12(IS)	ISTD			I		
80	TM	Benzidine	0.4723	0.4411	6.6	TM		
		Average			5.2			

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 5 Aug 21 22:09
Instrument: Yoda
Cal. Date: 07/30/21
Data File: 0730Y125.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Pyrene	1.416	1.481	4.6	TM	
82	S	Terphenyl-D14(S)	1.043	1.071	2.7	S	
83	TM	Butyl benzylphthalate	0.7344	0.7667	4.4	TM	
84	TM	3,3'-Dichlorobenzidine	0.4528	0.4661	2.9	TM	
85	TM	Benz (a) anthracene	1.280	1.310	2.3	TM	
86	TM	Bis (2-ethylhexyl) phthalate	0.9886	1.052	6.4	TM	
87	TM	Chrysene	1.230	1.290	4.9	TM	
88	*TM	Di-n-octylphthalate	1.650	1.821	10	*TM	
89	I	Perylene-D12(IS)	ISTD			I	
90	TM	Benzo (b) fluoranthene	1.242	1.408	13	TM	
91	TM	Benzo (k) fluoranthene	1.241	1.146	7.7	TM	
92	*TM	Benzo (a) pyrene	1.150	1.210	5.2	*TM	
93	TM	Indeno (1,2,3-cd) pyrene	1.219	1.256	3.0	TM	
94	TM	Dibenz (a,h) anthracene	1.098	1.129	2.8	TM	
95	TM	Benzo (g,h,i) perylene	1.091	1.122	2.8	TM	
96							
97							
98							
99							
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120							
		Average			5.2		

ORGANICS

Raw Data

SEP004

Organic Extraction Worksheet

Method	625/8270 Separatory Funnel Extra 3510C	Extraction Set	210728A	Extraction Method	SEP004	Units	mL

Spiked ID 1	8270T 50ug/mL Spike 6/15/21-3/25/22		Surrogate ID 1	8270 Surrogate 7/19/21-5/19/22	
Spiked ID 2			Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	07/28/21 16:21	
Spiked ID 8			Ext. End Time:	07/29/21 14:30	
			GC Requires Extract By:		

pH1	2		Water Bath Temp 1 °C	
pH2	14		Water Bath Temp 2 °C	
pH3			Water Bath Temp 3 °C	

Spiked By: **Date** **Witnessed By:** **Date**

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	210728A Blk				0.200	1 equip	1000	1	2/1	07/28/21 16:21	TCLP
2	210728A LCS-1		1	1	0.200	1 equip	1000	1	2/1	07/28/21 16:21	
3	210728A LCSD-1		1	1	0.200	1 equip	1000	1	2/1	07/28/21 16:21	
4	BA36271	BA36271S01			0.200	1 equip	1000	1	2/1	07/28/21 16:21	96859

Solvent and Lot#	
NaCl (100g)	20K305207
1+1 Sulfuric Acid (10mLs)	4/7/21-4/7/22
ph strip	HC155968
Dichloromethane (DCM)	61117
Filter Paper	400181
Na2SO4	2020120870
10N NaOH (40mLs)	6/21/21-6/21/22

Extraction COC Transfer	
Extraction lab employee Initials	
GC analyst's initials	CW
Date	7/30/21
Time	10:30
Refrigerator	GC_C

	Technician's Initials
Scanned By	SB
Sample Preparation	SB
Extraction	SB
Concentration	CG

Modified	07/19/21 1:24:41 PM

Reviewed By: **Date**

Organic Extraction Worksheet

Method	8270 TCLP EXTRACTION	Extraction Set	210720A	Extraction Method	TCLP827 TCLP	Units	mL

Spiked ID 1		Surrogate ID 1			
Spiked ID 2		Surrogate ID 2			
Spiked ID 3		Surrogate ID 3			
Spiked ID 4		Surrogate ID 4			
Spiked ID 5		Surrogate ID 5			
Spiked ID 6		Sufficient Vol for Matrix QC:	NO		
Spiked ID 7		Ext. Start Time:	07/20/21 16:00		
Spiked ID 8		Ext. End Time:	07/21/21 10:52		
		GC Requires Extract By:			
		pH1		Water Bath Temp 1 °C	22,22,22,22 °C
		pH2		Water Bath Temp 2 °C	
		pH3		Water Bath Temp 3 °C	

Spiked By: **Date** **Witnessed By:** **Date**

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	210720A Blk					equip	1000	1000	NA	07/20/21 16:00	
2	210720A LCS-1					equip	1000	1000	NA	07/20/21 16:00	
3	210720A LCSD-1		weight	Ph1	pH1	equip	1000	1000	NA	07/20/21 16:00	
4	BA36269	BA36269W01				equip	1030	1	2/1	07/21/21 13:50	96859 Extraction done by _SEP004 3510 ID:71872
5	BA36271	BA36271S01	5.10g	5.89	5.45	equip	100.15	2003.00	NA	07/20/21 16:00	96859

Solvent and Lot#	
Scale Balance	eb1
Di Water	7-20-21
pH Meter	thing one
1N HCL Prep	6-23-21
RPM Tumber 30+/-2 rpm	29
TCLP Room thermo ID	tclp #1
Fluid Prep 2	7-20-21

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	
Date	
Time	
Refrigerator	

	Technician's Initials
Scanned By	YL
Sample Preparation	YL
Extraction	YL
Concentration	YL

Modified	07/22/21 1:49:09 PM

Reviewed By: KY **Date** 07/21/21

_SEP004

Organic Extraction Worksheet

Method	625/8270 Separatory Funnel Extra 3510C	Extraction Set	210721A	Extraction Method	SEP004	Units	mL

Spiked ID 1	8270T 50ug/mL Spike 06/15/21 - 03/25/22		Surrogate ID 1	8270 Surrogate 07/19/21 - 05/19/22	
Spiked ID 2	Sim PAH Spike 05/28/21 - 05/28/22		Surrogate ID 2	SIM Surrogate 11/30/20 - 11/30/21	
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	07/21/21 13:50	
Spiked ID 8			Ext. End Time:	07/22/21 19:40	
			GC Requires Extract By:		

pH1	2	07/21/21 14:00	Water Bath Temp 1 °C	
pH2	14	07/21/21 16:47	Water Bath Temp 2 °C	75/74.5C
pH3			Water Bath Temp 3 °C	70/70.5C °C

Spiked By: **Date** **Witnessed By:** **Date**

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	210721A Blk				0.200,0.050	1,2 equip	1000	1	2/1	07/21/21 13:50	
2	210721A LCS-1		1	1	0.200	1 equip	1000	1	2/1	07/21/21 13:50	
3	210721A LCS-2		0.125	2	0.050	2 equip	1000	1	2/1	07/21/21 13:50	
4	210721A LCSD-1		1	1	0.200	1 equip	1000	1	2/1	07/21/21 13:50	
5	210721A LCSD-2		0.125	2	0.050	2 equip	1000	1	2/1	07/21/21 13:50	
6	BA36080	BA36080W09			0.200,0.050	1,2 equip	1020	1	2/1	07/21/21 13:50	96827 LTD VOL
7	BA36081	BA36081W09			0.200,0.050	1,2 equip	1020	1	2/1	07/21/21 13:50	96827 LTD VOL
8	BA36082	BA36082W07			0.200,0.050	1,2 equip	1040	1	2/1	07/21/21 13:50	96827 LTD VOL
9	BA36083	BA36083W09			0.200,0.050	1,2 equip	1020	1	2/1	07/21/21 13:50	96827 LTD VOL
10	BA36084	BA36084W08			0.200,0.050	1,2 equip	1040	1	2/1	07/21/21 13:50	96827 LTD VOL
11	BA36085	BA36085W06			0.200,0.050	1,2 equip	1020	1	2/1	07/21/21 13:50	96827 LTD VOL
12	BA36086	BA36086W08			0.200,0.050	1,2 equip	1020	1	2/1	07/21/21 13:50	96827 LTD VOL
13	BA36087	BA36087W08			0.200,0.050	1,2 equip	1020	1	2/1	07/21/21 13:50	96827 LTD VOL
14	BA36174	BA36174W07			0.200,0.050	1,2 equip	1070	1	2/1	07/21/21 13:50	96842 LTD VOL
15	BA36264	BA36264W08			0.200,0.050	1,2 equip	1020	1	2/1	07/21/21 13:50	96855 LTD VOL
16	BA36265	BA36265W08			0.200,0.050	1,2 equip	1050	1	2/1	07/21/21 13:50	96855 LTD VOL

Solvent and Lot#	
1+1 Sulfuric Acid (10mLs)	04/07/21
ph strip	HC155968
Dichloromethane (DCM)	60338
Filter Paper	400189
Na2SO4	2020120870
10N NaOH (40mLs)	04/03/21

Extraction COC Transfer	
Extraction lab employee Initials	
GC analyst's initials	LS
Date	7/23/21
Time	08:42
Refrigerator	GC_C

	Technician's Initials
Scanned By	
Sample Preparation	
Extraction	
Concentration	

Modified	07/23/21 9:11:31 AM

Reviewed By: **Date**

Organic Extraction Worksheet

Method	625/8270 Separatory Funnel Extra 3510C	Extraction Set	210721A	Extraction Method	SEP004	Units	mL

Spiked ID 1	8270T 50ug/mL Spike 06/15/21 - 03/25/22		Surrogate ID 1	8270 Surrogate 07/19/21 - 05/19/22	
Spiked ID 2	Sim PAH Spike 05/28/21 - 05/28/22		Surrogate ID 2	SIM Surrogate 11/30/20 - 11/30/21	
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	07/21/21 13:50	
Spiked ID 8			Ext. End Time:	07/22/21 19:40	
			GC Requires Extract By:		

pH1	2	07/21/21 14:00	Water Bath Temp 1 °C	
pH2	14	07/21/21 16:47	Water Bath Temp 2 °C	75/74.5C
pH3			Water Bath Temp 3 °C	70/70.5C °C

Spiked By: **Date** **Witnessed By:** **Date**

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
17	BA36266	BA36266W07			0.200,0.050	1,2 equip	1030	1	2/1	07/21/21 13:50	96855 LTD VOL
18	BA36267	BA36267W08			0.200,0.050	1,2 equip	1060	1	2/1	07/21/21 13:50	96855 LTD VOL
19	BA36269	BA36269W01			0.200,0.050	1,2 equip	1030	1	2/1	07/21/21 13:50	96859

Solvent and Lot#	
1+1 Sulfuric Acid (10mLs)	04/07/21
ph strip	HC155968
Dichloromethane (DCM)	60338
Filter Paper	400189
Na2SO4	2020120870
10N NaOH (40mLs)	04/03/21

Extraction COC Transfer	
Extraction lab employee Initials	
GC analyst's initials	LS
Date	
Time	
Refrigerator	GC_C

	Technician's Initials
Scanned By	
Sample Preparation	
Extraction	
Concentration	

Modified	07/23/21 9:11:31 AM

Reviewed By: **Date**

Injection Log

Directory: M:\YODA\DATA\Y210730\

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	3	0730Y003.D	1	SV TUNE 7/2/21		30 Jul 21 10:41
2	4	0730Y004.D	1	4 ug/mL 07/16/21		30 Jul 21 10:56
3	5	0730Y005.D	1	5 ug/mL 07/16/21		30 Jul 21 11:22
4	6	0730Y006.D	1	10 ug/mL 07/16/21		30 Jul 21 11:48
5	7	0730Y007.D	1	20 ug/mL 07/16/21		30 Jul 21 12:13
6	8	0730Y008.D	1	40 ug/mL 07/16/21		30 Jul 21 12:39
7	9	0730Y009.D	1	50 ug/mL 07/16/21		30 Jul 21 13:04
8	10	0730Y010.D	1	60 ug/mL 07/16/21		30 Jul 21 13:29
9	11	0730Y011.D	1	80 ug/mL 07/16/21		30 Jul 21 13:55
10	12	0730Y012.D	1	100 ug/mL 07/16/21		30 Jul 21 14:20
11	13	0730Y013.D	1	SS 50 ug/mL 07/16/21		30 Jul 21 14:45
12	16	0730Y016.D	1	SV TUNE 7/2/21		2 Aug 21 11:26
13	17	0730Y017.D	1	50 ug/mL 07/16/21		2 Aug 21 11:41
14	18	0730Y018.D	1	210721A BLK 1/1000		2 Aug 21 12:19
15	19	0730Y020.D	1	210721A LCS-1 1/1000		2 Aug 21 13:09
16	34	0730Y034.D	1	BA36269W01 1/1030		2 Aug 21 19:08
17	35	0730Y035.D	1	50 ug/mL 07/16/21 (2)		2 Aug 21 19:33
18	97	0730Y097.D	1	SV TUNE 7/2/21		5 Aug 21 10:13
19	98	0730Y098.D	1	50 ug/mL 07/16/21 (3)	1 compound increased sens	5 Aug 21 10:28
20	1	0730Y101.D	1	210728A BLK 1/1000		5 Aug 21 11:52
21	4	0730Y104.D	1	BA36271S01 1/1000		5 Aug 21 13:09
22	6	0730Y106.D	1	210728A LCS-1 1/1000		5 Aug 21 14:00
23	25	0730Y125.D	1	50 ug/mL 07/16/21 (3)		5 Aug 21 22:09

ORGANICS

Calibration Data

VOLATILE ORGANIC ANALYSIS BY
EPA METHOD 8260B

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 7/21/2021
Matrix: Instrument: Max Initials:

		Compound	0721M02.D 1	0721M03.D 2	0721M04.D 3	0721M05.D 4	0721M06.D 5	0721M07.D 6	0721M08.D 7	0721M09.D 8	0721M10.D 9		Avg	%RSD	Type	r^2	Q	MRF
1	I	Fluorobenzene (IS)																
2	TM	Chlorotrifluoroethene													TM			
3	TML	Dichlorodifluoromethane			0.1470	0.1634	0.1001	0.1524	0.1260	0.1515	0.1497		0.14	15	TM	0.999		
4	TM	Freon 114	0.1010	0.1327	0.1241	0.1125	0.0773	0.0973	0.1155	0.1124	0.1050		0.11	15	TM			
5	TM**	Chloromethane		0.1545	0.1075	0.1075	0.1141	0.1053	0.1071	0.1069	0.1117		0.11	14	TM**			
6	TM*L	Vinyl chloride	0.1227	0.1142	0.1547	0.1035	0.0932	0.1110	0.0988	0.1092	0.1158		0.11	16	TM*	0.999		
7	TM	2-Chloro-1,1,1-trifluoroethane													TM			
8	TM	Bromomethane		0.0825	0.0831	0.0808	0.0844	0.0684	0.0792	0.0744	0.0738		0.08	7.1	TM			
9	TML	Chloroethane		0.0850	0.0828	0.0639	0.0627	0.0580	0.0558	0.0521	0.0548		0.06	20	TM	0.999		
10	TM	Dichlorofluoromethane	0.2672	0.2203	0.2224	0.2071	0.2059	0.2097	0.2147	0.2137	0.2180		0.22	8.5	TM			
11	TM	Trichlorofluoromethane	0.2635	0.2845	0.2564	0.2518	0.2027	0.2367	0.2150	0.2365	0.2454		0.24	10	TM			
12	TM	2,2-Dichloro-1,1,1-trifluoroethane													TM			
13	TM	Acrolein	0.0165	0.0172	0.0176	0.0164	0.0158	0.0167	0.0164	0.0159	0.0164		0.02	3.4	TM			
14	TM	Acetone	0.0485	0.0459	0.0370	0.0330	0.0355	0.0383	0.0338	0.0340	0.0342		0.04	15	TM			
15	TM	Freon-113		0.1341	0.1357	0.1190	0.0912	0.1168	0.1147	0.1154	0.1114		0.12	12	TM			
16	TM	Acetonitrile	0.0108	0.0120	0.0110	0.0114	0.0110	0.0113	0.0124	0.0125	0.0111		0.01	5.7	TM			
17	TM	2-propanol													TM			
18	TM*	1,1-DCE	0.1839	0.2020	0.1918	0.1630	0.1587	0.1775	0.1704	0.1759	0.1778		0.18	7.6	TM*			
19	TM	t-Butanol		0.0099	0.0116	0.0104	0.0115	0.0117	0.0125	0.0129	0.0140		0.01	11	TM			
20	TM	Methyl Acetate			0.0950	0.0783	0.0856	0.0834	0.0765	0.0735	0.0785		0.08	8.8	TM			
21	TML	Iodomethane			0.0642	0.0645	0.0880	0.1102	0.1287	0.1501	0.1613		0.11	36	TM	0.999		
22	TML	Acrylonitrile			0.0155	0.0307	0.0350	0.0454	0.0398	0.0405	0.0404		0.04	28	TM	1.000		
23	TM	2-Methylpentane													TM			
24	TM	Methylene chloride			0.1264	0.1469	0.1153	0.1242	0.1128	0.1173	0.1165		0.12	9.5	TM			
25	TM	Carbon disulfide		0.2141	0.2037	0.1729	0.1924	0.1841	0.2009	0.1923	0.1854		0.19	6.7	TM			
26	TM	Methyl t-butyl ether (MtBE)	0.4508	0.4725	0.4264	0.4084	0.3774	0.3863	0.4087	0.4061	0.3966		0.41	7.4	TM			
27	TM	Trans-1,2-DCE	0.1312	0.1629	0.1401	0.1308	0.1330	0.1212	0.1260	0.1379	0.1366		0.14	8.7	TM			
28	TM	3-Methylpentane													TM			
29	TM	Diisopropyl Ether	0.3322	0.3857	0.3144	0.3156	0.3354	0.3155	0.3224	0.3256	0.3315		0.33	6.6	TM			
30	TM**	1,1-DCA	0.2995	0.2154	0.2303	0.2064	0.2220	0.2081	0.2081	0.2242	0.2226		0.23	13	TM**			
31	TML	Vinyl Acetate	0.0483	0.1014	0.0544	0.1045	0.1486	0.0998	0.1100	0.0892	0.1165		0.10	32	TM	0.991		
32	TM	Ethyl tert Butyl Ether	0.3655	0.3814	0.3325	0.3692	0.3918	0.3637	0.3731	0.3808	0.3754		0.37	4.5	TM			
33	TM	Methylcyclopentane				0.0208	0.0194	0.0162	0.0195	0.0172	0.0155		0.02	12	TM			
34	TM	MEK (2-Butanone)	0.0403	0.0482	0.0431	0.0421	0.0423	0.0489	0.0464	0.0441	0.0422		0.04	6.8	TM			
35	TM	Cis-1,2-DCE	0.1380	0.1936	0.1261	0.1469	0.1547	0.1482	0.1436	0.1484	0.1479		0.15	12	TM			

VOLATILE ORGANIC ANALYSIS BY
EPA METHOD 8260B

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 7/21/2021
Matrix: Instrument: Max Initials:

		Compound	1	2	3	4	5	6	7	8	9		Avg	%RSD	Type		Q	MRF
36	TM	2,2-Dichloropropane	0.2393	0.2783	0.2763	0.2154	0.2472	0.2265	0.2203	0.2233	0.2259		0.24	9.9	TM			
37	TM*	Chloroform	0.3563	0.3394	0.2534	0.2500	0.2747	0.2524	0.2571	0.2608	0.2635		0.28	14	TM*			
38	TM	Bromochloromethane	0.0721	0.1061	0.1257	0.1099	0.1138	0.1090	0.1044	0.1093	0.1120		0.11	13	TM			
39	S	Dibromofluoromethane(S)	0.3232	0.3292	0.2826	0.2769	0.2946	0.3074	0.2921	0.3051	0.2808		0.30	6.2	S			
40	TM	1,1,1-TCA	0.2455	0.2674	0.1921	0.2593	0.2676	0.2646	0.2489	0.2750	0.2624		0.25	9.8	TM			
41	TM	Cyclohexane	0.0972	0.0874	0.1103	0.0748	0.0805	0.0855	0.0965	0.0975	0.0901		0.09	12	TM			
42	TM	1,1-Dichloropropene	0.2125	0.1952	0.1762	0.1641	0.1619	0.1603	0.1602	0.1670	0.1613		0.17	11	TM			
43	TM	2,2,4-Trimethylpentane	0.1826	0.2314	0.2764	0.2949	0.1878	0.2478	0.2609	0.2517	0.2524		0.24	15	TM			
44	S	1,2-DCA-D4(S)	0.1961	0.1904	0.1829	0.1760	0.1867	0.1977	0.1964	0.2008	0.1813		0.19	4.5	S			
45	TM	Carbon Tetrachloride	0.2125	0.2390	0.2632	0.2488	0.2383	0.2504	0.2445	0.2487	0.2440		0.24	5.6	TM			
46	TM	Tert Amyl Methyl Ether	0.4583	0.3993	0.3985	0.3537	0.3723	0.3604	0.3708	0.3537	0.3550		0.38	9.0	TM			
47	TM	1,2-DCA	0.2363	0.2812	0.2462	0.2289	0.2382	0.2320	0.2197	0.2347	0.2284		0.24	7.4	TM			
48	TM	Benzene	0.5232	0.5217	0.4106	0.4890	0.4960	0.4760	0.4603	0.4958	0.4901		0.48	7.0	TM			
49	TM	TCE	0.1741	0.1851	0.1386	0.1372	0.1357	0.1382	0.1382	0.1441	0.1438		0.15	12	TM			
50	TM	2-Pentanone	0.0522	0.0689	0.0703	0.0646	0.0692	0.0734	0.0726	0.0716	0.0678		0.07	9.5	TM			
51	TM*L	1,2-Dichloropropane	0.0595	0.0996	0.0970	0.0704	0.0680	0.0669	0.0563	0.0632	0.0642		0.07	22	TM*	0.999		
52	TM	Bromodichloromethane	0.1669	0.2407	0.2000	0.1797	0.2118	0.2136	0.2013	0.2170	0.2101		0.20	10	TM			
53	TM	Methyl Cyclohexane	0.1703	0.1541	0.1790	0.1928	0.1393	0.1573	0.1713	0.1799	0.1770		0.17	9.6	TM			
54	TM	Dibromomethane		0.0613	0.0809	0.0841	0.0877	0.0878	0.0796	0.0841	0.0835		0.08	10	TM			
55	TM	MIBK (methyl isobutyl ketone)	0.0885	0.1019	0.0927	0.0877	0.0883	0.0953	0.0924	0.0917	0.0903		0.09	4.8	TM			
56	TML	1-Bromo-2-chloroethane			0.0349	0.0131	0.0339	0.0268	0.0292	0.0314	0.0281		0.03	26	TM	0.997		
57	TM	2-Chloroethyl vinyl ether													TM			
58	TM	Cis-1,3-Dichloropropene	0.1550	0.1440	0.1188	0.1114	0.1186	0.1237	0.1183	0.1193	0.1204		0.13	11	TM			
59	TM*	Toluene	0.4593	0.5560	0.5269	0.5090	0.5524	0.5182	0.5136	0.5385	0.5440		0.52	5.6	TM*			
60	TM	Trans-1,3-Dichloropropene	0.2070	0.2528	0.1685	0.1834	0.2001	0.2023	0.1898	0.1975	0.2015		0.20	11	TM			
61	TM	1,1,2-TCA	0.1037	0.1164	0.1105	0.0800	0.0832	0.0894	0.0843	0.0868	0.0843		0.09	14	TM			
62	TM	2-Hexanone	0.0558	0.0626	0.0587	0.0522	0.0576	0.0596	0.0591	0.0597	0.0564		0.06	5.1	TM			
63	I	Chlorobenzene-D5 (IS)																
64	S	Toluene-D8(S)	1.152	1.254	1.055	1.050	1.126	1.135	1.119	1.114	1.055		1.1	5.7	S			
65	TM	1,2-EDB	0.1655	0.1874	0.1271	0.1563	0.1501	0.1407	0.1414	0.1449	0.1431		0.15	12	TM			
66	TM	Tetrachloroethene	0.1719	0.1711	0.1363	0.1311	0.1175	0.1219	0.1243	0.1254	0.1231		0.14	15	TM		*	
67	TM	1-Chlorohexane	0.1804	0.1567	0.1857	0.1921	0.1552	0.1551	0.1658	0.1589	0.1716		0.17	8.4	TM			
68	TM	1,1,1,2-Tetrachloroethane	0.1783	0.2016	0.1784	0.2086	0.1891	0.1957	0.1951	0.1944	0.1933		0.19	5.1	TM			
69	TM	m&p-Xylene	0.2719	0.3134	0.2774	0.2774	0.2793	0.2727	0.2784	0.2909	0.2897		0.28	4.6	TM			
70	TM	o-Xylene	0.2773	0.3151	0.2617	0.3186	0.2813	0.2840	0.2822	0.2905	0.2899		0.29	6.2	TM			

VOLATILE ORGANIC ANALYSIS BY
EPA METHOD 8260B

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 7/21/2021
Matrix: Instrument: Max Initials:

		Compound	1	2	3	4	5	6	7	8	9		Avg	%RSD	Type		Q	MRF
71	TM	Styrene	0.4801	0.4847	0.4683	0.4129	0.4634	0.4678	0.4561	0.4777	0.4837		0.47	4.8	TM			
72	S	4-Bromofluorobenzene(S)	0.5070	0.4564	0.3969	0.4137	0.4479	0.4506	0.4426	0.4440	0.4191		0.44	7.1	S			
73	TM	1,3-Dichloropropane	0.2393	0.2565	0.2588	0.2183	0.2154	0.2249	0.2116	0.2138	0.2167		0.23	8.1	TM			
74	TM	Dibromochloromethane	0.1828	0.2211	0.2611	0.1958	0.2029	0.2141	0.1934	0.2021	0.2026		0.21	11	TM			
75	TM**	Chlorobenzene	0.5591	0.3707	0.4379	0.4615	0.4308	0.4525	0.4407	0.4555	0.4474		0.45	11	TM**			
76	TM*	Ethylbenzene	0.6958	0.7224	0.6768	0.7010	0.6836	0.7100	0.6709	0.7069	0.7069		0.70	2.4	TM*			
77	TM**	Bromoform	0.2000	0.2250	0.1551	0.1494	0.1700	0.1723	0.1592	0.1637	0.1568		0.17	14	TM**			
78	I	1,4-Dichlorobenzene-D (IS)																
79	TM	Isopropylbenzene	1.145	1.221	1.331	1.130	1.108	1.129	1.093	1.183	1.249		1.2	6.6	TM			
80	TM**	1,1,2,2-Tetrachloroethane	0.2846	0.2947	0.2137	0.2194	0.2380	0.2173	0.2086	0.2169	0.2191		0.23	14	TM**			
81	TM	1,2,3-Trichloropropane	0.1211	0.0708	0.0904	0.1100	0.1085	0.1010	0.0887	0.0992	0.0952		0.10	15	TM			
82	TML	t-1,4-Dichloro-2-Butene	0.0482	0.0567	0.0348	0.0851	0.0720	0.0627	0.0650	0.0608	0.0652		0.06	23	TM	0.999		
83	TM	Bromobenzene	0.4102	0.4331	0.3885	0.3528	0.4015	0.3816	0.3648	0.3911	0.3915		0.39	6.1	TM			
84	TM	n-Propylbenzene	1.589	1.377	1.223	1.256	1.252	1.205	1.144	1.266	1.324		1.3	10	TM			
85	TM	4-Ethyltoluene	1.385	1.035	1.108	1.009	1.081	1.097	1.162	1.190	1.223		1.1	10.0	TM			
86	TM	2-Chlorotoluene	0.8719	0.7160	0.9394	0.9204	0.9002	0.8897	0.7550	0.7761	0.8288		0.84	9.4	TM			
87	TM	1,3,5-Trimethylbenzene	1.156	1.109	0.8897	0.9273	0.9662	0.9770	0.9474	1.028	1.066		1.0	8.8	TM			
88	TM	4-Chlorotoluene	0.9878	0.8730	0.8990	0.8976	0.9331	0.8783	0.8891	0.9129	0.9530		0.91	4.1	TM			
89	TM	Tert-Butylbenzene	0.5118	0.5134	0.4581	0.5108	0.5187	0.5575	0.5537	0.6052	0.6421		0.54	10	TM			
90	TM	1,2,4-Trimethylbenzene		0.9776	0.9871	0.8492	0.9697	0.9709	0.9479	1.036	1.089		0.98	7.1	TM			
91	TM	Sec-Butylbenzene	1.042	1.070	0.9989	1.011	1.070	1.066	1.079	1.195	1.258		1.1	7.8	TM			
92	TM	p-Isopropyltoluene	1.088	0.8710	0.9313	0.9064	0.9721	1.046	1.034	1.128	1.220		1.0	11	TM			
93	TM	Benzyl Chloride	0.4219	0.3938	0.3581	0.3411	0.3100	0.3448	0.2950	0.3039	0.3491		0.35	12	TM			
94	TM	1,3-DCB	0.8087	0.7235	0.7092	0.6893	0.6759	0.6641	0.6208	0.6693	0.7029		0.70	7.5	TM			
95	TM	1,4-DCB	0.8237	0.7266	0.6060	0.6779	0.7142	0.6639	0.6348	0.6814	0.6966		0.69	9.0	TM			
96	TM	n-Butylbenzene	0.7560	0.5280	0.6255	0.5543	0.6105	0.6484	0.6894	0.8005			0.65	14	TM			
97	TM	1,2-DCB	0.7443	0.4996	0.6795	0.6533	0.6319	0.6155	0.6238	0.6622	0.6899		0.64	10	TM			
98	TM	Hexachloroethane	0.2260	0.2384	0.2008	0.2085	0.1747	0.1835	0.1801	0.1839	0.2072		0.20	11	TM			
99	TM	1,2-Dibromo-3-chloropropane		0.0873	0.0857	0.0842	0.0629	0.0680	0.0718	0.0754	0.0954		0.08	14	TM			
100	TML	1,2,4-Trichlorobenzene			0.3049	0.2924	0.3007	0.3391	0.3767	0.4575	0.6019		0.38	30	TM	0.990		
101	TML	Hexachlorobutadiene	0.2253	0.2612	0.2345	0.2091	0.2096	0.2240	0.2522	0.2779	0.3225		0.25	15	TM	0.996		
102	TML	Naphthalene			0.2039	0.2074	0.2440	0.2814	0.3121				0.25	19	TM	0.998		
103	TML	1,2,3-Trichlorobenzene			0.1668	0.1729	0.2472	0.2973	0.3286	0.3995			0.27	34	TM	0.993		
104																		
105																		

VOLATILE ORGANIC ANALYSIS BY EPA METHOD 8260B

Form 7

Second Source Calibration

Lab Name: APPL, Inc. SDG No:

Case No: Date Analyzed: 7/21/2021

Matrix: Instrument: Max

Initial Cal. Date: 7/21/2021

Data File: 0721M12.D

		Compound	MEAN	CCRF	%D		%Drift
1	TM	Chlorotrifluoroethene	0.0000	0.0165	0.00	TM	
2	TML	Dichlorodifluoromethane	0.1414	0.1093	23	TML	20
3	TM	Freon 114	0.1086	0.1028	5.4	TM	
4	TM**	Chloromethane	0.1143	0.1189	4.0	TM**	
5	TM*L	Vinyl chloride	0.1137	0.1080	5.0	TM*L	0.14
6	TM	2-Chloro-1,1,1-trifluoroethane	0.0000	0.0033	0.00	TM	
7	TM	Bromomethane	0.0783	0.0740	5.5	TM	
8	TML	Chloroethane	0.0644	0.0547	15	TML	2.4
9	TM	Dichlorofluoromethane	0.2199	0.2129	3.2	TM	
10	TM	Trichlorofluoromethane	0.2436	0.2088	14	TM	
11	TM	2,2-Dichloro-1,1,1-trifluoroethane	0.0000	0.0005	0.00	TM	
12	TM	Acrolein	0.0165	0.0155	6.3	TM	
13	TM	Acetone	0.0378	0.0360	4.8	TM	
14	TM	Freon-113	0.1173	0.1145	2.4	TM	
15	TM	Acetonitrile	0.0115	0.0114	0.51	TM	
16	TM	2-propanol	0.0000	0.0001	0.00	TM	
17	TM*	1,1-DCE	0.1779	0.1838	3.3	TM*	
18	TM	t-Butanol	0.0118	0.0111	5.8	TM	
19	TM	Methyl Acetate	0.0815	0.0807	1.1	TM	
20	TML	Iodomethane	0.1096	0.0834	24	TML	25
21	TML	Acrylonitrile	0.0353	0.0408	15	TML	2.4
22	TM	2-Methylpentane	0.0000	0.0008	0.00	TM	
23	TM	Methylene chloride	0.1227	0.1270	3.5	TM	
24	TM	Carbon disulfide	0.1932	0.2055	6.3	TM	
25	TM	Methyl t-butyl ether (MtBE)	0.4148	0.3842	7.4	TM	
26	TM	Trans-1,2-DCE	0.1355	0.1370	1.1	TM	
27	TM	3-Methylpentane	0.0000	0.0008	0.00	TM	
28	TM	Diisopropyl Ether	0.3309	0.3184	3.8	TM	
29	TM**	1,1-DCA	0.2263	0.2406	6.3	TM**	
30	TML	Vinyl Acetate	0.0970	0.0821	15	TML	19
31	TM	Ethyl tert Butyl Ether	0.3704	0.3475	6.2	TM	
32	TM	Methylcyclopentane	0.0181	0.0175	3.2	TM	
33	TM	MEK (2-Butanone)	0.0442	0.0410	7.3	TM	
34	TM	Cis-1,2-DCE	0.1497	0.1694	13	TM	
35	TM	2,2-Dichloropropane	0.2392	0.2435	1.8	TM	
36	TM*	Chloroform	0.2786	0.2745	1.5	TM*	
37	TM	Bromochloromethane	0.1069	0.1189	11	TM	
38	TM	1,1,1-TCA	0.2536	0.2893	14	TM	
39	TM	Cyclohexane	0.0911	0.0925	1.5	TM	
40	TM	1,1-Dichloropropene	0.1732	0.1664	3.9	TM	
		Average			6.1		

*NT 9/3/21

VOLATILE ORGANIC ANALYSIS BY EPA METHOD 8260B

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 7/21/2021
Instrument: Max
Cal. Date: 7/21/2021
Data File: 0721M12.D

		Compound	MEAN	CCRF	%D		%Drift
41	TM	2,2,4-Trimethylpentane	0.2429	0.2097	14	TM	
42	TM	Carbon Tetrachloride	0.2433	0.2655	9.2	TM	
43	TM	Tert Amyl Methyl Ether	0.3802	0.3451	9.2	TM	
44	TM	1,2-DCA	0.2384	0.2333	2.1	TM	
45	TM	Benzene	0.4847	0.5060	4.4	TM	
46	TM	TCE	0.1483	0.1417	4.5	TM	
47	TM	2-Pentanone	0.0678	0.0697	2.8	TM	
48	TM*L	1,2-Dichloropropane	0.0717	0.0665	7.3	TM*L	4.6
49	TM	Bromodichloromethane	0.2046	0.2204	7.7	TM	
50	TM	Methyl Cyclohexane	0.1690	0.1577	6.7	TM	
51	TM	Dibromomethane	0.0811	0.0870	7.3	TM	
52	TM	MIBK (methyl isobutyl ketone)	0.0921	0.0848	7.9	TM	
53	TML	1-Bromo-2-chloroethane	0.0282	0.0270	4.3	TML	10
54	TM	2-Chloroethyl vinyl ether	0.0000	0.0877	0.00	TM	
55	TM	Cis-1,3-Dichloropropene	0.1255	0.1257	0.17	TM	
56	TM*	Toluene	0.5242	0.5855	12	TM*	
57	TM	Trans-1,3-Dichloropropene	0.2003	0.1997	0.30	TM	
58	TM	1,1,2-TCA	0.0932	0.0870	6.6	TM	
59	TM	2-Hexanone	0.0580	0.0567	2.3	TM	
60	TM	1,2-EDB	0.1507	0.1504	0.26	TM	
61	TM	Tetrachloroethene	0.1358	0.1446	6.4	TM	
62	TM	1-Chlorohexane	0.1690	0.1641	2.9	TM	
63	TM	1,1,1,2-Tetrachloroethane	0.1927	0.2249	17	TM	
64	TM	m&p-Xylene	0.2835	0.3077	8.6	TM	
65	TM	o-Xylene	0.2890	0.2986	3.3	TM	
66	TM	Styrene	0.4661	0.5196	11	TM	
67	TM	1,3-Dichloropropane	0.2283	0.2335	2.3	TM	
68	TM	Dibromochloromethane	0.2084	0.2212	6.1	TM	
69	TM**	Chlorobenzene	0.4507	0.4938	9.6	TM**	
70	TM*	Ethylbenzene	0.6971	0.7570	8.6	TM*	
71	TM**	Bromoform	0.1724	0.1703	1.2	TM**	
72	TM	Isopropylbenzene	1.177	1.229	4.5	TM	
73	TM**	1,1,2,2-Tetrachloroethane	0.2347	0.2361	0.61	TM**	
74	TM	1,2,3-Trichloropropane	0.0983	0.1022	3.9	TM	
75	TML	t-1,4-Dichloro-2-Butene	0.0612	0.0703	15	TML	10
76	TM	Bromobenzene	0.3906	0.4192	7.3	TM	
77	TM	n-Propylbenzene	1.293	1.333	3.1	TM	
78	TM	4-Ethyltoluene	1.143	1.173	2.6	TM	
79	TM	2-Chlorotoluene	0.8442	1.016	20	TM	
80	TM	1,3,5-Trimethylbenzene	1.007	1.092	8.4	TM	
		Average			6.3		

VOLATILE ORGANIC ANALYSIS BY
EPA METHOD 8260B

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 7/21/2021
Instrument: Max
Cal. Date: 7/21/2021
Data File: 0721M12.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	4-Chlorotoluene	0.9138	1.010	11	TM	
82	TM	Tert-Butylbenzene	0.5413	0.6334	17	TM	
83	TM	1,2,4-Trimethylbenzene	0.9784	1.132	16	TM	
84	TM	Sec-Butylbenzene	1.088	1.260	16	TM	
85	TM	p-Isopropyltoluene	1.022	1.152	13	TM	
86	TM	Benzyl Chloride	0.3464	0.2908	16	TM	
87	TM	1,3-DCB	0.6960	0.7523	8.1	TM	
88	TM	1,4-DCB	0.6917	0.7328	5.9	TM	
89	TM	n-Butylbenzene	0.6516	0.7618	17	TM	
90	TM	1,2-DCB	0.6444	0.7121	10	TM	
91	TM	Hexachloroethane	0.2003	0.2182	8.9	TM	
92	TM	1,2-Dibromo-3-chloropropane	0.0788	0.0864	9.5	TM	
93	TML	1,2,4-Trichlorobenzene	0.3819	0.3819	0.01	TML	0.95
94	TML	Hexachlorobutadiene	0.2463	0.2520	2.3	TML	4.6
95	TML	Naphthalene	0.2498	0.3181	27	TML	7.3
96	TML	1,2,3-Trichlorobenzene	0.2687	0.3289	22	TML	0.96
97							
98							
99							
100							
101							
102							
103							
104							
105							
106							
107							
108							
109							
110							
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							
		Average			12.5		

VOLATILE ORGANIC ANALYSIS BY EPA METHOD 8260B

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 7/28/2021
Instrument: Max
Initial Cal. Date: 7/21/2021
Data File: 0728M07.D

		Compound	MEAN	CCRF	%D	%Drift		
1	I	Fluorobenzene (IS)	ISTD			I		
2	TM	Chlorotrifluoroethene	0.0000	0.0157	0.00	TM		
3	TML	Dichlorodifluoromethane	0.1414	0.1397	1.2	TML	0.07	
4	TM	Freon 114	0.1086	0.0984	9.4	TM		
5	TM**	Chloromethane	0.1143	0.0750	34	TM**		*NT
6	TM*L	Vinyl chloride	0.1137	0.1011	11	TM*L	5.9	
7	TM	2-Chloro-1,1,1-trifluoroethane	0.0000	0.0026	0.00	TM		
8	TM	Bromomethane	0.0783	0.0468	40	TM		*NT
9	TML	Chloroethane	0.0644	0.0592	8.1	TML	5.8	
10	TM	Dichlorofluoromethane	0.2199	0.2320	5.5	TM		
11	TM	Trichlorofluoromethane	0.2436	0.3037	25	TM		*NT TM 9/3/21
12	TM	2,2-Dichloro-1,1,1-trifluoroethane	0.0000	0.0003	0.00	TM		
13	TM	Acrolein	0.0165	0.0148	11	TM		
14	TM	Acetone	0.0378	0.0409	8.3	TM		
15	TM	Freon-113	0.1173	0.1362	16	TM		
16	TM	Acetonitrile	0.0115	0.0138	20	TM		
17	TM	2-propanol	0.0000	0.0001	0.00	TM		
18	TM*	1,1-DCE	0.1779	0.1816	2.1	TM*		
19	TM	t-Butanol	0.0118	0.0153	29	TM		*NT
20	TM	Methyl Acetate	0.0815	0.0997	22	TM		*NT
21	TML	Iodomethane	0.1096	0.0730	33	TML	32	*NT
22	TML	Acrylonitrile	0.0353	0.0424	20	TML	6.3	
23	TM	Methylene chloride	0.1227	0.1517	24	TM		*NT
24	TM	Carbon disulfide	0.1932	0.1783	7.7	TM		
25	TM	Methyl t-butyl ether (MtBE)	0.4148	0.4268	2.9	TM		
26	TM	Trans-1,2-DCE	0.1355	0.1255	7.4	TM		
27	TM	3-Methylpentane	0.0000	0.0003	0.00	TM		
28	TM	Diisopropyl Ether	0.3309	0.3004	9.2	TM		
29	TM**	1,1-DCA	0.2263	0.2216	2.1	TM**		
30	TML	Vinyl Acetate	0.0970	0.1301	34	TML	23	*NT
31	TM	Ethyl tert Butyl Ether	0.3704	0.3719	0.41	TM		
32	TM	Methylcyclopentane	0.0181	0.0135	25	TM		*NT
33	TM	MEK (2-Butanone)	0.0442	0.0469	6.3	TM		
34	TM	Cis-1,2-DCE	0.1497	0.1419	5.2	TM		
35	TM	2,2-Dichloropropane	0.2392	0.2881	20	TM		
36	TM*	Chloroform	0.2786	0.3062	9.9	TM*		
37	TM	Bromochloromethane	0.1069	0.1198	12	TM		
38	S	Dibromofluoromethane(S)	0.2991	0.3265	9.1	S		
39	TM	1,1,1-TCA	0.2536	0.3231	27	TM		*NT
40	TM	Cyclohexane	0.0911	0.0900	1.2	TM		
		Average			12.8			

VOLATILE ORGANIC ANALYSIS BY EPA METHOD 8260B

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 7/28/2021
Instrument: Max
Cal. Date: 7/21/2021
Data File: 0728M07.D

		Compound	MEAN	CCRF	%D		%Drift
41	TM	1,1-Dichloropropene	0.1732	0.1636	5.5	TM	
42	TM	2,2,4-Trimethylpentane	0.2429	0.2371	2.4	TM	
43	S	1,2-DCA-D4(S)	0.1898	0.2146	13	S	
44	TM	Carbon Tetrachloride	0.2433	0.2747	13	TM	
45	TM	Tert Amyl Methyl Ether	0.3802	0.3767	0.93	TM	
46	TM	1,2-DCA	0.2384	0.2523	5.8	TM	
47	TM	Benzene	0.4847	0.4630	4.5	TM	
48	TM	TCE	0.1483	0.1507	1.6	TM	
49	TM	2-Pentanone	0.0678	0.0894	32	TM	*NT
50	TM*L	1,2-Dichloropropane	0.0717	0.0582	19	TM*L	8.4
51	TM	Bromodichloromethane	0.2046	0.2252	10	TM	
52	TM	Methyl Cyclohexane	0.1690	0.1671	1.1	TM	
53	TM	Dibromomethane	0.0811	0.0936	15	TM	
54	TM	MIBK (methyl isobutyl ketone)	0.0921	0.0961	4.4	TM	
55	TML	1-Bromo-2-chloroethane	0.0282	0.0287	1.8	TML	3.9
56	TM	2-Chloroethyl vinyl ether	0.0000	0.1137	0.00	TM	
57	TM	Cis-1,3-Dichloropropene	0.1255	0.1303	3.8	TM	
58	TM*	Toluene	0.5242	0.5749	9.7	TM*	
59	TM	Trans-1,3-Dichloropropene	0.2003	0.2134	6.5	TM	
60	TM	1,1,2-TCA	0.0932	0.0894	4.0	TM	
61	TM	2-Hexanone	0.0580	0.0672	16	TM	
62	I	Chlorobenzene-D5 (IS)	ISTD			I	
63	S	Toluene-D8(S)	1.118	1.132	1.3	S	
64	TM	1,2-EDB	0.1507	0.1407	6.7	TM	
65	TM	Tetrachloroethene	0.1358	0.1301	4.2	TM	
66	TM	1-Chlorohexane	0.1690	0.1720	1.8	TM	
67	TM	1,1,1,2-Tetrachloroethane	0.1927	0.2221	15	TM	
68	TM	m&p-Xylene	0.2835	0.2959	4.4	TM	
69	TM	o-Xylene	0.2890	0.2906	0.56	TM	
70	TM	Styrene	0.4661	0.4529	2.8	TM	
71	S	4-Bromofluorobenzene(S)	0.4420	0.4499	1.8	S	
72	TM	1,3-Dichloropropane	0.2283	0.1996	13	TM	
73	TM	Dibromochloromethane	0.2084	0.2186	4.9	TM	
74	TM**	Chlorobenzene	0.4507	0.4782	6.1	TM**	
75	TM*	Ethylbenzene	0.6971	0.6968	0.04	TM*	
76	TM**	Bromoform	0.1724	0.1730	0.35	TM**	
77	I	1,4-Dichlorobenzene-D (IS)	ISTD			I	
78	TM	Isopropylbenzene	1.177	1.144	2.8	TM	
79	TM**	1,1,2,2-Tetrachloroethane	0.2347	0.2111	10	TM**	
80	TM	1,2,3-Trichloropropane	0.0983	0.1052	6.9	TM	
		Average			6.6		

VOLATILE ORGANIC ANALYSIS BY
EPA METHOD 8260B

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 7/28/2021
Instrument: Max
Cal. Date: 7/21/2021
Data File: 0728M07.D

		Compound	MEAN	CCRF	%D	%Drift	
81	TML	t-1,4-Dichloro-2-Butene	0.0612	0.0712	16	TML	12
82	TM	Bromobenzene	0.3906	0.4086	4.6	TM	
83	TM	n-Propylbenzene	1.293	1.223	5.4	TM	
84	TM	4-Ethyltoluene	1.143	1.138	0.45	TM	
85	TM	2-Chlorotoluene	0.8442	0.7745	8.3	TM	
86	TM	1,3,5-Trimethylbenzene	1.007	1.058	5.0	TM	
87	TM	4-Chlorotoluene	0.9138	0.9220	0.91	TM	
88	TM	Tert-Butylbenzene	0.5413	0.5843	7.9	TM	
89	TM	1,2,4-Trimethylbenzene	0.9784	1.037	6.0	TM	
90	TM	Sec-Butylbenzene	1.088	1.194	9.7	TM	
91	TM	p-Isopropyltoluene	1.022	1.173	15	TM	
92	TM	Benzyl Chloride	0.3464	0.3483	0.56	TM	
93	TM	1,3-DCB	0.6960	0.7340	5.5	TM	
94	TM	1,4-DCB	0.6917	0.6751	2.4	TM	
95	TM	n-Butylbenzene	0.6516	0.7896	21	TM	
96	TM	1,2-DCB	0.6444	0.6987	8.4	TM	
97	TM	Hexachloroethane	0.2003	0.2025	1.1	TM	
98	TM	1,2-Dibromo-3-chloropropane	0.0788	0.0722	8.4	TM	
99	TML	1,2,4-Trichlorobenzene	0.3819	0.3874	1.4	TML	1.9
100	TML	Hexachlorobutadiene	0.2463	0.3008	22	TML	11
101	TML	Naphthalene	0.2498	0.3277	31	TML	10
102	TML	1,2,3-Trichlorobenzene	0.2687	0.3324	24	TML	0.12
103							
104							
105							
106							
107							
108							
109							
110							
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							
		Average			9.3		

*NT

VOLATILE ORGANIC ANALYSIS BY
EPA METHOD 8260B

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Date Analyzed: 7/28/2021
Matrix: Instrument: Max
Initial Cal. Date: 7/21/2021
Data File: 0728M26.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	Fluorobenzene (IS)	ISTD			I	
2	TM	Chlorotrifluoroethene	0.0000	0.0141	0.00	TM	
3	TML	Dichlorodifluoromethane	0.1414	0.1480	4.7	TML	5.6
4	TM	Freon 114	0.1086	0.1011	6.9	TM	
5	TM**	Chloromethane	0.1143	0.0897	22	TM**	
6	TM*L	Vinyl chloride	0.1137	0.0820	28	TM*L	22
7	TM	2-Chloro-1,1,1-trifluoroethane	0.0000	0.0030	0.00	TM	
8	TM	Bromomethane	0.0783	0.0296	62	TM	
9	TML	Chloroethane	0.0644	0.0778	21	TML	40
10	TM	Dichlorofluoromethane	0.2199	0.2371	7.8	TM	
11	TM	Trichlorofluoromethane	0.2436	0.3084	27	TM	
12	TM	2,2-Dichloro-1,1,1-trifluoroethane	0.0000	0.0003	0.00	TM	
13	TM	Acrolein	0.0165	0.0062	62	TM	
14	TM	Acetone	0.0378	0.0362	4.2	TM	
15	TM	Freon-113	0.1173	0.1391	19	TM	
16	TM	Acetonitrile	0.0115	0.0120	4.1	TM	
17	TM	2-propanol	0.0000	0.0002	0.00	TM	
18	TM*	1,1-DCE	0.1779	0.1862	4.7	TM*	
19	TM	t-Butanol	0.0118	0.0136	15	TM	
20	TM	Methyl Acetate	0.0815	0.0810	0.66	TM	
21	TML	Iodomethane	0.1096	0.0557	49	TML	42
22	TML	Acrylonitrile	0.0353	0.0366	3.6	TML	7.9
23	TM	2-Methylpentane	0.0000	0.0003	0.00	TM	
24	TM	Methylene chloride	0.1227	0.1181	3.8	TM	
25	TM	Carbon disulfide	0.1932	0.1685	13	TM	
26	TM	Methyl t-butyl ether (MtBE)	0.4148	0.4392	5.9	TM	
27	TM	Trans-1,2-DCE	0.1355	0.1307	3.5	TM	
28	TM	3-Methylpentane	0.0000	0.0003	0.00	TM	
29	TM	Diisopropyl Ether	0.3309	0.3029	8.5	TM	
30	TM**	1,1-DCA	0.2263	0.2287	1.1	TM**	
31	TML	Vinyl Acetate	0.0970	0.1100	13	TML	5.3
32	TM	Ethyl tert Butyl Ether	0.3704	0.3793	2.4	TM	
33	TM	Methylcyclopentane	0.0181	0.0210	16	TM	
34	TM	MEK (2-Butanone)	0.0442	0.0374	15	TM	
35	TM	Cis-1,2-DCE	0.1497	0.1451	3.1	TM	
36	TM	2,2-Dichloropropane	0.2392	0.2129	11	TM	
37	TM*	Chloroform	0.2786	0.2782	0.17	TM*	
38	TM	Bromochloromethane	0.1069	0.1196	12	TM	
39	S	Dibromofluoromethane(S)	0.2991	0.3228	7.9	S	
40	TM	1,1,1-TCA	0.2536	0.3239	28	TM	
		Average			12.5		

*NT JA 9/3/21

*NT

VOLATILE ORGANIC ANALYSIS BY
EPA METHOD 8260B

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 7/28/2021
Instrument: Max
Cal. Date: 7/21/2021
Data File: 0728M26.D

		Compound	MEAN	CCRF	%D		%Drift
41	TM	Cyclohexane	0.0911	0.0947	4.0	TM	
42	TM	1,1-Dichloropropene	0.1732	0.1636	5.5	TM	
43	TM	2,2,4-Trimethylpentane	0.2429	0.2219	8.6	TM	
44	S	1,2-DCA-D4(S)	0.1898	0.2175	15	S	
45	TM	Carbon Tetrachloride	0.2433	0.2890	19	TM	
46	TM	Tert Amyl Methyl Ether	0.3802	0.3487	8.3	TM	
47	TM	1,2-DCA	0.2384	0.2594	8.8	TM	
48	TM	Benzene	0.4847	0.4951	2.1	TM	
49	TM	TCE	0.1483	0.1422	4.1	TM	
50	TM	2-Pentanone	0.0678	0.0734	8.2	TM	
51	TM*L	1,2-Dichloropropane	0.0717	0.0622	13	TM*L	2.0
52	TM	Bromodichloromethane	0.2046	0.2371	16	TM	
53	TM	Methyl Cyclohexane	0.1690	0.1569	7.2	TM	
54	TM	Dibromomethane	0.0811	0.1048	29	TM	
55	TM	MIBK (methyl isobutyl ketone)	0.0921	0.0827	10	TM	
56	TML	1-Bromo-2-chloroethane	0.0282	0.0293	4.1	TML	1.6
57	TM	2-Chloroethyl vinyl ether	0.0000	0.0827	0.00	TM	
58	TM	Cis-1,3-Dichloropropene	0.1255	0.1356	8.0	TM	
59	TM*	Toluene	0.5242	0.5256	0.26	TM*	
60	TM	Trans-1,3-Dichloropropene	0.2003	0.2183	9.0	TM	
61	TM	1,1,2-TCA	0.0932	0.0911	2.2	TM	
62	TM	2-Hexanone	0.0580	0.0588	1.4	TM	
63	I	Chlorobenzene-D5 (IS)	ISTD			I	
64	S	Toluene-D8(S)	1.118	1.112	0.51	S	
65	TM	1,2-EDB	0.1507	0.1557	3.3	TM	
66	TM	Tetrachloroethene	0.1358	0.1238	8.9	TM	
67	TM	1-Chlorohexane	0.1690	0.1632	3.5	TM	
68	TM	1,1,1,2-Tetrachloroethane	0.1927	0.2072	7.5	TM	
69	TM	m&p-Xylene	0.2835	0.2948	4.0	TM	
70	TM	o-Xylene	0.2890	0.3027	4.7	TM	
71	TM	Styrene	0.4661	0.4687	0.55	TM	
72	S	4-Bromofluorobenzene(S)	0.4420	0.4488	1.5	S	
73	TM	1,3-Dichloropropane	0.2283	0.2096	8.2	TM	
74	TM	Dibromochloromethane	0.2084	0.2138	2.6	TM	
75	TM**	Chlorobenzene	0.4507	0.4560	1.2	TM**	
76	TM*	Ethylbenzene	0.6971	0.7150	2.6	TM*	
77	TM**	Bromoform	0.1724	0.1778	3.1	TM**	
78	I	1,4-Dichlorobenzene-D (IS)	ISTD			I	
79	TM	Isopropylbenzene	1.177	1.099	6.6	TM	
80	TM**	1,1,2,2-Tetrachloroethane	0.2347	0.2097	11	TM**	
		Average			6.7		

VOLATILE ORGANIC ANALYSIS BY
EPA METHOD 8260B

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 7/28/2021
Instrument: Max
Cal. Date: 7/21/2021
Data File: 0728M26.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	1,2,3-Trichloropropane	0.0983	0.1127	15	TM	
82	TML	t-1,4-Dichloro-2-Butene	0.0612	0.0500	18	TML	21
83	TM	Bromobenzene	0.3906	0.3857	1.3	TM	
84	TM	n-Propylbenzene	1.293	1.151	11	TM	
85	TM	4-Ethyltoluene	1.143	1.060	7.3	TM	
86	TM	2-Chlorotoluene	0.8442	0.7562	10	TM	
87	TM	1,3,5-Trimethylbenzene	1.007	0.9774	3.0	TM	
88	TM	4-Chlorotoluene	0.9138	0.8855	3.1	TM	
89	TM	Tert-Butylbenzene	0.5413	0.5469	1.0	TM	
90	TM	1,2,4-Trimethylbenzene	0.9784	0.9455	3.4	TM	
91	TM	Sec-Butylbenzene	1.088	1.139	4.7	TM	
92	TM	p-Isopropyltoluene	1.022	1.079	5.6	TM	
93	TM	Benzyl Chloride	0.3464	0.2409	30	TM	
94	TM	1,3-DCB	0.6960	0.7243	4.1	TM	
95	TM	1,4-DCB	0.6917	0.6822	1.4	TM	
96	TM	n-Butylbenzene	0.6516	0.6746	3.5	TM	
97	TM	1,2-DCB	0.6444	0.6643	3.1	TM	
98	TM	Hexachloroethane	0.2003	0.1761	12	TM	
99	TM	1,2-Dibromo-3-chloropropane	0.0788	0.0707	10	TM	
100	TML	1,2,4-Trichlorobenzene	0.3819	0.3755	1.7	TML	0.11
101	TML	Hexachlorobutadiene	0.2463	0.2819	14	TML	4.6
102	TML	Naphthalene	0.2498	0.3075	23	TML	4.0
103	TML	1,2,3-Trichlorobenzene	0.2687	0.3451	28	TML	3.0
104							
105							
106							
107							
108							
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110							
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							
		Average			9.3		

ORGANICS

Raw Data

TCLP (1311) / SPLP (1312) Tumbling Information Sheet

Method ID:	EPA 1311
Date / Initials:	07/19/21 EO
Tumbler Start Time:	07/19/21 17:00
Tumbler End Time:	07/20/21 11:00
RPM of tumbler (30 +/- 2rpm):	30rpm
Temperature Ranges of Room (23 +/- 2C)	01/21/00
Thermometer ID:	S/N130728581
Prep date of Fluid #1:	#1
pH Verification #1: (4.93 +/- 0.05)	4.93
Balance ID:	VB1
Locked Formula Cells	
Analysts Complete	

ZHE Pressure check performed: The ZHE should be checked for leaks after every extraction. Pressurize the device to 50 psi, allow it to stand unattended for 1 hour, and recheck the pressure.

For the ZHE to be acceptable for use, the piston within the ZHE should be able to be moved with approximately 15 psi or less. If it takes more pressure to move the piston, the O-rings in the device should be replaced.

To take the temperature of the room: On the Traceable Thermometer located on the desk by the tumblers, press Memory Clear when you start the tumbler. When you stop the tumbler, record the temperature ranges of the room (both of the temperatures recorded on the bottom of the display) on

ZHE #	Sample ID	Filamentous material present? (e.g.,Paper, Cloth, etc.)	Type of TCLP fluid used	Is the sample > 0.5% liquid	(If answered YES in column F) % Solids	(If answered YES in column F) Sample aliquot (g) (100/%Solids)*100	Weight of beaker (g)	Tared weight of Sample in beaker (g)	weight of beaker after sample transfer (g)	Adjusted weight of sample if > 1% adhered to beaker	Weight of sample	Weight of TCLP fluid added (g)	Tedlar Bag lot number	Piston check: </= 15psi	ZHE start pressure check date/time	ZHE start pressure psi	ZHE end pressure check date/time	ZHE end pressure psi	Extraction Vessel S.N. # (Rotate the Blank every batch)
1	Blank/LCS	No	#1	no		#DIV/0!	NA	NA	NA	NA	NA	NA	28181028	YES	07/19/21 15:00	50	07/19/21 16:00	50	5072
2	BA36271S01	No	#1	no		#DIV/0!	2.180	25.190	0.000	25.19	25.19	503.80	28181028	YES	07/19/21 15:00	50	07/19/21 16:00	50	5065
3						#DIV/0!				0.00									
4						#DIV/0!				0.00									
5						#DIV/0!				0.00									
6						#DIV/0!				0.00									
7						#DIV/0!				0.00									
8						#DIV/0!				0.00									
9						#DIV/0!				0.00									
10						#DIV/0!				0.00									
11						#DIV/0!				0.00									
12						#DIV/0!				0.00									
13						#DIV/0!				0.00									
14						#DIV/0!				0.00									
15						#DIV/0!				0.00									
16						#DIV/0!				0.00									
17						#DIV/0!				0.00									
18						#DIV/0!				0.00									
19						#DIV/0!				0.00									
20						#DIV/0!				0.00									

Injection Log

Directory: M:\MAX\DATA\210721

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	1	0721M01.D	1	25ug/L BFB STD 3/23/21	IS&S 6/4/21	07/21/2021 13:42
2	2	0721M02.D	1	0.3ug/L VOC STD 7/21/21	IS&S 6/4/21	07/21/2021 14:09
3	3	0721M03.D	1	0.5ug/L VOC STD 7/21/21	IS&S 6/4/21	07/21/2021 14:38
4	4	0721M04.D	1	1ug/L VOC STD 7/21/23	IS&S 6/4/21	07/21/2021 15:06
5	5	0721M05.D	1	2ug/L VOC STD 7/21/24	IS&S 6/4/21	07/21/2021 15:34
6	6	0721M06.D	1	5ug/L VOC STD 7/21/25	IS&S 6/4/21	07/21/2021 16:02
7	7	0721M07.D	1	10ug/L VOC STD 7/21/26	IS&S 6/4/21	07/21/2021 16:30
8	8	0721M08.D	1	20ug/L VOC STD 7/21/27	IS&S 6/4/21	07/21/2021 16:58
9	9	0721M09.D	1	40ug/L VOC STD 7/21/28	IS&S 6/4/21	07/21/2021 17:26
10	10	0721M10.D	1	100ug/L VOC STD 7/21/29	IS&S 6/4/21	07/21/2021 17:54
11	12	0721M12.D	1	(SS) 10ug/L VOC STD 7/21/26	IS&S 6/4/21	07/21/2021 18:50
12	1	0728M01.D	1	25ug/L BFB STD 3/23/21	IS&S 6/4/21	07/28/2021 10:08
13	7	0728M07.D	1	210728A TCLP CCV/LCS 10ug/L	IS&S 6/4/21	07/28/2021 12:55
14	8	0728M08.D	1	210728A TCLP LCSD 10ug/L	IS&S 6/4/21	07/28/2021 13:23
15	9	0728M09.D	1	210728A TCLP BLK	IS&S 6/4/21	07/28/2021 13:51
16	11	0728M11.D	1	BA36270W01	IS&S 6/4/21	07/28/2021 14:47
17	17	0728M17.D	1	BA36269W07	IS&S 6/4/21	07/28/2021 17:35
18	18	0728M18.D	1	BA36271S01 TCLP	IS&S 6/4/21	07/28/2021 18:03
19	26	0728M26.D	1	Ending CCV 10ug/L 7/28/21	IS&S 6/4/21	07/28/2021 21:47

METALS

Calibration Data

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CH2M Hill

ARF No: 96859 SDG: 96859

Analysis Date: 8/5/2021 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 10:43	%R(1)	True CCV1	Found 17:39	%R(1)	True CCV1	Found 18:41	%R(1)	
Silver (Ag)	250	260.05	104	250	251.49	101	250	251.85	101	P
Arsenic (As)	500	524.04	105	500	513.62	103	500	511.75	102	P
Barium (Ba)	500	513.71	103	500	509.99	102	500	509.82	102	P
Cadmium (Cd)	500	512.85	103	500	495.37	99.1	500	496.12	99.2	P
Chromium (Cr)	500	512.08	102	500	501.88	100	500	500.17	100	P
Lead (Pb)	500	507.66	102	500	504.43	101	500	504.68	101	P
Selenium (Se)	500	511.46	102	500	512.67	103	500	511.27	102	P

(1) Control Limits: Metals 90-110

ILM02.0

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CH2M Hill

ARF No: 96859 SDG: 96859

Analysis Date: 8/5/2021 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 10:43	%R(1)	True CCV1	Found 19:30	%R(1)	True	Found	%R(1)	
Silver (Ag)	250	260.05	104	250	252.28	101				P
Arsenic (As)	500	524.04	105	500	512.74	103				P
Barium (Ba)	500	513.71	103	500	513.24	103				P
Cadmium (Cd)	500	512.85	103	500	500.56	100				P
Chromium (Cr)	500	512.08	102	500	504.69	101				P
Lead (Pb)	500	507.66	102	500	509.47	102				P
Selenium (Se)	500	511.46	102	500	511.63	102				P

(1) Control Limits: Metals 90-110

ILM02.0

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC. Contract: CH2M Hill

ARF No.: 96859 SDG: 96859

Preparation Blank Matrix (soil/water): water

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

Analysis Date: 8/5/2021

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
	10:47		17:43		18:50				17:48		
Silver (Ag)	10.00	U	10.00	U	10.00	U			10.00	U	P
Arsenic (As)	50.00	U	50.00	U	50.00	U			50.00	U	P
Barium (Ba)	50.00	U	50.00	U	50.00	U			11.40	J	P
Cadmium (Cd)	50.00	U	50.00	U	.58	J			50.00	U	P
Chromium (Cr)	50.00	U	50.00	U	50.00	U			50.00	U	P
Lead (Pb)	100.00	U	100.00	U	100.00	U			100.00	U	P
Selenium (Se)	50.00	U	50.00	U	50.00	U			50.00	U	P

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC. Contract: CH2M Hill

ARF No.: 96859 SDG: 96859

Preparation Blank Matrix (soil/water): water

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

Analysis Date: 8/5/2021

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
	10:47		18:50		19:39				18:54		
Silver (Ag)	10.00	U	10.00	U	10.00	U			10.00	U	P
Arsenic (As)	50.00	U	50.00	U	50.00	U			50.00	U	P
Barium (Ba)	50.00	U	50.00	U	.85	J			50.00	U	P
Cadmium (Cd)	50.00	U	.58	J	.76	J			50.00	U	P
Chromium (Cr)	50.00	U	50.00	U	50.00	U			50.00	U	P
Lead (Pb)	100.00	U	100.00	U	100.00	U			100.00	U	P
Selenium (Se)	50.00	U	50.00	U	50.00	U			50.00	U	P

A.P.P.L. INC.
4
ICP INTERFERENCE CHECK SAMPLE

Lab Name:	A.P.P.L. INC.	Contract:	CH2M Hill
ARF No.:	96859	SDG:	96859
ICP ID Number:	Cyrus	ICS Source:	Environmental Express

Analysis Date: 8/5/2021 Concentration Units: ug/L

Analyte	True		Initial Found		
	Sol A	Sol AB	Sol A 11:05	Sol AB 11:09	%R(1)
Silver (Ag)		500	-0.06	540.19	108
Arsenic (As)		250	0.14	263.06	105
Barium (Ba)		250	-0.23	257.89	103
Cadmium (Cd)		500	-0.33	500.42	100
Chromium (Cr)		250	-0.09	256.29	103
Lead (Pb)		500	-2.73	502.25	100
Selenium (Se)		250	-1.59	247.93	99.2

(1) Control Limits: Metals 80-120

Low Level ICV

Sample Name	Acq Date Time	Run Sequence	Analyte	Actual Conc (ug/L)	Spiked Conc (ug/L)	Control Limits	% Recovery	QC Flag
LLICV	8/5/21 10:52 AM	210805A	Silver	0.58	0.5	80-120%	116	
LLICV	8/5/21 10:52 AM	210805A	Aluminum	51.43	50	80-120%	103	
LLICVX2	8/5/21 10:56 AM	210805A	Arsenic	4.2	4	80-120%	105	
LLICV	8/5/21 10:52 AM	210805A	Boron	27.09	25	80-120%	108	
LLICV	8/5/21 10:52 AM	210805A	Barium	1.510	1.5	80-120%	101	
LLICV	8/5/21 10:52 AM	210805A	Beryllium	1.050	1	80-120%	105	
LLICVX2	8/5/21 10:56 AM	210805A	Calcium	104.25	100	80-120%	104	
LLICV	8/5/21 10:52 AM	210805A	Cadmium	0.27	0.25	80-120%	108	
LLICV	8/5/21 10:52 AM	210805A	Cobalt	2.800	2.5	80-120%	112	
LLICVX2	8/5/21 10:56 AM	210805A	Chromium	1.15	1	80-120%	115	
LLICV	8/5/21 10:52 AM	210805A	Copper	2.43	2.5	80-120%	97	
LLICV	8/5/21 10:52 AM	210805A	Iron	27.92	25	80-120%	112	
LLICV	8/5/21 10:52 AM	210805A	Potassium	499.8	500	80-120%	100	
LLICV	8/5/21 10:52 AM	210805A	Magnesium	28.05	25	80-120%	112	
LLICV	8/5/21 10:52 AM	210805A	Manganese	1.12	1	80-120%	112	
LLICVX2	8/5/21 10:56 AM	210805A	Molybdenum	2.14	2	80-120%	107	
LLICV	8/5/21 10:52 AM	210805A	Sodium	506.82	500	80-120%	101	
LLICV	8/5/21 10:52 AM	210805A	Nickel	1.080	1	80-120%	108	
LLICV	8/5/21 10:52 AM	210805A	Phosphorus	13.05	12.5	80-120%	104	
LLICV	8/5/21 10:52 AM	210805A	Lead	1.59	1.5	80-120%	106	
LLICV	8/5/21 10:52 AM	210805A	Antimony	1.66	2	80-120%	83	
LLICVX2	8/5/21 10:56 AM	210805A	Selenium	4.28	4	80-120%	107	
LLICV	8/5/21 10:52 AM	210805A	Tin	3.020	3	80-120%	101	
LLICV	8/5/21 10:52 AM	210805A	Strontium	1.060	1	80-120%	106	
LLICV	8/5/21 10:52 AM	210805A	Titanium	2.68	2.5	80-120%	107	
LLICV	8/5/21 10:52 AM	210805A	Thallium	2.22	2	80-120%	111	
LLICV	8/5/21 10:52 AM	210805A	Vanadium	0.42	0.5	80-120%	84	
LLICV	8/5/21 10:52 AM	210805A	Zinc	25.06	25	80-120%	100	

METALS

Raw Data

Metals Digestion Worksheet

Method Name 3010A Digestion (TCLP) **Prep Method** M3010TCLP T **Set** 210805A **Units** mL

Spikes	
Spiked ID 1	LCSW LOT# 10064561-19-52700 Pipette AP-21
Spiked ID 2	LCSW LOT# 10064561-18-52699
Spiked ID 3	Li HDL #AU01003-40046
Spiked ID 4	
Spiked By	NM Date: 08/05/21 7:47:00 AM
Witnessed By	NA Date: 08/05/21 7:47:00 AM

Starting Temp:	SLOT 5 THERM:KAHN 96C/95C
Ending Temp:	SLOT 5 97C/96C
Temperature Type:	Mod Block
Sufficient Vol for Matrix QC:	YES
End Date/Time	08/05/21 12:27

	Sample	Sample Container	Spike Amount	Spike ID	Digested Amount	Final Volume	Start Date/Time	Comments
1	210805A Blk				50mL	50mL	08/05/21 7:47	equip: Modblock2
2	210805A LCS		500uL	1+2	50mL	50mL	08/05/21 7:47	equip: Modblock2
3	BA36269	BA36269W05			50mL	50mL	08/05/21 7:47	equip: Modblock2 96859 Sample 100% Liquid
4	BA36269 MS	BA36269W05	500uL	1+2	50mL	50mL	08/05/21 7:47	equip: Modblock2 96859 Sample 100% Liquid
5	BA36269 MSD	BA36269W05	500uL	1+2	50mL	50mL	08/05/21 7:47	equip: Modblock2 96859 Sample 100% Liquid

Solvent and Lot#
HNO3 BDH 1120120 20556
1:1 HCL 2-16-21
100mL vessel 030000066

Sample COC Transfer	
Sample prep employee Initials	nm
Analyst's initials	PW
Date	8/12/21
Time	0952
Moved to	8/12/21

Technician's Initials	
Scanned By	nm
Sample Preparation	nm
Digestion	nm
Bring up to volume	
Modified	08/05/21 7:40:06 AM

Reviewed By: PW **Date:** 8/12/21

M3010TCL

Metals Digestion Worksheet

Method Name 3010A Digestion (TCLP) **Prep Method** M3010TCLP T **Set** 210803A **Units** mL

Spikes	
Spiked ID 1	LCSW LOT# 10064561-19-52700 Pipette AP-21
Spiked ID 2	LCSW LOT# 10064561-18-52699
Spiked ID 3	Li HDL #AU01003-40046
Spiked ID 4	
Spiked By	NM Date: 08/03/21 8:22:00 AM
Witnessed By	NA Date: 08/03/21 8:22:00 AM

Starting Temp:	SLOT 28 THERM:9104 93C/90C
Ending Temp:	SLOT 28 93C/90C
Temperature Type:	Mod Block
Sufficient Vol for Matrix QC:	YES
End Date/Time	08/03/21 12:00

	Sample	Sample Container	Spike Amount	Spike ID	Digested Amount	Final Volume	Start Date/Time	Comments
1	210803A Blk				50mL	50mL	08/03/21 8:22	equip: Modblock4 Tumble Start Time 7/31/21@15:41 Fluid #1
2	210803A BLK 1				50mL	50mL	08/03/21 8:22	equip: Modblock4 Tumble Start Time 6/11/21@14:19 Fluid #1
3	210803A LCS		500uL	1+2	50mL	50mL	08/03/21 8:22	equip: Modblock4 Tumble End time 8/1/21@09:52 Fluid#1
4	210803A LCS 1		500uL	1+2	50mL	50mL	08/03/21 8:22	equip: Modblock4 Tumble End Time 6/12/21@07:30 Fluid#1
5	BA33498	BA33498M01			50mL	50mL	08/03/21 8:22	equip: Modblock4 96372 BLK 1/ LCS 1
6	BA33499	BA33499M01			50mL	50mL	08/03/21 8:22	equip: Modblock4 96372 Fluid # 1
7	BA36271	BA36271S03			50mL	50mL	08/03/21 8:22	equip: Modblock4 96859 Fluid # 1
8	BA36271 MS	BA36271S03	500uL	1+2	50mL	50mL	08/03/21 8:22	equip: Modblock4 Fluid # 1
9	BA36271 MSD	BA36271S03	500uL	1+2	50mL	50mL	08/03/21 8:22	equip: Modblock4 Fluid # 1

Solvent and Lot#
HNO3 BDH 1120120 20556
1:1 HCL 2-16-21
100mL vessel 030000066

Sample COC Transfer	
Sample prep employee Initials	nm
Analyst's initials	PL
Date	8/3/21
Time	1203
Moved to	Meta/S

Technician's Initials	
Scanned By	nm
Sample Preparation	nm
Digestion	nm
Bring up to volume	
Modified	08/03/21 8:05:33 AM

Reviewed By: PL Date: 8/3/21

6010C/TCLP Injection Log

Directory: K:\ICP-OES Cyrus\Backup Excel\

RunID	Injected		Sample Name	Misc Info	FileName	Multiplier
1	05 Aug 2021	10:12	CalBlk 210805		210805A200	1.
2	05 Aug 2021	10:16	STD1 210805		210805A200	1.
3	05 Aug 2021	10:21	STD2 210805		210805A200	1.
4	05 Aug 2021	10:25	STD3 210805		210805A200	1.
5	05 Aug 2021	10:30	STD4 210805		210805A200	1.
6	05 Aug 2021	10:34	STD5 210805		210805A200	1.
7	05 Aug 2021	10:39	STD6 210805		210805A200	1.
8	05 Aug 2021	10:43	ICV 210805		210805A200	1.
9	05 Aug 2021	10:47	ICB 210805		210805A200	1.
10	05 Aug 2021	10:52	LLLOQ 210805		210805A200	1.
11	05 Aug 2021	10:56	LLLOQX2 210805		210805A200	1.
13	05 Aug 2021	11:05	ICSA 210805		210805A200	1.
14	05 Aug 2021	11:09	ICSAB 210805		210805A200	1.
67	05 Aug 2021	17:39	CCV 210805		210805A200	1.
68	05 Aug 2021	17:43	CCB 210805		210805A200	1.
69	05 Aug 2021	17:48	210803A BLK DF2		210805A200	2.
70	05 Aug 2021	17:52	210803A LCS DF2		210805A200	2.
72	05 Aug 2021	18:01	BA36271S03 DF10		210805A200	10.
81	05 Aug 2021	18:41	CCV 210805		210805A200	1.
83	05 Aug 2021	18:50	CCB 210805		210805A200	1.
84	05 Aug 2021	18:54	210805A BLK DF2		210805A200	2.
85	05 Aug 2021	18:59	210805A LCS DF2		210805A200	2.
86	05 Aug 2021	19:03	BA36269W05 DF10		210805A200	10.
92	05 Aug 2021	19:30	CCV 210805		210805A200	1.
94	05 Aug 2021	19:39	CCB 210805		210805A200	1.

METALS

Calibration Data

A.P.P.L. INC.
2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CH2M Hill
ARF No: 96859 SDG: 96859

Analysis Date: 08/02/21 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 12:52	%R(1)	True CCV1	Found 13:15	%R(1)	True	Found	%R(1)	
Mercury (Hg)	4.17	4.105	98.4	5.208	5.013	96.3				P

(1) Control Limits: Metals 90-110 ILM02.0

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC. Contract: CH2M Hill

ARF No.: 96859 SDG: 96859

Preparation Blank Matrix (soil/water): water

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

Analysis Date: 08/02/21

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	1	C	2	C	3	C		C	
	12:54		13:17						13:02		
Mercury (Hg)	.20	U	.20	U					.20	U	P

A.P.P.L. INC.

LLQC Check

Lab Name: A.P.P.L. INC. Contract: CH2M Hill

ARF No: 96859 SDG: 96859

Concentration Units: ug/L

Analysis Date: 08/02/21

Analyte	LLQC								
	True	Found	%R(1)	True	Found	%R(1)	True	Found	%R(1)
	LLQC	12:55							
Mercury (Hg)	0.2	0.1657	82.8						

==========

Reprocessing Begun
Logged In Analyst: chemist_metals **Technique: AA FIMS-MHS**

Results Data Set (original): 210802W2
Results Library (original): C:\Users\Public\PerkinElmer\AA\Data\Results\Results.mdb
Results Data Set (reprocessed):
Results Library (reprocessed):

==========

Method Loaded
Method Name: ANA 7470 **Method Last Saved: 07/29/21 4:05:28 PM**
Method Description: EPA 7470A

==========

Sequence No.: 1 **Autosampler Location: 1**
Sample ID: Calib. Blank **Date Collected: 08/02/21 12:40:49 PM**
Analyst: **Data Type: Reprocessed on 08/02/21 1:22:55 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: Calib. Blank **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[0.00]	0.0001	-0.0004	0.0001	12:41:27 PM	No
2		[0.00]	0.0002	0.0015	0.0002	12:41:50 PM	No
3		[0.00]	0.0001	0.0005	0.0001	12:42:14 PM	No
Mean:		[0.00]	0.0001				
SD:		0.0000	0.0000				
%RSD:		0.00%	34.82				

Auto-zero performed.

==========

Sequence No.: 2 **Autosampler Location: 2**
Sample ID: ICAL 0.2ppb 210802 **Date Collected: 08/02/21 12:42:27 PM**
Analyst: **Data Type: Reprocessed on 08/02/21 1:22:55 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICAL 0.2ppb 210802 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[0.2]	0.0013	0.0061	0.0014	12:43:06 PM	No
2		[0.2]	0.0014	0.0070	0.0015	12:43:30 PM	No
3		[0.2]	0.0014	0.0072	0.0015	12:43:53 PM	No
Mean:		[0.2]	0.0014				
SD:		0.000	0.0000				
%RSD:		0.00%	3.07				

Standard number 1 applied. [0.2]
Correlation Coef.: 1.000000 Slope: 0.00682 Intercept: 0.00000

==========

Sequence No.: 3 **Autosampler Location: 3**
Sample ID: ICAL 0.5ppb 210802 **Date Collected: 08/02/21 12:44:07 PM**
Analyst: **Data Type: Reprocessed on 08/02/21 1:22:55 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICAL 0.5ppb 210802 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[0.5]	0.0033	0.0125	0.0034	12:44:46 PM	No

2	[0.5]	0.0033	0.0128	0.0034	12:45:09 PM	No
3	[0.5]	0.0033	0.0133	0.0035	12:45:33 PM	No
Mean:	[0.5]	0.0033				
SD:	0.000	0.0000				
%RSD:	0.00%	1.36				

Standard number 2 applied. [0.5]
Correlation Coef.: 0.999649 Slope: 0.00665 Intercept: 0.00000

==========

Sequence No.: 4 **Autosampler Location: 4**
Sample ID: ICAL 1ppb 210802 **Date Collected: 08/02/21 12:45:47 PM**
Analyst: **Data Type: Reprocessed on 08/02/21 1:22:55 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICAL 1ppb 210802 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[1]	0.0068	0.0258	0.0069	12:46:26 PM	No
2		[1]	0.0069	0.0259	0.0070	12:46:50 PM	No
3		[1]	0.0068	0.0255	0.0069	12:47:13 PM	No
Mean:		[1]	0.0068				
SD:		0.00	0.0001				
%RSD:		0.00%	0.92				

Standard number 3 applied. [1]
Correlation Coef.: 0.999753 Slope: 0.00678 Intercept: 0.00000

==========

Sequence No.: 5 **Autosampler Location: 5**
Sample ID: ICAL 2ppb 210802 **Date Collected: 08/02/21 12:47:28 PM**
Analyst: **Data Type: Reprocessed on 08/02/21 1:22:55 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICAL 2ppb 210802 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[2]	0.0140	0.0505	0.0141	12:48:08 PM	No
2		[2]	0.0139	0.0495	0.0140	12:48:31 PM	No
3		[2]	0.0142	0.0529	0.0143	12:48:54 PM	No
Mean:		[2]	0.0140				
SD:		0.00	0.0001				
%RSD:		0.00%	0.81				

Standard number 4 applied. [2]
Correlation Coef.: 0.999642 Slope: 0.00696 Intercept: 0.00000

==========

Sequence No.: 6 **Autosampler Location: 6**
Sample ID: ICAL 5ppb 210802 **Date Collected: 08/02/21 12:49:09 PM**
Analyst: **Data Type: Reprocessed on 08/02/21 1:22:55 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICAL 5ppb 210802 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[5]	0.0369	0.1339	0.0370	12:49:47 PM	No
2		[5]	0.0365	0.1316	0.0366	12:50:10 PM	No
3		[5]	0.0365	0.1336	0.0367	12:50:33 PM	No
Mean:		[5]	0.0366				
SD:		0.00	0.0002				
%RSD:		0.00%	0.66				

Standard number 5 applied. [5]

Correlation Coef.: 0.999592 Slope: 0.00727 Intercept: 0.00000

==========

Sequence No.: 7 **Autosampler Location: 7**
Sample ID: ICAL 10ppb 210802 **Date Collected: 08/02/21 12:50:47 PM**
Analyst: **Data Type: Reprocessed on 08/02/21 1:22:55 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICAL 10ppb 210802 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[10]	0.0736	0.2703	0.0737	12:51:25 PM	No
2		[10]	0.0738	0.2695	0.0739	12:51:49 PM	No
3		[10]	0.0748	0.2775	0.0749	12:52:12 PM	No
Mean:		[10]	0.0741				
SD:		0.00	0.0006				
%RSD:		0.00%	0.86				

Standard number 6 applied. [10]
Correlation Coef.: 0.999853 Slope: 0.00738 Intercept: 0.00000

Calibration data for Hg 253.7 **Equation: Linear Through Zero**

ID	Mean Signal (Abs)	Entered Conc. ug/L	Calculated Conc. ug/L	Standard Deviation	%RSD
Calib. Blank	0.0000	0	0.0000	0.00	34.82
ICAL 0.2ppb 210802	0.0014	0.2	0.1850	0.00	3.07
ICAL 0.5ppb 210802	0.0033	0.5	0.4489	0.00	1.36
ICAL 1ppb 210802	0.0068	1.0	0.9237	0.00	0.92
ICAL 2ppb 210802	0.0140	2.0	1.9033	0.00	0.81
ICAL 5ppb 210802	0.0366	5.0	4.9666	0.00	0.66
ICAL 10ppb 210802	0.0741	10.0	10.0444	0.00	0.86

Correlation Coef.: 0.999853 Slope: 0.00738 Intercept: 0.00000

==========

Sequence No.: 8 **Autosampler Location: 9**
Sample ID: ICV 210802 **Date Collected: 08/02/21 12:52:26 PM**
Analyst: **Data Type: Reprocessed on 08/02/21 1:22:55 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICV 210802 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	4.104	4.104	0.0303	0.1125	0.0304	12:53:05 PM	No
2	4.080	4.080	0.0301	0.1081	0.0302	12:53:28 PM	No
3	4.131	4.131	0.0305	0.1099	0.0306	12:53:51 PM	No
Mean:	4.105	4.105	0.0303				
SD:	0.0257	0.0257	0.0002				
%RSD:	0.63%	0.63%	0.63				

QC value within limits for Hg 253.7 Recovery = 102.63%
All analyte(s) passed QC.

==========

Sequence No.: 9 **Autosampler Location: 1**
Sample ID: ICB 210802 **Date Collected: 08/02/21 12:54:06 PM**
Analyst: **Data Type: Reprocessed on 08/02/21 1:22:56 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICB 210802 **Analyte: Hg 253.7**

Repl	SampleConc	StndConc	BlnkCorr	Peak	Peak	Time	Peak

#	ug/L	ug/L	Signal	Area	Height		Stored
1	-0.0055	-0.0055	-0.0000	-0.0006	0.0001	12:54:44 PM	No
2	0.0001	0.0001	0.0000	0.0003	0.0001	12:55:07 PM	No
3	-0.0005	-0.0005	-0.0000	0.0005	0.0001	12:55:30 PM	No
Mean:	-0.0020	-0.0020	-0.0000				
SD:	0.00310	0.00310	0.0000				
%RSD:	157.63%	157.63%	157.63				

QC value within limits for Hg 253.7 Recovery = Not calculated
All analyte(s) passed QC.

==========

Sequence No.: 10 **Autosampler Location: 2**
Sample ID: LLQC 210802 **Date Collected: 08/02/21 12:55:44 PM**
Analyst: **Data Type: Reprocessed on 08/02/21 1:22:56 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: LLQC 210802 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.1608	0.1608	0.0012	0.0039	0.0013	12:56:23 PM	No
2	0.1696	0.1696	0.0013	0.0047	0.0014	12:56:46 PM	No
3	0.1667	0.1667	0.0012	0.0046	0.0013	12:57:09 PM	No
Mean:	0.1657	0.1657	0.0012				
SD:	0.00450	0.00450	0.0000				
%RSD:	2.71%	2.71%	2.71				

QC value within limits for Hg 253.7 Recovery = 82.83%
All analyte(s) passed QC.

METALS

Raw Data

Mercury Digestion Worksheet

Method Name 7470 Mercury Digestion (TCLP) **Prep Method** M7470TCLP **Set** 210802A **Units** mL

Spikes			
Spiked ID 1	Hg WORKING STANDARD prep 8-2-21 Pipette M33		
Spiked ID 2	Hg WORKING ICV prep 8-2-21		
Spiked ID 3	100mL vessel 0300000066		
Spiked ID 4			
Spiked By	sm	Date:	08/02/21 8:53:00 AM
Witnessed By	nm	Date:	08/02/21 8:53:00 AM

Starting Temp:	SLOT 16 THERM:Kahn 78C
Ending Temp:	SLOT 16 87C
Temp Type:	Modblock1 Fluid #1 Tumble Start Time 07/31/21 @ 15:41
End Date/Time	08/02/21 10:57:00 AM

Mercury Calibration			
Sample	**Spike Amount**	**Spike ID**	**Final Volume**
0 ppb		1	72.25 ml
0.2 ppb	0.2 ml	1	72.25 ml
0.5 ppb	0.5 ml	1	72.25 ml
1 ppb	1 ml	1	72.25 ml
2 ppb	2 ml	1	72.25 ml
5 ppb	5 ml	1	72.25 ml
5 ppb	5 ml	1	72.25 ml
10 ppb	10 ml	1	72.25 ml
ICV	4 ml	2	72.25 ml

Start Date/Time of Calibration 08/02/21 8:53

Sufficient Vol for Matrix QC:	Yes

	Sample	Sample Container	Spike Amount	Spike ID	Digested Amount	Final Volume	Start Date/Time	Comments
1	210802A Blk				50mL	72.25mL	08/02/21 8:53	equip: Modblock1 Fluid #1 Tumble Start Time 07/31/21 @ 15:41
2	210802A Blk 2				50mL	72.25mL	08/02/21 8:53	equip: Modblock1 DI Water
3	210802A LCS		4mL	1	50mL	72.25mL	08/02/21 8:53	equip: Modblock1 Fluid #1 Tumble End Time 08/01/21 @ 09:52
4	210802A LCS 2				50mL	72.25mL	08/02/21 8:53	equip: Modblock1 DI Water
5	210802A LCSD		4mL	1	50mL	72.25mL	08/02/21 8:53	equip: Modblock1 Fluid #1
6	210802A LCSD 2				50mL	72.25mL	08/02/21 8:53	equip: Modblock1 DI Water
7	BA36269	BA36269W05			50mL	72.25mL	08/02/21 8:53	equip: Modblock1 96859 100% Liquid
8	BA36271	BA36271S03			50mL	72.25mL	08/02/21 8:53	equip: Modblock1 96859 Fluid #1
9	BA36577	BA36577M01			50mL	72.25mL	08/02/21 8:53	equip: Modblock1 96926 Fluid #1
10	BA36577_MS	BA36577M01	4mL	1	50mL	72.25mL	08/02/21 8:53	equip: Modblock1 Fluid #1
11	BA36577_MSD	BA36577M01	4mL	1	50mL	72.25mL	08/02/21 8:53	equip: Modblock1 Fluid #1

Solvent and Lot#
HNO3 BDH 1120120 20553
H2SO4 J.T.B. 268820 19610
KMnO4 7-23-21
K2S2O8 7-20-21
Decolorizer 7-30-21

Sample COC Transfer	
Sample prep employee Initials	sm
Analyst's initials	
Date	
Time	
Moved to	

Technician's Initials	
Scanned By	sm
Sample Preparation	sm
Digestion	sm
Bring up to volume	
Modified	08/02/21 8:46:12 AM

Reviewed By: **Date:**

7470A/TCLP Injection Log

Directory: K:\FIMS Freddie\Backup Excel\

RunID	Injected		Sample Name	Misc Info	FileName	Multiplier
1	02 Aug 2021	12:40	Calib. Blank		210802W2 96	1.
2	02 Aug 2021	12:42	ICAL 0.2ppb 210802		210802W2 96	1.
3	02 Aug 2021	12:44	ICAL 0.5ppb 210802		210802W2 96	1.
4	02 Aug 2021	12:45	ICAL 1ppb 210802		210802W2 96	1.
5	02 Aug 2021	12:47	ICAL 2ppb 210802		210802W2 96	1.
6	02 Aug 2021	12:49	ICAL 5ppb 210802		210802W2 96	1.
7	02 Aug 2021	12:50	ICAL 10ppb 210802		210802W2 96	1.
8	02 Aug 2021	12:52	ICV 210802		210802W2 96	1.
9	02 Aug 2021	12:54	ICB 210802		210802W2 96	1.
10	02 Aug 2021	12:55	LLQC 210802		210802W2 96	1.
11	02 Aug 2021	12:57	210802A BLK		210802W2 96	1.
12	02 Aug 2021	12:59	210802A LCS		210802W2 96	1.
13	02 Aug 2021	13:00	210802A LCSD		210802W2 96	1.
14	02 Aug 2021	13:02	210802A BLK 2		210802W2 96	1.
15	02 Aug 2021	13:04	210802A LCS 2		210802W2 96	1.
16	02 Aug 2021	13:05	210802A LCSD 2		210802W2 96	1.
17	02 Aug 2021	13:07	BA36271S03		210802W2 96	1.
21	02 Aug 2021	13:14	BA36269W05		210802W2 96	1.
22	02 Aug 2021	13:15	CCV 210802		210802W2 96	1.
23	02 Aug 2021	13:17	CCB 210802		210802W2 96	1.

INORGANIC ANALYSIS
Calibration and Raw Data

% Moisture

Batch: QCG 210721-M008721

Method: CLP 4.0

Date: 07/21/21 15:56

Sample	Container	Pan (g)	Pan+Wet (g)	Pan+Dry 1 (g)	Pan+Dry 2 (g)	Moisture (%)	Comments
BA36218	S04	0.8379	8.1963	7.6211	7.6212	7.816	
		07/21/21 15:56	07/21/21 15:56	07/22/21 07:22	07/22/21 07:22		
BA36168D		0.8439	8.6646	7.9015	7.9018	9.754	
		07/21/21 15:45	07/21/21 15:46		07/22/21 07:18		
BA36169		0.8399	8.2694	7.5049	7.5050	10.289	
		07/21/21 15:46	07/21/21 15:47	07/22/21 07:18	07/22/21 07:18		
BA36170		0.8370	7.4925	7.2081	7.2085	4.267	
		07/21/21 15:47	07/21/21 15:47		07/22/21 07:19		
BA36171		0.8345	8.5282	8.2005	8.2009	4.254	
		07/21/21 15:48	07/21/21 15:48	07/22/21 07:19	07/22/21 07:19		
BA36172		0.8481	7.9629	7.6665	7.6669	4.160	
		07/21/21 15:49	07/21/21 15:49	07/22/21 07:20	07/22/21 07:20		
BA36173		0.8368	7.7199	7.4178	7.4178	4.389	
		07/21/21 15:49	07/21/21 15:50	07/22/21 07:20			
BA36207	S02	0.8318	6.1635	5.5815	5.5815	10.916	
		07/21/21 15:50	07/21/21 15:52	07/22/21 07:20	07/22/21 07:20		
BA36208	S02	0.8400	7.7338	7.1498	7.1499	8.470	
		07/21/21 15:52	07/21/21 15:53		07/22/21 07:21		
BA36168		0.8307	8.2028	7.4608	7.4609	10.064	
		07/21/21 15:44	07/21/21 15:45	07/22/21 07:18	07/22/21 07:18		
BA36217	S04	0.8388	9.0926	8.4810	8.4815	7.404	
		07/21/21 15:55	07/21/21 15:55		07/22/21 07:22		
BA36323	S01	0.8246	8.7457	2.7625	2.7625	75.535	
		07/21/21 16:08	07/21/21 16:09	07/22/21 07:26	07/22/21 07:26		
BA36219	S04	0.8433	6.3752	5.9584	5.9586	7.531	
		07/21/21 15:57	07/21/21 15:57		07/22/21 07:23		
BA36243	S01	0.8325	8.4843	2.1464	2.1465	82.828	
		07/21/21 15:59	07/21/21 16:00	07/22/21 07:23	07/22/21 07:23		
BA36260	S04	0.8382	9.1223	8.5160	8.5162	7.316	
		07/21/21 16:00	07/21/21 16:02		07/22/21 07:23		
BA36261	S04	0.8310	7.8264	7.4472	7.4472	5.421	
		07/21/21 16:02	07/21/21 16:02	07/22/21 07:24			
BA36262	S04	0.8301	6.7144	6.2413	6.2412	8.042	
		07/21/21 16:03	07/21/21 16:03	07/22/21 07:24	07/22/21 07:24		
BA36263	S04	0.8357	8.4245	8.1023	8.1027	4.240	
		07/21/21 16:03	07/21/21 16:04		07/22/21 07:25		
BA36271	S01	0.8456	5.9869	5.0532	5.0533	18.159	
		07/21/21 16:05	07/21/21 16:06	07/22/21 07:25			
BA36285	S10	0.8394	6.3309	5.7644	5.7644	10.316	
		07/21/21 16:07	07/21/21 16:07	07/22/21 07:25			
BA36209	S02	0.8311	6.6238	6.0906	6.0906	9.205	
		07/21/21 15:54	07/21/21 15:54	07/22/21 07:21	07/22/21 07:21		

Date/Time InOven@104ºC	Date/Time OutOven@104ºC	Date/Time InOven@104ºC	Date/Time OutOven@104ºC
07/21/21 3:56:00 PM			07/22/21 7:22:00 AM

ANALYTICAL REPORT

July 30, 2021

APPL Inc - Clovis, CA

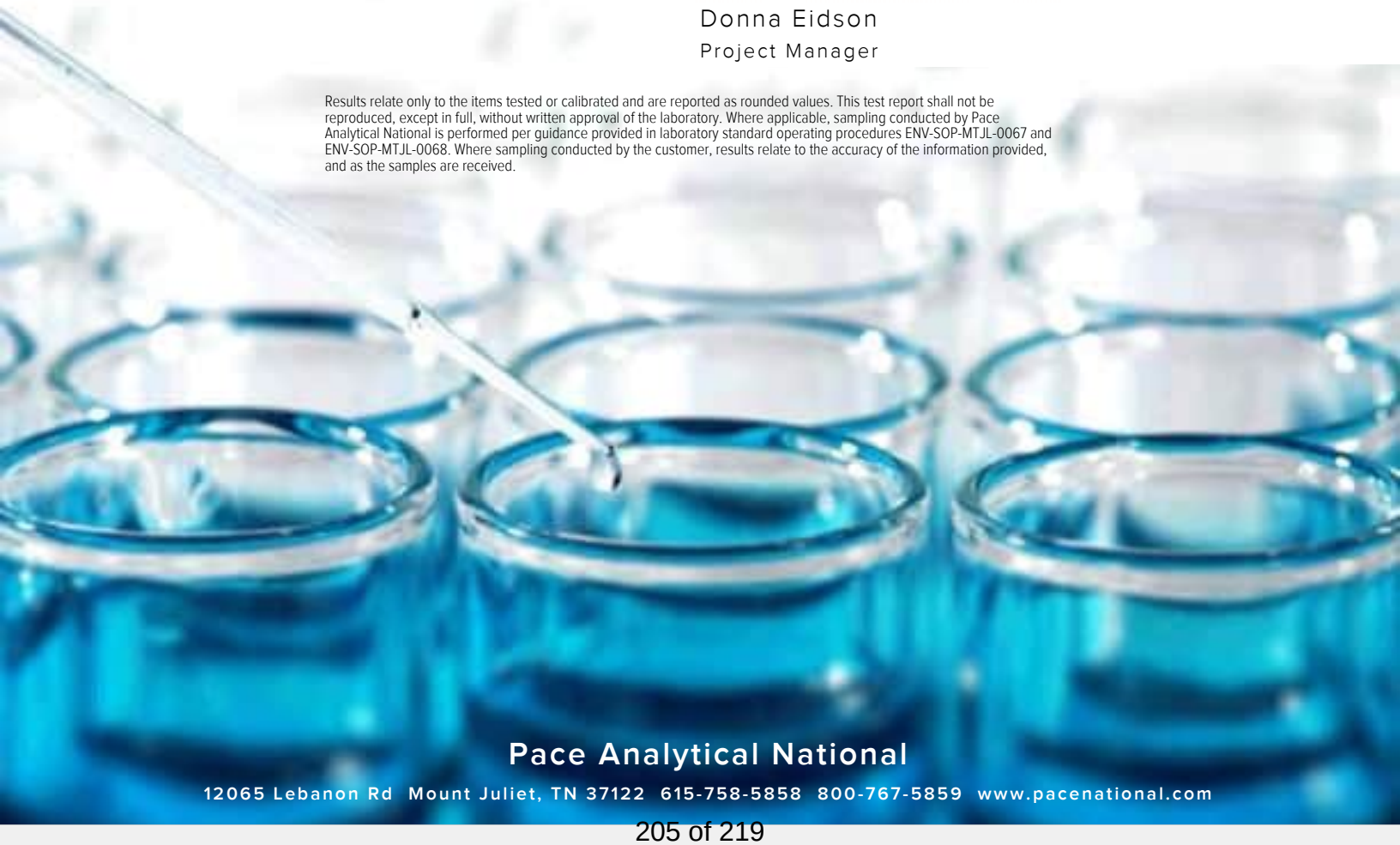
Sample Delivery Group:	L1380556
Samples Received:	07/20/2021
Project Number:	
Description:	

Report To: Libby Cheeseborough
908 N. Temperance Ave
Clovis, CA 93611

Entire Report Reviewed By:

Donna Eidson
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



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BA36269 L1380556-01 WW

Collected by	Collected date/time	Received date/time
	07/15/21 08:45	07/20/21 13:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 4500 CN E-2011	WG1712656	1	07/28/21 15:53	07/29/21 14:52	KEG	Mt. Juliet, TN
Wet Chemistry by Method 4500 S2 D-2011	WG1708563	1	07/20/21 18:37	07/20/21 18:37	BJD	Mt. Juliet, TN

BA36271 L1380556-02 Solid

Collected by	Collected date/time	Received date/time
	07/15/21 09:15	07/20/21 13:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG1710636	1	07/24/21 10:21	07/24/21 10:26	CMK	Mt. Juliet, TN
Wet Chemistry by Method 9012 B	WG1713906	1	07/29/21 21:01	07/30/21 01:12	SDL	Mt. Juliet, TN
Wet Chemistry by Method 9034-9030B	WG1710149	1	07/22/21 21:00	07/22/21 21:00	LDT	Mt. Juliet, TN
Wet Chemistry by Method D93/1010A	WG1711517	1	07/26/21 02:19	07/26/21 02:19	CAT	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Donna Eidson
Project Manager

Project Narrative

All Reactive Cyanide results reported in the attached report were determined as totals using method 9012 B.
All Reactive Cyanide results reported in the attached report were determined as totals using method 4500 CN E-2011.
All Reactive Sulfide results reported in the attached report were determined as totals using method 4500 S2 D-2011.
All Reactive Sulfide results reported in the attached report were determined as totals using method 9034-9030B.

Wet Chemistry by Method 4500 CN E-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Cyanide	ND		0.00500	1	07/29/2021 14:52	WG1712656

Wet Chemistry by Method 4500 S2 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Reactive Sulfide	ND		0.0500	1	07/20/2021 18:37	WG1708563

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	82.5		1	07/24/2021 10:26	WG1710636

Wet Chemistry by Method 9012 B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Reactive Cyanide	ND		0.250	1	07/30/2021 01:12	WG1713906

Wet Chemistry by Method 9034-9030B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Reactive Sulfide	35.9		25.0	1	07/22/2021 21:00	WG1710149

Wet Chemistry by Method D93/1010A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	Deg. F			date / time	
Ignitability	DNI at 170		1	07/26/2021 02:19	WG1711517

Method Blank (MB)

(MB) R3683818-1 07/24/21 10:26

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.00100			

L1380556-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1380556-02 07/24/21 10:26 • (DUP) R3683818-3 07/24/21 10:26

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	82.5	84.7	1	2.59		10

Laboratory Control Sample (LCS)

(LCS) R3683818-2 07/24/21 10:26

Analyte	Spike Amount %	LCS Result %	LCS Rec. %	Rec. Limits %	LCS Qualifier
Total Solids	50.0	50.0	100	85.0-115	

QUALITY CONTROL SUMMARY

L1380556-01

Method Blank (MB)

(MB) R3685445-1 07/29/21 14:30

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Reactive Cyanide	U		0.00180	0.00500

L1379748-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1379748-01 07/29/21 14:36 • (DUP) R3685445-3 07/29/21 14:37

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	ND	1	0.000		20

L1383114-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1383114-02 07/29/21 15:03 • (DUP) R3685445-8 07/29/21 15:04

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	0.00581	0.00564	1	2.97		20

Laboratory Control Sample (LCS)

(LCS) R3685445-2 07/29/21 14:31

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	0.100	0.100	100	87.1-120	

L1379748-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1379748-02 07/29/21 14:38 • (MS) R3685445-4 07/29/21 14:39 • (MSD) R3685445-5 07/29/21 14:42

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	0.100	ND	0.0386	0.0326	38.6	32.6	1	90.0-110	J6	J6	16.9	20

L1383114-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1383114-01 07/29/21 15:00 • (MS) R3685445-6 07/29/21 15:01 • (MSD) R3685445-7 07/29/21 15:02

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	0.100	ND	0.102	0.0977	97.8	93.5	1	90.0-110			4.31	20

Method Blank (MB)

(MB) R3681833-1 07/20/21 18:25

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Reactive Sulfide	U		0.0250	0.0500

Laboratory Control Sample (LCS)

(LCS) R3681833-2 07/20/21 18:25

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	0.500	0.563	113	85.0-115	

Method Blank (MB)

(MB) R3685637-1 07/30/21 00:56

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Cyanide	U		0.0390	0.250

L1379974-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1379974-03 07/30/21 01:03 • (DUP) R3685637-3 07/30/21 01:04

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	0.310	ND	1	52.2	P1	20

L1381102-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1381102-02 07/30/21 01:13 • (DUP) R3685637-6 07/30/21 01:14

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3685637-2 07/30/21 00:57

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	2.50	2.55	102	85.0-115	

L1379974-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1379974-03 07/30/21 01:03 • (MS) R3685637-4 07/30/21 01:05 • (MSD) R3685637-5 07/30/21 01:08

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	0.310	1.18	1.71	52.5	84.1	1	75.0-125	J6	J3	36.4	20

L1381102-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1381102-02 07/30/21 01:13 • (MS) R3685637-7 07/30/21 01:15 • (MSD) R3685637-8 07/30/21 01:16

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	ND	0.528	1.74	21.9	1	75.0-125	J6	J3 J6	93.2	20

Method Blank (MB)

(MB) R3682978-1 07/22/21 21:00

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Sulfide	U		7.63	25.0

Laboratory Control Sample (LCS)

(LCS) R3682978-2 07/22/21 21:00

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	100	87.9	87.9	70.0-130	

L1379697-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1379697-04 07/22/21 21:00 • (MS) R3682978-3 07/22/21 21:00 • (MSD) R3682978-4 07/22/21 21:00

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Sulfide	100	ND	99.5	99.7	99.5	99.7	1	70.0-130			0.199	20

L1381306-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1381306-02 07/26/21 02:19 • (DUP) R3683709-3 07/26/21 02:19

Analyte	Original Result Deg. F	DUP Result Deg. F	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ignitability	DNI at 170	DNI at 170	1	0.000		10

L1381440-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1381440-01 07/26/21 02:19 • (DUP) R3683709-4 07/26/21 02:19

Analyte	Original Result Deg. F	DUP Result Deg. F	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ignitability	DNI at 170	DNI at 170	1	0.000		10

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3683709-1 07/26/21 02:19 • (LCSD) R3683709-2 07/26/21 02:19

Analyte	Spike Amount Deg. F	LCS Result Deg. F	LCSD Result Deg. F	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ignitability	126	127	129	101	102	95.6-104			1.56	10

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

SUBCONTRACT ORDER

APPL, Inc.

ARF: 96859 **PO: 00-96859**

SENDING LABORATORY:

APPL Labs
908 North Temperance Ave.
Clovis, CA 93611
Phone: (559) 275-2175
Fax: (559) 275-4422
Project Manager: Libby Cheeseborough (libby@applinc.com)

LM & LMC 7/19/21

RECEIVING LABORATORY:

PACE Analytical National Center
12065 Lebanon Rd.
Mt. Juliet, TN 37122
Phone: (615) 773-9672x
Fax:
DOD Expiration Date:

L1380556 Rev
L1380556

Comments: STD TAT;DVP 4 report; email results & questions to libby@applinc.com.

	APPL ID	Sample ID	LOC ID	Matrix	Collected	Analysis	Price
1.	BA36269	VE-UXO17-EB01-071521	QC	Water	07/15/21 08:45	SW-846 7.3.4.2 Reactivity to Sulfide	-01
				Water	07/15/21 08:45	SW-846 9014 Reactivity to Cyanide	
2.	BA36271	VE-UXO17-CANISTER-01	VE-UXO17	Water	07/15/21 09:15	SW-846 1010 Ignitability	
				Water	07/15/21 09:15	SW-846 7.3.4.2 Reactivity to Sulfide	-02
				Water	07/15/21 09:15	SW-846 9014 Reactivity to Cyanide	

219 of 219

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N		
Sufficient volume sent:	Y N		
RAD Screen <0.5 mR/hr:	Y N		

L1380556
AT

A045

Released By	Date	Time	Received By	Date	Time
	7-19-21	1230			
				7-20-21	R.P 0905
Released By	Date	Time	Received By	Date	Time
					1315

Upon receipt, please email signed COC to APPL Inc.
To ensure timely payment, please include the PO number on your invoice.

908 North Temperance Ave. ∇ Clovis, CA 93611 ∇ Phone 559-275-2175 ∇ Fax 559-275-4422

Certification Number: CA1312
NELAP Certification number: CA00046
DoD-ELAP Certificate number:4064.01

Data Validation Report

August 13, 2021

CH2M Hill
4000 Embassy Row, #600
Atlanta, Georgia 30328

Attn: Camden Robinson

Title: Report of Data: Case 96689

Project: CTO-004 UXO 17 TCRA

Contract #: 148025769

Dear Ms. Robinson:

One miscellaneous sample was received June 25, 2021. Written results for the requested analyses are being provided on this August 13, 2021.

Results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

If you have any questions or require further information, please contact your APPL Project Manager, Libby Cheeseborough, libby@applinc.com at your convenience. Thank you for choosing APPL, Inc.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. These test results meet all requirements of NELAC and DoD QSM. Release of the hard copy has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Paula McCartney for

Loren Portwood, Laboratory Director
APPL, Inc.

LP/lac
Enclosure
cc: File

Data Validatable Package
for
CTO-004 UXO 17 TCRA
ARF 96689
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CASE NARRATIVE

Case Narrative

ARF: 96689

Project: CTO-004 UXO 17 TCRA

Sample Receipt Information:

One miscellaneous sample was received June 25,2021, at 2.0°C. The samples were assigned Analytical Request Form (ARF) number 96689. The sample numbers and requested analyses were compared to the chains of custody and email communication. It was noted that the sample arrived biphasic as liquid and oil. No exception was encountered.

Sample Preparation and Analysis:

For the 8015 analysis, the oil was prepared by weighing out an aliquot and diluting with methylene chloride. The liquid portion was extracted according to EPA method 3510C. TCLP leachate was not performed for this analysis.

For the 8270D analysis, the oil was prepared by weighing out an aliquot and diluting with hexane. The liquid portion was extracted according to EPA method 3510C. TCLP leachate was not performed for this analysis.

For the EPA 8260B analysis, the sample was volumetrically measured and diluted with VOA free water then was purged according to EPA method 5030B. TCLP leachate was not performed for this analysis.

For the EPA 6010C analysis, the sample was digested according to EPA method 3010A. TCLP leachate was not performed for this analysis.

For the EPA 7470A analysis, the samples was digested and analyzed according to the method. TCLP leachate was not performed for this analysis.

Only the portion of the injection log relative to these samples is included. A full sequence log is available upon request. Measurement uncertainty can be reported upon request.

Exceptions, Abnormalities and Deviations:

EPA 8015C: The sample as received was biphasic. The liquid and oil phases were extracted separately. In the oil sample the surrogate recovered outside of the control limits. The recovery may be attributed to the matrix.

8270D: The surrogates were diluted out in the water sample. The dilute and shoot was not spiked with surrogates.

The continuing calibration standard 0628K124.D was a bad injection and another continuing calibration standard, 0628K125.D, was injected the next morning.

One internal standard recovered below the acceptable range in the continuing calibration standard 0628K158 due to the effect of previous samples. Only the LCS was affected.

EPA 8260C: The sample was analyzed at a dilution due the oil nature of the matrix.

EPA 8260C Gasoline: The sample was analyzed at a dilution due the oil nature of the matrix.

SDG	Received	Client ID	APPL ID	Collected DateTime	Matrix	Method	Method Description
96689	06/25/21	VE-UXO17-DRUM-01	BA35396	06/24/21 8:45:00 AM	MISC	6010C/TCLP	TCLP METALS 6010C
96689	06/25/21	VE-UXO17-DRUM-01	BA35396	06/24/21 8:45:00 AM	MISC	EPA 8260C	EPA 8260C WATER
96689	06/25/21	VE-UXO17-DRUM-01	BA35396	06/24/21 8:45:00 AM	MISC	EPA 8260C	EPA 8260C GRO WATER
96689	06/25/21	VE-UXO17-DRUM-01	BA35396	06/24/21 8:45:00 AM	MISC	EPA 8270D	EPA 8270D WATER
96689	06/25/21	VE-UXO17-DRUM-01	BA35396	06/24/21 8:45:00 AM	MISC	EPA 8270C	EPA 8270C SOILS
96689	06/25/21	VE-UXO17-DRUM-01	BA35396	06/24/21 8:45:00 AM	MISC	EPA 9040B	PH BY SW846 9040B
96689	06/25/21	VE-UXO17-DRUM-01	BA35396	06/24/21 8:45:00 AM	MISC	EPA 8015C-e	TPH-D WATER EPA 8015C
96689	06/25/21	VE-UXO17-DRUM-01	BA35396	06/24/21 8:45:00 AM	MISC	7470A/7470A	EPA 7470A TOTAL MERCURY
96689	06/25/21	VE-UXO17-DRUM-01	BA35396	06/24/21 8:45:00 AM	MISC	7470A/TCLP	TCLP MERCURY 7470A
96689	06/25/21	VE-UXO17-DRUM-01	BA35396	06/24/21 8:45:00 AM	MISC	EPA 8015B-e	TPH Diesel Soil EPA 8015B

Abbreviations and Flags

FLAG	DESCRIPTION
#	Recovery or RPD outside control limits
*	Recovery or RPD outside control limits
B	Analyte detected in associated method blank
C1	Reason for correction: wrote incorrect response
C2	Reason for correction: calculated incorrectly
C3	Reason for correction: needs to be rechecked
C4	Reason for correction: data not usable
DO	Diluted out
E	Exceeds linear range
F	Estimated value
G1	Includes a wide range of hydrocarbons which does not match our gasoline standard
G10	Includes a match to hydrocarbon profiles within the range of mineral spirits
G11	Includes a match to hydrocarbon profiles within the range of JP-4
G12	Pattern does not match the gasoline standard; the carbon range for this sample is consistent with JP8
G13	Closely resembles the hydrocarbon profile of aviation gasoline
G14	Analyte concentration may be biased due to carry over
G2	Closely resembles the boiling point hydrocarbon profile consistent with weathered gasoline
G3	Includes higher boiling hydrocarbons
G4	Includes dominant peak(s) not indicative of petroleum hydrocarbons
G5	Is mainly dominant peak(s) not indicative of petroleum hydrocarbons
G6	Contains recognizable contaminant peak(s) which has been removed from quantitation
G7	Is mainly a match to hydrocarbons within the range of gasoline
G8	Closely resembles the boiling point hydrocarbon profile consistent with weathered gasoline
G9	Includes hydrocarbons within the range of kerosene
J	Estimated value
M	Matrix effect
MI1	Manual integration: integration does not follow baseline
MI2	Manual integration: non-target peak interference
MI3	Manual integration: to split a peak that was integrated as one peak by the computer
MI4	Manual integration: to integrate a split peak
MI5	Manual integration: the whole peak or part of the peak was not integrated
MI6	Manual integration: computer integrated wrong peak
MI7	Manual integration: other - explain
MDL	Method detection limit
ND	Not detected
NT	Non-target
Q	Acceptance criteria not met
T1 I	Includes wide range of hydrocarbons not indicative of diesel
T1 M	Is mainly wide range of hydrocarbons not necessarily indicative of diesel
T2 I	Includes lower boiling hydrocarbons, i.e. mineral spirits, kerosene, stoddard solvent, white gas
T2 M	Is mainly lower boiling hydrocarbons, i.e. mineral spirits, kerosene, stoddard solvent, white gas
T3 I	Includes higher boiling hydrocarbons, i.e. asphaltene, waster oil, motor oil, or weathered diesel fuel
T3 M	Is mainly higher boiling hydrocarbons, i.e. asphaltene, waster oil, motor oil, or weathered diesel fuel
T4 I	Includes dominant peak(s) not indicative of hydrocarbons
T4 M	Is mainly dominant peak(s) not indicative of hydrocarbons
T5	Contains recognizable contaminant peak(s) which has been removed from quantitation
T6	Is mainly a match to hydrocarbons within range of diesel fuel
T7	Closely resembles the boiling point hydrocarbon profile consistent with diesel fuel
T8	Includes a match to hydrocarbon profiles within range of diesel and kerosene fuel
T9 I	Includes non-diesel hydrocarbons within boiling point range of diesel fuel
T9 M	Is mainly non-diesel hydrocarbons within boiling point range of diesel fuel.
Y	Percent difference between primary and confirmation column > 40%

SAMPLE MANAGEMENT RECORDS

CHAIN OF CUSTODY,

ARF, CRF, AND

CLIENT COMMUNICATION

APPL - Analysis Request Form

96689

Client: CH2M Hill
Address: 400 Embassy Row, #600
Atlanta, GA 30328-7001
Attn: Camden Robinson
Phone: 770-439-8363 Fax: 770-604-9182 ce
Job: 0004 Vieques, Puerto Rico UXO 17
PO #: PO # 148025769
Chain of Custody (Y/N): Y # 20210624-APPL-01
RAD Screen (Y/N): Y pH (Y/N): Y
Turn Around Type: ONE WEEK

Received by: MSA
Date Received: 06/25/21 Time: 10:00
Delivered by: FEDEX
Shuttle Custody Seals (Y/N): Y Time Zone: -4
Chest Temp(s): 2.0°C
Color: VFRG/D-Ye/AZ-ReO/SUB
Samples Chilled until Placed in Refrig/Freezer: Y
Project Manager: Libby Cheesebor
QC Report Type: DVP3/SNEDD/PR
Due Date: 07/02/21

Comments:
RC: login to Camden.Robinson@jacobs.com
AN: Pkg Style 1; Level 3 DoD QSM v5; Forms: U prints LOD database; J flag parent for MS/MSD failures

FR: pdf of final report to Camden.Robinson@jacobs.com

EDD: SNEDD to Camden.Robinson@jacobs.com

Sample Distribution:
GC: 1-$87DDODV45W, 1-$DROWDOD5, 1-$TCLPSDOD5
Extractions: 1-_SEP004, 1-_SEP011, 1-_TCLP827
VOA: 1-$86CDODV45W, 1-$86CGRODOD5W, 1-$GASBL, 1-$TCLPVDOD5
Metals: 1-$61CTCLP50M(As,Ba,Cd,Cr,Pb,Se,Ag), 1-$TCLPGDOD50M(As,Ba,Cd,Cr,Pb,Se,Ag)
Wetlab: 1-$9040
Other: 1-_M3010TCLP, 1-_M7470TCLP, 1-SUB

Charges:

Invoice To:
USAPINVOICES@JACOBS.COM
USAPInvoices@jacobs.com

	Client ID	APPL ID	Sampled	Analyses Requested
1.	VE-UXO17-DRUM-01	HOT!! BA35396M	06/24/21 08:45	$61CTCLP50M(As,Ba,Cd,Cr,Pb,Se,Ag), $86CDODV45W, $86CGRODOD5W, $87DDODV45W, $9040, $DROWDOD5, $GASBL, $TCLPGDOD50M(As,Ba,Cd,Cr,Pb,Se,Ag), $TCLPSDOD5, $TCLPVDOD5, SUB

APPL Sample Receipt Form

ARF# **96689**

Sample	Container Type	Count	p
BA35396	[4] PL 125mL	1	NA
	[6] PL 500mL - HNO3	2	1.6
	[11] PL 250mL - NaOH	1	7
	[13] VOAs - HCL	10	NA
	[17] Amber Liter	4	NA
	[39] Amber Liter, HCL prsvd	1	5
	[39] Amber Liter, HCL prsvd	1	2.2

Sample	Container Type	Count	p

96089

ELECTRONIC CHAIN OF CUSTODY RECORD

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611
Phone: (559) 275-2175
Fax: (559) 275-4422

C.O.C. 20210624-APPL-01

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name:	CH2MHILL	Company Name:	See Contact
Phone:	770.439-8363	Phone:	
Address:	400 Embassy Row #600 Atlanta GA	Address:	
Fax:		Fax:	
Attn:	Camden Robinson	Attn:	

Project Name/Number	Sampler (Print)	Date Shipped: 6/24/2021
UXO 17 TCRA	Dennis Ballam / Ronny Fields	Carrier: FedEx
Purchase Order Number	Sampler (Signature)	Waybill No.: 774087848915
		Comments:

Sample Identification	Location	Date Collected	Time Collected	Time Zone	No. of Containers	Matrix: Aq	Sed.	Soil		SW-846 8260C	SW-846 6015 GRO	SW-846 8270D	SW-846- 6015 DRO and ORO	SW-846 1311/8270 TCLP	SW-846 1311/8260 TCLP	SW-846 1311/8010/7470 TCLP	SW-846 9040C Corrosivity	SW-846 1010 Ignitability	SW-846 9014 Reactivity to cyanide	SW-846 7.3.4.2 Reactivity	pH	
VE-UXO17-DRUM-01	VE-UXO17	6/24/2021	08:45	AST	20	✓				X	X	X	X	X	X	X	X	X	X	X	X	drum
									✓													
									✓													
									✓													
									✓													
									✓													
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									✓													
									✓													
									✓													
									✓													
									✓													

Shuttle Temperature:	Turnaround Requested: Check one	Sample Disposal:	
R3@2.0/2.0°C	☐ Standard 2-3 wk ☑ One week ☐ 24/48 Hrs. ☐ Other	☐ ~~Return to client~~ ☐ ~~Disposal by Lab (30 day retention)~~	not applicable

	Date	Time			Date	Time	
Relinquished by sampler:	6/24/21	12:05	Received by:	Relinquished by:			Received by:
Relinquished by:	Date	Time	Received by:	Relinquished by:	6/25/21	1000	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

Note: The first sampled date of the ARF will be used as the COC number unless indicated otherwise.

COOLER RECEIPT FORM **ARF: 96689**

1) Project: UXO 17 TCRA Vieques CTO-0004 UXO17 Date Received: 06/25/21

2) Coolers: Number of Coolers: 1

3) YES Were custody seals present and intact?
How many? 1 Name/Date on seal? SEE BELOW

4) YES Was there a shipping slip? Carrier name: FEDEX

5) Type of packing in cooler: X bubble wrap __ popcorn __ foam X plastic bags __ other
X wet ice __ dry ice __ no ice __ gel ice

6) YES Were cooler temperatures acceptable?

7) Serial number of calibrated thermometer used: R3 CF:+0.0°C

8) Cooler temp(s): In °C. Thermometer Temp / Corrected Temp
1: 2.0/2.0 2: _____ 3: _____ 4: _____ 5: _____ 6: _____
7: _____ 8: _____ 9: _____ 10: _____ 11: _____ 12: _____

Chain of custody:

9) YES Was a chain of custody received?

10) YES Were the custody papers complete/signed in the appropriate places?

Sample Labels:

11) YES Were all sample labels complete (sample ID, date/time of sampling, etc.)?

12) YES Did all container labels agree with custody papers?

Sample Containers:

13) YES Were all containers sealed in separate bags?

14) YES Did all containers arrive in good condition:(unbroken, no leakage, no cracked/broken lids)?

15) YES Were correct containers and preservatives used for the tests indicated?

16) YES Was a sufficient amount of sample sent for tests indicated?

17) Yes Were bubbles present in volatile samples?
If yes, the following were received with air bubbles:
Larger than a pea: BA35396w04-10
Smaller than a pea: BA35396w02-03

Preservation Hold time:

18) Yes Was a sufficient amount of holding time remaining to analyze the samples?

19) Yes Was the pH taken of all non-VOA preserved samples and written on the sample container?

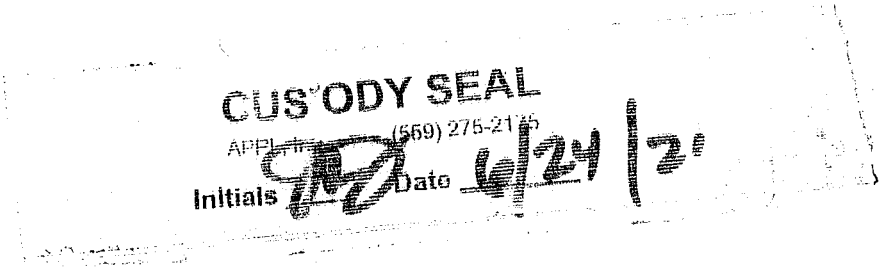
20) No Was the pH of acid preserved non-VOA samples < 2?

21) No Was the pH of the "basic" preserved samples for Cyanide > 12, Sulfide >9, Hexchrom >9?

22) NO Were unpreserved VOA Vials received for VOA Dept analysis?

23) NA If "yes", are the unpreserved VOA vials noted in the ADD TEST FIELD on the ARF?
pH strip lot number: HC029115,HC863463
Lab notified if pH was not adequate: Extractions to further preserve

Notes/Deficiencies:



Personnel receiving samples: MS Second reviewer: SV
Personnel labeling samples: MS
Project manager notified: MS Date/Time of notification 06/25/21
Name of client notified: _____ Date/Time of notification _____

SAMPLE RESULTS

TPH-D WATER EPA 8015C

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

Attn: Camden Robinson

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Project: 0004 Vieques, Puerto Rico UXO 17

ARF: 96689

Sample ID: VE-UXO17-DRUM-01

APPL ID: BA35396

Sample Collection Date: 06/24/21

QCG: #DROWD-210701A-265954

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8015C-e	TPH-DRO (C10-C24)	25000	4950	1650.0	825.0	ug/L	07/01/21	07/13/21
EPA 8015C-e	TPH-LRO (C24-C36)	58000 ++	16500	6996.0	3498.0	ug/L	07/01/21	07/13/21
EPA 8015C-e	SURROGATE: OCTACOSANE (S)	118	60-142			%	07/01/21	07/13/21
EPA 8015C-e	SURROGATE: ORTHO-TERPHENYL (S)	85.4	56-125			%	07/01/21	07/13/21

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method:	DROB702.M
Run #:	713017
Instrument:	Apollo
Sequence:	210713
Dilution Factor:	33
Initials:	MBE

Printed: 07/15/21 11:26:14 AM

\PPL-F1-SC-MCRes/MCPQL-REG MDLs-DO

TPH Diesel Soil EPA 8015B

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson

Project: 0004 Vieques, Puerto Rico UXO 17

ARF: 96689

Sample ID: VE-UXO17-DRUM-01

APPL ID: BA35396

Sample Collection Date: 06/24/21

QCG: #TPHDS-210630A-265948

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
(Moisture is < PQL (2%). No adjustments to solid Concentrations and Limits are necessary.)								
EPA 8015B-e	DIESEL FUEL	74000000	200000	200000.0	100000.0	ug/kg	06/30/21	07/13/21
EPA 8015B-e	MOTOR OIL	310000000 ++	200000	200000.0	702000.0	ug/kg	06/30/21	07/13/21
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	31.8 #	47-140			%	06/30/21	07/13/21
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (S)	12.3 #	58-128			%	06/30/21	07/13/21

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method:	DOC0702.M
Run #:	712058
Instrument:	Apollo
Sequence:	210712
Dilution Factor:	200
Initials:	MBE

Printed: 07/15/21 11:26:14 AM

\PPL-F1-SC-MCRes/MCPQL-REG MDLs-DOI

EPA 8270D WATER

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson

Project: 0004 Vieques, Puerto Rico UXO 17

ARF: 96689

Sample ID: VE-UXO17-DRUM-01

APPL ID: BA35396

Sample Collection Date: 06/24/21

QCG: #87DDO-210701A-265693

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8270D	1,2,4-TRICHLOROBENZENE	250.00 U	500.0	250.00	65.00	ug/L	07/01/21	07/06/21
EPA 8270D	1,2-DICHLOROBENZENE	250.00 U	500.0	250.00	55.00	ug/L	07/01/21	07/06/21
EPA 8270D	1,2-DIPHENYLHYDRAZINE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	1,3-DICHLOROBENZENE	250.00 U	500.0	250.00	50.00	ug/L	07/01/21	07/06/21
EPA 8270D	1,4-DICHLOROBENZENE	250.00 U	500.0	250.00	50.00	ug/L	07/01/21	07/06/21
EPA 8270D	2,4,5-TRICHLOROPHENOL	250.00 U	500.0	250.00	115.00	ug/L	07/01/21	07/06/21
EPA 8270D	2,4,6-TRICHLOROPHENOL	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	2,4-DICHLOROPHENOL	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	2,4-DIMETHYLPHENOL	250.00 U	500.0	250.00	120.00	ug/L	07/01/21	07/06/21
EPA 8270D	2,4-DINITROPHENOL	250.00 U	1000.0	250.00	90.00	ug/L	07/01/21	07/06/21
EPA 8270D	2,4-DINITROTOLUENE	250.00 U	1000.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	2,6-DINITROTOLUENE	250.00 U	1000.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	2-CHLORONAPHTHALENE	250.00 U	500.0	250.00	100.00	ug/L	07/01/21	07/06/21
EPA 8270D	2-CHLOROPHENOL	250.00 U	500.0	250.00	100.00	ug/L	07/01/21	07/06/21
EPA 8270D	2-METHYLNAPHTHALENE	250.00 U	500.0	250.00	90.00	ug/L	07/01/21	07/06/21
EPA 8270D	2-METHYLPHENOL	300 J	500.0	250.00	95.00	ug/L	07/01/21	07/06/21
EPA 8270D	2-NITROANILINE	250.00 U	1000.0	250.00	120.00	ug/L	07/01/21	07/06/21
EPA 8270D	2-NITROPHENOL	250.00 U	500.0	250.00	105.00	ug/L	07/01/21	07/06/21
EPA 8270D	3,3'-DICHLOROBENZIDINE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	3-NITROANILINE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	3/4-METHYLPHENOL	250.00 U	500.0	250.00	85.00	ug/L	07/01/21	07/06/21
EPA 8270D	4,6-DINITRO-2-METHYLPHENOL	250.00 U	1000.0	250.00	110.00	ug/L	07/01/21	07/06/21
EPA 8270D	4-BROMOPHENYL PHENYL ETHER	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	4-CHLORO-3-METHYLPHENOL	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	4-CHLOROANILINE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	4-CHLOROPHENYL PHENYL ETHER	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	4-NITROANILINE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	4-NITROPHENOL	250.00 U	1000.0	250.00	40.00	ug/L	07/01/21	07/06/21
EPA 8270D	ACENAPHTHENE	250.00 U	500.0	250.00	115.00	ug/L	07/01/21	07/06/21
EPA 8270D	ACENAPHTHYLENE	250.00 U	500.0	250.00	115.00	ug/L	07/01/21	07/06/21
EPA 8270D	ANTHRACENE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	BENZ (A) ANTHRACENE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	BENZO (A) PYRENE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	BENZO (B) FLUORANTHENE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	BENZO (G,H,I) PERYLENE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21

J = Estimated value.
DO = Diluted Out.

Quant Method: K0628.M
Run #: 0628K104
Instrument: KYLO
Sequence: 210628
Dilution Factor: 50
Initials: MA

Printed: 07/12/21 10:51:22 AM

APPL-F1-SC-NoMC-REG MDLs-DOD

EPA 8270D WATER

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson

Project: 0004 Vieques, Puerto Rico UXO 17

ARF: 96689

Sample ID: VE-UXO17-DRUM-01

APPL ID: BA35396

Sample Collection Date: 06/24/21

QCG: #87DDO-210701A-265693

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8270D	BENZO (K) FLUORANTHENE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	BENZOIC ACID	1600	500.0	250.00	50.00	ug/L	07/01/21	07/06/21
EPA 8270D	BENZYL ALCOHOL	350 J	500.0	250.00	100.00	ug/L	07/01/21	07/06/21
EPA 8270D	BIS (2-CHLORETHOXY) METHANE	250.00 U	500.0	250.00	120.00	ug/L	07/01/21	07/06/21
EPA 8270D	BIS (2-CHLOROETHYL) ETHER	250.00 U	500.0	250.00	110.00	ug/L	07/01/21	07/06/21
EPA 8270D	BIS (2-CHLOROISOPROPYL) ETHER	250.00 U	500.0	250.00	100.00	ug/L	07/01/21	07/06/21
EPA 8270D	BIS (2-ETHYLHEXYL) PHTHALATE	250.00 U	1000.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	BUTYL BENZYL PHTHALATE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	CARBAZOLE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	CHRYSENE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	DI-N-BUTYL PHTHALATE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	DI-N-OCTYL PHTHALATE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	DIBENZ (A,H) ANTHRACENE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	DIBENZOFURAN	250.00 U	1000.0	250.00	120.00	ug/L	07/01/21	07/06/21
EPA 8270D	DIETHYL PHTHALATE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	DIMETHYL PHTHALATE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	FLUORANTHENE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	FLUORENE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	HEXACHLOROBENZENE	250.00 U	1000.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	HEXACHLOROBUTADIENE	250.00 U	500.0	250.00	45.00	ug/L	07/01/21	07/06/21
EPA 8270D	HEXACHLOROETHANE	250.00 U	500.0	250.00	40.00	ug/L	07/01/21	07/06/21
EPA 8270D	INDENO (1,2,3-CD) PYRENE	250.00 U	500.0	250.00	120.00	ug/L	07/01/21	07/06/21
EPA 8270D	ISOPHORONE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	N-NITROSODI-N-PROPYLAMINE	250.00 U	500.0	250.00	110.00	ug/L	07/01/21	07/06/21
EPA 8270D	N-NITROSODIMETHYLAMINE	250.00 U	500.0	250.00	85.00	ug/L	07/01/21	07/06/21
EPA 8270D	N-NITROSODIPHENYLAMINE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	NAPHTHALENE	250.00 U	500.0	250.00	90.00	ug/L	07/01/21	07/06/21
EPA 8270D	NITROBENZENE	250.00 U	500.0	250.00	105.00	ug/L	07/01/21	07/06/21
EPA 8270D	PENTACHLOROPHENOL	250.00 U	1000.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	PHENANTHRENE	250.00 U	1000.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	PHENOL	92 J	500.0	250.00	50.00	ug/L	07/01/21	07/06/21
EPA 8270D	PYRENE	250.00 U	500.0	250.00	125.00	ug/L	07/01/21	07/06/21
EPA 8270D	SURROGATE: 2,4,6-TRIBROMOPHENO	DO	43-140			%	07/01/21	07/06/21
EPA 8270D	SURROGATE: 2-FLUORBIPHENYL (S)	DO	44-119			%	07/01/21	07/06/21
EPA 8270D	SURROGATE: 2-FLUOROPHENOL (S)	DO	19-119			%	07/01/21	07/06/21
EPA 8270D	SURROGATE: NITROBENZENE-D5 (S)	DO	44-120			%	07/01/21	07/06/21

J = Estimated value.
DO = Diluted Out.

Quant Method: K0628.M
Run #: 0628K104
Instrument: KYLO
Sequence: 210628
Dilution Factor: 50
Initials: MA

Printed: 07/12/21 10:51:22 AM

APPL-F1-SC-NoMC-REG MDLs-DOD

EPA 8270D WATER

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

Attn: Camden Robinson

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Project: 0004 Vieques, Puerto Rico UXO 17

ARF: 96689

Sample ID: VE-UXO17-DRUM-01

APPL ID: BA35396

Sample Collection Date: 06/24/21

QCG: #87DDO-210701A-265693

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8270D	SURROGATE: PHENOL-D6 (S)	DO	10-115			%	07/01/21	07/06/21
EPA 8270D	SURROGATE: TERPHENYL-D14 (S)	DO	50-134			%	07/01/21	07/06/21

J = Estimated value.
DO = Diluted Out.

Quant Method:	K0628.M
Run #:	0628K104
Instrument:	KYLO
Sequence:	210628
Dilution Factor:	50
Initials:	MA

Printed: 07/12/21 10:51:22 AM

APPL-F1-SC-NoMC-REG MDLs-DOD

EPA 8270C SOILS

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson
Project: 0004 Vieques, Puerto Rico UXO 17
ARF: 96689
Sample ID: VE-UXO17-DRUM-01
APPL ID: BA35396
Sample Collection Date: 06/24/21
#Error

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8270C	1,2,4-TRICHLOROBENZENE	501000.0 U	1000000	501000.0	148200.0	ug/kg	07/01/21	07/06/21
EPA 8270C	1,2-DICHLOROBENZENE	501000.0 U	1000000	501000.0	153600.0	ug/kg	07/01/21	07/06/21
EPA 8270C	1,3-DICHLOROBENZENE	501000.0 U	1000000	501000.0	152100.0	ug/kg	07/01/21	07/06/21
EPA 8270C	1,4-DICHLOROBENZENE	501000.0 U	1000000	501000.0	146700.0	ug/kg	07/01/21	07/06/21
EPA 8270C	2,4,5-TRICHLOROPHENOL	501000.0 U	1000000	501000.0	180300.0	ug/kg	07/01/21	07/06/21
EPA 8270C	2,4,6-TRICHLOROPHENOL	501000.0 U	1000000	501000.0	144900.0	ug/kg	07/01/21	07/06/21
EPA 8270C	2,4-DICHLOROPHENOL	501000.0 U	1000000	501000.0	151500.0	ug/kg	07/01/21	07/06/21
EPA 8270C	2,4-DIMETHYLPHENOL	501000.0 U	1000000	501000.0	131700.0	ug/kg	07/01/21	07/06/21
EPA 8270C	2,4-DINITROPHENOL	501000.0 U	1000000	501000.0	161100.0	ug/kg	07/01/21	07/06/21
EPA 8270C	2,4-DINITROTOLUENE	501000.0 U	1000000	501000.0	191400.0	ug/kg	07/01/21	07/06/21
EPA 8270C	2,6-DINITROTOLUENE	501000.0 U	1000000	501000.0	181800.0	ug/kg	07/01/21	07/06/21
EPA 8270C	2-CHLORONAPHTHALENE	501000.0 U	1000000	501000.0	157200.0	ug/kg	07/01/21	07/06/21
EPA 8270C	2-CHLOROPHENOL	501000.0 U	1000000	501000.0	132900.0	ug/kg	07/01/21	07/06/21
EPA 8270C	2-METHYLNAPHTHALENE	501000.0 U	1000000	501000.0	151200.0	ug/kg	07/01/21	07/06/21
EPA 8270C	2-METHYLPHENOL	501000.0 U	1000000	501000.0	135600.0	ug/kg	07/01/21	07/06/21
EPA 8270C	2-NITROANILINE	501000.0 U	1000000	501000.0	187200.0	ug/kg	07/01/21	07/06/21
EPA 8270C	2-NITROPHENOL	501000.0 U	1000000	501000.0	143400.0	ug/kg	07/01/21	07/06/21
EPA 8270C	3,3´-DICHLOROBENZIDINE	501000.0 U	1000000	501000.0	168900.0	ug/kg	07/01/21	07/06/21
EPA 8270C	3-NITROANILINE	501000.0 U	1000000	501000.0	183300.0	ug/kg	07/01/21	07/06/21
EPA 8270C	3/4-METHYLPHENOL	501000.0 U	1000000	501000.0	139200.0	ug/kg	07/01/21	07/06/21
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	501000.0 U	1000000	501000.0	169200.0	ug/kg	07/01/21	07/06/21
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	501000.0 U	1000000	501000.0	169800.0	ug/kg	07/01/21	07/06/21
EPA 8270C	4-CHLORO-3-METHYLPHENOL	501000.0 U	1000000	501000.0	176400.0	ug/kg	07/01/21	07/06/21
EPA 8270C	4-CHLOROANILINE	501000.0 U	1000000	501000.0	49500.0	ug/kg	07/01/21	07/06/21
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	501000.0 U	1000000	501000.0	182100.0	ug/kg	07/01/21	07/06/21
EPA 8270C	4-NITROANILINE	501000.0 U	1000000	501000.0	218400.0	ug/kg	07/01/21	07/06/21
EPA 8270C	4-NITROPHENOL	501000.0 U	1000000	501000.0	179400.0	ug/kg	07/01/21	07/06/21
EPA 8270C	ACENAPHTHENE	501000.0 U	1000000	501000.0	161400.0	ug/kg	07/01/21	07/06/21
EPA 8270C	ACENAPHTHYLENE	501000.0 U	1000000	501000.0	159300.0	ug/kg	07/01/21	07/06/21
EPA 8270C	ANTHRACENE	501000.0 U	1000000	501000.0	183900.0	ug/kg	07/01/21	07/06/21
EPA 8270C	BENZ (A) ANTHRACENE	501000.0 U	1000000	501000.0	174000.0	ug/kg	07/01/21	07/06/21
EPA 8270C	BENZO (A) PYRENE	501000.0 U	1000000	501000.0	152100.0	ug/kg	07/01/21	07/06/21
EPA 8270C	BENZO (B) FLUORANTHENE	501000.0 U	1000000	501000.0	180000.0	ug/kg	07/01/21	07/06/21
EPA 8270C	BENZO (G,H,I) PERYLENE	501000.0 U	1000000	501000.0	165600.0	ug/kg	07/01/21	07/06/21
EPA 8270C	BENZO (K) FLUORANTHENE	501000.0 U	1000000	501000.0	183000.0	ug/kg	07/01/21	07/06/21

Quant Method: K0628.M
Run #: 0628K105
Instrument: KYLO
Sequence: 210628
Dilution Factor: 3000
Initials: MA

Printed: 07/12/21 10:51:22 AM
APPL-F1-SC-NoMC-REG MDLs-DOD

EPA 8270C SOILS

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson

Project: 0004 Vieques, Puerto Rico UXO 17

ARF: 96689

Sample ID: VE-UXO17-DRUM-01

APPL ID: BA35396

Sample Collection Date: 06/24/21

#Error

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8270C	BENZOIC ACID	501000.0 U	1000000	501000.0	88800.0	ug/kg	07/01/21	07/06/21
EPA 8270C	BENZYL ALCOHOL	501000.0 U	1000000	501000.0	167400.0	ug/kg	07/01/21	07/06/21
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	501000.0 U	1000000	501000.0	149700.0	ug/kg	07/01/21	07/06/21
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	501000.0 U	1000000	501000.0	150000.0	ug/kg	07/01/21	07/06/21
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	501000.0 U	1000000	501000.0	141900.0	ug/kg	07/01/21	07/06/21
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	501000.0 U	1000000	501000.0	184800.0	ug/kg	07/01/21	07/06/21
EPA 8270C	BUTYL BENZYL PHTHALATE	501000.0 U	1000000	501000.0	166500.0	ug/kg	07/01/21	07/06/21
EPA 8270C	CARBAZOLE	501000.0 U	1000000	501000.0	244800.0	ug/kg	07/01/21	07/06/21
EPA 8270C	CHRYSENE	501000.0 U	1000000	501000.0	181800.0	ug/kg	07/01/21	07/06/21
EPA 8270C	DI-N-BUTYL PHTHALATE	501000.0 U	1000000	501000.0	197700.0	ug/kg	07/01/21	07/06/21
EPA 8270C	DI-N-OCTYL PHTHALATE	501000.0 U	1000000	501000.0	175200.0	ug/kg	07/01/21	07/06/21
EPA 8270C	DIBENZ (A,H) ANTHRACENE	501000.0 U	1000000	501000.0	178200.0	ug/kg	07/01/21	07/06/21
EPA 8270C	DIBENZOFURAN	501000.0 U	1000000	501000.0	171900.0	ug/kg	07/01/21	07/06/21
EPA 8270C	DIETHYL PHTHALATE	501000.0 U	1000000	501000.0	186300.0	ug/kg	07/01/21	07/06/21
EPA 8270C	DIMETHYL PHTHALATE	501000.0 U	1000000	501000.0	189900.0	ug/kg	07/01/21	07/06/21
EPA 8270C	FLUORANTHENE	501000.0 U	1000000	501000.0	196200.0	ug/kg	07/01/21	07/06/21
EPA 8270C	FLUORENE	501000.0 U	1000000	501000.0	183900.0	ug/kg	07/01/21	07/06/21
EPA 8270C	HEXACHLOROBENZENE	501000.0 U	1000000	501000.0	180900.0	ug/kg	07/01/21	07/06/21
EPA 8270C	HEXACHLOROBUTADIENE	501000.0 U	1000000	501000.0	155100.0	ug/kg	07/01/21	07/06/21
EPA 8270C	HEXACHLOROETHANE	501000.0 U	1000000	501000.0	149700.0	ug/kg	07/01/21	07/06/21
EPA 8270C	INDENO (1,2,3-CD) PYRENE	501000.0 U	1000000	501000.0	181200.0	ug/kg	07/01/21	07/06/21
EPA 8270C	ISOPHORONE	501000.0 U	1000000	501000.0	171000.0	ug/kg	07/01/21	07/06/21
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	501000.0 U	1000000	501000.0	164700.0	ug/kg	07/01/21	07/06/21
EPA 8270C	N-NITROSODIMETHYLAMINE	501000.0 U	1000000	501000.0	262200.0	ug/kg	07/01/21	07/06/21
EPA 8270C	N-NITROSODIPHENYLAMINE	501000.0 U	1000000	501000.0	151800.0	ug/kg	07/01/21	07/06/21
EPA 8270C	NAPHTHALENE	501000.0 U	1000000	501000.0	151500.0	ug/kg	07/01/21	07/06/21
EPA 8270C	NITROBENZENE	501000.0 U	1000000	501000.0	149400.0	ug/kg	07/01/21	07/06/21
EPA 8270C	PENTACHLOROPHENOL	501000.0 U	1000000	501000.0	176100.0	ug/kg	07/01/21	07/06/21
EPA 8270C	PHENANTHRENE	501000.0 U	1000000	501000.0	174600.0	ug/kg	07/01/21	07/06/21
EPA 8270C	PHENOL	501000.0 U	1000000	501000.0	129000.0	ug/kg	07/01/21	07/06/21
EPA 8270C	PYRENE	501000.0 U	1000000	501000.0	162300.0	ug/kg	07/01/21	07/06/21

Quant Method:	K0628.M
Run #:	0628K105
Instrument:	KYLO
Sequence:	210628
Dilution Factor:	3000
Initials:	MA

Printed: 07/12/21 10:51:22 AM

APPL-F1-SC-NoMC-REG MDLs-DOD

EPA 8260C WATER

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson
Project: 0004 Vieques, Puerto Rico UXO 17
ARF: 96689
Sample ID: VE-UXO17-DRUM-01
APPL ID: BA35396
Sample Collection Date: 06/24/21
QCG: #86CDO-210708AT-266021

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8260C	1,1,1,2-TETRACHLOROETHANE	30000.00 U	100000.0	30000.00	13000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,1,1-TRICHLOROETHANE	30000.00 U	100000.0	30000.00	14000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,1,2,2-TETRACHLOROETHANE	30000.00 U	100000.0	30000.00	10000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,1,2-TRICHLOROETHANE	50000.00 U	100000.0	50000.00	20000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,1-DICHLOROETHANE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,1-DICHLOROETHENE	50000.00 U	100000.0	50000.00	25000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,1-DICHLOROPROPENE	50000.00 U	100000.0	50000.00	20000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,2,3-TRICHLOROBENZENE	50000.00 U	100000.0	50000.00	25000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,2,3-TRICHLOROPROPANE	100000.00 U	200000.0	100000.0	39000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,2,4-TRICHLOROBENZENE	50000.00 U	100000.0	50000.00	21000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,2,4-TRIMETHYLBENZENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,2-DIBROMO-3-CHLOROPROPANE	100000.00 U	200000.0	100000.0	50000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,2-DIBROMOETHANE	50000.00 U	100000.0	50000.00	20000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,2-DICHLOROBENZENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,2-DICHLOROETHANE	30000.00 U	100000.0	30000.00	14000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,2-DICHLOROPROPANE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,3,5-TRIMETHYLBENZENE	30000.00 U	100000.0	30000.00	12000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,3-DICHLOROBENZENE	30000.00 U	100000.0	30000.00	11000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,3-DICHLOROPROPANE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	1,4-DICHLOROBENZENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	2,2-DICHLOROPROPANE	50000.00 U	100000.0	50000.00	22000.00	ug/L	07/09/21	07/09/21
EPA 8260C	2-BUTANONE	200000.0 U	1000000.2	200000.0	60000.0	ug/L	07/09/21	07/09/21
EPA 8260C	2-CHLOROTOLUENE	30000.00 U	100000.0	30000.00	14000.00	ug/L	07/09/21	07/09/21
EPA 8260C	2-HEXANONE	200000.0 U	1000000.2	200000.0	90000.0	ug/L	07/09/21	07/09/21
EPA 8260C	4-CHLOROTOLUENE	30000.00 U	100000.0	30000.00	13000.00	ug/L	07/09/21	07/09/21
EPA 8260C	4-METHYL-2-PENTANONE	500000.0 U	1000000.5	500000.0	190000.0	ug/L	07/09/21	07/09/21
EPA 8260C	ACETONE	200000.0 U	1000000.2	200000.0	90000.0	ug/L	07/09/21	07/09/21
EPA 8260C	BENZENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	BROMOBENZENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	BROMOCHLOROMETHANE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	BROMODICHLOROMETHANE	30000.00 U	100000.0	30000.00	14000.00	ug/L	07/09/21	07/09/21
EPA 8260C	BROMOFORM	30000.00 U	100000.0	30000.00	14000.00	ug/L	07/09/21	07/09/21
EPA 8260C	BROMOMETHANE	50000.00 U	200000.0	50000.00	24000.00	ug/L	07/09/21	07/09/21
EPA 8260C	CARBON DISULFIDE	50000.00 U	100000.0	50000.00	20000.00	ug/L	07/09/21	07/09/21
EPA 8260C	CARBON TETRACHLORIDE	30000.00 U	100000.0	30000.00	10000.00	ug/L	07/09/21	07/09/21

Quant Method: T0708W.M
Run #: 0708T35
Instrument: Thor
Sequence: 210708
Dilution Factor: 100000
Initials: CHE

Printed: 07/16/21 4:22:54 PM
APPL-F1-SC-NoMC-REG MDLs-DOD

EPA 8260C WATER

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson
Project: 0004 Vieques, Puerto Rico UXO 17
ARF: 96689
Sample ID: VE-UXO17-DRUM-01
APPL ID: BA35396
Sample Collection Date: 06/24/21
QCG: #86CDO-210708AT-266021

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8260C	CHLOROBENZENE	50000.00 U	100000.0	50000.00	21000.00	ug/L	07/09/21	07/09/21
EPA 8260C	CHLORODIBROMOMETHANE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	CHLOROETHANE	50000.00 U	100000.0	50000.00	21000.00	ug/L	07/09/21	07/09/21
EPA 8260C	CHLOROFORM	30000.00 U	100000.0	30000.00	7000.00	ug/L	07/09/21	07/09/21
EPA 8260C	CHLOROMETHANE	50000.00 U	100000.0	50000.00	25000.00	ug/L	07/09/21	07/09/21
EPA 8260C	CIS-1,2-DICHLOROETHENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	CIS-1,3-DICHLOROPROPENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	DIBROMOMETHANE	50000.00 U	100000.0	50000.00	20000.00	ug/L	07/09/21	07/09/21
EPA 8260C	DICHLORODIFLUOROMETHANE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	ETHYLBENZENE	50000.00 U	100000.0	50000.00	23000.00	ug/L	07/09/21	07/09/21
EPA 8260C	HEXACHLOROBUTADIENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	ISOPROPYLBENZENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	M,P-XYLENE	30000.00 U	200000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	METHYL TERT-BUTYL ETHER	52000.00 U	100000.0	52000.00	26000.00	ug/L	07/09/21	07/09/21
EPA 8260C	METHYLENE CHLORIDE	100000.00 U	500000.0	100000.00	35000.00	ug/L	07/09/21	07/09/21
EPA 8260C	N-BUTYLBENZENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	N-PROPYLBENZENE	50000.00 U	100000.0	50000.00	21000.00	ug/L	07/09/21	07/09/21
EPA 8260C	NAPHTHALENE	50000.00 U	100000.0	50000.00	25000.00	ug/L	07/09/21	07/09/21
EPA 8260C	O-XYLENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	P-ISOPROPYLTOLUENE	30000.00 U	100000.0	30000.00	12000.00	ug/L	07/09/21	07/09/21
EPA 8260C	SEC-BUTYLBENZENE	30000.00 U	100000.0	30000.00	12000.00	ug/L	07/09/21	07/09/21
EPA 8260C	STYRENE	50000.00 U	100000.0	50000.00	25000.00	ug/L	07/09/21	07/09/21
EPA 8260C	TERT-BUTYLBENZENE	30000.00 U	100000.0	30000.00	13000.00	ug/L	07/09/21	07/09/21
EPA 8260C	TETRACHLOROETHENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	TOLUENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	TRANS-1,2-DICHLOROETHENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	TRANS-1,3-DICHLOROPROPENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	TRICHLOROETHENE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	TRICHLOROFLUOROMETHANE	50000.00 U	100000.0	50000.00	24000.00	ug/L	07/09/21	07/09/21
EPA 8260C	VINYL CHLORIDE	30000.00 U	100000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	XYLENES (TOTAL)	30000.00 U	200000.0	30000.00	15000.00	ug/L	07/09/21	07/09/21
EPA 8260C	SURROGATE: 1,2-DICHLOROETHANE-	109	81-118			%	07/09/21	07/09/21
EPA 8260C	SURROGATE: 4-BROMOFLUOROBENZ	101	85-114			%	07/09/21	07/09/21
EPA 8260C	SURROGATE: DIBROMOFLUOROMETH	107	80-119			%	07/09/21	07/09/21
EPA 8260C	SURROGATE: TOLUENE-D8 (S)	103	89-112			%	07/09/21	07/09/21

Quant Method: T0708W.M
Run #: 0708T35
Instrument: Thor
Sequence: 210708
Dilution Factor: 100000
Initials: CHE

Printed: 07/16/21 4:22:54 PM
APPL-F1-SC-NoMC-REG MDLs-DOD

Metals Analysis

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson

Project: 0004 Vieques, Puerto Rico UXO 17

ARF: 96689

Sample ID: VE-UXO17-DRUM-01

APPL ID: BA35396

Sample Collection Date: 06/24/21

Method	Analyte	Result	LOQ	LOD	DL	Units	DF	Prep Date	Analysis Date
6010C/TCLP	ARSENIC (AS)	0.0100 U	0.050	0.0100	0.0043	mg/L	1	07/02/21	07/06/21
6010C/TCLP	BARIUM (BA)	1.3	0.050	0.0040	0.0008	mg/L	1	07/02/21	07/06/21
6010C/TCLP	CADMIUM (CD)	0.0030 U	0.050	0.0030	0.0005	mg/L	1	07/02/21	07/06/21
6010C/TCLP	CHROMIUM (CR)	0.0040 U	0.050	0.0040	0.0014	mg/L	1	07/02/21	07/06/21
6010C/TCLP	LEAD (PB)	0.063 J	0.100	0.0040	0.0016	mg/L	1	07/02/21	07/06/21
6010C/TCLP	SELENIUM (SE)	0.0100 U	0.050	0.0100	0.0046	mg/L	1	07/02/21	07/06/21
6010C/TCLP	SILVER (AG)	0.0037 J	0.010	0.0009	0.0004	mg/L	1	07/02/21	07/06/21

J = Estimated value.

Printed: 08/13/21 10:34:21 AM

APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Camden Robinson

Project: 0004 Vieques, Puerto Rico UXO 17

ARF: 96689

Sample ID: VE-UXO17-DRUM-01

APPL ID: BA35396

Sample Collection Date: 06/24/21

Method	Analyte	Result	LOQ	LOD	DL	Units	DF	Prep Date	Analysis Date
7470A/TCLP	MERCURY (HG)	0.00015 U	0.0002	0.00015	0.00006	mg/L	1	07/02/21	07/14/21

Printed: 07/28/21 9:54:14 AM

APPL-F1-SC-NoMC-REG MDLs

EPA 8260C GRO WATER

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

Attn: Camden Robinson

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Project: 0004 Vieques, Puerto Rico UXO 17

ARF: 96689

Sample ID: VE-UXO17-DRUM-01

APPL ID: BA35396

Sample Collection Date: 06/24/21

QCG: #86CGR-210708AM-266015

Method	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
EPA 8260C	GASOLINE RANGE ORGANICS	1800000.0 U	2000000	300000.0	860000.0	ug/L	07/08/21	07/08/21
EPA 8260C	SURROGATE: 4-BROMOFLUOROBENZ	94.4	85-114			%	07/08/21	07/08/21

Quant Method:	MGAS0702.M
Run #:	0708M26
Instrument:	Max
Sequence:	210707
Dilution Factor:	100000
Initials:	CHE

Printed: 07/16/21 2:49:57 PM

APPL-F1-SC-NoMC-REG MDLs-DOD

Wetlab Results

ARF: 96689

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

CH2M Hill
400 Embassy Row, #600
Atlanta, GA 30328-7001

Attn: Camden Robinson

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
APPL ID: BA35396	-Client Sample ID: VE-UXO17-DRUM-01		-Sample Collection Date: 06/24/21			Project: 0004 Vieques, Puerto Ri	
EPA 9040B	PH	4.09@19.5C	NA		pH Units	06/25/21	06/25/21

Printed: 07/06/21 10:19:42 AM

QC FORMS

EPA 8015B-e

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96689

Case No: 96689 Date Analyzed: 07/13/21

Matrix: MISC Instrument: Apollo

APPL ID.	Client Sample No.	SURROGATE: OCTACOSANE (S)			SURROGATE: ORTHO-TERPHENYL (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210630A-BLK	Blank	47-140	118		58-128	87.8	
210630A-LCS	Lab Control Spike	47-140	122		58-128	122	
210630A-LCSD	Lab Control SpikeD	47-140	118		58-128	119	
BA35396	VE-UXO17-DRUM-01	47-140	31.8	#	58-128	12.3	#

Comments: Batch: #TPHDS-210630A

= Recovery outside of Control Limits on Sample.

EPA 8015C-e

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96689

Case No: 96689 Date Analyzed: 07/13/21

Matrix: MISC Instrument: Apollo

APPL ID.	Client Sample No.	SURROGATE: OCTACOSANE (S)			SURROGATE: ORTHO-TERPHENYL (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210701A-BLK	Blank	60-142	114		56-125	85.6	
210701A-LCS	Lab Control Spike	60-142	117		56-125	98.2	
210701A-LCSD	Lab Control SpikeD	60-142	115		56-125	97.0	
BA35396	VE-UXO17-DRUM-01	60-142	118		56-125	85.4	

Comments: Batch: #DROWD-210701A

EPA 8015B-e

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	96689
Case No:	96689	Date Analyzed:	07/13/21
Matrix:	MISC	Instrument:	Apollo
Blank ID:	210630A-BLK	Time Analyzed:	1023

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210630A-BLK	Blank	712054	07/13/21 1023
210630A-LCS	Lab Control Spike	712055	07/13/21 1051
210630A-LCSD	Lab Control SpikeD	712056	07/13/21 1120
BA35396	VE-UXO17-DRUM-01	712058	07/13/21 1216

Comments: Batch: #TPHDS-210630A

EPA 8015C-e

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	96689
Case No:	96689	Date Analyzed:	07/13/21
Matrix:	MISC	Instrument:	Apollo
Blank ID:	210701A-BLK	Time Analyzed:	2149

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210701A-BLK	Blank	713014	07/13/21 2149
210701A-LCS	Lab Control Spike	713015	07/13/21 2217
210701A-LCSD	Lab Control SpikeD	713016	07/13/21 2245
BA35396	VE-UXO17-DRUM-01	713017	07/13/21 2314

Comments: Batch: #DROWD-210701A

Method Blank
TPH Diesel Soil EPA 8015B

Blank Name/QCG: **210630S-35396 - 265948**
Batch ID: #TPHDS-210630A

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	DIESEL FUEL	200000.0 U	200000	00000.0	00000.0	ug/kg	06/30/21	07/13/21
BLANK	MOTOR OIL	2000000.0 U	2000000	00000.0	02000.0	ug/kg	06/30/21	07/13/21
BLANK	SURROGATE: OCTACOSANE (S)	118	47-140			%	06/30/21	07/13/21
BLANK	SURROGATE: ORTHO-TERPHEN	87.8	58-128			%	06/30/21	07/13/21

Quant Method: DOC0702.M
Run #: 712054
Instrument: Apollo
Sequence: 210712
Initials: MBE

GC SC-Blank-REG MDLs-DOD
Printed: 07/15/21 11:25:59 AM

Method Blank
TPH-D WATER EPA 8015C

Blank Name/QCG: **210701S-35396 - 265954**
Batch ID: #DROWD-210701A

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	TPH-DRO (C10-C24)	1800 J	4950	1650.0	825.0	ug/L	07/01/21	07/13/21
BLANK	TPH-LRO (C24-C36)	3800 J	16500	6996.0	3498.0	ug/L	07/01/21	07/13/21
BLANK	SURROGATE: OCTACOSANE (S)	114	60-142			%	07/01/21	07/13/21
BLANK	SURROGATE: ORTHO-TERPHEN	85.6	56-125			%	07/01/21	07/13/21

J = Estimated value.

Quant Method: DROB702.M
Run #: 713014
Instrument: Apollo
Sequence: 210713
Initials: MBE

GC SC-Blank-REG MDLs-DOD
Printed: 07/15/21 11:25:59 AM

EPA 8015B-e

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96689
Case No:	96689	Date Analyzed:	07/13/21
Matrix:	MISC	Instrument:	Apollo
LCS ID:	210630A-LCS	Time Analyzed:	1051

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210630A-BLK	Blank	712054	07/13/21 1023
210630A-LCS	Lab Control Spike	712055	07/13/21 1051
210630A-LCSD	Lab Control SpikeD	712056	07/13/21 1120
BA35396	VE-UXO17-DRUM-01	712058	07/13/21 1216

Comments: Batch: #TPHDS-210630A

EPA 8015C-e

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96689
Case No:	96689	Date Analyzed:	07/13/21
Matrix:	MISC	Instrument:	Apollo
LCS ID:	210701A-LCS	Time Analyzed:	2217

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210701A-BLK	Blank	713014	07/13/21 2149
210701A-LCS	Lab Control Spike	713015	07/13/21 2217
210701A-LCSD	Lab Control SpikeD	713016	07/13/21 2245
BA35396	VE-UXO17-DRUM-01	713017	07/13/21 2314

Comments: Batch: #DROWD-210701A

Laboratory Control Spike Recoveries
TPH Diesel Soil EPA 8015B

APPL ID: **210630S-35396 LCS - 265948**
Batch ID: #TPHDS-210630A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Lvl ug/kg	SPK Result ug/kg	DUP Result ug/kg	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
DIESEL FUEL	25000000	24500000	23700000	98.0	94.8	64-122	3.3	30
MOTOR OIL	25000000	27100000	24700000	108	98.8	50-150	9.3	30
SURROGATE: OCTACOSANE (S)	600000	734000	709000	122	118	47-140		
SURROGATE: ORTHO-TERPHENYL (S)	600000	734000	715000	122	119	58-128		

Comments:

Primary	SPK	DUP
Quant Method :	DOC0702.M	DOC0702.M
Extraction Date :	06/30/21	06/30/21
Analysis Date :	07/13/21	07/13/21
Instrument :	Apollo	Apollo
Run :	712055	712056
Initials :	MBE	

Printed: 07/15/21 11:25:52 AM
APPL Standard LCSD

Laboratory Control Spike Recoveries
TPH-D WATER EPA 8015C

APPL ID: **210701S-35396 LCS - 265954**
Batch ID: #DROWD-210701A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Lvl ug/L	SPK Result ug/L	DUP Result ug/L	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
TPH-DRO (C10-C24)	66700	70100	70400	105	106	36-132	0.43	30
TPH-LRO (C24-C36)	66700	66500	67000	99.8	101	41-113	0.75	30
SURROGATE: OCTACOSANE (S)	5000	5870	5730	117	115	60-142		
SURROGATE: ORTHO-TERPHENYL (S)	5000	4910	4850	98.2	97.0	56-125		

Comments:

Primary	SPK	DUP
Quant Method :	DROB702.M	DROB702.M
Extraction Date :	07/01/21	07/01/21
Analysis Date :	07/13/21	07/13/21
Instrument :	Apollo	Apollo
Run :	713015	713016
Initials :	MBE	

Printed: 07/15/21 11:25:52 AM
APPL Standard LCSD

EPA 8270D

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96689

Case No: 96689 Date Analyzed: 07/06/21

Matrix: MISC Instrument: KYLO

APPL ID.	Client Sample No.	SURROGATE: 2,4,6-TRIBROMOPHENOL (S)			SURROGATE: 2-FLUORBIPHENYL (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210701A-BLK	Blank	43-140	73.6		44-119	59.0	
BA35396	VE-UXO17-DRUM-01	43-140	DO		44-119	DO	
210701A-LCS	Lab Control Spike	43-140	81.5		44-119	66.8	

Comments: Batch: #87DDO-210701A

EPA 8270D

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96689

Case No: 96689 Date Analyzed: 07/06/21

Matrix: MISC Instrument: KYLO

APPL ID.	Client Sample No.	SURROGATE: 2-FLUOROPHENOL (S)			SURROGATE: NITROBENZENE-D5 (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210701A-BLK	Blank	19-119	70.7		44-120	76.3	
BA35396	VE-UXO17-DRUM-01	19-119	DO		44-120	DO	
210701A-LCS	Lab Control Spike	19-119	80.5		44-120	77.3	

Comments: Batch: #87DDO-210701A

EPA 8270D

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96689

Case No: 96689 Date Analyzed: 07/06/21

Matrix: MISC Instrument: KYLO

APPL ID.	Client Sample No.	SURROGATE: PHENOL-D6 (S)			SURROGATE: TERPHENYL-D14 (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210701A-BLK	Blank	10-115	69.1		50-134	64.6	
BA35396	VE-UXO17-DRUM-01	10-115	DO		50-134	DO	
210701A-LCS	Lab Control Spike	10-115	82.5		50-134	70.4	

Comments: Batch: #87DDO-210701A

EPA 8270D

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	96689
Case No:	96689	Date Analyzed:	07/06/21
Matrix:	MISC	Instrument:	KYLO
Blank ID:	210701A-BLK	Time Analyzed:	0921

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210701A-BLK	Blank	0628K101	07/06/21 0921
BA35396	VE-UXO17-DRUM-01	0628K104	07/06/21 1030
210701A-LCS	Lab Control Spike	0628K142	07/07/21 1518

Comments: Batch: #87DDO-210701A

Method Blank
EPA 8270D WATER

Blank Name/QCG: **210701S-35396 - 265693**
Batch ID: #87DDO-210701A

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	1,2,4-TRICHLOROBENZENE	5.00 U	10.0	5.00	1.30	ug/L	07/01/21	07/06/21
BLANK	1,2-DICHLOROBENZENE	5.00 U	10.0	5.00	1.10	ug/L	07/01/21	07/06/21
BLANK	1,2-DIPHENYLHYDRAZINE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	1,3-DICHLOROBENZENE	5.00 U	10.0	5.00	1.00	ug/L	07/01/21	07/06/21
BLANK	1,4-DICHLOROBENZENE	5.00 U	10.0	5.00	1.00	ug/L	07/01/21	07/06/21
BLANK	2,4,5-TRICHLOROPHENOL	5.00 U	10.0	5.00	2.30	ug/L	07/01/21	07/06/21
BLANK	2,4,6-TRICHLOROPHENOL	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	2,4-DICHLOROPHENOL	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	2,4-DIMETHYLPHENOL	5.00 U	10.0	5.00	2.40	ug/L	07/01/21	07/06/21
BLANK	2,4-DINITROPHENOL	5.00 U	20.0	5.00	1.80	ug/L	07/01/21	07/06/21
BLANK	2,4-DINITROTOLUENE	5.00 U	20.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	2,6-DINITROTOLUENE	5.00 U	20.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	2-CHLORONAPHTHALENE	5.00 U	10.0	5.00	2.00	ug/L	07/01/21	07/06/21
BLANK	2-CHLOROPHENOL	5.00 U	10.0	5.00	2.00	ug/L	07/01/21	07/06/21
BLANK	2-METHYLNAPHTHALENE	5.00 U	10.0	5.00	1.80	ug/L	07/01/21	07/06/21
BLANK	2-METHYLPHENOL	5.00 U	10.0	5.00	1.90	ug/L	07/01/21	07/06/21
BLANK	2-NITROANILINE	5.00 U	20.0	5.00	2.40	ug/L	07/01/21	07/06/21
BLANK	2-NITROPHENOL	5.00 U	10.0	5.00	2.10	ug/L	07/01/21	07/06/21
BLANK	3,3'-DICHLOROBENZIDINE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	3-NITROANILINE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	3/4-METHYLPHENOL	5.00 U	10.0	5.00	1.70	ug/L	07/01/21	07/06/21
BLANK	4,6-DINITRO-2-METHYLPHENOL	5.00 U	20.0	5.00	2.20	ug/L	07/01/21	07/06/21
BLANK	4-BROMOPHENYL PHENYL ETH	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	4-CHLORO-3-METHYLPHENOL	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	4-CHLOROANILINE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	4-CHLOROPHENYL PHENYL ET	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	4-NITROANILINE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	4-NITROPHENOL	5.00 U	20.0	5.00	0.80	ug/L	07/01/21	07/06/21
BLANK	ACENAPHTHENE	5.00 U	10.0	5.00	2.30	ug/L	07/01/21	07/06/21
BLANK	ACENAPHTHYLENE	5.00 U	10.0	5.00	2.30	ug/L	07/01/21	07/06/21
BLANK	ANTHRACENE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	BENZ (A) ANTHRACENE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	BENZO (A) PYRENE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	BENZO (B) FLUORANTHENE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21

Quant Method: K0628.M
Run #: 0628K101
Instrument: KYLO
Sequence: 210628
Initials: MA

GC SC-Blank-REG MDLs-DOD
Printed: 07/12/21 10:26:48 AM

Method Blank
EPA 8270D WATER

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210701S-35396 - 265693**
Batch ID: #87DDO-210701A

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	BENZO (G,H,I) PERYLENE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	BENZO (K) FLUORANTHENE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	BENZOIC ACID	5.00 U	10.0	5.00	1.00	ug/L	07/01/21	07/06/21
BLANK	BENZYL ALCOHOL	5.00 U	10.0	5.00	2.00	ug/L	07/01/21	07/06/21
BLANK	BIS (2-CHLORETHOXY) METHAN	5.00 U	10.0	5.00	2.40	ug/L	07/01/21	07/06/21
BLANK	BIS (2-CHLOROETHYL) ETHER	5.00 U	10.0	5.00	2.20	ug/L	07/01/21	07/06/21
BLANK	BIS (2-CHLOROISOPROPYL) ET	5.00 U	10.0	5.00	2.00	ug/L	07/01/21	07/06/21
BLANK	BIS (2-ETHYLHEXYL) PHTHALAT	5.00 U	20.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	BUTYL BENZYL PHTHALATE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	CARBAZOLE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	CHRYSENE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	DI-N-BUTYL PHTHALATE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	DI-N-OCTYL PHTHALATE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	DIBENZ (A,H) ANTHRACENE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	DIBENZOFURAN	5.00 U	20.0	5.00	2.40	ug/L	07/01/21	07/06/21
BLANK	DIETHYL PHTHALATE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	DIMETHYL PHTHALATE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	FLUORANTHENE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	FLUORENE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	HEXACHLOROBENZENE	5.00 U	20.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	HEXACHLOROBUTADIENE	5.00 U	10.0	5.00	0.90	ug/L	07/01/21	07/06/21
BLANK	HEXACHLOROETHANE	5.00 U	10.0	5.00	0.80	ug/L	07/01/21	07/06/21
BLANK	INDENO (1,2,3-CD) PYRENE	5.00 U	10.0	5.00	2.40	ug/L	07/01/21	07/06/21
BLANK	ISOPHORONE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	N-NITROSODI-N-PROPYLAMINE	5.00 U	10.0	5.00	2.20	ug/L	07/01/21	07/06/21
BLANK	N-NITROSODIMETHYLAMINE	5.00 U	10.0	5.00	1.70	ug/L	07/01/21	07/06/21
BLANK	N-NITROSODIPHENYLAMINE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	NAPHTHALENE	5.00 U	10.0	5.00	1.80	ug/L	07/01/21	07/06/21
BLANK	NITROBENZENE	5.00 U	10.0	5.00	2.10	ug/L	07/01/21	07/06/21
BLANK	PENTACHLOROPHENOL	5.00 U	20.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	PHENANTHRENE	5.00 U	20.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	PHENOL	5.00 U	10.0	5.00	1.00	ug/L	07/01/21	07/06/21
BLANK	PYRENE	5.00 U	10.0	5.00	2.50	ug/L	07/01/21	07/06/21
BLANK	SURROGATE: 2,4,6-TRIBROMOP	73.6	43-140			%	07/01/21	07/06/21

Quant Method: K0628.M
Run #: 0628K101
Instrument: KYLO
Sequence: 210628
Initials: MA

GC SC-Blank-REG MDLs-DOD
Printed: 07/12/21 10:26:48 AM

Method Blank
EPA 8270D WATER

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210701S-35396 - 265693**
Batch ID: #87DDO-210701A

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	SURROGATE: 2-FLUORBIPHENY	59.0	44-119			%	07/01/21	07/06/21
BLANK	SURROGATE: 2-FLUOROPHENO	70.7	19-119			%	07/01/21	07/06/21
BLANK	SURROGATE: NITROBENZENE-	76.3	44-120			%	07/01/21	07/06/21
BLANK	SURROGATE: PHENOL-D6 (S)	69.1	10-115			%	07/01/21	07/06/21
BLANK	SURROGATE: TERPHENYL-D14 (	64.6	50-134			%	07/01/21	07/06/21

Quant Method: K0628.M
Run #: 0628K101
Instrument: KYLO
Sequence: 210628
Initials: MA

GC SC-Blank-REG MDLs-DOD
Printed: 07/12/21 10:26:48 AM

EPA 8270D

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96689
Case No:	96689	Date Analyzed:	07/07/21
Matrix:	MISC	Instrument:	KYLO
LCS ID:	210701A-LCS	Time Analyzed:	1518

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210701A-BLK	Blank	0628K101	07/06/21 0921
BA35396	VE-UXO17-DRUM-01	0628K104	07/06/21 1030
210701A-LCS	Lab Control Spike	0628K142	07/07/21 1518

Comments: Batch: #87DDO-210701A

Laboratory Control Spike Recovery
EPA 8270D WATER

APPL ID: **210701S-35396 LCS - 265693**
Batch ID: #87DDO-210701A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
1,2,4-TRICHLOROBENZENE	50.0	30.2	60.4	29-116
1,2-DICHLOROBENZENE	50.0	34.0	68.0	32-111
1,2-DIPHENYLHYDRAZINE	50.0	37.9	75.8	49-122
1,3-DICHLOROBENZENE	50.0	31.4	62.8	28-110
1,4-DICHLOROBENZENE	50.0	32.4	64.8	29-112
2,4,5-TRICHLOROPHENOL	50.0	37.5	75.0	53-123
2,4,6-TRICHLOROPHENOL	50.0	39.0	78.0	50-125
2,4-DICHLOROPHENOL	50.0	41.8	83.6	47-121
2,4-DIMETHYLPHENOL	50.0	38.5	77.0	31-124
2,4-DINITROPHENOL	50.0	39.0	78.0	23-143
2,4-DINITROTOLUENE	50.0	35.1	70.2	57-128
2,6-DINITROTOLUENE	50.0	35.7	71.4	57-124
2-CHLORONAPHTHALENE	50.0	37.8	75.6	40-116
2-CHLOROPHENOL	50.0	37.1	74.2	38-117
2-METHYLNAPHTHALENE	50.0	36.0	72.0	40-121
2-METHYLPHENOL	50.0	37.6	75.2	30-117
2-NITROANILINE	50.0	35.0	70.0	55-127
2-NITROPHENOL	50.0	39.2	78.4	47-123
3,3'-DICHLOROBENZIDINE	50.0	14.5	29.0	27-129
3-NITROANILINE	50.0	34.2	68.4	41-128
3/4-METHYLPHENOL	100	83.6	83.6	29-110
4,6-DINITRO-2-METHYLPHENOL	50.0	35.3	70.6	44-137
4-BROMOPHENYL PHENYL ETHER	50.0	36.9	73.8	55-124
4-CHLORO-3-METHYLPHENOL	50.0	38.8	77.6	52-119
4-CHLOROANILINE	50.0	27.5	55.0	33-117
4-CHLOROPHENYL PHENYL ETHER	50.0	36.0	72.0	53-121
4-NITROANILINE	50.0	36.5	73.0	35-120
4-NITROPHENOL	50.0	37.3	74.6	10-125
ACENAPHTHENE	50.0	35.7	71.4	47-122
ACENAPHTHYLENE	50.0	35.4	70.8	41-130
ANTHRACENE	50.0	36.1	72.2	57-123

Primary	SPK
Quant Method :	K0628.M
Extraction Date :	07/01/21
Analysis Date :	07/07/21
Instrument :	KYLO
Run :	0628K142
Initials :	MA

Comments:

Printed: 07/12/21 10:25:11 AM

APPL Standard LCS

Laboratory Control Spike Recovery
EPA 8270D WATER

APPL ID: **210701S-35396 LCS - 265693**
Batch ID: #87DDO-210701A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
BENZ (A) ANTHRACENE	50.0	36.5	73.0	58-125
BENZO (A) PYRENE	50.0	34.3	68.6	54-128
BENZO (B) FLUORANTHENE	50.0	38.1	76.2	53-131
BENZO (G,H,I) PERYLENE	50.0	33.8	67.6	50-134
BENZO (K) FLUORANTHENE	50.0	33.8	67.6	57-129
BENZOIC ACID	50.0	45.7	91.4	10-125
BENZYL ALCOHOL	50.0	37.9	75.8	31-112
BIS (2-CHLORETHOXY) METHANE	50.0	39.3	78.6	48-120
BIS (2-CHLOROETHYL) ETHER	50.0	39.2	78.4	43-118
BIS (2-CHLOROISOPROPYL) ETHER	50.0	40.5	81.0	37-130
BIS (2-ETHYLHEXYL) PHTHALATE	50.0	58.1	116	55-135
BUTYL BENZYL PHTHALATE	50.0	37.4	74.8	53-134
CARBAZOLE	50.0	39.0	78.0	60-122
CHRYSENE	50.0	35.7	71.4	59-123
DI-N-BUTYL PHTHALATE	50.0	35.0	70.0	59-127
DI-N-OCTYL PHTHALATE	50.0	42.4	84.8	51-140
DIBENZ (A,H) ANTHRACENE	50.0	35.8	71.6	51-134
DIBENZOFURAN	50.0	33.2	66.4	53-118
DIETHYL PHTHALATE	50.0	37.2	74.4	56-125
DIMETHYL PHTHALATE	50.0	36.0	72.0	45-127
FLUORANTHENE	50.0	35.7	71.4	57-128
FLUORENE	50.0	35.7	71.4	52-124
HEXACHLOROBENZENE	50.0	35.9	71.8	53-125
HEXACHLOROBUTADIENE	50.0	24.2	48.4	22-124
HEXACHLOROETHANE	50.0	27.5	55.0	21-115
INDENO (1,2,3-CD) PYRENE	50.0	36.1	72.2	52-134
ISOPHORONE	50.0	38.3	76.6	42-124
N-NITROSODI-N-PROPYLAMINE	50.0	35.4	70.8	49-119
N-NITROSODIMETHYLAMINE	50.0	38.0	76.0	25-110
N-NITROSODIPHENYLAMINE	100	68.0	68.0	51-123
NAPHTHALENE	50.0	35.3	70.6	40-121

Primary	SPK
Quant Method :	K0628.M
Extraction Date :	07/01/21
Analysis Date :	07/07/21
Instrument :	KYLO
Run :	0628K142
Initials :	MA

Comments:

Printed: 07/12/21 10:25:11 AM

APPL Standard LCS

Laboratory Control Spike Recovery
EPA 8270D WATER

APPL ID: **210701S-35396 LCS - 265693**
Batch ID: #87DDO-210701A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
NITROBENZENE	50.0	38.0	76.0	45-121
PENTACHLOROPHENOL	50.0	39.4	78.8	35-138
PHENANTHRENE	50.0	38.3	76.6	59-120
PHENOL	50.0	35.5	71.0	10-115
PYRENE	50.0	36.9	73.8	57-126
SURROGATE: 2,4,6-TRIBROMOPHENOL	200	163	81.5	43-140
SURROGATE: 2-FLUORBIPHENYL (S)	100	66.8	66.8	44-119
SURROGATE: 2-FLUOROPHENOL (S)	200	161	80.5	19-119
SURROGATE: NITROBENZENE-D5 (S)	100	77.3	77.3	44-120
SURROGATE: PHENOL-D6 (S)	200	165	82.5	10-115
SURROGATE: TERPHENYL-D14 (S)	100	70.4	70.4	50-134

Comments:

Primary	SPK
Quant Method :	K0628.M
Extraction Date :	07/01/21
Analysis Date :	07/07/21
Instrument :	KYLO
Run :	0628K142
Initials :	MA

Printed: 07/12/21 10:25:11 AM

APPL Standard LCS

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No:
Matrix: Water
ID: 0628K003.D

SDG No:
Date Analyzed: 06/28/21
Instrument: KYLO
Time Analyzed: 16:04

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		4 ug/ml 6/23/21	0628K004.D	06/28/21 16:18
2		5 ug/ml 6/23/21	0628K005.D	06/28/21 16:42
3		10 ug/ml 6/23/21	0628K006.D	06/28/21 17:04
4		20 ug/ml 6/23/21	0628K007.D	06/28/21 17:27
5		40 ug/ml 6/23/21	0628K008.D	06/28/21 17:50
6		50 ug/ml 6/23/21	0628K009.D	06/28/21 18:13
7		60 ug/ml 6/23/21	0628K010.D	06/28/21 18:36
8		80 ug/ml 6/23/21	0628K011.D	06/28/21 18:58
9		100 ug/ml 6/23/21	0628K012.D	06/28/21 19:21
10		SS 50 ug/ml 6/23/21	0628K013.D	06/28/21 19:44
11				
12				
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14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80.04% of mass 198	36.4
68	0 - 2% of mass 69	1.8
70	0 - 2% of mass 69	0.6
127	10 - 80% of mass 198	56.6
197	0 - 2% of mass 198	0.3
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.7
275	10 - 60% of mass 198	23.3
365	1 - 100% of mass 198	2.6
441	0.01 - 24% of mass 442	13.8
442	50 - 500% of mass 198	77.0
443	15 - 24% of mass 442	19.1

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 96689
Matrix: Water
ID: 0628K099.D

SDG No: 96689
Date Analyzed: 07/06/21
Instrument: KYLO
Time Analyzed: 8:31

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		50 ug/ml 6/23/21	0628K100.D	07/06/21 8:43
2	Blank	210701A BLK 1/1000	0628K101.D	07/06/21 9:21
3	VE-UXO17-DRUM-01	BA35396M12 1/100 DF5	0628K104.D	07/06/21 10:30
4	VE-UXO17-DRUM-01	BA35396M13 100/1.00G	0628K105.D	07/06/21 10:53
5		50 ug/ml 6/23/21	0628K125.D	07/07/21 8:06
6				
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13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80.04% of mass 198	35.5
68	0 - 2% of mass 69	1.8
70	0 - 2% of mass 69	0.6
127	10 - 80% of mass 198	54.7
197	0 - 2% of mass 198	0.7
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.6
275	10 - 60% of mass 198	23.9
365	1 - 100% of mass 198	2.6
441	0.01 - 24% of mass 442	13.5
442	50 - 500% of mass 198	76.9
443	15 - 24% of mass 442	18.3

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No:
Matrix: Water
ID: 0628K128.D

SDG No:
Date Analyzed: 07/07/21
Instrument: KYLO
Time Analyzed: 9:40

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		50 ug/ml 6/23/21	0628K131.D	07/07/21 10:44
2	Lab Control Spike	210701A LCS-1 1/1000	0628K142.D	07/07/21 15:18
3		50 ug/ml 6/23/21	0628K158.D	07/07/21 21:26
4				
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12				
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14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80.04% of mass 198	31.6
68	0 - 2% of mass 69	1.7
70	0 - 2% of mass 69	0.6
127	10 - 80% of mass 198	53.7
197	0 - 2% of mass 198	0.6
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.6
275	10 - 60% of mass 198	24.9
365	1 - 100% of mass 198	2.9
441	0.01 - 24% of mass 442	13.7
442	50 - 500% of mass 198	85.1
443	15 - 24% of mass 442	18.9

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract:

Lab Code: SDG No.:

Lab File ID (Standard): 0628K100.D Date Analyzed: 6 Jul 21 8:43

Instrument ID: KYLO Time Analyzed: 6 Jul 21 8:43

GC Column: ID: Heated Purge: (Y/N)

		1,4-dichlorobenzene-D4(IS)		Napthalene-D8(IS)		Acenaphthene-D10(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	421221	5.10	2155840	6.44	1537490	8.44
	UPPER LIMIT	842442	5.27	4311680	6.61	3074980	8.61
	LOWER LIMIT	210611	4.93	1077920	6.27	768745	8.27
	SAMPLE NO.						
01	210701A BLK 1/1000	497701	5.10	1751610	6.43	1328430	8.43
02	BA35396M12 1/100 DF5	430065	5.10	1744740	6.44	1628280	8.43
03	BA35396M13 100/1.00G	441758	5.10	1577990	6.43	1376670	8.43
04	50 ug/ml 6/23/21	365079	5.10	1879240	6.44	1437320	8.44
05							
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22							

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract:

Lab Code: SDG No.:

Lab File ID (Standard): 0628K100.D Date Analyzed: 6 Jul 21 8:43

Instrument ID: KYLO Time Analyzed: 6 Jul 21 8:43

GC Column: ID: Heated Purge: (Y/N)

		Phenanthrene-D10(IS)		Chrysene-D12(IS)		Perylene-D12(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	2941280	10.17	2063380	13.26	1624330	15.17
	UPPER LIMIT	5882560	10.34	4126760	13.43	3248660	15.34
	LOWER LIMIT	1470640	10.00	1031690	13.09	812165	15.00
	SAMPLE NO.						
01	210701A BLK 1/1000	2516530	10.16	2473060	13.26	2035760	15.17
02	BA35396M12 1/100 DF5	3100750	10.16	2090430	13.25	1289160	15.16
03	BA35396M13 100/1.00G	2814770	10.16	1863760	13.25	949616	15.16
04	50 ug/ml 6/23/21	2549040	10.17	1742110	13.27	1133690	15.17
05							
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22							

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract:

Lab Code: SDG No.:

Lab File ID (Standard): 0628K131.D Date Analyzed: 7 Jul 21 10:44

Instrument ID: KYLO Time Analyzed: 7 Jul 21 10:44

GC Column: ID: Heated Purge: (Y/N)

		1,4-dichlorobenzene-D4(IS)		Napthalene-D8(IS)		Acenaphthene-D10(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	388129	5.10	1930070	6.44	1485830	8.44
	UPPER LIMIT	776258	5.27	3860140	6.61	2971660	8.61
	LOWER LIMIT	194065	4.93	965035	6.27	742915	8.27
	SAMPLE NO.						
01	210701A LCS-1 1/1000	356186	5.10	1760950	6.44	1483080	8.43
02	50 ug/ml 6/23/21	317562	5.10	1486770	6.44	1257620	8.43
03							
04							
05							
06							
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22							

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract:

Lab Code: SDG No.:

Lab File ID (Standard): 0628K131.D Date Analyzed: 7 Jul 21 10:44

Instrument ID: KYLO Time Analyzed: 7 Jul 21 10:44

GC Column: ID: Heated Purge: (Y/N)

		Phenanthrene-D10(IS)		Chrysene-D12(IS)		Perylene-D12(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	2927240	10.17	2058810	13.26	1706890	15.17
	UPPER LIMIT	5854480	10.34	4117620	13.43	3413780	15.34
	LOWER LIMIT	1463620	10.00	1029405	13.09	853445	15.00
	SAMPLE NO.						
01	210701A LCS-1 1/1000	2812600	10.16	2034410	13.26	1766280	15.16
02	50 ug/ml 6/23/21	2393170	10.16	1503420	13.26	742057 *	15.15
03							
04							
05							
06							
07							
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22							

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

EPA 8260C

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96689

Case No: 96689 Date Analyzed: 07/08/21

Matrix: MISC Instrument: Thor

APPL ID.	Client Sample No.	SURROGATE: 1,2-DICHLOROETHANE-D4 (S)			SURROGATE: 4-BROMOFLUOROBENZENE (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210708AT-LCS	Lab Control Spike	81-118	107		85-114	106	
210708AT-LCSD	Lab Control SpikeD	81-118	106		85-114	105	
210708AT-BLK	Blank	81-118	108		85-114	102	
BA35396	VE-UXO17-DRUM-01	81-118	109		85-114	101	

Comments: Batch: #86CDO-210708AT

EPA 8260C

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96689

Case No: 96689 Date Analyzed: 07/08/21

Matrix: MISC Instrument: Thor

APPL ID.	Client Sample No.	SURROGATE: DIBROMOFLUOROMETHANE (S)			SURROGATE: TOLUENE-D8 (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
210708AT-LCS	Lab Control Spike	80-119	105		89-112	105	
210708AT-LCSD	Lab Control SpikeD	80-119	104		89-112	104	
210708AT-BLK	Blank	80-119	106		89-112	103	
BA35396	VE-UXO17-DRUM-01	80-119	107		89-112	103	

Comments: Batch: #86CDO-210708AT

EPA 8260C

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	96689
Case No:	96689	Date Analyzed:	07/08/21
Matrix:	MISC	Instrument:	Thor
Blank ID:	210708AT-BLK	Time Analyzed:	1723

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210708AT-LCS	Lab Control Spike	0708T13	07/08/21 1633
210708AT-LCSD	Lab Control SpikeD	0708T14	07/08/21 1658
210708AT-BLK	Blank	0708T15	07/08/21 1723
BA35396	VE-UXO17-DRUM-01	0708T35	07/09/21 0139

Comments: Batch: #86CDO-210708AT

Method Blank
EPA 8260C WATER

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210708S-35396 - 266021**
Batch ID: #86CDO-210708AT

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	1,1,1,2-TETRACHLOROETHANE	0.30 U	1.0	0.30	0.13	ug/L	07/08/21	07/08/21
BLANK	1,1,1-TRICHLOROETHANE	0.30 U	1.0	0.30	0.14	ug/L	07/08/21	07/08/21
BLANK	1,1,2,2-TETRACHLOROETHANE	0.30 U	1.0	0.30	0.10	ug/L	07/08/21	07/08/21
BLANK	1,1,2-TRICHLOROETHANE	0.50 U	1.0	0.50	0.20	ug/L	07/08/21	07/08/21
BLANK	1,1-DICHLOROETHANE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	1,1-DICHLOROETHENE	0.50 U	1.0	0.50	0.25	ug/L	07/08/21	07/08/21
BLANK	1,1-DICHLOROPROPENE	0.50 U	1.0	0.50	0.20	ug/L	07/08/21	07/08/21
BLANK	1,2,3-TRICHLOROBENZENE	0.50 U	1.0	0.50	0.25	ug/L	07/08/21	07/08/21
BLANK	1,2,3-TRICHLOROPROPANE	1.00 U	2.0	1.00	0.39	ug/L	07/08/21	07/08/21
BLANK	1,2,4-TRICHLOROBENZENE	0.50 U	1.0	0.50	0.21	ug/L	07/08/21	07/08/21
BLANK	1,2,4-TRIMETHYLBENZENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	1,2-DIBROMO-3-CHLOROPROPA	1.00 U	2.0	1.00	0.50	ug/L	07/08/21	07/08/21
BLANK	1,2-DIBROMOETHANE	0.50 U	1.0	0.50	0.20	ug/L	07/08/21	07/08/21
BLANK	1,2-DICHLOROBENZENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	1,2-DICHLOROETHANE	0.30 U	1.0	0.30	0.14	ug/L	07/08/21	07/08/21
BLANK	1,2-DICHLOROPROPANE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	1,3,5-TRIMETHYLBENZENE	0.30 U	1.0	0.30	0.12	ug/L	07/08/21	07/08/21
BLANK	1,3-DICHLOROBENZENE	0.30 U	1.0	0.30	0.11	ug/L	07/08/21	07/08/21
BLANK	1,3-DICHLOROPROPANE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	1,4-DICHLOROBENZENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	2,2-DICHLOROPROPANE	0.50 U	1.0	0.50	0.22	ug/L	07/08/21	07/08/21
BLANK	2-BUTANONE	2.00 U	10.0	2.00	0.60	ug/L	07/08/21	07/08/21
BLANK	2-CHLOROTOLUENE	0.30 U	1.0	0.30	0.14	ug/L	07/08/21	07/08/21
BLANK	2-HEXANONE	2.00 U	10.0	2.00	0.92	ug/L	07/08/21	07/08/21
BLANK	4-CHLOROTOLUENE	0.30 U	1.0	0.30	0.13	ug/L	07/08/21	07/08/21
BLANK	4-METHYL-2-PENTANONE	5.00 U	10.0	5.00	1.90	ug/L	07/08/21	07/08/21
BLANK	ACETONE	2.00 U	10.0	2.00	0.95	ug/L	07/08/21	07/08/21
BLANK	BENZENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	BROMOBENZENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	BROMOCHLOROMETHANE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	BROMODICHLOROMETHANE	0.30 U	1.0	0.30	0.14	ug/L	07/08/21	07/08/21
BLANK	BROMOFORM	0.30 U	1.0	0.30	0.14	ug/L	07/08/21	07/08/21
BLANK	BROMOMETHANE	0.50 U	2.0	0.50	0.24	ug/L	07/08/21	07/08/21
BLANK	CARBON DISULFIDE	0.50 U	1.0	0.50	0.20	ug/L	07/08/21	07/08/21

Quant Method: T0708W.M
Run #: 0708T15
Instrument: Thor
Sequence: 210708
Initials: CHE

GC SC-Blank-REG MDLs-DOD
Printed: 07/16/21 4:22:41 PM

Method Blank
EPA 8260C WATER

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210708S-35396 - 266021**
Batch ID: #86CDO-210708AT

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	CARBON TETRACHLORIDE	0.30 U	1.0	0.30	0.10	ug/L	07/08/21	07/08/21
BLANK	CHLOROBENZENE	0.50 U	1.0	0.50	0.21	ug/L	07/08/21	07/08/21
BLANK	CHLORODIBROMOMETHANE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	CHLOROETHANE	0.50 U	1.0	0.50	0.21	ug/L	07/08/21	07/08/21
BLANK	CHLOROFORM	0.30 U	1.0	0.30	0.07	ug/L	07/08/21	07/08/21
BLANK	CHLOROMETHANE	0.50 U	1.0	0.50	0.25	ug/L	07/08/21	07/08/21
BLANK	CIS-1,2-DICHLOROETHENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	CIS-1,3-DICHLOROPROPENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	DIBROMOMETHANE	0.50 U	1.0	0.50	0.20	ug/L	07/08/21	07/08/21
BLANK	DICHLORODIFLUOROMETHANE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	ETHYLBENZENE	0.50 U	1.0	0.50	0.23	ug/L	07/08/21	07/08/21
BLANK	HEXACHLOROBUTADIENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	ISOPROPYLBENZENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	M,P-XYLENE	0.30 U	2.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	METHYL TERT-BUTYL ETHER	0.52 U	1.0	0.52	0.26	ug/L	07/08/21	07/08/21
BLANK	METHYLENE CHLORIDE	1.00 U	5.0	1.00	0.35	ug/L	07/08/21	07/08/21
BLANK	N-BUTYLBENZENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	N-PROPYLBENZENE	0.50 U	1.0	0.50	0.21	ug/L	07/08/21	07/08/21
BLANK	NAPHTHALENE	0.50 U	1.0	0.50	0.25	ug/L	07/08/21	07/08/21
BLANK	O-XYLENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	P-ISOPROPYLTOLUENE	0.30 U	1.0	0.30	0.12	ug/L	07/08/21	07/08/21
BLANK	SEC-BUTYLBENZENE	0.30 U	1.0	0.30	0.12	ug/L	07/08/21	07/08/21
BLANK	STYRENE	0.50 U	1.0	0.50	0.25	ug/L	07/08/21	07/08/21
BLANK	TERT-BUTYLBENZENE	0.30 U	1.0	0.30	0.13	ug/L	07/08/21	07/08/21
BLANK	TETRACHLOROETHENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	TOLUENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	TRANS-1,2-DICHLOROETHENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	TRANS-1,3-DICHLOROPROPENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	TRICHLOROETHENE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	TRICHLOROFLUOROMETHANE	0.50 U	1.0	0.50	0.24	ug/L	07/08/21	07/08/21
BLANK	VINYL CHLORIDE	0.30 U	1.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	XYLENES (TOTAL)	0.30 U	2.0	0.30	0.15	ug/L	07/08/21	07/08/21
BLANK	SURROGATE: 1,2-DICHLOROET	108	81-118			%	07/08/21	07/08/21
BLANK	SURROGATE: 4-BROMOFLUORO	102	85-114			%	07/08/21	07/08/21

Quant Method: T0708W.M
Run #: 0708T15
Instrument: Thor
Sequence: 210708
Initials: CHE

GC SC-Blank-REG MDLs-DOD
Printed: 07/16/21 4:22:41 PM

Method Blank
EPA 8260C WATER

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210708S-35396 - 266021**
Batch ID: #86CDO-210708AT

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	SURROGATE: DIBROMOFLUOR	106	80-119			%	07/08/21	07/08/21
BLANK	SURROGATE: TOLUENE-D8 (S)	103	89-112			%	07/08/21	07/08/21

Quant Method: T0708W.M
Run #: 0708T15
Instrument: Thor
Sequence: 210708
Initials: CHE

GC SC-Blank-REG MDLs-DOD
Printed: 07/16/21 4:22:41 PM

EPA 8260C

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96689
Case No:	96689	Date Analyzed:	07/08/21
Matrix:	MISC	Instrument:	Thor
LCS ID:	210708AT-LCS	Time Analyzed:	1633

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210708AT-LCS	Lab Control Spike	0708T13	07/08/21 1633
210708AT-LCSD	Lab Control SpikeD	0708T14	07/08/21 1658
210708AT-BLK	Blank	0708T15	07/08/21 1723
BA35396	VE-UXO17-DRUM-01	0708T35	07/09/21 0139

Comments: Batch: #86CDO-210708AT

Laboratory Control Spike Recoveries
EPA 8260C WATER

APPL ID: **210708S-35396 LCS - 266021**
Batch ID: #86CDO-210708AT

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Lvl ug/L	SPK Result ug/L	DUP Result ug/L	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
1,1,1,2-TETRACHLOROETHANE	10.00	10.7	10.4	107	104	78-124	2.8	20
1,1,1-TRICHLOROETHANE	10.00	10.6	10.5	106	105	74-131	0.95	20
1,1,2,2-TETRACHLOROETHANE	10.00	10.5	10.2	105	102	71-121	2.9	20
1,1,2-TRICHLOROETHANE	10.00	10.3	10.2	103	102	80-119	0.98	20
1,1-DICHLOROETHANE	10.00	10.2	9.97	102	99.7	77-125	2.3	20
1,1-DICHLOROETHENE	10.00	9.82	9.93	98.2	99.3	71-131	1.1	20
1,1-DICHLOROPROPENE	10.00	10.0	9.91	100	99.1	79-125	0.90	20
1,2,3-TRICHLOROBENZENE	10.00	10.2	9.88	102	98.8	69-129	3.2	20
1,2,3-TRICHLOROPROPANE	10.00	10.5	10.6	105	106	73-122	0.95	20
1,2,4-TRICHLOROBENZENE	10.00	10.0	10.0	100	100	69-130	0.0	20
1,2,4-TRIMETHYLBENZENE	10.00	10.6	10.5	106	105	76-124	0.95	20
1,2-DIBROMO-3-CHLOROPROPANE	10.00	10.3	9.94	103	99.4	62-128	3.6	20
1,2-DIBROMOETHANE	10.00	10.1	9.67	101	96.7	77-121	4.4	20
1,2-DICHLOROBENZENE	10.00	10.2	10.1	102	101	80-119	0.99	20
1,2-DICHLOROETHANE	10.00	10.2	10.1	102	101	73-128	0.99	20
1,2-DICHLOROPROPANE	10.00	10.1	10.1	101	101	78-122	0.0	20
1,3,5-TRIMETHYLBENZENE	10.00	10.8	10.6	108	106	82-120	1.9	20
1,3-DICHLOROBENZENE	10.00	10.1	10.3	101	103	80-119	2.0	20
1,3-DICHLOROPROPANE	10.00	10.3	9.97	103	99.7	80-119	3.3	20
1,4-DICHLOROBENZENE	10.00	9.99	9.96	99.9	99.6	79-118	0.30	20
2,2-DICHLOROPROPANE	10.00	9.50	9.37	95.0	93.7	60-139	1.4	20
2-BUTANONE	50.0	53.6	53.8	107	108	56-143	0.37	20
2-CHLOROTOLUENE	10.00	10.1	9.88	101	98.8	79-122	2.2	20
2-HEXANONE	50.0	53.0	52.5	106	105	57-139	0.95	20

Comments: _____

Primary	SPK	DUP
Quant Method :	T0708W.M	T0708W.M
Extraction Date :	07/08/21	07/08/21
Analysis Date :	07/08/21	07/08/21
Instrument :	Thor	Thor
Run :	0708T13	0708T14
Initials :	CHE	

Laboratory Control Spike Recoveries
EPA 8260C WATER

APPL ID: **210708S-35396 LCS - 266021**
Batch ID: #86CDO-210708AT

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Lvl ug/L	SPK Result ug/L	DUP Result ug/L	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
4-CHLOROTOLUENE	10.00	10.6	10.4	106	104	78-122	1.9	20
4-METHYL-2-PENTANONE	50.0	52.8	51.8	106	104	67-130	1.9	20
ACETONE	50.0	48.3	47.4	96.6	94.8	39-160	1.9	20
BENZENE	10.00	10.0	10.1	100	101	79-120	1.00	20
BROMOBENZENE	10.00	10.3	10.1	103	101	80-120	2.0	20
BROMOCHLOROMETHANE	10.00	10.9	10.5	109	105	78-123	3.7	20
BROMODICHLOROMETHANE	10.00	10.5	10.3	105	103	79-125	1.9	20
BROMOFORM	10.00	10.9	11.0	109	110	66-130	0.91	20
BROMOMETHANE	10.00	10.7	10.2	107	102	53-141	4.8	20
CARBON DISULFIDE	10.00	10.1	10.2	101	102	64-133	0.99	20
CARBON TETRACHLORIDE	10.00	10.9	10.7	109	107	72-136	1.9	20
CHLOROBENZENE	10.00	10.2	10.1	102	101	82-118	0.99	20
CHLORODIBROMOMETHANE	10.00	10.8	10.4	108	104	74-126	3.8	20
CHLOROETHANE	10.00	10.2	10.0	102	100	60-138	2.0	20
CHLOROFORM	10.00	10.4	10.2	104	102	79-124	1.9	20
CHLOROMETHANE	10.00	10.2	9.64	102	96.4	50-139	5.6	20
CIS-1,2-DICHLOROETHENE	10.00	10.2	10.3	102	103	78-123	0.98	20
CIS-1,3-DICHLOROPROPENE	10.00	10.4	10.2	104	102	75-124	1.9	20
DIBROMOMETHANE	10.00	11.2	11.0	112	110	79-123	1.8	20
DICHLORODIFLUOROMETHANE	10.00	11.9	10.6	119	106	32-152	11.6	20
ETHYLBENZENE	10.00	10.4	10.3	104	103	79-121	0.97	20
HEXACHLOROBUTADIENE	10.00	9.71	9.83	97.1	98.3	66-134	1.2	20
ISOPROPYLBENZENE	10.00	10.2	10.4	102	104	72-131	1.9	20
M,P-XYLENE	20.0	21.1	20.8	106	104	80-121	1.4	20

Comments: _____

Primary	SPK	DUP
Quant Method :	T0708W.M	T0708W.M
Extraction Date :	07/08/21	07/08/21
Analysis Date :	07/08/21	07/08/21
Instrument :	Thor	Thor
Run :	0708T13	0708T14
Initials :	CHE	

Laboratory Control Spike Recoveries
EPA 8260C WATER

APPL ID: **210708S-35396 LCS - 266021**
Batch ID: #86CDO-210708AT

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Lvl ug/L	SPK Result ug/L	DUP Result ug/L	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
METHYL TERT-BUTYL ETHER	10.00	10.2	9.98	102	99.8	71-124	2.2	20
METHYLENE CHLORIDE	10.00	9.78	9.70	97.8	97.0	74-124	0.82	20
N-BUTYLBENZENE	10.00	10.4	10.4	104	104	75-128	0.0	20
N-PROPYLBENZENE	10.00	10.4	10.4	104	104	76-126	0.0	20
NAPHTHALENE	10.00	9.94	9.87	99.4	98.7	61-128	0.71	20
O-XYLENE	10.00	10.5	10.5	105	105	78-122	0.0	20
P-ISOPROPYLTOLUENE	10.00	10.6	10.6	106	106	77-127	0.0	20
SEC-BUTYLBENZENE	10.00	10.5	10.4	105	104	77-126	0.96	20
STYRENE	10.00	10.6	10.6	106	106	78-123	0.0	20
TERT-BUTYLBENZENE	10.00	10.8	10.7	108	107	78-124	0.93	20
TETRACHLOROETHENE	10.00	10.4	10.3	104	103	74-129	0.97	20
TOLUENE	10.00	10.2	10.3	102	103	80-121	0.98	20
TRANS-1,2-DICHLOROETHENE	10.00	10.2	10.0	102	100	75-124	2.0	20
TRANS-1,3-DICHLOROPROPENE	10.00	10.7	10.3	107	103	73-127	3.8	20
TRICHLOROETHENE	10.00	10.1	10.1	101	101	79-123	0.0	20
TRICHLOROFLUOROMETHANE	10.00	10.9	11.0	109	110	65-141	0.91	20
VINYL CHLORIDE	10.00	10.3	10.0	103	100	58-137	3.0	20
XYLENES (TOTAL)	30.0	31.5	31.3	105	104	79-121	0.64	20
SURROGATE: 1,2-DICHLOROETHANE-D	25.0	26.8	26.4	107	106	81-118		
SURROGATE: 4-BROMOFLUOROBENZE	25.0	26.5	26.2	106	105	85-114		
SURROGATE: DIBROMOFLUOROMETH	25.0	26.3	26.1	105	104	80-119		
SURROGATE: TOLUENE-D8 (S)	25.0	26.3	26.1	105	104	89-112		

Comments:

Primary	SPK	DUP
Quant Method :	T0708W.M	T0708W.M
Extraction Date :	07/08/21	07/08/21
Analysis Date :	07/08/21	07/08/21
Instrument :	Thor	Thor
Run :	0708T13	0708T14
Initials :	CHE	

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No:
Matrix: Water
ID: 0708T00.D

SDG No:
Date Analyzed: 07/08/21
Instrument: Thor
Time Analyzed: 11:19

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		0.3ug/L VOC STD 7/8/	0708T02.D	07/08/21 12:00
2		0.5ug/L VOC STD 7/8/	0708T03.D	07/08/21 12:25
3		1ug/L VOC STD 7/8/21	0708T04.D	07/08/21 12:50
4		2ug/L VOC STD 7/8/21	0708T05.D	07/08/21 13:15
5		5ug/L VOC STD 7/8/21	0708T06.D	07/08/21 13:39
6		10ug/L VOC STD 7/8/2	0708T07.D	07/08/21 14:04
7		20ug/L VOC STD 7/8/2	0708T08.D	07/08/21 14:29
8		40ug/L VOC STD 7/8/2	0708T09.D	07/08/21 14:54
9		100ug/L VOC STD 7/8/	0708T10.D	07/08/21 15:19
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
50	15 - 40% of mass 95	19.0
75	30 - 60% of mass 95	50.0
95	100 - 100% of mass 95	100.0
96	5 - 9% of mass 95	8.5
173	0 - 2.05% of mass 174	1.2
174	50 - 200% of mass 95	99.5
175	5 - 9% of mass 174	8.1
176	95 - 101% of mass 174	99.9
177	5 - 9% of mass 176	6.2

Form 5
Tune Summary

Lab Name: APPL Inc. SDG No: 96689
Case No: 96689 Date Analyzed: 07/08/21
Matrix: Water Instrument: Thor
ID: 0708T11.D Time Analyzed: 15:44

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		(SS) 10ug/L VOC STD	0708T12.D	07/08/21 16:09
2	Lab Control Spike	210708A LCS 10ug/L	0708T13.D	07/08/21 16:33
3	Lab Control SpikeD	210708A LCSD 10ug/L	0708T14.D	07/08/21 16:58
4	Blank	210708A BLK	0708T15.D	07/08/21 17:23
5	VE-UXO17-DRUM-01	BA35396W01 DF100000	0708T35.D	07/09/21 1:39
6		Ending CCV 10ug/L 7/	0708T36.D	07/09/21 2:03
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
50	15.0 - 40.0% of mass 95	17.4
75	30.0 - 60.0% of mas 95	50.1
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.3
173	Less than 2.0% of mass 174	0.9
174	50.0 - 200.0% of mass 95	101.8
175	5.0 - 9.0% of mass 174	7.2
176	95.0 - 101.0% of mass 174	96.0
177	5.0 - 9.0% of mass 176	6.6

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract:

Lab Code: SDG No.:

Lab File ID (Standard): 0708T07.D Date Analyzed: 8 Jul 21 14:04

Instrument ID: Thor Time Analyzed: 8 Jul 21 14:04

GC Column: ID: Heated Purge: (Y/N)

		Fluorobenzene (IS)		Chlorobenzene-D5 (IS)		1,4-Dichlorobenzene-D (IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	1194730	6.46	983645	9.92	567656	12.48
	UPPER LIMIT	2389460	6.63	1967290	10.09	1135312	12.65
	LOWER LIMIT	597365	6.29	491823	9.75	283828	12.31
	SAMPLE NO.						
01	(SS) 10ug/L VOC STD 7	1217610	6.46	999615	9.92	586037	12.48
02	210708A LCS 10ug/L	1228360	6.46	998272	9.92	578024	12.48
03	210708A LCSD 10ug/L	1231400	6.46	1001350	9.92	578953	12.48
04	210708A BLK	1193410	6.46	983275	9.92	551070	12.48
05	BA35396W01 DF10000	1134160	6.46	937098	9.92	524919	12.48
06	Ending CCV 10ug/L 7/8/	1144950	6.46	943559	9.92	551047	12.48
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

6010C/TCLP

Form 4

Blank Summary

Lab Name: APPL, Inc. SDG No: 96689

Case No: 96689 Date Analyzed: 07/06/21

Matrix: MISC Instrument: Cyrus

Blank ID: 210702A-BLK Time Analyzed: 1609

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210702A-MSD	Matrix SpikeD	210706A	07/06/21 1649
210702A-MS	Matrix Spike	210706A	07/06/21 1644
210702A-LCS	Lab Control Spike	210706A	07/06/21 1613
210702A-BLK	Blank	210706A	07/06/21 1609
BA35396	VE-UXO17-DRUM-01	210706A	07/06/21 1640

Comments: Batch: #61CTC-210702A

METALS BLANK

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Analyte	Result	LOQ	LOD	DL	Units	Prep Date	Analysis Date	QC Group
6010C	ARSENIC (AS)	0.0100 U	0.050	0.0100	0.0043	mg/L	07/02/21	07/06/21	#61CTC-210702A-BA35396
6010C	BARIUM (BA)	0.0040 U	0.050	0.0040	0.0008	mg/L	07/02/21	07/06/21	#61CTC-210702A-BA35396
6010C	CADMIUM (CD)	0.0030 U	0.050	0.0030	0.0005	mg/L	07/02/21	07/06/21	#61CTC-210702A-BA35396
6010C	CHROMIUM (CR)	0.0040 U	0.050	0.0040	0.0014	mg/L	07/02/21	07/06/21	#61CTC-210702A-BA35396
6010C	LEAD (PB)	0.0040 U	0.100	0.0040	0.0016	mg/L	07/02/21	07/06/21	#61CTC-210702A-BA35396
6010C	SELENIUM (SE)	0.0100 U	0.050	0.0100	0.0046	mg/L	07/02/21	07/06/21	#61CTC-210702A-BA35396
6010C	SILVER (AG)	0.0009 U	0.010	0.0009	0.0004	mg/L	07/02/21	07/06/21	#61CTC-210702A-BA35396

Metals SC-Blank-REG MDLs
Printed: 08/13/21 10:36:29 AM

6010C/TCLP

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96689
Case No:	96689	Date Analyzed:	07/06/21
Matrix:	MISC	Instrument:	Cyrus
LCS ID:	210702A-LCS	Time Analyzed:	1613

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210702A-MSD	Matrix SpikeD	210706A	07/06/21 1649
210702A-MS	Matrix Spike	210706A	07/06/21 1644
210702A-LCS	Lab Control Spike	210706A	07/06/21 1613
210702A-BLK	Blank	210706A	07/06/21 1609
BA35396	VE-UXO17-DRUM-01	210706A	07/06/21 1640

Comments: Batch: #61CTC-210702A

Laboratory Control Spike Recovery
METALS

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Level mg/L	SPK Result mg/L	SPK % Recovery	Recovery Limits	Extract Date	Analysis Date	QC Group
EPA 6010C	ARSENIC (AS)	0.250	0.25	100	87-113	07/02/21	07/06/21	#61CTC-210702A-BA35396
EPA 6010C	BARIUM (BA)	0.250	0.25	100	88-113	07/02/21	07/06/21	#61CTC-210702A-BA35396
EPA 6010C	CADMIUM (CD)	0.050	0.048	96.0	88-113	07/02/21	07/06/21	#61CTC-210702A-BA35396
EPA 6010C	CHROMIUM (CR)	0.250	0.25	100	90-113	07/02/21	07/06/21	#61CTC-210702A-BA35396
EPA 6010C	LEAD (PB)	0.250	0.24	96.0	86-113	07/02/21	07/06/21	#61CTC-210702A-BA35396
EPA 6010C	SELENIUM (SE)	0.250	0.22	88.0	83-114	07/02/21	07/06/21	#61CTC-210702A-BA35396
EPA 6010C	SILVER (AG)	0.100	0.100	100	84-115	07/02/21	07/06/21	#61CTC-210702A-BA35396

Comments:

7470A/TCLP

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	96689
Case No:	96689	Date Analyzed:	07/14/21
Matrix:	MISC	Instrument:	Freddie
Blank ID:	210702A-BLK	Time Analyzed:	1402

APPL ID.	Client Sample No.	File ID.	Date Analyzed
BA35396	VE-UXO17-DRUM-01	210714W	07/14/21 1404
210702A-MSD	Matrix SpikeD	210714W	07/14/21 1409
210702A-MS	Matrix Spike	210714W	07/14/21 1407
210702A-LCS	Lab Control Spike	210714W	07/14/21 1404
210702A-BLK	Blank	210714W	07/14/21 1402

Comments: Batch: #TCLPG-210702A

METALS BLANK

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Analyte	Result	LOQ	LOD	DL	Units	Prep Date	Analysis Date	QC Group
7470A	MERCURY (HG)	0.00015 U	0.0002	0.00015	0.00006	mg/L	07/02/21	07/14/21	#TCLPG-210702A-BA35396

Metals SC-Blank-REG MDLs
Printed: 07/28/21 9:54:25 AM

7470A/TCLP

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96689
Case No:	96689	Date Analyzed:	07/14/21
Matrix:	MISC	Instrument:	Freddie
LCS ID:	210702A-LCS	Time Analyzed:	1404

APPL ID.	Client Sample No.	File ID.	Date Analyzed
BA35396	VE-UXO17-DRUM-01	210714W	07/14/21 1404
210702A-MSD	Matrix SpikeD	210714W	07/14/21 1409
210702A-MS	Matrix Spike	210714W	07/14/21 1407
210702A-LCS	Lab Control Spike	210714W	07/14/21 1404
210702A-BLK	Blank	210714W	07/14/21 1402

Comments: Batch: #TCLPG-210702A

Laboratory Control Spike Recovery
METALS

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Level mg/L	SPK Result mg/L	SPK % Recovery	Recovery Limits	Extract Date	Analysis Date	QC Group
EPA 7470A	MERCURY (HG)	0.004	0.0045	112	82-119	07/02/21	07/14/21	#TCLPG-210702A-BA35396

Comments:

Matrix Spike Recoveries

METALS

APPL ID: **210702S-35396 MS - 266341**

Sample ID: BA35396

Client ID: VE-UXO17-DRUM-01

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Lvl mg/L	Matrix Res mg/L	SPK Res mg/L	DUP Res mg/L	SPK % Recovery	DUP % Recovery	RPD	RPD Max	Recovery Limits	Extract Date-Spk	Analysis Date-Spk	Extract Date-Dup	Analysis Date-Dup	QC Group	QC Sample
EPA 7470A	MERCURY (HG)	0.004	ND	0.0045	0.0043	112	108	4.5	20	82-119	07/02/21	07/14/21	07/02/21	07/14/21	266341	BA35396

Comments:

EPA 8260C

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 96689

Case No: 96689 Date Analyzed: 07/08/21

Matrix: MISC Instrument: Max

APPL ID.	Client Sample No.	SURROGATE: 4-BROMOFLUOROBENZENE (S)					
		Limits	Result	Qualifier	Limits	Result	Qualifier
210708AM-LCS	Lab Control Spike	85-114	99.6				
210708AM-BLK	Blank	85-114	97.0				
BA35396	VE-UXO17-DRUM-01	85-114	94.4				
210708AM-LCSD	Lab Control SpikeD	85-114	95.2				

Comments: Batch: #86CGR-210708AM

EPA 8260C

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	96689
Case No:	96689	Date Analyzed:	07/08/21
Matrix:	MISC	Instrument:	Max
Blank ID:	210708AM-BLK	Time Analyzed:	1404

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210708AM-LCS	Lab Control Spike	0708M07	07/08/21 1336
210708AM-BLK	Blank	0708M08	07/08/21 1404
BA35396	VE-UXO17-DRUM-01	0708M26	07/08/21 2227
210708AM-LCSD	Lab Control SpikeD	0708M28	07/08/21 2323

Comments: Batch: #86CGR-210708AM

Method Blank
EPA 8260C GRO WATER

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **210708S-35396 - 266015**
Batch ID: #86CGR-210708AM

Sample Type	Analyte	Result	LOQ	LOD	DL	Units	Extraction Date	Analysis Date
BLANK	GASOLINE RANGE ORGANICS	18.0 U	20	18.0	8.6	ug/L	07/08/21	07/08/21
BLANK	SURROGATE: 4-BROMOFLUORO	97.0	85-114			%	07/08/21	07/08/21

Quant Method: MGAS0702.M
Run #: 0708M08
Instrument: Max
Sequence: 210707
Initials: CHE

GC SC-Blank-REG MDLs-DOD
Printed: 07/16/21 2:49:43 PM

EPA 8260C

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	96689
Case No:	96689	Date Analyzed:	07/08/21
Matrix:	MISC	Instrument:	Max
LCS ID:	210708AM-LCS	Time Analyzed:	1336

APPL ID.	Client Sample No.	File ID.	Date Analyzed
210708AM-LCS	Lab Control Spike	0708M07	07/08/21 1336
210708AM-BLK	Blank	0708M08	07/08/21 1404
BA35396	VE-UXO17-DRUM-01	0708M26	07/08/21 2227
210708AM-LCSD	Lab Control SpikeD	0708M28	07/08/21 2323

Comments: Batch: #86CGR-210708AM

Laboratory Control Spike Recoveries
EPA 8260C GRO WATER

APPL ID: **210708S-35396 LCS - 266015**
Batch ID: #86CGR-210708AM

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Lvl ug/L	SPK Result ug/L	DUP Result ug/L	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
GASOLINE RANGE ORGANICS	300	330	325	110	108	78-122	1.5	30
SURROGATE: 4-BROMOFLUOROBENZE	25.0	24.9	23.8	99.6	95.2	85-114		

Comments:

Primary	SPK	DUP
Quant Method :	MGAS0702.M	MGAS0702.M
Extraction Date :	07/08/21	07/08/21
Analysis Date :	07/08/21	07/08/21
Instrument :	Max	Max
Run :	0708M07	0708M28
Initials :	CHE	

ORGANICS

Calibration Data

TPH Extractables
DROB0702

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 07/02/21
Matrix: Water Instrument: Apollo
Initials: MB

			702005.D	702006.D	702007.D	702008.D	702009.D	702010.D	702011 D								
		Compound	1	2	3	4	5	6	7				Avg	%RSD	Type	r^2	Q
1	HATM	Diesel (C10-C24)		1951949	2014939	2067917	2039722	2119264	2139867				2055610	3.4	HATM		
2	HBTM	Motor Oil (C24-C36)		1488430	1239525	1274234	1246456	1291444	1297684				1306295	7.1	HBTM		
3	SA	Ortho-Terphenyl(S)	2636466	2540006	2431557	2529925	2422677	2435838	2499496				2499423	3.1	SA		
4	SA	Octacosane(S)	1728504	1650255	1588691	1695307	1644244	1699403	1705536				1673134	2.9	SA		
5																	
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0.468214

TPH Extractables
DOC0702

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 07/02/21
Matrix: Water Instrument: Apollo
Initials: MB

			702005.D	702006.D	702007.D	702008.D	702009.D	702010.D	702011.D								
		Compound	1	2	3	4	5	6	7				Avg	%RSD	Type	r^2	Q
1	HATM	Diesel (C10-C24)	3016894	1951949	2014939	2067917	2039722	2119264	2139867				2192936	17	HATM		
2	HBTM	Motor Oil (C24-C40)		1676406	1491952	1522421	1492860	1546113	1554117				1547312	4.4	HBTM		
3	SA	Ortho-Terphenyl(S)	2636466	2540006	2431557	2529925	2422677	2435838	2499496				2499423	3.1	SA		
4	SA	Octacosane(S)	1728504	1650255	1588691	1695307	1644244	1699403	1705536				1673134	2.9	SA		
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0.776978

TPH Extractables
DOC0702

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 07/13/21
Instrument: Apollo
Initial Cal. Date: 07/02/21
Data File: 712041.D

		Compound	MEAN	CCRF	%D	%Drift	
1	HATM	Diesel (C10-C24)	2192940	2247600	2.5	HATM	
2	HBTM	Motor Oil (C24-C40)	1547310	1714280	11	HBTM	
3	SA	Ortho-Terphenyl(S)	2499420	2760690	10	SA	
4	SA	Octacosane(S)	1673130	1823420	9.0	SA	
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		Average			8.1		

TPH Extractables
DOC0702

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 07/13/21
Instrument: Apollo
Initial Cal. Date: 07/02/21
Data File: 712060.D

		Compound	MEAN	CCRF	%D	%Drift	
1	HATM	Diesel (C10-C24)	2192940	2319080	5.8	HATM	
2	HBTM	Motor Oil (C24-C40)	1547310	1733720	12	HBTM	
3	SA	Ortho-Terphenyl(S)	2499420	2804650	12	SA	
4	SA	Octacosane(S)	1673130	1870680	12	SA	
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		Average			10.5		

TPH Extractables
DROB0702

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 07/13/21
Instrument: Apollo
Initial Cal. Date: 07/02/21
Data File: 713003.D

		Compound	MEAN	CCRF	%D	%Drift	
1	HATM	Diesel (C10-C24)	2055610	2329240	13	HATM	
2	HBTM	Motor Oil (C24-C36)	1306300	1427600	9.3	HBTM	
3	SA	Ortho-Terphenyl(S)	2499420	2875880	15	SA	
4	SA	Octacosane(S)	1673130	1861210	11	SA	
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		Average			12.1		

TPH Extractables
DROB0702

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 07/13/21
Instrument: Apollo
Initial Cal. Date: 07/02/21
Data File: 713018.D

		Compound	MEAN	CCRF	%D	%Drift	
1	HATM	Diesel (C10-C24)	2055610	2431680	18	HATM	
2	HBTM	Motor Oil (C24-C36)	1306300	1568330	20	HBTM	
3	SA	Ortho-Terphenyl(S)	2499420	2932840	17	SA	
4	SA	Octacosane(S)	1673130	1897340	13	SA	
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		Average			17.0		

ORGANICS

Raw Data

_LIQ005SGC

Organic Extraction Worksheet

Method	Continuous Liq/Liq TPH- 3520C w/SGC	Extraction Set	210630A	Extraction Method	LIQ005SGC	Units	mL

Spiked ID 1	Diesel Motor Oil Mix 6-28-21 6-28-22		Surrogate ID 1	THC Surrogate 6-23-21 6-23-22	
Spiked ID 2			Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	06/30/21 14:23	
Spiked ID 8			Ext. End Time:	06/30/21 14:30	
			GC Requires Extract By:		

pH1			Water Bath Temp 1 °C	
pH2			Water Bath Temp 2 °C	
pH3			Water Bath Temp 3 °C	

Spiked By: KY **Date** 06/30/21 **Witnessed By:** SR **Date** 06/30/21

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	210630A Blk				1	1 equip	1.00g	100	NA	06/30/21 14:23	
2	210630A LCS-1		1	1	1	1 equip	1.00g	100	NA	06/30/21 14:23	
3	210630A LCSD-1		1	1	1	1 equip	1.00g	100	NA	06/30/21 14:23	
4	BA35148	BA35148M01			1	1 equip	1.58g	100	NA	06/30/21 14:23	96668 Dilute and Shoot
5	BA35396	BA35396M13			1	1 equip	1.01g	100	NA	06/30/21 14:23	96689 Dilute and Shoot END TIME 7-1-21 08:00

Solvent and Lot#	
Dichloromethane (DCM)	60338

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	CW
Date	7/1/21
Time	14:05
Refrigerator	Hobart

	Technician's Initials
Scanned By	SR
Sample Preparation	SR
Extraction	SR
Concentration	SR

Modified	07/01/21 2:13:32 PM

Reviewed By: KY **Date** 07/07/21

Organic Extraction Worksheet

Method	THC Separatory Funnel Extraction 3510C	Extraction Set	210701A	Extraction Method	SEP011	Units	mL

Spiked ID 1	Diesel Motor Oil Mix 6-28-21 6-28-22		Surrogate ID 1	THC Surrogate 7-1-21 7-1-22	
Spiked ID 2			Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	07/01/21 8:15	
Spiked ID 8			Ext. End Time:	07/01/21 8:31	
			GC Requires Extract By:		

pH1	2	07/01/21 8:03	Water Bath Temp 1 °C	
pH2			Water Bath Temp 2 °C	
pH3			Water Bath Temp 3 °C	

Spiked By: KY **Date** 07/01/21 **Witnessed By:** SR **Date** 07/01/21

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	210701A Blk				0.250	1 equip	30	5	2	07/01/21 8:15	micro extraction 3511 in Hexane
2	210701A LCS-1		0.080	1	0.250	1 equip	30	5	2	07/01/21 8:15	
3	210701A LCSD-1		0.080	1	0.250	1 equip	30	5	2	07/01/21 8:15	
4	BA35396	BA35396M12			0.250	1 equip	30	5	2	07/01/21 8:15	96689 "HOT"

Solvent and Lot#	
1+1 HCL (1mL)	6/22/21 6/22/22
PH Strips	HC148594
Hexane	244802

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	CW
Date	7/1/21
Time	10:25
Refrigerator	Hobart

	Technician's Initials
Scanned By	KY
Sample Preparation	SR
Extraction	SR,KY
Concentration	SR

Modified	07/08/21 10:48:14 AM

Reviewed By: KY **Date** 07/08/21

07/15/21 11:27:29 AM Ext_ID 71682

Injection Log

Directory: G:\APOLLO\DATA\210702\

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	5	702005.D	1	DMO STD-1 07/02/21	water	7-2-21 14:35:23
2	6	702006.D	1	DMO STD-2 07/02/21	water	7-2-21 15:03:41
3	7	702007.D	1	DMO STD-3 07/02/21	water	7-2-21 15:32:00
4	8	702008.D	1	DMO STD-4 07/02/21	water	7-2-21 16:01:03
5	9	702009.D	1	DMO STD-5 07/02/21	water	7-2-21 16:29:22
6	10	702010.D	1	DMO STD-6 07/02/21	water	7-2-21 16:57:44
7	11	702011.D	1	DMO STD-7 07/02/21	water	7-2-21 17:26:03
8	12	702012.D	1	DMO STD-SS 07/02/21	water	7-2-21 17:54:24
9	41	712041.D	1	Diesel Motor Oil 06/30/21	water	7-13-21 4:15:29
10	54	712054.D	100000	210630A BLK 100/1.00G	soil	7-13-21 10:23:15
11	55	712055.D	100000	210630A LCS-1 100/1.00G	soil	7-13-21 10:51:36
12	56	712056.D	100000	210630A LCSD-1 100/1.00G	soil	7-13-21 11:20:04
13	58	712058.D	99009.9	BA35396M13 100/1.01G	soil	7-13-21 12:16:44
14	60	712060.D	1	Diesel Motor Oil 06/30/21	water	7-13-21 13:13:18
15	3	713003.D	1	Diesel Motor Oil CCV 06/30/21	water	7-13-21 16:37:40
16	14	713014.D	166.667	210701A BLK 5/30	water	7-13-21 21:49:20
17	15	713015.D	166.667	210701A LCS-1 5/30	water	7-13-21 22:17:40
18	16	713016.D	166.667	210701A LCSD-1 5/30	water	7-13-21 22:45:54
19	17	713017.D	166.667	BA35396M12 5/30	water	7-13-21 23:14:16
20	18	713018.D	1	Diesel Motor Oil CCV 06/30/21	water	7-13-21 23:42:40

ORGANICS

Calibration Data

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 06/28/21
Matrix: Instrument: KYLO Initials: MA

			0628K004.D	0628K005.D	0628K006.D	0628K007.D	0628K008.D	0628K009.D	0628K010.D	0628K011.D	0628K012.D							
		Compound	4	5	10	20	40	50	60	80	100		Avg	%RSD	Type	r^2	Q	MRF
1	I	1,4-dichlorobenzene-D4(IS)	ISTD															
2	L	1,4-Dioxane			0.5228	0.8546	0.8596	0.8495	0.8579	0.8681	0.8639		0.81	16		0.999		
3	TM	n-Nitrosodimethylamine		1.042	0.9804	1.015	1.067	1.056	1.047	1.031	1.046		1.0	2.6	TM			
4	TM	Pyridine		2.984	2.725	2.792	2.994	2.990	3.001	2.995	3.063		2.9	4.0	TM			
5	S	2-Fluorophenol (S)		1.554	1.758	1.722	1.720	1.678	1.588	1.516	1.439		1.6	7.1	S			
6	S	Phenol-D6 (S)		1.635	1.899	1.826	2.013	2.078	2.128	2.159	2.282		2.0	10	S			
7	*TM	Phenol		2.740	2.506	2.463	2.750	2.773	2.956	2.864	3.103		2.8	7.7	*TM			0.800
8	TM	Aniline		1.449	1.358	1.382	1.596	1.447	1.433	1.297	1.214		1.4	8.2	TM			
9	TM	Bis (2-chloroethyl) ether		1.070	0.9975	0.9857	1.099	1.118	1.160	1.153	1.275		1.1	8.5	TM			0.700
10	TM	2-Chlorophenol		1.873	1.790	1.778	1.922	1.920	1.969	1.900	1.949		1.9	3.7	TM			0.800
11	TM	1,3-DCB		2.137	1.972	1.961	2.076	2.044	2.060	1.992	1.979		2.0	3.1	TM			
12	*TM	1,4-DCB		2.194	2.008	2.019	2.139	2.113	2.115	2.037	2.020		2.1	3.3	*TM			
13	TML	Benzyl alcohol		0.8001	0.8743	0.9921	1.490	1.652	1.795	1.785	1.854		1.4	32	TM	0.995		
14	TM	1,2-DCB		1.970	1.780	1.799	1.934	1.880	1.900	1.761	1.696		1.8	5.2	TM			
15	TML	2-Methylphenol		1.355	1.318	1.338	1.786	1.896	1.927	2.056	2.170		1.7	20	TM	0.994		0.700
16	TM	Bis (2-chloroisopropyl) ether		1.948	1.830	1.779	2.051	2.073	2.194	2.139	2.189		2.0	7.8	TM			0.010
17	TML	Acetophenone		1.578	1.677	1.833	2.578	2.781	3.037	3.075	3.178		2.5	27	TM	0.995		0.010
18	TM	3&4-Methylphenol			1.828	1.931	2.339	2.483	2.588	2.554	2.642		2.3	14	TM			0.600
19	**TML	n-Nitrosodi-n-propylamine		0.6492	0.7881	1.105	1.833	2.024	2.227	2.244	2.235		1.6	42	**TM	0.995		0.500
20	TM	Hexachloroethane		0.7809	0.7417	0.7390	0.8170	0.8030	0.8218	0.7886	0.7753		0.78	4.0	TM			0.300
21	I	Napthalene-D8(IS)	ISTD															
22	S	Nitrobenzene-D5(S)			0.3652	0.3614	0.3991	0.4055	0.4156	0.4320	0.4407		0.40	7.6	S			
23	TM	Nitrobenzene		0.4523	0.4416	0.4394	0.4730	0.4674	0.4864	0.4866	0.4923		0.47	4.5	TM			0.200
24	TMQ	Isophorone		0.5243	0.7849	1.237	1.467	1.378	1.319	1.225	1.143		1.1	28	TM	0.998		0.400
25	*TM	2-Nitrophenol		0.1869	0.2079	0.2284	0.2637	0.2683	0.2804	0.2730	0.2864		0.25	15	*TM			0.100
26	TM	2,4-Dimethylphenol		0.4489	0.4587	0.5088	0.5806	0.5578	0.5591	0.5290	0.5203		0.52	9.1	TM			0.200
27	TML	Benzoic acid			0.2151	0.3489	0.5284	0.5275	0.5154	0.4913	0.5074		0.45	27	TM	0.992		
28	TM	Bis (2-chloroethoxy) methane		0.4635	0.4824	0.5255	0.6229	0.6342	0.6225	0.6157	0.5956		0.57	12	TM			0.300
29	*TM	2,4-Dichlorophenol		0.3811	0.3900	0.4172	0.4688	0.4534	0.4348	0.4086	0.3816		0.42	7.9	*TM			0.200
30	TM	1,2,4-Trichlorobenzene		0.3838	0.3558	0.3415	0.3356	0.3243	0.3188	0.3078	0.3027		0.33	8.0	TM			
31	TM	3,4-Dimethylphenol		0.6823	0.7625	0.8898	0.9216	0.9019	0.8234	0.7620	0.6727		0.80	12	TM			
32	TM	Naphthalene		1.419	1.374	1.356	1.368	1.315	1.323	1.259	1.157		1.3	6.2	TM			0.700
33	TMQ	4-Chloroaniline		0.6122	0.6989	0.7753	0.7514	0.6850	0.6166	0.5044	0.4177		0.63	19	TM	0.998		0.010
34	TM	2,6-Dichlorophenol		0.3615	0.3779	0.4176	0.4382	0.4113	0.3817	0.3582	0.3131		0.38	10	TM			
35	TM	Hexachloropropene		0.1900	0.1965	0.1929	0.1933	0.1843	0.1842	0.1739	0.1606		0.18	6.5	TM			

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 06/28/21
Matrix: Instrument: KYLO Initials: MA

		Compound	4	5	10	20	40	50	60	80	100		Avg	%RSD	Type		Q	
36	*TM	Hexachlorobutadiene		0.1705	0.1574	0.1506	0.1407	0.1324	0.1328	0.1282	0.1248		0.14	11	*TM			0.010
37	TML	Caprolactum			0.4583	0.4626	0.3752	0.3617	0.3472	0.3302	0.3142		0.38	16	TM	0.994		0.010
38	*TM	4-Chloro-3-methylphenol		0.6454	0.7158	0.7691	0.7006	0.6493	0.6150	0.5454	0.5327		0.65	13	*TM			0.200
39	TM	2-Methylnaphthalene		0.9747	1.003	1.083	1.110	1.027	0.9731	0.9350	0.8390		0.99	8.6	TM			0.400
40	TM	1-Methylnaphthalene		1.066	1.085	1.175	1.162	1.086	1.043	0.9325	0.8181		1.0	11	TM			
41	I	Acenaphthene-D10(IS)	ISTD															
42	**TM	Hexachlorocyclopentadiene		0.1405	0.1656	0.1837	0.1764	0.1663	0.1905	0.1993	0.2026		0.18	12	**TM			0.050
43	TM	1,2,4,5-Tetrachlorobenzene		0.4282	0.4214	0.4376	0.4804	0.4891	0.4892	0.4535	0.4714		0.46	6.0	TM			0.010
44	*TM	2,4,6-Trichlorophenol		0.3328	0.3753	0.4050	0.4322	0.4302	0.4293	0.4008	0.4171		0.40	8.5	*TM			0.200
45	TM	2,4,5-Trichlorophenol		0.4225	0.4578	0.4690	0.4772	0.4737	0.4775	0.4255	0.4177		0.45	5.8	TM			0.200
46	S	2-Fluorobiphenyl(S)		0.9783	1.228	1.326	1.453	1.484	1.407	1.348	1.372		1.3	12	S			
47	TM	1,1'-Biphenyl		1.628	1.675	1.730	1.802	1.650	1.579	1.440	1.247		1.6	11	TM			0.010
48	TM	2-Chloronaphthalene		1.244	1.247	1.328	1.434	1.394	1.342	1.254	1.159		1.3	7.0	TM			0.800
49	TM	2-Nitroaniline		0.5492	0.5810	0.5618	0.5792	0.5928	0.6016	0.5620	0.5750		0.58	3.0	TM			0.010
50	TM	Dimethyl phthalate		2.206	2.027	1.929	1.989	2.008	2.043	1.925	1.989		2.0	4.4	TM			0.010
51	TM	2,6-DNT		0.4343	0.4437	0.4279	0.4575	0.4945	0.4650	0.4715	0.4905		0.46	5.3	TM			0.200
52	TM	Acenaphthylene		2.335	2.426	2.499	2.413	2.434	2.313	2.071	2.142		2.3	6.5	TM			0.900
53	TM	3-Nitroaniline		0.5697	0.5331	0.5185	0.5643	0.5421	0.5614	0.4947	0.4855		0.53	6.0	TM			0.010
54	*TM	Acenaphthene		1.702	1.629	1.583	1.509	1.463	1.351	1.292	1.243		1.5	11	*TM			0.900
55	**TML	2,4-Dinitrophenol			0.0466	0.1110	0.2109	0.2424	0.2681	0.2830	0.3095		0.21	46	**TM	0.994		0.010
56	**TML	4-Nitrophenol		0.3483	0.4035	0.4497	0.5199	0.5609	0.5743	0.5328			0.48	18	**TM	0.995		0.010
57	TM	Dibenzofuran		2.486	2.336	2.192	1.972	1.892	1.802	1.643			2.0	15	TM			0.800
58	TM	2,4-DNT		0.6492	0.6419	0.6333	0.6595	0.6563	0.6546	0.6563	0.6506		0.65	1.3	TM			0.200
59	TM	2,3,4,6-Tetrachlorophenol		0.2775	0.2933	0.2998	0.3309	0.3272	0.3408	0.3182	0.3378		0.32	7.3	TM			0.010
60	TM	Diethyl phthalate		2.349	2.174	2.130	2.227	2.192	2.201	2.040	1.977		2.2	5.3	TM			0.010
61	TMQ	4-Chlorophenyl phenyl ether			0.8343	0.7391	0.6893	0.6644	0.5977	0.5587	0.5221		0.66	16	TM	0.998		0.400
62	TMQ	Fluorene		2.222	2.019	1.795	1.605	1.513	1.415	1.289	1.211		1.6	22	TM	0.999		0.900
63	TM	4-Nitroaniline		0.5419	0.5862	0.5738	0.6296	0.6420	0.6283	0.5825	0.5571		0.59	6.2	TM			0.010
64	S	2,4,6-Tribromophenol(S)			0.1391	0.1432	0.1533	0.1676	0.1640	0.1736	0.1677		0.16	8.4	S			
65	I	Phenanthrene-D10(IS)	ISTD															
66	TML	4,6-Dinitro-2-methylphenol			0.0908	0.1464	0.1945	0.2006	0.1998	0.1896			0.17	26	TM	0.993		0.010
67	TM	Diphenyl amine			0.8565	0.7632	0.7250	0.6585	0.6495	0.5501			0.70	15	TM			
68	*TM	n-Nitrosodiphenylamine			0.8565	0.7632	0.7250	0.6585	0.6495	0.5501			0.70	15	*TM			0.010
69	TM	1,2-Diphenylhydrazine		1.302	1.214	1.140	1.293	1.234	1.205	1.045	0.9931		1.2	9.5	TM			
70	TM	4-Bromophenyl phenyl ether		0.2236	0.2089	0.2004	0.2079	0.2014	0.1908	0.1878	0.1748		0.20	7.5	TM			0.100

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 06/28/21
Matrix: Instrument: KYLO Initials: MA

		Compound	4	5	10	20	40	50	60	80	100		Avg	%RSD	Type		Q	
71	TM	Hexachlorobenzene		0.2132	0.2006	0.2013	0.2043	0.2016	0.1972	0.1914	0.1844		0.20	4.3	TM			0.100
72	TM	Atrazine		0.1601	0.1831	0.1996	0.2050	0.2056	0.1896	0.2087	0.1976		0.19	8.3	TM			0.010
73	*TM	Pentachlorophenol				0.1321	0.1572	0.1572	0.1582	0.1496	0.1429		0.15	7.0	*TM			0.050
74	TM	Phenanthrene			1.508	1.482	1.404	1.360	1.197	1.121	0.9905		1.3	15	TM			0.700
75	TM	Anthracene		1.607	1.562	1.497	1.457	1.361	1.324	1.103	1.103		1.4	14	TM			0.700
76	TM	Carbazol		1.621	1.664	1.721	1.586	1.462	1.360	1.241	1.083		1.5	15	TM			0.010
77	TMQ	Di-n-butylphthalate		2.239	2.315	2.270	1.898	1.844	1.590	1.319			1.9	20	TM	0.998		0.010
78	*TM	Fluoranthene			1.682	1.611	1.434	1.398	1.293	1.081			1.4	15	*TM			0.600
79	I	Chrysene-D12(IS)	ISTD															
80	TML	Benzidine		0.2253	0.2853	0.3657	0.3937	0.4110	0.4151	0.4467	0.4345		0.37	21	TM	0.998		
81	TM	Pyrene		2.005	2.101	2.150	2.117	2.030	2.030	1.986	1.779		2.0	5.7	TM			0.600
82	S	Terphenyl-D14(S)		0.9399	1.226	1.240	1.140	1.213	1.202	1.166	1.086		1.2	8.6	S			
83	TM	Butyl benzylphthalate		1.092	1.169	1.196	1.150	1.180	1.091	1.022	1.039		1.1	5.9	TM			0.010
84	TM	3,3'-Dichlorobenzidine		0.4919	0.5290	0.5171	0.4973	0.4509	0.4469	0.3886	0.3520		0.46	14	TM			0.010
85	TM	Benz (a) anthracene		1.730	1.738	1.626	1.548	1.572	1.477	1.370	1.314		1.5	10.0	TM			0.800
86	TM	Bis (2-ethylhexyl) phthalate		1.507	1.602	1.657	1.568	1.522	1.508	1.357	1.078		1.5	12	TM			0.010
87	TM	Chrysene		1.793	1.709	1.597	1.530	1.557	1.468	1.321	1.273		1.5	12	TM			0.700
88	*TM	Di-n-octylphthalate		2.109	2.301	2.492	2.489	2.413	2.360	2.192	1.987		2.3	8.0	*TM			0.010
89	I	Perylene-D12(IS)	ISTD															
90	TM	Benzo (b) fluoranthene		1.447	1.607	1.511	1.636	1.837	1.769	1.920	1.784		1.7	9.8	TM			0.700
91	TM	Benzo (k) fluoranthene		1.447	1.446	1.493	1.583	1.501	1.601	1.388	1.508		1.5	4.8	TM			0.700
92	*TM	Benzo (a) pyrene	1.365	1.386	1.349	1.366	1.447	1.466	1.477	1.417	1.398		1.4	3.3	*TM			0.700
93	TM	Indeno (1,2,3-cd) pyrene		0.9110	0.8900	0.9145	0.9456	0.9321	0.8811	0.7979	0.7482		0.88	7.9	TM			0.500
94	TM	Dibenz (a,h) anthracene		1.038	0.9979	1.018	1.044	1.006	0.9757	0.8861	0.8150		0.97	8.3	TM			0.400
95	TM	Benzo (g,h,i) perylene		1.004	0.9402	0.9253	0.9223	0.8796	0.8367	0.7529	0.6777		0.87	12	TM			0.500
96																		
97																		
98																		
99																		
100																		
101																		
102																		
103																		
104																		
105																		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Second Source Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Date Analyzed: 06/28/21
Matrix: Instrument: KYLO
Initial Cal. Date: 06/28/21
Data File: 0628K013.D

		Compound	MEAN	CCRF	%D		%Drift
1	L	1,4-Dioxane	0.8109	0.9321	15	L	9.2
2	TM	n-Nitrosodimethylamine	1.036	1.153	11	TM	
3	TM	Pyridine	2.943	3.160	7.4	TM	
4	*TM	Phenol	2.769	2.789	0.71	*TM	
5	TM	Aniline	1.397	1.553	11	TM	
6	TM	Bis (2-chloroethyl) ether	1.107	1.094	1.2	TM	
7	TM	2-Chlorophenol	1.888	1.952	3.4	TM	
8	TM	1,3-DCB	2.028	2.231	10	TM	
9	*TM	1,4-DCB	2.081	2.286	9.9	*TM	
10	TML	Benzyl alcohol	1.405	1.583	13	TML	5.9
11	TM	1,2-DCB	1.840	2.042	11	TM	
12	TML	2-Methylphenol	1.731	1.853	7.1	TML	5.2
13	TM	Bis (2-chloroisopropyl) ether	2.025	2.054	1.4	TM	
14	TML	Acetophenone	2.467	2.635	6.8	TML	8.4
15	TM	3&4-Methylphenol	2.338	2.428	3.9	TM	
16	**TML	n-Nitrosodi-n-propylamine	1.638	1.933	18	**TML	5.8
17	TM	Hexachloroethane	0.7834	0.8658	11	TM	
18	TM	Nitrobenzene	0.4674	0.4926	5.4	TM	
19	TMQ	Isophorone	1.135	1.511	33	TMQ	12
20	*TM	2-Nitrophenol	0.2494	0.2776	11	*TM	
21	TM	2,4-Dimethylphenol	0.5204	0.5886	13	TM	
22	TML	Benzoic acid	0.4477	0.5473	22	TML	10
23	TM	Bis (2-chloroethoxy) methane	0.5703	0.6202	8.7	TM	
24	*TM	2,4-Dichlorophenol	0.4169	0.4875	17	*TM	
25	TM	1,2,4-Trichlorobenzene	0.3338	0.3449	3.3	TM	
26	TM	3,4-Dimethylphenol	0.8020	0.9294	16	TM	
27	TM	Naphthalene	1.321	1.365	3.3	TM	
28	TMQ	4-Chloroaniline	0.6327	0.7061	12	TMQ	7.5
29	TM	2,6-Dichlorophenol	0.3824	0.4386	15	TM	
30	TM	Hexachloropropene	0.1845	0.1948	5.6	TM	
31	*TM	Hexachlorobutadiene	0.1422	0.1456	2.4	*TM	
32	TML	Caprolactum	0.3785	0.3783	0.05	TML	9.5
33	*TM	4-Chloro-3-methylphenol	0.6467	0.6988	8.1	*TM	
34	TM	2-Methylnaphthalene	0.9930	1.164	17	TM	
35	TM	1-Methylnaphthalene	1.046	1.122	7.3	TM	
36	**TM	Hexachlorocyclopentadiene	0.1781	0.1650	7.4	**TM	
37	TM	1,2,4,5-Tetrachlorobenzene	0.4589	0.4964	8.2	TM	
38	*TM	2,4,6-Trichlorophenol	0.4028	0.4320	7.2	*TM	
39	TM	2,4,5-Trichlorophenol	0.4526	0.4727	4.4	TM	
40	TM	1,1'-Biphenyl	1.594	1.699	6.6	TM	
		Average			9.4		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 06/28/21
Instrument: KYLO
Cal. Date: 06/28/21
Data File: 0628K013.D

		Compound	MEAN	CCRF	%D		%Drift
41	TM	2-Chloronaphthalene	1.300	1.464	13	TM	
42	TM	2-Nitroaniline	0.5753	0.5831	1.3	TM	
43	TM	Dimethyl phthalate	2.014	1.948	3.3	TM	
44	TM	2,6-DNT	0.4606	0.5009	8.8	TM	
45	TM	Acenaphthylene	2.329	2.433	4.5	TM	
46	TM	3-Nitroaniline	0.5337	0.5474	2.6	TM	
47	*TM	Acenaphthene	1.471	1.482	0.74	*TM	
48	**TML	2,4-Dinitrophenol	0.2102	0.2605	24	**TML	1.4
49	**TML	4-Nitrophenol	0.4842	0.5835	21	**TML	7.6
50	TM	Dibenzofuran	2.046	1.910	6.7	TM	
51	TM	2,4-DNT	0.6502	0.6508	0.09	TM	
52	TM	2,3,4,6-Tetrachlorophenol	0.3157	0.3350	6.1	TM	
53	TM	Diethyl phthalate	2.161	2.165	0.15	TM	
54	TMQ	4-Chlorophenyl phenyl ether	0.6579	0.6667	1.3	TMQ	4.7
55	TMQ	Fluorene	1.634	1.545	5.4	TMQ	4.0
56	TM	4-Nitroaniline	0.5927	0.6599	11	TM	
57	TML	4,6-Dinitro-2-methylphenol	0.1703	0.2015	18	TML	5.2
58	TM	Diphenyl amine	0.7004	0.6856	2.1	TM	
59	*TM	n-Nitrosodiphenylamine	0.7004	0.6856	2.1	*TM	
60	TM	1,2-Diphenylhydrazine	1.178	1.267	7.5	TM	
61	TM	4-Bromophenyl phenyl ether	0.1995	0.1996	0.08	TM	
62	TM	Hexachlorobenzene	0.1992	0.2046	2.7	TM	
63	TM	Atrazine	0.1937	0.1657	14	TM	
64	*TM	Pentachlorophenol	0.1495	0.1627	8.8	*TM	
65	TM	Phenanthrene	1.295	1.365	5.4	TM	
66	TM	Anthracene	1.377	1.361	1.2	TM	
67	TM	Carbazol	1.467	1.518	3.5	TM	
68	TMQ	Di-n-butylphthalate	1.925	1.821	5.4	TMQ	3.8
69	*TM	Fluoranthene	1.416	1.367	3.5	*TM	
70	TML	Benzidine	0.3722	0.3278	12	TML	20
71	TM	Pyrene	2.025	2.106	4.0	TM	
72	TM	Butyl benzylphthalate	1.117	1.200	7.4	TM	
73	TM	3,3'-Dichlorobenzidine	0.4592	0.4767	3.8	TM	
74	TM	Benz (a) anthracene	1.547	1.606	3.8	TM	
75	TM	Bis (2-ethylhexyl) phthalate	1.475	1.630	10	TM	
76	TM	Chrysene	1.531	1.575	2.9	TM	
77	*TM	Di-n-octylphthalate	2.293	2.496	8.9	*TM	
78	TM	Benzo (b) fluoranthene	1.689	1.852	9.7	TM	
79	TM	Benzo (k) fluoranthene	1.496	1.636	9.4	TM	
80	*TM	Benzo (a) pyrene	1.408	1.472	4.6	*TM	
		Average			6.5		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 06/28/21
Instrument: KYLO
Cal. Date: 06/28/21
Data File: 0628K013.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Indeno (1,2,3-cd) pyrene	0.8776	0.8045	8.3	TM	
82	TM	Dibenz (a,h) anthracene	0.9727	0.9389	3.5	TM	
83	TM	Benzo (g,h,i) perylene	0.8673	0.7683	11	TM	
84							
85							
86							
87							
88							
89							
90							
91							
92							
93							
94							
95							
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110							
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							
		Average			7.6		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 6 Jul 21 8:43
Instrument: KYLO
Initial Cal. Date: 06/28/21
Data File: 0628K100.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	1,4-dichlorobenzene-D4(IS)	ISTD			I	
2	L	1,4-Dioxane	0.8109	0.8707	7.4	L	2.3
3	TM	n-Nitrosodimethylamine	1.036	1.064	2.8	TM	
4	TM	Pyridine	2.943	2.861	2.8	TM	
5	S	2-Fluorophenol (S)	1.622	1.697	4.6	S	
6	S	Phenol-D6 (S)	2.002	2.140	6.9	S	
7	*TM	Phenol	2.769	2.900	4.7	*TM	
8	TM	Aniline	1.397	1.395	0.12	TM	
9	TM	Bis (2-chloroethyl) ether	1.107	1.198	8.2	TM	
10	TM	2-Chlorophenol	1.888	1.987	5.3	TM	
11	TM	1,3-DCB	2.028	2.039	0.57	TM	
12	*TM	1,4-DCB	2.081	2.097	0.79	*TM	
13	TML	Benzyl alcohol	1.405	1.621	15	TML	3.9
14	TM	1,2-DCB	1.840	1.903	3.4	TM	
15	TML	2-Methylphenol	1.731	1.966	14	TML	0.15
16	TM	Bis (2-chloroisopropyl) ether	2.025	2.314	14	TM	
17	TML	Acetophenone	2.467	2.858	16	TML	1.7
18	TM	3&4-Methylphenol	2.338	2.414	3.3	TM	
19	**TML	n-Nitrosodi-n-propylamine	1.638	2.079	27	**TML	0.27
20	TM	Hexachloroethane	0.7834	0.8318	6.2	TM	
21	I	Napthalene-D8(IS)	ISTD			I	
22	S	Nitrobenzene-D5(S)	0.4028	0.4206	4.4	S	
23	TM	Nitrobenzene	0.4674	0.4929	5.5	TM	
24	TMQ	Isophorone	1.135	1.342	18	TMQ	2.3
25	*TM	2-Nitrophenol	0.2494	0.2733	9.6	*TM	
26	TM	2,4-Dimethylphenol	0.5204	0.5410	4.0	TM	
27	TML	Benzoic acid	0.4477	0.4039	9.8	TML	16
28	TM	Bis (2-chloroethoxy) methane	0.5703	0.6370	12	TM	
29	*TM	2,4-Dichlorophenol	0.4169	0.4462	7.0	*TM	
30	TM	1,2,4-Trichlorobenzene	0.3338	0.3191	4.4	TM	
31	TM	3,4-Dimethylphenol	0.8020	0.8296	3.4	TM	
32	TM	Naphthalene	1.321	1.318	0.22	TM	
33	TMQ	4-Chloroaniline	0.6327	0.6304	0.35	TMQ	9.8
34	TM	2,6-Dichlorophenol	0.3824	0.3947	3.2	TM	
35	TM	Hexachloropropene	0.1845	0.1885	2.2	TM	
36	*TM	Hexachlorobutadiene	0.1422	0.1369	3.7	*TM	
37	TML	Caprolactum	0.3785	0.3926	3.7	TML	14
38	*TM	4-Chloro-3-methylphenol	0.6467	0.6219	3.8	*TM	
39	TM	2-Methylnaphthalene	0.9930	1.010	1.7	TM	
40	TM	1-Methylnaphthalene	1.046	1.026	1.9	TM	
		Average			6.4		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 6 Jul 21 8:43
Instrument: KYLO
Cal. Date: 06/28/21
Data File: 0628K100.D

		Compound	MEAN	CCRF	%D		%Drift
41	I	Acenaphthene-D10(IS)	ISTD			I	
42	**TM	Hexachlorocyclopentadiene	0.1781	0.2052	15	**TM	
43	TM	1,2,4,5-Tetrachlorobenzene	0.4589	0.5114	11	TM	
44	*TM	2,4,6-Trichlorophenol	0.4028	0.4447	10	*TM	
45	TM	2,4,5-Trichlorophenol	0.4526	0.4908	8.4	TM	
46	S	2-Fluorobiphenyl(S)	1.324	1.514	14	S	
47	TM	1,1'-Biphenyl	1.594	1.748	9.6	TM	
48	TM	2-Chloronaphthalene	1.300	1.454	12	TM	
49	TM	2-Nitroaniline	0.5753	0.6218	8.1	TM	
50	TM	Dimethyl phthalate	2.014	2.039	1.2	TM	
51	TM	2,6-DNT	0.4606	0.4803	4.3	TM	
52	TM	Acenaphthylene	2.329	2.334	0.19	TM	
53	TM	3-Nitroaniline	0.5337	0.5773	8.2	TM	
54	*TM	Acenaphthene	1.471	1.429	2.9	*TM	
55	**TML	2,4-Dinitrophenol	0.2102	0.1967	6.4	**TML	17
56	**TML	4-Nitrophenol	0.4842	0.5841	21	**TML	7.7
57	TM	Dibenzofuran	2.046	1.796	12	TM	
58	TM	2,4-DNT	0.6502	0.6207	4.5	TM	
59	TM	2,3,4,6-Tetrachlorophenol	0.3157	0.3283	4.0	TM	
60	TM	Diethyl phthalate	2.161	2.182	0.97	TM	
61	TMQ	4-Chlorophenyl phenyl ether	0.6579	0.6124	6.9	TMQ	6.1
62	TMQ	Fluorene	1.634	1.430	12	TMQ	5.8
63	TM	4-Nitroaniline	0.5927	0.6434	8.6	TM	
64	S	2,4,6-Tribromophenol(S)	0.1583	0.1579	0.25	S	
65	I	Phenanthrene-D10(IS)	ISTD			I	
66	TML	4,6-Dinitro-2-methylphenol	0.1703	0.1794	5.3	TML	5.4
67	TM	Diphenyl amine	0.7004	0.6807	2.8	TM	
68	*TM	n-Nitrosodiphenylamine	0.7004	0.6807	2.8	*TM	
69	TM	1,2-Diphenylhydrazine	1.178	1.286	9.1	TM	
70	TM	4-Bromophenyl phenyl ether	0.1995	0.1991	0.19	TM	
71	TM	Hexachlorobenzene	0.1992	0.2040	2.4	TM	
72	TM	Atrazine	0.1937	0.2067	6.7	TM	
73	*TM	Pentachlorophenol	0.1495	0.1578	5.5	*TM	
74	TM	Phenanthrene	1.295	1.293	0.12	TM	
75	TM	Anthracene	1.377	1.355	1.6	TM	
76	TM	Carbazol	1.467	1.487	1.3	TM	
77	TMQ	Di-n-butylphthalate	1.925	1.791	6.9	TMQ	0.75
78	*TM	Fluoranthene	1.416	1.338	5.5	*TM	
79	I	Chrysene-D12(IS)	ISTD			I	
80	TML	Benzidine	0.3722	0.3908	5.0	TML	6.2
		Average			6.4		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 6 Jul 21 8:43
Instrument: KYLO
Cal. Date: 06/28/21
Data File: 0628K100.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Pyrene	2.025	2.078	2.7	TM	
82	S	Terphenyl-D14(S)	1.152	1.176	2.1	S	
83	TM	Butyl benzylphthalate	1.117	1.151	3.0	TM	
84	TM	3,3'-Dichlorobenzidine	0.4592	0.4711	2.6	TM	
85	TM	Benz (a) anthracene	1.547	1.486	3.9	TM	
86	TM	Bis (2-ethylhexyl) phthalate	1.475	1.479	0.30	TM	
87	TM	Chrysene	1.531	1.428	6.7	TM	
88	*TM	Di-n-octylphthalate	2.293	2.458	7.2	*TM	
89	I	Perylene-D12(IS)	ISTD			I	
90	TM	Benzo (b) fluoranthene	1.689	1.753	3.8	TM	
91	TM	Benzo (k) fluoranthene	1.496	1.597	6.8	TM	
92	*TM	Benzo (a) pyrene	1.408	1.476	4.8	*TM	
93	TM	Indeno (1,2,3-cd) pyrene	0.8776	0.9036	3.0	TM	
94	TM	Dibenz (a,h) anthracene	0.9727	0.9788	0.63	TM	
95	TM	Benzo (g,h,i) perylene	0.8673	0.8365	3.6	TM	
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120							
		Average			3.7		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 7 Jul 21 8:06
Instrument: KYLO
Initial Cal. Date: 06/28/21
Data File: 0628K125.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	1,4-dichlorobenzene-D4(IS)	ISTD			I	
2	L	1,4-Dioxane	0.8109	0.4522	44	L	45
3	TM	n-Nitrosodimethylamine	1.036	1.106	6.8	TM	
4	TM	Pyridine	2.943	3.026	2.8	TM	
5	S	2-Fluorophenol (S)	1.622	1.725	6.4	S	
6	S	Phenol-D6 (S)	2.002	2.213	11	S	
7	*TM	Phenol	2.769	3.015	8.9	*TM	
8	TM	Aniline	1.397	1.505	7.7	TM	
9	TM	Bis (2-chloroethyl) ether	1.107	1.224	11	TM	
10	TM	2-Chlorophenol	1.888	1.996	5.7	TM	
11	TM	1,3-DCB	2.028	2.025	0.15	TM	
12	*TM	1,4-DCB	2.081	2.107	1.3	*TM	
13	TML	Benzyl alcohol	1.405	1.730	23	TML	1.7
14	TM	1,2-DCB	1.840	1.871	1.7	TM	
15	TML	2-Methylphenol	1.731	2.069	20	TML	4.5
16	TM	Bis (2-chloroisopropyl) ether	2.025	2.386	18	TM	
17	TML	Acetophenone	2.467	3.022	23	TML	3.2
18	TM	3&4-Methylphenol	2.338	2.637	13	TM	
19	**TML	n-Nitrosodi-n-propylamine	1.638	2.187	33	**TML	4.7
20	TM	Hexachloroethane	0.7834	0.8146	4.0	TM	
21	I	Napthalene-D8(IS)	ISTD			I	
22	S	Nitrobenzene-D5(S)	0.4028	0.4353	8.1	S	
23	TM	Nitrobenzene	0.4674	0.4999	7.0	TM	
24	TMQ	Isophorone	1.135	1.474	30	TMQ	8.6
25	*TM	2-Nitrophenol	0.2494	0.2806	13	*TM	
26	TM	2,4-Dimethylphenol	0.5204	0.5652	8.6	TM	
27	TML	Benzoic acid	0.4477	0.4939	10	TML	0.33
28	TM	Bis (2-chloroethoxy) methane	0.5703	0.6731	18	TM	
29	*TM	2,4-Dichlorophenol	0.4169	0.4557	9.3	*TM	
30	TM	1,2,4-Trichlorobenzene	0.3338	0.3145	5.8	TM	
31	TM	3,4-Dimethylphenol	0.8020	0.8931	11	TM	
32	TM	Naphthalene	1.321	1.359	2.8	TM	
33	TMQ	4-Chloroaniline	0.6327	0.6879	8.7	TMQ	2.9
34	TM	2,6-Dichlorophenol	0.3824	0.4090	7.0	TM	
35	TM	Hexachloropropene	0.1845	0.1806	2.1	TM	
36	*TM	Hexachlorobutadiene	0.1422	0.1344	5.5	*TM	
37	TML	Caprolactum	0.3785	0.4016	6.1	TML	17
38	*TM	4-Chloro-3-methylphenol	0.6467	0.6626	2.5	*TM	
39	TM	2-Methylnaphthalene	0.9930	1.038	4.5	TM	
40	TM	1-Methylnaphthalene	1.046	1.104	5.5	TM	
		Average			10.7		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 7 Jul 21 8:06
Instrument: KYLO
Cal. Date: 06/28/21
Data File: 0628K125.D

		Compound	MEAN	CCRF	%D		%Drift
41	I	Acenaphthene-D10(IS)	ISTD			I	
42	**TM	Hexachlorocyclopentadiene	0.1781	0.1983	11	**TM	
43	TM	1,2,4,5-Tetrachlorobenzene	0.4589	0.4919	7.2	TM	
44	*TM	2,4,6-Trichlorophenol	0.4028	0.4439	10	*TM	
45	TM	2,4,5-Trichlorophenol	0.4526	0.4823	6.6	TM	
46	S	2-Fluorobiphenyl(S)	1.324	1.481	12	S	
47	TM	1,1'-Biphenyl	1.594	1.772	11	TM	
48	TM	2-Chloronaphthalene	1.300	1.438	11	TM	
49	TM	2-Nitroaniline	0.5753	0.6141	6.7	TM	
50	TM	Dimethyl phthalate	2.014	1.904	5.5	TM	
51	TM	2,6-DNT	0.4606	0.4470	2.9	TM	
52	TM	Acenaphthylene	2.329	2.334	0.19	TM	
53	TM	3-Nitroaniline	0.5337	0.5343	0.12	TM	
54	*TM	Acenaphthene	1.471	1.419	3.6	*TM	
55	**TML	2,4-Dinitrophenol	0.2102	0.2101	0.04	**TML	13
56	**TML	4-Nitrophenol	0.4842	0.5454	13	**TML	0.91
57	TM	Dibenzofuran	2.046	1.796	12	TM	
58	TM	2,4-DNT	0.6502	0.6002	7.7	TM	
59	TM	2,3,4,6-Tetrachlorophenol	0.3157	0.3121	1.1	TM	
60	TM	Diethyl phthalate	2.161	2.026	6.2	TM	
61	TMQ	4-Chlorophenyl phenyl ether	0.6579	0.6298	4.3	TMQ	2.7
62	TMQ	Fluorene	1.634	1.444	12	TMQ	4.7
63	TM	4-Nitroaniline	0.5927	0.6111	3.1	TM	
64	S	2,4,6-Tribromophenol(S)	0.1583	0.1478	6.7	S	
65	I	Phenanthrene-D10(IS)	ISTD			I	
66	TML	4,6-Dinitro-2-methylphenol	0.1703	0.1941	14	TML	1.6
67	TM	Diphenyl amine	0.7004	0.7121	1.7	TM	
68	*TM	n-Nitrosodiphenylamine	0.7004	0.7121	1.7	*TM	
69	TM	1,2-Diphenylhydrazine	1.178	1.358	15	TM	
70	TM	4-Bromophenyl phenyl ether	0.1995	0.2066	3.6	TM	
71	TM	Hexachlorobenzene	0.1992	0.2048	2.8	TM	
72	TM	Atrazine	0.1937	0.2044	5.6	TM	
73	*TM	Pentachlorophenol	0.1495	0.1591	6.4	*TM	
74	TM	Phenanthrene	1.295	1.327	2.5	TM	
75	TM	Anthracene	1.377	1.368	0.66	TM	
76	TM	Carbazol	1.467	1.555	6.0	TM	
77	TMQ	Di-n-butylphthalate	1.925	1.825	5.2	TMQ	4.2
78	*TM	Fluoranthene	1.416	1.450	2.4	*TM	
79	I	Chrysene-D12(IS)	ISTD			I	
80	TML	Benzidine	0.3722	0.3498	6.0	TML	15
		Average			6.1		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 7 Jul 21 8:06
Instrument: KYLO
Cal. Date: 06/28/21
Data File: 0628K125.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Pyrene	2.025	2.151	6.2	TM	
82	S	Terphenyl-D14(S)	1.152	1.286	12	S	
83	TM	Butyl benzylphthalate	1.117	1.246	12	TM	
84	TM	3,3'-Dichlorobenzidine	0.4592	0.4418	3.8	TM	
85	TM	Benz (a) anthracene	1.547	1.590	2.8	TM	
86	TM	Bis (2-ethylhexyl) phthalate	1.475	1.565	6.1	TM	
87	TM	Chrysene	1.531	1.496	2.3	TM	
88	*TM	Di-n-octylphthalate	2.293	2.426	5.8	*TM	
89	I	Perylene-D12(IS)	ISTD			I	
90	TM	Benzo (b) fluoranthene	1.689	1.905	13	TM	
91	TM	Benzo (k) fluoranthene	1.496	1.590	6.3	TM	
92	*TM	Benzo (a) pyrene	1.408	1.473	4.6	*TM	
93	TM	Indeno (1,2,3-cd) pyrene	0.8776	0.6976	21	TM	
94	TM	Dibenz (a,h) anthracene	0.9727	0.7695	21	TM	
95	TM	Benzo (g,h,i) perylene	0.8673	0.6199	29	TM	
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120							
		Average			10.4		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 7 Jul 21 10:44
Instrument: KYLO
Initial Cal. Date: 06/28/21
Data File: 0628K131.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	1,4-dichlorobenzene-D4(IS)	ISTD			I	
2	L	1,4-Dioxane	0.8109	0.8088	0.26	L	4.7
3	TM	n-Nitrosodimethylamine	1.036	1.054	1.8	TM	
4	TM	Pyridine	2.943	2.873	2.4	TM	
5	S	2-Fluorophenol (S)	1.622	1.701	4.9	S	
6	S	Phenol-D6 (S)	2.002	2.125	6.1	S	
7	*TM	Phenol	2.769	2.842	2.6	*TM	
8	TM	Aniline	1.397	1.397	0.04	TM	
9	TM	Bis (2-chloroethyl) ether	1.107	1.139	2.8	TM	
10	TM	2-Chlorophenol	1.888	1.969	4.3	TM	
11	TM	1,3-DCB	2.028	2.050	1.1	TM	
12	*TM	1,4-DCB	2.081	2.106	1.2	*TM	
13	TML	Benzyl alcohol	1.405	1.619	15	TML	4.0
14	TM	1,2-DCB	1.840	1.904	3.5	TM	
15	TML	2-Methylphenol	1.731	1.947	13	TML	1.0
16	TM	Bis (2-chloroisopropyl) ether	2.025	2.217	9.4	TM	
17	TML	Acetophenone	2.467	2.861	16	TML	1.6
18	TM	3&4-Methylphenol	2.338	2.553	9.2	TM	
19	**TML	n-Nitrosodi-n-propylamine	1.638	1.995	22	**TML	3.2
20	TM	Hexachloroethane	0.7834	0.8118	3.6	TM	
21	I	Napthalene-D8(IS)	ISTD			I	
22	S	Nitrobenzene-D5(S)	0.4028	0.4178	3.7	S	
23	TM	Nitrobenzene	0.4674	0.4825	3.2	TM	
24	TMQ	Isophorone	1.135	1.377	21	TMQ	0.48
25	*TM	2-Nitrophenol	0.2494	0.2733	9.6	*TM	
26	TM	2,4-Dimethylphenol	0.5204	0.5419	4.1	TM	
27	TML	Benzoic acid	0.4477	0.3845	14	TML	20
28	TM	Bis (2-chloroethoxy) methane	0.5703	0.6304	11	TM	
29	*TM	2,4-Dichlorophenol	0.4169	0.4512	8.2	*TM	
30	TM	1,2,4-Trichlorobenzene	0.3338	0.3216	3.6	TM	
31	TM	3,4-Dimethylphenol	0.8020	0.8742	9.0	TM	
32	TM	Naphthalene	1.321	1.358	2.8	TM	
33	TMQ	4-Chloroaniline	0.6327	0.6831	8.0	TMQ	1.8
34	TM	2,6-Dichlorophenol	0.3824	0.4032	5.4	TM	
35	TM	Hexachloropropene	0.1845	0.1896	2.8	TM	
36	*TM	Hexachlorobutadiene	0.1422	0.1392	2.1	*TM	
37	TML	Caprolactum	0.3785	0.4007	5.9	TML	17
38	*TM	4-Chloro-3-methylphenol	0.6467	0.6313	2.4	*TM	
39	TM	2-Methylnaphthalene	0.9930	1.030	3.7	TM	
40	TM	1-Methylnaphthalene	1.046	1.087	3.9	TM	
		Average			6.4		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 7 Jul 21 10:44
Instrument: KYLO
Cal. Date: 06/28/21
Data File: 0628K131.D

		Compound	MEAN	CCRF	%D	%Drift	
41	I	Acenaphthene-D10(IS)	ISTD			I	
42	**TM	Hexachlorocyclopentadiene	0.1781	0.2093	17	**TM	
43	TM	1,2,4,5-Tetrachlorobenzene	0.4589	0.4882	6.4	TM	
44	*TM	2,4,6-Trichlorophenol	0.4028	0.4319	7.2	*TM	
45	TM	2,4,5-Trichlorophenol	0.4526	0.4681	3.4	TM	
46	S	2-Fluorobiphenyl(S)	1.324	1.433	8.2	S	
47	TM	1,1'-Biphenyl	1.594	1.711	7.3	TM	
48	TM	2-Chloronaphthalene	1.300	1.384	6.4	TM	
49	TM	2-Nitroaniline	0.5753	0.5974	3.8	TM	
50	TM	Dimethyl phthalate	2.014	1.942	3.6	TM	
51	TM	2,6-DNT	0.4606	0.4546	1.3	TM	
52	TM	Acenaphthylene	2.329	2.356	1.2	TM	
53	TM	3-Nitroaniline	0.5337	0.5544	3.9	TM	
54	*TM	Acenaphthene	1.471	1.412	4.0	*TM	
55	**TML	2,4-Dinitrophenol	0.2102	0.2083	0.90	**TML	14
56	**TML	4-Nitrophenol	0.4842	0.5675	17	**TML	4.8
57	TM	Dibenzofuran	2.046	1.858	9.2	TM	
58	TM	2,4-DNT	0.6502	0.6630	2.0	TM	
59	TM	2,3,4,6-Tetrachlorophenol	0.3157	0.3399	7.7	TM	
60	TM	Diethyl phthalate	2.161	2.165	0.18	TM	
61	TMQ	4-Chlorophenyl phenyl ether	0.6579	0.6312	4.1	TMQ	2.4
62	TMQ	Fluorene	1.634	1.476	9.6	TMQ	1.9
63	TM	4-Nitroaniline	0.5927	0.6550	11	TM	
64	S	2,4,6-Tribromophenol(S)	0.1583	0.1675	5.8	S	
65	I	Phenanthrene-D10(IS)	ISTD			I	
66	TML	4,6-Dinitro-2-methylphenol	0.1703	0.1761	3.4	TML	6.9
67	TM	Diphenyl amine	0.7004	0.6443	8.0	TM	
68	*TM	n-Nitrosodiphenylamine	0.7004	0.6443	8.0	*TM	
69	TM	1,2-Diphenylhydrazine	1.178	1.229	4.3	TM	
70	TM	4-Bromophenyl phenyl ether	0.1995	0.1928	3.3	TM	
71	TM	Hexachlorobenzene	0.1992	0.2013	1.1	TM	
72	TM	Atrazine	0.1937	0.2041	5.4	TM	
73	*TM	Pentachlorophenol	0.1495	0.1598	6.9	*TM	
74	TM	Phenanthrene	1.295	1.272	1.8	TM	
75	TM	Anthracene	1.377	1.418	3.0	TM	
76	TM	Carbazol	1.467	1.459	0.56	TM	
77	TMQ	Di-n-butylphthalate	1.925	1.860	3.4	TMQ	8.1
78	*TM	Fluoranthene	1.416	1.378	2.7	*TM	
79	I	Chrysene-D12(IS)	ISTD			I	
80	TML	Benzidine	0.3722	0.3976	6.8	TML	4.7
		Average			5.4		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 7 Jul 21 10:44
Instrument: KYLO
Cal. Date: 06/28/21
Data File: 0628K131.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Pyrene	2.025	2.041	0.79	TM	
82	S	Terphenyl-D14(S)	1.152	1.205	4.6	S	
83	TM	Butyl benzylphthalate	1.117	1.157	3.5	TM	
84	TM	3,3'-Dichlorobenzidine	0.4592	0.4958	8.0	TM	
85	TM	Benz (a) anthracene	1.547	1.501	3.0	TM	
86	TM	Bis (2-ethylhexyl) phthalate	1.475	1.406	4.7	TM	
87	TM	Chrysene	1.531	1.451	5.3	TM	
88	*TM	Di-n-octylphthalate	2.293	2.454	7.0	*TM	
89	I	Perylene-D12(IS)	ISTD			I	
90	TM	Benzo (b) fluoranthene	1.689	1.710	1.2	TM	
91	TM	Benzo (k) fluoranthene	1.496	1.588	6.2	TM	
92	*TM	Benzo (a) pyrene	1.408	1.478	5.0	*TM	
93	TM	Indeno (1,2,3-cd) pyrene	0.8776	0.9444	7.6	TM	
94	TM	Dibenz (a,h) anthracene	0.9727	1.053	8.2	TM	
95	TM	Benzo (g,h,i) perylene	0.8673	0.8978	3.5	TM	
96							
97							
98							
99							
100							
101							
102							
103							
104							
105							
106							
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108							
109							
110							
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							
		Average			4.9		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Date Analyzed: 7 Jul 21 21:26
Matrix: Instrument: KYLO
Initial Cal. Date: 06/28/21
Data File: 0628K158.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	1,4-dichlorobenzene-D4(IS)	ISTD			I	
2	L	1,4-Dioxane	0.8109	1.010	24	L	18
3	TM	n-Nitrosodimethylamine	1.036	1.116	7.7	TM	
4	TM	Pyridine	2.943	3.029	2.9	TM	
5	S	2-Fluorophenol (S)	1.622	1.718	6.0	S	
6	S	Phenol-D6 (S)	2.002	2.093	4.5	S	
7	*TM	Phenol	2.769	2.729	1.5	*TM	
8	TM	Aniline	1.397	1.189	15	TM	
9	TM	Bis (2-chloroethyl) ether	1.107	1.222	10	TM	
10	TM	2-Chlorophenol	1.888	1.924	1.9	TM	
11	TM	1,3-DCB	2.028	2.069	2.0	TM	
12	*TM	1,4-DCB	2.081	2.136	2.7	*TM	
13	TML	Benzyl alcohol	1.405	1.519	8.1	TML	9.2
14	TM	1,2-DCB	1.840	1.921	4.4	TM	
15	TML	2-Methylphenol	1.731	1.874	8.3	TML	4.3
16	TM	Bis (2-chloroisopropyl) ether	2.025	2.137	5.5	TM	
17	TML	Acetophenone	2.467	2.786	13	TML	3.9
18	TM	3&4-Methylphenol	2.338	2.618	12	TM	
19	**TML	n-Nitrosodi-n-propylamine	1.638	1.978	21	**TML	3.9
20	TM	Hexachloroethane	0.7834	0.8155	4.1	TM	
21	I	Napthalene-D8(IS)	ISTD			I	
22	S	Nitrobenzene-D5(S)	0.4028	0.4257	5.7	S	
23	TM	Nitrobenzene	0.4674	0.4919	5.2	TM	
24	TMQ	Isophorone	1.135	1.510	33	TMQ	12
25	*TM	2-Nitrophenol	0.2494	0.2808	13	*TM	
26	TM	2,4-Dimethylphenol	0.5204	0.5909	14	TM	
27	TML	Benzoic acid	0.4477	0.5155	15	TML	4.4
28	TM	Bis (2-chloroethoxy) methane	0.5703	0.6679	17	TM	
29	*TM	2,4-Dichlorophenol	0.4169	0.4865	17	*TM	
30	TM	1,2,4-Trichlorobenzene	0.3338	0.3345	0.21	TM	
31	TM	3,4-Dimethylphenol	0.8020	0.9642	20	TM	
32	TM	Naphthalene	1.321	1.398	5.8	TM	
33	TMQ	4-Chloroaniline	0.6327	0.6704	6.0	TMQ	1.2
34	TM	2,6-Dichlorophenol	0.3824	0.4522	18	TM	
35	TM	Hexachloropropene	0.1845	0.1879	1.9	TM	
36	*TM	Hexachlorobutadiene	0.1422	0.1441	1.4	*TM	
37	TML	Caprolactum	0.3785	0.4457	18	TML	33
38	*TM	4-Chloro-3-methylphenol	0.6467	0.6958	7.6	*TM	
39	TM	2-Methylnaphthalene	0.9930	1.102	11	TM	
40	TM	1-Methylnaphthalene	1.046	1.201	15	TM	
		Average			10.0		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 7 Jul 21 21:26
Instrument: KYLO
Cal. Date: 06/28/21
Data File: 0628K158.D

		Compound	MEAN	CCRF	%D		%Drift	
41	I	Acenaphthene-D10(IS)	ISTD			I		
42	**TM	Hexachlorocyclopentadiene	0.1781	0.1837	3.1	**TM		
43	TM	1,2,4,5-Tetrachlorobenzene	0.4589	0.4920	7.2	TM		
44	*TM	2,4,6-Trichlorophenol	0.4028	0.4360	8.2	*TM		
45	TM	2,4,5-Trichlorophenol	0.4526	0.4637	2.4	TM		
46	S	2-Fluorobiphenyl(S)	1.324	1.473	11	S		
47	TM	1,1'-Biphenyl	1.594	1.738	9.0	TM		
48	TM	2-Chloronaphthalene	1.300	1.398	7.5	TM		
49	TM	2-Nitroaniline	0.5753	0.5904	2.6	TM		
50	TM	Dimethyl phthalate	2.014	1.984	1.5	TM		
51	TM	2,6-DNT	0.4606	0.4708	2.2	TM		
52	TM	Acenaphthylene	2.329	2.447	5.0	TM		
53	TM	3-Nitroaniline	0.5337	0.5197	2.6	TM		
54	*TM	Acenaphthene	1.471	1.451	1.4	*TM		
55	**TML	2,4-Dinitrophenol	0.2102	0.1226	42	**TML	39	
56	**TML	4-Nitrophenol	0.4842	0.4912	1.4	**TML	8.6	
57	TM	Dibenzofuran	2.046	1.866	8.8	TM		
58	TM	2,4-DNT	0.6502	0.6006	7.6	TM		
59	TM	2,3,4,6-Tetrachlorophenol	0.3157	0.3163	0.20	TM		
60	TM	Diethyl phthalate	2.161	2.181	0.91	TM		
61	TMQ	4-Chlorophenyl phenyl ether	0.6579	0.6605	0.39	TMQ	3.4	
62	TMQ	Fluorene	1.634	1.539	5.8	TMQ	3.5	
63	TM	4-Nitroaniline	0.5927	0.5892	0.59	TM		
64	S	2,4,6-Tribromophenol(S)	0.1583	0.1628	2.8	S		
65	I	Phenanthrene-D10(IS)	ISTD			I		
66	TML	4,6-Dinitro-2-methylphenol	0.1703	0.1331	22	TML	27	
67	TM	Diphenyl amine	0.7004	0.6853	2.2	TM		
68	*TM	n-Nitrosodiphenylamine	0.7004	0.6853	2.2	*TM		
69	TM	1,2-Diphenylhydrazine	1.178	1.252	6.3	TM		
70	TM	4-Bromophenyl phenyl ether	0.1995	0.2020	1.2	TM		
71	TM	Hexachlorobenzene	0.1992	0.2015	1.1	TM		
72	TM	Atrazine	0.1937	0.1995	3.0	TM		
73	*TM	Pentachlorophenol	0.1495	0.1389	7.1	*TM		
74	TM	Phenanthrene	1.295	1.373	6.1	TM		
75	TM	Anthracene	1.377	1.443	4.8	TM		
76	TM	Carbazol	1.467	1.497	2.0	TM		
77	TMQ	Di-n-butylphthalate	1.925	1.964	2.0	TMQ	21	
78	*TM	Fluoranthene	1.416	1.502	6.1	*TM		
79	I	Chrysene-D12(IS)	ISTD			I		
80	TML	Benzidine	0.3722	0.1419	62	TML	61	*NT
		Average			7.1			

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 7 Jul 21 21:26
Instrument: KYLO
Cal. Date: 06/28/21
Data File: 0628K158.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Pyrene	2.025	2.370	17	TM	
82	S	Terphenyl-D14(S)	1.152	1.453	26	S	
83	TM	Butyl benzylphthalate	1.117	1.333	19	TM	
84	TM	3,3'-Dichlorobenzidine	0.4592	0.3905	15	TM	
85	TM	Benz (a) anthracene	1.547	1.661	7.4	TM	
86	TM	Bis (2-ethylhexyl) phthalate	1.475	1.775	20	TM	
87	TM	Chrysene	1.531	1.521	0.65	TM	
88	*TM	Di-n-octylphthalate	2.293	2.572	12	*TM	
89	I	Perylene-D12(IS)	ISTD			I	
90	TM	Benzo (b) fluoranthene	1.689	2.060	22	TM	
91	TM	Benzo (k) fluoranthene	1.496	1.954	31	TM	
92	*TM	Benzo (a) pyrene	1.408	1.555	10	*TM	
93	TM	Indeno (1,2,3-cd) pyrene	0.8776	0.5241	40	TM	
94	TM	Dibenz (a,h) anthracene	0.9727	0.6076	38	TM	
95	TM	Benzo (g,h,i) perylene	0.8673	0.4465	49	TM	
96							
97							
98							
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101							
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117							
118							
119							
120							
		Average			21.9		

ORGANICS

Raw Data

Organic Extraction Worksheet

Method	625/8270 Separatory Funnel Extra 3510C	Extraction Set	210701A	Extraction Method	SEP004	Units	mL

Spiked ID 1	8270T 50ug/mL Spike 6-15-21 3-25-22		Surrogate ID 1	8270 Surrogate 3-8-21 3-8-22	
Spiked ID 2			Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	07/01/21 8:50	
Spiked ID 8			Ext. End Time:	07/01/21 17:25	
			GC Requires Extract By:		

pH1	2	07/01/21 9:05	Water Bath Temp 1 °C	70/66 E-WB6 °C
pH2	14	07/01/21 14:43	Water Bath Temp 2 °C	
pH3			Water Bath Temp 3 °C	

Spiked By: KA **Date** 07/01/21 **Witnessed By:** CFM **Date** 07/01/21

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	210701A Blk				0.200	1	1000	1	2/1	07/01/21 8:50	
						equip	E-WB6				
2	210701A LCS-1		1	1	0.200	1	1000	1	2/1	07/01/21 8:50	
						equip	E-WB6				
3	210701A LCSD-1		1	1	0.200	1	1000	1	2/1	07/01/21 8:50	
						equip	E-WB6				
4	BA35396	BA35396M12			0.200	1	100	1	2/1	07/01/21 8:50	96689 ADD 900mL DI TO
						equip	E-WB6				
5	BA35396 OIL	BA35396M13					1.36g	100	NA	07/01/21 8:50	96689 DILUTE AND SHOOT OIL SAMPLE
						equip					

Solvent and Lot#	
1+1 Sulfuric Acid (10mLs)	4-7-21
ph strip	HC148594
Dichloromethane (DCM)	60338
Filter Paper	2100181
Na2SO4	2020120870
10N NaOH (40mLs)	6-21-21

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	CW
Date	7/2/21
Time	10:15
Refrigerator	GC_C

	Technician's Initials
Scanned By	SR,KY
Sample Preparation	SR,KY,KA
Extraction	SR,KA
Concentration	KA

Modified	07/08/21 9:30:22 AM

Reviewed By: KY **Date** 07/08/21

Injection Log

Directory: M:\KYLO\DATA\210628\

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	3	0628K003.D	1	SV TUNE 10/2/20		28 Jun 21 16:04
2	4	0628K004.D	1	4 ug/ml 6/23/21		28 Jun 21 16:18
3	5	0628K005.D	1	5 ug/ml 6/23/21		28 Jun 21 16:42
4	6	0628K006.D	1	10 ug/ml 6/23/21		28 Jun 21 17:04
5	7	0628K007.D	1	20 ug/ml 6/23/21		28 Jun 21 17:27
6	8	0628K008.D	1	40 ug/ml 6/23/21		28 Jun 21 17:50
7	9	0628K009.D	1	50 ug/ml 6/23/21		28 Jun 21 18:13
8	10	0628K010.D	1	60 ug/ml 6/23/21		28 Jun 21 18:36
9	11	0628K011.D	1	80 ug/ml 6/23/21		28 Jun 21 18:58
10	12	0628K012.D	1	100 ug/ml 6/23/21		28 Jun 21 19:21
11	13	0628K013.D	1	SS 50 ug/ml 6/23/21		28 Jun 21 19:44
12	99	0628K099.D	1	SV TUNE 7/2/21		6 Jul 21 8:31
13	100	0628K100.D	1	50 ug/ml 6/23/21		6 Jul 21 8:43
14	101	0628K101.D	1	210701A BLK 1/1000		6 Jul 21 9:21
15	104	0628K104.D	50	BA35396M12 1/100 DF5		6 Jul 21 10:30
16	105	0628K105.D	100000	BA35396M13 100/1.36G		6 Jul 21 10:53
17	125	0628K125.D	1	50 ug/ml 6/23/21		7 Jul 21 8:06
18	128	0628K128.D	1	SV TUNE 7/2/21		7 Jul 21 9:40
19	131	0628K131.D	1	50 ug/ml 6/23/21		7 Jul 21 10:44
20	142	0628K142.D	1	210701A LCS-1 1/1000		7 Jul 21 15:18
21	8	0628K158.D	1	50 ug/ml 6/23/21		7 Jul 21 21:26

ORGANICS

Calibration Data

VOLATILE ORGANIC ANALYSIS
VOLATILE ORGANIC COMPOUNDS

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 7/8/2021
Matrix: Instrument: Thor
Initials:

		Compound	0708T02.D	0708T03.D	0708T04.D	0708T05.D	0708T06.D	0708T07.D	0708T08.D	0708T09.D	0708T10.D		Avg	%RSD	Type	r^2	Q	MRF
1	I	Fluorobenzene (IS)																
2	TM	Chlorotrifluoroethene													TM			
3	TM	Dichlorodifluoromethane		0.0817	0.0824	0.0669	0.0693	0.0734	0.0768	0.0649	0.0509		0.07	15	TM			
4	TML	Freon 114													TM		*	
5	TM**	Chloromethane	0.0563	0.0476	0.0538	0.0493	0.0457	0.0458	0.0468	0.0451	0.0467		0.05	8.1	TM**			
6	TM*	Vinyl chloride	0.1302	0.1070	0.1369	0.1257	0.1164	0.1145	0.1161	0.1142	0.1102		0.12	8.2	TM*			
7	L	Butane															*	
8	TM	2-Chloro-1,1,1-trifluoroethane													TM			
9	TML	Bromomethane		0.1038	0.0938	0.0951	0.0741	0.0747	0.0727	0.0704	0.0655		0.08	17	TM	0.999		
10	TM	Chloroethane		0.0720	0.0830	0.0768	0.0682	0.0684	0.0623	0.0627	0.0569		0.07	12	TM			
11	TM	Dichlorofluoromethane	0.2311	0.2251	0.2077	0.2044	0.2027	0.1944	0.1815	0.1761	0.1611		0.20	11	TM			
12	TM	Trichlorofluoromethane	0.1928	0.1893	0.2048	0.1693	0.1732	0.1899	0.1830	0.1736	0.1635		0.18	7.3	TM			
13	TM	Pentane													TM			
14	TM	Diethyl ether													TM			
15	TM	1,2 Dichlorotrifluoroethane													TM			
16	TM	Acrolein	0.0200	0.0189	0.0210	0.0217	0.0170	0.0218	0.0215	0.0219	0.0185		0.02	8.8	TM			
17	TM	Acetone	0.0246	0.0197	0.0196	0.0189	0.0175	0.0191	0.0191	0.0181	0.0182		0.02	11	TM			
18	TML	Freon-113	0.0522	0.0456	0.0560	0.0416	0.0445	0.0484	0.0530	0.0541	0.0526		0.05	10.0	TM	1.000		
19	TM*	1,1-DCE	0.1728	0.1817	0.2037	0.1830	0.1670	0.1778	0.1708	0.1785	0.1711		0.18	6.1	TM*			
20	TM	2-Propanol													TM			
21	TM	Acetonitrile	0.0019	0.0018	0.0017	0.0021	0.0019	0.0020	0.0019	0.0018	0.0014		0.00	10	TM			
22	TM	t-Butanol	0.0038	0.0035	0.0039	0.0046	0.0039	0.0044	0.0042	0.0037			0.00	9.1	TM			
23	TM	Methyl Acetate		0.1034	0.0900	0.0847	0.0820	0.0876	0.0941	0.0990	0.0989		0.09	8.2	TM			
24	TML	Iodomethane			0.0106	0.0101	0.0124	0.0144	0.0173	0.0225	0.0242		0.02	35	TM	0.997		
25	TML	Acrylonitrile			0.0178	0.0272	0.0287	0.0334	0.0358	0.0384	0.0383		0.03	24	TM	1.000		
26	TM	Methylene chloride		0.1508	0.1649	0.1576	0.1392	0.1409	0.1368	0.1398	0.1363		0.15	7.3	TM			
27	TM	Carbon disulfide		0.1366	0.1617	0.1526	0.1438	0.1410	0.1320	0.1284	0.1211		0.14	9.4	TM			
28	TM	Methyl t-butyl ether (MtBE)	0.3206	0.3366	0.3498	0.3261	0.3291	0.3357	0.3362	0.3520	0.3487		0.34	3.3	TM			
29	TM	Trans-1,2-DCE	0.1782	0.1579	0.1588	0.1700	0.1617	0.1716	0.1639	0.1714	0.1726		0.17	4.2	TM			
30	TML	Hexane													TM		*	
31	TM	Diisopropyl Ether	0.3299	0.3413	0.3392	0.3394	0.3413	0.3522	0.3579	0.3736	0.3728		0.35	4.4	TM			
32	TM	2,2-Dichloro-1,1,1-trifluoroethane													TM			
33	TM**	1,1-DCA	0.2188	0.2128	0.2216	0.2100	0.2142	0.2142	0.2089	0.2154	0.2168		0.21	1.9	TM**			
34	TM	Vinyl Acetate			0.0874	0.0955	0.0892	0.0857	0.0820				0.09	5.7	TM			
35	TM	Ethyl tert Butyl Ether	0.3357	0.3158	0.3268	0.3179	0.3210	0.3419	0.3496	0.3621	0.3637		0.34	5.4	TM			

VOLATILE ORGANIC ANALYSIS
VOLATILE ORGANIC COMPOUNDS

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 7/8/2021
Matrix: Instrument: Thor Initials:

		Compound	1	2	3	4	5	6	7	8	9		Avg	%RSD	Type		Q	MRF
36	TM	MEK (2-Butanone)	0.0246	0.0247	0.0258	0.0282	0.0261	0.0276	0.0296	0.0294	0.0289		0.03	7.2	TM			
37	TM	Cis-1,2-DCE	0.1895	0.1836	0.1957	0.1908	0.1811	0.1933	0.1857	0.1973	0.1960		0.19	3.1	TM			
38	TM	2,2-Dichloropropane	0.2183	0.1889	0.1851	0.1870	0.1906	0.1859	0.1811	0.1858	0.1858		0.19	5.8	TM			
39	TM	2-Methylpentane													TM			
40	TM	3-Methylpentane													TM			
41	TM*	Chloroform	0.2298	0.2093	0.2393	0.2285	0.2217	0.2238	0.2229	0.2328	0.2302		0.23	3.7	TM*			
42	TM	Bromochloromethane	0.0749	0.0826	0.0922	0.0962	0.0921	0.0954	0.0890	0.0914	0.0884		0.09	7.5	TM			
43	S	Dibromofluoromethane(S)		0.1732	0.2177	0.2229	0.2481	0.2506	0.2603	0.2608	0.2687		0.24	13	S			
44	TM	1,1,1-TCA	0.0842	0.0903	0.0855	0.0838	0.0864	0.0898	0.0873	0.0916	0.0920		0.09	3.5	TM			
45	TM	Cyclohexane	0.1978	0.1557	0.1949	0.1619	0.1581	0.1779	0.1896	0.1955	0.1990		0.18	10.0	TM			
46	TM	1,1-Dichloropropene	0.1822	0.1562	0.1700	0.1548	0.1586	0.1617	0.1635	0.1694	0.1712		0.17	5.3	TM			
47	TM	2,2,4-Trimethylpentane	0.3641	0.3270	0.3918	0.2900	0.3247	0.3513	0.4040	0.4076	0.4107		0.36	12	TM			
48	S	1,2-DCA-D4(S)	0.2064	0.2035	0.2525	0.2490	0.2828	0.2840	0.2951	0.2909	0.2981		0.26	14	S			
49	TM	Carbon Tetrachloride	0.1402	0.1451	0.1701	0.1669	0.1749	0.1779	0.1825	0.1906	0.1932		0.17	11	TM			
50	TM	Tert Amyl Methyl Ether	0.3425	0.3225	0.3127	0.3287	0.3192	0.3416	0.3444	0.3608	0.3576		0.34	5.0	TM			
51	TM	Methylcyclopentane													TM			
52	TM	1,2-DCA	0.1938	0.1659	0.1811	0.1657	0.1747	0.1769	0.1704	0.1748	0.1711		0.17	4.9	TM			
53	TM	Benzene	0.5627	0.4784	0.5121	0.4839	0.4779	0.5004	0.4857	0.5008	0.5016		0.50	5.2	TM			
54	TM	TCE	0.1959	0.1317	0.1536	0.1479	0.1485	0.1480	0.1486	0.1533	0.1548		0.15	11	TM			
55	TM	2-Pentanone	0.0949	0.0882	0.0945	0.1024	0.1000	0.1036	0.1082	0.1092	0.0920		0.10	7.3	TM			
56	TM*	1,2-Dichloropropane	0.1218	0.1315	0.1447	0.1317	0.1290	0.1353	0.1269	0.1328	0.1311		0.13	4.7	TM*			
57	TM	Bromodichloromethane	0.1555	0.1510	0.1604	0.1734	0.1617	0.1695	0.1670	0.1768	0.1770		0.17	5.6	TM			
58	TM	Methyl Cyclohexane	0.2017	0.1720	0.1948	0.1696	0.1708	0.1959	0.2161	0.2184	0.2209		0.20	11	TM			
59	TM	Dibromomethane		0.0665	0.0860	0.0965	0.0960	0.0996	0.1003	0.1054	0.1034		0.09	13	TM			
60	TM	MIBK (methyl isobutyl ketone	0.0623	0.0585	0.0601	0.0631	0.0600	0.0638	0.0664	0.0670	0.0675		0.06	5.2	TM			
61	TM	1-Bromo-2-chloroethane	0.0952	0.0834	0.0828	0.0885	0.0871	0.0874	0.0919	0.0904	0.0921		0.09	4.6	TM			
62	TM	2-Chloroethyl vinyl ether													TM			
63	TM	Cis-1,3-Dichloropropene	0.1783	0.1896	0.1771	0.1867	0.1879	0.1927	0.1901	0.2037	0.2066		0.19	5.2	TM			
64	TM*	Toluene	0.5518	0.4950	0.5713	0.5494	0.5479	0.5580	0.5503	0.5664	0.5645		0.55	4.1	TM*			
65	TM	Trans-1,3-Dichloropropene	0.1593	0.1484	0.1710	0.1668	0.1763	0.1790	0.1808	0.1947	0.1927		0.17	8.6	TM			
66	TM	1,1,2-TCA	0.1278	0.1085	0.1201	0.1068	0.1087	0.1166	0.1131	0.1188	0.1168		0.12	5.8	TM			
67	TM	2-Hexanone	0.0424	0.0377	0.0407	0.0424	0.0411	0.0433	0.0455	0.0461	0.0467		0.04	6.7	TM			
68	I	Chlorobenzene-D5 (IS)																
69	S	Toluene-D8(S)		0.7952	0.9877	0.9936	1.128	1.136	1.196	1.177	1.218		1.1	13	S			
70	TM	1,2-EDB	0.1620	0.1542	0.1563	0.1484	0.1499	0.1580	0.1517	0.1591	0.1586		0.16	3.0	TM			

VOLATILE ORGANIC ANALYSIS
VOLATILE ORGANIC COMPOUNDS

Form 6
Initial Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Initial Cal. Date: 7/8/2021
Instrument: Thor

Initials:

		Compound	1	2	3	4	5	6	7	8	9		Avg	%RSD	Type		Q	MRF
71	TM	Tetrachloroethene	0.2329	0.2032	0.2082	0.2210	0.2128	0.2152	0.2169	0.2185	0.2188		0.22	3.9	TM			
72	TM	1-Chlorohexane		0.2773	0.2670	0.2232	0.2135	0.2158	0.2213	0.2241	0.2241		0.23	10	TM			
73	TM	1,1,1,2-Tetrachloroethane	0.1387	0.1470	0.1647	0.1657	0.1583	0.1643	0.1622	0.1684	0.1705		0.16	6.6	TM			
74	TM	m&p-Xylene	0.5721	0.5194	0.5561	0.5424	0.5442	0.5702	0.5735	0.5938	0.5958		0.56	4.4	TM			
75	TM	o-Xylene	0.5838	0.5355	0.5563	0.5308	0.5502	0.5733	0.5794	0.6043	0.6041		0.57	4.8	TM			
76	TM	Styrene	0.3770	0.3412	0.3920	0.3963	0.3898	0.4171	0.4381	0.4668	0.4730		0.41	10	TM			
77	S	4-Bromofluorobenzene(S)		0.2853	0.3642	0.3615	0.4134	0.4160	0.4444	0.4360	0.4477		0.40	14	S			
78	TM	1,3-Dichloropropane	0.2532	0.2189	0.2239	0.2332	0.2214	0.2359	0.2283	0.2394	0.2350		0.23	4.5	TM			
79	TM	Dibromochloromethane	0.1547	0.1453	0.1698	0.1621	0.1620	0.1710	0.1701	0.1803	0.1838		0.17	7.2	TM			
80	TM**	Chlorobenzene		0.4692	0.4891	0.4684	0.4430	0.4631	0.4549	0.4704	0.4646		0.47	2.8	TM**			
81	TM*	Ethylbenzene	0.7073	0.7029	0.7409	0.7426	0.7121	0.7459	0.7412	0.7690	0.7699		0.74	3.4	TM*			
82	TM**	Bromoform	0.1016	0.1122	0.1238	0.1119	0.1280	0.1301	0.1331	0.1417	0.1441		0.13	11	TM**			
83	I	1,4-Dichlorobenzene-D (IS)																
84	TM	Isopropylbenzene	1.279	1.263	1.217	1.227	1.226	1.276	1.279	1.357	1.371		1.3	4.3	TM			
85	TM**	1,1,2,2-Tetrachloroethane	0.3357	0.2841	0.2969	0.3093	0.3054	0.3260	0.3252	0.3457	0.3394		0.32	6.6	TM**			
86	TM	1,2,3-Trichloropropane	0.1122	0.0967	0.1069	0.1139	0.1032	0.1106	0.1077	0.1155	0.1132		0.11	5.5	TM			
87	TM	t-1,4-Dichloro-2-Butene			0.0665	0.0752	0.0738	0.0806	0.0929	0.0905	0.0916		0.08	13	TM			
88	TM	Bromobenzene	0.3682	0.3220	0.3768	0.3564	0.3420	0.3584	0.3477	0.3745	0.3684		0.36	4.9	TM			
89	TM	n-Propylbenzene	1.435	1.286	1.363	1.381	1.376	1.459	1.469	1.535	1.552		1.4	6.0	TM			
90	TM	4-Ethyltoluene	1.166	1.086	1.184	1.202	1.212	1.300	1.350	1.378	1.384		1.3	8.4	TM			
91	TM	2-Chlorotoluene	1.154	1.002	0.9739	0.9520	0.9574	0.9956	0.9940	1.036	1.044		1.0	6.1	TM			
92	TM	1,3,5-Trimethylbenzene	0.9481	0.9363	1.019	0.9875	1.001	1.083	1.079	1.127	1.133		1.0	7.1	TM			
93	TM	4-Chlorotoluene	0.9616	0.9255	0.9926	0.9931	1.004	1.045	1.022	1.061	1.063		1.0	4.5	TM			
94	TM	Tert-Butylbenzene	1.004	0.7834	1.027	1.014	1.005	1.064	1.066	1.122	1.138		1.0	10	TM			
95	TM	1,2,4-Trimethylbenzene	0.9900	0.8973	0.9526	0.9493	0.9932	1.050	1.060	1.124	1.134		1.0	8.0	TM			
96	TM	Sec-Butylbenzene		1.169	1.277	1.265	1.270	1.366	1.349	1.410	1.426		1.3	6.6	TM			
97	TM	p-Isopropyltoluene	1.138	1.022	1.112	1.083	1.097	1.192	1.205	1.265	1.286		1.2	7.6	TM			
98	TM	Benzyl Chloride	0.5460	0.4684	0.5145	0.5071	0.4890	0.5301	0.5548	0.5862	0.6022		0.53	8.2	TM			
99	TM	1,3-DCB	0.7883	0.5869	0.6502	0.6438	0.6507	0.6728	0.6507	0.6842	0.6727		0.67	8.0	TM			
100	TM	1,4-DCB	0.7883	0.6536	0.7046	0.6994	0.6455	0.6805	0.6542	0.6892	0.6820		0.69	6.2	TM			
101	TM	n-Butylbenzene	0.9180	0.8760	0.9167	0.9120	0.9445	0.9853	1.006	1.074	1.099		0.97	7.9	TM			
102	TM	1,2-DCB	0.6669	0.5723	0.5853	0.6044	0.5929	0.6154	0.6007	0.6344	0.6335		0.61	4.8	TM			
103	TML	Hexachloroethane			0.0697	0.1799	0.1850	0.2009	0.2117	0.2172			0.18	31	TM	1.000		
104	TML	1,2-Dibromo-3-chloropropane		0.0549	0.0540	0.0681	0.0667	0.0714	0.0757	0.0831	0.0885		0.07	17	TM	0.999		
105	TM	1,2,4-Trichlorobenzene	0.4532	0.3672	0.3845	0.3710	0.3571	0.3809	0.3884	0.4355	0.4602		0.40	9.8	TM			

VOLATILE ORGANIC ANALYSIS
VOLATILE ORGANIC COMPOUNDS

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 7/8/2021
Matrix: Instrument: Thor Initials:

		Compound	1	2	3	4	5	6	7	8	9		Avg	%RSD	Type		Q	MRF
106	TM	Hexachlorobutadiene			0.2135	0.2147	0.2066	0.2133	0.2059	0.2242	0.2376		0.22	5.1	TM			
107	TML	Naphthalene			0.3162	0.3448	0.3407	0.3871	0.4032	0.4839	0.5153		0.40	19	TM	0.998		
108	TM	1,2,3-Trichlorobenzene	0.4468	0.3338	0.3087	0.3264	0.3232	0.3437	0.3496	0.4020	0.4175		0.36	13	TM			
109																		
110																		
111																		
112																		
113																		
114																		
115																		
116																		
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138																		
139																		
140																		

VOLATILE ORGANIC ANALYSIS
VOLATILE ORGANIC COMPOUNDS

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 8 Jul 21 16:09
Instrument: Thor
Initial Cal. Date: 7/8/2021
Data File: 0708T12.D

		Compound	MEAN	CCRF	%D		%Drift	
1	TM	Dichlorodifluoromethane	0.0708	0.0792	12	TM		
2	TML	Freon 114	0.0000	0.0964	0.00	TML		
3	TM**	Chloromethane	0.0486	0.0520	7.1	TM**		
4	TM*	Vinyl chloride	0.1190	0.1347	13	TM*		
5	L	Butane	0.0000	0.0015	0.00	L		
6	TM	2-Chloro-1,1,1-trifluoroethane	0.0000	0.0000	0.00	TM		
7	TML	Bromomethane	0.0813	0.0825	1.6	TML	15	
8	TM	Chloroethane	0.0688	0.0828	20	TM		
9	TM	Dichlorofluoromethane	0.1982	0.2028	2.3	TM		
10	TM	Trichlorofluoromethane	0.1822	0.2094	15	TM		
11	TM	Pentane	0.0000	0.0002	0.00	TM		
12	TM	Acrolein	0.0202	0.0197	2.8	TM		
13	TM	Acetone	0.0194	0.0192	1.2	TM		
14	TML	Freon-113	0.0498	0.0507	1.9	TML	2.3	
15	TM*	1,1-DCE	0.1785	0.1813	1.6	TM*		
16	TM	2-Propanol	0.0000	0.0000	0.00	TM		
17	TM	Acetonitrile	0.0019	0.0021	16	TM		
18	TM	t-Butanol	0.0040	0.0045	14	TM		
19	TM	Methyl Acetate	0.0925	0.0935	1.2	TM		
20	TML	Iodomethane	0.0159	0.0345	117	TML	68	NT
21	TML	Acrylonitrile	0.0314	0.0356	13	TML	1.4	
22	TM	Methylene chloride	0.1458	0.1561	7.1	TM		
23	TM	Carbon disulfide	0.1396	0.1511	8.2	TM		
24	TM	Methyl t-butyl ether (MtBE)	0.3372	0.3430	1.7	TM		
25	TM	Trans-1,2-DCE	0.1673	0.1731	3.4	TM		
26	TM	Diisopropyl Ether	0.3497	0.3596	2.8	TM		
27	TM	2,2-Dichloro-1,1,1-trifluoroethane	0.0000	0.0001	0.00	TM		
28	TM**	1,1-DCA	0.2147	0.2221	3.4	TM**		
29	TM	Vinyl Acetate	0.0879	0.0874	0.58	TM		
30	TM	Ethyl tert Butyl Ether	0.3372	0.3487	3.4	TM		
31	TM	MEK (2-Butanone)	0.0272	0.0290	6.6	TM		
32	TM	Cis-1,2-DCE	0.1903	0.1974	3.7	TM		
33	TM	2,2-Dichloropropane	0.1898	0.1870	1.5	TM		
34	TM	2-Methylpentane	0.0000	0.0253	0.00	TM		
35	TM	3-Methylpentane	0.0000	0.0725	0.00	TM		
36	TM*	Chloroform	0.2265	0.2368	4.6	TM*		
37	TM	Bromochloromethane	0.0892	0.0956	7.2	TM		
38	TM	1,1,1-TCA	0.0879	0.0914	4.0	TM		
39	TM	Cyclohexane	0.1811	0.1889	4.3	TM		
40	TM	1,1-Dichloropropene	0.1653	0.1762	6.6	TM		
		Average			7.7			

VOLATILE ORGANIC ANALYSIS
VOLATILE ORGANIC COMPOUNDS

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 8 Jul 21 16:09
Instrument: Thor
Cal. Date: 7/8/2021
Data File: 0708T12.D

		Compound	MEAN	CCRF	%D	%Drift	
41	TM	2,2,4-Trimethylpentane	0.3635	0.3901	7.3	TM	
42	TM	Carbon Tetrachloride	0.1713	0.1952	14	TM	
43	TM	Tert Amyl Methyl Ether	0.3367	0.3502	4.0	TM	
44	TM	Methylcyclopentane	0.0000	0.0194	0.00	TM	
45	TM	1,2-DCA	0.1749	0.1807	3.3	TM	
46	TM	Benzene	0.5004	0.5139	2.7	TM	
47	TM	TCE	0.1536	0.1633	6.3	TM	
48	TM	2-Pentanone	0.0992	0.1096	10	TM	
49	TM*	1,2-Dichloropropane	0.1316	0.1336	1.5	TM*	
50	TM	Bromodichloromethane	0.1658	0.1779	7.3	TM	
51	TM	Methyl Cyclohexane	0.1956	0.2114	8.1	TM	
52	TM	Dibromomethane	0.0942	0.1046	11	TM	
53	TM	MIBK (methyl isobutyl ketone)	0.0632	0.0638	0.96	TM	
54	TM	1-Bromo-2-chloroethane	0.0888	0.0897	1.1	TM	
55	TM	2-Chloroethyl vinyl ether	0.0000	0.0001	0.00	TM	
56	TM	Cis-1,3-Dichloropropene	0.1903	0.1971	3.6	TM	
57	TM*	Toluene	0.5505	0.5834	6.0	TM*	
58	TM	Trans-1,3-Dichloropropene	0.1743	0.1864	6.9	TM	
59	TM	1,1,2-TCA	0.1153	0.1199	4.0	TM	
60	TM	2-Hexanone	0.0429	0.0428	0.21	TM	
61	TM	1,2-EDB	0.1553	0.1545	0.53	TM	
62	TM	Tetrachloroethene	0.2164	0.2273	5.0	TM	
63	TM	1-Chlorohexane	0.2333	0.2239	4.0	TM	
64	TM	1,1,1,2-Tetrachloroethane	0.1600	0.1703	6.5	TM	
65	TM	m&p-Xylene	0.5631	0.5996	6.5	TM	
66	TM	o-Xylene	0.5686	0.5993	5.4	TM	
67	TM	Styrene	0.4102	0.4447	8.4	TM	
68	TM	1,3-Dichloropropane	0.2321	0.2343	0.92	TM	
69	TM	Dibromochloromethane	0.1666	0.1741	4.5	TM	
70	TM**	Chlorobenzene	0.4653	0.4790	2.9	TM**	
71	TM*	Ethylbenzene	0.7369	0.7691	4.4	TM*	
72	TM**	Bromoform	0.1252	0.1370	9.5	TM**	
73	TM	Isopropylbenzene	1.277	1.319	3.3	TM	
74	TM**	1,1,2,2-Tetrachloroethane	0.3186	0.3231	1.4	TM**	
75	TM	1,2,3-Trichloropropane	0.1089	0.1101	1.1	TM	
76	TM	t-1,4-Dichloro-2-Butene	0.0816	0.0910	12	TM	
77	TM	Bromobenzene	0.3572	0.3667	2.7	TM	
78	TM	n-Propylbenzene	1.428	1.508	5.5	TM	
79	TM	4-Ethyltoluene	1.251	1.321	5.6	TM	
80	TM	2-Chlorotoluene	1.012	1.019	0.71	TM	
		Average			4.7		

VOLATILE ORGANIC ANALYSIS
VOLATILE ORGANIC COMPOUNDS

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 8 Jul 21 16:09
Instrument: Thor
Cal. Date: 7/8/2021
Data File: 0708T12.D

		Compound	MEAN	CCRF	%D	%Drift	
81	TM	1,3,5-Trimethylbenzene	1.035	1.111	7.4	TM	
82	TM	4-Chlorotoluene	1.007	1.063	5.5	TM	
83	TM	Tert-Butylbenzene	1.025	1.122	9.5	TM	
84	TM	1,2,4-Trimethylbenzene	1.017	1.091	7.3	TM	
85	TM	Sec-Butylbenzene	1.317	1.399	6.3	TM	
86	TM	p-Isopropyltoluene	1.155	1.223	5.9	TM	
87	TM	Benzyl Chloride	0.5331	0.4565	14	TM	
88	TM	1,3-DCB	0.6667	0.6792	1.9	TM	
89	TM	1,4-DCB	0.6886	0.6784	1.5	TM	
90	TM	n-Butylbenzene	0.9702	1.012	4.3	TM	
91	TM	1,2-DCB	0.6118	0.6198	1.3	TM	
92	TML	Hexachloroethane	0.1774	0.2042	15	TML	0.49
93	TML	1,2-Dibromo-3-chloropropane	0.0703	0.0769	9.4	TML	0.67
94	TM	1,2,4-Trichlorobenzene	0.3998	0.3964	0.84	TM	
95	TM	Hexachlorobutadiene	0.2165	0.2197	1.4	TM	
96	TML	Naphthalene	0.3988	0.4015	0.68	TML	3.1
97	TM	1,2,3-Trichlorobenzene	0.3613	0.3717	2.9	TM	
98							
99							
100							
101							
102							
103							
104							
105							
106							
107							
108							
109							
110							
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							
		Average			5.6		

VOLATILE ORGANIC ANALYSIS
VOLATILE ORGANIC COMPOUNDS

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Date Analyzed: 9 Jul 21 2:03
Matrix: Instrument: Thor
Initial Cal. Date: 7/8/2021
Data File: 0708T36.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	Fluorobenzene (IS)	ISTD			I	
2	TM	Dichlorodifluoromethane	0.0708	0.0686	3.1	TM	
3	TML	Freon 114	0.0000	0.0852	0.00	TML	
4	TM**	Chloromethane	0.0486	0.0476	2.0	TM**	
5	TM*	Vinyl chloride	0.1190	0.1139	4.3	TM*	
6	L	Butane	0.0000	0.0002	0.00	L	
7	TML	Bromomethane	0.0813	0.0731	10	TML	0.19
8	TM	Chloroethane	0.0688	0.0694	0.85	TM	
9	TM	Dichlorofluoromethane	0.1982	0.2008	1.3	TM	
10	TM	Trichlorofluoromethane	0.1822	0.1761	3.3	TM	
11	TM	Pentane	0.0000	0.0014	0.00	TM	
12	TM	Acrolein	0.0202	0.0186	8.0	TM	
13	TM	Acetone	0.0194	0.0191	1.8	TM	
14	TML	Freon-113	0.0498	0.0490	1.5	TML	5.5
15	TM*	1,1-DCE	0.1785	0.1740	2.5	TM*	
16	TM	2-Propanol	0.0000	0.0000	0.00	TM	
17	TM	Acetonitrile	0.0019	0.0020	9.0	TM	
18	TM	t-Butanol	0.0040	0.0042	5.6	TM	
19	TM	Methyl Acetate	0.0925	0.0895	3.2	TM	
20	TML	Iodomethane	0.0159	0.0278	75	TML	41
21	TML	Acrylonitrile	0.0314	0.0324	3.2	TML	6.9
22	TM	Methylene chloride	0.1458	0.1455	0.22	TM	
23	TM	Carbon disulfide	0.1396	0.1447	3.6	TM	
24	TM	Methyl t-butyl ether (MtBE)	0.3372	0.3306	2.0	TM	
25	TM	Trans-1,2-DCE	0.1673	0.1656	1.0	TM	
26	TML	Hexane	0.0000	0.0001	0.00	TML	
27	TM	Diisopropyl Ether	0.3497	0.3531	0.97	TM	
28	TM**	1,1-DCA	0.2147	0.2151	0.18	TM**	
29	TM	Vinyl Acetate	0.0879	0.0826	6.1	TM	
30	TM	Ethyl tert Butyl Ether	0.3372	0.3366	0.16	TM	
31	TM	MEK (2-Butanone)	0.0272	0.0283	3.9	TM	
32	TM	Cis-1,2-DCE	0.1903	0.1852	2.7	TM	
33	TM	2,2-Dichloropropane	0.1898	0.1526	20	TM	
34	TM	2-Methylpentane	0.0000	0.0241	0.00	TM	
35	TM	3-Methylpentane	0.0000	0.0699	0.00	TM	
36	TM*	Chloroform	0.2265	0.2328	2.8	TM*	
37	TM	Bromochloromethane	0.0892	0.0975	9.3	TM	
38	S	Dibromofluoromethane(S)	0.2378	0.2504	5.3	S	
39	TM	1,1,1-TCA	0.0879	0.0907	3.2	TM	
40	TM	Cyclohexane	0.1811	0.1773	2.1	TM	
		Average			5.1		

VOLATILE ORGANIC ANALYSIS
VOLATILE ORGANIC COMPOUNDS

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 9 Jul 21 2:03
Instrument: Thor
Cal. Date: 7/8/2021
Data File: 0708T36.D

		Compound	MEAN	CCRF	%D	%Drift	
41	TM	1,1-Dichloropropene	0.1653	0.1635	1.1	TM	
42	TM	2,2,4-Trimethylpentane	0.3635	0.3176	13	TM	
43	S	1,2-DCA-D4(S)	0.2625	0.2818	7.3	S	
44	TM	Carbon Tetrachloride	0.1713	0.1845	7.7	TM	
45	TM	Tert Amyl Methyl Ether	0.3367	0.3422	1.7	TM	
46	TM	Methylcyclopentane	0.0000	0.0204	0.00	TM	
47	TM	1,2-DCA	0.1749	0.1731	1.1	TM	
48	TM	Benzene	0.5004	0.4983	0.42	TM	
49	TM	TCE	0.1536	0.1593	3.7	TM	
50	TM	2-Pentanone	0.0992	0.1031	3.9	TM	
51	TM*	1,2-Dichloropropane	0.1316	0.1360	3.3	TM*	
52	TM	Bromodichloromethane	0.1658	0.1693	2.1	TM	
53	TM	Methyl Cyclohexane	0.1956	0.1979	1.2	TM	
54	TM	Dibromomethane	0.0942	0.1056	12	TM	
55	TM	MIBK (methyl isobutyl ketone)	0.0632	0.0637	0.82	TM	
56	TM	1-Bromo-2-chloroethane	0.0888	0.0899	1.3	TM	
57	TM	2-Chloroethyl vinyl ether	0.0000	0.0001	0.00	TM	
58	TM	Cis-1,3-Dichloropropene	0.1903	0.1863	2.1	TM	
59	TM*	Toluene	0.5505	0.5628	2.2	TM*	
60	TM	Trans-1,3-Dichloropropene	0.1743	0.1733	0.62	TM	
61	TM	1,1,2-TCA	0.1153	0.1176	2.0	TM	
62	TM	2-Hexanone	0.0429	0.0432	0.84	TM	
63	I	Chlorobenzene-D5 (IS)	ISTD			I	
64	S	Toluene-D8(S)	1.079	1.130	4.7	S	
65	TM	1,2-EDB	0.1553	0.1547	0.40	TM	
66	TM	Tetrachloroethene	0.2164	0.2191	1.2	TM	
67	TM	1-Chlorohexane	0.2333	0.2041	13	TM	
68	TM	1,1,1,2-Tetrachloroethane	0.1600	0.1664	4.0	TM	
69	TM	m&p-Xylene	0.5631	0.5725	1.7	TM	
70	TM	o-Xylene	0.5686	0.5739	0.92	TM	
71	TM	Styrene	0.4102	0.4249	3.6	TM	
72	S	4-Bromofluorobenzene(S)	0.3961	0.4118	4.0	S	
73	TM	1,3-Dichloropropane	0.2321	0.2273	2.1	TM	
74	TM	Dibromochloromethane	0.1666	0.1736	4.2	TM	
75	TM**	Chlorobenzene	0.4653	0.4635	0.40	TM**	
76	TM*	Ethylbenzene	0.7369	0.7418	0.66	TM*	
77	TM**	Bromoform	0.1252	0.1309	4.6	TM**	
78	I	1,4-Dichlorobenzene-D (IS)	ISTD			I	
79	TM	Isopropylbenzene	1.277	1.243	2.7	TM	
80	TM**	1,1,2,2-Tetrachloroethane	0.3186	0.3104	2.6	TM**	
		Average			3.1		

VOLATILE ORGANIC ANALYSIS
VOLATILE ORGANIC COMPOUNDS

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 9 Jul 21 2:03
Instrument: Thor
Cal. Date: 7/8/2021
Data File: 0708T36.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	1,2,3-Trichloropropane	0.1089	0.1133	4.0	TM	
82	TM	t-1,4-Dichloro-2-Butene	0.0816	0.0797	2.4	TM	
83	TM	Bromobenzene	0.3572	0.3527	1.2	TM	
84	TM	n-Propylbenzene	1.428	1.418	0.74	TM	
85	TM	4-Ethyltoluene	1.251	1.272	1.7	TM	
86	TM	2-Chlorotoluene	1.012	0.9873	2.5	TM	
87	TM	1,3,5-Trimethylbenzene	1.035	1.053	1.8	TM	
88	TM	4-Chlorotoluene	1.007	1.031	2.3	TM	
89	TM	Tert-Butylbenzene	1.025	1.050	2.4	TM	
90	TM	1,2,4-Trimethylbenzene	1.017	1.027	0.96	TM	
91	TM	Sec-Butylbenzene	1.317	1.304	0.94	TM	
92	TM	p-Isopropyltoluene	1.155	1.154	0.10	TM	
93	TM	Benzyl Chloride	0.5331	0.3578	33	TM	
94	TM	1,3-DCB	0.6667	0.6568	1.5	TM	
95	TM	1,4-DCB	0.6886	0.6619	3.9	TM	
96	TM	n-Butylbenzene	0.9702	0.9335	3.8	TM	
97	TM	1,2-DCB	0.6118	0.5979	2.3	TM	
98	TML	Hexachloroethane	0.1774	0.1950	9.9	TML	4.7
99	TML	1,2-Dibromo-3-chloropropane	0.0703	0.0721	2.6	TML	6.1
100	TM	1,2,4-Trichlorobenzene	0.3998	0.3585	10	TM	
101	TM	Hexachlorobutadiene	0.2165	0.2010	7.2	TM	
102	TML	Naphthalene	0.3988	0.3658	8.3	TML	10.0
103	TM	1,2,3-Trichlorobenzene	0.3613	0.3346	7.4	TM	
104							
105							
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107							
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109							
110							
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							
		Average			4.8		

ORGANICS

Raw Data

Injection Log

Directory: M:\THOR\DATA\210708

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	1	0708T00.D	1	25ug/L BFB STD 5/3/21	2uL	07/08/2021 11:19
2	2	0708T02.D	1	0.3ug/L VOC STD 7/8/21	IS&S 02/02/21	07/08/2021 12:00
3	3	0708T03.D	1	0.5ug/L VOC STD 7/8/21	IS&S 02/02/21	07/08/2021 12:25
4	4	0708T04.D	1	1ug/L VOC STD 7/8/21	IS&S 02/02/21	07/08/2021 12:50
5	5	0708T05.D	1	2ug/L VOC STD 7/8/21	IS&S 02/02/21	07/08/2021 13:15
6	6	0708T06.D	1	5ug/L VOC STD 7/8/21	IS&S 02/02/21	07/08/2021 13:39
7	7	0708T07.D	1	10ug/L VOC STD 7/8/21	IS&S 02/02/21	07/08/2021 14:04
8	8	0708T08.D	1	20ug/L VOC STD 7/8/21	IS&S 02/02/21	07/08/2021 14:29
9	9	0708T09.D	1	40ug/L VOC STD 7/8/21	IS&S 02/02/21	07/08/2021 14:54
10	10	0708T10.D	1	100ug/L VOC STD 7/8/21	IS&S 02/02/21	07/08/2021 15:19
11	11	0708T11.D	1	25ug/L BFB STD 5/3/21	IS&S 02/02/21	07/08/2021 15:44
12	12	0708T12.D	1	(SS) 10ug/L VOC STD 7/8/21	IS&S 02/02/21	07/08/2021 16:09
13	13	0708T13.D	1	210708A LCS 10ug/L	IS&S 02/02/21	07/08/2021 16:33
14	14	0708T14.D	1	210708A LCSD 10ug/L	IS&S 02/02/21	07/08/2021 16:58
15	15	0708T15.D	1	210708A BLK	IS&S 02/02/21	07/08/2021 17:23
16	35	0708T35.D	100000	BA35396W01 DF100000	IS&S 02/02/21	07/09/2021 01:39
17	36	0708T36.D	1	Ending CCV 10ug/L 7/8/21	IS&S 02/02/21	07/09/2021 02:03

METALS
Calibration Data

APPL, INC.

A.P.P.L. INC.
2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CH2M Hill
ARF No: 96689 SDG: 96689

Analysis Date: 07/06/21 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 13:04	%R(1)	True CCV1	Found 16:31	%R(1)	True CCV1	Found 16:53	%R(1)	
Silver (Ag)	250	262.26	105	250	250.46	100	250	250.21	100	P
Arsenic (As)	500	523.3	105	500	508.4	102	500	508.78	102	P
Barium (Ba)	500	515.5	103	500	508.36	102	500	507.24	101	P
Cadmium (Cd)	500	513.49	103	500	499.99	100	500	498.95	99.8	P
Chromium (Cr)	500	512.84	103	500	503.25	101	500	500.77	100	P
Lead (Pb)	500	506.92	101	500	504.73	101	500	502.51	101	P
Selenium (Se)	500	516.62	103	500	513.89	103	500	511.81	102	P

(1) Control Limits: Metals 90-110

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC. Contract: CH2M Hill

ARF No.: 96689 SDG: 96689

Preparation Blank Matrix (soil/water): water

Preparation Blank Concentration Units (ug/L or mg/kg): mg/L

Analysis Date: 07/06/21

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
	13:09		16:35		16:57				16:09		
Silver (Ag)	10.00	U	10.00	U	10.00	U			.0100	U	P
Arsenic (As)	50.00	U	50.00	U	50.00	U			.0500	U	P
Barium (Ba)	50.00	U	50.00	U	1.38	J			.0500	U	P
Cadmium (Cd)	.54	J	50.00	U	1.42	J			.0500	U	P
Chromium (Cr)	50.00	U	50.00	U	50.00	U			.0500	U	P
Lead (Pb)	100.00	U	100.00	U	100.00	U			.1000	U	P
Selenium (Se)	50.00	U	50.00	U	50.00	U			.0500	U	P

A.P.P.L. INC.
4
ICP INTERFERENCE CHECK SAMPLE

Lab Name:	A.P.P.L. INC.	Contract:	CH2M Hill
ARF No.:	96689	SDG:	96689
ICP ID Number:	Cyrus	ICS Source:	Environmental Express

Analysis Date: 07/06/21 Concentration Units: ug/L

Analyte	True		Initial Found		
	Sol A	Sol AB	Sol A 13:31	Sol AB 13:35	%R(1)
Silver (Ag)		500	-0.04	537.02	107
Arsenic (As)		250	-2.59	262.6	105
Barium (Ba)		250	0.01	257.17	103
Cadmium (Cd)		500	-0.11	494.7	98.9
Chromium (Cr)		250	0.57	254.78	102
Lead (Pb)		500	-1.61	503.06	101
Selenium (Se)		250	-0.03	250.45	100

(1) Control Limits: Metals 80-120

Low Level ICV

Sample Name	Acq Date Time	Run Sequence	Analyte	Actual Conc (ug/L)	Spiked Conc (ug/L)	Control Limits	% Recovery	QC Flag
LLICVX6	7/6/21 1:13 PM	210706A	Silver	2.72	3	80-120%	91	
LLICV	7/6/21 1:13 PM	210706A	Aluminum	47.52	50	80-120%	95	
LLICV	7/6/21 1:13 PM	210706A	Arsenic	1.8	2	80-120%	90	
LLICV	7/6/21 1:13 PM	210706A	Boron	27.21	25	80-120%	109	
LLICV	7/6/21 1:13 PM	210706A	Barium	1.560	1.5	80-120%	104	
LLICV	7/6/21 1:13 PM	210706A	Beryllium	1.040	1	80-120%	104	
LLICV	7/6/21 1:13 PM	210706A	Calcium	59.82	50	80-120%	120	
LLICVX2	7/6/21 1:17 PM	210706A	Cadmium	0.49	0.5	80-120%	98	
LLICV	7/6/21 1:13 PM	210706A	Cobalt	2.700	2.5	80-120%	108	
LLICV	7/6/21 1:13 PM	210706A	Chromium	0.50	0.5	80-120%	100	
LLICV	7/6/21 1:13 PM	210706A	Copper	2.61	2.5	80-120%	104	
LLICV	7/6/21 1:13 PM	210706A	Iron	25.84	25	80-120%	103	
LLICV	7/6/21 1:13 PM	210706A	Potassium	510.2	500	80-120%	102	
LLICV	7/6/21 1:13 PM	210706A	Magnesium	26.89	25	80-120%	108	
LLICV	7/6/21 1:13 PM	210706A	Manganese	1.09	1	80-120%	109	
LLICVX2	7/6/21 1:17 PM	210706A	Molybdenum	2.38	2	80-120%	119	
LLICV	7/6/21 1:13 PM	210706A	Sodium	504.21	500	80-120%	101	
LLICVX2	7/6/21 1:17 PM	210706A	Nickel	1.890	2	80-120%	95	
LLICV	7/6/21 1:13 PM	210706A	Phosphorus	10.39	12.5	80-120%	83	
LLICV	7/6/21 1:13 PM	210706A	Lead	1.69	1.5	80-120%	113	
LLICV	7/6/21 1:13 PM	210706A	Antimony	1.84	2	80-120%	92	
LLICVX2	7/6/21 1:17 PM	210706A	Selenium	3.62	4	80-120%	91	
LLICV	7/6/21 1:13 PM	210706A	Tin	2.900	3	80-120%	97	
LLICV	7/6/21 1:13 PM	210706A	Strontium	1.070	1	80-120%	107	
LLICV	7/6/21 1:13 PM	210706A	Titanium	2.64	2.5	80-120%	106	
LLICVX2	7/6/21 1:17 PM	210706A	Thallium	3.62	4	80-120%	91	
LLICV	7/6/21 1:13 PM	210706A	Vanadium	0.55	0.5	80-120%	110	
LLICV	7/6/21 1:13 PM	210706A	Zinc	27.91	25	80-120%	112	

METALS
Raw Data

APPL, INC.

ICP-OES Calibration Standard Prep

Prepared: 07/06/21
Expires: 07/13/21
1% HNO3 / 5% HCl Prep: 07/06/21
Prepared By (Initials): PW

Calibration Standard 6

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. Range (ug/mL)	Lot Number - QA Number/ APPL Prep Date	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
Solution A	Inorganic Ventures	HP1810-250	200 - 5,000	m2meb662248-38391	09/04/24	500uL	100mL	1% HNO3 / 5% HCl	1000 - 25,000
Solution B	Inorganic Ventures	HP1810-250	4000 - 10,000	m2meb662249-38389	09/04/24	500uL			2000 - 50,000
Solution C	Inorganic Ventures	HP1810-250	100 - 200	m2meb662250-38394	09/04/24	500uL			500 - 1000
Calibration Standard 5									
ICP-OES Calib Standard 3	Inorganic Ventures	Standard 2/CCV1	0.5 - 50	Prepared 07/06/21	07/13/21	25mL	50mL	1% HNO3 / 5% HCl	250 - 25,000
Calibration Standard 1									
200.7 LDL	O2SI	160634-01-01	0.05 - 100	10080366-3-41267	03/18/22	250uL	50mL	1% HNO3 / 5% HCl	0.25 - 200

ICP-OES ICV (SS)

Prepared: 06/30/21
Expires: 07/14/21
1% HNO3 / 5% HCl Prep: 06/30/21
Prepared By (Initials): PW

ICP-OES ICV 1

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. Range (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/mL)
QCS ICV Soln A	CPI	4400-070615RH01	50 - 500	10062445-13-52340	11/11/22	250uL	50mL	1% HNO3 / 5% HCl	0.25 - 2.5
QCS ICV Soln B	CPI	4400-070615RH01	2,500	10062445-14-52341	11/11/22	250uL			12.5

ICP-OES CCV2

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. Range (ug/mL)	APPL Prep Date	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/mL)
ICP-OES Calib Standard 3	Inorganic Ventures	CCV2	0.5 - 50	Prepared 07/06/21	07/13/21	15mL	40mL	1% HNO3 / 5% HCl	0.15 - 15

ICP-OES Low Levels (LLICV)

Prepared: 07/06/21
Expires: 07/20/21
1% HNO3 / 5% HCl Prep: 07/06/21
Prepared By (Initials): PW

LLICV

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. Range ug/mL	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
200.7 LDL	O2SI	160634-01-01	0.05 - 100	10080366-3-41267	03/18/22	250uL	50mL	1% HNO3 / 5% HCl	0.25 - 200
LLICVX2 / Standard 2									
200.7 LDL	O2SI	160634-01-01	0.05 - 100	10080366-3-41267	03/18/22	500uL	50mL	1% HNO3 / 5% HCl	0.50 - 400
LLICVX6 / Standard 3									
200.7 LDL	O2SI	160634-01-01	0.05 - 100	10080366-3-41267	03/18/22	1.5mL	50mL	1% HNO3 / 5% HCl	1.5 - 1,200
LLICVX10 / Standard 4									
200.7 LDL	O2SI	160634-01-01	0.05 - 100	10080366-3-41267	03/18/22	2.5mL	50mL	1% HNO3 / 5% HCl	2.5 - 2,000
LLICV 10									
ICP-OES Calib Standard 3	Inorganic Ventures	HP1810-250	0.5 - 50	10080366-3-41267	07/13/21	500uL	50mL	1% HNO3 / 5% HCl	5 - 500
LLICV 50									
ICP-OES Calib Standard 3	Inorganic Ventures	HP1810-250	0.5 - 50	10080366-3-41267	07/13/21	2.5mL	50mL	1% HNO3 / 5% HCl	25 - 2,500

ICP-OES Interference Check Solution A

Prepared: 06/30/21
Expires: 07/14/21
1% HNO3 / 5% HCl Prep: 06/30/21

Prepared By (Initials): PW

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Aluminum	Inorganic Ventures	35-APPLTSP-6010ICSA	10,000	N2-MEB670092-39414	07/25/22	500uL	50mL	1% HNO3 / 5% HCl	100
Calcium			10,000						100
Magnesium			10,000						100
Iron			10,000						100
ICP-OES Interference Check Solution AB									
Aluminum	Inorganic Ventures	35-APPLTSP-6010ICSA	10,000	N2-MEB670092-39414	07/25/22	500uL	50mL	1% HNO3 / 5% HCl	100
Calcium			10,000						100
Magnesium			10,000						100
Iron			10,000						100
Special Mix (Interference)	O2SI	160495-01-01	100	10081266-2-49725	07/13/21	250uL			0.5

ICP-OES Internal Standards

Prepared: 07/01/21
Expires: 07/13/21
1% HNO3 / 5% HCl Prep: 07/01/21

Prepared By (Initials): PW

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (mg/L)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (mg/L)
Yttrium	O2SI	060039-04-03	1,000	10083563-2-49726	07/13/21	4mL	2L	1% HNO3 / 5% HCl	2

Metals Digestion Worksheet

Method Name 3010A Digestion (TCLP) **Prep Method** M3010TCLP T **Set** 210702A **Units** mL

Spikes	
Spiked ID 1	LCSW LOT# 10064561-19-52291 Pipette AP-21
Spiked ID 2	LCSW LOT# 10064561-18-52292
Spiked ID 3	Li HDL #AU01003-40046
Spiked ID 4	
Spiked By	NM Date: 07/02/21 7:41:00 AM
Witnessed By	NA Date: 07/02/21 7:41:00 AM

Starting Temp:	SLOT 38 THERM:MT1 96C/95C
Ending Temp:	SLOT 38 97C/96C
Temperature Type:	Mod Block
Sufficient Vol for Matrix QC:	YES
End Date/Time	07/02/21 12:15

	Sample	Sample Container	Spike Amount	Spike ID	Digested Amount	Final Volume	Start Date/Time	Comments
1	210702A Blk				50mL	50mL	07/02/21 7:41	equip: Modblock2
2	210702A LCS		500uL	1+2	50mL	50mL	07/02/21 7:41	equip: Modblock2
3	BA35396	BA35396M18			5mL	50mL	07/02/21 7:41	equip: Modblock2 96689 OIL SAMPLE DF10 HOT!!
4	BA35396 MS	BA35396M18	500uL	1+2	5mL	50mL	07/02/21 7:41	equip: Modblock2 96689 OIL SAMPLE DF10 HOT!!
5	BA35396 MSD	BA35396M18	500uL	1+2	5mL	50mL	07/02/21 7:41	equip: Modblock2 96689 OIL SAMPLE DF10 HOT!!

Solvent and Lot#
HNO3 BDH 1120090 19673
1:1 HCL 2-16-21
50mL vessel 0260000089

Sample COC Transfer	
Sample prep employee Initials	nm
Analyst's initials	PW
Date	8/12/21
Time	1247
Moved to	Metals

Technician's Initials	
Scanned By	nm
Sample Preparation	nm
Digestion	nm
Bring up to volume	
Modified	07/02/21 7:36:12 AM

Reviewed By: PW **Date:** 8/12/21

6010C/TCLP Injection Log

Directory: K:\ICP-OES Cyrus\Backup Excel\

RunID	Injected		Sample Name	Misc Info	FileName	Multiplier
1	06 Jul 2021	12:33	CalBlk 210706		210706A200	1.
2	06 Jul 2021	12:38	STD1 210706		210706A200	1.
3	06 Jul 2021	12:42	STD2 210706		210706A200	1.
4	06 Jul 2021	12:47	STD3 210706		210706A200	1.
5	06 Jul 2021	12:51	STD4 210706		210706A200	1.
6	06 Jul 2021	12:55	STD5 210706		210706A200	1.
7	06 Jul 2021	13:00	STD6 210706		210706A200	1.
8	06 Jul 2021	13:04	ICV 210706		210706A200	1.
9	06 Jul 2021	13:09	ICB 210706		210706A200	1.
10	06 Jul 2021	13:13	LLICV 210706		210706A200	1.
11	06 Jul 2021	13:17	LLICVX2 210706		210706A200	1.
12	06 Jul 2021	13:22	LLICVX6 210706		210706A200	1.
14	06 Jul 2021	13:31	ICSA 210706		210706A200	1.
15	06 Jul 2021	13:35	ICSAB 210706		210706A200	1.
24	06 Jul 2021	16:09	210702A BLK		210706A200	1.
25	06 Jul 2021	16:13	210702A LCS		210706A200	1.
29	06 Jul 2021	16:31	CCV 210706		210706A200	1.
30	06 Jul 2021	16:35	CCB 210706		210706A200	1.
31	06 Jul 2021	16:40	BA35396M18		210706A200	1.
32	06 Jul 2021	16:44	BA35396M18 MS		210706A200	1.
33	06 Jul 2021	16:49	BA35396M18 MSD		210706A200	1.
34	06 Jul 2021	16:53	CCV 210706		210706A200	1.
35	06 Jul 2021	16:57	CCB 210706		210706A200	1.

METALS

Calibration Data

A.P.P.L. INC.
2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CH2M Hill
ARF No: 96689 SDG: 96689

Analysis Date: 07/14/21 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 13:48	%R(1)	True CCV1	Found 14:09	%R(1)	True	Found	%R(1)	
Mercury (Hg)	4.17	4.351	104	5.208	4.889	93.9				P

(1) Control Limits: Metals 90-110 ILM02.0

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC. Contract: CH2M Hill

ARF No.: 96689 SDG: 96689

Preparation Blank Matrix (soil/water): water

Preparation Blank Concentration Units (ug/L or mg/kg): mg/L

Analysis Date: 07/14/21

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	1	C	2	C	3	C		C	
	13:50		14:11						14:01		
Mercury (Hg)	.20	U	.20	U					.0002	U	P

A.P.P.L. INC.

LLQC Check

Lab Name: A.P.P.L. INC. Contract: CH2M Hill

ARF No: 96689 SDG: 96689

Concentration Units: ug/L

Analysis Date: 07/14/21

Analyte	LLQC								
	True	Found	%R(1)	True	Found	%R(1)	True	Found	%R(1)
	LLQC	13:51							
Mercury (Hg)	0.2	0.1612	80.6						

==========

Sequence No.: 1 **Autosampler Location: 1**
Sample ID: Calib. Blank **Date Collected: 07/14/21 1:26:16 PM**
Analyst: **Data Type: Reprocessed on 07/27/21 10:28:15 AM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: Calib. Blank **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[0.00]	0.0002	-0.0007	0.0003	1:26:54 PM	No
2		[0.00]	-0.0001	-0.0015	-0.0000	1:27:17 PM	No
3		[0.00]	-0.0001	-0.0019	-0.0001	1:27:40 PM	No
Mean:		[0.00]	-0.0000				
SD:		0.0000	0.0002				
%RSD:		0.00%	>999.9%				

Auto-zero performed.

==========

Sequence No.: 2 **Autosampler Location: 2**
Sample ID: ICAL 0.2ppb 210714 **Date Collected: 07/14/21 1:27:53 PM**
Analyst: **Data Type: Reprocessed on 07/27/21 10:28:15 AM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICAL 0.2ppb 210714 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[0.2]	0.0011	0.0024	0.0011	1:28:32 PM	No
2		[0.2]	0.0011	0.0030	0.0011	1:28:55 PM	No
3		[0.2]	0.0011	0.0026	0.0011	1:29:19 PM	No
Mean:		[0.2]	0.0011				
SD:		0.000	0.0000				
%RSD:		0.00%	1.37				

Standard number 1 applied. [0.2]
Correlation Coef.: 0.999961 Slope: 0.00629 Intercept: 0.00000

==========

Sequence No.: 3 **Autosampler Location: 3**
Sample ID: ICAL 0.5ppb 210714 **Date Collected: 07/14/21 1:29:32 PM**
Analyst: **Data Type: Reprocessed on 07/27/21 10:28:15 AM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICAL 0.5ppb 210714 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[0.5]	0.0030	0.0089	0.0030	1:30:12 PM	No
2		[0.5]	0.0030	0.0097	0.0031	1:30:35 PM	No
3		[0.5]	0.0029	0.0084	0.0029	1:30:58 PM	No
Mean:		[0.5]	0.0029				
SD:		0.000	0.0001				
%RSD:		0.00%	2.97				

Standard number 2 applied. [0.5]
Correlation Coef.: 0.999961 Slope: 0.00629 Intercept: 0.00000

==========

Sequence No.: 4 **Autosampler Location: 4**
Sample ID: ICAL 1ppb 210714 **Date Collected: 07/14/21 1:31:12 PM**
Analyst: **Data Type: Reprocessed on 07/27/21 10:28:15 AM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**

Dilution: **Sample Prep Vol:**

Replicate Data: ICAL 1ppb 210714 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[1]	0.0060	0.0201	0.0061	1:31:52 PM	No
2		[1]	0.0060	0.0197	0.0060	1:32:15 PM	No
3		[1]	0.0060	0.0193	0.0061	1:32:38 PM	No
Mean:		[1]	0.0060				
SD:		0.00	0.0000				
%RSD:		0.00%	0.43				

Standard number 3 applied. [1]
Correlation Coef.: 0.999961 Slope: 0.00629 Intercept: 0.00000

==========

Sequence No.: 5 **Autosampler Location: 5**
Sample ID: ICAL 2ppb 210714 **Date Collected: 07/14/21 1:32:53 PM**
Analyst: **Data Type: Reprocessed on 07/27/21 10:28:15 AM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICAL 2ppb 210714 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[2]	0.0126	0.0412	0.0126	1:33:32 PM	No
2		[2]	0.0126	0.0413	0.0126	1:33:55 PM	No
3		[2]	0.0125	0.0419	0.0125	1:34:18 PM	No
Mean:		[2]	0.0125				
SD:		0.00	0.0001				
%RSD:		0.00%	0.42				

Standard number 4 applied. [2]
Correlation Coef.: 0.999961 Slope: 0.00629 Intercept: 0.00000

==========

Sequence No.: 6 **Autosampler Location: 6**
Sample ID: ICAL 5ppb 210714 **Date Collected: 07/14/21 1:34:33 PM**
Analyst: **Data Type: Reprocessed on 07/27/21 10:28:15 AM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICAL 5ppb 210714 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[5]	0.0313	0.1063	0.0313	1:35:11 PM	No
2		[5]	0.0315	0.1055	0.0315	1:35:35 PM	No
3		[5]	0.0311	0.1061	0.0312	1:35:58 PM	No
Mean:		[5]	0.0313				
SD:		0.00	0.0002				
%RSD:		0.00%	0.59				

Standard number 5 applied. [5]
Correlation Coef.: 0.999961 Slope: 0.00629 Intercept: 0.00000

==========

Sequence No.: 7 **Autosampler Location: 7**
Sample ID: ICAL 10ppb 210714 **Date Collected: 07/14/21 1:36:11 PM**
Analyst: **Data Type: Reprocessed on 07/27/21 10:28:15 AM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICAL 10ppb 210714 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored

1	[10]	0.0629	0.2175	0.0630	1:36:49 PM	No
2	[10]	0.0632	0.2157	0.0633	1:37:13 PM	No
3	[10]	0.0631	0.2136	0.0632	1:37:36 PM	No
Mean:	[10]	0.0631				
SD:	0.00	0.0001				
%RSD:	0.00%	0.22				

Standard number 6 applied. [10]
Correlation Coef.: 0.999961 Slope: 0.00629 Intercept: 0.00000
The calibration curve may not be linear.

Calibration data for Hg 253.7 **Equation: Linear Through Zero**

ID	Mean Signal (Abs)	Entered Conc. ug/L	Calculated Conc. ug/L	Standard Deviation	%RSD
Calib. Blank	0.0000	0	0.0000	0.00	>999.9%
ICAL 0.2ppb 210714	0.0011	0.2	0.1711	0.00	1.37
ICAL 0.5ppb 210714	0.0029	0.5	0.4677	0.00	2.97
ICAL 1ppb 210714	0.0060	1.0	0.9530	0.00	0.43
ICAL 2ppb 210714	0.0125	2.0	1.9927	0.00	0.42
ICAL 5ppb 210714	0.0313	5.0	4.9690	0.00	0.59
ICAL 10ppb 210714	0.0631	10.0	10.0233	0.00	0.22

Correlation Coef.: 0.999961 Slope: 0.00629 Intercept: 0.00000

==========

Sequence No.: 8 **Autosampler Location: 9**
Sample ID: ICV 210714 **Date Collected: 07/14/21 1:48:19 PM**
Analyst: **Data Type: Reprocessed on 07/27/21 10:28:15 AM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICV 210714 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	4.328	4.328	0.0272	0.0863	0.0273	1:48:59 PM	No
2	4.353	4.353	0.0274	0.0874	0.0275	1:49:22 PM	No
3	4.373	4.373	0.0275	0.0867	0.0276	1:49:46 PM	No
Mean:	4.351	4.351	0.0274				
SD:	0.0225	0.0225	0.0001				
%RSD:	0.52%	0.52%	0.52				

QC value within limits for Hg 253.7 Recovery = 108.78%
All analyte(s) passed QC.

==========

Sequence No.: 9 **Autosampler Location: 1**
Sample ID: ICB 210714 **Date Collected: 07/14/21 1:50:00 PM**
Analyst: **Data Type: Reprocessed on 07/27/21 10:28:16 AM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICB 210714 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	-0.0064	-0.0064	-0.0000	-0.0006	0.0000	1:50:39 PM	No
2	-0.0044	-0.0044	-0.0000	-0.0004	0.0000	1:51:02 PM	No
3	-0.0041	-0.0041	-0.0000	-0.0002	0.0000	1:51:25 PM	No
Mean:	-0.0050	-0.0050	-0.0000				
SD:	0.00125	0.00125	0.0000				
%RSD:	25.30%	25.30%	25.30				

QC value within limits for Hg 253.7 Recovery = Not calculated
All analyte(s) passed QC.

==========

Sequence No.: 10 **Autosampler Location: 2**
Sample ID: LLQC 210714 **Date Collected: 07/14/21 1:51:38 PM**

Analyst: **Data Type: Reprocessed on 07/27/21 10:28:16 AM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: LLQC 210714 **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.1528	0.1528	0.0010	0.0020	0.0010	1:52:17 PM	No
2	0.1616	0.1616	0.0010	0.0023	0.0011	1:52:40 PM	No
3	0.1693	0.1693	0.0011	0.0029	0.0011	1:53:04 PM	No
Mean:	0.1612	0.1612	0.0010				
SD:	0.00828	0.00828	0.0001				
%RSD:	5.14%	5.14%	5.14				

QC value within limits for Hg 253.7 Recovery = 80.62%
All analyte(s) passed QC.

METALS

Raw Data

Mercury Digestion Worksheet

Method Name 7470 Mercury Digestion (TCLP) **Prep Method** M7470TCLP **Set** 210702A **Units** mL

Spikes			
Spiked ID 1	Hg WORKING STANDARD prep 7-2-21 Pipette M33		
Spiked ID 2	Hg WORKING ICV prep 7-2-21		
Spiked ID 3	100mL vessel 0090000032		
Spiked ID 4			
Spiked By	NM	Date:	07/02/21 10:20:00 AM
Witnessed By	SM	Date:	07/02/21 10:20:00 AM

Starting Temp:	SLOT 31 THERM:Kahn 96C
Ending Temp:	SLOT 31 97C
Temp Type:	Modblock1
End Date/Time	07/02/21 12:28:00 PM

Mercury Calibration

Sample	Spike Amount	Spike ID	Final Volume
0 ppb		1	72.25 ml
0.2 ppb	0.2 ml	1	72.25 ml
0.5 ppb	0.5 ml	1	72.25 ml
1 ppb	1 ml	1	72.25 ml
2 ppb	2 ml	1	72.25 ml
5 ppb	5 ml	1	72.25 ml
5 ppb	5 ml	1	72.25 ml
10 ppb	10 ml	1	72.25 ml
ICV	4 ml	2	72.25 ml

Start Date/Time of Calibration 07/02/21 10:20

Sufficient Vol for Matrix QC:	YES

	Sample	Sample Container	Spike Amount	Spike ID	Digested Amount	Final Volume	Start Date/Time	Comments
1	210702A Blk				50mL	72.25mL	07/02/21 10:20	equip: Modblock1
2	210702A LCS		4mL	1	50mL	72.25mL	07/02/21 10:20	equip: Modblock1
3	BA35396	BA35396M18			5mL	72.25mL	07/02/21 10:20	equip: Modblock1 96689 OIL SAMPLE HOT!! DF10
4	BA35396 MS	BA35396M18	4mL	1	5mL	72.25mL	07/02/21 10:20	equip: Modblock1 96689 OIL SAMPLE HOT!! DF10
5	BA35396 MSD	BA35396M18	4mL	1	5mL	72.25mL	07/02/21 10:20	equip: Modblock1 96689 OIL SAMPLE HOT!! DF10

Solvent and Lot#
HNO3 BDH 1120090 19673
H2SO4 J.T.B. 268820 19612
KMnO4 6-24-21
K2S2O8 6-3-21
Decolorizer 6-30-21

Sample COC Transfer	
Sample prep employee Initials	nm
Analyst's initials	
Date	
Time	
Moved to	

Technician's Initials	
Scanned By	nm
Sample Preparation	nm
Digestion	nm
Bring up to volume	
Modified	07/02/21 10:12:12 AM

Reviewed By: **Date:**

7470A/TCLP Injection Log

Directory: K:\FIMS Freddie\Backup Excel\

RunID	Injected		Sample Name	Misc Info	FileName	Multiplier
1	14 Jul 2021	13:26	Calib. Blank		210714W 967	1.
2	14 Jul 2021	13:27	ICAL 0.2ppb 210714		210714W 967	1.
3	14 Jul 2021	13:29	ICAL 0.5ppb 210714		210714W 967	1.
4	14 Jul 2021	13:31	ICAL 1ppb 210714		210714W 967	1.
5	14 Jul 2021	13:32	ICAL 2ppb 210714		210714W 967	1.
6	14 Jul 2021	13:34	ICAL 5ppb 210714		210714W 967	1.
7	14 Jul 2021	13:36	ICAL 10ppb 210714		210714W 967	1.
8	14 Jul 2021	13:48	ICV 210714		210714W 967	1.
9	14 Jul 2021	13:50	ICB 210714		210714W 967	1.
10	14 Jul 2021	13:51	LLQC 210714		210714W 967	1.
16	14 Jul 2021	14:01	210702A BLK		210714W 967	1.
17	14 Jul 2021	14:03	210702A LCS		210714W 967	1.
18	14 Jul 2021	14:04	BA35396M18		210714W 967	1.
19	14 Jul 2021	14:06	BA35396M18 MS		210714W 967	1.
20	14 Jul 2021	14:08	BA35396M18 MSD		210714W 967	1.
21	14 Jul 2021	14:09	CCV 210714		210714W 967	1.
22	14 Jul 2021	14:11	CCB 210714		210714W 967	1.

ORGANICS

Calibration Data

VOLATILE ORGANIC ANALYSIS
VOLATILE ORGANIC COMPOUNDS

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 07/03/21
Matrix: Water Instrument: Max Initials: CH

			0703M02 D	0703M03.D	0703M04.D	0703M05 D	0703M06 D	0703M07.D	0703M08 D									
		Compound	1	2	3	4	5	6	7				Avg	%RSD	Type	r^2	Q	MRF
1	I	Fluorobenzene (IS)																
2	TMHBL	Gasoline C6-C10	12.2	5.351	2.937	1.309	0.9601	0.8725	0.8392				3.5	119	TMHB	0.998		
3	TMHB	Chlorobenzene-D5 (IS)																
4	TMHB	1,4-Dichlorobenzene (IS)																
5																		
6																		
7																		
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35																		

VOLATILE ORGANIC ANALYSIS
VOLATILE ORGANIC COMPOUNDS

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 3 Jul 21 13:51
Instrument: Max
Initial Cal. Date: 07/03/21
Data File: 0703M10.D

		Compound	MEAN	CCRF	%D		%Drift
1	TMHB	Gasoline C6-C10	3.491	1.414	59	TMHBL	9.3
2							
3							
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36							
37							
38							
39							
40							
		Average			59.0		

VOLATILE ORGANIC ANALYSIS
VOLATILE ORGANIC COMPOUNDS

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8 Jul 21 13:36
Instrument: Max
Initial Cal. Date: 07/07/21
Data File: 0708M07.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	Fluorobenzene (IS)	ISTD			I	
2	TMHB	Gasoline C6-C10	3.491	1.357	61	TMHBL	10
3	TMHB	Chlorobenzene-D5 (IS)	ISTD			TMHB	
4	TMHB	1,4-Dichlorobenzene (IS)	ISTD			TMHB	
5							
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39							
40							
		Average			61.0		

VOLATILE ORGANIC ANALYSIS BY
EPA METHOD 8260B

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8 Jul 21 13:36
Instrument: Max
Initial Cal. Date: 07/07/21
Data File: 0708M07.D

		Compound	MEAN	CCRF	%D	%Drift	
1	I	Fluorobenzene (IS)	ISTD			I	
2	S	Dibromofluoromethane(S)	0.2989	0.3073	2.8	S	
3	S	1,2-DCA-D4(S)	0.1312	0.1393	6.2	S	
4	I	Chlorobenzene-D5 (IS)	ISTD			I	
5	S	Toluene-D8(S)	1.183	1.198	1.3	S	
6	S	4-Bromofluorobenzene(S)	0.4158	0.4143	0.36	S	
7	I	1,4-Dichlorobenzene-D (IS)	ISTD			I	
8							
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39							
40							
		Average			2.7		

VOLATILE ORGANIC ANALYSIS
VOLATILE ORGANIC COMPOUNDS

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8 Jul 21 23:23
Instrument: Max
Initial Cal. Date: 07/07/21
Data File: 0708M28.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	Fluorobenzene (IS)	ISTD			I	
2	TMHB	Gasoline C6-C10	3.491	1.408	60	TMHBL	8.3
3	TMHB	Chlorobenzene-D5 (IS)	ISTD			TMHB	
4	TMHB	1,4-Dichlorobenzene (IS)	ISTD			TMHB	
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39							
40							
		Average			60.0		

VOLATILE ORGANIC ANALYSIS BY
EPA METHOD 8260B

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 8 Jul 21 23:23
Instrument: Max
Initial Cal. Date: 07/07/21
Data File: 0708M28.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	Fluorobenzene (IS)	ISTD			I	
2	S	Dibromofluoromethane(S)	0.2989	0.3035	1.6	S	
3	S	1,2-DCA-D4(S)	0.1312	0.1401	6.8	S	
4	I	Chlorobenzene-D5 (IS)	ISTD			I	
5	S	Toluene-D8(S)	1.183	1.194	0.95	S	
6	S	4-Bromofluorobenzene(S)	0.4158	0.3952	4.9	S	
7	I	1,4-Dichlorobenzene-D (IS)	ISTD			I	
8							
9							
10							
11							
12							
13							
14							
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37							
38							
39							
40							
		Average			3.6		

ORGANICS

Raw Data

Injection Log

Directory: M:\MAX\DATA\210702\

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	2	0703M02.D	1	20ug/L GAS STD 7/3/21	IS&S 6/4/21	3 Jul 21 10:07
2	3	0703M03.D	1	50ug/L GAS STD 7/3/21	IS&S 6/4/21	3 Jul 21 10:35
3	4	0703M04.D	1	100ug/L GAS STD 7/3/21	IS&S 6/4/21	3 Jul 21 11:03
4	5	0703M05.D	1	300ug/L GAS STD 7/3/21	IS&S 6/4/21	3 Jul 21 11:31
5	6	0703M06.D	1	600ug/L GAS STD 7/3/21	IS&S 6/4/21	3 Jul 21 11:59
6	7	0703M07.D	1	800ug/L GAS STD 7/3/21	IS&S 6/4/21	3 Jul 21 12:27
7	8	0703M08.D	1	1000ug/L GAS STD 7/3/21	IS&S 6/4/21	3 Jul 21 12:55
8	10	0703M10.D	1	(SS) 300ug/L GAS STD 7/3/21	IS&S 6/4/21	3 Jul 21 13:51
9	2	0707M03.D	1	0.3ug/L VOC STD 7/7/21	IS&S 6/4/21	7 Jul 21 12:34
10	3	0707M04.D	1	0.5ug/L VOC STD 7/7/21	IS&S 6/4/21	7 Jul 21 13:02
11	4	0707M05.D	1	1ug/L VOC STD 7/7/21	IS&S 6/4/21	7 Jul 21 13:30
12	5	0707M06.D	1	2ug/L VOC STD 7/7/21	IS&S 6/4/21	7 Jul 21 13:58
13	6	0707M07.D	1	5ug/L VOC STD 7/7/21	IS&S 6/4/21	7 Jul 21 14:25
14	7	0707M08.D	1	10ug/L VOC STD 7/7/21	IS&S 6/4/21	7 Jul 21 14:54
15	8	0707M09.D	1	20ug/L VOC STD 7/7/21	IS&S 6/4/21	7 Jul 21 15:21
16	9	0707M10.D	1	40ug/L VOC STD 7/7/21	IS&S 6/4/21	7 Jul 21 15:49
17	10	0707M11.D	1	100ug/L VOC STD 7/7/21	IS&S 6/4/21	7 Jul 21 16:18
18	7	0708M07.D	1	210708A CCV/LCS 300ug/L	IS&S 6/4/21	8 Jul 21 13:36
19	8	0708M08.D	1	210708A BLK	IS&S 6/4/21	8 Jul 21 14:04
20	26	0708M26.D	100000	BA35396W01 DF100000	IS&S 6/4/21	8 Jul 21 22:27
21	28	0708M28.D	1	LCSD/Ending CCV 300ug/L 7/8/21	IS&S 6/4/21	8 Jul 21 23:23

INORGANIC ANALYSIS
Calibration and Raw Data

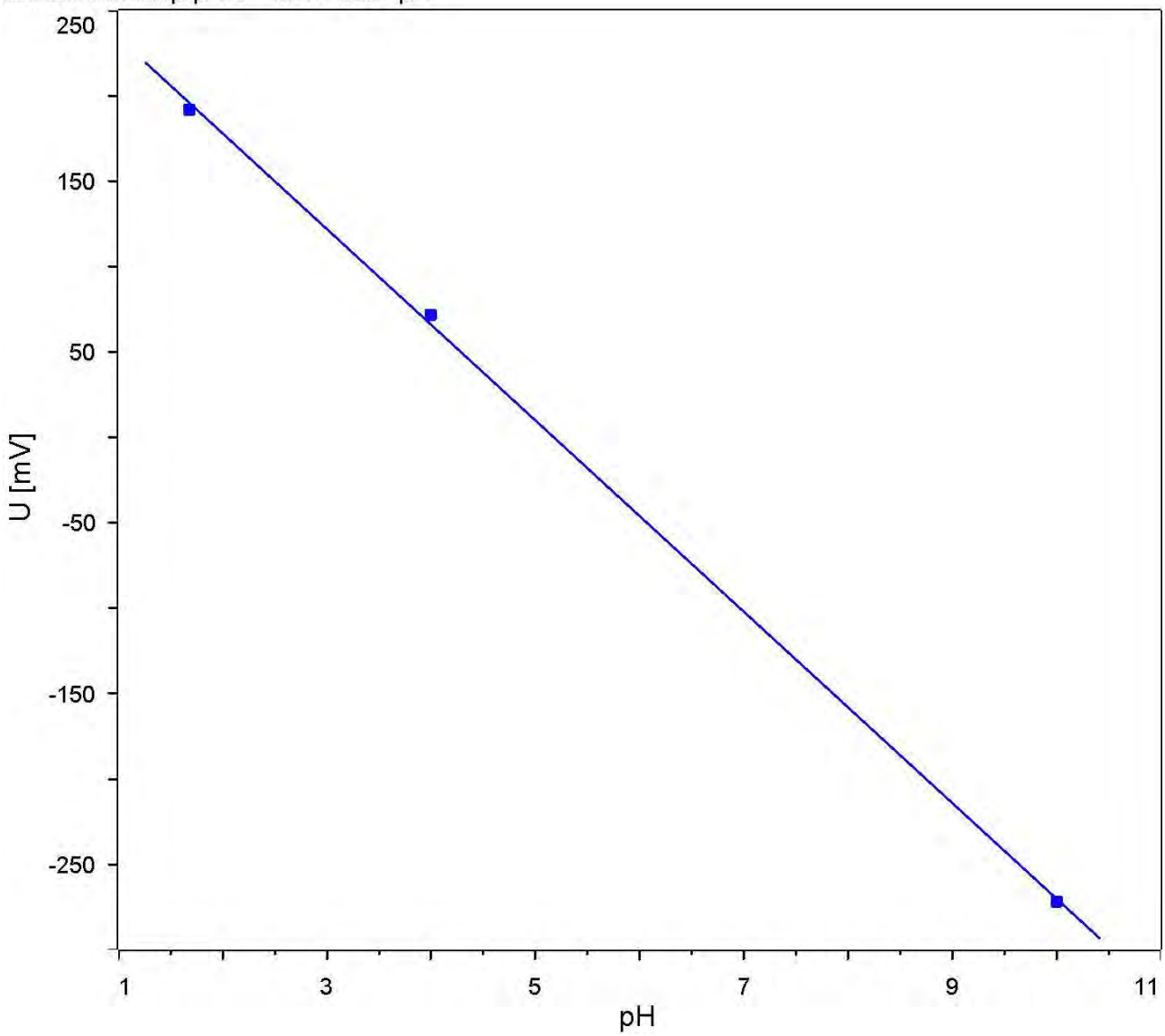
Timao Calibration Curve

2021-06-25 13:04:42

Calculations

Buffer 7	7.07	
Formula	'MEAS pH.EME'	
MEAS pH.EME	7.0711	
Slope	96.30	
Formula	'Calibration loop pH.SLO'	
Calibration loop pH.SLO	96.3	
pH(as)	5.18	
Formula	'Calibration loop pH.ENP'	
Calibration loop pH.ENP	5.179	
Res19	20.1	°C
Formula	'CAL MEAS pH.ETE'	
CAL MEAS pH.ETE	20.0707	

Calibration loop pH.1 - CAL LOOP pH



Metrohm 814/809 Titrando Data

Sample ID	Analysis Date/Time	Method	Result	Temp	Unit	Batch	Initials
CCV	2021-06-25 13:20:49 UTC-7	pH meas 2011	7.04 7.02	20.0			EA
BA335396M11	2021-06-25 13:17:55 UTC-7	pH meas 2011	4.09 4.11	19.5			EA
CCV	2021-06-25 13:15:02 UTC-7	pH meas 2011	7.05 7.03	20.0			EA

Tiamo Alkalinity Standard Prep

Prep'd By (Initials): AR

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Unit	Conc	Lot Number - QA Number	Prep/Opened	Exp. Date	Aliquot from Stock	Final Volume	Solvent	Final Standard Conc
Sulfuric Acid (H2SO4)	J.T.Baker	NA	NA	**167828**	**NA**	**NA**	PURCHASED	NA	NA	NA
0.10N Sulfuric Acid (H2SO4)	J.T.Baker	Normality	0.1N	**167828**	**03/21/21**	**03/21/22**	3ml	1L	DI	0.10N
0.02N Sulfuric Acid (H2SO4)	J.T.Baker	Normality	0.02N	**167828**	**03/21/21**	**03/21/22**	200mL	1L	DI	0.02N
Inorganic Spike(NaHCO3)	BDH	NA	NA	**19K0856189**	**04/09/20**	**NA**	PURCHASED	NA	NA	NA
Inorganic Spike Solution	BDH	Milligrams/Liters	250mg/L	**1575C510**	**01/21/21**	**07/21/21**	3.5g	500mL	DI	250mg/L
Standarizing Solution(NaCO3)	VWR	Normality	1N	**19A3156123-52129**	**04/23/21**	**01/31/23**	PURCHASED	NA	NA	NA

Tiamo Electroconductivity Standard Prep

Prep'd By (Initials): AR

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Units	Conc	Lot Number	Prep/Opened	Exp. Date	Aliquot from Stock	Final Volume	Solvent	Final Standard Conc. Range (µg/mL)
EC Spike(KCl)	Mallinckrodt AR	Na	NA	**6858 KHMV**	**NA**	**NA**	PURCHASED	NA	NA	NA
EC Spike Solution	Mallinckrodt AR	Moles/Conductivity	0.01M	**6858 KHMV**	**05/10/21**	5/10/22	0.7456g	1L	DI	1412umos
							0.5280g	1L	DI	1000umos
Storage Solution EC Probe	APPL	NA	NA	NA	NA	NA	NA	NA	DI	NA

Tiamo pH Buffer Reference Standards

Prep Date: Daily

Exp Date: Daily

Prep'd By (Initials): AR **Prep'd By (Initials): AR**

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Units	pH	Lot Number - QA Number	Opened	Exp. Date	Aliquot from Stock	Final Volume	Solvent	Final Standard Conc (µg/mL)
pH 1.68 Buffer	VWR	pH Units	1.68	**4101k68**	**02/18/21**	**07/29/21**	NA	NA	NA	NA
pH 4.00 Buffer	VWR	pH Units	4	**4912g84**	**02/18/21**	**12/12/21**	NA	NA	NA	NA
pH 10.01 Buffer	VWR	pH Units	10.01	**1004B81**	**07/02/20**	**10/12/21**	NA	NA	NA	NA
pH 7.00 Buffer	Ricca	pH Units	7	**1912A15**	**07/02/20**	**12/01/21**	NA	NA	NA	NA

ORP Standards

Prep Date: same as QCG batch

Prep'd By (Initials): AR

Name of Initial Standard (QAU Label)	Supplier	Units	mV	Lot Number - QA Number	Opened	Exp. Date	Aliquot from Stock	Final Volume	Solvent	Final Standard Conc (mV)
ORP Standard	Orion	mV	219mV @20C	**ZZ1**	**02/18/21**	**01/01/23**	20mL	20mL	Stock solution	219mV @ 20C

ANALYTICAL REPORT

July 16, 2021

APPL Inc - Clovis, CA

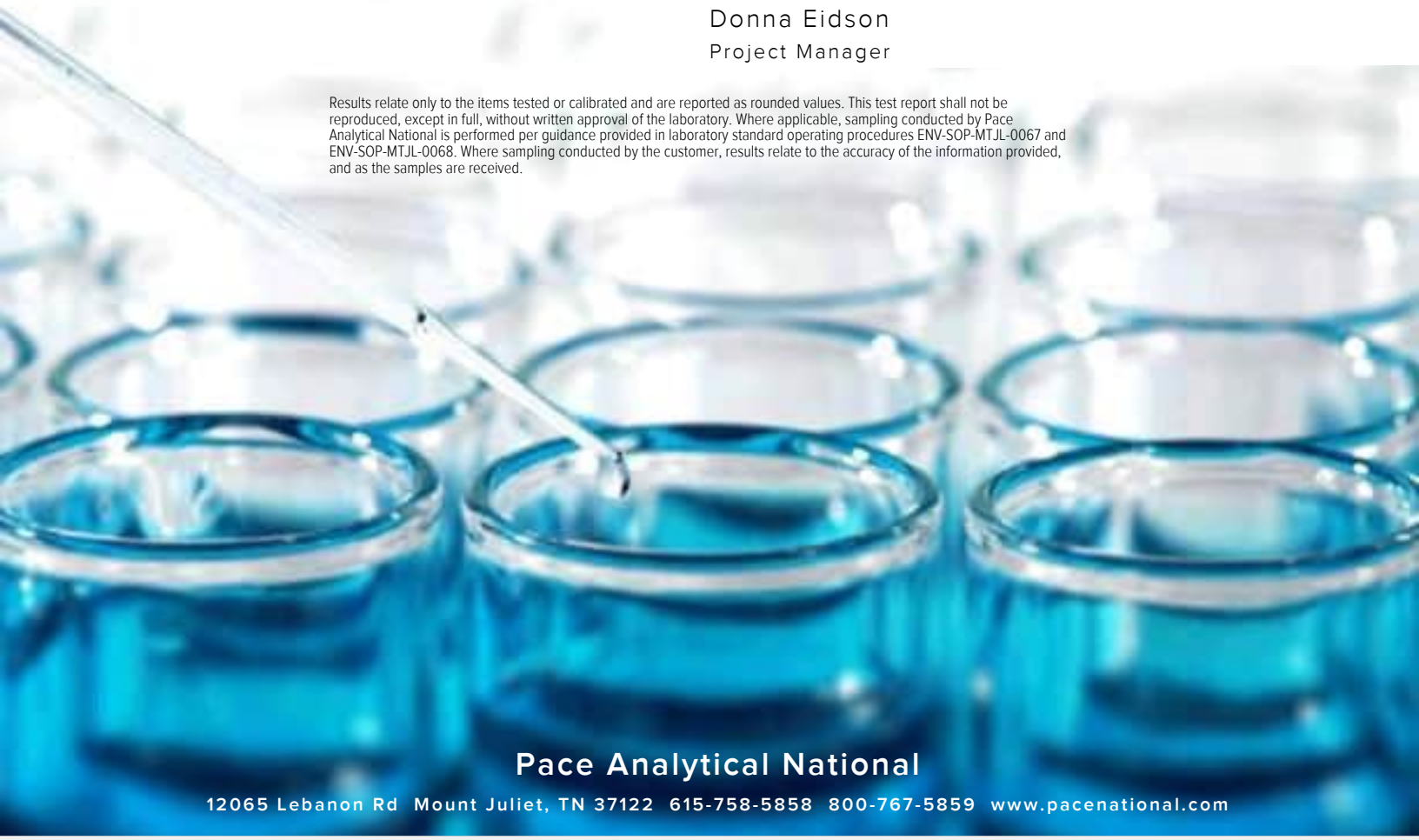
Sample Delivery Group:	L1372798
Samples Received:	06/30/2021
Project Number:	96689
Description:	

Report To: Libby Cheeseborough
908 N. Temperance Ave
Clovis, CA 93611

Entire Report Reviewed By:

Donna Eidson
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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Wet Chemistry by Method 9034-9030B 7

Wet Chemistry by Method D93/1010A 8

Gl: Glossary of Terms 9

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Sc: Sample Chain of Custody 11

SAMPLE SUMMARY

VE-UXO17-DRUM-01 L1372798-01 Solid

Collected by	Collected date/time	Received date/time
	06/24/21 08:45	06/30/21 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9012 B	WG1705458	1	07/14/21 18:18	07/15/21 13:31	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9034-9030B	WG1699318	1	07/02/21 19:00	07/02/21 19:00	LDT	Mt. Juliet, TN
Wet Chemistry by Method D93/1010A	WG1704087	1	07/14/21 01:14	07/14/21 01:14	CAT	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Donna Eidson
Project Manager

Project Narrative

All Reactive Cyanide results reported in the attached report were determined as totals using method 9012 B.

All Reactive Sulfide results reported in the attached report were determined as totals using method 9034-9030B.

Wet Chemistry by Method 9012 B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Cyanide	ND		0.250	1	07/15/2021 13:31	WG1705458

Wet Chemistry by Method 9034-9030B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Reactive Sulfide	ND	T8	25.0	1	07/02/2021 19:00	WG1699318

Wet Chemistry by Method D93/1010A

Analyte	Result Deg. F	Qualifier	Dilution	Analysis date / time	Batch
Ignitability	DNI at 170		1	07/14/2021 01:14	WG1704087

Method Blank (MB)

(MB) R3679903-1 07/15/21 13:19

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Cyanide	U		0.0390	0.250

L1373857-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1373857-01 07/15/21 13:40 • (DUP) R3679903-3 07/15/21 13:41

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	0.585	ND	1	83.5	P1	20

L1375599-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1375599-07 07/15/21 13:59 • (DUP) R3679903-9 07/15/21 14:00

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Reactive Cyanide	3.44	6.38	5	59.8	J3	20

Laboratory Control Sample (LCS)

(LCS) R3679903-2 07/15/21 13:20

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Cyanide	2.50	2.19	87.5	85.0-115	

L1375068-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1375068-01 07/15/21 13:45 • (MS) R3679903-4 07/15/21 13:46 • (MSD) R3679903-5 07/15/21 13:47

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	0.762	0.867	45.8	52.1	1	75.0-125	J6	J6	12.9	20

L1375073-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1375073-05 07/15/21 13:49 • (MS) R3679903-6 07/15/21 13:50 • (MSD) R3679903-7 07/15/21 13:51

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Cyanide	1.67	ND	1.37	1.23	81.9	73.6	1	75.0-125		J6	10.8	20

Method Blank (MB)

(MB) R3675181-1 07/02/21 19:00

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Reactive Sulfide	U		7.63	25.0

Laboratory Control Sample (LCS)

(LCS) R3675181-2 07/02/21 19:00

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Reactive Sulfide	100	95.8	95.8	70.0-130	

L1372085-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1372085-04 07/02/21 19:00 • (MS) R3675181-3 07/02/21 19:00 • (MSD) R3675181-4 07/02/21 19:00

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Reactive Sulfide	100	ND	87.9	87.8	87.9	87.8	1	70.0-130			0.139	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3679054-1 07/14/21 01:14 • (LCSD) R3679054-2 07/14/21 01:14

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	Deg. F	Deg. F	Deg. F	%	%	%			%	%
Ignitability	126	127	129	100	102	95.6-104			1.57	10

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
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Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

SUBCONTRACT ORDER

APPL, Inc.

E173

ARF: 96689 **PO: 00-96689**

SENDING LABORATORY:

APPL Labs
908 North Temperance Ave.
Clovis, CA 93611
Phone: (559) 275-2175
Fax: (559) 275-4422
Project Manager: Libby Cheeseborough (libby@applinc.com)

RECEIVING LABORATORY:

PACE Analytical National Center
12065 Lebanon Rd.
Mt. Juliet, TN 37122
Phone: (615) 773-9672x
Fax:
DOD Expiration Date:

1372798

Comments: One Week TAT;DVP 4 report; email results & questions to libby@applinc.com.

	APPL ID	Sample ID	LOC ID	Matrix	Collected	Analysis	Price
1.	BA35396	VE-UXO17-DRUM-01	VE-UXO17	Water	06/24/21 08:45	SW-846 1010 Ignitability	
				Water	06/24/21 08:45	SW-846 7.3.4.2 Reactivity	
				Water	06/24/21 08:45	SW-846 9014 Reactivity to cyanide	01

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N		
Sufficient volume sent:	Y N		
RAD Screen <0.5 mR/hr:	Y N		

AG BG
.2 + 0 = .2

Released By	Date	Time	Received By	Date	Time
	6/29/21	1450			
Released By	Date	Time	Received By	Date	Time
				6/30/21	9:00

Upon receipt, please email signed COC to APPL Inc.
To ensure timely payment, please include the PO number on your invoice.

Attachment B
Soil Sampling Standard Operating Procedures

Soil Sampling

1. Purpose and Scope

The purpose of this procedure is to provide standardized procedures for obtaining samples of surface and subsurface soils. Any project required deviations from Standard Operating Procedures (SOPs), will be provided in site-specific Sampling and Analysis Plans (SAPs).

2. Equipment and Materials

- Personal protection equipment
- Stainless-steel hand auger, split spoon, or appropriate hand tool
- Thin-walled sampling tubes (such as a Shelby tube)
- Direct-push rig, drilling rig, soil-coring rig, or hand auger equipment
- Stainless-steel pan or bowl
- Stainless-steel spoons or dedicated wooden spoons
- Sample bottles and equipment
- Photo-ionization detector (PID) or flame-ionization detector (FID)

3. Procedures and Guidelines

All personnel shall be wearing personal protective equipment (PPE) per health and safety plan (HASP). Decontaminate all equipment per SOP *E-1 Decontamination of Personnel and Equipment* and *E-2 Decontamination of Drilling Rigs and Equipment*. Locate and record the sample point in the logbook. If appropriate, record sample location using global positioning system (GPS) or land survey. Use of GPS units will be in accordance with manufacturer's specifications.

3.1 Surface and Shallow Subsurface Sampling with Hand Auger

Remove soil to a point just above the interval to be sampled. Collect soil at the desired sampling depth. Immediately take soil for volatile organic compound (VOC) and/or gasoline range organic (GRO) analysis directly from the bottom of the hand auger with an Encore or TerraCore sampler before the soil is extruded, specifically to substantively eliminate the concern over volatile loss. Place soil for analyses other than VOCs and/or GROs into a stainless-steel bowl, take a PID or FID reading of the soil collected, and log the readings accordingly into the boring (or other) log. Mix the soil in the bowl according to SOP *A-3 Homogenization of Soil and Sediment Samples*. If this interval is to be collected for analysis, use a stainless-steel spoon or dedicated wooden spoon to transfer the sample from the bowl to the sample container(s). Try not to touch soil to be collected with bare or gloved hands. Soil samples in sample containers should be free of pebbles, roots, and other non-soil debris. Preferably, soil jars should be filled full, but if difficulties are encountered in getting sample volume, see SAP for minimum sample volume required by lab, or have the Project Chemist call lab for minimum volume lab will need for that/those analyses. For VOC samples in Encore® samplers see SOP *A-4 Soil Sampling for VOCs Using the EnCore® Sampler.* For VOC samples in Terra core® samplers see SOP *A-6 Soil Sampling for VOCs Using the Terra Core® Sampler.*

3.2 Split-Spoon or Direct Push Sampling

Advance a boring to just above the sample depth using a drilling rig, slide hammer, or direct push technology (DPT) rig. Lower the sampler into the hole and advance it to a depth equal to the total length of the desired interval. If using a drilling rig, or slide hammer, advance the split spoon sampler using a weighted or pneumatic hammer. Record the weight, type, blow count (number of blows required to advance 6 inches), and penetrated length into the boring log. Record only the penetrated length if using DPT.

The driller will then open the sampler or extrude the Lexan (or similar) sample tube and cut open the tube, leaving the cut piece of tube on the sample to minimize the possibility of soil and vapors to escape. Record the total length of sample retrieved. Using a PID or FID, take readings along several points of the sampler and record them. Also, record any visual observations of suspected contamination, any unusual odors that may be indicative of contamination or other processes (e.g., biodegradation of organic carbon or sulfate reduction) in the subsurface. If this interval is to be collected, samples for VOC analysis are to be collected immediately from the core or split spoon at the target location (based on visual observations and PID/FID readings). Samples for analyses other than VOCs and/or GRO should be homogenized according to SOP *A-3 Homogenization of Soil and Sediment Samples*. For VOC samples in TerraCore® samplers see SOP *A-6 Soil Sampling for VOCs Using the TerraCore ® Sampler.*

Additional sample volume may be obtained by collecting a second sample below the first sample and compositing the sample for non-volatile parameters only (if still within the desired sample depth interval). A co-located hole within approximately 2 feet from the first hole may also be used to collect additional sample volume.

3.3 Thin-Walled Tube Sampling

Undisturbed samples may be collected for analysis for physical parameters such as vertical hydraulic conductivity. These samples will be collected using thin-walled sampling tubes (sometimes called Shelby tubes) according to ASTM D 1587 (attached). Tubes will be 24 to 36 inches long and 3 to 4 inches in diameter, depending upon the quantity of sample required. Undisturbed samples will be obtained by smoothly pressing the sampling tube through the interval to be sampled using the weight of the drilling rig. Jerking the sample should be avoided. Once the sample is brought to the surface, the ends will be sealed with bees wax (or comparable) and then sealed with end caps and tape. The sample designation, date and time of sampling, and the up direction will be noted on the sampling tube. The tube shall be kept upright as much as possible and will be protected from freezing and/or extreme heat or vibrations that could alter the sample.

3.4 Sampling Descriptions

Following sample retrieval, the soils should be visually described in the boring log using ASTM D 2488, (attached) including approximated depths, PID readings, and any other relevant observations. Use the standard CH2M soil description format found on soil boring log headers: soil name, USCS group symbol, Munsell number and color, moisture content, relative density or consistency, soil structure, mineralogy (note approximate percentages of sand, silt and clay). Use a measuring tape or folding ruler calibrated in feet and 10ths for logging soils. Note the depths that drilling penetration is easier/faster. Note at what depth drillers switched from augering to air hammer, as applicable. Make sure to note at what depth soil becomes saturated (and if it appears to return to an unsaturated state, indicating pearched water).

4. Key Checks and Preventative Maintenance

- Decontamination of all non-disposable equipment between sampling locations.
- PID/FID calibration and checks.

5. Attachments

- ASTM D 1587-08 Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes
- ASTM D 2488-00 Stand Practice for Description and Identification of Soils (Visual-Manual Procedure)

Designation: D 1587 – 08

Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes[1]

This standard is issued under the fixed designation D 1587; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This practice covers a procedure for using a thin-walled metal tube to recover relatively intact soil samples suitable for laboratory tests of engineering properties, such as strength, compressibility, permeability, and density. Thin-walled tubes used in piston, plug, or rotary-type samplers should comply with Section 6.3 of this practice which describes the thin-walled tubes.

NOTE 1—This practice does not apply to liners used within the samplers.

1.2 This Practice is limited to soils that can be penetrated by the thin-walled tube. This sampling method is not recommended for sampling soils containing gravel or larger size soil particles cemented or very hard soils. Other soil samplers may be used for sampling these soil types. Such samplers include driven split barrel samplers and soil coring devices (D 1586, D 3550, and D 6151). For information on appropriate use of other soil samplers refer to D 6169.

1.3 This practice is often used in conjunction with fluid rotary drilling (D 1452, D 5783) or hollow-stem augers (D 6151). Subsurface geotechnical explorations should be reported in accordance with practice (D 5434). This practice discusses some aspects of sample preservation after the sampling event. For information on preservation and transportation process of soil samples, consult Practice D 4220. This practice does not address environmental sampling; consult D 6169 and D 6232 for information on sampling for environmental investigations.

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4.1 The tubing tolerances presented in Table 1 are from sources available in North America. Use of metric equivalent is acceptable as long as thickness and proportions are similar to those required in this standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

1.6 This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D 653 Terminology Relating to Soil, Rock, and Contained Fluids

D 1452 Practice for Soil Investigation and Sampling by Auger Borings

D 1586 Test Method for Penetration Test (SPT) and Split-Barrel Sampling of Soils

D 2488 Practice for Description and Identification of Soils (Visual-Manual Procedure)

D 3550 Practice for Thick Wall, Ring-Lined, Split Barrel, Drive Sampling of Soils

D 3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

D 4220 Practices for Preserving and Transporting Soil Samples

[1] This practice is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.02 on Sampling and Related Field Testing for Soil Evaluations.

Current edition approved Oct. 1, 2008. Published October 2008. Originally approved in 1958. Last previous edition approved in 2007 as D 1587 – 00 (2007)$^{\varepsilon 1}$.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

***A Summary of Changes section appears at the end of this standard.**

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TABLE 1 Dimensional Tolerances for Thin-Walled Tubes

Size Outside Diameter	Nominal Tube Diameters from Table 2[A] Tolerances					
	2 in.	50.8 mm	3 in.	76.2 mm	5 in.	127 mm
Outside diameter, D_o	+0.007 -0.000	+0.179 -0.000	+0.010 -0.000	+0.254 -0.000	+0.015 -0.000	0.381 -0.000
Inside diameter, D_i	+0.000 -0.007	+0.000 -0.179	+0.000 -0.010	+0.000 -0.254	+0.000 -0.015	+0.000 -0.381
Wall thickness	±0.007	±0.179	±0.010	±0.254	±0.015	±0.381
Ovality	0.015	0.381	0.020	0.508	0.030	0.762
Straightness	0.030/ft	2.50/m	0.030/ft	2.50/m	0.030/ft	2.50/m

[A] Intermediate or larger diameters should be proportional. Specify only two of the first three tolerances; that is, D_o and D_i, or D_o and Wall thickness, or D_i and Wall thickness.

D 5434 Guide for Field Logging of Subsurface Explorations of Soil and Rock

D 5783 Guide for Use of Direct Rotary Drilling with Water-Based Drilling Fluid for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices

D 6151 Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling

D 6169 Guide for Selection of Soil and Rock Sampling Devices Used With Drill Rigs for Environmental Investigations

D 6232 Guide for Selection of Sampling Equipment for Waste and Contaminated Media Data Collection Activities

3. Terminology

3.1 *Definitions:*

3.1.1 For common definitions of terms in this standard, refer to Terminology D 653.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *inside clearance ratio, %, n*—the ratio of the difference in the inside diameter of the tube, D_i, minus the inside diameter of the cutting edge, D_e, to the inside diameter of the tube, D_i expressed as a percentage (see Fig. 1).

3.2.2 *ovality, n*—the cross section of the tube that deviates from a perfect circle.

4. Summary of Practice

4.1 A relatively intact sample is obtained by pressing a thin-walled metal tube into the in-situ soil at the bottom of a boring, removing the soil-filled tube, and applying seals to the soil surfaces to prevent soil movement and moisture gain or loss.

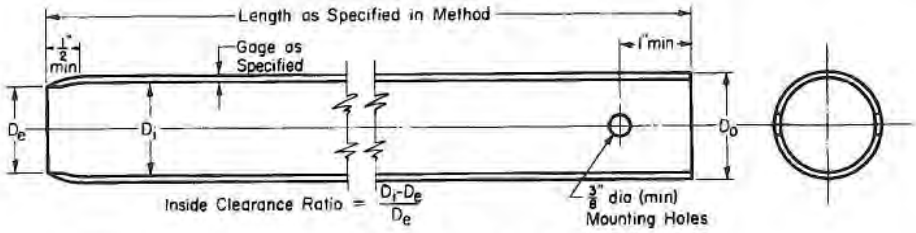
5. Significance and Use

5.1 This practice, or Practice D 3550 with thin wall shoe, is used when it is necessary to obtain a relatively intact specimen suitable for laboratory tests of engineering properties or other tests that might be influenced by soil disturbance.

NOTE 2—The quality of the result produced by this standard is dependent on the competence of the personnel performing it, and the suitability of the equipment and facilities used. Agencies that meet the criteria of Practice D 3740 are generally considered capable of competent and objective sampling. Users of this practice. are cautioned that compliance with Practice D 3740 does not in itself assure reliable results. Reliable results depend on many factors; Practice D 3740 provides a means of evaluating some of those factors.

6. Apparatus

6.1 *Drilling Equipment*—When sampling in a boring, any drilling equipment may be used that provides a reasonably clean hole; that minimizes disturbance of the soil to be sampled; and that does not hinder the penetration of the thin-walled sampler. Open borehole diameter and the inside



NOTE 1—Minimum of two mounting holes on opposite sides for D_o smaller than 4 in. (101.6 mm).

NOTE 2—Minimum of four mounting holes equally spaced for D_o 4 in. (101.6 mm) and larger.

NOTE 3—Tube held with hardened screws or other suitable means.

NOTE 4—2-in (50.8 mm) outside-diameter tubes are specified with an 18-gauge wall thickness to comply with area ratio criteria accepted for "intact samples." Users are advised that such tubing is difficult to locate and can be extremely expensive in small quantities. Sixteen-gauge tubes are generally readily available.

Metric Equivalent Conversions

in.	mm
3/8	9.53
1/2	12.7
1	25.4
2	50.8
3	76.2
4	101.6
5	127

FIG. 1 Thin-Walled Tube for Sampling

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TABLE 2 Suitable Thin-Walled Steel Sample Tubes[A]

Outside diameter (D_o):			
in.	2	3	5
mm	50.8	76.2	127
Wall thickness:			
Bwg	18	16	11
in.	0.049	0.065	0.120
mm	1.24	1.65	3.05
Tube length:			
in.	36	36	54
m	0.91	0.91	1.45
Inside clearance ratio, %	<1	<1	<1

[A] The three diameters recommended in Table 2 are indicated for purposes of standardization, and are not intended to indicate that sampling tubes of intermediate or larger diameters are not acceptable. Lengths of tubes shown are illustrative. Proper lengths to be determined as suited to field conditions.

diameter of driven casing or hollow stem auger shall not exceed 3.5 times the outside diameter of the thin-walled tube.

6.2 *Sampler Insertion Equipment*, shall be adequate to provide a relatively rapid continuous penetration force. For hard formations it may be necessary, although not recommended, to drive the thin-walled tube sampler.

6.3 *Thin-Walled Tubes*, should be manufactured to the dimensions as shown in Fig. 1. They should have an outside diameter of 2 to 5 in. (50 to 130 mm) and be made of metal having adequate strength for the type of soil to be sampled. Tubes shall be clean and free of all surface irregularities including projecting weld seams. Other diameters may be used but the tube dimensions should be proportional to the tube designs presented here.

6.3.1 *Length of Tubes*—See Table 2 and 7.4.1.

6.3.2 *Tolerances*, shall be within the limits shown in Table 1.

6.3.3 *Inside Clearance Ratio*, should be not greater than 1 % unless specified otherwise for the type of soil to be sampled. Generally, the inside clearance ratio used should increase with the increase in plasticity of the soil being sampled, except for sensitive soils or where local experience indicates otherwise. See 3.2.1 and Fig. 1 for definition of inside clearance ratio.

6.3.4 *Corrosion Protection*—Corrosion, whether from galvanic or chemical reaction, can damage or destroy both the thin-walled tube and the sample. Severity of damage is a function of time as well as interaction between the sample and the tube. Thin-walled tubes should have some form of protective coating, unless the soil is to be extruded less than 3 days. The type of coating to be used may vary depending upon the material to be sampled. Plating of the tubes or alternate base metals may be specified. Galvanized tubes are often used when long term storage is required. Coatings may include a light coat of lubricating oil, lacquer, epoxy, Teflon, zinc oxide, and others.

NOTE 3—Most coating materials are not resistant to scratching by soils that contain sands. Consideration should be given for prompt testing of the sample because chemical reactions between the metal and the soil sample con occur with time.

6.4 *Sampler Head*, serves to couple the thin-walled tube to the insertion equipment and, together with the thin-walled tube, comprises the thin-walled tube sampler. The sampler head shall contain a venting area and suitable check valve with the venting area to the outside equal to or greater than the area through the check valve. In some special cases, a check valve may not be required but venting is required to avoid sample compression. Attachment of the head to the tube shall be concentric and coaxial to assure uniform application of force to the tube by the sampler insertion equipment.

7. Procedure

7.1 Remove loose material from the center of a casing or hollow stem auger as carefully as possible to avoid disturbance of the material to be sampled. If groundwater is encountered, maintain the liquid level in the borehole at or above ground water level during the drilling and sampling operation.

7.2 Bottom discharge bits are not permitted. Side discharge bits may be used, with caution. Jetting through an open-tube sampler to clean out the borehole to sampling elevation is not permitted.

NOTE 4—Roller bits are available in downward-jetting and diffused-jet configurations. Downward-jetting configuration rock bits are not acceptable. Diffuse-jet configurations are generally acceptable.

7.3 Lower the sampling apparatus so that the sample tube's bottom rests on the bottom of the hole and record depth to the bottom of the sample tube to the nearest 0.1-ft (0.03 m).

7.3.1 Keep the sampling apparatus plumb during lowering, thereby preventing the cutting edge of the tube from scraping the wall of the borehole.

7.4 Advance the sampler without rotation by a continuous relatively rapid downward motion and record length of advancement to the nearest 1 in. (25 mm).

7.4.1 Determine the length of advance by the resistance and condition of the soil formation, but the length shall never exceed 5 to 10 diameters of the tube in sands and 10 to 15 diameters of the tube in clays. In no case shall a length of advance be greater than the sample-tube length minus an allowance for the sampler head and a minimum of 3 in. (76 mm) for sludge and end cuttings.

NOTE 5—The mass of sample, laboratory handling capabilities, transportation problems, and commercial availability of tubes will generally limit maximum practical lengths to those shown in Table 2.

7.5 When the soil formation is too hard for push-type insertion, the tube may be driven or Practice D 3550 may be used. If driving methods are used, the data regarding weight and fall of the hammer and penetration achieved must be shown in the report. Additionally, that tube must be prominently labeled a "driven sample."

7.6 Withdraw the sampler from the soil formation as carefully as possible in order to minimize disturbance of the sample. The tube can be slowly rotated to shear the material at the end of the tube, and to relieve water or suction pressures (or both) and improve recovery. Where the soil formation is soft, a delay before withdraw of the sampler (typically 5 to 30 minutes) may improve sample recovery.

8. Sample Measurement, Sealing and Labeling

8.1 Upon removal of the tube, remove the drill cuttings in the upper end of the tube and measure the length of the soil sample recovered to the nearest 0.25 in. (6 mm) in the tube. Seal the upper end of the tube. Remove at least 1 in. (25 mm)

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of material from the lower end of the tube. Use this material for soil description in accordance with Practice D 2488. Measure the overall sample length. Seal the lower end of the tube. Alternatively, after measurement, the tube may be sealed without removal of soil from the ends of the tube.

8.1.1 Tubes sealed over the ends, as opposed to those sealed with expanding packers, should be provided with spacers or appropriate packing materials, or both prior to sealing the tube ends to provide proper confinement. Packing materials must be nonabsorbent and must maintain their properties to provide the same degree of sample support with time.

8.1.2 Depending on the requirements of the investigation, field extrusion and packaging of extruded soil samples can be performed. This allows for physical examination and classification of the sample. Samples are extruded in special hydraulic jacks equipped with properly sized platens to extrude the core in a continuous smooth speed. In some cases, further extrusion may cause sample disturbance reducing suitability for testing of engineering properties. In other cases, if damage is not significant, cores can be extruded and preserved for testing (Practice D 4220). Bent or damaged tubes should be cut off before extruding.

8.2 Prepare and immediately affix labels or apply markings as necessary to identify the sample (see Section 9). Assure that the markings or labels are adequate to survive transportation and storage.

NOTE 6—Top end of the tube should be labeled "top."

9. Field Log

9.1 Record the information that may be required for preparing field logs in general accordance to Guide D 5434. This guide is used for logging explorations by drilling and sampling. Some examples of the information required include:

9.1.1 Name and location of the project,

9.1.2 Boring number,

9.1.3 Log of the soil conditions,

9.1.4 Surface elevation or reference to a datum to the nearest foot (0.5 m) or better,

9.1.5 Location of the boring,

9.1.6 Method of making the borehole,

9.1.7 Name of the drilling foreman and company, and

9.1.8 Name of the drilling inspector(s).

9.1.9 Date and time of boring-start and finish,

9.1.10 Depth to groundwater level: date and time measured,

9.2 Recording the appropriate sampling information is required as follows:

9.2.1 Depth to top of sample to the nearest 0.1 ft. (.03 m) and number of sample,

9.2.2 Description of thin-walled tube sampler: size, type of metal, type of coating,

9.2.3 Method of sampler insertion: push or drive,

9.2.4 Method of drilling, size of hole, casing, and drilling fluid used,

9.2.5 Soil description in accordance with Practice D 2488,

9.2.6 Length of sampler advance (push), and

9.2.7 Recovery: length of sample obtained.

10. Keywords

10.1 geologic investigations; intact; sampling; soil exploration; soil investigations; subsurface investigations

SUMMARY OF CHANGES

Committee D18 has identified the location of selected changes to this standard since the last issue (D 1587 – 00 (2007)$^{\varepsilon 1}$) that may impact the use of this standard. (Approved October 1, 2008.)

(*1*) Replaced "undisturbed" with "intact" in Sections 1.1, 4.1, 5.1, 10, and Note 4 of Fig. 1.

(*2*) Editorial changes made in Sections 1.4, 7.3, 7.4.1, 7.6, 8.1, and 8.1.2.

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Designation: D 2488 – 00

Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)[1]

This standard is issued under the fixed designation D 2488; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope *

1.1 This practice covers procedures for the description of soils for engineering purposes.

1.2 This practice also describes a procedure for identifying soils, at the option of the user, based on the classification system described in Test Method D 2487. The identification is based on visual examination and manual tests. It must be clearly stated in reporting an identification that it is based on visual-manual procedures.

1.2.1 When precise classification of soils for engineering purposes is required, the procedures prescribed in Test Method D 2487 shall be used.

1.2.2 In this practice, the identification portion assigning a group symbol and name is limited to soil particles smaller than 3 in. (75 mm).

1.2.3 The identification portion of this practice is limited to naturally occurring soils (disturbed and undisturbed).

NOTE 1—This practice may be used as a descriptive system applied to such materials as shale, claystone, shells, crushed rock, etc. (see Appendix X2).

1.3 The descriptive information in this practice may be used with other soil classification systems or for materials other than naturally occurring soils.

1.4 The values stated in inch-pound units are to be regarded as the standard.

1.5 *This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific precautionary statements see Section 8.

1.6 *This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 653 Terminology Relating to Soil, Rock, and Contained Fluids[2]

D 1452 Practice for Soil Investigation and Sampling by Auger Borings[2]

D 1586 Test Method for Penetration Test and Split-Barrel Sampling of Soils[2]

D 1587 Practice for Thin-Walled Tube Sampling of Soils[2]

D 2113 Practice for Diamond Core Drilling for Site Investigation[2]

D 2487 Classification of Soils for Engineering Purposes (Unified Soil Classification System)[2]

D 3740 Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and rock as Used in Engineering Design and Construction[3]

D 4083 Practice for Description of Frozen Soils (Visual-Manual Procedure)[2]

3. Terminology

3.1 *Definitions*—Except as listed below, all definitions are in accordance with Terminology D 653.

NOTE 2—For particles retained on a 3-in. (75-mm) US standard sieve, the following definitions are suggested:
Cobbles—particles of rock that will pass a 12-in. (300-mm) square opening and be retained on a 3-in. (75-mm) sieve, and
Boulders—particles of rock that will not pass a 12-in. (300-mm) square opening.

3.1.1 *clay*—soil passing a No. 200 (75-μm) sieve that can be made to exhibit plasticity (putty-like properties) within a range of water contents, and that exhibits considerable strength when air-dry. For classification, a clay is a fine-grained soil, or the fine-grained portion of a soil, with a plasticity index equal to or greater than 4, and the plot of plasticity index versus liquid

[1] This practice is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.07 on Identification and Classification of Soils.

Current edition approved Feb. 10, 2000. Published May 2000. Originally published as D 2488 – 66 T. Last previous edition D 2488 – 93ε1.

[2] *Annual Book of ASTM Standards*, Vol 04.08.

[3] *Annual Book of ASTM Standards*, Vol 04.09.

***A Summary of Changes section appears at the end of this standard.**

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limit falls on or above the "A" line (see Fig. 3 of Test Method D 2487).

3.1.2 *gravel*—particles of rock that will pass a 3-in. (75-mm) sieve and be retained on a No. 4 (4.75-mm) sieve with the following subdivisions:

coarse—passes a 3-in. (75-mm) sieve and is retained on a ¾-in. (19-mm) sieve.

fine—passes a ¾-in. (19-mm) sieve and is retained on a No. 4 (4.75-mm) sieve.

3.1.3 *organic clay*—a clay with sufficient organic content to influence the soil properties. For classification, an organic clay is a soil that would be classified as a clay, except that its liquid limit value after oven drying is less than 75 % of its liquid limit value before oven drying.

3.1.4 *organic silt*—a silt with sufficient organic content to influence the soil properties. For classification, an organic silt is a soil that would be classified as a silt except that its liquid limit value after oven drying is less than 75 % of its liquid limit value before oven drying.

3.1.5 *peat*—a soil composed primarily of vegetable tissue in various stages of decomposition usually with an organic odor, a dark brown to black color, a spongy consistency, and a texture ranging from fibrous to amorphous.

3.1.6 *sand*—particles of rock that will pass a No. 4 (4.75-mm) sieve and be retained on a No. 200 (75-µm) sieve with the following subdivisions:

coarse—passes a No. 4 (4.75-mm) sieve and is retained on a No. 10 (2.00-mm) sieve.

medium—passes a No. 10 (2.00-mm) sieve and is retained on a No. 40 (425-µm) sieve.

fine—passes a No. 40 (425-µm) sieve and is retained on a No. 200 (75-µm) sieve.

3.1.7 *silt*—soil passing a No. 200 (75-µm) sieve that is nonplastic or very slightly plastic and that exhibits little or no strength when air dry. For classification, a silt is a fine-grained soil, or the fine-grained portion of a soil, with a plasticity index less than 4, or the plot of plasticity index versus liquid limit falls below the "A" line (see Fig. 3 of Test Method D 2487).

4. Summary of Practice

4.1 Using visual examination and simple manual tests, this practice gives standardized criteria and procedures for describing and identifying soils.

4.2 The soil can be given an identification by assigning a group symbol(s) and name. The flow charts, Fig. 1a and Fig. 1b for fine-grained soils, and Fig. 2, for coarse-grained soils, can be used to assign the appropriate group symbol(s) and name. If the soil has properties which do not distinctly place it into a specific group, borderline symbols may be used, see Appendix X3.

NOTE 3—It is suggested that a distinction be made between *dual symbols* and *borderline symbols.*

Dual Symbol—A dual symbol is two symbols separated by a hyphen, for example, GP-GM, SW-SC, CL-ML used to indicate that the soil has been identified as having the properties of a classification in accordance with Test Method D 2487 where two symbols are required. Two symbols are required when the soil has between 5 and 12 % fines or when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart.

Borderline Symbol—A borderline symbol is two symbols separated by a slash, for example, CL/CH, GM/SM, CL/ML. A borderline symbol should be used to indicate that the soil has been identified as having properties that do not distinctly place the soil into a specific group (see Appendix X3).

5. Significance and Use

5.1 The descriptive information required in this practice can be used to describe a soil to aid in the evaluation of its significant properties for engineering use.

5.2 The descriptive information required in this practice should be used to supplement the classification of a soil as determined by Test Method D 2487.

5.3 This practice may be used in identifying soils using the classification group symbols and names as prescribed in Test Method D 2487. Since the names and symbols used in this practice to identify the soils are the same as those used in Test Method D 2487, it shall be clearly stated in reports and all other appropriate documents, that the classification symbol and name are based on visual-manual procedures.

5.4 This practice is to be used not only for identification of soils in the field, but also in the office, laboratory, or wherever soil samples are inspected and described.

5.5 This practice has particular value in grouping similar soil samples so that only a minimum number of laboratory tests need be run for positive soil classification.

NOTE 4—The ability to describe and identify soils correctly is learned more readily under the guidance of experienced personnel, but it may also be acquired systematically by comparing numerical laboratory test results for typical soils of each type with their visual and manual characteristics.

5.6 When describing and identifying soil samples from a given boring, test pit, or group of borings or pits, it is not necessary to follow all of the procedures in this practice for every sample. Soils which appear to be similar can be grouped together; one sample completely described and identified with the others referred to as similar based on performing only a few of the descriptive and identification procedures described in this practice.

5.7 This practice may be used in combination with Practice D 4083 when working with frozen soils.

NOTE 5—Notwithstanding the statements on precision and bias contained in this standard: The precision of this test method is dependent on the competence of the personnel performing it and the suitability of the equipment and facilities used. Agencies that meet the criteria of Practice D 3740 are generally considered capable of competent and objective testing. Users of this test method are cautioned that compliance with Practice D 3740 does not in itself assure reliable testing. Reliable testing depends on several factors; Practice D 3740 provides a means for evaluating some of those factors.

6. Apparatus

6.1 *Required Apparatus*:

6.1.1 *Pocket Knife or Small Spatula*.

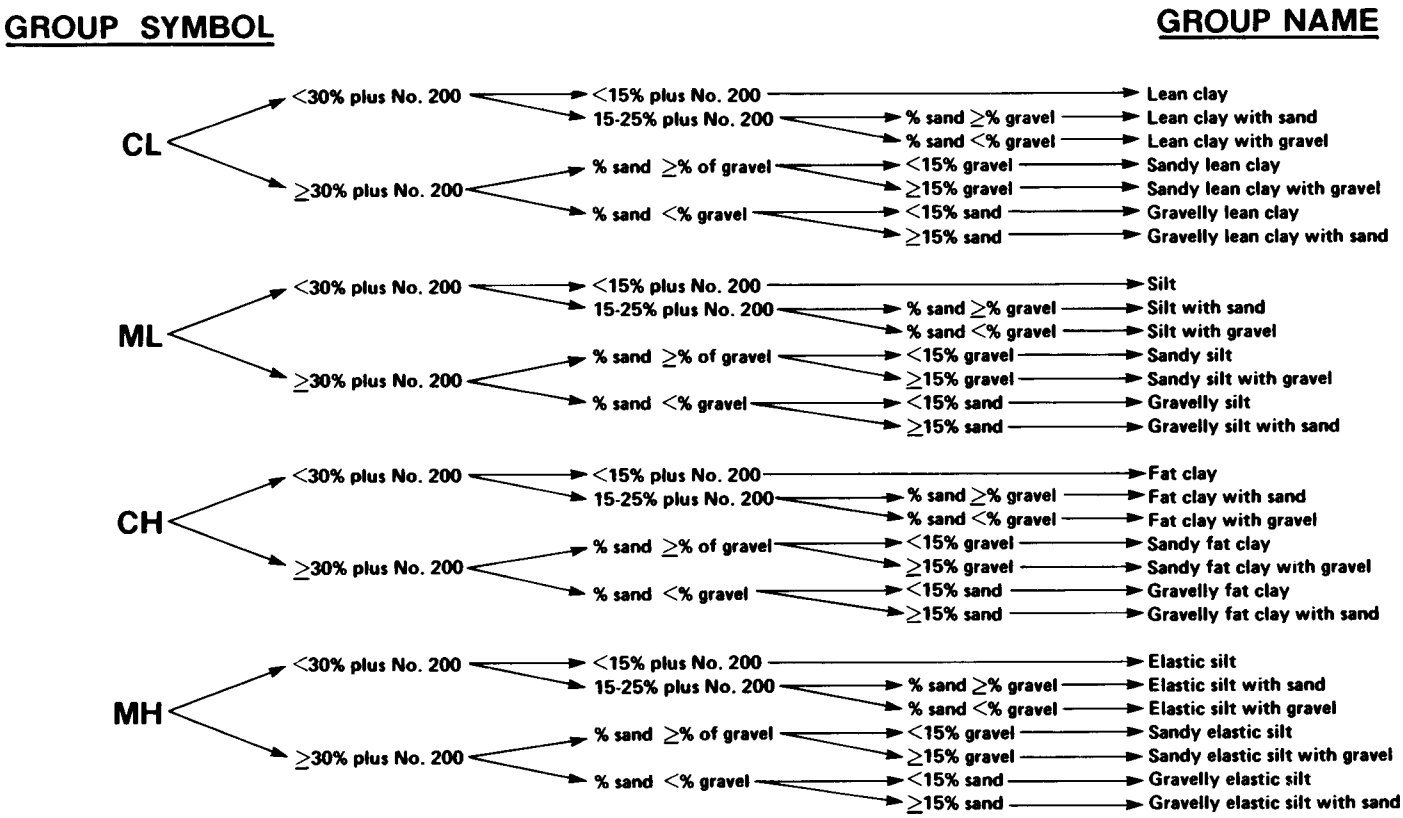
6.2 *Useful Auxiliary Apparatus*:

6.2.1 *Small Test Tube and Stopper* (or jar with a lid).

6.2.2 *Small Hand Lens*.

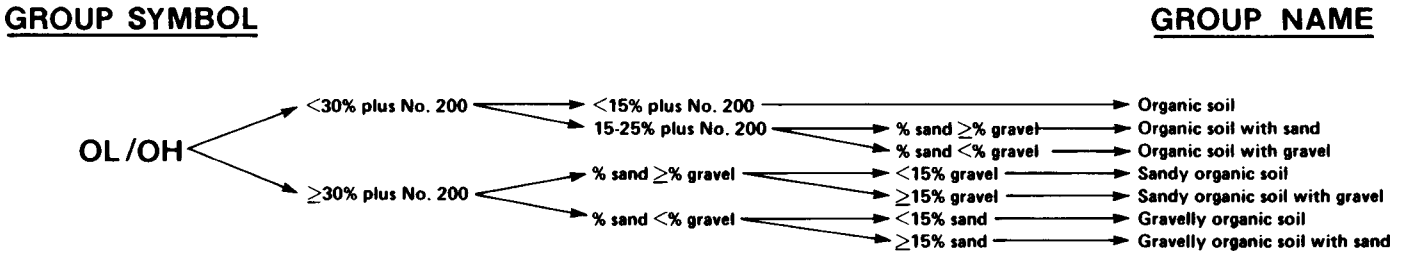
7. Reagents

7.1 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean water from a city water



NOTE 1—Percentages are based on estimating amounts of fines, sand, and gravel to the nearest 5 %.

FIG. 1a Flow Chart for Identifying Inorganic Fine-Grained Soil (50 % or more fines)



NOTE 1—Percentages are based on estimating amounts of fines, sand, and gravel to the nearest 5 %.

FIG. 1 b Flow Chart for Identifying Organic Fine-Grained Soil (50 % or more fines)

supply or natural source, including non-potable water.

7.2 *Hydrochloric Acid*—A small bottle of dilute hydrochloric acid, HCl, one part HCl (10 *N*) to three parts water (This reagent is optional for use with this practice). See Section 8.

8. Safety Precautions

8.1 When preparing the dilute HCl solution of one part concentrated hydrochloric acid (10 *N*) to three parts of distilled water, slowly add acid into water following necessary safety precautions. Handle with caution and store safely. If solution comes into contact with the skin, rinse thoroughly with water.

8.2 **Caution**—Do not add water to acid.

9. Sampling

9.1 The sample shall be considered to be representative of the stratum from which it was obtained by an appropriate, accepted, or standard procedure.

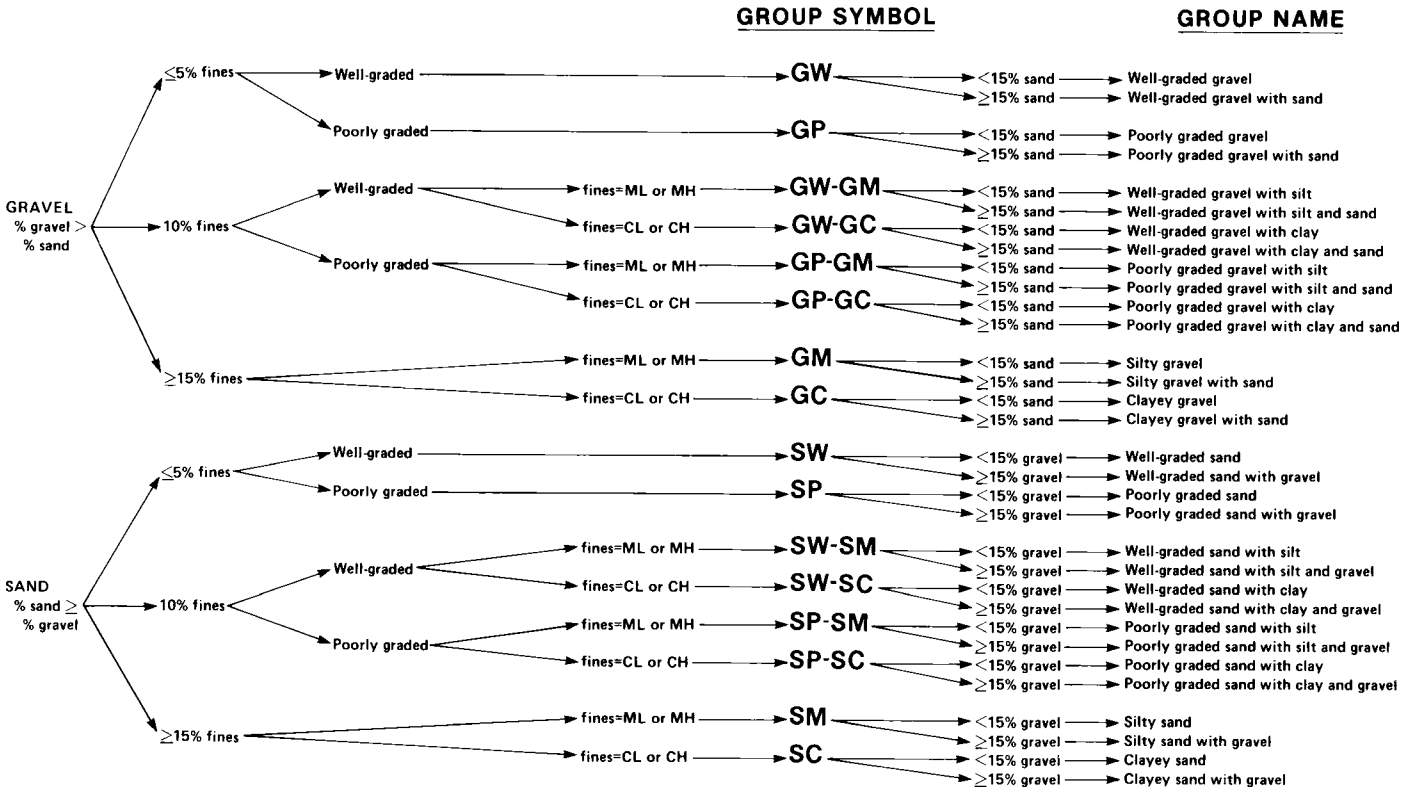
NOTE 6—Preferably, the sampling procedure should be identified as having been conducted in accordance with Practices D 1452, D 1587, or D 2113, or Test Method D 1586.

9.2 The sample shall be carefully identified as to origin.

NOTE 7—Remarks as to the origin may take the form of a boring number and sample number in conjunction with a job number, a geologic stratum, a pedologic horizon or a location description with respect to a permanent monument, a grid system or a station number and offset with respect to a stated centerline and a depth or elevation.

9.3 For accurate description and identification, the minimum amount of the specimen to be examined shall be in accordance with the following schedule:

Maximum Particle Size, Sieve Opening	Minimum Specimen Size, Dry Weight
4.75 mm (No. 4)	100 g (0.25 lb)
9.5 mm (⅜ in.)	200 g (0.5 lb)
19.0 mm (¾ in.)	1.0 kg (2.2 lb)
38.1 mm (1½ in.)	8.0 kg (18 lb)
75.0 mm (3 in.)	60.0 kg (132 lb)



NOTE 1—Percentages are based on estimating amounts of fines, sand, and gravel to the nearest 5 %.

FIG. 2 Flow Chart for Identifying Coarse-Grained Soils (less than 50 % fines)

NOTE 8—If random isolated particles are encountered that are significantly larger than the particles in the soil matrix, the soil matrix can be accurately described and identified in accordance with the preceeding schedule.

9.4 If the field sample or specimen being examined is smaller than the minimum recommended amount, the report shall include an appropriate remark.

10. Descriptive Information for Soils

10.1 *Angularity*—Describe the angularity of the sand (coarse sizes only), gravel, cobbles, and boulders, as angular, subangular, subrounded, or rounded in accordance with the criteria in Table 1 and Fig. 3. A range of angularity may be stated, such as: subrounded to rounded.

10.2 *Shape*—Describe the shape of the gravel, cobbles, and boulders as flat, elongated, or flat and elongated if they meet the criteria in Table 2 and Fig. 4. Otherwise, do not mention the shape. Indicate the fraction of the particles that have the shape, such as: one-third of the gravel particles are flat.

TABLE 1 Criteria for Describing Angularity of Coarse-Grained Particles (see Fig. 3)

Description	Criteria
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	Particles are similar to angular description but have rounded edges
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges
Rounded	Particles have smoothly curved sides and no edges

10.3 *Color*—Describe the color. Color is an important property in identifying organic soils, and within a given locality it may also be useful in identifying materials of similar geologic origin. If the sample contains layers or patches of varying colors, this shall be noted and all representative colors shall be described. The color shall be described for moist samples. If the color represents a dry condition, this shall be stated in the report.

10.4 *Odor*—Describe the odor if organic or unusual. Soils containing a significant amount of organic material usually have a distinctive odor of decaying vegetation. This is especially apparent in fresh samples, but if the samples are dried, the odor may often be revived by heating a moistened sample. If the odor is unusual (petroleum product, chemical, and the like), it shall be described.

10.5 *Moisture Condition*—Describe the moisture condition as dry, moist, or wet, in accordance with the criteria in Table 3.

10.6 *HCl Reaction*—Describe the reaction with HCl as none, weak, or strong, in accordance with the critera in Table 4. Since calcium carbonate is a common cementing agent, a report of its presence on the basis of the reaction with dilute hydrochloric acid is important.

10.7 *Consistency*—For intact fine-grained soil, describe the consistency as very soft, soft, firm, hard, or very hard, in accordance with the criteria in Table 5. This observation is inappropriate for soils with significant amounts of gravel.

10.8 *Cementation*—Describe the cementation of intact coarse-grained soils as weak, moderate, or strong, in accordance with the criteria in Table 6.

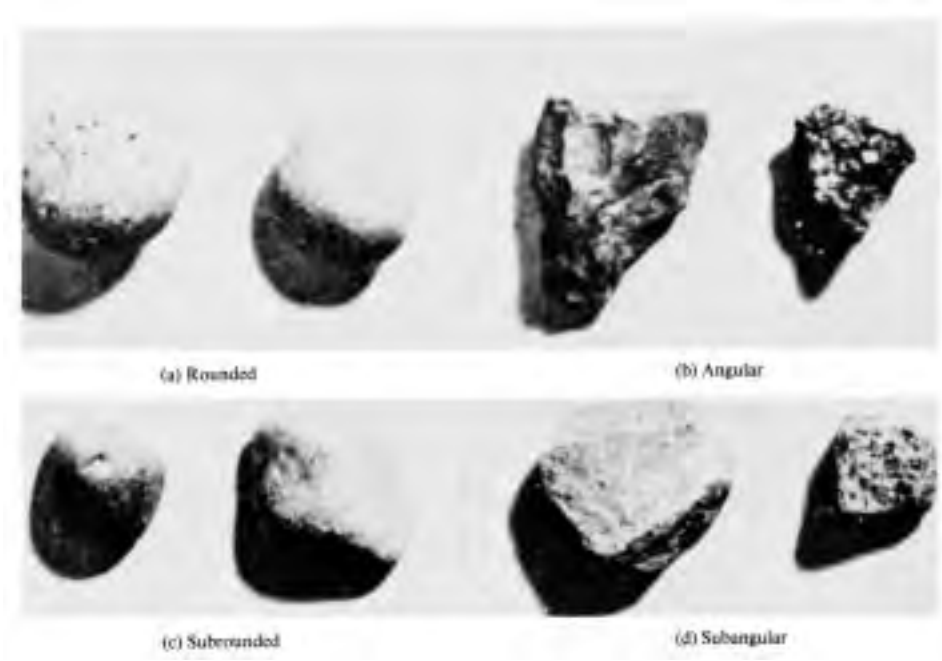


FIG. 3 Typical Angularity of Bulky Grains

TABLE 2 Criteria for Describing Particle Shape (see Fig. 4)

The particle shape shall be described as follows where length, width, and thickness refer to the greatest, intermediate, and least dimensions of a particle, respectively.	
Flat	Particles with width/thickness > 3
Elongated	Particles with length/width > 3
Flat and elongated	Particles meet criteria for both flat and elongated

10.9 *Structure*—Describe the structure of intact soils in accordance with the criteria in Table 7.

10.10 *Range of Particle Sizes*—For gravel and sand components, describe the range of particle sizes within each component as defined in 3.1.2 and 3.1.6. For example, about 20 % fine to coarse gravel, about 40 % fine to coarse sand.

10.11 *Maximum Particle Size*—Describe the maximum particle size found in the sample in accordance with the following information:

10.11.1 *Sand Size*—If the maximum particle size is a sand size, describe as fine, medium, or coarse as defined in 3.1.6. For example: maximum particle size, medium sand.

10.11.2 *Gravel Size*—If the maximum particle size is a gravel size, describe the maximum particle size as the smallest sieve opening that the particle will pass. For example, maximum particle size, 1½ in. (will pass a 1½-in. square opening but not a ¾-in. square opening).

10.11.3 *Cobble or Boulder Size*—If the maximum particle size is a cobble or boulder size, describe the maximum dimension of the largest particle. For example: maximum dimension, 18 in. (450 mm).

10.12 *Hardness*—Describe the hardness of coarse sand and larger particles as hard, or state what happens when the particles are hit by a hammer, for example, gravel-size particles fracture with considerable hammer blow, some gravel-size particles crumble with hammer blow. "Hard" means particles do not crack, fracture, or crumble under a hammer blow.

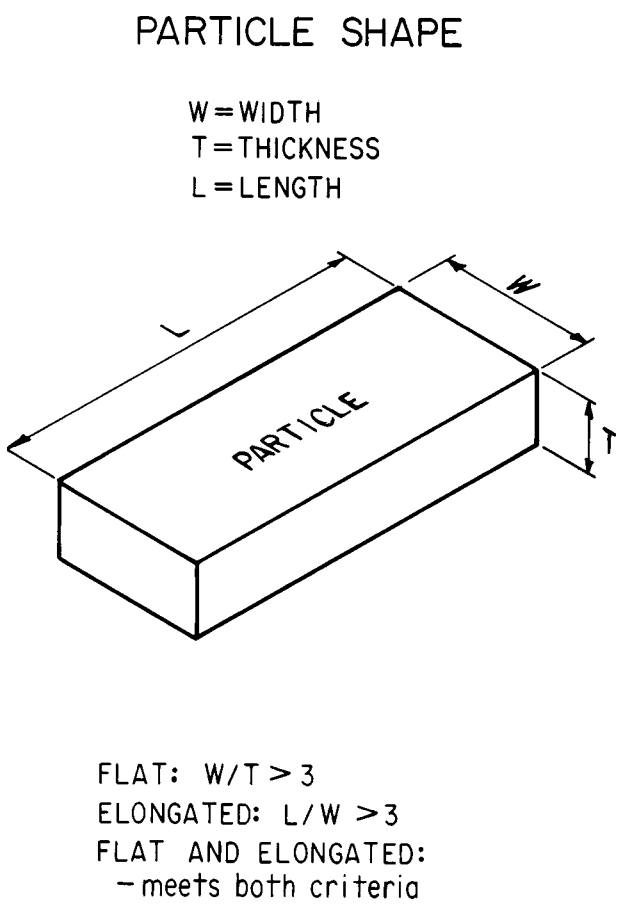


FIG. 4 Criteria for Particle Shape

10.13 Additional comments shall be noted, such as the presence of roots or root holes, difficulty in drilling or augering

TABLE 3 Criteria for Describing Moisture Condition

Description	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

TABLE 4 Criteria for Describing the Reaction With HCl

Description	Criteria
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

TABLE 5 Criteria for Describing Dilatancy

Description	Criteria
Very soft	Thumb will penetrate soil more than 1 in. (25 mm)
Soft	Thumb will penetrate soil about 1 in. (25 mm)
Firm	Thumb will indent soil about ¼in. (6 mm)
Hard	Thumb will not indent soil but readily indented with thumbnail
Very hard	Thumbnail will not indent soil

TABLE 6 Criteria for Describing Toughness

Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

TABLE 7 Criteria for Describing Dilatancy

Description	Criteria
Stratified	Alternating layers of varying material or color with layers at least 6 mm thick; note thickness
Laminated	Alternating layers of varying material or color with the layers less than 6 mm thick; note thickness
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided	Fracture planes appear polished or glossy, sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness
Homogeneous	Same color and appearance throughout

hole, caving of trench or hole, or the presence of mica.

10.14 A local or commercial name or a geologic interpretation of the soil, or both, may be added if identified as such.

10.15 A classification or identification of the soil in accordance with other classification systems may be added if identified as such.

11. Identification of Peat

11.1 A sample composed primarily of vegetable tissue in various stages of decomposition that has a fibrous to amorphous texture, usually a dark brown to black color, and an organic odor, shall be designated as a highly organic soil and shall be identified as peat, PT, and not subjected to the identification procedures described hereafter.

12. Preparation for Identification

12.1 The soil identification portion of this practice is based on the portion of the soil sample that will pass a 3-in. (75-mm) sieve. The larger than 3-in. (75-mm) particles must be removed, manually, for a loose sample, or mentally, for an intact sample before classifying the soil.

12.2 Estimate and note the percentage of cobbles and the percentage of boulders. Performed visually, these estimates will be on the basis of volume percentage.

NOTE 9—Since the percentages of the particle-size distribution in Test Method D 2487 are by dry weight, and the estimates of percentages for gravel, sand, and fines in this practice are by dry weight, it is recommended that the report state that the percentages of cobbles and boulders are by volume.

12.3 Of the fraction of the soil smaller than 3 in. (75 mm), estimate and note the percentage, by dry weight, of the gravel, sand, and fines (see Appendix X4 for suggested procedures).

NOTE 10—Since the particle-size components appear visually on the basis of volume, considerable experience is required to estimate the percentages on the basis of dry weight. Frequent comparisons with laboratory particle-size analyses should be made.

12.3.1 The percentages shall be estimated to the closest 5 %. The percentages of gravel, sand, and fines must add up to 100 %.

12.3.2 If one of the components is present but not in sufficient quantity to be considered 5 % of the smaller than 3-in. (75-mm) portion, indicate its presence by the term *trace*, for example, trace of fines. A trace is not to be considered in the total of 100 % for the components.

13. Preliminary Identification

13.1 The soil is *fine grained* if it contains 50 % or more fines. Follow the procedures for identifying fine-grained soils of Section 14.

13.2 The soil is *coarse grained* if it contains less than 50 % fines. Follow the procedures for identifying coarse-grained soils of Section 15.

14. Procedure for Identifying Fine-Grained Soils

14.1 Select a representative sample of the material for examination. Remove particles larger than the No. 40 sieve (medium sand and larger) until a specimen equivalent to about a handful of material is available. Use this specimen for performing the dry strength, dilatancy, and toughness tests.

14.2 *Dry Strength*:

14.2.1 From the specimen, select enough material to mold into a ball about 1 in. (25 mm) in diameter. Mold the material until it has the consistency of putty, adding water if necessary.

14.2.2 From the molded material, make at least three test specimens. A test specimen shall be a ball of material about ½ in. (12 mm) in diameter. Allow the test specimens to dry in air, or sun, or by artificial means, as long as the temperature does not exceed 60°C.

14.2.3 If the test specimen contains natural dry lumps, those that are about ½ in. (12 mm) in diameter may be used in place of the molded balls.

NOTE 11—The process of molding and drying usually produces higher strengths than are found in natural dry lumps of soil.

14.2.4 Test the strength of the dry balls or lumps by crushing between the fingers. Note the strength as none, low,

medium, high, or very high in accorance with the criteria in Table 8. If natural dry lumps are used, do not use the results of any of the lumps that are found to contain particles of coarse sand.

14.2.5 The presence of high-strength water-soluble cementing materials, such as calcium carbonate, may cause exceptionally high dry strengths. The presence of calcium carbonate can usually be detected from the intensity of the reaction with dilute hydrochloric acid (see 10.6).

14.3 *Dilatancy*:

14.3.1 From the specimen, select enough material to mold into a ball about ½ in. (12 mm) in diameter. Mold the material, adding water if necessary, until it has a soft, but not sticky, consistency.

14.3.2 Smooth the soil ball in the palm of one hand with the blade of a knife or small spatula. Shake horizontally, striking the side of the hand vigorously against the other hand several times. Note the reaction of water appearing on the surface of the soil. Squeeze the sample by closing the hand or pinching the soil between the fingers, and note the reaction as none, slow, or rapid in accordance with the criteria in Table 9. The reaction is the speed with which water appears while shaking, and disappears while squeezing.

14.4 *Toughness*:

14.4.1 Following the completion of the dilatancy test, the test specimen is shaped into an elongated pat and rolled by hand on a smooth surface or between the palms into a thread about ⅛ in. (3 mm) in diameter. (If the sample is too wet to roll easily, it should be spread into a thin layer and allowed to lose some water by evaporation.) Fold the sample threads and reroll repeatedly until the thread crumbles at a diameter of about ⅛ in. The thread will crumble at a diameter of ⅛ in. when the soil is near the plastic limit. Note the pressure required to roll the thread near the plastic limit. Also, note the strength of the thread. After the thread crumbles, the pieces should be lumped together and kneaded until the lump crumbles. Note the toughness of the material during kneading.

14.4.2 Describe the toughness of the thread and lump as low, medium, or high in accordance with the criteria in Table 10.

14.5 *Plasticity*—On the basis of observations made during the toughness test, describe the plasticity of the material in accordance with the criteria given in Table 11.

14.6 Decide whether the soil is an *inorganic* or an *organic* fine-grained soil (see 14.8). If inorganic, follow the steps given in 14.7.

TABLE 8 Criteria for Describing Toughness

Description	Criteria
None	The dry specimen crumbles into powder with mere pressure of handling
Low	The dry specimen crumbles into powder with some finger pressure
Medium	The dry specimen breaks into pieces or crumbles with considerable finger pressure
High	The dry specimen cannot be broken with finger pressure. Specimen will break into pieces between thumb and a hard surface
Very high	The dry specimen cannot be broken between the thumb and a hard surface

TABLE 9 Criteria for Describing Dilatancy

Description	Criteria
None	No visible change in the specimen
Slow	Water appears slowly on the surface of the specimen during shaking and does not disappear or disappears slowly upon squeezing
Rapid	Water appears quickly on the surface of the specimen during shaking and disappears quickly upon squeezing

TABLE 10 Criteria for Describing Toughness

Description	Criteria
Low	Only slight pressure is required to roll the thread near the plastic limit. The thread and the lump are weak and soft
Medium	Medium pressure is required to roll the thread to near the plastic limit. The thread and the lump have medium stiffness
High	Considerable pressure is required to roll the thread to near the plastic limit. The thread and the lump have very high stiffness

TABLE 11 Criteria for Describing Plasticity

Description	Criteria
Nonplastic	A ⅛-in. (3-mm) thread cannot be rolled at any water content
Low	The thread can barely be rolled and the lump cannot be formed when drier than the plastic limit
Medium	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit

14.7 *Identification of Inorganic Fine-Grained Soils*:

14.7.1 Identify the soil as a *lean clay*, CL, if the soil has medium to high dry strength, no or slow dilatancy, and medium toughness and plasticity (see Table 12).

14.7.2 Identify the soil as a *fat clay*, CH, if the soil has high to very high dry strength, no dilatancy, and high toughness and plasticity (see Table 12).

14.7.3 Identify the soil as a *silt*, ML, if the soil has no to low dry strength, slow to rapid dilatancy, and low toughness and plasticity, or is nonplastic (see Table 12).

14.7.4 Identify the soil as an *elastic silt*, MH, if the soil has low to medium dry strength, no to slow dilatancy, and low to medium toughness and plasticity (see Table 12).

NOTE 12—These properties are similar to those for a lean clay. However, the silt will dry quickly on the hand and have a smooth, silky feel when dry. Some soils that would classify as MH in accordance with the criteria in Test Method D 2487 are visually difficult to distinguish from lean clays, CL. It may be necessary to perform laboratory testing for proper identification.

TABLE 12 Identification of Inorganic Fine-Grained Soils from Manual Tests

Soil Symbol	Dry Strength	Dilatancy	Toughness
ML	None to low	Slow to rapid	Low or thread cannot be formed
CL	Medium to high	None to slow	Medium
MH	Low to medium	None to slow	Low to medium
CH	High to very high	None	High

14.8 *Identification of Organic Fine-Grained Soils*:

14.8.1 Identify the soil as an *organic soil*, OL/OH, if the soil contains enough organic particles to influence the soil properties. Organic soils usually have a dark brown to black color and may have an organic odor. Often, organic soils will change color, for example, black to brown, when exposed to the air. Some organic soils will lighten in color significantly when air dried. Organic soils normally will not have a high toughness or plasticity. The thread for the toughness test will be spongy.

NOTE 13—In some cases, through practice and experience, it may be possible to further identify the organic soils as organic silts or organic clays, OL or OH. Correlations between the dilatancy, dry strength, toughness tests, and laboratory tests can be made to identify organic soils in certain deposits of similar materials of known geologic origin.

14.9 If the soil is estimated to have 15 to 25 % sand or gravel, or both, the words "with sand" or "with gravel" (whichever is more predominant) shall be added to the group name. For example: "lean clay with sand, CL" or "silt with gravel, ML" (see Fig. 1a and Fig. 1b). If the percentage of sand is equal to the percentage of gravel, use "with sand."

14.10 If the soil is estimated to have 30 % or more sand or gravel, or both, the words "sandy" or "gravelly" shall be added to the group name. Add the word "sandy" if there appears to be more sand than gravel. Add the word "gravelly" if there appears to be more gravel than sand. For example: "sandy lean clay, CL", "gravelly fat clay, CH", or "sandy silt, ML" (see Fig. 1a and Fig. 1b). If the percentage of sand is equal to the percent of gravel, use "sandy."

15. Procedure for Identifying Coarse-Grained Soils

(Contains less than 50 % fines)

15.1 The soil is a *gravel* if the percentage of gravel is estimated to be more than the percentage of sand.

15.2 The soil is a *sand* if the percentage of gravel is estimated to be equal to or less than the percentage of sand.

15.3 The soil is a *clean gravel* or *clean sand* if the percentage of fines is estimated to be 5 % or less.

15.3.1 Identify the soil as a *well-graded gravel*, GW, or as a *well-graded sand*, SW, if it has a wide range of particle sizes and substantial amounts of the intermediate particle sizes.

15.3.2 Identify the soil as a *poorly graded gravel*, GP, or as a *poorly graded sand*, SP, if it consists predominantly of one size (uniformly graded), or it has a wide range of sizes with some intermediate sizes obviously missing (gap or skip graded).

15.4 The soil is either a *gravel with fines* or a *sand with fines* if the percentage of fines is estimated to be 15 % or more.

15.4.1 Identify the soil as a *clayey gravel*, GC, or a *clayey sand*, SC, if the fines are clayey as determined by the procedures in Section 14.

15.4.2 Identify the soil as a *silty gravel*, GM, or a *silty sand*, SM, if the fines are silty as determined by the procedures in Section 14.

15.5 If the soil is estimated to contain 10 % fines, give the soil a dual identification using two group symbols.

15.5.1 The first group symbol shall correspond to a clean gravel or sand (GW, GP, SW, SP) and the second symbol shall correspond to a gravel or sand with fines (GC, GM, SC, SM).

15.5.2 The group name shall correspond to the first group symbol plus the words "with clay" or "with silt" to indicate the plasticity characteristics of the fines. For example: "well-graded gravel with clay, GW-GC" or "poorly graded sand with silt, SP-SM" (see Fig. 2).

15.6 If the specimen is predominantly sand or gravel but contains an estimated 15 % or more of the other coarse-grained constituent, the words "with gravel" or "with sand" shall be added to the group name. For example: "poorly graded gravel with sand, GP" or "clayey sand with gravel, SC" (see Fig. 2).

15.7 If the field sample contains any cobbles or boulders, or both, the words "with cobbles" or "with cobbles and boulders" shall be added to the group name. For example: "silty gravel with cobbles, GM."

16. Report

16.1 The report shall include the information as to origin, and the items indicated in Table 13.

NOTE 14—*Example: Clayey Gravel with Sand and Cobbles, GC*—About 50 % fine to coarse, subrounded to subangular gravel; about 30 % fine to coarse, subrounded sand; about 20 % fines with medium plasticity, high dry strength, no dilatancy, medium toughness; weak reaction with HCl; original field sample had about 5 % (by volume) subrounded cobbles, maximum dimension, 150 mm.

In-Place Conditions—Firm, homogeneous, dry, brown

Geologic Interpretation—Alluvial fan

NOTE 15—Other examples of soil descriptions and identification are given in Appendix X1 and Appendix X2.

NOTE 16—If desired, the percentages of gravel, sand, and fines may be stated in terms indicating a range of percentages, as follows:

Trace—Particles are present but estimated to be less than 5 %

Few—5 to 10 %

Little—15 to 25 %

Some—30 to 45 %

Mostly—50 to 100 %

TABLE 13 Checklist for Description of Soils

1. Group name
2. Group symbol
3. Percent of cobbles or boulders, or both (by volume)
4. Percent of gravel, sand, or fines, or all three (by dry weight)
5. Particle-size range:
   Gravel—fine, coarse
   Sand—fine, medium, coarse
6. Particle angularity: angular, subangular, subrounded, rounded
7. Particle shape: (if appropriate) flat, elongated, flat and elongated
8. Maximum particle size or dimension
9. Hardness of coarse sand and larger particles
10. Plasticity of fines: nonplastic, low, medium, high
11. Dry strength: none, low, medium, high, very high
12. Dilatancy: none, slow, rapid
13. Toughness: low, medium, high
14. Color (in moist condition)
15. Odor (mention only if organic or unusual)
16. Moisture: dry, moist, wet
17. Reaction with HCl: none, weak, strong

For intact samples:

18. Consistency (fine-grained soils only): very soft, soft, firm, hard, very hard
19. Structure: stratified, laminated, fissured, slickensided, lensed, homogeneous
20. Cementation: weak, moderate, strong
21. Local name
22. Geologic interpretation
23. Additional comments: presence of roots or root holes, presence of mica, gypsum, etc., surface coatings on coarse-grained particles, caving or sloughing of auger hole or trench sides, difficulty in augering or excavating, etc.

16.2 If, in the soil description, the soil is identified using a classification group symbol and name as described in Test Method D 2487, it must be distinctly and clearly stated in log forms, summary tables, reports, and the like, that the symbol and name are based on visual-manual procedures.

17. Precision and Bias

17.1 This practice provides qualitative information only, therefore, a precision and bias statement is not applicable.

18. Keywords

18.1 classification; clay; gravel; organic soils; sand; silt; soil classification; soil description; visual classification

APPENDIXES

(Nonmandatory Information)

X1. EXAMPLES OF VISUAL SOIL DESCRIPTIONS

X1.1 The following examples show how the information required in 16.1 can be reported. The information that is included in descriptions should be based on individual circumstances and need.

X1.1.1 *Well-Graded Gravel with Sand (GW)*—About 75 % fine to coarse, hard, subangular gravel; about 25 % fine to coarse, hard, subangular sand; trace of fines; maximum size, 75 mm, brown, dry; no reaction with HCl.

X1.1.2 *Silty Sand with Gravel (SM)*—About 60 % predominantly fine sand; about 25 % silty fines with low plasticity, low dry strength, rapid dilatancy, and low toughness; about 15 % fine, hard, subrounded gravel, a few gravel-size particles fractured with hammer blow; maximum size, 25 mm; no reaction with HCl (Note—Field sample size smaller than recommended).

In-Place Conditions—Firm, stratified and contains lenses of silt 1 to 2 in. (25 to 50 mm) thick, moist, brown to gray; in-place density 106 lb/ft^3; in-place moisture 9 %.

X1.1.3 *Organic Soil (OL/OH)*—About 100 % fines with low plasticity, slow dilatancy, low dry strength, and low toughness; wet, dark brown, organic odor; weak reaction with HCl.

X1.1.4 *Silty Sand with Organic Fines (SM)*—About 75 % fine to coarse, hard, subangular reddish sand; about 25 % organic and silty dark brown nonplastic fines with no dry strength and slow dilatancy; wet; maximum size, coarse sand; weak reaction with HCl.

X1.1.5 *Poorly Graded Gravel with Silt, Sand, Cobbles and Boulders (GP-GM)*—About 75 % fine to coarse, hard, subrounded to subangular gravel; about 15 % fine, hard, subrounded to subangular sand; about 10 % silty nonplastic fines; moist, brown; no reaction with HCl; original field sample had about 5 % (by volume) hard, subrounded cobbles and a trace of hard, subrounded boulders, with a maximum dimension of 18 in. (450 mm).

X2. USING THE IDENTIFICATION PROCEDURE AS A DESCRIPTIVE SYSTEM FOR SHALE, CLAYSTONE, SHELLS, SLAG, CRUSHED ROCK, AND THE LIKE

X2.1 The identification procedure may be used as a descriptive system applied to materials that exist in-situ as shale, claystone, sandstone, siltstone, mudstone, etc., but convert to soils after field or laboratory processing (crushing, slaking, and the like).

X2.2 Materials such as shells, crushed rock, slag, and the like, should be identified as such. However, the procedures used in this practice for describing the particle size and plasticity characteristics may be used in the description of the material. If desired, an identification using a group name and symbol according to this practice may be assigned to aid in describing the material.

X2.3 The group symbol(s) and group names should be placed in quotation marks or noted with some type of distinguishing symbol. See examples.

X2.4 Examples of how group names and symbols can be incororated into a descriptive system for materials that are not naturally occurring soils are as follows:

X2.4.1 *Shale Chunks*—Retrieved as 2 to 4-in. (50 to 100-mm) pieces of shale from power auger hole, dry, brown, no reaction with HCl. After slaking in water for 24 h, material identified as “Sandy Lean Clay (CL)”; about 60 % fines with medium plasticity, high dry strength, no dilatancy, and medium toughness; about 35 % fine to medium, hard sand; about 5 % gravel-size pieces of shale.

X2.4.2 *Crushed Sandstone*—Product of commercial crushing operation; “Poorly Graded Sand with Silt (SP-SM)”; about 90 % fine to medium sand; about 10 % nonplastic fines; dry, reddish-brown, strong reaction with HCl.

X2.4.3 *Broken Shells*—About 60 % gravel-size broken shells; about 30 % sand and sand-size shell pieces; about 10 % fines; “Poorly Graded Gravel with Sand (GP).”

X2.4.4 *Crushed Rock*—Processed from gravel and cobbles in Pit No. 7; “Poorly Graded Gravel (GP)”; about 90 % fine, hard, angular gravel-size particles; about 10 % coarse, hard,

angular sand-size particles; dry, tan; no reaction with HCl.

X3. SUGGESTED PROCEDURE FOR USING A BORDERLINE SYMBOL FOR SOILS WITH TWO POSSIBLE IDENTIFICATIONS.

X3.1 Since this practice is based on estimates of particle size distribution and plasticity characteristics, it may be difficult to clearly identify the soil as belonging to one category. To indicate that the soil may fall into one of two possible basic groups, a borderline symbol may be used with the two symbols separated by a slash. For example: SC/CL or CL/CH.

X3.1.1 A borderline symbol may be used when the percentage of fines is estimated to be between 45 and 55 %. One symbol should be for a coarse-grained soil with fines and the other for a fine-grained soil. For example: GM/ML or CL/SC.

X3.1.2 A borderline symbol may be used when the percentage of sand and the percentage of gravel are estimated to be about the same. For example: GP/SP, SC/GC, GM/SM. It is practically impossible to have a soil that would have a borderline symbol of GW/SW.

X3.1.3 A borderline symbol may be used when the soil could be either well graded or poorly graded. For example: GW/GP, SW/SP.

X3.1.4 A borderline symbol may be used when the soil could either be a silt or a clay. For example: CL/ML, CH/MH, SC/SM.

X3.1.5 A borderline symbol may be used when a fine-grained soil has properties that indicate that it is at the boundary between a soil of low compressibility and a soil of high compressibility. For example: CL/CH, MH/ML.

X3.2 The order of the borderline symbols should reflect similarity to surrounding or adjacent soils. For example: soils in a borrow area have been identified as CH. One sample is considered to have a borderline symbol of CL and CH. To show similarity, the borderline symbol should be CH/CL.

X3.3 The group name for a soil with a borderline symbol should be the group name for the first symbol, except for:

CL/CH lean to fat clay
ML/CL clayey silt
CL/ML silty clay

X3.4 The use of a borderline symbol should not be used indiscriminately. Every effort shall be made to first place the soil into a single group.

X4. SUGGESTED PROCEDURES FOR ESTIMATING THE PERCENTAGES OF GRAVEL, SAND, AND FINES IN A SOIL SAMPLE

X4.1 *Jar Method*—The relative percentage of coarse- and fine-grained material may be estimated by thoroughly shaking a mixture of soil and water in a test tube or jar, and then allowing the mixture to settle. The coarse particles will fall to the bottom and successively finer particles will be deposited with increasing time; the sand sizes will fall out of suspension in 20 to 30 s. The relative proportions can be estimated from the relative volume of each size separate. This method should be correlated to particle-size laboratory determinations.

X4.2 *Visual Method*—Mentally visualize the gravel size particles placed in a sack (or other container) or sacks. Then, do the same with the sand size particles and the fines. Then, mentally compare the number of sacks to estimate the percentage of plus No. 4 sieve size and minus No. 4 sieve size present. The percentages of sand and fines in the minus sieve size No. 4 material can then be estimated from the wash test (X4.3).

X4.3 *Wash Test (for relative percentages of sand and fines)*—Select and moisten enough minus No. 4 sieve size material to form a 1-in (25-mm) cube of soil. Cut the cube in half, set one-half to the side, and place the other half in a small dish. Wash and decant the fines out of the material in the dish until the wash water is clear and then compare the two samples and estimate the percentage of sand and fines. Remember that the percentage is based on weight, not volume. However, the volume comparison will provide a reasonable indication of grain size percentages.

X4.3.1 While washing, it may be necessary to break down lumps of fines with the finger to get the correct percentages.

X5. ABBREVIATED SOIL CLASSIFICATION SYMBOLS

X5.1 In some cases, because of lack of space, an abbreviated system may be useful to indicate the soil classification symbol and name. Examples of such cases would be graphical logs, databases, tables, etc.

X5.2 This abbreviated system is not a substitute for the full name and descriptive information but can be used in supplementary presentations when the complete description is referenced.

X5.3 The abbreviated system should consist of the soil classification symbol based on this standard with appropriate lower case letter prefixes and suffixes as:

Prefix:	Suffix:

s = sandy	s = with sand
g = gravelly	g = with gravel
	c = with cobbles
	b = with boulders

X5.4 The soil classification symbol is to be enclosed in parenthesis. Some examples would be:

Group Symbol and Full Name	Abbreviated
CL, Sandy lean clay	s(CL)
SP-SM, Poorly graded sand with silt and gravel	(SP-SM)g
GP, poorly graded gravel with sand, cobbles, and boulders	(GP)scb
ML, gravelly silt with sand and cobbles	g(ML)sc

SUMMARY OF CHANGES

In accordance with Committee D18 policy, this section identifies the location of changes to this standard since the last edition (1993$^{\epsilon 1}$) that may impact the use of this standard.

(1) Added Practice D 3740 to Section 2.

(2) Added Note 5 under 5.7 and renumbered subsequent notes.

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Homogenization of Soil and Sediment Samples

1. Purpose and Scope

This document provides standardized procedures for the homogenization of soil and sediment samples. Any project required deviations from Standard Operating Procedures (SOPs), will be provided in site-specific Sampling and Analysis Plans (SAPs).

2. Equipment and Materials

- Stainless steel spoons or spatulas, disposable wooden sampling tools
- Stainless steel pans or bowls

3. Procedures and Guidelines

Soil and sediment samples to be analyzed for non-volatile organic compound (VOC) chemical analyses will be homogenized in the field. Samples for VOCs will not be collected from homogenized soil or sediment. A stainless steel spatula, stainless spoon, or disposable wooden device will be used to remove the soil from the split spoon or other sampling device into a stainless-steel pan or bowl. Do not touch soil to be collected with bare or gloved hands.

Prior to homogenization, any rocks, twigs, leaves, or other debris should be removed from the sample to the extent practical. The soil should be placed in a decontaminated stainless steel bowl (or similar) and thoroughly mixed using a stainless steel spoon (or similar).

All stainless steel spoons, spatulas, and bowls must be decontaminated following procedures specified in SOP *E-1 Decontamination of Personnel and Equipment* prior to homogenizing the sample.

4. Key Checks and Items

- Take VOC samples from undisturbed soil and sediment; do not collect VOC samples from homogenized soil or sediment.
- Decontaminate all non-disposable equipment between sampling locations.
- Make sure homogenization equipment (bowls and spoons) are intact and not rusting or flaking.

Preparing Field Logbooks

1. Purpose and Scope

This Standard Operating Procedure (SOP) will provide standardized procedures and basic requirements for entering field data into logbooks during field activities. Logbooks are legal documents. They must be prepared following specific procedures and must contain required information to ensure their integrity and legitimacy.

2. Equipment and Materials

- Logbook
- Indelible pen

3. Procedures and Guidelines

Properly completed field logbooks are a requirement of the work performed under the Navy CLEAN contract.

3.1 Procedures for Completing Field Logbooks

1. Field notes are to be kept in bound, hard-covered logbooks, as well as task-specific logs. The pages are to be water-resistant and notes will be taken only with a waterproof, non-erasable permanent ink pen.
2. The inside cover of the logbook generally should include:
    - Company name and address
    - Log-holders name if logbook was assigned specifically to that person
    - Activity or location
    - Project name
    - Project Manager (PM) name
    - Phone numbers of the company, supervisors, emergency response, etc.
3. Daily entries will be made chronologically. Each page of the logbook will have the date of the work and the note-taker's initials.
4. Information will be recorded directly into the field log during the work activity. Entries into the log should be as detailed and descriptive as possible so that a particular situation can be recalled without reliance on memory. Entries must be legible and complete.
5. Every line should be used to prevent later additions of text, or be marked through with a line, initialed and dated. Unused pages will be marked through with a line, the author's initials, date, and the note "Intentionally Left Blank."
6. If errors are made in the logbook, cross a single line through the error and enter the correct information. All corrections shall be initialed and dated by the person performing the correction. If possible, all corrections should be made by the individual keeping the log.
7. Only information relevant to the subject project will be added to the logbook.
8. The final page of each day's notes will include the note-taker's signature and date.

9. Copies of the field notes generally should be sent to the PM or designee in a timely manner (generally by the end of each week of work being performed).

3.2 Information Generally to be Included in Field Logs

1. Use the left side border to record times and the remainder of the page to record information.
2. General project information will be recorded at the beginning of each field project; the project title, project number, staff, scope of the day's work, and weather conditions (note changes).
3. Subcontractor Information: Record name of company, names and roles of subcontractor personnel, list type of equipment being used, and general scope of work. List start and stop times, and quantities of billable line items accomplished.
4. Technical and Project Information: Describe the details of the work being performed. The project SAP will describe the specific activities to be performed and may also list requirements for note taking. Discuss note-taking expectations with the PM prior to beginning the fieldwork.
5. Any conditions that might adversely affect the work or data obtained.
6. Time: Keep a running time log explaining field activities as they occur throughout the day.
7. Tail Gate Safety Talks: Record topics discussed.
8. Standard Health and Safety Procedures: Record level of personal protection being used (e.g., level D PPE). Also record other required health and safety procedures as specified in the project specific health and safety plan.
9. Instrument Calibration: Record calibration information for each piece of health and safety/field equipment if not recorded elsewhere.
10. Personnel: Record when personnel and visitors enter and leave the site.
11. Communications: Record all communications that impact performance of the project.
12. Deviations from the SAP: Record deviations from the SAP; document the reasons and communications authorizing deviations.
13. Health and Safety Incidents: Record all health and safety incidents in detail, immediately reporting them to the Field Team Leader (FTL) and PM.
14. Problems and Corrective Actions: Clearly describe problems encountered during the fieldwork and the corrective actions taken.
15. Sampling Information: Specific information that will be relevant to most sampling jobs includes the following:
    - Description of the general sampling area – site name, buildings and streets in the area, etc.
    - Station/location identifier
    - Description of the sample location – estimate location in comparison to two fixed points. If location not already identified on a map or figure, draw a diagram in the field logbook indicating sample location relative to these fixed points. Include distances in feet.
    - Sample matrix and type
    - Sample identifier, date, and time
    - Information on how the sample was collected. Distinguish between "grab," "composite," and "discrete" samples.
    - Number and type of sample containers collected

- Record of any field measurements taken (i.e. pH, turbidity, dissolved oxygen, and temperature, and conductivity)
- Parameters to be analyzed for, if appropriate
- Descriptions of soil samples and drilling cuttings can be entered in depth sequence, along with PID readings and other observations. Include any unusual appearances of the samples.
- If the PM specifies, some of the above can be entered in GBC or spiral bound field-sampling books printed specifically for the sampling task instead of in the hard cover logbook.

3.3 Suggested Format for Recording Field Data

1. Use tables to record sampling information and field data from multiple samples. Keep data organized for easier review.
2. Sketch sampling locations, construction sites, and other pertinent information.
3. Sketch well construction diagrams or use well-completion logs.

Chain-of-Custody

1. Purpose

This Standard Operating Procedure (SOP) provides standardized procedures for completing chain-of-custody (COC) forms. Any project required deviations from SOPs will be provided in site-specific Sampling and Analysis Plans (SAPs).

2. Scope

This procedure describes the steps necessary for transferring samples through the use of a COC. A COC is required for the tracking and recording of samples collected during program activities. Use of the COC creates an accurate written record that can be used to trace the possession and handling of the sample from the moment of its collection through analysis. This procedure identifies the necessary custody records and describes their completion. This procedure does not take precedence over regional- or site-specific requirements.

3. Definitions

Chain-of-Custody Record - A COC is a printed form that accompanies a sample or group of samples as custody is transferred from one custodian to another custodian. One copy of the form must be retained in the project file.

Custodian - The person responsible for the custody of samples at a particular time, until custody is transferred to another person (and so documented), who then becomes the custodian. A sample is under one's custody if:

- It is in one's actual possession.
- It is in one's view, after being in one's physical possession.
- It was in one's physical possession and is secured to prevent tampering.

Sample - A sample is physical evidence which is representative of conditions at the point and time that it was collected.

4. Procedures

The term "chain-of-custody" refers to procedures which ensure that evidence presented in a court of law is valid. The chain-of-custody procedures track the evidence from the time and place it is first obtained to the courtroom, as well as providing security for the evidence as it is moved and/or passed from the custody of one individual to another.

Chain-of-custody procedures, recordkeeping, and documentation are an important part of the management control of samples. Regulatory agencies must be able to provide the chain-of-possession and custody of any samples that are offered for evidence, or that form the basis of analytical test results introduced as evidence. Written procedures must be available and followed whenever evidence samples are collected, transferred, stored, analyzed, or destroyed.

4.1 Sample Identification

The method of identification of a sample depends on the type of measurement or analysis performed. When *in situ* measurements are made, the data are recorded directly in bound logbooks or other field data records with identifying information.

Information which may be recorded in the field logbook, when in situ measurements or samples for laboratory analysis are collected, includes:

- Field sampler(s)
- Contract Task Order (CTO) number
- Project sample number
- Sample location or sampling station number
- Date and time of sample collection and/or measurement
- Field observations
- Equipment used to collect samples and measurements
- Calibration data for equipment used

Measurements and observations shall be recorded using waterproof ink.

4.1.1 Sample Label

Samples removed and transported from the sample location to a laboratory or other location for analysis will be collected into laboratory provided containers and labeled. Sample labels will include:

- Project - CTO number
- Sample identification - The SAP/SSP I.D. provided for the sample
- Date - day, month, and year of sample collection
- Time - A four-digit number in the 24-hour format at time of collection
- Medium - water, soil, sediment, sludge, waste, etc.
- Sample type - grab or composite
- Preservation - type of preservation
- Analysis – type of analysis to be performed (e.g., VOC)
- Sampled by - printed name of the sampler
- Remarks - any pertinent additional information

4.2 Chain-of-Custody Procedures

After collection, separation, identification, and preservation, the sample is maintained under COC procedures until it is in the custody of the analytical laboratory and has been stored or disposed of.

4.2.1 Field Custody Procedures

- Care must be taken to ensure that the sample information on the label matches the COC exactly.
- The person undertaking the actual sampling in the field is responsible for the care and custody of the samples collected until they are properly transferred or dispatched.
- Sample labels shall be completed for each sample, using waterproof ink.

4.2.2 Transfer of Custody and Shipment

Samples are accompanied by a COC. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the COC. This documents sample custody transfer from the sampler to the analyst in the laboratory. The COC is shipped as described below:

- Place the original (top, signed copy) of the COC in a plastic zipper-type bag or other appropriate sample-shipping package. Retain the copy with field records.
- Sign and date two custody seals, 1-inch by 3-inch white paper labels with black lettering and an adhesive backing. The custody seals are part of the COC process and are used to prevent tampering with samples after they have been collected in the field. Custody seals shall be provided by the analytical laboratory.
- Place the seals across the shipping container opening on diagonally opposite corners, so that one would be broken if the container were to be opened.
- Complete other carrier-required shipping papers.

Any corrections are made by drawing a line through, initialing and dating the change, then entering the correct information. Erasures are not permitted.

As long as custody forms are sealed inside the shipping container and the custody seals are intact, commercial carriers are not required to sign the custody form.

The laboratory representative who accepts the incoming sample shipment then signs and dates the COC, completing the sample transfer process. It is then the laboratory's responsibility to maintain custody records throughout sample preparation and analysis.

5. Quality Assurance Records

Once samples have been packaged and shipped, the COC copy and airbill receipt become part of the QA record.

6. Attachments

- Chain-of-custody form.

7. References

EPA. 1991. *User's Guide to the Contract Laboratory Program*. Office of Emergency and Remedial Response, Washington, D.C. (EPA/540/P-91/002). January.

Vieques ERP

CH2M HILL

Chain of Custody Form

Project Site	AOC E	Number of Containers	Analysis Requested												Project No.
Project Manager	Brett Doerr														
Contact Tel No.	757-289-9246 (Adrienne Jones)														Lab Batch/SDG ID
Contact Address	4350 W. Cypress Street, Suite 600, Tampa, FL 33607														
Lab Name															Lab Tel No./Fax No.
Lab Contact															
Lab Address															

Item	Sample ID	Station ID	Matrix	Date & Time Collected	Number of Containers	MET_SO/CN	PCB_SO	PEST_SO	SVOC_SO	TL_SO	TOC_SO	TPH_SO_DRO/ORO	TPH_SO_GRO	VOC_SO	GRAIN_SIZE	TPH_W_GRO	VOC_W	Comments
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		

Sampled By:	Date/Time:	Custody Seal: Y / N Relinquished By:	Date/Time:
Shipped Via: UPS FedEx Hand Other (Please specify):			
Samples Temperature and Condition Upon Receipt (for lab's use):			
Received By:	Date/Time:	Custody Seal: Y / N Relinquished By:	Date/Time:
Received By:	Date/Time:	Custody Seal: Y / N Relinquished By:	Date/Time:
Remarks:			

Packaging and Shipping Procedures for Samples Not Considered Dangerous Goods

1. Purpose and Scope

The purpose of this Standard Operating Procedure (SOP) is to describe the packaging and shipping of samples of various media to a laboratory for analysis. This standardized procedure only covers samples of sufficiently low concentration as to not be considered dangerous goods for purposes of shipping.

2. Scope

The SOP only discusses the packaging and shipping of samples that are anticipated to have sufficiently low concentrations of chemical constituents as to not be considered dangerous goods when being shipped. Whether or not samples should be classified as low concentration or otherwise will depend upon the site history, observation of the samples in the field, odor, and photoionization detector readings.

If the site is known to have produced high concentration samples in the past or the sampler suspects that high concentrations of contaminants might be present in the samples, then the sampler should conservatively assume that the samples cannot be classified as low concentration. Samples that are anticipated to have medium to high concentrations of constituents should be packaged and shipped following procedures for dangerous goods shipping specified by the intended shipper (e.g., Federal Express).

3. Equipment and Materials

- Coolers
- Clear tape
- Duct tape
- “This Side Up” labels
- “Fragile” labels
- Ziploc bags or bubble wrap
- Ice
- Chain-of-Custody form (completed)
- Custody seals

4. Procedures and Guidelines

4.1 Sample Packing

1. Prepare coolers for shipment:
    - Tape drains shut from the inside of the cooler.
    - Affix “This Side Up” labels on all four sides and “Fragile” labels on at least two sides of each cooler, if available.
    - Place mailing label with laboratory address on top of coolers.
    - As necessary (helpful for large bottle ware), fill bottom of coolers with about 3 inches of bubble wrap.
2. Arrange decontaminated sample containers in groups by sample number. Consolidate volatile organic compound (VOC) samples into one cooler to minimize the need for trip blanks.

3. Affix appropriate adhesive sample labels to each container. Protect with clear label protection tape.
4. Seal each set of sample bottles within a separate waterproof zipper-type plastic bag and bubble wrap, if available. Make every attempt to ensure the samples are waterproof. Double bag Encore VOC samples and soil samples. Sample label should be visible through the bag.
5. Place two large plastic bag liners, one inside the other, openings up. Arrange sample containers in liners so bags do not touch each other. Temp blank should go on the bottom of the cooler, in an area where it can be completely surrounded by ice.
6. If ice is required to preserve the samples, use at least two full bags and place on and around the containers.
7. Fill remaining spaces with bubble wrap or ice as required and add the laboratory provided trip blank.
8. Close the inside liner first by twisting the opening to the bag liner closed, allowing as much air to escape as possible. Zip-tie the bag closed and tie the end into a knot. Do the same to the second liner being sure to remove as much air as possible.
9. Complete and sign COC (or obtain signature) and indicate the time and date it was relinquished to Federal Express or the courier. Place into a zip-type bag and tape it to the inside of the lid of the cooler.
10. Close lid and latch.
11. Carefully peel custody seals from backings and place intact over lid openings (right front and left back). Cover seals with clear protection tape.
12. Tape cooler shut on both ends, making several complete revolutions with tape. Do not cover custody seals.
13. Relinquish to Federal Express or to a courier arranged with the laboratory. Scan airbill receipt and COCs to the sample documentation coordinator (or mail if scanner not available) along with the other documentation.

4.2 Medium and High Concentration Samples

Medium and high concentration samples are packaged using the same techniques used to package low concentration samples, with several additional restrictions. The sample handler must refer to instructions associated with the shipping of dangerous goods for the necessary procedures for shipping by Federal Express or other overnight carrier.

5. Attachments

- None.

6. Key Checks and Items

- Be sure laboratory address is correct on the mailing label.
- Pack sample bottles carefully, with adequate bubble wrap or other packaging and without allowing bottles to touch.
- Be sure there is adequate ice.
- Include COC.
- Affix custody seals.

STANDARD OPERATING PROCEDURE H-6

Equipment Blank Preparation

1. Purpose and Scope

This document provides standardized procedures for collecting equipment blanks used to determine whether decontamination procedures are adequate during sampling. Any project required deviations from standard operating procedures (SOPs) will be provided in site-specific Sampling and Analysis Plans (SAPs). The general protocols for preparing the blanks are outlined. The actual equipment to be rinsed will depend on the requirements of the specific sampling procedure.

2. Equipment and Materials

- ASTM Type II reagent water with analysis certification (blank water)
- Sample bottles with preservatives according to the SAP
- Gloves

3. Procedures and Guidelines

1. Decon all sampling equipment according to SOP *E-1 Decontamination of Personnel and Equipment*.
2. For volatile organic compound (VOC) analysis from the surfaces of equipment other than pumps, pour blank water over one piece of equipment and into three 40-ml vials as per VOC water sampling procedure.
3. For non-VOC analyses, one aliquot is to be used for equipment. Pour blank water into the sampling bowl and other equipment so surfaces which previously contacted the sample are now in contact with the blank water. Pour blank fluid from pan into the appropriate sample bottles.
4. For pumps, run an extra gallon of blank water through the pump while collecting the pump outflow into appropriate containers. If a pump with disposable tubing is used, put new tubing onto the pump to collect the equipment blank.
5. Document and ship samples in accordance with the procedures for other samples.

4. Attachments

- None.

5. Key Checks and Items

- Wear gloves.
- Do not use any disposable or non-decontaminated equipment to prepare blank.
- Use ASTM Type II reagent water with analysis certification.

Attachment C
Laboratory DoD ELAP Accreditation Letter

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

EUROFINS LANCASTER LABORATORIES ENVIRONMENT TESTING LLC
2425 New Holland Pike, Lancaster, PA 17601
Kenneth Boley Phone: 717-556-9413

ENVIRONMENTAL

Valid To: November 30, 2024 Certificate Number: 0001.01

In recognition of the successful completion of the A2LA evaluation process (including an assessment of the laboratory's compliance with the 2009 TNI Environmental Testing Laboratory Standard, the requirements of the DoD Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 5.4 of the DoD/DOE Quality Systems Manual for Environmental Laboratories, and ISO/IEC 17025:2017, accreditation is granted to this laboratory to perform recognized EPA methods using the following testing technologies in the analyte catagories identified below, and on the following matrices as applicable: Drinking Water, Bottled Water, Water as a Component of Food and Beverage, Non-Potable Water, Food and Feed, Aqueous and Solid Hazardous Waste, and Tissue.

Testing Technologies

Atomic Absorption/ICP-AES Spectrometry, ICP-MS Spectrometry, Gas Chromatography, Gas Chromatography/Mass Spectrometry, Gravimetry, High Performance Liquid Chromatography, Ion Chromatography, Misc.-Electronic Probes (pH, F^-, O_2), Oxygen Demand, Spectrophotometry (Visible), Spectrophotometry (Automated), Titrimetry, TCLP, Total Organic Carbon, Turbidity, Liquid Chromatography/Mass Spectrometry/Mass Spectrometry, High Resolution Gas Chromatography/Mass Spectrometry

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
Demands				
COD	----------	EPA 410.4	EPA 410.4	----------
Total Organic Carbon	----------	EPA 9060A SM 5310C-2014	EPA 9060A SM 5310C-2014	EPA 9060A Lloyd Kahn
Anions				
Ammonia	----------	EPA 350.1	EPA 350.1	SM 4500-NH3 B/C-2011
Fluoride	----------	EPA 300.0 EPA 9056A	EPA 300.0 EPA 9056A	EPA 300.0 EPA 9056A
Nitrate (as N)	----------	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 9056A
Nitrite (as N)	----------	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 9056A

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Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
Nitrate Nitrite Total	----------	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 353.2 EPA 9056A	EPA 300.0 EPA 9056A
Bromide	----------	EPA 300.0 EPA 9056A	EPA 300.0 EPA 9056A	----------
Chloride	----------	EPA 300.0 EPA 9056A	EPA 300.0 EPA 9056A	EPA 300.0 EPA 9056A
Sulfate	----------	EPA 300.0 EPA 9056A	EPA 300.0 EPA 9056A	EPA 300.0 EPA 9056A
Wet Chemistry				
Acid Volatile Sulfide	----------	----------	EPA-821-R-91-100	EPA-821-R-91-100
AVS-SEM Distillation	----------	----------	EPA-821-R-91-100	EPA-821-R-91-100
Alkalinity	----------	SM 2320B-2011	SM 2320B-2011	----------
Biochemical Oxygen Demand (BOD)	----------	SM 5210B-2016	SM 5210B-2016	----------
Carbonaceous Biochemical Oxygen Demand (CBOD	----------	SM 5210B-2016	SM 5210B-2016	----------
Corrosivity	----------	----------	SW-846 Chapter 7	SW-846 Chapter 7
Conductivity	----------	SM 2510B-2011	SM 2510B-2011	----------
Cyanide	----------	EPA 9012B	EPA 9012B	EPA 9012B
Ferrous Iron	----------	SM 3500Fe B-2011	SM 3500Fe B-2011	----------
Filterable Residue (TDS)	----------	SM 2540C-2015	SM 2540C-2015	----------
Flashpoint	----------	EPA 1010A/B	EPA 1010A/B	EPA 1010A/B
Grain Size	----------	----------	----------	ASTM D422 MOD
Hardness	----------	EPA 130.2 SM 2340B-2011 SM 2340C-2011	EPA 130.2 SM 2340B-2011 SM 2340C-2011	----------
HEM (Oil&Grease)	----------	EPA 1664B	EPA 1664B	EPA 9071B
Hexavalent Chromium Digestion	----------	----------	----------	EPA 3060A
Hexavalent Chromium	----------	EPA 218.6 EPA 7196A EPA 7199	EPA 7196A EPA 7199	EPA 7196A EPA 7199
Ignitability	----------	----------	40 CFR 261.21	40 CFR 261.21
Non-filterable Residue (TSS)	----------	SM 2540D-2015	SM 2540D-2015	----------
Orthophosphate	----------	EPA 365.3	EPA 365.3	----------
Paint Filter	----------	----------	----------	EPA 9095B
pH	----------	SM 4500 H+B-2011 EPA 9040B/C	EPA 9040B/C	EPA 9045C/D
Phenol	----------	EPA 9066	EPA 9066	----------
Reactivity Prep	----------	----------	SW-846 Chapter 7.3	SW-846 Chapter 7.3
Reactive Cyanide	----------	----------	EPA 9012B	EPA 9012B
Reactive Sulfide	----------	----------	EPA 9034	EPA 9034

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
SGT-HEM (Total Petroleum Hydrocarbons)	----------	EPA 1664B	EPA 1664B	EPA 9071B
Sulfide	----------	EPA 376.1 EPA 376.2 SM 4500 S2D-2011 SM 4500 S2F-2011	EPA 376.1 EPA 376.2 SM 4500 S2D-2011 SM 4500 S2F-2011	----------
Total Kjeldahl Nitrogen (TKN)	----------	EPA 351.2	EPA 351.2	EPA 351.2
Total Phosphorus	----------	EPA 365.1 SM 4500P F-2011	EPA 365.1 SM 4500P F-2011	EPA 365.1 SM 4500P F-2011
Total Residue	----------	SM 2540B-2015	SM 2540B-2015	SM 2540G-2015
Metals				
Metals Digestion	----------	EPA 3005A	EPA 3005A	EPA 3050B
Aluminum	EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Antimony	EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Arsenic	EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Barium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Beryllium	EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Boron	----------	EPA 200.7 EPA 6010D	EPA 6010D	EPA 6010D
Cadmium	EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Calcium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
Chromium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Cobalt	EPA 200.7	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Copper	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Iron	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Lead	EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Lithium	EPA 200.7	EPA 200.7 EPA 6010D	EPA 6010D	EPA 6010D
Molybdenum	----------	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Magnesium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Manganese	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Mercury	EPA 245.1	EPA 245.1 EPA 7470A	EPA 245.1 EPA 7470A	EPA 7471B
Nickel	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Potassium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
Selenium	EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Silicon	----------	EPA 200.7 EPA 6010D	EPA 6010D	EPA 6010D
Silver	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Sodium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Strontium	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Sulfur	EPA 200.7	EPA 200.7 EPA 6010D	EPA 6010D	EPA 6010D
Thallium	EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Thorium	----------	EPA 6010D	EPA 6010D	EPA 6010D
Tin	EPA 200.7	EPA 200.7 EPA 6010D	EPA 6010D	EPA 6010D
Titanium	----------	EPA 200.7 EPA 200.8 EPA 6010D	EPA 6010D	EPA 6010D
Tungsten	----------	EPA 6010D	EPA 6010D	EPA 6010D
Uranium	----------	EPA 200.8 EPA 6020B	EPA 6020B	EPA 6020B
Vanadium	EPA 200.7	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Zinc	EPA 200.7 EPA 200.8	EPA 200.7 EPA 200.8 EPA 6010D EPA 6020B	EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Zirconium	----------	EPA 6010D	EPA 6010D	EPA 6010D
Simulatneously Extracted Metals (SEM) by EPA-821-R-91-100				
Aluminum			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
Antimony			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Arsenic			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Barium			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Beryllium			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Cadmium			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Calcium			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Chromium			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Cobalt			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Copper			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Iron			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Lead			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Molybdenum			EPA 6020B	EPA 6020B
Magnesium			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Manganese			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Mercury			EPA 7470A	EPA 7470A
Nickel			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Potassium			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Selenium			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Silver			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Sodium			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Strontium			EPA 6020B	EPA 6020B

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
Thallium			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Tin			EPA 6020B	EPA 6020B
Titanium			EPA 6020B	EPA 6020B
Vanadium			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Zinc			EPA 6010D EPA 6020B	EPA 6010D EPA 6020B
Purgeable Organics (Volatiles)				
Volatile Preparation	----------	EPA 5030C	EPA 5030C	EPA 5035A
Acetone	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Acetonitrile	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Acrolein	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Acrylonitrile	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Allyl chloride	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
tert-Amyl Alcohol	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
tert-Amyl Methyl Ether	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
tert-Butyl Alcohol	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
tert-Butyl Formate	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Benzene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Bromobenzene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Bromochloromethane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Bromodichloromethane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Bromoform	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Bromomethane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
2-Butanone	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
n-Butylbenzene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
sec-Butylbenzene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
tert-Butylbenzene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Carbon disulfide	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Carbon tetrachloride	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
2-Chloro-1,3-butadiene	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Chloroacetonitrile	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Chlorobenzene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1-Chlorobutane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Chlorodifluoromethane	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Chloroethane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
2-Chloroethyl Vinyl Ether	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
Chloroform	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1-Chlorohexane	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Chloromethane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
2-Chlorotoluene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
4-Chlorotoluene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Cyclohexane	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Cyclohexanone	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Di-Isopropyl ether	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Dibromochloromethane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,2-Dibromo-3-chloropropane	EPA 524.2	EPA 8260C/D EPA 8011	EPA 8260C/D EPA 8011	EPA 8260C/D
Dibromomethane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,2-Dibromoethane (EDB)	----------	EPA 8260C/D EPA 8011	EPA 8260C/D EPA 8011	EPA 8260C/D
1,2-Dichlorobenzene	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,3-Dichlorobenzene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,4-Dichlorobenzene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
trans-1,4-dichloro-2-butene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Dichlorodi-fluoromethane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,1-Dichloroethane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,2-Dichloroethane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,1-Dichloroethene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
cis-1,2-Dichloroethene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
trans-1,2-Dichloroethene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Dichlorofluoromethane	EPA 524.2	----------	----------	----------
1,2-Dichloropropane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,3-Dichloropropane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
2,2-Dichloropropane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,1-Dichloropropene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
cis-1,3-Dichloropropene	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
trans-1,3-Dichloropropene	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,4-Dioxane	----------	EPA 8260C/D EPA 8260C/D SIM	EPA 8260C/D EPA 8260C/D SIM	EPA 8260C/D EPA 8260C/D SIM
Ethanol	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Ethylbenzene	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Ethyl ether	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Ethyl Methacrylate	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Ethyl Tert-Butyl Ether	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Freon-113	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
Gasoline Range Organics (GRO) [Volatile Petroleum Hydrocarbons (VPH)]	----------	EPA 8015C EPA 8015D EPA 8260C/D NW TPH-Gx MA VPH AK101	EPA 8015C EPA 8015D EPA 8260C/D NW TPH-Gx MA VPH AK101	EPA 8015C EPA 8015D EPA 8260C/D NW TPH-Gx MA VPH AK101
Heptane	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Hexane	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
2-Hexanone	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Hexachlorobutadiene	EPA 524.2			
Hexachloroethane	EPA 524.2			
Isopropyl Alcohol	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Isopropylbenzene	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,4-Isopropyltoluene	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Methylacrylonitrile	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Methyl Acetate	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Methyl Acrylate	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Methyl Iodide	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Methylene Chloride	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Methyl Methacrylate	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Methyl Tert-Butyl Ether	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
4-Methyl-2-pentanone	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Methylcyclohexane	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
2-Nitropropane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Naphthalene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Pentachloroethane	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Propionitrile	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
n-Propylbenzene	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Styrene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Tert-Amyl Ethyl Ether	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,1,1,2-Tetrachloroethane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,1,2,2-Tetrachloroethane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Tetrachloroethene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Tetrahydrofuran	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Toluene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,2,3-Trichlorobenzene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,2,4-Trichlorobenzene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,1,1-Trichloroethane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,1,2-Trichloroethane	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Trichloroethene	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Trichlorofluoromethane	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
1,2,3-Trichloropropane	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,2,4-Trimethylbenzene	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,3,5-Trimethylbenzene	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
130BVinyl Acetate	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Vinyl Chloride	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Xylenes, Total	----------	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,2-Xylene (o-Xylene)	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
1,3+1,4-Xylene (m+p Xylene)	EPA 524.2	EPA 8260C/D	EPA 8260C/D	EPA 8260C/D
Extractable Organics (Semivolatiles)				
Acenaphthene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Acenaphthylene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Acetophenone	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2-Acetylaminofluorene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Alkylated PAHs	----------	EPA 8270D/E SIM	EPA 8270D/E SIM	EPA 8270D/E SIM
4-Aminobiphenyl	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2-Amino-4,6-dinitrotoluene	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD
4-Amino-2,6-dinitrotoluene	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD
Aniline	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Anthracene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Atrazine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Benzaldehyde	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Benzidine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Benzoic acid	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Benzo (a) anthracene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Benzo (b) fluoranthene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Benzo (k) fluoranthene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Benzo (ghi) perylene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Benzo (a) pyrene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Benzo (e) pyrene	----------	EPA 8270D/E SIM	EPA 8270D/E SIM	EPA 8270D/E SIM
Benzyl Alcohol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Biphenyl	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
bis (2-Chloroethoxy) Methane	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
bis (2-Chloroethyl) Ether	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
bis (2-Ethylhexyl) Phthalate	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
4-Bromophenylphenyl Ether	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Butyl benzyl Phthalate	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Caprolactam	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Carbazole	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Carbon Range Organics C8-C44 (including subsets of this range i.e. HRO, MRO, ORO, RRO)	----------	EPA 8015C EPA 8015D	EPA 8015C EPA 8015D	EPA 8015C EPA 8015D
4-Chloroaniline	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
4-Chloro-3-methylphenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Chlorobenzilate	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
1-Chloronaphthalene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2-Chloronaphthalene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2-Chlorophenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
4-Chlorophenyl phenyl ether	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Chrysene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Cresols (Methyl phenols)	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
cis-/trans-Diallate	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2,4-Diamino-6-nitrotoluene	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD
2,6-Diamino-4-nitrotoluene	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD
Dibenzo (a,h) acridine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Dibenzo (a,h) anthracene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Dibenzofuran	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
1,2-Dichlorobenzene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
1,3-Dichlorobenzene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
1,4-Dichlorobenzene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
3,3-Dichlorobenzidine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Diesel Range Organics (DRO) [Extractable Petroleum Hydrocarbons (EPH)]	----------	EPA 8015C EPA 8015D NWTPH DX MA EPH TX1005 AK102/103 AK102/103-SV	EPA 8015C EPA 8015D NWTPH DX MA EPH TX1005 AK102/103 AK102/103-SV	EPA 8015C EPA 8015D NWTPH DX MA EPH TX1005 AK102/103

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
2,4-Dichlorophenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2,6-Dichlorophenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Diethyl Phthalate	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Dimethoate	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
p-Dimethylaminoazobenze	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
7,12-Dimethylbenz (a) anthracene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2,4-Dimethylphenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Dimethyl Phthalate	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
3,3'-Dimethylbenzidine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Di-n-butyl Phthalate	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Di-n-octyl phthalate	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
3,5-Dinitroaniline	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD
1,3-Dinitrobenzene	----------	EPA 8270D/E EPA 8330B	EPA 8270D/E EPA 8330B	EPA 8270D/E EPA 8330B MOD
1,4-Dinitrobenzene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2,4-Dinitrophenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2,4-Dinitrotoluene	----------	EPA 8270D/E EPA 8330B	EPA 8270D/E EPA 8330B	EPA 8270D/E EPA 8330B MOD
2,6-Dinitrotoluene	----------	EPA 8270D/E EPA 8330B	EPA 8270D/E EPA 8330B	EPA 8270D/E EPA 8330B MOD
1,4-Dioxane	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Diphenylamine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Diphenyl ether	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
1,2-Diphenylhydrazine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Ethyl Methanesulfonate	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Fluoroanthene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Fluorene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Hexachlorobenzene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Hexachlorobutadiene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Hexachlorocyclo-pentadiene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Hexachloroethane	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Hexachloropropene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
Indeno (1,2,3-cd) Pyrene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Isodrin	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Isophorone	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Isosafrole	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
3-Methycholanthrene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2-Methyl-4,6-dinitrophenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Methyl methane sulfonate	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
1-Methylnaphthalene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
2-Methylnaphthalene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
2-Methylphenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
4-Methylphenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Naphthalene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
1,4-Naphthoquinone	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
1-Naphthylamine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2-Naphthylamine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
4-Nitroquinoline-1-oxide	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2-Nitroaniline	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
3-Nitroaniline	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
4-Nitroaniline	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Nitrobenzene	----------	EPA 8270D/E EPA 8330B	EPA 8270D/E EPA 8330B	EPA 8270D/E EPA 8330B MOD
Nitroglycerin	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD
2-Nitrophenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
4-Nitrophenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2-Nitrotoluene	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD
3-Nitrotoluene	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD
4-Nitrotoluene	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD
5-Nitro-o-toluidine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
n-Nitroso-di-n-butylamine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
n-Nitrosodiethylamine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
n-Nitrosodimethylamine	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
n-Nitrosomethylethylamine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
n-Nitrosomorpholine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
n-Nitrosodi-n-propylamine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
n-Nitrosodiphenylamine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
n-Nitrosopiperidine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
n-Nitrosopyrrolidine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD
2,2-Oxybis (1-chloropropane)	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Pentachlorobenzene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Pentachloronitrobenzene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Pentachlorophenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Pentaerythritol Tetranitrate (PETN)	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD
Perylene	----------	EPA 8270D/E SIM	EPA 8270D/E SIM	EPA 8270D/E SIM
Phenacetin	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Phenanthrene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Phenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2-Picoline	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Pronamide	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Pyrene	----------	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM	EPA 8270D/E EPA 8270D/E SIM
Pyridine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Safrole	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
1,2,4,5- Tetrachlorobenzene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2,3,4,6-Tetrachlorophenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Tetraethyl dithiopyrophosphate	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Tetraethy lead	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Tetryl	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD
Thionazin	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
o-Toluidine	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
1,2,4-Trichlorobenzene	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
1,3,5-Trinitrobenzene	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD
2,4,5-Trichlorophenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2,4,6-Trichlorophenol	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
O,O,O-Tri-ethylphosphorothioate	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
2,4,6-Trinitrotoluene	----------	EPA 8330B	EPA 8330B	EPA 8330B MOD
Organochlorine Pesticides				
Aldrin	----------	EPA 8081B	EPA 8081B	EPA 8081B
alpha-BHC	----------	EPA 8081B	EPA 8081B	EPA 8081B
beta-BHC	----------	EPA 8081B	EPA 8081B	EPA 8081B
delta-BHC	----------	EPA 8081B	EPA 8081B	EPA 8081B
gamma-BHC (Lindane)	----------	EPA 8081B	EPA 8081B	EPA 8081B
alpha-Chlordane	----------	EPA 8081B	EPA 8081B	EPA 8081B
Chlordane (Technical)	----------	EPA 8081B	EPA 8081B	EPA 8081B
2,4'-DDD	----------	EPA 8081B	EPA 8081B	EPA 8081B
2,4'-DDE	----------	EPA 8081B	EPA 8081B	EPA 8081B
2,4'-DDT	----------	EPA 8081B	EPA 8081B	EPA 8081B
4,4'-DDD	----------	EPA 8081B	EPA 8081B	EPA 8081B

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
4,4'-DDE	----------	EPA 8081B	EPA 8081B	EPA 8081B
4,4'-DDT	----------	EPA 8081B	EPA 8081B	EPA 8081B
Dieldrin	----------	EPA 8081B	EPA 8081B	EPA 8081B
Dinoseb	----------	EPA 8270D/E	EPA 8270D/E	EPA 8270D/E
Endosulfan I (alpha)	----------	EPA 8081B	EPA 8081B	EPA 8081B
Endosulfan II (beta)	----------	EPA 8081B	EPA 8081B	EPA 8081B
Endosulfan Sulfate	----------	EPA 8081B	EPA 8081B	EPA 8081B
Endrin	----------	EPA 8081B	EPA 8081B	EPA 8081B
Endrin Aldehyde	----------	EPA 8081B	EPA 8081B	EPA 8081B
Endrin Ketone	----------	EPA 8081B	EPA 8081B	EPA 8081B
gamma-Chlordane	----------	EPA 8081B	EPA 8081B	EPA 8081B
Heptachlor	----------	EPA 8081B	EPA 8081B	EPA 8081B
Heptachlor Epoxide	----------	EPA 8081B	EPA 8081B	EPA 8081B
Hexachlorobenzene	----------	EPA 8081B	EPA 8081B	EPA 8081B
Hexachlorocyclopentadiene	----------	EPA 8081B	EPA 8081B	EPA 8081B
Methoxychlor	----------	EPA 8081B	EPA 8081B	EPA 8081B
Mirex	----------	EPA 8081B	EPA 8081B	EPA 8081B
Toxaphene	----------	EPA 8081B	EPA 8081B	EPA 8081B
PCBs (Aroclors)				
PCB-1016 (Arochlor)	----------	EPA 8082A	EPA 8082A	EPA 8082A
PCB-1221	----------	EPA 8082A	EPA 8082A	EPA 8082A
PCB-1232	----------	EPA 8082A	EPA 8082A	EPA 8082A
PCB-1242	----------	EPA 8082A	EPA 8082A	EPA 8082A
PCB-1248	----------	EPA 8082A	EPA 8082A	EPA 8082A
PCB-1254	----------	EPA 8082A	EPA 8082A	EPA 8082A
PCB-1260	----------	EPA 8082A	EPA 8082A	EPA 8082A
PCB-1262	----------	EPA 8082A	EPA 8082A	EPA 8082A
PCB-1268	----------	EPA 8082A	EPA 8082A	EPA 8082A
PCB congeners (209)	----------	EPA 1668A EPA 1668C	EPA 1668A EPA 1668C	EPA 1668A EPA 1668C
Herbicides				
2,4,5-T	----------	EPA 8151A	EPA 8151A	EPA 8151A
2,4,5-TP (Silvex)	----------	EPA 8151A	EPA 8151A	EPA 8151A
2,4-D	----------	EPA 8151A	EPA 8151A	EPA 8151A
2,4-DB	----------	EPA 8151A	EPA 8151A	EPA 8151A
Dalapon	----------	EPA 8151A	EPA 8151A	EPA 8151A
Dicamba	----------	EPA 8151A	EPA 8151A	EPA 8151A
Dichlorprop	----------	EPA 8151A	EPA 8151A	EPA 8151A
Dinoseb	----------	EPA 8151A	EPA 8151A	EPA 8151A
MCPA	----------	EPA 8151A	EPA 8151A	EPA 8151A
MCPP	----------	EPA 8151A	EPA 8151A	EPA 8151A
Pentachlorophenol	----------	EPA 8151A	EPA 8151A	EPA 8151A
PCB Homologues				
Monochlorobiphenyls	----------	EPA 680	EPA 680	EPA 680
Dichlorobiphenyls	----------	EPA 680	EPA 680	EPA 680
Trichlorobiphenyls	----------	EPA 680	EPA 680	EPA 680

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
Tetrachlorobiphenyls	----------	EPA 680	EPA 680	EPA 680
Pentachlorobiphenyls	----------	EPA 680	EPA 680	EPA 680
Hexachlorobiphenyls	----------	EPA 680	EPA 680	EPA 680
Heptachlorobiphenyls	----------	EPA 680	EPA 680	EPA 680
Octachlorobiphenyls	----------	EPA 680	EPA 680	EPA 680
Nonachlorobiphenyls	----------	EPA 680	EPA 680	EPA 680
Decachlorobiphenyls	----------	EPA 680	EPA 680	EPA 680
Dioxins/Furans				
2,3,7,8-TCDD	EPA 1613B	EPA 8290A	EPA 8290A	EPA 8290A
2,3,7,8-TCDF	----------	EPA 8290A	EPA 8290A	EPA 8290A
1,2,3,7,8-PeCDF	----------	EPA 8290A	EPA 8290A	EPA 8290A
2,3,4,7,8-PeCDF	----------	EPA 8290A	EPA 8290A	EPA 8290A
1,2,3,7,8-PeCDD	----------	EPA 8290A	EPA 8290A	EPA 8290A
1,2,3,4,7,8-HxCDF	----------	EPA 8290A	EPA 8290A	EPA 8290A
1,2,3,6,7,8-HxCDF	----------	EPA 8290A	EPA 8290A	EPA 8290A
2,3,4,6,7,8-HxCDF	----------	EPA 8290A	EPA 8290A	EPA 8290A
1,2,3,7,8,9-HxCDF	----------	EPA 8290A	EPA 8290A	EPA 8290A
1,2,3,4,7,8,-HxCDD	----------	EPA 8290A	EPA 8290A	EPA 8290A
1,2,3,6,7,8-HxCDD	----------	EPA 8290A	EPA 8290A	EPA 8290A
1,2,3,7,8,9-HxCDD	----------	EPA 8290A	EPA 8290A	EPA 8290A
1,2,3,4,6,7,8-HpCDF	----------	EPA 8290A	EPA 8290A	EPA 8290A
1,2,3,4,7,8,9-HpCDF	----------	EPA 8290A	EPA 8290A	EPA 8290A
1,2,3,4,6,7,8-HpCDD	----------	EPA 8290A	EPA 8290A	EPA 8290A
OCDF	----------	EPA 8290A	EPA 8290A	EPA 8290A
OCDD	----------	EPA 8290A	EPA 8290A	EPA 8290A
Total HpCDD	----------	EPA 8290A	EPA 8290A	EPA 8290A
Total HpCDF	----------	EPA 8290A	EPA 8290A	EPA 8290A
Total HxCDD	----------	EPA 8290A	EPA 8290A	EPA 8290A
Total HxCDF	----------	EPA 8290A	EPA 8290A	EPA 8290A
Total PeCDD	----------	EPA 8290A	EPA 8290A	EPA 8290A
Total PeCDF	----------	EPA 8290A	EPA 8290A	EPA 8290A
Total TCDD	----------	EPA 8290A	EPA 8290A	EPA 8290A
Total TCDF	----------	EPA 8290A	EPA 8290A	EPA 8290A
Misc. Headspace Analysis				
Carbon dioxide	----------	RSK-175	RSK-175	----------
Ethane	----------	RSK-175	RSK-175	----------
Ethene	----------	RSK-175	RSK-175	----------
Methane	----------	RSK-175	RSK-175	----------
Acetylene	----------	RSK-175	RSK-175	----------
Propane	----------	RSK-175	RSK-175	----------
Hazardous Waste Characteristics				
Toxicity Characteristic Leaching Procedure	----------	----------	EPA 1311	EPA 1311
Synthetic Precipitation Leaching Procedure	----------	----------	EPA 1312	EPA 1312

Parameter/Analyte	Drinking Water	Non-Potable Water	Solid Hazardous Waste	
			Aqueous	Solid
ASTM Leaching Procedure	----------	----------	ASTM D3987-12	ASTM D3987-12
Other				
Perchlorate	----------	EPA 6850	EPA 6850	EPA 6850
Hydrazine	----------	EPA 8315A MOD	EPA 8315A MOD	EPA 8315A MOD
Formaldehyde	----------	----------	EPA 8315A	EPA 8315A
Methylhydrazine	----------	EPA 8315A MOD	EPA 8315A MOD	EPA 8315A MOD
1,1-Dimethylhydrazine	----------	EPA 8315A MOD	EPA 8315A MOD	EPA 8315A MOD
Acetic Acid	----------	EPA 8015D	EPA 8015D	----------
Butryic acid	----------	EPA 8015D	EPA 8015D	----------
Lactic Acid	----------	EPA 8015D	EPA 8015D	----------
Propionic Acid	----------	EPA 8015D	EPA 8015D	----------
Pyruvic Acid	----------	EPA 8015D	EPA 8015D	----------
Citric Acid	----------	EPA 8015D	EPA 8015D	----------
Formic Acid	----------	EPA 8015D	EPA 8015D	----------
Oxalic Acid	----------	EPA 8015D	EPA 8015D	----------
Quinic Acid	----------	EPA 8015D	EPA 8015D	----------
Succinic Acid	----------	EPA 8015D	EPA 8015D	----------
Tartaric Acid	----------	EPA 8015D	EPA 8015D	----------
Volatile Preparation	----------	EPA 5030C	EPA 5030C	EPA 5035A
Organic Extraction/Cleanup	----------	EPA 3510C EPA 3511 EPA 3660B, 3620C, 3665A	EPA 3510C EPA 3511 EPA 3660B, 3620C, 3665A	EPA 3546 EPA 3550C EPA 3660B, 3620C, 3665A, 3640A

Parameter/Analyte	Drinking Water	Nonpotable Water	Solid Haz.Waste	Tissue
Per and Polyfluoroalkyl Substances (PFAS)				
N-ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	EPA 537 EPA 537.1	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
N-methyl perfluoroctanesulfonamidoacetic Acid (NMeFOSAA)	EPA 537 EPA 537.1	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluorobutanesulfonic Acid (PFBS)	EPA 537 EPA 537.1 EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633	EPA Draft Method 1633 Draft 3

Parameter/Analyte	Drinking Water	Nonpotable Water	Solid Haz.Waste	Tissue
		Draft 3	Draft 3	
Perfluorodecanoic Acid (PFDA) CASRN: 335-76-2	EPA 537 EPA 537.1 EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluorododecanoic Acid (PFDoA)	EPA 537 EPA 537.1 EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluoroheptanoic Acid (PFHpA) CASRN: 375-85-9	EPA 537 EPA 537.1 EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluorohexanesulfonic Acid (PFHxS) CASRN: 355-46-4	EPA 537 EPA 537.1 EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluorohexanoic Acid (PFHxA)	EPA 537 EPA 537.1 EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluorononanoic Acid (PFNA)	EPA 537 EPA 537.1 EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluorooctanesulfonic Acid (PFOS)	EPA 537 EPA 537.1 EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluorooctanoic Acid (PFOA)	EPA 537 EPA 537.1 EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633	EPA Draft Method 1633 Draft 3

Parameter/Analyte	Drinking Water	Nonpotable Water	Solid Haz.Waste	Tissue
		Draft 3	Draft 3	
Perfluorotetradecanoic Acid (PFTeDA) CASRN: 376-06-7	EPA 537 EPA 537.1	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluorotridecanoic Acid (PFTrDA) CASRN: 72629-94-8	EPA 537 EPA 537.1	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluoroundecanoic Acid (PFUnA) CASRN: 2058-94-8	EPA 537 EPA 537.1 EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Hexafluoropropylene oxide dimer acid (HF- PODA)	EPA 537.1 EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
4,8-Dioxa-3*H*-perfluorononanoic acid (ADONA)	EPA 537.1 EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
9-Chlorohexadecafluoro-3-oxanonane-1- sulfonic acid (9Cl-PF3ONS)	EPA 537.1 EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
11-Chloroeicosafluoro-3-oxaundecane-1- sulfonic acid (11Cl-PF3OUdS)	EPA 537.1 EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluorobutanoic Acid (PFBA)	EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3

Parameter/Analyte	Drinking Water	Nonpotable Water	Solid Haz.Waste	Tissue
Perfluoropentanoic Acid (PFPeA) CASRN: 2706-90-3	EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
1H,1H, 2H, 2H-Perfluorohexane sulfonic acid (4:2FTS)	EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
1H,1H, 2H, 2H-Perfluorodecane sulfonic acid (8:2-FTS) CASRN: 39108-34-4	EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluoropentanesulfonic Acid (PFPeS)	EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
1H,1H, 2H, 2H-Perfluorooctane sulfonic acid (6:2-FTS) CASRN: 27619-97-2	EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluoroheptanesulfonic Acid (PFHpS) CASRN: 375-92-8	EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluorononanesulfonic Acid (PFNS)	----------	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluorodecanesulfonic Acid (PFDS)	----------	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3

Parameter/Analyte	Drinking Water	Nonpotable Water	Solid Haz.Waste	Tissue
10:2 Fluorotelomersulfonic Acid (10:2-FTS)	----------	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15	----------
Perfluorododecanesulfonic Acid (PFDoS)	----------	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluorohexadecanoic Acid (PFHxDA)	----------	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15	----------
Perfluorooctadecanoic Acid (PFODA)	----------	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15	----------
Perfluorooctanesulfonamide (PFOSA)	----------	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
N-methyl perfluorooctanesulfonamidoethanol (NMeFOSE) CASRN: 24448-09-7	----------	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
N-methyl perfluorooctanesulfonamide (NMeFOSA)	----------	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
N-ethyl perfluorooctanesulfonamidoethanol (NEtFOSE)	----------	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
N-ethylperfluorooctanesulfonamide (NEtFOSA)	----------	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3

Parameter/Analyte	Drinking Water	Nonpotable Water	Solid Haz.Waste	Tissue
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluoro-3-methoxypropanoic acid (PFMPA) CASRN: 377-73-1	EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluoro-4-methoxybutanoic acid (PFMBA)	EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	EPA 533	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
3-Perfluoropropylpropanoic acid (3:3 FTCA) CASRN: 356-02-5	---	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
2*H*,2*H*,3*H*,3*H*-Perfluorooctanoic acid (5:3 FTCA)	---	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3
3-Perfluoroheptylpropanoic acid (7:3 FTCA) CASRN: 812-70-4	---	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	PFAS by LCMSMS Compliant with QSM 5.3/5.4 Table B-15 EPA Draft Method 1633 Draft 3	EPA Draft Method 1633 Draft 3

In addition, in recognition of the successful completion of the A2LA evaluation process including an assessment of the laboratory's compliance with ISO IEC 17025:2017, the 2009 TNI Environmental Testing Laboratory Standard, and for the test methods applicable to Kentucky Statute KRS 224.60-130(2)(a), and for the test methods applicable to the Wyoming Storage Tank Remediation Laboratory Accreditation Program), accreditation is granted to this laboratory to perform recognized EPA methods using the following testing technologies and in the analyte categories identified below:

Testing Technologies

Atomic Absorption/ICP-AES Spectrometry, ICP-MS Spectrometry, Gas Chromatography, Gas Chromatography/Mass Spectrometry, Gravimetry, High Performance Liquid Chromatography, Ion Chromatography, Misc.-Electronic Probes (pH, F^-, O_2), Oxygen Demand, Spectrophotometry (Visible), Spectrophotometry (Automated), Titrimetry, TCLP, Total Organic Carbon, Turbidity, Liquid Chromatography/Mass Spectrometry/Mass Spectrometry, High Resolution Gas Chromatography/Mass Spectrometry

Parameter/Analyte	Tissue	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Other				
Perchlorate	Food & Food Products EPA 6850	EPA 6850	EPA 6850	EPA 6850
Hydrazine	----------	EPA 8315A MOD	EPA 8315A MOD	EPA 8315A MOD
Methylhydrazine	----------	EPA 8315A MOD	EPA 8315A MOD	EPA 8315A MOD
1,1-Dimethylhydrazine	----------	EPA 8315A MOD	EPA 8315A MOD	EPA 8315A MOD
Volatile Preparation	----------	EPA 5030C	EPA 5030C	EPA 5035A
Organic Extraction/ Cleanup	EPA 3546 EPA 3550C EPA 3660B EPA 3620C EPA 3665A EPA 3640A	EPA 3510C EPA 3511 EPA 3660B EPA 3620C EPA 3665A	EPA 3510C EPA 3511 EPA 3660B EPA 3620C EPA 3665A	EPA 3546 EPA 3550C EPA 3660B EPA 3620C EPA 3665A EPA 3640A

Parameter/Analyte	Tissue	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Kentucky UST Program				
Metals				
Arsenic	----------	----------	EPA 6010B	EPA 6010B
Barium	----------	----------	EPA 6010B	EPA 6010B
Cadmium	----------	----------	EPA 6010B	EPA 6010B
Chromium	----------	----------	EPA 6010B	EPA 6010B
Lead	----------	----------	EPA 6010B	EPA 6010B
Mercury	----------	----------	EPA 7470A	EPA 7471A
Selenium	----------	----------	EPA 6010B	EPA 6010B
Silver	----------	----------	EPA 6010B	EPA 6010B
Purgeable Organics (Volatiles)				

Parameter/Analyte	Tissue	Nonpotable Water	Solid Hazardous Waste	
			Aqueous	Solid
Diesel Range Organics (DRO)	----------	EPA 8015C EPA 8015D	EPA 8015C EPA 8015D	EPA 8015C EPA 8015D
Gasoline Range Organics (GRO)	----------	EPA 8015C EPA 8015D	EPA 8015C EPA 8015D	EPA 8015C EPA 8015D
Wyoming Storage Tank Program				
Metals				
Cadmium	----------	----------	EPA 6010C	EPA 6010C
Chromium	----------	----------	EPA 6010C	EPA 6010C
Chromium (Total, hexavalent)	----------	----------	EPA 7196A	EPA 7196A
Lead	----------	----------	EPA 6010C	EPA 6010C
Purgeable Organics (Volatiles)				
Volatile Preparation	----------	----------	EPA 5030C	EPA 5035A
Benzene	----------	----------	EPA 8260D	EPA 8260D
1,2-Dichloroethane	----------	----------	EPA 8260D	EPA 8260D
1,2-Dibromoethane	----------	----------	EPA 8011	EPA 8011
Diisopropyl Ether	----------	----------	EPA 8260D	EPA 8260D
Ethyl Benzene	----------	----------	EPA 8260D	EPA 8260D
Ethyl tert-butyl Ether	----------	----------	EPA 8260D	EPA 8260D
Methyl tert-butyl Ether	----------	----------	EPA 8260D	EPA 8260D
Naphthalene	----------	----------	EPA 8260D	EPA 8260D
Toluene	----------	----------	EPA 5030C EPA 8260D	EPA 8260D
Tert-amyl Methyl Ether	----------	----------	EPA 8260D	EPA 8260D
Tert-butyl Alcohol	----------	----------	EPA 8260D	EPA 8260D
Xylenes, total	----------	----------	EPA 8260D	EPA 8260D
Gasoline Range Organics (GRO C6-C10)	----------	----------	EPA 8260D	EPA 8260D
Extractable Organics (Semivolatiles)				
Diesel Range Organics (DRO C10-C32)	----------	----------	EPA 8015C w/ EPA 3630 cleanup	EPA 8015C w/ EPA 3630 cleanup

In recognition of the successful completion of the A2LA evaluation process, including an assessment of the laboratory's compliance with ISO/IEC 17025:2017 accreditation is granted to this laboratory to perform recognized EPA methods using the following testing technologies and, in the analyte, categories identified below:

Food and Feed (WHO 29)	**Food/Feed**
2,3,7,8-TCDD	EPA 1613B
2,3,7,8-TCDF	EPA 1613B
1,2,3,7,8-PeCDF	EPA 1613B
2,3,4,7,8-PeCDF	EPA 1613B
1,2,3,7,8-PeCDD	EPA 1613B
1,2,3,4,7,8-HxCDF	EPA 1613B
1,2,3,6,7,8-HxCDF	EPA 1613B
2,3,4,6,7,8-HxCDF	EPA 1613B
1,2,3,7,8,9-HxCDF	EPA 1613B
1,2,3,4,7,8-HxCDD	EPA 1613B
1,2,3,6,7,8-HxCDD	EPA 1613B
1,2,3,7,8,9-HxCDD	EPA 1613B
1,2,3,4,6,7,8-HpCDF	EPA 1613B
1,2,3,4,7,8,9-HpCDF	EPA 1613B
1,2,3,4,6,7,8-HpCDD	EPA 1613B
OCDF	EPA 1613B
OCDD	EPA 1613B
Food and Feed (WHO 29)	**Food/Feed**
6 marker PCBs (PCB28, PCB52, PCB101, PCB138, PCB153, and PCB180)	EPA 1668C
(PCB77, PCB81, PCB105, PCB114, PCB118, PCB123, PCB126, PCB156, PCB157, PCB167, PCB169, and PCB189)	EPA 1668C

Parameter/Analyte	**Tissue**	**Nonpotable Water**	**Solid Hazardous Waste**	
			Aqueous	**Solid**
12 Dioxin-like PCBs (dl-PCBs)/coplanar PCBs (PCB77, PCB81, PCB105, PCB114, PCB118, PCB123, PCB126, PCB156, PCB157, PCB167, PCB169, & PCB189)	EPA 1668C	----------	----------	----------

Parameter/Analyte	Drinking Water	Nonpotable Water	Solid Haz.Waste
Per and Polyfluoroalkyl Substances (PFAS)			
N-ethyl perfluorooctane-sulfonamidoacetic acid (NetFOSAA)	EPA 537 Ver. 1.1 EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
N-methyl perfluoroctane-sulfonamidoacetic acid (NMeFOSAA)	EPA 537 Ver. 1.1 EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorobutanesulfonic acid (PFBS)	EPA 537 Ver. 1.1 EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorodecanoic acid (PFDA)	EPA 537 Ver. 1.1 EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorododecanoic acid (PFDoDA)	EPA 537 Ver. 1.1 EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluoroheptanoic acid (PFHpA)	EPA 537 Ver. 1.1 EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorohexanesulfonic acid (PFHxS)	EPA 537 Ver. 1.1 EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorohexanoic acid (PFHxA)	EPA 537 Ver. 1.1 EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorononanoic acid (PFNA)	EPA 537 Ver. 1.1 EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorooctanesulfonic acid (PFOS)	EPA 537 Ver. 1.1 EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorooctanoic acid (PFOA)	EPA 537 Ver. 1.1 EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorotetradecanoic acid (PFTeDA)	EPA 537 Ver. 1.1 EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorotridecanoic acid (PFTrDA)	EPA 537 Ver. 1.1 EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluoroundecanoic acid (PFUnDA)	EPA 537 Ver. 1.1 EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)-propanoic acid (HFPODA)	EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	EPA 537.1	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluoro-n-butanoic acid (PFBA)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluoro-n-pentanoic acid (PFPeA)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod

Parameter/Analyte	Drinking Water	Nonpotable Water	Solid Haz.Waste
8:2 Fluorotelomersulfonic acid (8:2FTS)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
4:2 Fluorotelomersulfonic acid (4:2-FTS)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluoropentanesulfonic acid (PFPeS)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
6:2 Fluorotelomersulfonic acid (6:2-FTS)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluoroheptanesulfonic acid (PFHpS)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorononanesulfonic acid (PFNS)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorodecanesulfonic acid (PFDS)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
10:2 Fluorotelomersulfonic acid (10:2-FTS)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorododecanesulfonic acid (PFDoDS)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorohexadecanoic acid (PFHxDA)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorooctadecanoic acid (PFODA)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
Perfluorooctanesulfonamide (PFOSA)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
2-(N-methylperfluoro-1-octanesulfonamido)-ethanol (NMePFOSAE)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
N-methylperfluoro-1-octanesulfonamide (NMePFOSA)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol (NEtPFOSAE)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod
N-ethylperfluoro-1-octanesulfonamide (NEtPFOSA)	----------	EPA 537 Ver.1.1 Mod	EPA 537 Ver.1.1 Mod

Accredited Laboratory

A2LA has accredited

EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC

Lancaster, PA

for technical competence in the field of

Environmental Testing

In recognition of the successful completion of the A2LA evaluation process that includes an assessment of the laboratory's compliance with ISO/IEC 17025:2017, the 2009 TNI Environmental Testing Laboratory Standard, and the requirements of the Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 5.4 of the DoD/DOE Quality System Manual for Environmental Laboratories (QSM), accreditation is granted to this laboratory to perform recognized EPA methods as defined on the associated A2LA Environmental Scope of Accreditation. This accreditation demonstrates technical competence for this defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated *April 2017*).

Presented this 21st day of November 2022.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1.01
Valid to November 30, 2024

For the tests to which this accreditation applies, please refer to the laboratory's Environmental Scope of Accreditation.

Attachment D
Responses to Regulator Comments

ATTACHMENT D

Responses to Regulator Comments

Responses to EPA Comments on
Draft UXO 17 Playa Caracas/Red Beach Remedial Investigation Quality Assurance Project Plan
Atlantic Fleet Weapons Training Area – Vieques
Former Vieques Naval Training Range, Vieques, Puerto Rico
Dated February 2024

GENERAL COMMENT:

Consider adding a Document Control Number (DCN) to the cover page and/or WS1&2 to identify the most current version of the QAPP and to ensure that only that version of the QAPP is used by all project participants.

Navy Response: The Navy concurs with the substantive content of the comment, but the standard process, which includes the use of "Draft," "Draft Final," and "Final" in the document title to ensure version control, will be continued. That process has been successfully used for documents generated for Vieques and other Navy facilities under the CLEAN program for many years.

SPECIFIC COMMENTS:

1. **Worksheet #3 & 5:** As per the Optimized UFP-QAPP Worksheets guidance document (March 2012), please ensure that key personnel currently denoted as "TBD" in the organization chart are identified in the final QAPP for approval. This would include the CH2M FTL and the Data Validation Subcontractor.

   Navy Response: As standard protocol for Vieques QAPPs preparation, all key personnel, including subcontractors, known at the time of the particular version (draft, draft final, final) preparation are included in the QAPP. If key personnel and/or a particular subcontractor is "TBD" at the time of final QAPP submittal, once those key personnel and/or subcontractor are identified, the personnel and/or company name and information can be conveyed to the project team for informational purposes upon request. Because any key personnel or subcontractor selected for the project must meet the requirements dictated by the QAPP, it is not necessary nor efficient to delay project execution with a QAPP revision, addendum, or technical memorandum to convey this information. Further, actual subcontractors utilized on the project will be included in the associated RI Report, which is provided for stakeholder agency review.

2. **Worksheet #6**

   a) Verify the information in the "Field Corrective Actions" row. The listed Initiator and Recipient do not appear to match with the description in the Procedure cell. Additionally, there are no "Field Quality Manager" and "Activity Quality Manager" roles designated on the organization chart (WS3&5). Should these persons be the CH2M FTL and the Project Delivery and Quality Manager instead?

   Navy Response: The Field Corrective Actions (CA)" row has been revised as follows:

   - The Initiator cell has been revised to read: "FTL (TBD)"
   - The Recipient cell has been revised to read:

     "Dennis Ballam
     CH2M PM
     dennis.ballam@jacobs.com

Brett Doerr
CH2M PDQM
Brett.doerr@jacobs.com ”

- The Procedure cell has been revised to read:
    - “Field issues requiring CA will be identified by the FTL and brought to the attention of the PM, who in turn will notify the PDQM before any decisions or actions are made. In general, the procedures defined under Minor QAPP changes and Substantive QAPP changes in this worksheet will be followed in determining the need for and implementing field CAs.
    - Communications and decisions should be made daily and before conducting any actions that may be affected by such communications and decisions.
    - Communications with the PDQM will be in person or by phone, followed up with an email to document decisions and actions.”

Related to these revisions, the following additional revisions have been made:

- “Project Delivery and Quality Manager” has been added to the Acronyms list and defined as “PDQM.”
- All occurrences of “AQM” in the QAPP have been replaced with “PDQM.”

b) Verify the Recipients in the “Management of analytical laboratory…” and “Analytical data validation issues…” rows. Currently, the table has the Initiator and the Recipient as the same person. Based on the Procedure descriptions, it appears the Recipients may include the subcontractor laboratory, CH2M Program Chemist, CH2M PM, CH2M, Project Delivery and Quality Manager, and/or the NAVFAC QAO. Additionally, clarify if the data validation subcontractor can contact the laboratory directly to discuss issues/corrective actions.

Navy Response: The recipient column associated with the “Management of analytical laboratory…” has been revised as follows:

“Dennis Ballam
CH2M PM
dennis.ballam@jacobs.com

Brett Doerr
CH2M Project Delivery Quality Manager
Brett.doerr@jacobs.com

Michael Zamboni
CH2M Program Chemist
Michael.zamboni@jacobs.com ”

The recipient column associated with the “Analytical data validation issues…” has been revised as follows:

“Camden Robinson
CH2M Project Chemist
Camden.robinson@jacobs.com ”

Additionally, the following statement has been added under the procedure column to clarify the data validation subcontractor’s contact with the laboratory:

- "Analytical data validation subcontractor may contact the laboratory directly to discuss issues/corrective actions. All issues discussed or noted will be documented and brought to the attention of the Project Chemist daily."

c) In the "Communications regarding QAPP changes…" row, clarify how/by whom the EPA QAO would be contacted. Would the pathway be from CH2M to NAVFAC to the EPA PM to the EPA QAO? The communication procedures indicate that communication may occur via telephone; however, there are several telephone numbers missing from Worksheet #6. Furthermore, some Communication Drivers, such as stop work due to safety issues, do not specify the form(s) of communication. Please revise Worksheet #6 to include telephone numbers for all key project personnel to ensure successful communication throughout the duration of the project and include the forms of communication for all Communication Drivers

Navy Response: The Notes section of this worksheet has been updated to indicate it is all agencies RPM's responsibility to contact and disseminate information to other project personnel within the RPM's particular agency. The key personnel all have the telephone numbers of project staff within the lines of communication. However, telephone numbers are not included in the QAPP (unless specifically requested by the particular individual) for privacy purposes.

For any Communication Driver where the mode(s) of communication is not shown, it has been added.

d) Clarify if the Project Data Manager (PDM) and the Database Manager are the same role/person. As applicable, revise the Recipient and/or Procedure cells for the "Quality control (QC) on laboratory data…", the "Uploading project analytical data…", and the "Reporting lab data quality issues" rows.

Navy Response: The recipient columns associated with the "Quality control (QC) on laboratory data…", and the "Uploading project analytical data…" have been revised as follows:

"Nicole Hall
CH2M PDM
Nicole.hall@jacobs.com "

The procedure cell associated with "Reporting lab data quality issues" was revised as follows:

"All sample receipt variances and QA/QC issues with project field samples will be reported by the Laboratory PM to the CH2M PM, Project Chemist, and /or PDQM….."

e) Verify if the data validation subcontractor should be listed in the Procedure description for the "Reporting lab data quality issues" row.

Navy Response: The data validation (DV) subcontractor will notify the project chemist of any serious analytical issues that may affect data usability that the laboratory may have missed; therefore, the DV subcontractor has been added.

f) There are several personnel that are listed as to be determined (TBD). Please ensure that the Final RI QAPP identifies all project personnel.

Navy Response: Please see the response to Specific Comment #1.

3. Worksheet #10

a) Table 10-1 is referenced in the first paragraph in the "Potential Sources of Environmental Contamination" subsection. This table was not located in the QAPP. Verify the need for the table, and add (or remove reference) as applicable.

Navy Response: The table was inadvertently omitted from the Draft version (although similar information was provided in Figure 10-4). The table has been included in the Draft Final version.

b) Conceptual Site Model, Page 34: It is unclear how many small arms items have been identified at Red Beach. On line 8, the text states that 16 fired small arms blank cartridges were identified during the 2002 munitions and explosives of concern (MEC) investigation; line 25 states that two small arms items were found during the 2021 Time Critical Removal Action (TCRA); and line 30 on page 35 states that 30 small arms items were found at the site between 2002, 2019, and 2021. Furthermore, Figure 10-4, UXO [unexploded ordnance] Playa Caracas/Red Beach RI [Remedial Investigation] QAPP [Quality Assurance Project Plan], only shows 15 locations with identified small arms ammunition. Please verify the number of small arms ammunition locations identified during the 2002 MEC investigation and 2021 TCRA and revise Worksheet #10 or Figure 10-4 accordingly.

Navy Response: The text and figure are correct. As noted in the response to Specific Comment #3a, Table 10-1 has been included in the Draft Final version. The table shows how many small arms were found during each of the 2002, 2019, and 2021 investigations/removal. The reason 15 small arms locations are shown in Figure 10-4 is because several of those locations contained multiple small arms.

4. **Worksheet #11:** Project/Data Quality Objectives, Page 46. Additional discussion is requested to ensure that the DQO Guidance has been followed.

Navy Response: The Navy feels the information provided in Worksheet #11 demonstrates both the UFP-QAPP and DQO guidance were followed. Please provide specifics regarding which elements of the DQO guidance the reviewer perceives were not followed and the specific information that needs to be added to demonstrate the DQO guidance was followed.

5. **Worksheet #13:** Clarify if the data on the drum/canister contents (Attachment A) is considered to be included in the TCRA Completion Report. Consider adding the data as a separate "Data Type" to this worksheet.

Navy Response: The referenced data were included in the TCRA Completion Report. The "Data Type" entry has been revised to read: "Locations of Encountered Items and Associated Analytical Data."

6. **Worksheet #14 & 16**

a) As possible, revise the planned start and end dates in the final QAPP. Note that general timelines for tasks (i.e., three days, two weeks, etc.) could be used if actual calendar dates are not yet known.

Navy Response: To the extent possible, the requested information will be added to the final QAPP. Of note, the Navy and stakeholder agencies have regular meetings and calls throughout the year during which the schedule of field activities and report preparation/review are discussed, which is a more effective method of conveying the information than including tentative dates in a QAPP.

b) Clarify if DFW4, Soil Sampling also includes the laboratory analysis and data validation tasks. If so, revise the row to add the laboratory and the data validation subcontractor to the Responsible Party cell, and the data package/EDD and the validation report to the Deliverables cell. Otherwise, add rows to the table for these activities and provide the associated schedule/ deliverable information accordingly.

Navy Response: Rows for laboratory analysis and data validation have been added to the schedule.

7. **Worksheet #15**

a) Provide an explanation for the use of italics for select analytes.

Navy Response: All italics have been removed.

b) In WS15-1, verify the PALs and/or PAL Limit References for methylcyclohexane, 2-chlorotoluene, 4-chlorotoluene, and 1,2,3-trichloropropane. The PALs for methylcyclohexane and 1,2,3-trichloropropane appear to be the RSL (not the Lab LOD or the Risk-Based SSL as given), and both 2- and 4-chlorotoluene appear to have RSL values in the most current EPA table.

Navy Response: The PAL Limit Reference for methylcyclohexane, 1,2,3-trichloropropane, 2-Chlorotoluene, and 4-Chlorotoluene has been revised to RSL Residential Soil (HQ=0.1). The PALs for 2-chlorotoluene and 4-chlorotoluene have been revised to the RSL residential Soil (HQ=0.1) value of 160,000 ug/kg.

c) In WS15-3, verify the LCS recovery limits for delta-BHC. The given values appear to be for alpha-BHC instead.

Navy Response: The LCS recovery limit for delta-BHC has been revised to 47-139.

d) In WS15-4, verify the PALs and/or PAL Limit References for calcium, magnesium, and sodium. The listed PALs do not match to the laboratory LODs as noted.

Navy Response: The PAL column has been revised to reflect the LOD value for calcium, magnesium, and sodium. Additionally, potassium was revised to reflect the LOD.

8. Worksheet #17

a) Clarify the homogenization procedures in the eighth paragraph of DFW 4, Soil Sampling. The text appears to indicate that homogenization of the soil will occur after collection of the SVOC fraction (in addition to the VOC fraction). This differs from the Attachment B procedures, specifically Section 3.1 of SOP A-2 and Section 3 of SOP A-3.

Navy Response: The referenced text in DFW 4 has been revised to be consistent with the SOPs, as follows:

"…previously. Immediately after soil is collected with the hand auger, soil for VOC analysis will be collected directly from the bottom of the hand auger with an Encore or TerraCore sampler before the soil is extruded, specifically to substantively eliminate the concern over volatile loss. The remaining subsurface soil will be placed directly into a stainless-steel bowl and homogenized using a stainless-steel spoon for the remaining analyses. Once homogenized,…"

b) Verify that the decontamination procedure just follows the information in the worksheet, and should not be a SOP in Attachment B. Note that decontamination is referenced as SOP E-1 elsewhere in the Attachment B procedures.

Navy Response: Yes, decontamination will follow what is stated in the worksheet. The following has been added to the end of the first note under the table in Worksheet #21: "Further, if there is text provided in the QAPP that is inconsistent with text provided in an SOP, the text in the QAPP takes precedent, including references within SOPs to other SOPs that are not included in Attachment B. In these circumstances, the text provided in the QAPP fulfills the substantive content of an SOP."

c) Verify the outputs for DFW 4, Soil Sampling in Figure 17-1. As noted above in Specific Comment #10b, the laboratory data packages/EDDs and the data validation reports may also be deliverables associated with this task.

Navy Response: Figure 17-1 has been revised to include the laboratory data packages/EDDs and data validation reports as deliverables in DFW 4.

9. Worksheet #18

a) The sample collection method for each sample or sample group should be provided, however, this information is missing. Please revise Worksheet #18 to include the sample collection method for each sample or sample group.

Navy Response: The requested information is already included in Worksheet 18 in a format consistent with QAPP guidance. Additionally, the following modification to the entries has been made: "SOP A-2 (Attachment B)" has been replaced with "SOP A-2 and SOP A-3 (Attachment B)."

b) Clarify the sample location nomenclature. Based on WS17 and Figure 17-2, there appear to be four borings per sampling type. It is unclear why the deeper sample from the same location has been given a different boring number (i.e., SO01/SB01 for the 46-70-inch bgs sample and SO02/SB02 for the 70-94-inch bgs sample).

Navy Response: The sample nomenclature is correct as written. Two discrete samples will be collected at each location from discrete intervals (see Worksheet #17 DFW 4).

c) Verify the analytical groups for the two equipment blanks. Currently, both EBs are being analyzed for VOCs, pesticides, and metals. Based on WS20, it appears that one of the EBs would be associated with the drum area sampling and should include SVOCs (not pesticides).

Navy Response: The following revisions have been made to the two EB entries:

The field QC portion of the table in Worksheet #18 has been revised to separate the drum QC samples from the canister QC samples. The drum sample now has one EB reported for the VOC, SVOC, and Metals analyses, and the canisters has one EB reported for the VOC, PEST, and Metals analyses.

10. Worksheet #19 & 30

a) The SOP for pesticides analysis was not included for review, but SW-846 Method 8081B specifies that extracts to be analyzed by this method should be stored in the dark, and this is not specified in the table for pesticide samples. Please revise Worksheet #19 & 30 to specify that pesticides sample extracts be protected from light and include the SOP for pesticide analysis.

Navy Response: Worksheet #19 &30 has been revised to specify that pesticide extracts should be protected from light and the SOP has been provided.

b) Verify the preparation and analytical holding times for VOCs. Is the total holding time from sample collection 28 days (i.e., 14 plus 14), or should the combined time be 14 days?

Navy Response: The combined holding time for VOCs is 14 days. This clarification has been made to the VOC entry.

c) The first footnote references a "backup laboratory". Clarify if a backup laboratory has been selected for the project (and if so, add as applicable to the organization-related worksheets), or if a laboratory will be selected only if needed. If the second, ensure that information on this new laboratory would be disseminated to the project team.

Navy Response: The referenced text has been updated as follows:

"If circumstances render the subcontracted laboratory unable to perform the analytical services, a backup laboratory will be contacted to confirm accreditations and quarterly LOD verification and, once subcontracted, the updated laboratory worksheets and current ELAP accreditation letter will be provided to the RPMs."

11. Worksheet #20: Verify the analytical groups for the MS/MSD samples. WS18 only indicates that additional volume for QC will be collected from the canister area, and thus would not include SVOCs. Will one of the drum area samples be collected for a SVOC MS/MSD? As applicable, revise this worksheet and/or WS18.

Navy Response: Worksheet #18 has been revised to account for the SVOC MS/MSD samples associated with the drum area samples.

12. Worksheet #21

a) For SOP A-2, specify "hand-auger" as the equipment option in the table.

Navy Response: The text in column "SOP Option or Equipment Type" for SOP A-2 has been updated as follows:
"SOP to be used for soil sampling procedures (via hand-auger) in **Attachment B**."

b) Determine if a SOP for decontamination and/or a reference to WS17 for this procedure should be included; refer also to Specific Comment 12b above.

Navy Response: Please see the response to Specific Comment 8b.

c) The SOP reference in Worksheet #22, "SP1," should be included in Worksheet #21, along with its title revision, and date. Please revise Worksheet #21 to include SOP SP1.

Navy Response: The field crews will be utilizing the RTK-GPS equipment in accordance with the manufacturer's manual and sufficient detail regarding the function test can be included in the main body of the QAPP, obviating the need to add an SOP. The SOP reference in Worksheet #22 has been updated to "N/A." Accordingly, the following text regarding the RTK-GPS function test has been added to DFW 3 in Worksheet #17:

"The RTK-GPS base station will be established at a local benchmark or control point. GPS coordinates will reference UTM Zone 20N, NAD83 Continental United States (CONUS) (i.e., no local datum transform applied). The base station will transmit real-time corrections to the RTK-GPS receiver unit(s), which will be used to collect a geo-static point at a second local benchmark or control point. The observed coordinates will be compared to the known coordinates to confirm the tolerance is within the acceptable accuracy (see Worksheet #22)."

13. **Worksheet #22:** Clarify the reference to "SP1" in the SOP Reference column. There is no such procedure included in Attachment B; add as applicable.

Navy Response: Please see the response to Specific Comment 12c.

14. **Worksheet #23**

a) There appears to be two rows for SOP WI8636. Verify the appropriateness of both rows, and, as applicable, delete one for clarity.

Navy Response: One of the duplicate rows was deleted.

b) Add the applicable matrix/matrices to the Matrix and Analytical Group column for pesticides in the SOP WI9232 row.

Navy Response: "Solid" was added to the Matrix and Analytical Group column.

c) Add the applicable analytical group to the Matrix and Analytical Group column for SOP WI11625 (i.e., hexavalent chromium).

Navy Response: "Hexavalent Chromium" was added to the Matrix and Analytical Group column.

d) Consider removing matrices not applicable to this program for clarity (e.g., tissues for metals in the SOP WI11933 row).

Navy Response: "Tissue" was removed from the SOP WI11933 row and all other applicable locations.

15. **Worksheet #25:** Verify the SOP references for the organic fractions. The given methods do not appear to match the list in WS23.

Navy Response: The SOP references have been revised for the VOC, SVOC, and Pesticides analyses to be consistent with worksheet #23.

16. **Worksheet #26 & 27:** Verify the recipient for copies of the sample login forms as discussed in the second paragraph of the "Sample Identification Procedures" subsection. This worksheet indicates the project data manager, while WS6 states that the project chemist will be communicating with the laboratory.

Navy Response: The "project data manager" has been revised to "project chemist" in worksheet #26 & 27.

17. Worksheet #28

a) Verify if the pesticides table (WS28-3) should include internal standards. If so, revise accordingly. If not, no change is needed.

Navy Response: No internal standards are required.

b) Revise the worksheet title number for hexavalent chromium to WS28-5.

Navy Response: The worksheet title number has been revised as requested.

18. Worksheet #29

a) Fill in the empty cells in the table, specifically the "Field Sampling…Checklists" row. As applicable, can use "not applicable", "as needed" or "TBD".

Navy Response: "Field Auditor" and "PM" have been added as the "generator" and "verification," respectively.

19. Worksheet #31, 32 & 33: In the "Beyond Zero" row of Table 31-1, verify the "Person Responsible for Performing Assessment". This worksheet indicates the FTL, while WS29 states a "field auditor" would generate these reports.

Navy Response: "Field auditor" in Worksheet #29 has been revised to "FTL."

20. Worksheets #34, 35 & 36

a) Verify the use of "N/A" in the Data Validation Reports row in Table 34-1. Will the reports not be used as part of the completeness and/or conformance evaluations?

Navy Response: The "N/A" entries in the Data Validation Reports row have been revised to "X."

b) Clarify what role is being referenced by "QA" in the "Records Reviewed" table. Is this the laboratory QA manager or the Project Delivery and Quality Manager?

Navy Response: This is the laboratory QA manager, and all QAs have been revised to "Lab QA manager."

c) Determine if any applicable laboratory personnel (e.g., sample receipt technician, laboratory PM) should be added to the list of responsible persons for the "Sample condition upon receipt" row.

Navy Response: The laboratory PM has been added to the list of responsible persons.

d) Revise the WS15 and WS28 references in the "Data Validation" table for pesticides and metals/ hexavalent chromium. The pesticides column currently lists two WS tables (-3 and -4) when there should only be one (-3). The metals/hexavalent chromium column should reference one WS15 table (-4) and two WS28 tables (-4 and -5).

Navy Response: All references have been revised as requested.

e) Verify the percentage of raw data to be reviewed. This table indicates 100%, while previous text says only 10% of the results will be Stage 4 (which includes raw data review).

Navy Response: The table has been revised to 10% of raw data to be reviewed.

21. Worksheet #37

a) Clarify if anyone from NAVFAC will be involved in the usability assessment, such as the Navy chemist.

Navy Response: As has been done for all previous remedial investigations for Vieques sites, Navy and regulatory personnel involvement in the DUA is done at the remedial investigation report review stage. As warranted, the NAVFAC RPM solicits input from the NAVFAC chemist to review specific elements of the report such as the DUA.

b) Verify inclusion of the “Final Verification and Validation Plan” in the list of input documents. This plan is not discussed elsewhere in the QAPP.

Navy Response: The “Final Verification and Validation Plan” has been removed from the list because it is not applicable to the remedial investigation.

c) In the Data Quality Indicators section, completeness is described as calculated by dividing the number of available results by the total number of results, but completeness should be calculated relative to the total number of results planned in order to account for results that were not able to be obtained (e.g., to account for sample breakage, inability to collect a sample, etc.). Please revise Worksheet #37 to indicate completeness will be calculated based on the number of planned results.

Navy Response: Completeness has been revised to the number of valid measurements over a given time divided by the total number of planned measurements to account for results that were not able to be obtained.

Responses to PRDNER Comments on
Draft UXO 17 Playa Caracas/Red Beach Remedial Investigation
Quality Assurance Project Plan
Atlantic Fleet Weapons Training Area – Vieques
Former Vieques Naval Training Range, Vieques, Puerto Rico
Dated February 2024

General Comments

1. Based on the results of the diesel/motor oil sample provided in Attachment A, should the analytical suite include GRO/DRO/ORO for evaluation? The sample had very high results for C10-C24 and C24-C36 petroleum hydrocarbons.

   Navy Response: The analytical protocol for the remedial investigation is consistent with sites being addressed under CERCLA and consistent with what has been done for other Vieques sites where petroleum hydrocarbons may have been released.

Page-Specific Comments

1. SAP Worksheet 7&8: Please add education/experience for Elizabeth Martin – Eurofins PM as well as the data validation subcontractor once determined.

   Navy Response: The education/experience for Elizabeth Martin has been added. As standard protocol for Vieques QAPP preparation the information for all key personnel, including subcontractors, known at the time of the particular version (draft, draft final, final) preparation are included in the QAPP. If key personnel and/or a particular subcontractor is "TBD" at the time of final QAPP submittal, once those key personnel and/or subcontractor are identified, the personnel and/or company name and associated information can be conveyed to the project team for informational purposes upon request. Because any key personnel or subcontractor selected for the project must meet the requirements dictated by the QAPP, it is not necessary nor efficient to delay project execution with a QAPP revision, addendum, or technical memorandum to convey this information. Further, actual subcontractors utilized on the project will be included in the associated RI Report, which is provided for stakeholder agency review.

2. SAP Worksheet #6:

   a. The recipient for field corrective actions seems to be incorrect. The text under procedures suggests that the recipient should be the PM and AQM. Please clarify and revise the worksheet as appropriate.

      Navy Response: The recipient has been revised to the PM and PDQM. Please note, "Project Delivery and Quality Manager" has been added to the Acronyms list and defined as "PDQM" and all occurrences of "AQM" in the QAPP have been replaced with "PDQM."

   b. Please clarify if Camden Robinson should be listed as both the initiator and recipient for analytical CA/release of analytical data. The text under procedures suggests that the others should be included as recipients. Please clarify and revise the worksheet as appropriate.

      Navy Response: The recipient has been revised to be the PM, PDQM, and Program Chemist

   c. Please clarify if the data validation PM should be listed as both the initiator and recipient for analytical data validation issues/data validation CAs. The text under procedures suggests that

the project chemist should be included as a recipient. Please clarify and revise the worksheet as appropriate.

Navy Response: The recipient has been revised to be the Project Chemist.

3. SAP Worksheet #10:

    a. Site History, Paragraph 4:

        i. Please revise the text to note that the contents of the drum were sampled for total chemical concentrations of tested parameters, not TCLP, as noted in the laboratory report in Attachment A.

        Navy Response: The referenced sentence has been revised read: "Upon discovery, the liquid contents of the drum were sampled for Toxicity Characteristic Leaching Procedure (TCLP) analysis for disposal purposes and total chemical concentrations of various parameters for assessing the nature of the liquid."

        ii. The last sentence is confusing as written. Please revise the sentence to better clarify whether the drum was assumed to be or not to be associated with military training activities.

        Navy Response: The sentence has been revised to read: "It is assumed this drum was associated with the military training activities at Red Beach."

    b. Potential Sources of Environmental Contamination: The text refers to a Table 10-1. However, this table was not provided. Please revise, as needed.

    Navy Response: The table was inadvertently omitted from the draft version. It has been included in the draft final version.

    c. Receptors and Exposure Scenarios: The final paragraph states that one reasons no ecological receptors are anticipated is because of the encountered depths (i.e., deeper than 12 inches bgs). However, the Site History section of this worksheet states that the diesel/motor oil drum was encountered at 12-inches below ground surface. Since it is not "deeper" than 12 inches bgs, please clarify if ecological receptors are applicable. In addition, it would be helpful to show the area of land crab habitat on Figure 10-4 and reference in the text to support the statement that there is no land crab habitat in the area of the drum and canisters.

    Navy Response: The first sentence of the fourth paragraph under "Site History" has been clarified to read: "The top of the diesel/motor oil drum (55-gallon) was encountered at approximately 12 inches below ground surface (bgs). The portion of the drum containing liquid was below 12 inches bgs and was observed to be intact with no indications of leaking or ground staining."

4. SAP Worksheet #11, Page 46: Please revise the first bullet to read "Current Vieques health screening values…"

    Navy Response: The bullet has been revised to read "Current Vieques human health screening values for soil (i.e., at the time the RI human health risk assessment is performed) Regional Screening Levels (RSLs) (adjusted for hazard quotient [HQ] of 0.1 for non-carcinogens)"

5. SAP Worksheet #15-1:

    a. The PAL Limit for cyclohexane appears to be inconsistent with the residential RSL published in November 2023 (650,000 µg/Kg). Please revise as appropriate.

    Navy Response: 120,000 µg/kg is the soil saturation concentration (Csat) value for cyclohexane. In accordance with the Vieques HHRA protocol (CH2M, 2018), when establishing PAL limits, the

Csat values on the EPA's RSL summary table (just left of the analyte name) are to be considered. Where Csat values are lower than the RSLs, the Csat values are utilized as the PALs. While Csat values are not used for risk assessment, including them as PALs (when less than the RSLs) provides a conservative mechanism by which the potential for NAPL presence can be assessed.

To address this and all other such occurrences, the "PAL Limits Reference" has been changed to "EPA Soil Saturation Concentration (Csat)" and the following footnote has been added to the table:

"In accordance with the Vieques HHRA protocol (CH2M, 2018), when establishing PAL limits, the Csat values on the EPA's RSL summary table are to be considered. Where Csat values are lower than the RSLs, the Csat values (to two decimal places) are utilized as the PALs. While Csat values are not used for risk assessment, including them as PALs (when less than the RSLs) provides a conservative mechanism by which the potential for NAPL presence can be assessed."

b. The PAL Limit for dichlorodifluoromethane appears to be inconsistent with the residential RSL published in November 2023 (8,700 µg/Kg). Please revise as appropriate.

Navy Response: The PAL Limit value has been revised as requested.

c. The PAL Limit for 1,1,1-Trichloroethane appears to be inconsistent with the residential RSL published in November 2023 (810,000 µg/Kg). Please revise as appropriate.

Navy Response: Please see the response to Page-specific Comment 5a. 640,000 µg/kg is the Csat value for 1,1,1-Trichloroethane.

d. Please revise the PAL Limit Reference for methylcyclohexane to RSL Residential Soil instead of Lab LOD.

Navy Response: The PAL Limit Reference has been revised as requested.

e. Please revise the PALs and PAL Limit Reference for 2-chlorotoluene and 4-chlorotoluene to 160,000 ug/kg and RSL Residential Soil, instead of the lab LOD of 2.0.

Navy Response: The PALs and PAL Limit Reference have been revised as requested.

f. Please revise the PAL Limit Reference for 1,2,3-trichloropropane to RSL Residential Soil instead of Risk-Based SSL.

Navy Response: The PAL Limit Reference has been revised as requested.

g. The PAL Limit for n-butylbenzene appears to be inconsistent with the residential RSL published in November 2023 (390,000 µg/Kg). Please revise as appropriate.

Navy Response: Please see the response to Page-specific Comment 5a. 110,000 µg/kg is the Csat value for n-butylbenzene.

h. The PAL Limit for n-propylbenzene appears to be inconsistent with the residential RSL published in November 2023 (380,000 µg/Kg). Please revise as appropriate.

Navy Response: Please see the response to Page-specific Comment 5a. 260,000 µg/kg is the Csat value for n-propylbenzene.

i. The PAL Limit for sec-butylbenzene appears to be inconsistent with the residential RSL published in November 2023 (780,000 µg/Kg). Please revise as appropriate.

Navy Response: Please see the response to Page-specific Comment 5a. 150,000 µg/kg is the Csat value for sec-butylbenzene.

j. The PAL Limit for tert-butylbenzene appears to be inconsistent with the residential RSL published in November 2023 (780,000 µg/Kg). Please revise as appropriate.

Navy Response: Please see the response to Page-specific Comment 5a. 180,000 µg/kg is the Csat value for tert-butylbenzene.

6. SAP Worksheet #15-2: Please add benzoic acid and benzyl alcohol to the target list of SVOCs since these two SVOCs were detected in the analysis of the oil in Attachment 2.

   Navy Response: Benzoic acid and benzyl alcohol have been added as requested.

7. SAP Worksheet #15-4:

   a. Please revise the PAL to the laboratory-reported LOD for those metals which reference the Lab LOD as the PAL Limit Reference (calcium, magnesium, potassium, sodium).

      Navy Response: The lab's LOD values have been revised as requested.

   b. Please revise the RSL Residential RSL for lead to 200 mg/kg. The OLEM memo signed on January 17, 2024, reduces the residential soil lead RSL to 200 mg/kg. See https://www.epa.gov/system/files/documents/2024-01/olem-residential-lead-soil-guidance-2024_signed_508.pdf

      Navy Response: The RSL has been revised as requested.

8. SAP Worksheet #17:

   a. DFW4: Soil Sampling:

      i. The text states that subsurface soil will be placed into a stainless-steel bowl and the VOC and SVOC samples will be collected, followed by homogenization for the remaining parameters. Please revise this text to be consistent with SOP A-2 in Attachment B: the aliquot for VOCs must be collected from the bottom of the hand auger with a TerraCore sampler before the auger contents are extruded. All remaining parameters, including SVOCs, will then be placed into the bowl for subsequent homogenization.

         Navy Response: The text has been revised as requested.

      ii. Please describe a path forward should the borehole collapse before reaching the sample depths in each borehole.

         Navy Response: The following clarifying text has been added to Worksheet #17 DFW 4: Soil Sampling:

         "While collecting the subsurface soil samples, regular depth measurements will be taken to ensure the respective sample intervals are collected. Should the borehole collapse while conducting hand augering, the collapsed soil will be removed to the depth of the last recorded depth measurement and hand augering continued until the respective interval is reached."

   b. Page 67, Line 9: The samples from the drum were analyzed for total concentrations, not TCLP analysis. Please revise the text as appropriate.

      Navy Response: The referenced sentence has been revised to read: "Based on the results of total chemical concentration analyses, the former drum contents were determined to be diesel/motor oil."

   c. Page 67, Last Paragraph: As written, the text could be interpreted that ice would only be added to coolers once packaged for shipping. All samples should be maintained on ice in a cooler once collected until receipt by the laboratory. Please clarify the text to avoid any confusion.

Navy Response: The following sentence has been added as the first sentence of the last paragraph before the Analytical Parameters section of DFW 4: "All samples will be maintained on ice in a cooler once collected until receipt by the laboratory."

9. SAP Worksheet #18:
    a. Please add 1 MS/MSD for SVOCs, as per SAP Worksheet #20.

       Navy Response: Worksheet #18 has been updated to include 1 MS/MSD for SVOC analysis.

    b. Please add SVOCs to the equipment blanks being collected, as per SAP Worksheet #20.

       Navy Response: Worksheet #18 has been updated to include equipment blanks for SVOC analysis.

10. SAP Worksheets #19 & #30:
    a. VOCs:
        i. Please remove SOP Reference WI11169 as this is applicable to GRO.

           Navy Response: SOP Reference WI11169 has been removed from Worksheets #19 & #30.

        ii. Please add the requirement for DI-water preserved vials to be frozen within 48 hours of collection.

           Navy Response: The DI-water preservation for the VOC analysis has been added as requested.

    b. Pesticides: The SOP reference provided for preparation is for aqueous samples; please provide the solid sample preparation SOP.

       Navy Response: SOP WI10926 is the solid preparation method for pesticides; therefore, no revision appears warranted.

    c. Metals: The SOP reference provided for preparation is for aqueous samples; please provide the solid sample preparation SOP.

       Navy Response: SOPs WI8636 and WI10618 are the solid digestion methods for the metals and hexavalent chromium analyses; therefore, no revision appears warranted.

11. SAP Worksheet #20: Based on the use of TerraCore samplers for VOC sampling, equipment blanks will not be required for the VOC analysis. Please update table accordingly.

    Navy Response: While the VOC samples will be collected directly from the soil at the bottom of the hand auger, the hand auger will be used to collect samples at multiple sampling locations with decontamination between locations. Therefore, VOC analysis for equipment blank samples collected on the hand augers appears to be appropriate.

12. SAP Worksheet #21: Please include an SOP for the RTK GPS Unit in this table and in Appendix B as Worksheet #22 references an SOP.

    Navy Response: The field crews will be utilizing the RTK-GPS equipment in accordance with the manufacturer's manual and sufficient detail regarding the function test can be included in the main body of the QAPP, obviating the need to add an SOP. The following additional detail regarding the RTK-GPS function test has been added to DFW 3 in Worksheet #17:

    "The RTK-GPS base station will be established at a local benchmark or control point. GPS coordinates will reference UTM Zone 20N, NAD83 Continental United States (CONUS) (i.e., no local datum transform applied). The base station will transmit real-time corrections to the RTK-GPS receiver unit(s), which will be used to collect a geo-static point at a second local benchmark or control point. The observed

coordinates will be compared to the known coordinates to confirm the tolerance is within the acceptable accuracy (see Worksheet #22)."

13. SAP Worksheet #23:

    a. Please provide the solid sample preparation SOP for SVOCs and metals.

       Navy Response: WI19617 is the solid sample preparation method for the SVOC analysis, and WI8636 is the solid sample preparation method for metals analysis; both are already included in the worksheet table. Please note that the laboratory revised the title for the metal preparation SOP which has now been updated in the QAPP.

       Please remove SOPs WI11169, WI10926, WI18636 from this table as these SOPs are not applicable to this investigation.

       Navy Response: SOP WI11169 has been removed as requested. SOP WI10926 is the solid preparation method for pesticides and SOP WI18636 is the solid sample preparation method for the metals analysis, so they will be retained. Please note the laboratory revised the titles for the pesticide and metal preparation SOPs which have now been updated in the SAP.

14. SAP Worksheet #25:

    a. VOCs: Please update Testing Activity to CCV and BFB per 12-hour tune period.

       Navy Response: The Testing Activity has been revised as requested.

    b. VOCs, SVOCs, Pesticides: Please update the SOP References to WI8236, WI19617, WI19232, respectively.

       Navy Response: The SOP References have been updated as requested.

15. SAP Worksheet #28-1:

    a. Field Duplicate Corrective Action: Please remove references to laboratory and field homogenization, which are not applicable to VOCs.

       Navy Response: Laboratory and field homogenization have been removed as requested.

    b. Based on the comment for SAP Worksheet #20, please remove the row for Equipment Blanks.

       Navy Response: Please see the response to Page-specific Comment 11.

16. SAP Worksheet #28-5:

    a. Please renumber this worksheet as #28-5 instead of #28-7.

       Navy Response: The worksheet has been renumbered as requested.

    b. MS/MSD: Please specify that the requirements are for a soluble and insoluble MS, as per SW-846 method 3060A.

       Navy Response: The QC Sample for MS/MSD has been revised to MS (soluble and insoluble).

17. SAP Worksheet #34, #35 & #36:

    a. Analytical Specifications:

       i. Pesticides: Remove reference to Worksheets #15-4 and #28-4.

          Navy Response: The references have been removed as requested.

       ii. Metals: Change to Worksheets #15-4, #24, #28-4, #28-5.

          Navy Response: The references have been revised as requested.

b. Measurement Performance Criteria:

i. Pesticides: Remove reference to Worksheets #15-4 and #28-4.

Navy Response: The references have been removed as requested.

18. Metals: Change to Worksheets #15-4, #28-4, #28-5.

Navy Response: The references have been revised as requested.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Caribbean Islands National Wildlife Refuge
P.O. Box 510, Carr. 301, Km. 5.1
Boquerón, Puerto Rico 00622

July 14, 2024

Mr. Dan Waddill
Naval Facilities Engineering Command 6506 Hampton Road
Norfolk, Virginia 23508-1278

Re: UXO 17 Playa Caracas/Red Beach
Remedial Investigation QUAPP

Dear Mr. Waddill:

The U.S. Fish and Wildlife Service (USFWS) has reviewed the UXO 17 Playa Caracas/Red Beach Remedial Investigation QUAPP and agrees with the document and has no additional comments.

Please go ahead and find my signature on the attached page for Worksheet # 1&2: Title and Approval Page, located on page 18 of the document.

Thank you for the opportunity to revise and provide comments. For any further questions or clarifications, please do not hesitate to contact me at 786-847-3314 or the Refuge Manager, Mr. Mike Barandiaran at 305-699-8919.

Sincerely,

SILMARIE PADRON

Digitally signed by SILMARIE PADRON
Date: 2024.07.14 20:02:12 -04'00'

Silmarie Padron
Project Leader

TAKE PRIDE IN AMERICA