

April 2025 Meydenbauer Bay Yacht Club



Sediment Characterization Report for Proposed Maintenance Dredging

Prepared for

Meydenbauer Bay Yacht Club 9927 Meydenbauer Way SE Bellevue, Washington 98004

Prepared by

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Appendix A Sampling and Analysis Plan



February 2023 Meydenbauer Bay Yacht Club Maintenance Dredging Evaluation



Sampling and Analysis Plan

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ABBREVIATIONS

AFDW	ash-free dry-weight
ARL	Analytical Resources, LLC.
City	City of Bellevue
COC	chemical of concern
COE	United States Army Corps of Engineers Lake Washington Datum
су	cubic yard
DGPS	differential global positioning system
DMMP User Manual	Dredged Material Evaluation and Disposal Procedures User Manual
DMMP	Dredged Material Management Program
DMMU	dredged material management unit
DQO	data quality objective
Ecology	Washington State Department of Ecology
EIM	Environmental Information Management
EPA	U.S. Environmental Protection Agency
Gravity	Gravity Marine Consulting
HDPE	high-density polyethylene
MBYC	Meydenbauer Bay Yacht Club
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
PARIS	Permitting and Reporting Information System
PCB	Polychlorinated biphenyl
PSEP	Puget Sound Estuary Program
QA	quality assurance
QC	quality control
QL	quantitation limit
Ref Tox	reference toxicant
RPD	relative percent difference
RTK	real-time kinematic
SAP	Sampling and Analysis Plan
SL	screening level

SIGNATURE PAGE FOR SUBCONTRACTORS

Approval signatures indicate that subcontractors have reviewed this Sampling and Analysis Plan and agree to follow the methods and quality assurance procedures contained herein.

	Date:
Shawn Hinz, Project Manager	
Gravity Marine Consulting	
	Date:
Shelly Fishel, Project Manager	
Analytical Resources, LLC	
-	
	Date:
Stella Cuenco, Data Validator	
Laboratory Data Consultants	
,	

1 Introduction

This Sampling and Analysis Plan (SAP) details the sediment characterization approach and procedures to obtain a suitability determination from the Dredged Material Management Program (DMMP) for open-water disposal of dredged sediment from the Meydenbauer Bay Yacht Club (MBYC) marina in the City of Bellevue (City), Washington (Figure 1). This SAP was developed in accordance with the DMMP guidance (DMMP 2021) and Sediment Management Standards (Washington Administrative Code 173-204-120).

The purpose of the project is to conduct maintenance dredging to restore the MBYC marina basin elevation by removing high spots of sediment accumulation (associated with deposition from Meydenbauer Creek) to allow for safe passage and mooring of vessels in the MBYC marina. The conceptual dredge design will target the permitted elevation of +13.5 feet United States Army Corps of Engineers Lake Washington Datum (COE) with 1-foot of advance maintenance and a 1-foot allowable overdredge to elevation +11.5 feet COE. The newly exposed Z-layer is the first 2 feet of sediment beyond the overdredge elevation, from elevation +11.5 to +9.5 feet COE for this project. Up to 18,500 cubic yards (cy) of sediment will be removed during construction.

The MBYC marina is ranked as "moderate" by the DMMP agencies for concern for potential contamination. To characterize dredged material and post-dredge surface material, sediment core samples will be collected from three dredged material management units (DMMUs), at seven locations, resulting in three dredged material characterization samples and three individual Z-layer samples.

Sampling locations, target core depths, sample intervals, compositing schemes, and chemical testing methods have been selected in accordance with the most recent DMMP guidance (DMMP 2021). Sediment chemical and physical data from this investigation will be presented to the DMMP agencies to determine the suitability of the sediment for open-water disposal at the Elliott Bay non-dispersive disposal site, and for antidegradation determination. MBYC may also use these data to determine practical upland disposal sites . This SAP addresses project team responsibilities, the conceptual dredge plan, sampling and analytical procedures, data quality, and data reporting procedures. Historical data are provided in Appendix A. Field collection forms are provided in Appendix B. Procedures for vessel inspection and cleaning for invasive species are provided in Appendix C.

2 Site Information

MBYC is planning to implement a maintenance dredging event within their marina located in Whalers Cove, Meydenbauer Bay, Lake Washington. Dredging is anticipated to be performed during the 2024/2025 agency-approved in-water work window (or at a later date as desired by MBYC) to the dredge elevation of approximately +11.5 feet COE. MBYC is proposing to complete a maintenance dredging action that includes 1 foot of advanced maintenance below the marina design elevation, plus 1 foot of allowable overdredge.

Advanced maintenance dredging refers to sediment that will be dredged below the project elevation. This practice helps to ensure project elevations are met, minimizes operating and facilities maintenance costs, and reduces dredging frequency. It also helps to minimize air emissions (including greenhouse gases) and environmental disturbance because it extends the interval between dredging cycles. Allowable overdredge allows incidental excursions that may occur due to unanticipated variations in substrate, incidental removal of submerged obstructions, wind, waves, and other site conditions that may reduce the ability to accurately control the excavation elevation of the dredging equipment.

Other than a localized area adjacent to a City stormwater outfall that discharges along the south end of the property boundary, maintenance dredging has not been completed within the marina basin because it was last dredged in the 1960s. The focus of this program will be to restore the design elevation by removing high spots of sediment accumulation to allow for safe moorage and passage of vessels into and out of the marina (Figure 1).

2.1 Site History

MBYC was founded in 1946 and provides covered and uncovered moorage for a variety of recreational vessels. The last recorded marina-wide maintenance dredging event at the MBYC occurred in the 1960s, when the MBYC was dredged to a lake elevation of approximately +13.5 feet COE. The lake level is maintained by the United States Army Corps of Engineers between approximate elevation +20 and +22 feet COE annually; therefore, the design elevation of the MBYC corresponds to about 6.5 to 8.5 feet of water depth over each annual lake level cycle.

The only dredging that has occurred since the 1960s has been done by the City of Bellevue near a stormwater outfall that discharges at the south end of the marina pursuant to an easement obligation¹. The first event occurred in 1997 and included a testing program near the outfall (see Appendix A). This event resulted in removal of about 150 cy of material within a localized shoal area around the outfall structure, which was disposed of in an upland landfill since it was not eligible for

¹ The City of Bellevue manages this outfall and adjacent sediments and can be contacted regarding monitoring requirements and details of past dredging events. Contact information can be provided upon request.

open water disposal. MBYC is aware of two additional dredging events (2014 and 2017) conducted by the City adjacent to the outfall. No additional testing occurred as part of these events.

2.2 Existing Data Summary

A search was conducted in Washington State Department of Ecology's (Ecology) Contaminated Cleanup Site databases, Water Quality Permitting and Reporting Information System (PARIS), Ecology Well Viewer database, and the Environmental Information Management (EIM) database to identify contaminated sites, potential ongoing sources of contamination, and historical contamination. Additionally, data from the 1997 suitability determination for dredging near the City of Bellevue outfall are included in Appendix A.

2.2.1 Ecology Cleanup and Well Viewer Databases

The Ecology Toxic Cleanup Site database was reviewed and one adjacent cleanup site in Meydenbauer Bay was identified at Bellevue Marina (Cleanup Site ID: 13219, Facility ID: 12984) to the north of the MBYC marina. On December 22, 2009, during a geotechnical investigation, the City of Bellevue Utilities Department discovered soil with physical indications (odor) and noted petroleum contamination in a boring labeled "B-4." Soil was analyzed, and gasoline range hydrocarbons were detected at a concentration greater than the Model Toxic Control Act Method A cleanup level. The impacted soil from boring B-4 was approximately 15 inches below ground surface and located adjacent to the MBYC at 100 100th Avenue SE, Bellevue, Washington 98004. In April 2010, on behalf of the City, the discovery was filed with Ecology's Northwest Regional Office. Ecology sent an early notice letter in May 2017 to the City of Bellevue Parks (owner) indicating the listing as a suspected cleanup site. The Bellevue Marina is currently listed as awaiting cleanup.

The Ecology Reported Spills database indicated one recent spill has been reported in the immediate vicinity of the site (Figure A-1). The one spill occurred in January 2018 and released 20 gallons of vegetable oil into the water.

2.2.2 PARIS Database

No existing stormwater permits are issued for the MBYC or adjacent properties. Based on online utility maps from the City, there are two City managed stormwater discharge points locations, one City managed sewer gravity main, and one privately managed storm discharge point in the vicinity of the MBYC marina, as follows and as shown in Figure 2:

- City-managed storm discharge point north of Dock 3: 12-inch PVC pipe active during storm events
- City-managed sewer discharge point north of Dock 3: 10-inch ductile iron pipe that acts as an overflow for the pump station

- Privately managed storm discharge point near Dock 2: 21-inch pipe that discharges collected water from MBYC parking area and city street stormwater runoff
- City-managed storm discharge point south of Dock 1: 60-inch reinforced concrete gravity main

2.2.3 Ecology Well Viewer Database

The Ecology Well Report Viewer was reviewed and indicated three geotechnical soil borings have been completed by Cornerstone Geotechnical Inc., on the MBYC property in August 2008. The soil borings were completed via mud rotary methods to depths of 14, 19, and 24 feet below ground surface. The borings were collected to inform discussion on earthquake insurance and are not relevant to this project.

2.2.4 EIM Database

No available EIM data within the project boundary were listed on the Ecology EIM database.

Available EIM data, within the first quarter mile of the property boundary include two sediment grab samples. Location ID KCM-MDNBRSWMBCH (collected in 2010) and Location ID LKWA00834 (collected in 2000) had analyses of DMMP parameters including grain size, conventionals, metals, semivolatile organic compounds, pesticides, polycyclic aromatic hydrocarbons, and polychlorinated biphenyls (PCBs).

The sediment sample most near the MBYC marina was location ID LKWA00834. The sediment grab was from the top 10 centimeters of material and was primarily silt (61.8%), sand (33%), trace gravel (3.2%), and trace clay (2%). No analytes from KCM-MDNBRSWMBCH exceed DMMP SLs. Sample LKWA00834 had minor DMMP screening level exceedances of mercury, tributyltin, benzoic acid, pesticides (4,4-DDD, and 4,4-DDT), and total DMMP PCB Aroclors. Appendix A includes maps of the sample locations (Figure A-2) and EIM data export summary (Table A-1).

2.2.5 Invasive Species

A check was performed to determine whether the New Zealand mudsnail has been documented within the project area. Based on the review of the United States Geological Survey Nonindigenous Aquatic Species database, King County Services, and Washington Department of Fish and Wildlife, the New Zealand mudsnail has been identified in Lake Washington as a localized, low infestation. No confirmed New Zealand mudsnail sites were identified in Meydenbauer Bay.

Eurasian Milfoil and Brazilian Elodea are Class B invasive species and are widespread throughout Washington State. Their presence has been documented in Meydenbauer Bay. Each year, when permitted by the state, the bay is treated for eradication of both species using a licensed and approved applicator. The chemical that is applied is Diquat. The last eradication event was scheduled for July 2022.

Inspection and cleaning procedures will be followed as described in Section 5.11 and Appendix C to prevent the potential spread of either species.

2.2.6 Eelgrass

Eelgrass is not known to exist in the area surrounding the site.

3 **Project Team and Responsibilities**

This section discusses the proposed project team and team member responsibilities for conducting the MBYC maintenance dredging sediment characterization.

3.1 Project Planning, Coordination, and Quality Assurance/Quality Control

Delaney Peterson will serve as the sediment characterization lead responsible for SAP development and quality assurance (QA) for the field sampling and laboratory programs. Ms. Peterson will be kept fully informed of field program procedures and progress during sample collection and laboratory activities during sample preparation. She will record any activities that vary from this SAP and develop appropriate resolutions for irregularities. Upon completing the sampling and analytical program, they will review laboratory QA/quality control (QC) results and incorporate findings into the final Sediment Characterization Report. Any QA/QC problems will be brought to the attention of the DMMP agencies as soon as possible to discuss issues related to the problem and to evaluate potential solutions.

3.2 Field Sample Collection

Stephen Strehl will serve as the field lead and will provide overall direction for field sampling as it relates to logistics, personnel assignments, and field operations. Mr. Strehl will supervise field collection of the sediment core samples and verify accurate positioning and recording of sampling locations, depths, and identification. He will also ensure conformity to sampling and handling requirements, including field decontamination procedures; perform physical evaluation and logging of the samples; maintain chain-of-custody of the core samples; and compile field data into the project database.

Gravity Marine Consulting (Gravity), or a similar subconsultant (pending availability), will provide the research vessel and captain to collect vibracore samples.

3.3 Physical and Chemical Analyses and Data Validation

Analytical Resources, LLC (ARL), will conduct physical and chemical analyses. ARL is National Environmental Laboratory Accreditation Program accredited and is accredited by the Washington State Department of Ecology. They will ensure that the submitted samples are handled and analyzed in accordance with DMMP marine (and freshwater if z-layer analyses are required) analytical testing protocols, QA/QC requirements, and the requirements specified in this SAP. ARL will prepare a laboratory data report containing all analytical and QA/QC results. Laboratory Data Consultants will conduct EPA Stage 2B (USEPA 2009) validations, per the requirements in *Dredged Material Evaluation and Disposal Procedures User Manual* (DMMP User Manual; DMMP 2021).

3.4 Sediment Characterization Report

The Sediment Characterization Report will be prepared collaboratively by the Anchor QEA team to support the suitability determination. This report will summarize the sampling effort, analytical methods, QA/QC narrative, and analytical testing results. The content of this report is further described in Section 10.

4 Conceptual Dredging Plan

This section provides the conceptual dredging plan used to determine sampling rationale for dredged material and Z-layer sediment characterization.

4.1 Site Ranking

The project area has a general ranking of moderate by the DMMP agencies because it is a marina. This ranking means that sources exist in the vicinity of the project, or there are present or historical uses of the project site, with the potential for producing chemical concentrations within a range associated historically with some potential for causing adverse biological impacts.

4.2 Estimated Dredge Area

The project is proposed to occur within the marina, which receives deposition from Meydenbauer Creek, located just south of the marina (Figure 1). Maintenance dredging will be performed to the permitted elevation of +13.5 feet COE and will include 1-foot advance maintenance and a 1-foot overdredge allowance (to a maximum elevation of +11.5 feet COE; Figure 2). Design side slopes are 3 feet horizontal to 1 foot vertical (3H:1V) on the southern and western boundaries, while the northern and eastern boundaries have been designed to include a vertical cut.² Because the site has not been dredged since the 1960s, a conservative assumption has been made that the sediment is heterogeneous surface material.

4.3 Estimated Dredge Volumes

The maximum dredge volume for this project is estimated to be 18,500 cy. This estimate was based on bathymetry data surveyed by Gravity on May 12, 2022, and includes side slope and planned overdredge volumes, and a contingency volume to make certain the permitted dredge volume will exceed the actual dredge volume.

DMMP guidelines dictate the required number of DMMUs and maximum sediment volume represented by a single field sample. In a moderate ranked area, the maximum volume of heterogeneous sediment in a single surface DMMU is 16,000 cy and the maximum volume of sediment represented by each field sample is 4,000 cy (DMMP 2021). Therefore, two DMMUs with five core locations are required to characterize sediment in the planned dredge prism. An additional DMMU and associated sample location has been proposed to separately characterize the stormwater outfall area that is managed by the City of Bellevue. An additional sample (location C-4; see Figure 2) at the north end of the site near the two outfalls was also added at the request of DMMP. Therefore, a total of three DMMUs and seven core locations are proposed. Figure 2 shows the dredge prism,

² Vertical cuts are assumed on the northern and eastern boundaries due to adjacent structures. Additional volume has been include in the overall volume estimate to account for material that sloughs into the dredge prism.

DMMUs, and proposed sampling locations, and Figure 3 shows a representative cross section of the dredge prism.

4.4 Sampling Design

Seven sampling locations were selected to characterize the proposed dredged area. Table 1a provides the coordinates of the seven target sampling locations and sampling depths proposed from each core. Table 1b shows the sampling compositing scheme that will be used to create the representative DMMU sample composite generated for analysis. Sediment from the mudline down to +11.5 feet COE will be considered the dredged material. Sediment from +11.5 to +9.5 feet COE is the 2-foot Z-layer sample and represents the proposed post-dredge surface. Archives of each individual dredged material core segment (e.g., C-1-A) and Z-layer sample will be collected.

The seven sampling locations were selected in locations where the thickest dredge cuts are anticipated based on the survey data. The proposed locations require core lengths of approximately 5 to 6 feet maximum (to reach the Z-layer). Because the settlement from Meydenbauer Creek and Lake Washington sediments are primarily silt and sand (based on nearby sediment grab locations) difficulty achieving required coring depths is not anticipated for six of the seven locations³; however, if subsurface debris or larger grain size material are encountered during coring, it may be difficult to achieve adequate recovery or reach the Z-layer. If difficult coring conditions are encountered, the Z-layer may not be reached. If this situation occurs, a portion of the bottom 1-foot of the core will be sampled and archived for potential subsequent analysis. Sediment from the entire core should be included in the dredge prism sample. Coordination with DMMP will occur before any changes are made to the z-layer interval.

The Z-layer (or the archive from the bottom 1 foot of core) will only be analyzed and compared to the freshwater SMS if the dredged material has chemicals that exceed one or more marine SLs. If no chemicals exceed marine SLs, antidegradation requirements will be met and no further testing will be required.

³ Sample location C-4 requested by DMMP is in or near a riprap slope of unknown extent. If riprap is encountered, the sample will be moved further offshore to a maximum distance of 30 feet from the current location.

5 Sampling Methods Requirements

This section addresses the sample collection and processing procedures that will be used to ensure data quality, including sample collection and sample processing. Specifically, this section describes scheduling, positioning, identification, collection, core processing, compositing, field QA, and waste management.

5.1 Sampling Schedule and Platform

Sampling will occur as soon as possible after this SAP is approved by DMMP agencies. Mobilization, field sampling, sample processing, and demobilization are anticipated to occur over 2 days.

Core samples will be collected using in-water vibracore collection techniques. Core tubes will be advanced to achieve the target depths provided in Table 1a. Core collection vessels will be operated by crews with extensive experience in vibracore operations.

5.2 Horizontal Positioning and Vertical Control

Horizontal positioning will be determined by an onboard differential global positioning system (DGPS) based on target coordinates shown in Table 1a. The DGPS will record sampling positions with a minimum 3-foot accuracy. The horizontal datum will be the North American Datum of 1983, Washington State Plane, North Zone, US feet. The DMMP agencies' point of contact (Kelsey van der Elst, Corps DMMO) will be consulted if there is a need to move a sampling location more than 10 feet from any station. Any stations that are moved will remain within the dredge prism.

The water depth at each sediment sampling location will be measured using a fathometer or leadline during vibracoring. The water elevation at each station will be measured using Gravity's survey package, which includes a real-time kinematic (RTK) survey DGPS and survey-grade fathometer mounted on board the vessel above sea level. A survey reference marker will be identified from the Washington State reference marker network and used to calibrate the onboard RTK-DGPS for measuring water elevation. Gravity will conduct any necessary data corrections based on the location of the RTK-DGPS within the vessel. The water depth, water level (from RTK), and time of collection will be recorded on sediment core collection logs. The mudline elevation (feet COE) will be estimated by subtracting the water depth from the water level. For example, if the lead-line measurement is 5.5 feet at a sampling location and the recorded Lake Washington elevation is 20 feet COE, the mudline elevation at that location is calculated as follows: 20 feet COE – 5.5 feet = 14.5 feet COE.

5.3 Field Documentation

Field documentation will consist of a daily field log and sediment core collection and processing forms (Appendix B). All data entries will be made using an indelible-ink pen. Corrections to field forms will be made by drawing a single line through the error, writing in the correct information, and

then dating and initialing the change. The daily field log is intended to provide sufficient data and observations to enable readers to reconstruct events that occurred during the sampling effort. Examples of information to be recorded include field personnel, weather conditions, complications encountered, field communications, and other general details associated with the sampling effort. Collection and processing form requirements are described in Sections 5.9.1 and 5.9.2, respectively.

5.4 Station Locations

Figure 2 shows the proposed sampling locations. The seven locations were selected to achieve spatial representation within the dredge area. Table 1a presents the target coordinates and estimated mudline elevations of the proposed sampling locations.

5.5 Station and Sample Identification

Sediment core sample nomenclature identification is as follows:

- Each sampling location will be identified as the station number (e.g., C-1).
- Individual samples processed from the core will be identified by the same alphanumeric identification used to identify the sampling location, followed by the sample interval identifier (e.g., A or Z for Z-layer sample; C-1-Z for a sample collected from the Z-layer sample of C-1). The date will be appended (YYYYMMDD) to maintain database uniqueness.
- Composite samples will be identified by the dredge unit number followed by the sample interval identifier (A) to represent surface dredged material. For example, DU1-A would be used for a composite sample collected from DMMU1.

5.6 Equipment Decontamination Procedures

Sample containers, instruments, working surfaces, technician's protective gear, and other items that may contact sediment sample material must meet high standards of cleanliness. All equipment and instruments used that are in direct contact with the sediment collected for analysis must be made of glass, stainless steel, or high-density polyethylene (HDPE). All reusable sampling equipment will be cleaned prior to core collection (at each station) and prior to sample collection (each interval) during core processing. Decontamination of all items will follow Puget Sound Estuary Program (PSEP) protocols. The decontamination procedure is as follows:

- Scrub until free of visible sediment.
- Prewash and rinse with site water.
- Wash with a brush in a solution of distilled water and biodegradable phosphate-free liquid detergent (Liquinox) soap.
- Rinse three times with distilled water.
- Cover (no contact) all decontaminated items with aluminum foil.

5.7 Sample Containers for Analysis

The contract laboratory will provide certified, precleaned, U.S. Environmental Protection Agency (EPA)-approved containers for all chemistry samples. Sediment for bioassay testing will be placed in commercially available HDPE buckets that have been decontaminated as described in Section 5.6.

5.8 Field Quality Assurance

Field QA will include collecting additional sediment volume as required to ensure that the laboratory has sufficient sample volume to run the program-required analytical QA/QC samples (i.e., matrix spikes [MSs] and replicates) for analyses.

5.9 Sediment Core Collection

The subsequent subsections detail vibracore collection methods and vibracore processing methods.

5.9.1 Vibracore Collection Procedures

All core samples will be collected using a vibracore. A vibracore collects a continuous profile of sediments by using a high frequency vibrating coring device that penetrates the underlying sediments with minimal distortion. A vibracore is ideal for collecting long, relatively undisturbed cores from various sediment types. The vibracore will be fitted with a Lexan core tube and advanced to full penetration below the mudline.

The core tube will be lined with a clean plastic liner. The sediment will not contact the outer core tube. New liners will be used for each sampling location.

Vibracore samples will be collected in the following manner:

- The vessel will maneuver to the proposed sampling location.
- A 4-inch-diameter, thin-walled, 14-foot Lexan core tube with inner plastic liner will be secured to the vibratory assembly and deployed from the vessel.
- The cable umbilical to the vibrator assembly will be drawn taut and perpendicular as the core rests on the bottom sediment.
- The depth to sediment will be measured with a lead-line at the bow of the boat near the vibracore assembly.
- The core will be vibratory-driven into the sediment using two counter-rotating vibrating heads.
- A continuous core sample will be collected to target depth or until refusal.
- The depth of core penetration will be measured and recorded by the vessel captain using a tape measure attached to the vibracore head.
- The core barrel will be extracted from the sediment using the winch.

- While suspended from the A-frame, the assembly and core barrel will be sprayed off and then placed on the vessel deck.
- The core sample will be evaluated at the ends of the core tube, and the length of recovered sediment will be recorded by subtracting the head space from the total length of the core tube.

Acceptance criteria for sediment core samples are as follows:

- The core tube appears intact without obstruction or blocking.
- Recovery is greater than 75% of the drive length.
- Penetration is deep enough to collect all target depth intervals.

If sample acceptance criteria are not achieved, the sample will be rejected unless modified acceptance criteria (i.e., lower percent recovery after multiple attempts) are approved by the DMMP agencies.

Anchor QEA personnel will record field conditions and provide notes on a sediment core collection log (Appendix B). Logs will include the following information:

- Water depth at each station using a lead-line at point of sampling station
- Coordinates of each station, as determined by DGPS
- Date and time of collection of each sediment core sample
- Names of field personnel collecting and handling the samples
- Observations made during sample collection, including weather conditions, complications, ship traffic, presence of anthropogenic debris or New Zealand mudsnail, and other details associated with the sampling effort
- Sampling location identification
- Length and depth intervals of each core section
- Percent recovery for each core sample
- Qualitative notation of apparent resistance of sediment column to coring (how the core drove)
- Any deviation from the approved SAP

Once the core samples are deemed acceptable, the cutterhead will be removed, and a cap will be placed over the end of the tube and secured firmly in place with duct tape. The core tube will then be removed from the sampler, and the other end of the core will be capped and taped. The core tube will be labeled with duct tape and permanent black pen with the location identification and an arrow pointing to the top of core. Cores will be stored upright in a vertical position and secured to ensure they are stable until processing.

5.9.2 Vibracore Processing Procedures

Cores will be processed on board the sampling vessel on the same day as collection When processed, the entire core length contained within the polyethylene liner will be extracted from the core tube with the ends tied off and laid in a core processing tray. The liner will be cut open using a decontaminated stainless-steel box cutter. Using decontaminated stainless-steel wire core splitters or spatulas, the core will then be split lengthwise into two halves for sampling.

Prior to further sampling, Anchor QEA personnel will delineate sampling intervals, take color photographs, and record a sediment description of each core on a sediment core processing log (Appendix B). Logs will include the following information:

- Sample recovery
- Physical soil description in accordance with ASTM D 2488 and ASTM D 2487 Unified Soil Classification System procedures including soil type, density/consistency of soil, and color
- Odor (e.g., hydrogen sulfide and petroleum)
- Visual stratification, structure, and texture
- Vegetation and debris (e.g., wood waste or fibers, paint chips, concrete, sand blast grit, and metal debris)
- Biological activity (e.g., detritus, shells, tubes, bioturbation, and live or dead organisms)
- Presence of oil sheen
- Contact with native material (and description of material), if applicable

Given the anticipated grain size characteristics, sample intervals will not be corrected for length based on core recovery.

Once the two sample intervals (i.e., dredge prism interval and z-layer interval)⁴ are delineated as described in Table 1a, the sediment from each interval will be placed into a decontaminated stainless-steel bowl and mixed until homogenous and consistent in color and texture. Archives will be collected from individual cores. Core composites will be generated by placing a volume of sediment proportional to the length of each core into a large stainless-steel bowl and mixing until uniform in color and texture. Homogenized material from individual cores will be stored in the mixing bowls, covered with aluminum foil, and put on ice prior to compositing. To create composites, equal amounts of material from each sample interval will be composited together and homogenized until uniform in color and texture. The composited sediment will be spooned into laboratory-supplied jars for analyses. The sulfides samples will be collected from the homogenized core composites, placed in jars with 5 milliliters of 2-Normal zinc acetate per 30 grams, and shaken

⁴ The field crew will be prepared to sample notable horizons if a layer with odor or some other unexpected characteristic is encountered. This should be discussed with DMMP prior to making changes.

vigorously to preserve the samples. Sample jars will be placed in zip-top bags and stored on ice in coolers in a secure location following chain-of-custody protocols described in Section 6.

5.10 Waste Management

All disposable sampling materials and personal protective equipment used in sample collection and processing, such as disposable coveralls, gloves, and paper towels, will be placed in heavy-duty garbage bags or other appropriate containers. Sediment remaining after core processing and sampling will be disposed of at the sampling location.

5.11 Vessel Inspection and Cleaning for Invasive Species

No confirmed New Zealand mudsnail (*Potamopyrgus antipodarum*) sites have been identified in Meydenbauer Bay. Inspection and cleaning procedures will be followed to prevent possible infection from the vessel being deployed for the project and to prevent the potential spread of any unidentified infections of New Zealand mudsnail or other invasive species. These procedures are detailed in Gravity's SOP SW-19: *Boat Inspection and Cleaning for Invasive Species*, located in Appendix C. A New Zealand mudsnail identification guide is provided in Appendix D. Additionally, any permit conditions related to inspection or cleaning procedures identified in the Washington Department of Fish and Wildlife Hydraulic Project Approval, or other permits and approvals, issued for the sampling or maintenance dredging activities will also be implemented.

6 Sample Handling and Custody

Samples are in one's custody if they are: 1) in the custodian's possession or view; 2) in a secured location (under lock) with restricted access; or 3) in a container that is secured with an official seal(s) such that the sample cannot be reached without breaking the seal(s). Chain-of-custody procedures will be followed for all samples throughout the collection, handling, and analysis process. The principal document used to track possession and transfer of samples is the chain-of-custody form. Each sample will be represented on a chain-of-custody form the day that it is collected. All data entries will be made using an indelible-ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, and then dating and initialing the change. Blank lines and spaces on the chain-of-custody form will be lined-out and dated and initialed by the individual maintaining custody.

All samples will be transferred to the ARL sample custodian by Anchor QEA personnel. Upon transfer of sample possession to ARL, the person transferring custody of the sample container will sign the chain-of-custody form. Upon receipt of samples at the laboratory, the receiver will record the condition of the samples on a sample receipt form. Table 2 presents the sample handling and storage requirements to be followed by field and laboratory staff. The sample sizes in Table 2 provide sufficient material for the required laboratory QC samples.

7 Physical and Chemical Analyses

Table 3 presents the proposed analytes, evaluation guidelines, analytical methods to be used, and target quantitation limits (QLs) for evaluating sediment. All sample analyses will be conducted in accordance with DMMP- and Ecology-approved methods. Prior to analyses, all samples will be maintained according to appropriate holding times and temperatures for each analysis (Table 2).

ARL will report sample specific QLs and method detection limit (MDLs) for each target analyte in the laboratory data report. Values reported between the QL and MDL will be assigned a J-qualifier to denote that the concentration is estimated. ARL has established sediment methods that achieve QLs less than the DMMP and Sediment Management Standards screening levels (SLs), as shown in Table 3. Because dredged material is planned for disposal in a marine environment, it will be compared against DMMP Marine Guidelines, and material will also be analyzed for butyltins and dioxin/furans. If Z-layer samples are triggered for analyses after dredged material has been characterized, results will be compared against SMS Freshwater Guidelines because the newly exposed surface will be in a freshwater environment. For instances where nondetected QLs exceed SLs (i.e., matrix interference), the result will be evaluated to the MDL. If the MDL exceeds the SL and will impact the outcome of the evaluation, measures will be taken (e.g., additional extract cleanups, sample repreparation and reanalysis, use of a different method, etc.) to achieve an MDL below the SL.

In completing physical and chemical analyses for this project, the contract laboratory is expected to meet the following minimum requirements:

- Adhere to the methods outlined in this SAP, including methods referenced for each analytical procedure.
- Deliver PDF and electronic data in EQuIS format (per Anchor QEA database requirements).
- Meet reporting requirements for deliverables (package that meets DMMP reporting requirements).
- Meet turnaround times for deliverables.
- Implement QA/QC procedures, including laboratory QC requirements.
- Notify the project manager of any QA/QC problems when they are identified to allow for quick resolution. The project manager will then notify the DMMP agencies' point of contact if there are significant impacts to data quality.
- Allow laboratory and data audits to be performed, if deemed necessary.

8 Data Quality Control Procedures

The data quality objective (DQO) for this project is to ensure that data collected are of known and acceptable quality to achieve the project objectives described in this SAP. Laboratory QA/QC samples will be analyzed to measure collection and analytical method performance. The required frequencies for these analyses are provided in Table 4. Applicable quantitative goals for analytical data are provided in Table 5.

8.1 Special Training Requirements and Certifications

For sample preparation tasks, it is important that field crews be trained in standardized data collection requirements so that data collected are consistent among the field crew. All field staff will be fully trained in sediment core collection and sampling methods, decontamination protocols, field documentation, and chain-of-custody procedures.

In addition, the 29 Code of Federal Regulations 1910.120 Occupational Safety and Health Administration regulations require training to provide employees with the knowledge and skills to enable them to perform their jobs safely and with minimum risk to their personal health. All field crews will have completed the 40-hour HAZWOPER training course and 8-hour refresher courses, as necessary, to meet Occupational Safety and Health Administration regulations.

8.2 Laboratory Deliverables

For all analyses, the data reporting requirements will include those items necessary to complete data validation, including copies of all raw data (QA2 level). The ARL will be required, where applicable, to report the following:

- **Project Narrative:** This summary, in the form of a cover letter, will discuss problems, if any, encountered during any aspect of analysis. This summary should discuss, but not be limited to, QC, sample shipment, sample storage, and analytical difficulties. Any problems encountered and their resolutions will be documented in as much detail as appropriate.
- **Chain-of-Custody Records:** Legible copies of the chain-of-custody forms will be provided as part of the data package. This documentation will include the time of receipt and condition of each sample received by the laboratory. Additional internal tracking of sample custody by the laboratory will also be documented on a sample receipt form. The form must include all sample shipping container temperatures measured at the time of sample receipt.
- **Sample Results:** The data package will summarize the results for each sample analyzed. The summary will include the following information when applicable:
 - Field sample identification code and the corresponding laboratory identification code
 - Sample matrix
 - Date of sample extraction

- Date and time of analysis
- Weight and volume used for analysis
- Final dilution volumes or concentration factor for the sample
- Identification of the instrument used for analysis
- QLs and MDLs
- Analytical results with reporting units
- Data qualifiers and their definitions
- **QA/QC Summaries:** This section will contain the results of the laboratory QA/QC procedures. Each QA/QC sample analysis will be documented with the same information required for the sample results. No recovery or blank corrections will be made by the laboratory. At a minimum, the following elements will be included/reported:
 - Calibration Data Summary: This summary will report the concentrations of the initial calibration and daily calibration standards and the date and time of analysis. The response factor, percent relative standard deviation, percent difference, retention time, and calibration r value for each analyte will be listed, as appropriate. Results for standards to indicate instrument sensitivity will also be documented.
 - Internal Standard Area Count Summary
 - Method Blank Analysis: Target compounds and concentrations
 - Surrogate Spike Recovery: Surrogates added, concentrations, percent recoveries, and control limits will be reported.
 - Matrix Spike Recovery: Analytes added, percent recoveries and relative percent difference (RPD) values for matrix spike duplicate (MSD) analyses.
 - Matrix Duplicate: RPD values or difference values for matrix duplicate analyses
 - Laboratory Control Sample: Analytes added, percent recoveries and RPD values for laboratory control sample duplicate analyses
 - Relative Retention Time: Relative retention times of each detected target analyte for primary and confirmational chromatographic analyses
- **Original Data:** Legible copies of the original data generated by the laboratory will include the following:
 - Sample extraction, preparation, extraction method, and cleanup logs
 - Instrument specifications and analysis logs
 - Calculation worksheets, if used
 - Full scan chromatograms for all samples, standards, blanks, calibrations, spikes, replicates, and reference materials
 - Ion chromatograms for all detected analytes in gas chromatography/mass spectrometry analyses

- Full-scan chromatograms and quantitation reports for all gas chromatography and gas chromatography/mass spectrometry samples, standards, blanks, calibrations, spikes, replicates, and reference materials
- Enhanced spectra of detected compounds with associated best-match spectra for each sample

8.3 Laboratory Quality Control Procedures

Laboratory QC procedures, where applicable, include initial and continuing instrument calibrations, standard reference materials, laboratory control samples, laboratory replicates, MS/MSD samples, surrogate spikes, and method blanks. Table 4 lists the frequency of analysis for laboratory QA/QC samples, and Table 5 summarizes the DQOs for laboratory precision, accuracy, and completeness.

Results of the QC samples from each sample group will be reviewed by the analyst immediately after a sample group has been analyzed. The QC sample results will then be evaluated to determine if control limits have been exceeded. If control limits are exceeded in the sample group, Anchor QEA will be contacted immediately, and corrective action (e.g., method modifications followed by reprocessing the affected samples) will be initiated prior to processing a subsequent group of samples.

8.4 Data Validation, Verification, and Management

Laboratory data will be provided in PDF and EQuIS electronic format and uploaded to Anchor QEA's project database. Once data are received from the laboratory, several QC procedures will be followed to provide an accurate evaluation of data quality. A Stage 2B data validation_will be performed for all testing parameters. Data quality review will be completed by Laboratory Data Consultants in accordance with EPA National Functional Guidelines (EPA 2020a, 2020b, 2020c) by considering the following:

- Data completeness
- Holding times
- Method blanks
- Surrogate and labeled compound recoveries
- Detection limits
- Laboratory control samples
- Replicates
- MS/MSD samples
- Instrument tunes
- Initial and continuing calibrations
- Internal standard area recoveries
- Second column confirmation results

• Estimated maximum potential concentrations

Data will be validated in accordance with the project specific DQOs (Table 5), analytical method criteria, and ARL's internal performance standards based on its standard operating procedures and internal control limits. The results of the data quality review, including assigning qualifiers in accordance with the EPA National Functional Guidelines (EPA 2020a, 2020b, 2020c) and a tabular summary of qualifiers, will be generated by the database manager and submitted to the QA/QC manager for final review and confirmation of data validity.

Laboratory data, which will be electronically provided and loaded into Anchor QEA's project database, will undergo a check against the laboratory hard copy data. Data will be validated or reviewed manually, and qualifiers, if assigned, will be entered manually. The accuracy of all manually entered data will be verified by a second party. Data will be exported from EQuIS to Excel tables.

Field datasheets will be checked for completeness and accuracy prior to delivery to the database manager. Data generated in the field will be documented on hard copy, summarized in a spreadsheet, and provided to the database manager, who is responsible for data entry into the database. Manually entered data will be checked by a second party. Field documentation will be filed in the main project file after data entry and checking are complete.

9 Bioassay Testing

Chemical concentrations will be compared to the applicable DMMP screening guidelines. If chemicals of concern (COCs) are detected in the surface interval samples at or less than the SL, then bioassay testing is not required to determine material suitability for unconfined, open-water disposal. If COCs are detected above the DMMP SL or maximum level, bioassay testing may be performed as follows. If any COC exceeds a bioaccumulation trigger, a decision will be made in coordination with DMMP whether to pursue bioassay or bioaccumulation testing. This section includes procedures for bioassay testing. Bioaccumulation testing is not proposed in this SAP.

Sediment for bioassay testing will be collected from the same composite sediment homogenate submitted for bulk chemical analyses. Homogenized sediment will be placed into a plastic bag. The bag will then be adequately sealed with headspace removed. Samples will be shipped to EcoAnalysts in Port Gamble, Washington, and stored in the dark at $4^{\circ}C \pm 2^{\circ}C$ and bioassay testing will be triggered as required. The grain size and conventional data for all DMMU samples undergoing bioassay testing will be provided to the DMMP before choosing the test organisms. The bioassay tests will be initiated within 8 weeks of sample collection. If Z-layer sample chemical analyses are required, testing may need to be expedited to evaluate chemical results in order to meet bioassay hold times. Chain-of-custody procedures will be maintained by the laboratories throughout bioassay testing.

9.1 Bioassay Laboratory Protocols

The tiered testing approach will be used. A decision will be made as to whether bioassay testing will be undertaken on the composite sample if one or more COCs are above the DMMP SL or maximum level. To the extent feasible, chemical results will be provided for bioassay decisions within 28 days of sample collection. The DMMP agencies will be kept informed of analytical progress to support bioassay decisions. Bioassay testing, if required, will be preplanned to initiate appropriate testing as soon as possible after the first chemical results become available and the decision is made to conduct bioassays. This includes obtaining test organisms and control and reference sediment in a timely manner and allowing extra time for saltwater acclimation. This approach will support the opportunity for any additional bioassay testing within the allowable 56-day holding period if such need arises.

Marine bioassay testing requires test sediment be matched and run with appropriate DMMPapproved reference sediment to factor out sediment grain size effects on bioassay organisms. Reference-area sediment will be collected as soon as possible before biological testing. Anchor QEA will follow DMMP guidance (DMMP 2021) and will coordinate with DMMP to locate a suitable reference sediment location. During reference sediment collection, sediments will be wet-sieved to find an adequate match. Wet-sieving uses a 63-micron (#230) sieve and a graduated cylinder; 100 milliliters of sediment is placed in the sieve and washed thoroughly until the water runs clear. The volume of sand and gravel remaining in the sieve is then washed into the graduated cylinder and measured. This represents the coarse fraction; the fines content is determined by subtracting this number from 100. Because of the wide heterogeneity of grain size in the reference areas, it may be necessary to perform wet-sieving in several places before a reference sediment with the proper grain size is found or reference sediments may be mixed to achieve the appropriate grain size. The sample analyzed by wet-sieving should be representative of the sediment that will be used for bioassays. Homogenization of the sediment prior to wet-sieving is recommended. Coordinates will be recorded at each sampling location. Reference sediments will be analyzed for total solids, total volatile solids, total organic carbon, grain size, ammonia, and sulfides.

Marine acute toxicity and chronic sublethal bioassays prescribed by the DMMP (amphipod, sediment larval, and *Neanthes arenaceodentata* growth) will be conducted if required on dredged material. All biological testing will comply with PSEP guidance as updated by DMMP (PSEP 1995). General biological testing procedures and specific procedures for each sediment bioassay are summarized in the following subsections.

9.2 General Biological Testing Procedures

9.2.1 Negative Controls

Negative control sediment is used to check laboratory performance. Negative control sediment is clean sediment in which the test organism normally lives that is expected to produce low mortality. The sediment larval test uses a negative seawater control rather than control sediment.

The amphipod, sediment larval, and juvenile infaunal growth (*Neanthes*) tests each have performance standards for negative controls, which are identified in Section 9.3 and Table 6.

9.2.2 Reference Sediment

The DMMP prescribes the use of bioassay reference sediment for test comparison and interpretations that closely match the grain size characteristics of the dredged material test sediment. The reference sediment is used to check for physical effects of the test sediment. Selection of a suitable reference site location will be approved by the DMMP agencies' point of contact. Reference sediment samples will target locations with percent fines (silt + clay) within about 10% of the project sample materials.

Bioassays have performance standards for reference sediment (see Section 9.3 and Table 6). Retesting may be required if these standards are not met.

Reference sediment will be collected using a Van Veen-type grab sampler in accordance with PSEP protocols (PSEP 1997). Reference sediment will be analyzed for total solids, total volatile solids, total

organic carbon, bulk ammonia, bulk sulfides, and grain size. The methods and QA guidelines for analyzing sediment conventionals in the test sediment will also be used in the reference sediment.

9.2.3 Positive Controls

A positive control will be run for each bioassay. Positive controls are chemicals known to be toxic to the test organism and indicate the sensitivity of the particular organisms used in a bioassay. An appropriate reference toxicant (Ref Tox) will be run with each batch of test sediment.

9.2.4 Ammonia and Sulfide Purging and Reference Toxicant Testing

To avoid nontreatment effects of bioassay test organisms from ammonia and sulfides, aqueous concentrations will be measured by the testing laboratory in the appropriate exposure medium (porewater or overlying water, depending on test organism) prior to initiating bioassay testing. Procedures to determine Ref Tox testing or purging will follow the methods outlined in DMMP's clarification paper (DMMP 2015) regarding ammonia and sulfide triggers. Decision-making regarding sample purging procedures will be coordinated with the DMMP agencies.

Unionized ammonia and hydrogen sulfide aqueous concentrations measured by the testing laboratory will be compared with the Reference Toxicant and Purging Triggers for Marine Bioassays (Table 9-4 in DMMP 2021). Relevant water quality parameters (temperature, pH, and salinity) will be measured in the aqueous medium to calculate unionized ammonia and hydrogen sulfide concentrations. If concentrations are less than the Ref Tox or purging triggers, bioassay testing may proceed normally. The ammonia Ref Tox test will be run if ammonia exceeds the trigger concentrations for the specified test organisms. If ammonia or sulfide concentrations exceed the purge trigger concentrations, sediments will be purged by the testing laboratory to lower concentrations to less than the trigger level. Purging will be conducted by the testing laboratory using established protocols involving aeration and/or overlying water replacement. Purging methods may be omitted in consultation with the DMMP agencies if COCs are subject to loss or alteration during purging. Once ammonia and sulfide concentrations are within the acceptable limits for each test organism, bioassay testing may proceed.

Bioassay testing reporting will include all ammonia and sulfides measurements, including water quality measurements and relevant calculations.

9.2.5 Saltwater Acclimation

Because freshwater sediment dredged material is planned for disposal in a marine site, marine bioassays will be conducted on dredged material sediment samples. Confounding factors caused by testing freshwater sediments in aerated saltwater with marine organisms can lead to toxicity independent of contaminant-related effects. The confounding factors include increased ammonia concentrations caused by disruption or elimination of microbial communities adapted to freshwater

conditions, as well as salinity and pH levels within sediments or overlying water that are outside the recommended ranges for the test organisms. Therefore, sediments will need to be acclimated to marine conditions prior to commencement of bioassay testing. Acclimation will follow considerations in the Sediment Acclimation and the Larval Bioassay Test Issue and Clarification Paper (DMMP 2020) and will be discussed with DMMP prior to sample collection. The length of time required for sediments to acclimate is unknown and to meet testing holding times, planning with DMMP and the bioassay laboratory will be initiated prior to sample collection.

9.2.6 Water Quality Monitoring

Salinity, temperature, pH, and dissolved oxygen will be measured daily for the amphipod and sediment larval tests. These measurements will be made every 3 days for the *Neanthes* bioassay test. Ammonia and sulfides will be determined at the beginning and end of the three tests. Monitoring will be conducted for test and reference sediment and negative controls (including seawater controls). Parameter measurements must be within the limits specified for each bioassay. Measurements for each treatment will be made on a separate chemistry beaker set up to be identical to the other replicates within the treatment group, including the addition of test organisms.

9.3 Marine Bioassay-Specific Procedures

Three standard DMMP sediment toxicity tests will be conducted on dredged material samples identified for toxicity testing. These tests are as follows:

- Acute 10-day amphipod mortality test (*Eohaustorius estuaries, Ampelisca abdita*, or *Rhepoxynius abronius*)
- Acute 48-hour bivalve larvae combined mortality and abnormality test (*Mytilus galloprovincialis* or *Dendraster excentricus*)
- Chronic 20-day juvenile survival and growth test (Neanthes arenaceodentata)

9.3.1 10-Day Amphipod Mortality Test

This test involves exposing the amphipod *Eohaustorius estuarius*, *Ampelisca abdita*, or *Rhepoxynius abronius* to test sediment for 10 days. In sediment with high percent fines (greater than 60%), *Ampelisca abdita* or *Eohaustorius estuarius* will be used. *Ampelisca abdita* is the preferred organism for testing sediments with high clay (greater than 20%) content, and *Eohaustorius estuarius* is the preferred test organism for clay less than 20%. *Rhepoxynius abronius* is only used for testing Puget Sound sediment with coarse grain size (less than 60% fines). The appropriate test species will be determined in consultation with the DMMP agencies based on the project area grain size data. The number of surviving amphipods at the end of the exposure period will be counted. Daily emergence data and the number of amphipods failing to rebury at the end of the test will be recorded as well. Performance standards and evaluation are shown in Table 6.

9.3.2 Sediment Larval Test

This test monitors larval development of a suitable echinoderm or bivalve species (*Mytilus galloprovincialis* or *Dendraster excentricus*) in the presence of test sediment. Either species will be used depending on availability and spawning conditions at the time of testing. If both species are unavailable, the laboratory may propose to use an alternate species. Any proposal to use an alternative species will be coordinated with the DMMP agencies.

The test is run until the appropriate stage of development is achieved in a seawater control. The larval test will be aerated. The test will be performed according to the procedures and QA/QC performance standards described in PSEP protocols (PSEP 1995) and the most recent protocols in DMMP (2021). The resuspension protocol will only be used if determined appropriate and in coordination with DMMP agencies for approval prior to implementation. At the end of the test, larvae from each test sediment exposure are examined to quantify abnormality and mortality. Performance standards and evaluation are shown in Table 6.

9.3.3 20-Day Juvenile Infaunal Growth Test

This test uses the polychaete *Neanthes* in a 20-day growth test. The growth rate of organisms exposed to test sediment is compared to the growth rate of organisms exposed to reference sediment. The test will be performed according to the procedures and QA/QC performance standards described in PSEP protocols (PSEP 1995), the protocol for juvenile *Neanthes* sediment bioassay (Johns et al. 1990), and the most recent protocols in DMMP (2021). Testing results will be reported on an ash-free dry-weight (AFDW) basis. The AFDW procedure eliminates weight from sediment in the gut, thereby providing a more accurate measurement of the change in biomass during the exposure period. Performance standards and evaluation guidelines are shown in Table 6.

9.3.4 Interpretation

Test interpretations consist of endpoint comparisons to controls and references on an absolute percentage basis, as well as statistical comparison to reference. Test interpretation will follow the guidelines established in the DMMP User Manual (DMMP 2021). Evaluation guidelines are listed in Table 6.

9.3.4.1 One-Hit Failure

When the response of any one bioassay test exceeds the bioassay-specific DMMP guidelines (Table 6) relative to the negative control and reference, the DMMU is judged to be unsuitable for unconfined open-water disposal.
9.3.4.2 Two-Hit Failure

If no one-hit failure occurs but the response of two bioassay tests are statistically significant compared to the reference sediment (and <70% of mean reference sediment growth rate for the *Neanthes* bioassay for nondispersive sites), the DMMU is judged to be unsuitable for unconfined open-water disposal.

9.4 Reporting

The bioassay laboratory will provide a written report that meets all the requirements in the DMMP User Manual (DMMP 2021).

9.5 Bioaccumulation Testing

Bioaccumulation testing is not proposed in this SAP. Given the holding time limitation and volume of sediment needed for the bioaccumulation tests, sediment will be recollected if bioaccumulation testing is required. If required, the procedures and methods will be described in an addendum to this SAP and submitted to DMMP agencies for approval prior to initiating additional sediment sampling and testing.

10 Sediment Characterization Report

Anchor QEA will prepare a Sediment Characterization Report documenting all activities associated with collecting, transporting, and analyzing samples. At a minimum, the final report will include the following:

- A summary of all field activities, including sampling equipment and protocols used
- Any deviations from the approved SAP
- A table summarizing:
 - Actual sampling locations in state plane coordinates (Washington North Zone) including a description of methods used to record positions
 - Measured water depths and mudline elevations at time of sampling of each location and real-time tide levels
 - Core penetrations and recoveries, sample depths, and sample compositing scheme
- A project map showing actual and target sampling locations with DMMU outlines
- A QA/QC narrative for chemical testing
- Field data collection sheets
- A summary table of sample analytical results with validation qualifiers, comparison to the applicable screening values in Table 3 with any exceedances highlighted
- Summary tables of bioassay results, QA data, and interpretation (if applicable)
- Appendices, including sample collection forms, chain-of-custody forms, photographs, analytical laboratory reports, bioassay laboratory reports, and validation reports.
- Electronic data in Ecology's EIM format will be submitted to DMMP agencies
- Comprehensive laboratory data package for Ecology (electronic only)

11 References

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Table 1a Target Sampling Locations and Sampling Depths

	Coord	inates ^a	Estimated Mudline		Heterogeneous	Z-Layer Sample Depths ^d
Station ID	Northing	Easting	Elevation (feet COE) ^b	Target Core Length ^c (feet)	A-Interval Depths ^c (feet)	(Elev. +9.5 to +11.5 feet COE)
C-1	225010.48'	1301059.86'	+13.7	5	0 to 2.2	2.2 to 4.2
C-2	224857.66'	1301143.33'	+14.0	5	0 to 2.5	2.5 to 4.5
C-3	224742.74'	1301344.62'	+15.1	6	0 to 3.6	3.6 to 5.6
C-4	225192.91'	1301195.35'	+15.5	6	0 to 4.0	4.0 to 6.0
C-5	225102.87'	1301340.66'	+13.5	5	0 to 2.0	2.0 to 4.0
C-6	224964.43'	1301424.85'	+14.0	5	0 to 2.5	2.5 to 4.5
C-7	224844.05'	1301470.31'	+14.4	5	0 to 2.9	2.9 to 4.9

Notes:

a. Coordinates are in North American Datum of 1983, Washington State Plane North, U.S. feet.

b. Depth intervals are approximate based on estimated mudline depths from most recent bathymetry. Actual depth intervals will be determined in situ based on measured mudline.

c. Individual sample intervals will be sampled and archived for potential future analyses.

d. Z-layer samples will be collected from each core and archived for potential future analysis pending results of dredged material. If a shorter core is obtained,

and the Z-interval is not reached, the bottom 1-foot of the core will be sampled and retained as a separate sample.

COE: United States Army Corps of Engineers Lake Washington Datum

Table 1b Sample Compositing Scheme

DMMU Volume	Cores in DMMU Sample Composite	Core Intervals in Sample Composite ^a	Sample Composite ID	Testing Parameters
Divitivio volume	Sample Composite	Sample Composite	שו	resting Parameters
	C-1	А		
DMMU1 10,670 cy	C-2	А	DU-1A	
	C-3	А		
	C-4	А		Marine DMMP ^{b,c}
DMMU2 6,480 cy	C-5	А	DU-2A	
	C-6	А		
DMMU3 1,350 cy	C-7	А	DU-3A	

Notes:

a. See Table 1a for sample intervals.

pesticides, polychlorinated biphenyls (PCBs), metals, sulfide, ammonia, total organic carbon, grain size, total volatile solids, and total solids.

c. Exceedances in the surface sample composite will trigger z-layer testing using the freshwater COC list.

cy: cubic yards

DMMP: Dredged Material Management Program

DMMU: Dredged Material Management Unit

Table 2 Sample Handling and Storage Guidelines

Parameter	Sample Size	Container Size and Type ^a	Holding Time	Preservative
Grain size	300 g	16-oz glass or HDPE	6 months	4°C ± 2°C
Total solids, total organic carbon, total volatile solids	30 g	8-oz glass or HDPE	14 days	4°C ± 2°C
Total solids, total organic carbon, total volatile solids	50 g	0-02 glass of HDFE	6 months	-18°C ± 2°C
Ammonia	25 g	4-oz glass	7 days	Cool/4°C
Total sulfides	50 g	2-oz glass	7 days	5 mL 2-Normal zinc acetate/dark/cool/4°C
Total metals	10 g	4-oz glass	6 months; 28 days for mercury	4°C ± 2°C
	i o g	4 OZ gluss	2 years; 1 year for mercury	-18°C ± 2°C
			14 days until extraction	4°C ± 2°C
SVOCs, PAHs, PCBs, pesticides, organotins, TPH	200 g	2 x 16-oz glass	1 year until extraction	-18°C ± 2°C
			40 days after extraction	4°C ± 2°C
Dioxins/furans	10 a	4 oz ambar alass	14 days until extraction	4°C ± 2°C
	10 g	4-oz amber glass	1 year until extraction	-18°C ± 2°C
Chemistry archive for untested intervals	500 g	16-oz glass	1 year until extraction	Freeze/-18°C
Bioassays	500 g	Plastic bag	8 weeks	4°C ± 2°C; no headspace

Notes:

a. Sample containers may vary based on availability at the time of sample collection.

g: grams

HDPE: high-density polyethylene

mL: milliliter

oz: ounce

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

SVOC: semivolatile organic compound

Parameters for Analysis, Screening Levels, Analytical Methods, and Target Quantitation Limits

				Ν	arine DMMP Guid	elines	SMS Freshwa	ter Sediment	SMS Marine	Sediment	Marine	SMS AET
Parameter	Analytical Method	Method Detection Limit	Quantitation Limit	Screening Level	Bioaccumulation Trigger	Maximum Level	Sediment Cleanup Objective	Cleanup Screening Level	Sediment Cleanup Objective	Cleanup Screening Level	Sediment Cleanup Objective	Cleanup Screening Level
Conventional Parameters (%)	Wethod	Detection	Linit	Level	inggei		objective	Level	Objective	Level	objective	
		1	0.1		1			1			1	
Grain size (PSEP or ASTM modified) ^a	PSEP/ASTM Mod		0.1									
Total solids	SM2540G/PSEP		0.1									
Total volatile solids	SM2540G/PSEP		0.1									
Total organic carbon	Plumb (1981)/EPA 9060 Mod											
Conventional Parameters (mg/kg dry wei		1			1			1				
Ammonia	Plumb (1981)/SM 4500-NH3		0.4									
Total sulfides	PSEP/SM 4500-S2		1.0									
Metals (mg/kg dry weight)		1				· · · · · · · · · · · · · · · · · · ·		1				
Antimony	EPA 6020B	0.10	0.20	150		200						
Arsenic	EPA 6020B	0.038	0.20	57	507.1	700	14	120	57	93	57	93
Cadmium	EPA 6020B	0.040	0.10	5.1		14	2.1	5.4	5.1	6.7	5.1	6.7
Chromium	EPA 6020B	0.26	0.50	260			72	88	260	270	260	270
Copper	EPA 6020B	0.35	0.50	390		1,300	400	1200	390	390	390	390
Lead	EPA 6020B	0.052	0.10	450	975	1,200	360	> 1300 ^c	450	530	450	530
Mercury	7471B	0.0053	0.025	0.41	1.5	2.3	0.66	0.8	0.41	0.59	0.41	0.59
Nickel	EPA 6020B	0.22	0.50				26	110				
Selenium ^b	EPA 6020B	0.18	0.50		3		11	> 20 ^c				
Silver	EPA 6020B	0.022	0.20	6.1		8.4	0.57	1.7	6.1	6.1	6.1	6.1
Zinc	EPA 6020B	2.9	6.0	410		3,800	3200	> 4200 ^c	410	960	410	960
Organometallic Compounds (µg/kg dry w	eight)											
Monobutyltin	Krone/8270E-SIM	1.9	4.1				540	> 4800 ^c				
Dibutyltin	Krone/8270E-SIM	1.7	5.8				910	130,000				
Tributyltin (ion)	Krone/8270E-SIM	0.5	3.9		73		47	320				
Tetrabutyltin	Krone/8270E-SIM	5.0	5.0				97	> 97 ^c				
PAHs (µg/kg dry weight)	•					•			mg/k	g OC	µg∕kg dı	ry weight
1-Methylnaphthalene ^d	EPA 8270E	5.3	20								•	
2-Methylnaphthalene ^d	EPA 8270E	4.5	20	670		1,900			38	64	670	670
Acenaphthene	EPA 8270E	5.2	20	500		2,000			16	57	500	500
Acenaphthylene	EPA 8270E	6.2	20	560		1,300			66	66	1,300	1,300
Anthracene	EPA 8270E	7.2	20	960		13,000			220	1,200	960	960
Benzo(a)anthracene	EPA 8270E	6.0	20	1300		5,100			110	270	1,300	1,600
Benzo(a)pyrene	EPA 8270E	4.2	20	1600		3,600			99	210	1,600	1,600
Benzo(g,h,i)perylene	EPA 8270E	14	20	670		3,200			31	78	670	720
Chrysene	EPA 8270E	6.1	20	1,400		21,000			110	460	1,400	2,800
Dibenz(a,h)anthracene	EPA 8270E	17	20	230		1,900			12	33	230	230
Fluoranthene	EPA 8270E	6.1	20	1,700	4,600	30,000			160	1,200	1,700	2,500
Fluorene	EPA 8270E	15	20	540		3,600			23	79	540	540
Indeno(1,2,3-cd)pyrene	EPA 8270E	15	20	600		4,400			34	88	600	690
Naphthalene	EPA 8270E	4.2	20	2,100		2,400			99	170	2,100	2,100
Phenanthrene	EPA 8270E	8.7	20	1500		21,000			100	480	1,500	1,500
Pyrene	EPA 8270E	5.7	20	2600	11,980	16,000			1,000	1,400	2,600	3,300
- Jiene		5.7		2000	11,500	10,000		l	1,000	1,100	2,000	5,500

Parameters for Analysis, Screening Levels, Analytical Methods, and Target Quantitation Limits

				N	Aarine DMMP Guide	elines	SMS Freshwa	ter Sediment	SMS Marin	e Sediment	Marine	SMS AET
							Sediment	Cleanup	Sediment	Cleanup	Sediment	Cleanup
	Analytical	Method	Quantitation	Screening	Bioaccumulation		Cleanup	Screening	Cleanup	Screening	Cleanup	Screening
Parameter	Method	Detection Limit	_	Level	Trigger	Maximum Level	Objective	Level	Objective	Level	Objective	Level
Total benzo(b,j,k)fluoranthenes	EPA 8270E	10	40	3200		9,900			230	450	3,200	3,600
Total LPAH $(U = 0)^{e}$	EPA 8270E			5,200		29,000			370	780	5,200	5,200
Total HPAHs $(U = 0)^{f}$	EPA 8270E			12000		69,000			960	5,300	12,000	17,000
Total PAHs $(U = 0)^{g}$	Calculated						17,000	30,000				
Chlorinated Hydrocarbons (µg/kg dry we			1						mg/k	kg OC	µg/kg di	ry weight
1,4-Dichlorobenzene	EPA 8270E	0.6	5.0	110		120			3.1	9	110	110
1,2-Dichlorobenzene	EPA 8270E	0.7	5.0	35		110			2.3	2.3	35	50
1,2,4-Trichlorobenzene	EPA 8270E	2.7	5.0	31		64			0.81	1.8	31	51
Hexachlorobenzene	EPA 8270E	0.7	5.0	22	168	230			0.38	2.3	22	70
Phthalates (µg/kg dry weight)	217702702	0.1	5.0		100	250			mg/k			ry weight
Dimethyl phthalate	EPA 8270E	4.4	20	71		1,400			53	53	71	160
Diethyl phthalate	EPA 8270E	20	50	200		1,200			61	110	200	>1,200
Di-n-butyl phthalate	EPA 8270E	5.6	20	1,400		5,100	380	1000	220	1,700	1,400	1,400
Butyl benzyl phthalate	EPA 8270E	9.4	20	63		970			4.9	64	63	900
Bis(2-ethylhexyl) phthalate	EPA 8270E	5.5	20	1,300		8,300	500	22,000	47	78	1300	1900
Di-n-octyl phthalate	EPA 8270E	4.4	20	6,200		6,200	39	> 1100 ^c	58	4,500	6,200	6,200
Phenols (µg/kg dry weight)		7.7	20	0,200		0,200	55	> 1100	50	4,500	0,200	0,200
Phenol	EPA 8270E	4.4	20	420		1,200	120	210	420	1,200	420	1,200
2-Methylphenol	EPA 8270E	6.7	20	63		77			63	63	63	63
4-Methylphenol	EPA 8270E	7.4	20	670		3,600	260	2000	670	670	670	670
2,4-Dimethylphenol	EPA 8270E	2.2	25.0	29		210			29	29	29	29
Pentachlorophenol	EPA 8270E	31.2	100	400	504	690	1200	> 1200 ^c	360	690	360	690
Miscellaneous Extractables (µg/kg dry we		51.2	100	400	504	030	1200	> 1200	mg/kg OC (u			ry weight
Benzyl Alcohol	EPA 8270E	16	20	57		870			57 dry weight	73 dry weight	57	73
Benzoic Acid	EPA 8270E	39	200	650		760	2900	3800	650 dry weight	650 dry weight	650	650
Dibenzofuran	EPA 8270E	14	200	540		1,700	200	680	15	58	540	540
Hexachlorobutadiene	EPA 8270E	4.8	20	11		270			3.9	6.2	11	120
N-Nitrosodiphenylamine	EPA 8270E	5.3	20	28					11	11	28	40
Carbazole	EPA 8270E	4.3	20				900	1100	3.9	6.2	11	120
Pesticides (µg/kg dry weight)		4.5	20				500	1100	5.5	0.2		120
2,4'-DDD	EPA 8081B	0.20	1.0									
2,4'-DDE	EPA 8081B EPA 8081B	0.20	1.0									
2,4'-DDE 2,4'-DDT	EPA 8081B EPA 8081B	0.23	1.0									
4,4'-DDD	EPA 8081B EPA 8081B	0.32	1.0	16								
	EPA 8081B											
4,4'-DDE 4,4'-DDT	EPA 8081B EPA 8081B	0.14	1.0 1.0	9 12								
2,4'-DDD and 4,4'-DDD	Calculated							860				
	Calculated						310 21	33				
2,4'-DDE and 4,4'-DDE 2,4'-DDT and 4,4'-DDT	Calculated						100	8100				
	Calculated				50	69						
Total DDT (U = 0) ^h Aldrin	EPA 8081B			9.5								
beta-HCH	EPA 8081B EPA 8081B	0.09	0.50	9.5			7.2	11				
Dieldrin	EPA 8081B EPA 8081B	0.09	1.0	1.9		1,700	4.9	9.3				
	EFA OUOID	0.12	1.0	1.9		1,700	4.9	9.5				

Parameters for Analysis, Screening Levels, Analytical Methods, and Target Quantitation Limits

				Ν	Aarine DMMP Guid	elines	SMS Freshwa	ter Sediment	SMS Marin	e Sediment	Marine	SMS AET
							Sediment	Cleanup	Sediment	Cleanup	Sediment	Cleanup
	Analytical	Method	Quantitation	Screening	Bioaccumulation		Cleanup	Screening	Cleanup	Screening	Cleanup	Screening
Parameter	Method	Detection Limit	Limit	Level	Trigger	Maximum Level	Objective	Level	Objective	Level	Objective	Level
Endrin ketone	EPA 8081B	0.28	1.0				8.5					
Heptachlor	EPA 8081B	0.05	0.50	1.5		270						
cis-chlordane	EPA 8081B	0.1	0.5									
trans-chlordane	EPA 8081B	0.3	0.5									
cis-nonchlor	EPA 8081B	0.2	0.5									
trans-nonachlor	EPA 8081B	0.2	0.5									
oxychlordane	EPA 8081B	0.1	0.5									
Total Chlordane (U = 0) ⁱ	EPA 8081B			2.8	37							
PCBs (µg/kg dry weight)	•	•	•		•	•	•	•	•			
Aroclor 1016	EPA 8082A	1.6	4.0									
Aroclor 1221	EPA 8082A	1.6	4.0									
Aroclor 1232	EPA 8082A	1.6	4.0									
Aroclor 1242	EPA 8082A	1.6	4.0									
Aroclor 1248	EPA 8082A	1.6	4.0									
Aroclor 1254	EPA 8082A	1.6	4.0									
Aroclor 1260	EPA 8082A	0.6	4.0						mg/k	cg OC	µg/kg d	ry weight
Total Aroclor PCBs (U = 0)	EPA 8082A	1.6	4.0	130	38 mg/kg OC	3,100	110	2500	12	65	130	1,000
Total Petroleum Hydrocarbons (mg/kg	dry weight)	•	•		•	•			•			
Diesel range organics	NWTPHDx	2.3	5.0				340	510				
Residual range organics	NWTPHDx	3.0	10				3600	4400				
Dioxin/Furans (ng/kg dry weight) ^j			-	•	•		•					
Dioxins												
2,3,7,8-TCDD	EPA 1613B	0.15	1.0									
1,2,3,7,8-PeCDD	EPA 1613B	0.17	1.0									
1,2,3,4,7,8-HxCDD	EPA 1613B	0.17	1.0									
1,2,3,6,7,8-HxCDD	EPA 1613B	0.18	1.0									
1,2,3,7,8,9-HxCDD	EPA 1613B	0.22	1.0									
1,2,3,4,6,7,8-HpCDD	EPA 1613B	0.56	2.5									
OCDD	EPA 1613B	4.60	10									
Furans												
2,3,7,8-TCDF	EPA 1613B	0.06	1.0									
1,2,3,7,8-PeCDF	EPA 1613B	0.24	1.0									
2,3,4,7,8,-PeCDF	EPA 1613B	0.22	1.0									
1,2,3,4,7,8-HxCDF	EPA 1613B	0.28	1.0									
1,2,3,6,7,8-HxCDF	EPA 1613B	0.20	1.0									
1,2,3,7,8,9-HxCDF	EPA 1613B	0.19	1.0									
2,3,4,6,7,8-HxCDF	EPA 1613B	0.17	1.0									
1,2,3,4,6,7,8-HpCDF	EPA 1613B	0.21	1.0									
1,2,3,4,7,8,9-HpCDF	EPA 1613B	0.24	1.0									

Parameters for Analysis, Screening Levels, Analytical Methods, and Target Quantitation Limits

				N	larine DMMP Guide	elines	SMS Freshwat	ter Sediment	SMS Marine	Sediment	Marine	SMS AET
							Sediment	Cleanup	Sediment	Cleanup	Sediment	Cleanup
	Analytical	Method	Quantitation	Screening	Bioaccumulation		Cleanup	Screening	Cleanup	Screening	Cleanup	Screening
Parameter	Method	Detection Limit	Limit	Level	Trigger	Maximum Level	Objective	Level	Objective	Level	Objective	Level
OCDF	EPA 1613B	1.10	2.5									
Total TEQ (U = 0)				4.0	10							
Total TEQ (U = 1/2 EDL)				4.0	10							

Notes:

a. Grain size analysis will include the #10 and #230 sieves.

b. Because no screening level value exists for toxicity testing, selenium will only be evaluated for its bioaccumulation potential.

c. Greater than (>) values indicate that the upper bound of toxicity level is unknown, but is known to be above the concentration shown.

e. 1-Methylnaphthalene and 2-methylnaphthalene are included in the summation of total PAH for freshwater projects. 2-Methylnaphthalene is analyzed for marine projects but is not included in the summation for total LPAHs. 1-Methylnaphthalene is not analyzed for marine projects.

e. Total LPAH consists of the sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene.

f. Total HPAH consists of the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b,j,k)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.

g. Total PAHs consists of the sum of all PAHs listed.

h. Total DDT consists of the sum of 4,4'-DDD; 4,4'-DDE; and 4,4'-DDT.

i. Chlordane includes cis-chlordane, trans-chlordane, cis-nonaclor, trans-nonaclor, and oxychlordane.

j. Dioxin/furan results will be reported to sample and analysis-specific estimated detection limits.

µg/kg: micrograms per kilogram

AET: Apparent Effects Threshold

ASTM: ASTM International

DDD: dichlorodiphenyldichloroethane

DDE: dichlorodiphenyldichloroethylene

DDT: dichlorodiphenyltrichloroethane

EPA: U.S. Environmental Protection Agency

HPAH: high-molecular-weight PAHs

LPAH: low-molecular-weight PAHs

mg/kg: milligram per kilogram

ng/kg: nanograms per kilogram

OC: organic carbon-normalized

PAHs: polycyclic aromatic hydrocarbons

PCBs: polychlorinated bipheynls

PSEP: Puget Sound Estuary Program

SMS: Sediment Management Standards

TEQ: toxic equivalency

Table 4Laboratory Quality Assurance/Quality Control Requirements

					Laboratory Qua	lity Control Eleme	nts		
	Initial	Continuing			Laboratory		Matrix Spike		
Parameter	Calibration	Calibration	Duplicates	Triplicates	Control Sample	Matrix Spikes	Duplicates	Method Blanks	Surrogate Spikes
Grain size	Each batch ^a	NA	NA	Per batch	NA	NA	NA	NA	NA
Total solids/total volatile solids	Each batch ^a	NA	NA	Per batch	NA	NA	NA	NA	NA
Total organic carbon	Daily or each batch	1 per 10 samples	NA	Per batch	1 per 20 samples or 1 per batch	NA	NA	1 per 20 samples or 1 per batch	NA
Ammonia	Each batch	1 per 10 samples	NA	Per batch	1 per 20 samples or 1 per batch	NA	NA	1 per 20 samples or 1 per batch	NA
Total sulfides	Each batch	1 per 10 samples	NA	Per batch	1 per 20 samples or 1 per batch	NA	NA	1 per 20 samples or 1 per batch	NA
Metals	Daily	1 per 10 samples	Per batch	NA	1 per 20 samples or 1 per batch	NA			
Organotins	As needed ^b	Every 12 hours ^c	NA	NA	1 per 20 samples or 1 per batch	Every sample			
SVOCs/PAHs	As needed ^b	Every 12 hours	NA	NA	1 per 20 samples or 1 per batch	Every sample			
Pesticides	As needed ^b	1 per 10 samples ^c	NA	NA	1 per 20 samples or 1 per batch	Every sample			
PCBs	As needed ^b	1 per 10 samples ^c	NA	NA	1 per 20 samples or 1 per batch	Every sample			
ТРН	As needed ^b	1 per 10 samples ^c	NA	NA	1 per 20 samples or 1 per batch	Every sample			
Dioxins/furans	As needed ^b	Every 12 hours		NA	1 per 20 samples or 1 per batch	NA	NA	1 per 20 samples or 1 per batch	Every sample ^d

Notes:

a. Calibration and certification of drying ovens and weighing scales are conducted bi-annually.

b. Initial calibrations are considered valid until the continuing calibration no longer meets method specifications. At that point, a new initial calibration is performed.

c. Continuing calibrations at the beginning and end of each batch and every 10 samples.

d. Isotope dilution with labeled compounds are required in every sample.

NA: not applicable

PCBs: polychlorinated biphenyls

PAHs: polycyclic aromatic hydrocarbons

SVOCs: semivolatile organic compounds

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Table 5 Data Quality Objectives

Parameter	Precision	Accuracy	Surrogates	Completeness
Grain size	± 20% RSD	NA	NA	95%
Total solids/total volatile solids	± 20% RSD	NA	NA	95%
Total organic carbon	± 20% RSD	75%–125% R	NA	95%
Ammonia	± 20% RSD	75%–125% R	NA	95%
Total sulfides	± 20% RSD	75%–125% R	NA	95%
Total metals	± 20% RPD	75%–125% R	NA	95%
Organotins	± 35% RPD	50%–150% R	Laboratory limits	95%
PAHs/SVOCs	± 35% RPD	50%–150% R	Laboratory limits	95%
Pesticides	± 35% RPD	50%–150% R	Laboratory limits	95%
PCBs	± 35% RPD	50%–150% R	Laboratory limits	95%
Total petroleum hydrocarbons	± 35% RPD	50%–150% R	Laboratory limits	95%
Dioxins/furans	± 30% RPD	50%–150% R	Method limits	95%

Notes:

NA: not applicable

PAHs: polycyclic aromatic hydrocarbons

PCBs: polychlorinated biphenyls

PS-SRM: Puget Sound sediment reference material

R: recovery

RPD: relative percent difference

RSD: relative standard deviation

SRM: standard reference material

SVOCs: semivolatile organic compounds

Bioassay Performance Standards and Evaluation Guidelines

	Negative Control Performance Reference Sedime		Dispersive Dispos Interpretation Gui		Nondispersive I Interpretation	•
Bioassay	Standard	Performance Standard	1-hit rule	2-hit rule	1-hit rule	2-hit rule
	M < 100/	M M (200)		M	_T - M _C > 20%	
Amphipod Mortality	M _C ≤ 10%	$M_R - M_C \le 20\%$	M _T - M _R > 10%	NOCN	$M_{T} - M_{R} > 30\%$	NOCN
Lanval Dovelopment	N /1>070			N	_T / N _C < 0.80	
Larval Development	N _C / I ≥ 0.70	$N_R / N_C \ge 0.65$	$N_R/N_C - N_T/N_C > 0.15$	NOCN	$N_{R}/N_{C} - N_{T}/N_{C} > 0.30$	NOCN
Neanthes Growth	$M_C \le 10\%$	$M_R \le 20\%$		MIG	_r / MIG _c < 0.80	
Neurines Growin	and	and	$MIG_T/MIG_R < 0.70$	NOCN	$MIG_T/MIG_R < 0.50$	$MIG_T/MIG_R < 0.70$

Notes:

C: negative control

I: initial count

M: mortality

MIG: mean individual growth rate (milligrams/individual/day)

N: normal larvae

NOCN: no other conditions necessary

R: reference sediment

SD: statistically significant difference

T: test sediment

Figures



Publish Date: 2023/01/18 10:19 AM | User: jbigsby Filepath: K:\Projects\2595-Meydenbauer Yacht Club\MBYC Maintenance Dredging Eval\2595-RP-002 (Vicinity Map-SAP).dwg Figure 1



Figure 1 Vicinity Map

Sampling and Analysis Plan MBYC Maintenance Dredging Evaluation



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LEGEND:

Α

- —--- Meydenbauer Bay Yacht Club Property Line
- ----- Project Area
- DMMU Boundary
- — Storm Drain Easement
- K 6' Chain Link Fence
- <u>12</u> Existing Contours (1' & 5' Intervals)
- <u>Proposed Contours (1 & 5' Intervals)</u>
- +12.5' Dredge Prism Extent
- Proposed Sediment Sampling Location
- Storm Drain Discharge Point
- Sewer Overflow Discharge Point
- Cross Section Location

SOURCE: Aerial photograph from King County, dated 2021. Property survey conducted by True North Land Surveying, dated July 12, 2022. Hydrographic survey conducted by Gravity Marine on May 12, 2022. **HORIZONTAL DATUM:** Washington State Plane North Zone, NAD83, U.S. Survey Feet **VERTICAL DATUM:** Corps of Engineers Lake Washington



Figure 2 Conceptual Dredge Prism and Sample Locations

Sampling and Analysis Plan MBYC Maintenance Dredging Evaluation



Publish Date: 2023/01/18 10:19 AM | User: jbigsby Filepath: K:\Projects\2595-Meydenbauer Yacht Club\MBYC Maintenance Dredging Eval\2595-RP-003 (Dredge Design-12.5' Plan & Sections-SAP).dwg Figure 3



Figure 3 **Conceptual Dredge Prism Cross Sections**

> Sampling and Analysis Plan MBYC Maintenance Dredging Evaluation

Appendix A Historical Data

Figure A-1: Reported Spill Locations Figure A-2: Meydenbauer Bay Sediment Grab Sample Locations Table A-1: Meydenbauer Bay Yacht Club EIM Data Export Attachment A-1: MBYC 1995 Sampling Data Memorandum



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Figure A-1 Reported Spill Locations

Sampling and Analysis Plan Meydenbauer Yacht Club Maintenance Dredging Evaluation



Source: Washington State Department of Ecology, 2022. Environmental Information Management System. Location Data Summary. Accessed August 18, 2022. Available at: https://apps.ecology.wa.gov/eim/search/default.aspx.

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Figure A-2 Meydenbauer Bay Sediment Grab Sample Locations Sampling and Analysis Plan Meydenbauer Yacht Club Maintenance Dredging Evaluation

Table A-1 Meydenbauer Bay Yacht Club EIM Data Export

			Task	KingLakeSeds	LKWA00
			Location ID	KCM-MDNBRSWMBCH	LKWA00834
			Sample ID	L51549-10	L18812-3
			Sample Date	8/24/2010	9/13/2000
			Depth	0 - 10 cm	0 - 10 cm
			Sample Type	Ν	N
			Matrix	SE	SE
			Х		-122.211907161978
			Y		47.6102464564289
	DMMPSL2021	DMMPBT2021	DMMPML2021		
Conventional Parameters (mg/kg)					
Acid volatile sulfide					88
Ammonia as nitrogen				1 J	55
Phosphate (orthophosphate)				1 U	
Phosphorus				291	691
Sulfide					55 U
Conventional Parameters (pct)					
Total organic carbon				0.051 U	7
Total solids				86	18.1
Conventional Parameters (SU)					
рН				7	
Grain Size (pct)		• •			
Pebble				14	
Gravel				34	3 J
Granule (very fine gravel)				2	
Sand				65	33
Sand, very coarse				18	
Sand, coarse				34	
Sand, medium				22	
Sand, fine				8	
Sand, very fine				1	
Silt				1 U	62
Silt, coarse				0 U	
Silt, medium				1 U	
Silt, fine				1 U	
Silt, very fine				10	
Clay				10	2 J
Clay, coarse				10	
Clay, medium				1 U	
Clay, fine				1 U	
Total fines (Reported, not calculated)				10	
Metals (mg/kg)				10	
Antimony	150		200	0 UJ	1 UJ
Arsenic	57	507.1	700	2	15
	57	507.1	700	2	0 U
Beryllium			14		
Cadmium	5.1		14	0 JT	1
Chromium	260		1000	10	48
Copper	390		1300	9	65
Lead	450	975	1200	2	184
Manganese				163	269
Mercury	0.41	1.5	2.3	TL 0	1
Nickel				17	41
Selenium		3		0 U	2 U
Silver	6.1		8.4	TL 0	1 J
Thallium				0 JT	0 U
Zinc	410		3800	35	190
Drganometallic Compounds (μg/kg)					
Butyltin (n-Butyltin)					98
Dibutyltin					85
Tetrabutyltin					2 U
Tributyltin		73			100 J
/olatile Organics (μg/kg)					
Bis(2-ethylhexyl)adipate				23 U	
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	11		270		150 U
Semivolatile Organics (μg/kg)			I		
1,2,4-Trichlorobenzene	31		64	0 U	4 UJ
1,2-Dichlorobenzene	35		110	0 U	4 UJ
1,2-Diphenylhydrazine					290 U
1,3-Dichlorobenzene				0 U	4 UJ
1,4-Dichlorobenzene	110		120	0 U	4 UJ
2,2'-Oxybis (2-chloropropane)					290 UJ
2,4,5-Trichlorophenol					610 U
2,4,6-Trichlorophenol			┼───┤		610 U
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Sampling and Analysis Plan Meydenbauer Bay Yacht Club Maintenance Dredging Evaluation

Table A-1 Meydenbauer Bay Yacht Club EIM Data Export

			Task	KingLakeSeds	LKWA00
			Location ID	KCM-MDNBRSWMBCH	LKWA00834
			Sample ID	L51549-10	L18812-3
			Sample Date	8/24/2010	9/13/2000
			Depth	0 - 10 cm	0 - 10 cm
			Sample Type	N	N
			Matrix	SE	SE
				JL	-122.211907161978
			X		
			Ŷ		47.6102464564289
	DMMPSL2021	DMMPBT2021	DMMPML2021		
2,4-Dimethylphenol	29		210	2 U	150 U
2,4-Dinitrophenol					290 U
2,4-Dinitrotoluene					61 U
2,6-Dinitrotoluene					61 U
2-Chloronaphthalene					88 U
2-Chlorophenol					290 U
2-Methylphenol (o-Cresol)	63		77	5 U	150 U
2-Nitroaniline	05				610 U
2-Nitrophenol					150 U
3,3'-Dichlorobenzidine					150 UJ
3-Nitroaniline					610 UJ
4-Bromophenyl-phenyl ether					61 U
4-Chloro-3-methylphenol					290 U
4-Chloroaniline					R
4-Chlorophenyl phenyl ether	1	1			88 U
4-Methylphenol (p-Cresol)	670		3600	9 U	150 U
	070		5000		
4-Nitroaniline					610 UJ
4-Nitrophenol					290 U
Aniline					R
Benzidine					R
Benzoic acid	650		760	182 UJ	660
Benzyl alcohol	57		870	5 U	150 U
Bis(2-chloroethoxy)methane					150 U
Bis(2-chloroethyl)ether					88 UJ
-	1300		0200		
Bis(2-ethylhexyl)phthalate			8300	11 JT	630
Butylbenzyl phthalate	63		970	9 U	88 U
Coprostanol (Cholestan-3-ol (3B, 5B))					1500 U
Diethyl phthalate	200		1200	9 U	150 U
Dimethyl phthalate	71		1400	9 U	61 U
Di-n-butyl phthalate	1400		5100	13 UJ	150 U
Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)					290 U
Di-n-octyl phthalate	6200		6200	9 U	88 U
Hexachlorobenzene	22	168	230	0 U	4 UJ
		100			
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	11		270	1 U	
Hexachlorocyclopentadiene					150 UJ
Hexachloroethane				2 U	150 UJ
Isophorone					150 U
Nitrobenzene					150 U
n-Nitrosodimethylamine					610 UJ
n-Nitrosodi-n-propylamine					150 U
n-Nitrosodiphenylamine	28		130	9 U	150 U
Pentachlorophenol	400	504	690	23 U	150 U
		504			
Phenol	420		1200	9 U	610 U
olycyclic Aromatic Hydrocarbons (μg/kg)		T			r
2-Methylnaphthalene	670		1900	5 U	240 U
Acenaphthene	500		2000	5 U	61 U
Acenaphthylene	560		1300	5 U	88 U
Anthracene	960		13000	5 U	88 UJ
Benzo(a)anthracene	1300	1	5100	5 U	280
Benzo(a)pyrene	1600		3600	<u> </u>	360
Benzo(b)fluoranthene	1000		5000	5 U	560 J
	670		2200		
Benzo(g,h,i)perylene	670		3200	5 U	280 J
Benzo(k)fluoranthene				5 U	330
Carbazole				5 U	150 U
Chrysene	1400		21000	5 U	490
Dibenzo(a,h)anthracene	230		1900	5 U	240 U
Dibenzofuran	540	1	1700	5 U	150 U
Fluoranthene	1700	4600	30000	<u> </u>	710 J
		4000			
Fluorene	540		3600	5 U	88 U
Indeno(1,2,3-c,d)pyrene	600		4400	5 U	270 J
Naphthalene	2100		2400	5 U	240 UJ
Phenanthrene	1500		21000	5 U	180 J
Pyrene	2600	11980	16000	5 U	580
Total Benzofluoranthenes (b,j,k) (U = 0)	3200		9900	5 U	890 J

Sampling and Analysis Plan Meydenbauer Bay Yacht Club Maintenance Dredging Evaluation

2 of 4 February 2023

Table A-1 Meydenbauer Bay Yacht Club EIM Data Export

			Task	KingLakeSeds	LKWA00
			Location ID	KCM-MDNBRSWMBCH	LKWA00834
			Sample ID	L51549-10	L18812-3
			Sample Date	8/24/2010	9/13/2000
			Depth	0 - 10 cm	0 - 10 cm
			Sample Type	N	N
			Matrix	SE	SE
			X	JL	-122.211907161978
			x		
		DIAMODT2021	-		47.6102464564289
	DMMPSL2021	DMMPBT2021	DMMPML2021		
Total HPAH (DMMP) (U = 0)	12000		69000	5 U	3860 J
Total LPAH (DMMP) (U = 0)	5200		29000	5 U	180 J
Pesticides (µg/kg)					
4,4'-DDD (p,p'-DDD)	16			1 U	33
4,4'-DDE (p,p'-DDE)	9			1 U	8
4,4'-DDT (p,p'-DDT)	12			1 U	13 J
Aldrin	9.5			1 U	7 U
Chlordane					110
Chlordane, alpha- (Chlordane, cis-)				1 U	
Chlordane, gamma-				1 U	
Chlorpyrifos					94 UJ
Diazinon	10		1700		55 U
Dieldrin	1.9		1700	1 U	7 U
Disulfoton					55 U
Endosulfan					7 U
Endosulfan sulfate				1 U	7 U
Endosulfan, alpha- (I)				1 U	
Endosulfan, beta (II)				1 U	
Endrin				1 U	7 U
Endrin aldehyde				1 U	7 UJ
Heptachlor	1.5		270	1 U	7 U
Heptachlor epoxide			-	1 U	7 U
Hexachlorocyclohexane (BHC), alpha-				1 U	7 U
				1 U	7 U
Hexachlorocyclohexane (BHC), beta-					
Hexachlorocyclohexane (BHC), delta-				1 U	7 U
Hexachlorocyclohexane (BHC), gamma- (Lindane)				1 U	7 U
Malathion					150 UJ
Methoxychlor				6 U	37 U
Parathion					150 UJ
Phorate					94 U
Toxaphene				12 U	72 U
Sum 4,4 DDT, DDE, DDD (U = 0)		50	69	1 U	54 J
Total Chlordane (DMMP) (U = 0)	2.8	37		1 U	
Herbicides (µg/kg)					
2,2-Dichloropropionic acid (Dalapon)					35 UJ
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)					27 U
2,4,5-TP (Silvex)					33 U
2,4-D (2,4-Dichlorophenoxyacetic acid)					14 U
2,4-DB (2,4-D derivative)					14 U
Dicamba					32 U
Dichloroprop					18 U
Dinoseb					13 U
Mecoprop (MCPP)					16 U
Mephanac (MCPA)					15 U
PCB Aroclors (µg/kg)					
Aroclor 1016				2 U	72 U
Aroclor 1221				3 U	72 U
Aroclor 1232				3 U	72 U
Aroclor 1242				2 U	72 U
Aroclor 1242 Aroclor 1248				2 U	72 U
Aroclor 1243 Aroclor 1254				2 U	150
Aroclor 1260	100		2100	2 U	72 U
Total DMMP PCB Aroclors (U = 0)	130		3100	3 U	150
PCB Aroclors (mg/kg-OC)		~~	1	F A A A A	-
Total DMMP PCB Aroclors (U = 0)		38		5.882 U	2.143
Polybrominated diphenyl ethers (ng/kg)					
PBDE-017				0 U	
PBDE-028				0 U	
PBDE-047				0 1	
				0 U	
PBDE-066				0.11	
PBDE-066 PBDE-071				0 U	
				0 0	
PBDE-071					

Sampling and Analysis Plan Meydenbauer Bay Yacht Club Maintenance Dredging Evaluation

3 of 4 February 2023



MEMORANDUM

DATE:	November 28, 1995
TO:	Paul Benko
FROM:	Carl Kassebaum

SUBJECT: Meydenbauer Bay Outfall Project Analysis

1.0 Introduction

Purposes of this report are:

- 1. Review available information and sediment testing studies to assess the extent of sediment build-up in front of the outfall as a result of its discharges.
- 2. Evaluate the sediment build-up in relationship to the City/Yacht Club easement.
- 3. Provide summary of findings and conclusions.

2.0 Background and Study Efforts Undertaken to Date

Following is a brief history of events and summary of study efforts undertaken:

1. On July 10, 1981, a storm drainage easement was executed between the Meydenbauer Bay Yacht Club and the City of Bellevue. Key conditions in the easement are:

"Grantee accepts responsibility for sediment discharged from the energy dissipator and deposited off-shore to the <u>extent that said sediment may adversely</u> <u>impact Grantor's customary use</u> of its shorelands and boat moorage facilities. If and when sedimentation originating from the new pipeline energy dissipator system should cause the lake bottom of Grantor's shorelands to rise by more than two inches, on average, then Grantee will remove said sediment, or at Grantee's option Grantee may remove more than said accumulation from said shoreland."

810 3rd Avenue, Suite 408 - Seattle, WA 98104 (206) 382-0388 Fax (206) 382-0268 - e-mail: hartman@accessone.com "Topographic stations shall be located <u>at the entrance to each of said moorage</u> <u>slips</u> and at locations approximately twenty feet away from each slip entrance."

"In no case can the increase exceed three inches at any given station unless there is no impact on the use of that moorage slip."

"In no case shall Grantee be liable for any adverse impacts caused by changes in the lake surface elevation, or for any sedimentation which occurred prior to construction of the pipeline and dissipator system for any sediment deposited in any location which originates from any source other than the new pipeline energy dissipator system."

"Any and all sediment removal from the lake shall be contingent on the City's ability to obtain necessary federal, state, and local permits."

- 2. The outfall was built in 1982 and began functioning the same year. During the 1980's the City initiated a) stringent source control policies in the Central Business District (CBD), b) Business Partners for Clean Water Program, and c) required installation of water pollution systems on all new developments and redevelopments with high pollution potential. Because of all the above measures and ongoing programs, runoff today contains substantially less contaminates and solids than in 1982.
- 3. In February of 1982 prior to installation of the outfall, the Yacht Club measured spot elevations off the south side of the Yacht Club at various locations. Follow-up data were collected by the Yacht Club from these same locations in February of 1983, April 1985, January 1987, January 1990, May 1992, and April 1994.
- 4. At the end of January 1990, the Yacht Club supplied spot elevation data to the City through the January 1990 event. The Yacht Club requested, based on the data and the easement agreement, that the City institute action to remove sediment as stipulated in the easement agreement. In response, the City instituted action and applied for permits to dredge the area in front of the Yacht Club. At that time, the City did not verify to what extent sediment may have built up at the outfall discharge. The May 1992 and April 1994 spot elevation data was supplied to the City on July 19, 1995.
- 5. To complete the above permitting process, the City was required to undertake sediment testing of the material to be dredged. Based on Seattle-King County Department of Public Health requirements, sampling was undertaken for Total Petroleum Hydrocarbons (TPH) and heavy metals. Sediment testing was undertaken by Sweet-Edwards/EMCON, Inc (EMCON) on April 19 and November 6, 1991. Results were compiled and reported in January 1992. Based on the results which indicated great expense and permitting difficulty in implementing the project, the City decided to allow for more review and project study.
- 6. On August 23, 1995, the sediment was tested by Hartman Associates, Inc. (HAI) according to the Puget Sound Dredged Disposal Analysis (PSDDA) criteria to

determine whether the material may be suitable for open water disposal, and to verify location and extent of the outfall sediment.

3.0 Review and Analysis of Various Data Gathering Efforts

Yacht Club Lake Bottom Spot Elevation Surveys

The Yacht Club hired Bush, Roed & Hitchings, Inc. (BRHI) to collect spot elevation data. We understand that BRHI collected samples by lowering a disk over the side until it rested on the bottom. The depth was then measured to the water surface and the depth reported in relationship to the Puget Sound datum where Mean Lower Low Water = 0.0 feet.

The BRHI sampling locations and results for all sampling events are described by Figure 1 (Plan View), Figures 2 and 3 (Cross Sections), and Table 1.

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Based on our review and analysis of the data, we have the following observations.

- 1. We understand that the surveyor contacted the U.S. Corps of Engineers by phone to identify the lake level at the Hiram Chittenden Locks at the time of sampling. Depending on wind and wave conditions, outfall and creek discharges, and other local conditions inside Meydenbauer Bay, Lake Washington, Lake Union, and the Ship Canal, the actual water height at Meydenbauer Bay could have been substantially different than at the Locks. Based on these factors, the vertical measurement accuracy of the BRHI surveys is significantly greater than +/- 2 inches and probably equal to or greater than +/- one half foot.
- 2. The impact of aquatic vegetation is unknown on the measurements. However, it is expected that millfoil in the area will affect measurements that are undertaken during the months of late March through October. It is expected that the disk, when lowered over the side, will be held up above the actual lake bottom to some extent if it is resting on aquatic vegetation. The 1985, 1992, and 1994 survey events all were undertaken during the March-October time frame.
- 3. Review of Figures 2 and 3 indicate that the measurements over time are tightly bunched. Assuming measurement accuracy of +/- one half foot, all measurements inside of the +/- one half foot range, as depicted by the dashed lines, could be anywhere within this range. With the exceptions of location A at 5 feet and 28 feet from the dock, location C at 5 feet from the dock, and location E at 28 feet from the dock, the measurement accuracy boundaries are always overlapping. Assuming the +/- one half foot measurement accuracy, build up of material can only be confirmed at the A locations. The individual C and E locations are not consistent; results are unclear.
- 4. The spot elevations were located at the edge of the slips directly out from the finger piers, not at the entrance to the slips as specified by the easement agreement. Specifically, the easement wording states that

"Topographic stations shall be located at the entrance to each of said moorage slips and at locations approximately twenty feet away from each slip entrance."

Sediment Sampling in 1991

In 1991 sediment samples were collected by EMCON using a gravity corer and 2-foot long butyl acrylate tubes. Sample recovery was poor because of the loose nature of the sediment. Numerous attempts were made to recover adequate amount of sediment to test. In some locations, the sediment was so loose that no recovery was possible. Chemical analyses were only performed on recovered samples.

Due to the weight and force on the gravity corer striking the bottom and the very loose nature of the surface sediments, it is estimated that the actual core sediment samples were taken at a depth of at least 2 or more feet below the actual sediment surface. Sample recovery that was representative of the upper loose material may not have been achieved due to the thrust cone pressure of the core device.

The sediment samples recovered were described as having high water content and to be of fine grained texture. The chemical testing results indicate that the sediment contains elevated concentrations of heavy metals and total petroleum hydrocarbons (TPH), and that the recovered core section surface and depth sample results were comparable.

Cost estimates for dredging and disposal were extremely high (e.g., greater than \$200,000 for 300 yards of material). Based on the costs and the complex permitting processes, the City determined that additional study and analysis was required.

Sediment Testing for PSDDA Analyses in 1995

On August 23, 1995, sediment was collected by Pentec Environmental Inc. (Pentec) on behalf of HAI from three locations as identified as #1, #2, and #3 in Figure 4. At locations #1 and #2 a 7-foot-long, 4-inch square tube was placed on the sediment surface and pushed, only with the diver's force, almost entirely into the sediment. From this, approximately 2.0 to 2.3 feet of material was recovered. This procedure was repeated twice at locations #1 and #2 to collect sufficient material for testing. Equal amount of material from each of the two cores at each location (total of 4 cores) was then composited into one sample for chemical analysis.

A grab sample of material was collected at location number 3. This material consisted of sandy material.

The Pentec sampling observations and sample collection efforts are detailed in Attachment A.

From the visual analysis by the diver and the physical/chemical analyses of the sediment samples, the following observations are made:

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- 1. The surface sediments at locations 1 and 2 are extremely loose; the material is of soupy consistency. It flows and moves easily. Based on the inspection of the sediment cores and diver experience, the approximate depth of this fluffy loose material is definitely greater than one half foot and probably is greater than one foot in depth.
- 2. The total recovery of material in the seven-foot-long core was approximately 2.0 to 2.3 feet. Of this, the material was approximately equally distributed (e.g., one foot of overlying very soft organic material, and one foot of underlying peat material). Assuming direct correlation and compression of the sample, in-situ loose material could extend down approximately 3 feet before the underlying peat is encountered.
- 3. The overlying soft sediment was very organic; this is indicative of decay and buildup of organic plant material, presumably millfoil. Visual inspection of the bottom by the diver and inspection of the sediment samples indicates ongoing natural organic plant decay and build-up. Other sedimentation processes were not noted.
- 4. Diver survey of the area indicated extensive millfoil beds throughout most of the area. The beds completely cover much of the bottom and extend to within 1 to 2 feet of the surface. In order to collect sediment samples numbered 1 and 2, millfoil was first removed by the diver by hand from the area of sample collection, and then the sampler was guided into the sediment at the location which had been cleared. Based on the extensive growth, it appears that the millfoil could be causing problems with boat operations in the area.
- 5. The diver survey indicated sand build-up in front of the outfall as identified by Figure 4. No aquatic vegetation was growing at this location.
- 6. The diver survey indicated a sudden (e.g., not gradual change) demarcation between the sandy area and the silty soft sediment area extending outward from that point.
- 7. Chemistry analysis results indicated that the sediment tested is not suitable for open water disposal.

4.0 Evaluation

Evaluation of information derived from the data gathering efforts discussed above:

- 1. Depth measurements are very difficult to accomplish accurately at this site because:
 - a) The surface material is very soft. Any mechanical system of measurement such as the disk used by BRHI will sink into the top of this sediment to some degree. The smaller and heavier the disk, the deeper it will sink. The larger and lighter the disk, the higher it will tend to rest. Similar difficulties would be encountered with electronic bathymetric measurement from side

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scan sonar or radar. The actual density point at which the electronic echo is returned would be difficult to interpret.

- b) Millfoil and aquatic plants will intercept the measuring device or interfere with the electronic echo. In either case, artificially shallow water depth readings would tend to occur.
- 2. The sample locations (e.g., at the end of the floats) may have resulted in an exaggerated data set. Specifically, because the sediment is so soft on the surface, it is speculated that boat prop wash is a major dynamic process at the site. Boats coming in and out of the slips will tend to wash sediment away from the center of the slip with subsequent deposition occurring underneath or in line with the floats where the depth measurements were taken.
 - A major design purpose for construction of the Meydenbauer Bay trunk-line was to direct peak storm water runoff events away from Meydenbauer Creek and thus reduce flooding events along the creek. The 60 inch trunk-line acts as a high flow bypass line. Low and normal flow runoff events are controlled by the diversion structure at N.E. 2nd and 105th N.E. Low and normal flow events have sufficient energy (i.e., flow velocity) in the collection system to suspend and move fine sand, silt and clay sized particles. However, sufficient energy is not generated during these events to move the larger sand sized particles. Consequently, the fine sand, silt and clay particles are largely directed to Meydenbauer Creek.

During the course of a large storm, the following steps occur.

- Initially at the beginning of the storm as water starts to accumulate in Step 1: the system, almost all flows are directed to Meydenbauer Creek. Exception is that a small percentage of the lower basin, including Bellevue Square, discharges directly to the bypass line. Corresponding to this part of the storm is the initial washing or cleansing of the streets, parking lots, and other runoff surfaces. Since most of the drainage basin is in the CBD, including Bellevue Square, soil erosion and associated organic debris discharge is minimal. Sources of materials entering the system from the CBD are from road sanding, oils and greases from automobiles, and dust. Sufficient water volumes and energy occurs at this early phase to wash the fine materials (fine sands, silts, clays, and dust) into the system and eventually to Meydenbauer Creek. However, there is not sufficient energy to move sand particles completely through the collection system. These larger particles are temporarily trapped in catch basins.
- Step 2: As flows increase, water is diverted to the Meydenbauer Bay trunkline. Because of the increased flow energy, the sands in the system become suspended and are discharged at the Meydenbauer Bay outfall. The visible oil sheen which occasionally occurs with this discharge is believed to be a result of runoff from streets and parking

lots. Fine particles are largely not discharged during this portion of the storm. To the extent they are discharged, these particles will remain in suspension for a long period of time, eventually settling over a very large area.

The deposition of these fines will be in relationship to the intensity of the storm. If wave and wind action in the Bay is great, deposition will be widespread. The greater the energy in the Bay, the greater the area of deposition.

4. Review of the spot elevation data (Figures 2 and 3) indicates that previous to construction of the outfall and continuing to the present day, the water depth as measured at the G and H floats is consistently shallower than at the B through E floats. Reason for this is unknown. However, standard outfall (e.g., an outfall which discharges during all storm runoff regardless of storm size) deposition patterns would have resulted in the filling of this hole. For standard outfalls, the water depth immediately adjacent the outfall would be most shallow. Depths would then become progressively deeper at distances progressively greater from the outfall discharge point. The deeper the depth, the finer the material being deposited; sandy material next to outfall, grading into fine sands, then silts, and finally clays.

5. The 1990 and 1995 sediment sampling results tend to indicate that the area in which the sediments were tested may have been contaminated prior to outfall construction. This is based on the finding that the 1990 samples found equivalent concentrations of chemicals in the deeper and surface portions of the cores, and confirmation of equivalent chemical concentrations for the entire core in the 1995 sampling. The 1995 sampling identifies the subsurface layer as peat material, which is indicative of a natural system which was in place prior to construction of the outfall. The 1995 sampling, which collected a sample down to approximately 6 feet of depth did not result in sufficient dilution or differing results from the 1990 sampling.

6. The outfall has deposited sediment in greater than two inches depth immediately in front of the outfall and extending out approximately 75 feet. This material is sandy, heavier material that settles quickly.

- 7. The surface organic sediment extending out beyond the sandy area is very soft and loose. Dredging of this material would create a hole to which the soft surface soft material as well as the subsurface peat material would tend to flow into and fill up. Any dredging activity would likely need to be repeated quickly again; the benefit of the dredging would be short lived and economically difficult to justify.
- 8. Based on diver observations, it appears that millfoil could be causing problems with boat operations in the area.

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\sim 5.0 Conclusions

Based on the data gathered during the sampling processes and evaluation of other information as discussed above, the following conclusions are provided.

- 1. Sandy sediment, greater than two inches in depth and extending out approximately 75 feet, has been deposited in front of the outfall. Support evidence includes:
 - The diver survey confirms that this material consists largely of sand and that there is a sudden (e.g., not gradual change) demarcation between the sandy area and the silty soft sediment area extending outward from that point.
 - Assuming vertical accuracy of +/- one half foot for the Yacht Club lake bottom survey, the measurements at location A at 5 feet and 28 feet from the dock conclusively demonstrate sediment build-up of greater than 2 inches.
 - The 60 inch trunk-line acts as a high flow bypass line for the Meydenbauer drainage basin. Sand captured in catch basins during low flow storm events is suspended and diverted to the trunk-line during the high flow events and subsequently discharged at the Meydenbauer Bay outfall.
- 2. There is insufficient basis to establish that there is greater than two inches of material build-up, due to the outfall, extending beyond the sandy area immediately in front of the outfall. Support evidence includes:
 - Assuming vertical measurement accuracy of +/- one half foot for the Yacht Club lake bottom survey, the measurement variability ranges consistently overlap. Differences in measurements cannot be assured because of the vertical range accuracy overlap.
 - Visual inspection of the bottom by the diver and inspection of the sediment samples indicates ongoing natural organic plant decay and build-up. The overlying soft sediment is very organic and is indicative of decay and build-up of organic plant material, presumably millfoil. Other sedimentation processes were not noted.
 - The diver survey confirms that there is a sudden (e.g., not gradual change) demarcation between the sandy area and the silty soft sediment area extending outward from that point. Had there been significant discharges of solids other than sands, the sediment should become progressively finer at greater and greater distances from the outfall; sandy material next to outfall, grading into fine sands, then silts, and finally clays.
 - Water depth measurements at the G and H floats demonstrate consistently shallower depths than at the B through E floats, even prior to outfall construction. Had there been significant discharges of solids other than

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sands from the outfall, the deposition patterns should have resulted in the filling of this hole, not its continuance.

6.0 Recommendations

- 1. The City should continue with the permitting process to dredge and dispose of the sandy sediment in front of the outfall, and provide ongoing maintenance in this area in accordance with the easement agreement. The City should undertake additional chemical analyses to determine the proper disposal action.
- 2. Dredging of the soft loose sediment beyond the sandy sediment deposits is not recommended. Dredging of this material would create a hole to which the soft surface material as well as the subsurface peat material would tend to flow into and fill up. Any dredging activity would likely need to be repeated quickly again; the benefit of the dredging would be short lived and economically difficult to justify.

CC: Linda Dawson Cliff Whitmus

ATTACHMENT A MEYDENBAUER OUTFALL SEDIMENT CHARACTERIZATION

SAMPLE COLLECTION FOR PSDDA IN 1995

Cores for analysis of sediment characteristics were collected on August 23, 1995, at each of two different locations near the Meydenbauer Outfall located at the Meydenbauer Yacht Club, Bellevue, Washington. One additional sample of surface sediment was collected near the outfall by scooping material up with a glass sample container. Sampling locations are shown on Figure 4; sampling location, coordinates, and sample collection data are provided in Table 1.

Before sampling, the core tube and all parts of the sampler that came in contact with the sample were decontaminated following Puget Sound Estuary Program (PSEP 1991) protocols. The decontamination procedure deviated from PSEP protocols by not using an acid rinse and a solvent rinse; the rinse used was distilled water. Pentec acknowledged and accepted the potential added risk of sample contamination. The decontamination procedure was as follows:

- Pre-wash rinse with tap water.
- First wash with solution of tap water and Alconox soap (brush).
- Second rinse with tap water.
- Second wash with solution of tap water and Alconox soap (brush).
- First rinse with distilled water.
- Second rinse with distilled water.
- Coverage (no contact) of all decontaminated items with aluminum foil. Ends of core tubes were sealed with decontaminated stainless-steel-lined silicone rubber caps.

An attempt to use the Pentec Technologies, Inc., MudMole[™] pneumatic sediment corer to collect the cores failed because of extremely soft sediment conditions. The weight of the sediment corer caused the core tube to sink at an uncontrolled rate into the bottom.

To collect the cores, it was necessary to remove the driver head from the sediment sampler. The diver then pushed the 4-inch square, 7-ft long, aluminum core tube vertically into the hottom by hand as far as possible. After the core tube was pushed in, the core was extracted by hand. A hinged stainless steel core



catcher retained the sediment during extraction. The extremely soft nature of the sediment allowed penetrations of 5 to 6 ft with this method.

Extensive milfoil beds were found in the project area. These beds completely cover much of the bottom and extend to within 1 to 2 ft of the surface over much of the area. The diver attempted to locate an area free of milfoil at the sampling locations. If this was not possible, milfoil was removed by hand to clear an area for the core tube to be inserted. This technique avoided the risk of the plant material plugging the end of the core tube which could have reduced sediment recovery.

After extracting the core from the bottom, the water overlaying the sediment was carefully decanted. Distance from the top of the core tube to the surface of the retained sediment was measured with a decontaminated stainless steel ruler. This measurement was subtracted from the length of the core tube to calculate the amount of retained sediment. A sample label was affixed to the core tube and documentation regarding the sample entered onto the appropriate forms. The top and bottom of the core tube were sealed to prevent contamination before extruding the sediment from the core tube. The bottom of the core tube was capped with a stainless-steel-lined silicone rubber cap. To seal the top of the core tube, a stainless-steel-lined silicone plug was inserted into the core tube and pushed down until it contacted the surface of the sediment. The plug was then expanded to seal the core tube at the surface of the sediment.

Sediment core locations were documented using a differential global positioning system (DGPS) and were recorded to the nearest foot in the Washington State Plane coordinate system using North American Datum 1983 (NAD 83). Coordinates in latitude and longitude (NAD 83) are calculated to the nearest second. Water depths were measured with a diver's depth gauge.

The cores were extruded into stainless steel trays, photographed, and the qualitative sample characteristics documented.

LOCATION 1

Two cores were collected at this location in an open area several feet across which was found in the milfoil bed. These cores were labeled Cores 3 and 4. Penetration was 6 ft and 5 ft, respectively, with a recovery of 2.0 ft for each of the cores. The core tubes penetrated easily the first 3 ft, after which increasing resistance was felt. The sediment was a dark brown silt with a high percentage of organic material. An oil sheen was noted near the top of both cores. Organic fiber increased near the bottom of

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page 2 Pentec the cores, appearing to be peat bog, which made up the bottom 0.9 and 0.5 ft of Cores 3 and 4, respectively. This peat material was of a light brown color. Core 3 had a slight hydrogen sulfide odor. Volatile and sulfide compound samples were taken from Core 4 immediately after the core was extruded.

Two archive samples were collected of material composited from these two cores. The first of these samples consisted of sediment collected from above the dividing line between the peat layer and the upper sediment. The second sample was made up of material taken from below the dividing line.

LOCATION 2

Two cores were collected at this location and labeled Cores 1 and 2. A very dense mat of milfoil covered the entire bottom at this location. The diver removed the milfoil growth by pulling it out by hand to expose sediment prior to collecting the core sample. Core 1 had a penetration of 6 ft and a recovery of 2.3 ft. The core tube penetrated easily the first 3 ft, after which increasing resistanco was felt. An oil sheen was noted near the top of the core. The sediment was similar to that collected from Location 1, consisting of a dark brown silt with a high organic material content. The bottom 1.0 ft of the core was a lighter brown material with a greater amount of organic fiber content that appeared to be peat.

Core 2 was similar in appearance to Core 1. Penetration was 6 ft with a 2.3 ft recovery. An oil sheen was present near the top of the core. The bottom 0.8 ft of the core was a lighter color and appeared to be peat.

Two archive samples were collected of material composited from these two cores. The first of these samples consisted of sediment collected from above the dividing line between the peat layer and the upper sediment. The second sample was made up of material taken from below the dividing line.

LOCATION 3

A visual diving survey was conducted of the area near the outfall. The bottom of this area consists of a gray, firm sand that extends for an estimated 75 ft from the outfall. No milfoil was seen in this area. The edge of this sand deposit transitions quickly into soft sediments with a high organic content with no apparent gradation of transitional grain sizes. The sandy sediment appeared to contain very little organic material. This gray sandy material was not visible in any of the core samples collected at Location 1 or Location 2. A sample of this sediment was collected by scooping the surface material up using a glass sample container. This sample was frozen for possible future analysis.

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Equal amounts of sediment for the four cores collected at Location 1 and Location 2 was placed into a mixing bowl and homogenized to make one composite sample for chemical analysis.

REFERENCE

Puget Sound Estuary Program (PSEP). 1991. Recommended guidelines for conducting laboratory bioassays on Puget Sound sediments. Prepared for US Environmental Protection Agency—Region 10, Seattle.

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Meydenbauer Bay Yacht Club Dredging City of Bellevue

24-Oct-95 Bottom Elevations relative to MLLW at the Hiram M. Chittenden Locks

	20-1661	14.5	13.1	13.6	14 4	13.5	14,5	14.7	14.7	14.2
5-Apr-94 5 ****	0-leel	15.1	13.2	13.8	13.7	13.7	14.2	14.3	14.7	13.5
00 500t		14.2	12.5	13	13,9	13.3	14.1	14,5	14	14
3-May-92 ⊑ foot		14.5	13.2	13.5	13.5	13.5	13,9	14.1	14.6	13.4
to t		14.1	13.2	13.1	13.7	13.1	1	14,9	14.1	14.1
21-Jan-90		14.4	13.2	13,5	13.5	13.5	13.9	14	14,6	13.6
to t		13.9	12,9	12,9	13.8	1 3	13.9	14,3	14.1	. 14
10-Jan-87. 5 ************************************		14.1	13.1	13.1	13.4	13.3	13.6	14	14.2	13.1
+cc+		13.8	13.2	13	13.7	12.7	13,6	<u>,</u>	13.8	13.9
6-Apr-85 5 foot		13,8	13.2	12.8	13.4	13.2	13.3	<u>1</u> 4	14.1	13.6
100 toot		13,6	12.6	12.7	13.5	12.6	13.4	14	13.9	13.4
12-Feb-83 5 **** 0		13.6	13.2	12.9	13.4	13.1	13.3	14	14,1	13.5
40-3 0		13,2	12.9	12.8	13.5	12.5	13,6	4 4	14.2	
6-Feb-82 r 42.0		13.6	13	12.7	13.3	13.2	13.3	14.1	14.3	13.8
Э С	Bulkhead	ъ Ъ	20	85	120	150	185	220	305	335
Pier		A	ш	0	۵	ш	щ	ശ	т	£

* Distance from pler is 0-feet instead of 5-feet.

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TABLE 1

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				500	Coordinates						
Station		Sample	State Plane NA	e NAD 83			Water Depth	Penetration	Racovery	Percent	Sample
Nате	Rep.	Number	Northing	Easting	Latitude	Longitude	(H)	(L)	(L)	Recovery	Date
÷	n	18100300001	224850	1301408	47 °36 '29 "	122 "12 '28 "	7	5.0	2.0	40	8/23/95
	4	18100300001						6.0	2.0	33	8/23/9:
2	-	18100300001	224767	1301286	47 *36 *28 "	122 "12 '30 "	7	6.0	2.3	38	8/23/95
	N	1810030001						6.0	2.3	38	8/23/95
e	.	18100300002	224889	1301470	47 °36 '30 "	122 • 12 '27 "	NR	0.1	*	**	8/23/95

Table 2 Sampling location, coordinates, and sample collection data from the Meydenbaurer Outfall, August 1995.

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= Not recorded. ⊨ Surface scoop sample, archived. К¥

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Appendix B Field Collection Forms

	Daily Log
V OEA	
PROJECT NAME:	DATE:
SITE ADDRESS:	PERSONNEL:
WEATHER:	WIND FROM: N NE E SE S SW NW LIGHT MEDIUM HEAVY SUNNY CLOUDY RAIN ? TEMPERATURE: ° F . ° C [Circle appropriate units]
	COMMENTS

Signature:

QEA S	ediment C	ore Collecti	ion	Log		Page of
Job:		Station ID:				•
Job: Job No.:		Attempt No.:				_
Field Staff:		Date:				—
Contractor:		Logged By:				_
Vertical Datum:		Horizontal Datum	n: NA	AD83 WA State	Plane North, f	eet
Field Collection Coordinates:						
Lat/Northing:		Long/Easting:				_
A. Water Depth		el Measurements		C. Mudline El	evation	
DTM Depth Sounder:	Time:					_
DTM Lead Line:	Height:					
	Source:			Recovery Meas	surements (pric	or to cuts)
Core Collection Recovery Details:				↑ □		
Core Accepted: Yes / No						
Core Tube Length:						
Drive Penetration:		_				
Headspace Measurement:		-			I	
Recovery Measurement:		- [
Recovery Percentage:		-	£		1	
Total Length of Core To Process:		-	euĉ			
		-	Core Tube Length			
Drive Notes:			<u>q</u>			
			e I			
			Ö			
					I	
		-				
					Sections	To Process:
					A:	
					B:	
					C:	
					D:	
Core Field Observations and Descript	ion:	Sediment type, moistu odor, sheen, layering,				
		1				
Notos						
Notes:						

Sed	lime	ent (Cor	e Proces	ssing Log				1	L QEAS	OR
Job:					Station ID:					L QEAS	r
Job No	.:				Date/Time:						
No. of	Sectio	ons:			Core Logged E	Sy:					
Drive L					Attempt No.:						
Recove	ery:				Type of Core	Mudmole	e 🗌 Vibr	acore		Diver Core	
% Rec	overy				Diameter of Co	ore (inches)					
Notes:											
	_										
be (f	Gravel	and	Size % Fines					e (t		0	~
Recovered Length (ft)	5 D	s	іц Ц	(Deneity)	Classification an			Recovered Length (ft)		Sample	Summary Sketch
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Le Re	Size %	Size % Sand	Size	Constituer				Le Le		0,	٥°
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Labor	ratory Name: Date: Project Name: oject Number: ject Manager:																			V ANCHOR QEA
Pł	oject Number: ject Manager: none Number: nent Method:			Containers	ds	Total Volatile Solids	Total Organic Carbon			ercury	SHS		ors			Archive				
Line	Field Sample ID	Collection Date/Time	Matrix	o. of	Total Solids	Total Volá	Total Org	Ammonia	Sulfide	Metals/Mercury	SVOCs/PAHS	Pesticides	PCB Arcolors	Grain Size	Archive	Bioassay Archive				Comments/Preservation
1																				
2																				
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	Notes: Do not freeze bioass	av archive sample																 		

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Notes: Do not freeze bloassay archive sample.

Relinquished By:	Company: Anchor QEA, LLC	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time
Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Appendix C Boat Inspection and Cleaning for Invasive Species

STANDARD OPERATING PROCEDURE (SOP) SW-19 BOAT INSPECTION AND CLEANING FOR INVASIVE SPECIES

SCOPE AND APPLICATION

This SOP describes the protocol for procedures that have been developed to help prevent the spread of aquatic invasive species, especially quagga and zebra mussels and milfoil, on Gravity Environmental Consulting's trailered watercraft. When properly used, these procedures also preserve fishing, protect the aquatic environment, and save millions of dollars in water supply and electric-power generating equipment maintenance. It protects water bodies from the many destructive invasive species that hitchhike on boats. Finally, it enables Gravity to comply with state and federal laws prohibiting the spread of invasive species.

These instructions include inspection of every part of the equipment that has been in contact with the water. Including the processes to discover, remove, and kill, all invasive species. Microscopic, free-floating larvae can be found anywhere there is standing water remaining on your vessel or trailer. Attached juveniles the size of sand grains, older juveniles as large as shotgun shot, or adults up to an inch in length, might be found anywhere on Gravity boats. Therefore, the inspection must be detailed and thorough.

When a water body is known to be infected with mussels or Milfoil:

- Boats entering the water are not required to be inspected and cleaned.
- Boats leaving the water must be inspected and cleaned according to these procedures.

When a water body is known to NOT be infected with mussels:

- Arriving boats need to be inspected according to these procedures before entering the water. If ANY milfoil, mussel adults, juveniles or larvae are discovered, a complete cleaning of all equipment according to these procedures is *required*.
- Boats leaving the water require no inspection and cleaning.

Western water bodies known to contain quagga mussels include Lake Mead, Lake Mohave, Lake Havasu, and the Colorado River Drainage below these lakes. Water bodies located in the following states and Canadian provinces are known to contain quagga and/or zebra mussels. Alabama, Arizona, Arkansas, California, Connecticut, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada New York, Ohio, Oklahoma, Pennsylvania, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, as well as, Ontario, Canada and Quebec, Canada.¹

SUMMARY OF METHOD

Boats leaving a water body known to be infected: Immediately upon securing the craft to the trailer, remove it from the water and drive to the area designated for boat inspection and cleaning.

Boats arriving at a water body known to NOT be infected: Drive to the area designated for boat inspection.

PROCEDURES

All boats that have been in water known to be infested for over 24 hours and Boats and equipment where mussel juveniles have been discovered – that sandpaper feel:

Completely wash with a pressurized power sprayer using water of **140°** F or hotter. Contact with water at this temperature will kill quagga and zebra mussel juveniles and larvae in a few seconds. Qualified mussel researchers have established 104° F will work. However, hotter water works better and temperatures of 140°F and higher are common for the many power sprayers available.

- *Completely spray the entire exterior of the craft and the trailer*. Perform the wash slowly and carefully. The idea is to "cook 'em" with heat and "remove 'em" with the pressurized water. Spray all small nooks and crannies where mussel larvae may be lodged.
- No soap, detergent or chemicals are necessary.
- Be careful not to remove decals, paint or labels from the boat while spraying.

Using a power sprayer carwash, even one with hot water, is NOT adequate. One of the largest expenses in that business is energy to heat the water, regardless of the fuel used. Thus, there is considerable incentive to maximize profits by minimizing water heating. Some carwashes do not have any water heaters and only provide cold water washes. There is no assurance that carwashes use water of at least 104° F. Live mussel juveniles and larvae could be washed into storm drains that empty into the nearest stream. In addition to not cleaning the boat, this would spread mussels into waterways and reservoirs. This situation indicates using carwashes to control mussels is not advised.

Equipment

Fishing waders are a proven means of spreading invasive species. Everything from whirling disease to mud snails to quagga and zebra mussels are transported by waders. First, separate all individual components such as insoles, socks, booties, ankle guards, and laces. Then wash everything inside and out to remove dirt, plants and other visible substances. Be sure the treads are completely clean. Finally, soak them in a bucket or bathtub full of hot water. Allow sufficient soaking time for all components to reach the water temperature; thick felt soles take time. Repeat the soak with fresh hot water. Another option would be to soak them in a

potassium chloride solution made as described below. Completely dry all components and reassemble the waders.

Ropes, lines and cords and fish nets and all nets. Thoroughly wash them to remove dirt, plants and other visible substances. Then soak them in a bucket full of hot water from your house. Allow sufficient soaking time for all components to reach the water temperature. Repeat the soak with fresh hot water. Another option would be to soak them in a potassium chloride solution made as described below. Completely dry them, ideally in the sun on a hot day.

Drying Kills Mussels

Mussels are tough, and it's often difficult to know what exact conditions kill them. Thus, it's beneficial to know basic concepts. High temperatures, low humidity, and prolonged time are all injurious to mussels and increase the likelihood of death. *Boaters are advised to do everything possible to expose their equipment to hot and dry conditions for as long as possible.* Multiple researchers have shown that any dry exposure longer than 21 days will kill all mussels. Notice that these procedures contain specific actions that foster these conditions. They also prevent mildew with attendant cost and health issues, and your equipment lasts longer. It's recommended to leave boats outside in the sun, after opening and exposing compartments and wet locations.

Boats leaving a water body known to be infected:

After inspection and cleaning according to these procedures, allow the boat and trailer to air-dry for at least 7 days. Longer is better.

Boats arriving at a water body known to NOT be infected:

Drain ALL water from the boat, especially the live well. Drain all water from the bilge, motor well, (Figure 2) water-holding compartments, and water-skiing ballast tanks and bladders. See detailed instructions below for ballast tanks.

Completely drain all water from the motor cooling system. Some motors, like outboards, drain freely and easily. Other motors, like some inboards and stern-drives, can only be drained using special equipment and procedures. Follow the motor manufacturers instructions or obtain the services of a qualified service technician. This is exactly the same as draining the motor at the end of boating season to prevent freezing in the engine cooling system. Failure to do this can result in mussels growing inside the engine block and in the lines carrying cooling water to and from the motor. The consequences can be overheating, resulting in serious damage to the motor, in addition to transporting the mussels.

Thoroughly inspect the boat, trailer and all equipment for mud, plants and mussels.

Completely remove these contaminants. In addition to looking – inspect by gently running your hand along the entire surface of the equipment. Take time and carefully feel for juvenile mussels; when you locate them, it will feel like sandpaper.

Specifically, check the following areas.

Trailer				
Trailer frame Rollers	& bunks	License plate	Lights	Wiring
Axles Springs	Fenders	Hangers		
Pockets & hollow spa	aces Trailer	tires & wheels		

Water Craft Exterior

Entire hull	Trim tabs: top & bott	om of hinges	Thru-hull fittings	Transducers
Pitot tube	Cavitation Plates	Ropes & Line	esAnchors	
Depth sound	ers Water intakes	Water outlets	5 Lights	

Motors

Entire exterio	or housing	Propeller	Prope	ller shaft
Propeller sha	ft support	Propeller gua	ards	Propulsion systems
Lower unit	Gimbal area	Water intake	s & outle	ets

Boat Contents

ALL nets Float belts Personal floatation devices Float cushions Rope lockers Equipment lockers Waterfowl decoys and camouflage blinds

When adult quagga or zebra mussel shells are found attached to any surface –

remove and KILL THEM. There must be no reservation nor hesitation. These are the invasive creatures that cause so much environmental damage and cost so much money. They must be completely removed from wherever they are found and destroyed. Adults are indicated by shells of any visible size. They are the highest risk since they are the toughest to kill and they reproduce very rapidly. There has been much research on how to kill them using chemicals, radiation, heat and other methods that are complex and difficult to implement. *Therefore, simply crush them to death by stepping on them or hitting them with a rock, hammer or whatever is available.* Wear eye protection, gloves and protective clothing. Dispose of the remains in a dumpster. Depending on the degree of contamination, killing all adult mussels could be a substantial amount of work.

Specific Instructions Common to All Water Craft

All boats that have been in water known to be infested for over 24 hours and Boats and equipment where mussel juveniles have been discovered – that sandpaper feel:

Completely wash with a pressurized power sprayer using water of **140° F** or hotter. Contact with water at this temperature will kill quagga and zebra mussel juveniles and larvae in a few

seconds. Qualified mussel researchers have established 104° F will work. However, hotter water works better and temperatures of 140°F and higher are common for the many power sprayers available.

- *Completely spray the entire exterior of the craft and the trailer.* Perform the wash slowly and carefully. The idea is to "cook 'em" with heat and "remove 'em" with the pressurized water. Spray all small nooks and crannies where mussel larvae may be lodged.
- No soap, detergent or chemicals are necessary.
- Be careful not to remove decals, paint or labels from the boat while spraying.

Using a power sprayer carwash, even one with hot water, is NOT adequate. One of the largest expenses in that business is energy to heat the water, regardless of the fuel used. Thus, there is considerable incentive to maximize profits by minimizing water heating. Some carwashes do not have any water heaters and only provide cold water washes. There is no assurance that carwashes use water of at least 104° F. Live mussel juveniles and larvae could be washed into storm drains that empty into the nearest stream. In addition to not cleaning the boat, this would spread mussels into waterways and reservoirs. This situation indicates using carwashes to control mussels is not advised.

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Boats leaving a water body known to be infected:

After inspection and cleaning according to these procedures, allow the boat and trailer to air-dry for at least 7 days. Longer is better.

Boats arriving at a water body known to NOT be infected:

All boats that have been in water known to be infested for over 24 hours and Boats and equipment where mussel juveniles have been discovered – that sandpaper feel:

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Using a power sprayer carwash, even one with hot water, is NOT adequate. One of the largest expenses in that business is energy to heat the water, regardless of the fuel used. Thus, there is considerable incentive to maximize profits by minimizing water heating. Some carwashes do not have any water heaters and only provide cold water washes. There is no assurance that carwashes use water of at least 104° F. Live mussel juveniles and larvae could be washed into storm drains that empty into the nearest stream. In addition to not cleaning the boat, this would spread mussels into waterways and reservoirs. This situation indicates using carwashes to control mussels is not advised.

Diving Gear Additional Instructions

Diving gear is a well-proven means of spreading invasive species, including quagga and zebra mussels. Divers swim in ideal mussel habitat and easily pick up larvae and juveniles. Thoroughly wash <u>everything</u> inside and out to remove dirt, plants and other visible substances. This includes masks, wetsuits, booties and gloves. Also wash air tanks, air lines, regulators, and flippers. Finally, soak all equipment in a bucket or bathtub full of hot water from your house. Allow sufficient soaking time for all components to reach the water temperature. Repeat the soak with fresh hot water. Completely dry all equipment, ideally in sunlight.

Additional Information

Chlorine may be used to kill mussels, but only under carefully controlled circumstances.

- Chlorine is toxic, corrosive, and a strong oxidizer; it is extremely reactive. Only properly trained personnel, wearing protective equipment, should use chlorine. Work must be done in specifically designated areas and every one else should be kept out.
- Chlorine can be detrimental to the environment and harmful to water bodies in sufficient concentrations. Control chlorine runoff through evaporation or proper disposal.
- Chlorine has been used for years to kill mussels. Still, treatment should be conducted only as long as necessary to prevent damage. Use only the minimum concentration necessary. These apply to whatever boat system is being treated.

Appendix D New Zealand Mudsnail Identification Guide

New Zealand mudsnails (NZMS)

(Potamopyrgus antipodarum)

IDENTIFICATION GUIDE FOR KING COUNTY, WA

This identification guide is intended to help distinguish between the NZMS and native snails similar in size and appearance. How and when to use this guide: The highly invasive New Zealand mudsnail (NZMS) has been identified in 10 King County stream systems (Big Soos, Kelsey, May, McAleer, Thornton, Longfellow, Pipers, Mapes, Sunset, and Maple Leaf creeks) as of summer 2017. We ask that everyone doing freshwater field work turn over a rock or two to look for NZMS to help expand our understanding of its presence in King County.

A hand lens and flashlight will be helpful for seeing some features.



IDENTIFIABLE AND DISTINGUISHING FEATURES OF NZMS AND NATIVE SNAILS

Hold snail with tip up and opening facing you. Please note that measurements are approximate and will vary.

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New Zealand mudsnail (NZMS) Potamopyrgus antipodarum 5

- Usually less than 6 mm long
- Elongate shells with 5 to 8 whorls
- Right opening
- Variable shell color; gray to brown
- Has operculum (opening lid)

Pondsnails, Stagnicola and similar species in family Lymnaeidae

- Broader shell relative to length
 - D-shaped right opening with twisted inner lip
 - No operculum

Physella sp., no common name

Invasive non-native species

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0 __mm

- Thin, fairly transparent shell
 - Left oval opening that is 3/4 the length of the shell - No operculum

Juga sp., no common name

- Juvenile similar in size to NZMS
- Right opening
- Reddish-brown shell
- Thin spiral incised lines and raised folds
 - Has operculum
 - Only known from Soos Creek basin and Mill Creek

Galba sp., formerly Fossaria, no common name



- Thin, broader shell relative to length
 - Oval right opening half of the entire shell length
 - No operculum

Pristine pyrg (Pristinicola hemphilli)



- Very narrowly conical shell
- Clear to white coloration
- Oval, elongate right opening
- Lives in springs, unlikely to make large populations in streams or lakes - Has operculum

If you find NZMS, please identify the location and take pictures.

Contact Kate Macneale at kate.macneale@kingcounty.gov or 206-477-4769 to report potential King County infestations.

New Zealand mudsnail Identification Guide continued



Snails found in local streams (left to right) NZMS, Pristinicola, Galba, Physella, Juga (juvenile), Stagnicola



These boots were worn while walking in the mud at the edge of Capitol Lake in Olympia. Over 120 NZMS were found while cleaning the boots.

Gear decontamination tips for avoiding the spread of aquatic invasive species

Drain

- Avoid going in the water unless necessary for the work to be done.
- Do not wear felt soles on boots or waders; use hard soles only.
- Plan field trips to move from least to most likely areas of contamination; go from upstream to downstream along a water course.
- Scrub, clean, rinse, and examine all gear on-site before moving to a new water body.







When entering areas of known infestation, add one of the following decontamination procedures to the basic cleaning procedure:

- Dedicate equipment only to that site and use it nowhere else.
- Freeze for 8 hours (14 °F /-10 °C).
- Soak in hot water for at least 5 minutes (140 °F / 60 °C).
- Soak in 2% solution of Virkon Aquatic formulation for 20 minutes.
- Allow to dry in a warm, non-humid environment for at least 72 hours.

Resources



For more information including up-to-date King County infestation sites, please visit: www.kingcounty.gov/mudsnails

Search **"New Zealand mudsnail"** on the internet for additional information about NZMS and field gear decontamination.

Alternative formats available 206-477-9333 TTY Relay: 711

Thank you

Jennifer Vanderhoof for creating the scientific illustrations. Ed Johannes, Deixis Consultants, for technical content.



Department of Natural Resources and Parks Water and Land Resources Division Science and Technical Support Section Appendix B Field Forms and Photographs

	Daily Log
	CHOR
PROJECT NAME:	MBYC DATE: 9/18/23 PERSONNEL: EP/KT
SITE ADDRESS:	WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY SUNNY CLOUDY RAIN ? TEMPERATURE: °F ° ° [Circle appropriate units]
TIME	COMMENTS
0800	AQ on site to meet MBKC personell
0845	Gravity on site
9000 0900	
0945	HES Failagt
1015	Mobilize to C-1
1035	Attempt #1@ C-1 = rejected
1056	Attempt # 2 @ C-1 - ACCEPTED 78% recovery
1205	Mobilize to C-2
1215	Attempt #1@ C-2
1245	Attendet # 2@ C-Z-ACCEPTED
1345	Stad- lows for lunch
1400	Mobilize to C-3
1407	Attempt #1@ C-3 - ACCEPTED
1545	Mobilize to C-7
1555	Attempt#10C-7
1625	Attempt#2 @ C-7- ACCEPTED
755	Mobilize back to marina
1815	Gravity off site, KT off site
1900	EP off site

Signature:

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	Daily Log
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KA UE	Acc
PROJECT NAME:	
SITE ADDRESS:	PERSONNEL: EP/KT
WEATHER:	WIND FROM: N NE E S SW W NW LIGHT MEDIUM HEAVY SUNNY CLOUDY RAIN ? TEMPERATURE: 0.65.0 °.
TIME	COMMENTS
0800	EPONSITE
0815	Gravity on site
0830	KT on site call w/ AQ and MBKC to review 9/18 sampling
	deviation and discuss path forward
0915	Gravity assisting the Allyns in moving gypay from C-1
Ü935	Mobilize to C-1
0945	Attempt#3@ C-1-rejected
0955	Attempt#4@C-1-ACCEPTED
HO5 105	
1105	Attempt#1@C-4-ACCEPTED
1205	Mobilize to C-5
1213	Attempt # 1@C-5 - ACCEPTED
1310	Mobilize to C.6
1325	Attempt # 1@C-6 - rejected refusal @ 3ft
1335	Attempt#2@C-6- ACCEPTED
1425	Mix composite DU-2A - DU-2A sumpled
15-1450	Mobilize to C-2
1457	Attenot #3 @ C-2 - ACCEPTED
	Mobilize to C-3 Drop off KT, KT off site to retrieve sample
	ions
1530	Mobilize to C-3
1545	Attempt# 2@ G-3-ACCEPTED
1555	Mobilize buck to deck to drop off Gravity crew
1610	Gravity off site
1648	Gravite back on site
702	KT back on site with sample java
1722	Mix composite DU-14 - DU-14 sampled
1735	Gravity off site
1849	AROTSITE

Signature:

LL MOVA	Station ID: C-7	Page <u>2</u> of
Job: MBYC Job No.:	Attempt No.: 2	
	Date: 9/18/23	
Field Staff: EP/KT	Logged By: EKP	
Contractor: Gravity		IAD83 WA State Plane North, feet
Vertical Datum:	Horizontal Datum: N	AD83 WA State Plane North, feet
Field Collection Coordinates:		
Lat/Northing:	Long/Easting:	
A. Water Depth	B. Water Level Measurements	C. Mudline Elevation
DTM Depth Sounder:	Time: 1625	+14,3 ft
DTM Lead Line: 5,7	Height: 5 20	
	Source:	Recovery Measurements (prior to cuts)
Core Collection Recovery Details:		* []
Core Collection Recovery Details:		
Core Tube Length: 10		
Drive Penetration: 8 FH		
Headspace Measurement: 3 H		
Recovery Measurement: 7 11		
Recovery Percentage: 88%	ligt	
Total Length of Core To Process: 6,7	Core Tube Length	
Drive Notes:] [a]	
Drive notes.		
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		Costiens To Drasses
		Sections To Process:
		A:0-7 0-6.7
		1.010.1
		B:
		<u>B:</u>
		B: C:
		<u>B:</u>
Core Field Observations and Description		B: C: D: color, minor modifier, MAJOR modifier, other constituents,
Core Field Observations and Descrip		B: C: D:
		B: C: D: color, minor modifier, MAJOR modifier, other constituents,
Core Field Observations and Descrip		B: C: D: color, minor modifier, MAJOR modifier, other constituents,
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		B: C: D: color, minor modifier, MAJOR modifier, other constituents,
		B: C: D: color, minor modifier, MAJOR modifier, other constituents,
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		B: C: D: color, minor modifier, MAJOR modifier, other constituents,
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See processing log	odor, sheen, layering, ano	B: C: D: color, minor modifier, MAJOR modifier, other constituents, xic layer, debris, plant matter, shells, biota
See processing log		B: C: D: color, minor modifier, MAJOR modifier, other constituents, xic layer, debris, plant matter, shells, biota
See processing log	odor, sheen, layering, ano	B: C: D: color, minor modifier, MAJOR modifier, other constituents, xic layer, debris, plant matter, shells, biota

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QEA CEC	Sediment Core Collectio	n Log
	Station ID: C-7	
Job: MBVC Job No.:	Attempt No.: (
Field Staff: EP/KT	Date: 1/18/2.3	
Contractor: Grav. 4	Logged By: ER	
Vertical Datum:		NAD83 WA State Plane North, feet
Field Collection Coordinates: Lat/Northing:	Long/Easting:	
A. Water Depth	B. Water Level Measurements	C. Mudline Elevation
DTM Depth Sounder:	Time: 1555	+14.2 ft
DTM Lead Line: 5/8	Height: ZØ Source:	Recovery Measurements (prior to cuts)
Core Collection Recovery Details: Core Accepted: Yes / We Core Tube Length: O Drive Penetration: O		
Headspace Measurement: 3.6		-
Recovery Measurement: 6,2		
Recovery Percentage: 62%	Core Tube Lenath	
Total Length of Core To Process:		
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		<u>B:</u> C:
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Core Field Observations and Descri	ption: Sediment type, moisture odor, sheen, layering, ar	C:
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Core Field Observations and Descri	ption: Sediment type, moisture odor, sheen, layering, ar	C: D:
Core Field Observations and Descri	ption: Sediment type, moisture odor, sheen, layering, ar	C: D:

V QEA	Sediment Core Collect	Page _ of _
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Job No.:	Attempt No.:	and the second
Field Staff: EP/KT	Date: 9/18/23	
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/ertical Datum:		Im: NAD83 WA State Plane North, feet
Field Collection Coordinates:		·
_at/Northing:	Long/Easting:	
A. Water Depth	B. Water Level Measurements	
OTM Depth Sounder:	Time: & 1407	14.0 ft
DTM Lead Line: 6,0 14	Height: 10 Source:	Recovery Measurements (prior to cuts)
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Core Collection Recovery Details:		
Core Accepted: Yes / No		
Core Tube Length: 10-f+		
Drive Penetration: 9 H		
Headspace Measurement: 2.2.11		
Recovery Measurement: 7.8 1+		
		⊨
Recovery Percentage: 87%	2-11	
Total Length of Core To Process: 7,	3 FF	
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Driving to 9 ft becaus	e lher where type to 9 ft	Sections To Process: <u>A: O- 7.5 P</u> B:
Driving to 9 ft becaus	e liner in the type to 9 ft	Sections To Process: <u>A: O~ 7 S ft</u> <u>B:</u> C:
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Job: MYBC		Attempt No.:		
Field Staff: EP/KT		Date: 9/18/23		
Contractor: Grav H		Logged By: ERP	S	
Vertical Datum:		Horizontal Datum:		Plane North, feet
Field Collection Coordinates:				
Lat/Northing:	_	Long/Easting:		
A. Water Depth	B. Water Lev	el Measurements	C. Mudline El	evation
DTM Depth Sounder:	Time: 1215			
DTM Lead Line: 7, 2	Height: Source:		Recovery Meas	surements (prior to cuts)
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Core Collection Recovery Details:				
Core Accepted: Yes / No				
Core Tube Length: 10 F+				
Drive Penetration: 0 fl		<u>.</u>		
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Core Field Observations and Descri	ption:	Sediment type, moisture odor, sheen, layering, ar	, color, minor modifier, oxic layer, debris, plan	C: D: MAJOR modifier, other constituer
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ide No:: Attempt No: 2 ield Staff: EP/K T Date: 7//6/23 Contractor: 6 / Av / fw Logged By: EAD Value Staff: EAD Long/Easting: Long/Easting: Long/Easting: Attempt No: 2 Cong/Easting: No Water Depth B. Water Level Measurements Time: [0:56 C. Mudline Elevation Yead Line: 6, ? Source: Score Collection Recovery Details: Core Accepted: Yes / No Score Accepted: Yes / No Source: Score Accepted: Yes / No Ff Score Accepted: Yes / No Sections To Process: 3. ? Attempt Notth Drive Notes: Staff Ac/Ve Staff Ac/Ve Sections To Process: Staff Ac/Ve Diver Notes: Staff Ac/Ve Diver Notes: Staff Ac/Ve Diver Notes: Staff Ac/Ve Diver Staff Ac/Ve Core Field Observations and Description: Sedment type, moltare, color, minor modifier, other constitue odr, sheen, layering, anoxit	X, QEA	ediment Core Col		Page $\frac{2}{2}$ of
ield Staff: EP/K1 Date: ?// (k) / 2.3. Contractor: 6-rw/; fu Horizontal Datum: NADB3 WA State Plane North, feet ield Collection Coordinates: Horizontal Datum: NADB3 WA State Plane North, feet ield Collection Coordinates: Long/Easting: ield Collection Coordinates: Long/Easting: X. Water Depth B. Water Level Measurements C. Mudline Elevation Time: (0:56 1.3.7 Height: 2.0 Source: Source: Source: Core Collection Recovery Details: C. Mudline Elevation Ore Collection Recovery Details: Source: Core Collection Recovery Details: Ff Drive Ponetration: S.P.H Recovery Measurement: 3.7 P.H Recovery Percentage: 7.8 % Ff Orive Notes: Staff Ant/de Twowyh out SHAT Ant/de Twowyh out Sections To Process: Sections and Description: Sectiment type, molsture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shels, bota	Job: MBYC			
Contractor: F_{PAU} : f_{V} Fertical Datum: Horizontal Datum: NADB3 WA State Plane North, feet Heid Collection Coordinates: ad/Northing: $\frac{4}{1}$. Water Depth TIM Depth Sounder: TIM Depth Sounder: Time: $[0:56]$ Height: 2.0 Source: Source Collection Recovery Details: One Accepted: Yes / No Sore Collection Recovery Details: Source: Secovery Measurement: 5.1 + fr feacovery Procentage: 7.8 / fr Total Length of Core To Process: 3.7 fr Drive Notes: SHIP Anve: through out Sections To Process: 3.7 fr Drive Notes: SHIP Anve: through out Sections and Description: Sections and Description:	Job No.:			
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TM Lead Line: 6,9 Height: 20 Source: Recovery Measurements (prior to cuts) Core Collection Recovery Details: Sore Accepted: Yes / No Source Understation: SPH Headspace Measurement: 3, 9, 9+ Recovery Measurement: 3,	A. Water Depth		i	ation
Source: Source: Source Collection Recovery Details: Recovery Measurements (prior to cuts) One Tube Length: [0 ft ft Inviee Pententiage: 78% ft Orive Notes: ft SHAT Anive Two methods on at ft B: C: C: Drive Notes: SHAT Anive Two methods and Description: Sections To Process: Sections and Description: Sectiment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant mater, shels, bloa	DTM Depth Sounder:	Time: 10:56	(3.1	
Sore Accepted: Yes / No One Tube Length: [0 ft] Drive Ponetration: S Pt Becovery Measurement: 6.1 ft/ Recovery Percentage: 78% Total Length of Core To Process: 3.7 ft/ Drive Notes: SHIF1 do: Ve Twosch out Sections To Process: State Twosch out Bi: C: Drive Notes: SHIF1 do: Ve Twosch out Bi: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anxic layer, debris, plant matter, shells, biola	DTM Lead Line: 6,9		Recovery Measur	rements (prior to cuts)
Sore Accepted: Yes / No One Tube Length: [0 ft] Drive Ponetration: S Pt Becovery Measurement: 6.1 ft/ Recovery Percentage: 78% Total Length of Core To Process: 3.7 ft/ Drive Notes: SHIF1 do: Ve Twosch out Sections To Process: State Twosch out Bi: C: Drive Notes: SHIF1 do: Ve Twosch out Bi: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anxic layer, debris, plant matter, shells, biola	Core Collection Recovery Details:			
core Tube Length: Off- brive Penetration: Secovery Measurement: Secovery Measurement: Secovery Percentage: 78% Orive Notes: Staff A drive twoords out SHAP drive twoords out B: C: Drive Notes: Staff A drive twoords out Sections To Process A: 0-3,7 % B: C: Drive Notes: Staff A drive twoords out Sections more process: B: C: Drive Notes: Drive Notes: Staff A drive twoords out B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue core, sheen, layering, anoxic layer, debris, plant matter, shells, blota				
Drive Penetration: Set Headspace Measurement: 6.1 ft/ Recovery Measurement: 7.8 ft/ Secovery Percentage: 7.8 ft/ Total Length of Core To Process: 3.7 ft/ Drive Notes: Sections To Process Stfff dn/ue two_nh out B: C: D: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biola				
Headspace Measurement: 6.1 +/- Recovery Measurement: 3.9 + Secovery Percentage: 7.8 % Oriel Length of Core To Process: 3.7 +/- Drive Notes: StH1 Antue twomph out Sections To Process A: 0 - 3.7 +/- B: C: D: Core Field Observations and Description: Sections to process Sections to process Sections To Process A: 0 - 3.7 +/- B: C: D:			+	
Recovery Measurement: 3.1 Provide the second sec				
Recovery Percentage: 78% Orive Notes: StH1 StH2 Anve two whont Sections To Process: StH2 StH2 Anve two whont Sections To Process: A: 0-3,7 ft B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota				
Sections To Process A: O - 3, 7 A B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biola				
Sections To Process A: O - 3, 7 A B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biola		0.		
Sections To Process A: O - 3, 7 A B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biola	Total Length of Core To Process: 3. 7	++	9	
Sections To Process A: O - 3, 7 A B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biola	Drive Notes:			
Sections To Process A: O - 3, 7 A B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biola	SHEL dollar through out			
A: O-3.7 A B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota	STAT WICE WORK OUT		1 ŭ	
A: O-3.7 A B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota			4 🖵 '	
A: O-3.7 A B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota			4 1111	
Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota				Sections To Process:
Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota			1	A: 0-37 A
Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota				
Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota				
Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitue odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota				C:
Core Field Observations and Description: odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota				D:
Notes:	Core Field Observations and Descrip	tion: Sediment typ odor, sheen,	e, moisture, color, minor modifier, MA layering, anoxic layer, debris, plant m	AJOR modifier, other constitue natter, shells, biota
Notes:				
	Notes:			

ANCHOR QEA	Sediment Core Collectio	n Log		
	Station ID: C-			
Job: MBYC	Attempt No.: (
Job No.:	Date: 9/18/2.3			
Field Staff: EP/KT	Logged By: ERP			
Contractor: Grav.h	Logged By. EN	Datum: NAD83 WA State Plane North, feet		
Vertical Datum:	Horizontal Datum:	NAD65 WA State Flame North, leet		
Field Collection Coordinates:				
Lat/Northing:	Long/Easting:			
A. Water Depth	B. Water Level Measurements	C. Mudline Elevation		
DTM Depth Sounder:	Time: 10:35			
DTM Lead Line: 6, 7 Pt	Height: 20	Recovery Measurements (prior to cuts)		
	Source:			
Core Collection Recovery Details:				
Core Accepted: Yes /				
Core Tube Length: 0				
Drive Penetration: 10 ft				
Headspace Measurement: 6,9				
Recovery Measurement: 3.				
Recovery Percentage: 31%				
Total Length of Core To Process:	Core Tube Length			
Drive Notes:	ree la			
	p			
Stiff drive throughout	lo			
3				
		-		
		Sections To Process:		
		A:		
		B:		
5.		C:		
		• <u> </u>		
Core Field Observations and Descri	Sediment type, moisture,	, color, minor modifier, MAJOR modifier, other constituents,		
Core rield Observations and Decon	odor, sheen, layering, an	oxic layer, debris, plant matter, shells, biota		
Notes:				

QEA :::::	Sediment C	ore Collectio	n Log	Page 3 of 3
Job: MBYC		Station ID: C1		1 490 00 01
Job No.: 272595-01.01	-	Attempt No.:#3 4	1 #4	
Field Staff: KT/ERP	-	Date: 09/19/20	23	
Contractor: Gravity		Logged By: KT /		
Vertical Datum:	_	Horizontal Datum: N		Plane North, feet
Field Collection Coordinates: Lat/Northing: 41 36 32.841	NN	Long/Easting: 122	12 32	-8479 W
A. Water Depth	B. Water Leve	el Measurements	C. Mudline E	
DTM Depth Sounder:	Time: 945		+13	0 ft
DTM Lead Line: 6.9.44	Height: + 20+			
	Source: LWS	/	Recovery Mea	asurements (prior to cuts)
Core Collection Recovery Details: Core Accepted: Yes / No Core Tube Length: 10 ft Drive Penetration: 6 ft Headspace Measurement: 1.15 ft Recovery Measurement: 4.25 ft Recovery Percentage: 70.83 o/o Total Length of Core To Process: Drive Notes:	Attempt# 4 (2) No (0 ft 5 ft 0.15 ft 4 25 ft 85% 40 ft	(955)		Sections To Process: <u>A: 0^{-} 4.0ft</u> <u>B:</u> <u>C:</u> D:
Core Field Observations and Descrip	otion:	Sediment type, moisture, odor, sheen, layering, and	color, minor modifier	, MAJOR modifier, other constituents,
			unio layer, debits, pla	int matter, oneilo, viota
see processing log for	attompt # 4			
Notes:				
Sample Intervals : 0-1-6ft	1.6-3.6H			
Compte militardens 0 1015	10 .01			

JOB: MBYC	Station ID: GZ
Job: MP30 Job No.: 222595-01-01	Attempt No.: 3
Field Staff: KT/ ERP	Date: 09 / 9 /25
Contractor: Gratity	Logged By:KT/ERP
Vertical Datum:	Horizontal Datum: NAD83 WA State Plane North, feet
Field Collection Coordinates:	
_at/Northing: 47 36 29.26N	Long/Easting: 22 2 3.4997W
A. Water Depth B	B. Water Level Measurements C. Mudline Elevation
	ime: 1457 +12.9 ++
DTM Lead Line: 7.1 ft H	leight: + 20 ++
S	Bource: LWSC Recovery Measurements (prior to cuts)
Core Collection Recovery Details:	†
Core Accepted: Yes / No	
Core Tube Length: 10 ft	
Drive Penetration: 5ft	
	- 30ft
Recovery Measurement: 4.10 ft	
Recovery Percentage: 94 %	[£
Total Length of Core To Process: 4-40+	
Drive Notes:	
	[u]
	L Sections To Process:
	A: 0-4.40ft
	<u>A: 0-4.40ft</u> B:
	A: 0-4.40ft
	<u>A: 0-4.40ft</u> B:
	A: 0-4-40 ft B: C: D:
Core Field Observations and Description:	A: 0-4-40 ft B: C: D:
Core Field Observations and Description:	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituent
Core Field Observations and Description:	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituent
Core Field Observations and Description:	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituent
Core Field Observations and Description:	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituent
Core Field Observations and Description:	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituent
Core Field Observations and Description:	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituent
Core Field Observations and Description:	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituent
Core Field Observations and Description:	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituent
Core Field Observations and Description:	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituent
Core Field Observations and Description:	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituent
Core Field Observations and Description:	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituent
Core Field Observations and Description:	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituent
Core Field Observations and Description:	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituent
	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituen odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota
	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituen odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota
	A: 0-4.40 ft B: C: D: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituen odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

ANCHOR QEA	Sediment C	ore Collectio	n Log	Page 2 of
Job: MBYC		Station ID: C-2		
Job No.: 222 595-01.01	-	Attempt No.: 2		
Field Staff: EP/k 1		Date: 9/18/23		
Contractor: Gravity		Logged By: ERP		
Vertical Datum:		Horizontal Datum: I	AD83 WA Stat	e Plane North, feet
Field Collection Coordinates:		12.4		
Lat/Northing: 47 36 29.3061 N	<u>/</u>	Long/Easting: 22	12 31.50	12W
A. Water Depth	B Water Leve	el Measurements	C. Mudline I	Elevation
DTM Depth Sounder:	Time: 1245		+13.0	
DTM Lead Line: 7.0 ft	Height: 120			
	Source: LWS		Recovery Me	asurements (prior to cuts)
			+	1
Core Collection Recovery Details:				
Core Accepted: Yes / No				
Core Tube Length: 0 +				1
Drive Penetration: 5 fL				1.0
Headspace Measurement: 5,744			1	
Recovery Measurement: 4.3 4+				
Recovery Percentage: 87%	24	Core Tube Length		
Total Length of Core To Process: 🍟 f	r	- [e]		
Drive Notes:				
Drive Notes:		I		
		ž		
		0		- 大
				Sections To Process:
				A: 0-4
				B:
				C:
			•	D:
			celer miner modifie	r, MAJOR modifier, other constituents,
Core Field Observations and Descrip	ption:	odor, sheen, layering, and	oxic layer, debris, pla	ant matter, shells, biota
Notes:				

ANCHOR QEA		Page Zof 2
Job: MBrC	Station ID: C-3	
Job No.:	Attempt No.: 7	
Field Staff: EP	Date: 9/19/23 Logged By: ERI	2
Contractor: Gravity		NAD83 WA State Plane North, feet
Vertical Datum:	Horizontal Datum:	NADOS WA State Plane North, leet
Field Collection Coordinates:		
Lat/Northing:	Long/Easting:	
A. Water Depth	B. Water Level Measurements	C. Mudline Elevation
DTM Depth Sounder:	Time: 545	+14.5.21
DTM Lead Line: 5.5	Height: 20 Source:	Recovery Measurements (prior to cuts)
Core Collection Recovery Details:		+
Core Accepted: (Yes) / No		
Core Tube Length: 0 FL		
Drive Penetration: 6 Pt		
Headspace Measurement: 4.8 P+		-
Recovery Measurement: 5,7++		
Recovery Percentage: 86%		
Total Length of Core To Process: 44	<u>4.8.f</u>	
Drive Notes:	- <u>4.8.</u> + <u>t</u>	
Easy drive throughout	+	
Lasy arive woughou	<u>'</u> 3	
5		
		Sections To Process:
		A: 0-4.8
		<u>B:</u>
		C:
		D:
Core Field Observations and Descrip		, color, minor modifier, MAJOR modifier, other constituents, noxic layer, debris, plant matter, shells, biota
See processing log		
see processing log		
Notes:		
Sample intervals are O	-3 and 3-5	
Frank - Millionia - VC V		

Job: MBUC Job No: 22259(5-010) Field Staff: K1/ERP Contractor: Gravity Vertical Datum: Field Collection Coordinates: Lat/Northing: 47 36 32-5544N A. Water Depth DTM Depth Sounder: DTM Lead Line: 5.74± Core Collection Recovery Details: Core Accepted: Ver / No Core Tube Length: 10 ft Drive Penetration: 6 f-+ Headspace Measurement: 5 93 Recovery Measurement: 5 93 Recovery Percentage: 91.22 °/o Total Length of Core To Process: 5.50 ft	QEA CHOR	Sediment Core (Collection	n Log	1 Page of <u>1</u>
Job No: 22258/5-0101 Field Staff: KT/JERP Contractor: Chavitry Vertical Datum: Logged By: KT / ERP Horizontal Datum: Horizontal Datum: NADB3 WA State Plane North, feet Field Collection Coordinates: 12.5544N Lat/Northing: 47 3.6 32.5544N Lat/Northing: 47 3.6 32.5544N Lat/Northing: 47 3.6 32.5544N Lat/Northing: 47 3.6 32.5544N Long/Easting: 12.2 12.30.4074 w A. Water Depth B. Water Level Measurements C. Mudline Elevation DTM Depth Sounder: Time: 10.5 DTM Depth Sounder: Graduation -14.3.44 Drive Potentation: 6.74 Recovery Measurement: 0.17.64 Drive Notes: 0.17.64 Sections To Process: 5.50.64 Drive Notes: 0.75.50.64 B: C: Drive Notes: 0.75.50.64 B: C: Drive Notes: Sections and Description: Sections to Proce D: Sectore Field Observations and Descrip		Statio			Fage egror
Field Staff: KT / ERP Contractor: Gravity Vertical Datum: Horizontal Datum: Field Collection Coordinates: 12.5544N Lat/Northing: 47 A. Water Depth B. Water Level Measurements DTM Lead Line: 5.7 44: B. Water Level Measurements C. Mudline Elevation Time: IIOS Height: Height: Source: LWSC Core Collection Bacovery Details: Core Accepted: Core Tube Length: I ft Drive Penetration: 6.4 Prive Notes: 9.8 Drive Notes: 9.9 Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitied of steins, pant matter, shells, bloba					
Contractor: Crawing Vertical Datum: Logged By: RT/ERP Horizontal Datum: Horizontal Datum: KADB3 WA State Plane North, feet Field Collection Coordinates: 12.2.5544N Lat/Northing: 4.7 A. Water Depth B. Water Level Measurements DTM Depth Sounder: Time:: 1105 DTM Lead Line: 5.7.14 Source: LWSC Core Collection Recovery Details: C. Mudline Elevation Core Accepted: 10.4 Drive Ponetration: 6.4 Recovery Measurement: 5.9.0 ft Drive Ponetration: 6.4 Drive Notes: 5.5.0 ft Drive Notes: Sections To Proces: Drive Notes: Sections and Description: Sections and Description: Sediment type, moliture, color, micri modifier, MADR modifier, other constition dor, sheen, layering, anoxic layer, detris, plant matter, shells, biola Sect. PV0C2SSING					
Vertical Datum: Horizontal Datum: NAD83 WA State Plane North, feet Field Collection Coordinates: 32.5544N Long/Easting: 1/2 1/2 30.9074 W A. Water Depth B. Water Level Measurements +14.3.4t DTM Lead Line: 5.7.4t Height: 2014 Source: LWSC Recovery Measurements (prior to cuts) Core Collection Recovery Details: Core Tube Length: 10.17.17.14 Recovery Measurement: 0.17.17.14 Recovery Percentage: 9.1.2.2.9.6 Total Length of Core To Process: 5.50.6.4 Image: Source: LWSC Drive Notes: Sections To Process: 5.50.6.4 Image: Source: LWSC Sections To Procesc: 0.5.50.6.4 Drive Notes: Sections and Description: Sections the modifier, other constitution of the modifier, the constitution of the constitution of the constitution of the cons					
Field Collection Coordinates: 32-5544N Long/Easting: 1/2 1/2 30.4074 W A. Water Depth B. Water Level Measurements					
Lat/Northing: 47 36 32-5544N Long/Easting: 1/2 1/2 30.9074 W A. Water Depth B. Water Level Measurements Time: 105 +14 3 ft DTM Lead Line: 5 7.4 k Source: LWSC Recovery Measurements (prior to cuts) Core Collection Recovery Details: Core Tube Length:: 10.4 ft Recovery Measurement: 9.1 ft Drive Penetration: 6.4 ft 7.2 ft Recovery Measurement: 9.1 ft Recovery Measurement: 6.1 ft ft Recovery Measurement: 9.1 ft Drive Penetration: 6.7 ft ft Recovery Penetration: ft Drive Penetration: 6.7 ft ft Recovery Penetration: ft Drive Penetration: 6.7 ft ft Recovery Penetration: ft Drive Notes: Drive Notes: Drive Notes: Drive Notes: Drive Notes: ft Drive Notes: Sections and Description: Section: sheen, layering, anotic layer, debris, plant matter, shells, bloba Sect Processing Form Section: sheet, shells, bloba Drive Section: Form </td <td>Vertical Datum:</td> <td> Horizo</td> <td>ontal Datum: N</td> <td>AD83 WA State</td> <td>Plane North, feet</td>	Vertical Datum:	Horizo	ontal Datum: N	AD83 WA State	Plane North, feet
DTM Depth Sounder: Time: 1105 + 14 3 ft DTM Lead Line: 5 7 ft Height: + 20 ft Recovery Measurements (prior to cuts) Core Collection Bacovery Details: Core Core Tube Length: 10 ft Recovery Measurement: 0 + 17 ft Recovery Measurement: 0 + 17 ft Recovery Measurement: 0 + 17 ft Recovery Measurement: 0 + 17 ft Recovery Percentage: 91.22 % 91 9 0 5 5 0 1 1 0 5 5 0 1 0 0 5 5 0 <td></td> <td>SS44N Long/E</td> <td>Easting: 122</td> <td>12 30.90</td> <td>74 W</td>		SS44N Long/E	Easting: 122	12 30.90	74 W
DTM Lead Line: 5.14t Height:+20ft Source: LWSC Recovery Measurements (prior to cuts) Core Collection Bacovery Details: Core Tube Length: 10 ft Core Tube Length: 10 ft Ft Drive Penetration: 6 ft+ Ft Recovery Measurement: 5 %3 Recovery Measurement: 5 %3 Recovery Percentage: 91.22 % Total Length of Core To Process: 5.50 ft Drive Notes:	A. Water Depth		urements		
Source: LWS(Recovery Measurements (prior to cuts) Core Collection Becovery Details: Image: Core Accepted: 10 ft Core Tube Length: 10 ft Image: Core Tube Length: 10 ft Drive Penetration: 6 ft Ft Recovery Measurement: 5 93 Recovery Measurement: 5 93 Recovery Percentage: 11.22 % Image: Core To Process: 5.50 ft Drive Notes: Image: Core To Process: 5.50 ft Drive Notes: Image: Core To Process: 5.50 ft Core Field Observations and Description: Sediment type, moleture, color, minor modifier, MAOR modifier, other constitued of r, sheen, layering, anoxic layer, debris, plant matter, shells, blota	DTM Depth Sounder:		_	+14 3+	t
Source: LWS(Recovery Measurements (prior to cuts) Core Collection Becovery Details: Image: Core Accepted: 10 ft Core Tube Length: 10 ft Image: Core Tube Length: 10 ft Drive Penetration: 6 ft Ft Recovery Measurement: 5 93 Recovery Measurement: 5 93 Recovery Percentage: 11.22 % Image: Core To Process: 5.50 ft Drive Notes: Image: Core To Process: 5.50 ft Drive Notes: Image: Core To Process: 5.50 ft Core Field Observations and Description: Sediment type, moleture, color, minor modifier, MAOR modifier, other constitued of r, sheen, layering, anoxic layer, debris, plant matter, shells, blota		Height:+20+4			
Core Accepted: (a) / No Core Tube Length: 10 ft Headspace Measurement: 0 17 ft Recovery Measurement: 5 83 Recovery Percentage: 91.22% Total Length of Core To Process: 5.50 ft Drive Notes:				Recovery Mea	surements (prior to cuts)
Core Accepted: See Processing Form	Core Collection Recovery Details:				
Core Tube Length: 10 ft Drive Ponetration: 6 ft - Headspace Measurement: 0.17 ft Recovery Percentage: 9.3 Recovery Percentage: 9.1.22 % Drive Notes: 9.9					
Drive Penetration: 6 ft+ Headspace Measurement: 0.17 ft Recovery Measurement: 5 83 Recovery Preventage: 91.22 % Total Length of Core To Process: 5.50 ft Drive Notes:					
Headspace Measurement: 5 %3 Recovery Percentage: 91.22 % Total Length of Core To Process: 5.50 ft Drive Notes:	21				
Recovery Measurement: 5 93 Recovery Percentage: 91.22 % Total Length of Core To Process: 5.50 ft Drive Notes:					1
Recovery Percentage: 91.22 % Total Length of Core To Process: 5.50 ft Drive Notes: 99 Sections To Proce A: 0 - 5.50 ft B: C: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitution of or, sheen, layering, anoxic layer, debris, plant matter, shells, biota See pv0Cessing					
Sections To Proce A: 0-5.50 ft B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitution odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota See processiving For m					T
Sections To Proce A: 0-5.50 ft B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitution odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota See processing Form			lgt	1 1	
Sections To Proce A: 0-5.50 ft B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitution odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota See processiving For m	Total Length of Core To Process: 5.5) ft	b		
Sections To Proce A: 0-5.50 ft B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitution odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota See processiving For m					
Sections To Proce A: 0-5.50 ft B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitution odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota See processiving For m	Drive Notes:		1 15		
Sections To Proce A: 0-5.50 ft B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitution odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota See processing Form			[º		
A: 0-5.50 ft B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitions, sheen, layering, anoxic layer, debris, plant matter, shells, biota See pv0cessive See pv0cessive D: D: See pv0cessive See <td></td> <td></td> <td></td> <td></td> <td></td>					
A: 0-5.50 ft B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitions, sheen, layering, anoxic layer, debris, plant matter, shells, biota See pv0cessive See pv0cessive D: D: See pv0cessive See <td></td> <td></td> <td>_</td> <td></td> <td>1</td>			_		1
A: 0-5.50 ft B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitution odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota See pv0cessing Form			1.1		
A: 0-5.50 ft B: C: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitions, sheen, layering, anoxic layer, debris, plant matter, shells, biota See pv0cessiv19 Form			- 1 Jan 1 1		Sections To Process:
B: C: D: D: Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constitution, sheen, layering, anoxic layer, debris, plant matter, shells, biota See pt/0(cessing) Form					
Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constit odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota					
Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constition See processive Form					B:
Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constition odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota See processing Form					C:
Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constition odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota See pv0Cessing Form				*	D.
Core Field Observations and Description: see processing Form		Sedime	ent type moisture o	olor minor modifier	
	Core Field Observations and Description	odor, si	heen, layering, anox	kic layer, debris, plar	nt matter, shells, biota
	See processing Form				
Notes: Sample: 0-2.8 ft, 28 - 4.8 ft					
Notes: Sample: 0-2.8 ft, 28 - 4.8 ft					
Notes: Sample: 0-2.8 ft, 28 - 4.8 ft					
Notes: Sample: 0-2.8 ft, 28 - 4.8 ft					
Notes: Sample: 0-2.8 ft, 28 - 4.8 ft					
Notes: Sample: 0-2.8 ft, 28 - 4.8 ft					
Notes: Sample: 0-2.8 ft, 28 - 4.8 ft					
Notes: Sample: 0-2.8 ft, 28 - 4.8 ft					
Notes: Sample: 0-2.8 ft,28-4.8 ft					
Notes: Sample: 0-2.8 ft, 28 - 4.8 ft					
Notes: Sample: 0-2.8 ft, 28 - 4.8 ft					
Notes: Sample: 0-2.8 ft, 28 - 4.8 ft					
Sample: 0-2.0 Tt, 20 1.0 Tt	Notes: 0 7 8 LL 7	8 - 48 11			
	Sample: U-2.0 TE, C	v vo Tt			

ANCHOR QEA	Sediment C	ore Collectio	n Log	Page of
		Station ID: C5		Page of
Job: MBYL Job No.: 222545-01.01		Attempt No.:		
		Date: 09/19/202	3	
Field Staff: KT/ERP Contractor: Gravity		Logged By: K+		
Vertical Datum:		Horizontal Datum: N		Plane North, feet
		Tionzontal Datam. I		nano noranj roce
Field Collection Coordinates: Lat/Northing: 41 36 31	.6999 N	Long/Easting: 122	12 12	18.7985 W
A. Water Depth	B. Water Lev Time: [2]3	el Measurements	C. Mudline Ele +13 ft	
DTM Depth Sounder:	Height: + 20		-14-211	
DTM Lead Line: 7ft	Source: LWS		Recovery Meas	urements (prior to cuts)
	Source. LWS	4	Recovery meas	
Core Collection Recovery Details:				
Core Accepted: (Yes) / No				
Core Tube Length: 10 ft				
Drive Penetration: 5 ft		-	+	
	L	-		
Headspace Measurement: 5.5 +	r	-	1	
Recovery Measurement: 4.5 ft				t.
Recovery Percentage: 90%	2 01	Core Tube Length		
Total Length of Core To Process: 4	211	- e		
		e		
Drive Notes:		P		
Still - moderate drive thro	ughout.	ore la		
Refusal at 5ft	Ú.	Ŭ		
				Sections To Process:
				A: 0-4.2ft
				B:
				C:
				D:
Core Field Observations and Desc	ription:	Sediment type, moisture, odor, sheen, layering, and	color, minor modifier, l oxic layer, debris, plant	AJOR modifier, other constituents, matter, shells, biota
See processing log				
			1.	
Notes: Sample: 0-1.5,	10 70			
DAMIDIE - A T'21	1.2-3.2			
Dambar A T'S	1.>-3->			
Dampix " 0 1.5	1.5-3.5			

K, QEA THE	Sediment Core Collectio	PageZ of
Job: MBYC	Station ID: C6	
Job No.: 222545-01.01	Attempt No.: Z	
Field Staff: KT/ERP	Date: 09/19/23	
Contractor: Gravity	Logged By: KT/	
Vertical Datum:	Horizontal Datum:	NAD83 WA State Plane North, feet
Field Collection Coordinates: Lat/Northing:	Long/Easting:	
A. Water Depth DTM Depth Sounder:	B. Water Level Measurements Time: 1335	C. Mudline Elevation $+12.6 ft$
DTM Lead Line: 7.4 Ft	Height: + 20 ft Source: LWSC	Recovery Measurements (prior to cuts)
Core Collection Recovery Details: Core Accepted: Yes / No Core Tube Length: 10 ft Drive Penetration: 5 ft		
Headspace Measurement: -1.58++		
Recovery Measurement: 5.58ft		
Recovery Percentage: 1 12 %	te de la companya de	
Total Length of Core To Process: 📁	5.30	
Drive Notes: Easy drive to 4tt Moderate - stilf drive 4-?	Sft	
		Sections To Process:
		A: 0-5.30 ft B:
		A: 0 -5.30 ft
		A: 0-5.30 ft B:
		A: 0 - 5.30 ft B: C: D:
Core Field Observations and Descrip	ption: Sediment type, moisture odor, sheen, layering, ar	A: 0-5.30 ft B: C:
	ption: Sediment type, moisture odor, sheen, layering, ar	A: 0 -5.30 ft B: C: D:
	ption: Sediment type, moisture odor, sheen, layering, ar	A: 0 -5.30 ft B: C: D:
	ption: Sediment type, moisture odor, sheen, layering, ar	A: 0 -5.30 ft B: C: D:
	ption: Sediment type, moisture odor, sheen, layering, ar	A: 0 -5.30 ft B: C: D:
	ption: Sediment type, moisture odor, sheen, layering, ar	A: 0 -5.30 ft B: C: D:
	ption: Sediment type, moisture odor, sheen, layering, ar	A: 0 -5.30 ft B: C: D:
	ption: Sediment type, moisture odor, sheen, layering, ar	A: 0 -5.30 ft B: C: D:
	ption: Sediment type, moisture odor, sheen, layering, ar	A: 0 -5.30 ft B: C: D:
	ption: Sediment type, moisture odor, sheen, layering, ar	A: 0 -5.30 ft B: C: D:
	ption: Sediment type, moisture odor, sheen, layering, ar	A: 0 -5.30 ft B: C: D:
	ption: Sediment type, moisture odor, sheen, layering, ar	A: 0 -5.30 ft B: C: D:
Core Field Observations and Descrip	ption: Sediment type, moisture odor, sheen, layering, and	A: 0 -5.30 ft B: C: D:
Core Field Observations and Descrip	odor, sheen, layering, an	A: 0 -5.30 ft B: C: D:
Core Field Observations and Descrip	ption: Sediment type, moisture odor, sheen, layering, and $0 - 1.1 \text{ ft}$, $1.1 - 3.1 \text{ ft}$	A: 0 -5.30 ft B: C: D:

,

ANCHOR QEA	Sediment Core Collectio	Page 1 of 2
Job: MBYC Job No.: 222595-01.01 Field Staff: KT/ERp Contractor: (may (M Vertical Datum:	Logged By: kt	23 / Ek p NAD83 WA State Plane North, feet
Field Collection Coordinates: Lat/Northing:	Long/Easting:	
A. Water Depth DTM Depth Sounder: DTM Lead Line: 6.9 ft	B. Water Level Measurements Time: 325 Height: +20 ft Source: LWSC	C. Mudline Elevation + 13・1 ft Recovery Measurements (prior to cuts)
Core Collection Recovery Details: Core Accepted: Yes / No Core Tube Length: 0+4 Drive Penetration: 3+6 Headspace Measurement: Recovery Measurement: Recovery Measurement: Recovery Percentage: Total Length of Core To Process: Drive Notes: Stilf drive throughout. Havd refusal at 3 ff		Sections To Process:
		A: B: C: D:
Core Field Observations and Desc		e, color, minor modifier, MAJOR modifier, other constituents, noxic layer, debris, plant matter, shells, biota
Notes: Sample Interval:	0-1.6ft, 1.6tt-3.6tt	

Job: MBY Job No.: No. of Secti Drive Lengtl Recovery: 6 % Recovery Notes:	ons: n: §		Date/Time: Core Logged By: Attempt No.:	Core Logged By: Attempt No.: Type of Core					
Recovered Length (ft) Size % Gravel	Size % Sand	Size % Fines	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	DIA	Sample	Summary		
		æ	0-18 Loose, wet, to creasional south SILT, grayish brown, modernite H2S-like odor 1.8-33: changes to moist 3.3-3,5: Band of light brown CLAY 3.5-7: 4.75 ft: Loose, maist, brown, SILT, abudant organic mathes (lasts), trace wood (sticks)						
Job: <u>MBY C</u> Job No.: No. of Sections: [Drive Length: 9 Recovery: 7.5 % Recovery: 879 Notes:		Station ID: St. C-3 Date/Time: 9/18/23 1407 Core Logged By: RP Attempt No.: 1 Type of Core Mudmole Vi Diameter of Core (inches) 4	bracore		Diver Core				
--	---------------------------------------	--	--------------------------	-----	--	---------			
Recovered Length (ft) Size % Gravel Size % Sand	səu i % (Density ə Constitue	Classification and Remarks /, Moisture, Color, Minor Constituent, MAJOR ent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	DIA	Sample	Summary			
	1.4 - 4.5	F: Losse, noist, brown, SILT, abundant organic motion (roots), trace avoid (sticks), trace			$\begin{pmatrix} c-3-2-230918\\ 2.5-4.54 \end{pmatrix} \qquad \begin{pmatrix} c-3-4-230918\\ 0-2.5f \end{pmatrix}$				

lob: <u>MBV</u> lob No.: No. of Section Drive Length Recovery: & Recovery: Notes:	ons: 1 : 6 f	F Y	Station ID: (-2 Station ID: (-2 Date/Time: 9/18/23 Date/Time: 9/18/23 Core Logged By: PP Attempt No.: 2 Type of Core Type of Core (inches) Diameter of Core (inches)								
Recovered Length (ft) Size % Gravel	Size % Sand	Size % Fines	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Kecovered Length (ft) PID	Sample	Summary Sketch					
		100	0-1.5 ft: Wet, loose, grey.sh brown, no odor, rosteen Bude of light brown @ 0.9ft \$ 1.5 ft 1.5-2.6 ft: Loose, moist, greyish brown SILT, moderate organic matter (roots) trace wood (sticks) 2.6-3 3ft: Loose, moist, brown, SILT abudant organic matter (roots) trace wood (sticks) 3.3-4.0ft: grades to redish brown								

Job: A Job No No. of Drive L Recove % Rec Notes:	ABY Section engthery:	C ons: (1: 5 7-8	f-t	Station ID: Date/Time: 4/12/23 10:56 Core Logged By: ELP Attempt No.: Type of Core Mudmole Diameter of Core (inches)		Diver Core	
Recovered Length (ft)	Size % Gravel	Size % Sand	Size % Fines	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	PID	Sample	Summary Shetch
			100	0-1 ft: loose, met, grey-ish brown, SILT, moderate H2S-like oder slight 1-2.5 ft: loose, moist, brown, SILT, moderate organic matter, occasional wood, moderate tt2-5-like oder			
A A A A A A A A A A A A A A A A A A A				2.5-2.8 ft: grades to moderate wood 2.8 ft- 2.8 - 3.7: grades to ubundant wood Bothon of core = 3.7 ft			
					ge	of	

Sediment Job: <u>MB/C</u> Job No.: No. of Sections: Drive Length: 5 Recovery: <u>4.0</u> % Recovery: Notes:	1	Station ID: (-1 Date/Time: 9/19/23 Core Logged By: ERP Attempt No.: 3	ibracore		QEA 2	
Recovered Length (ft) Size % Gravel Size % Sand	Size % Fines	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	DIA	Sample	Summary
2 2 2 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		0-1.4 ft; Loose, wet, grayish brown, STLT trace wood (sticks), trace tt25-like odor, nusive 1.4-4.0 ft: Loose, mo.5t, brown, SILT klowlant organic matter (roots), trace wood (sticks), roderate tt25-like odos 19-2.2 ft: Woody debris up to 0.5 in dia. Bottom of care @ 4.0 ft	unhunhunh			

Drive Len Recovery % Recovery Notes:	4.4		Date/Time: 42 9 23 Core Logged By: Core Attempt No.: 3 Type of Core Mudmole Vit Diameter of Core (inches) 4	pracore		Diver Core	
Recovered Length (ft)	Size % Sand	Size % Fines	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	CIId	Sample	Summary
			0-1.7: Loose, wet, be dark brown, SILT, frace organic matter (rows), no odor, no sheen 1.7-4.4: Loose, maist, brown, SILT Occusional organic matter (rots frace woed (woody debis total no odor, no sheen. Botten of borning @ 4.4 ft	<u>uluuluuluu</u>			

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Job: / Job No No. of S Drive L Recove % Reco Notes:	.: Sectio ength ery: Ч	ns: 6	1	Station ID: (e [Diver Core	
Recovered Length (ft)	Size % Gravel	Size % Sand	Size % Fines	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	PID	Sample	Summary
				0-1ft: Loose, wet, dark brown, sady STLT (f-sml), trace argunic matter (roots), trace wael (sticks und woolg debris) 1-4.8ft grades to monst			
			-	Bottom of core @ 4.8A -			

ob: <u>ABY</u> ob No.: No. of Section Drive Length Recovery: <u>6</u> & Recovery: Notes:	C ons: : 6 f	ł	Station ID: 2-9 Date/Time: 9/19/23 1105 Core Logged By: ERP Attempt No.: Type of Core Mudmole Diameter of Core (inches)	acore		QEA 2	
Recovered Length (ft) Size % Gravel	Size % Sand	Size % Fines	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	DIA	Sample	Summary Sketch
	10		0-1.5 ft: Louse, wet, acasion sunh (m.), SILT trace organic matter (roots), graysh brown, nodor, no streen 1.5 - 3.5 ft: Loose, moist, brown, SILT, abundant arganic matter (roots) abundant wood (sticks & warly dobis No odor, no sheen 3.5 - 5.5 ft: grades to no wood, and HzS-1, ke odor from 3.5 - 5.5 ft				

lob: lob No.:			e Processing Log Station ID: (~ 5 Date/Time:	V ANCH QEAS	22
No. of Sectic Drive Length Recovery: % Recovery: Notes:):		Core Logged By: Attempt No.: Type of Core Mudmole Vibracore Diameter of Core (inches)	Diver Core	
Recovered Length (ft) Size % Gravel	Size % Sand	Size % Fines	Classification and Remarks (Density, Moisture, Color, Minor Constituent, MAJOR Constituent, with Additional Constituents, Sheen, Odor)	PID Sample	Summary
	2 (95	0-3.0 ft ; Loose, moist, trace sand (f.s. SILT, abundant organic matter (norts), trace wood (sticks & mody debris), no odos, no sheen		
			2.6 ft: changes to 10-20% f-c sand 3.0-3.9 ft: Stiff, moist, silty gravelly SAND 4.0 (t-c), couble upto 3.5 incles 4.0 ft botton of baring		

Job: MBYC Job No.: No. of Sections: Drive Length: 5 Recovery: 5.2 % Recovery: Notes:	ft	Station ID: <u>C-6</u> Date/Time: <u>9//9/23</u> (335 Core Logged By: <u>ERP</u> Attempt No.: <u>2</u> Type of Core <u>Mudmole</u> <u>VV</u> Diameter of Core (inches) <u>Y</u>	bracore		QEA 2	
Recovered Length (ft) Size % Gravel Size % Sand	Density,	Classification and Remarks Moisture, Color, Minor Constituent, MAJOR nt, with Additional Constituents, Sheen, Odor)	Recovered Length (ft)	DIA	Sample	Summary Sketch
1 0 10 1 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	100 0.75-1.1 1.1-27f Band of 1.5 2.7-4.0	 Loose, wet, dark brown, sande SILT, no odor, no steven, Orcasional organic molto (pore Ft: Loose, no. st, light brown, clayey, SILT, abundon? organic matter (toods), trace H2S-like abor, no steven t: Loose, meist, brown, clayey SILT, abundan? organic matter (roots), abundan? wood (sticks & woody debis), trace H2S like odor, no shoen light brown @ 2.3 - 2 4ft ft: grudes to trace growel Loose, meist, light gray, silly SAND(f-c), no odor, n sheen 				



C-1-A-20230919



C-1-Z-20230919





C-2-A-20230919



C-2-Z-20230919





C-3-A-20230919



C-3-Z-20230919





C-4-A-20230919



C-4-Z-20230919





C-5-A-20230919



C-5-Z-20230919





C-6-A-20230919



C-6-Z-20230919





C-7-A-20230918



C-7-Z-20230918



Appendix C Laboratory Analytical Report

File included as separate attachment

Appendix D Data Validation Report



Anchor QEA, LLC 720 Olive Way Suite 1900 Seattle, WA 98101 ATTN: Ms. Ali Judkins ajudkins@anchorgea.com February 27, 2024

SUBJECT: Meydenbauer Yacht Club - Data Validation

Dear Ms. Judkins,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on December 12, 2023. Attachment 1 is a summary of the samples that were reviewed for each analysis.

Revision:

TOC - Removed qualifiers due to holding time Dioxin/furans – Added qualifiers due to DUP RPD PAH – Removed MS/MSD RPD table

LDC Project #58181 RV1:

SDG #

23I0569

Fraction

Semivolatiles, Chlorinated Pesticides, Polychlorinated Biphenyls, Metals, Wet Chemistry, Polychlorinated Dioxins/Dibenzofurans

The data validation was performed under Stage 2B guidelines. The analysis was validated using the following documents, as applicable to each method:

- Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023)
- USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020)
- USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (November 2020)
- USEPA National Functional Guidelines (NFG) for High Resolution Superfund Methods Data Review (November 2020)
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014; update VI, July 2018

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco scuenco@lab-data.com Project Manager/Senior Chemist

	17 pages-ADV													Att	tach	mer	nt 1																	_	_	_	
	Stage 2B EQ	UIS/EDD	LC	DC#	‡ 5 8	818 ⁻	1 (<i>A</i>	٩nc	hor	^r Er	nvir	oni	me	ntal	- \$	Sea	ttle	e, W	IA /	' Me	eyd	enl	bau	er	Yad	cht	Clu	ıb)									
LDC	SDG#	DATE REC'D	(3) DATE DUE	SV (823	/OA 70E)	(82	'OA 70E IM)	Pe (808	est. 31B)		Bs 32A)	Met (602 /747	20B	Diox (161	tins 3B)	NI (45 NH3	00-	Pa Si (PS	ze	(45	= 00- D)	T\ (PS	/S EP)	To Sol (254		тс (906											
Matrix	: Water/Sedimer	nt		W	S	W	S	W	S	W	S	W	S	W			S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
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Laboratory Data Consultants, Inc. **Data Validation Report**

Project/Site Name:	Meydenbauer Yacht Club
LDC Report Date:	February 27, 2024
Parameters:	Semivolatiles
Validation Level:	Stage 2B
Laboratory:	Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 2310569

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
DU-3A-20230918	2310569-02	Sediment	09/18/23
DU-3A-20230918DL	2310569-02DL	Sediment	09/18/23
DU-2A-20230919	2310569-15	Sediment	09/19/23
DU-1A-20230919	2310569-16	Sediment	09/19/23
DU-2A-20230919MS	2310569-15MS	Sediment	09/19/23
DU-2A-20230919MSD	2310569-15MSD	Sediment	09/19/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Semivolatile Organic Compounds (SVOCs) by Environmental Protection Agency (EPA) SW 846 Method 8270E

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 **Holding Times**
- Sample Preservation (Cooler Temp) 2
- Sample Custody 3
- 4 Missing Deliverables
- 5 Calibration
- **Field Blanks** 6
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- Matrix Spike Duplicate (RPD or Duplicate Sample Analysis) 9
- Laboratory Control Sample 10
- 11 **ICP** Interference Check
- 12 **RPD Between Two Columns**
- 13 Surrogates
- 14 Field Duplicates
- 15 **Peak Resolution**
- 16 **ICP** Serial Dilution
- 17 **Chemical Recoveries**
- 18 **Trip Blanks**
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- **Potential False Positives** 21
- Do not use, other result more technically sound 22
- **Estimated Maximum Possible Concentration** 23
- 24 Other
- 25 Less than reporting limit

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For analytes where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the analytes, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all analytes were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all analytes with the following exceptions:

Date	Analyte	%D	Associated Samples	Flag	A or P
09/08/23	Benzoic acid	30.3	DU-3A-20230918 DU-2A-20230919 DU-1A-20230919	J (all detects) UJ (all non-detects)	A
11/01/23	Benzoic acid Pentachlorophenol	42.8 33.4	DU-3A-20230918DL	UJ (all non-detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes with the following exceptions:

Date	Analyte	%D	Associated Samples	Flag	A or P
11/03/23	Benzo(g,h,i)perylene	21.4	DU-3A-20230918DL	J (all detects)	A

V:\LOGIN\ANCHOR\MEYDENBAUER YACHT\58181A2A_AN3_RV1.DOC

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Extraction Date	Analyte	Concentration (ug/Kg)	Associated Samples
BLI0794-BLK1	09/28/23	Diethylphthalate	22.0	All samples in SDG 2310569

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration (ug/Kg)	Modified Final Concentration (ug/Kg)
DU-3A-20230918	Diethylphthalate	58.6	145U
DU-2A-20230919	Diethylphthalate	71.6	155U
DU-1A-20230919	Diethylphthalate	94.8	209U

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (50-150)	MSD (%R) (50-150)	Flag	A or P
DU-2A-20230919MS/MSD (DU-2A-20230919)	2-Methylphenol Bis(2-ethylhexyl)phthalate Di-n-octylphthalate Dibenzo(a,h)anthracene Benzo(g,h,i)perylene	29.5 21.4 49.3 43.2	41.0 34.7 21.9 -	J (all detects) UJ (all non-detects)	A
DU-2A-20230919MS/MSD (DU-2A-20230919)	Phenanthrene Fluoranthene Pyrene Benzo(a)anthracene Chrysene Benzo(a)pyrene	253 223 198 173 193 181	233 247 201 152 174 -	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A

Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Analyte	LCS %R (50-150)	LCSD %R (50-150)	Flag	A or P
BLI0794-BS1 (All samples in SDG 23I0569)	Bis(2-ethylhexyl)phthalate Di-n-octylphthalate 2-Methylphenol 4-Methylphenol	38.8 22.3 - -	36.9 20.4 28.8 42.3	J (all detects) UJ (all non-detects)	Ρ

Relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Analyte	RPD (≤35)	Flag	A or P
BLI0794-BS1 (All samples in SDG 23I0569)	2-Methylphenol	54.2	NA	-

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Target Analyte Quantitation

All target analyte quantitations met validation criteria with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
DU-3A-20230918	Phenanthrene Fluoranthene Pyrene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects)	А

Raw data were not reviewed for Stage 2B validation.

XIII. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed not reportable as follows:

Sample	Analyte	Reason	Flag	A or P
DU-3A-20230918	Phenanthrene Fluoranthene Pyrene	Results exceeded calibration range.	Not reportable	-
DU-3A-20230918DL	All analytes except Phenanthrene Fluoranthene Pyrene	Results from undiluted analyses were more usable.	Not reportable	-

Data qualified due to ICV %D, MS/MSD %R, LCS/LCSD %R, and laboratory blank contamination are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Semivolatiles - Data Qualification Summary - SDG 2310569

Sample	Analyte	Flag	A or P	Reason (Code)
DU-3A-20230918 DU-2A-20230919 DU-1A-20230919	Benzoic acid	J (all detects) UJ (all non-detects)	A	Initial calibration verification (%D) (5)
DU-2A-20230919	2-Methylphenol Bis(2-ethylhexyl)phthalate Di-n-octylphthalate Dibenzo(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (8)
DU-2A-20230919	Phenanthrene Fluoranthene Pyrene Benzo(a)anthracene Chrysene Benzo(a)pyrene	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (8)
DU-3A-20230918 DU-2A-20230919 DU-1A-20230919	Bis(2-ethylhexyl)phthalate Di-n-octylphthalate 2-Methylphenol 4-Methylphenol	J (all detects) UJ (all non-detects)	Р	Laboratory control samples (%R) (10)
DU-3A-20230918	Phenanthrene Fluoranthene Pyrene	Not reportable	-	Overall assessment of data (22)
DU-3A-20230918DL	All analytes except Phenanthrene Fluoranthene Pyrene	Not reportable	-	Overall assessment of data (22)

Meydenbauer Yacht Club Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 2310569

Sample	Analyte	Modified Final Concentration (ug/Kg)	A or P	Code
DU-3A-20230918	Diethylphthalate	145U	A	7
DU-2A-20230919	Diethylphthalate	155U	A	7
DU-1A-20230919	Diethylphthalate	209U	A	7

VALIDATION COMPLETENESS WORKSHEET LDC #: 58181A2a SDG #: 2310569

Stage 2B

Laboratory: Analytical Resources, Inc., Tukwila, WA

METHOD: GC/MS Semivolatiles (EPA SW-846 Method 8270E)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area			Comments	
1.	Sample receipt/Technical holding times	A, Ä			
11.	GC/MS Instrument performance check				
<u>III.</u>	Initial calibration/ICV	Aishi	RSDE ZO1. 7.D C ZOB	r	101530%
IV.	Continuing calibration	SW	7.DC 200		
V.	Laboratory Blanks	SN			
VI.	Field blanks	N			
VII.	Surrogate spikes	A			
VIII.	Matrix spike/Matrix spike duplicates	SN			
IX.	Laboratory control samples	SN	ucs / D		
Х.	Field duplicates	N			
_XI.	Internal standards	A			
XII.	Target analyte quantitation	SW	·		
XIII.	Target analyte identification	N	· · · · · · · · · · · · · · · · · · ·		
XIV	Overall assessment of data	SN			

Note: A = Acceptable

N = Not provided/applicable SW = See worksheet

R = Rinsate FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank SB=Source blank OTHER:

	Client ID		Lab ID	Matrix	Date
1	DU-3A-20230918		2310569-02	Sediment	09/18/23
2	DU-3A-20230918DL		2310569-02DL	Sediment	09/18/23
3	DU-2A-20230919		2310569-15	Sediment	09/19/23
4	DU-1A-20230919		2310569-16	Sediment	09/19/23
5	DU-2A-20230919MS		2310569-15MS	Sediment	09/19/23
6	DU-2A-20230919MSD		2310569-15MSD	Sediment	09/19/23
7					
8					
9					
10					
Votes					
+	BLI0794-BK1				
		1			

Date: 01/22/24 Page: 1 of Reviewer: 2nd Reviewer

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS SVOA

METHOD: GC/WS SVOA				
A. Phenol	GG. Acenaphthene	MMM. Bis(2-Chloroisopropyl)ether	SSSS. 2/3-Dimethyldibenzothiophene (4MDT)	Y1. 3,3'-Dimethylbenzidine
B. Bis (2-chloroethyl) ether	HH. 2,4-Dinitrophenol	NNN. Aniline	TTTT. 1-Methyldibenzothiophene (1MDT)	Z1. o-Toluidine
C. 2-Chlorophenol	II. 4-Nitrophenol	OOO. N-Nitrosodimethylamine	UUUU 2,3,4,6-Tetrachlorophenol	A2. Benzo(j)fluoranthene
D. 1,3-Dichlorobenzene	JJ. Dibenzofuran	PPP. Benzoic Acid	VVVV. 1,2,4,5-Tetrachlorobenzene	B2. Benzofluoranthenes, total
E. 1,4-Dichlorobenzene	KK. 2,4-Dinitrotoluene	QQQ. Benzyl alcohol	WWWW 2-Picoline	C2. trans-Decalin
F. 1,2-Dichlorobenzene	LL. Diethylphthalate	RRR. Pyridine	XXXX. 3-Methylcholanthrene	D2. cis-Decalin
G. 2-Methylphenol	MM. 4-Chlorophenyl-phenyl ether	SSS. Benzidine	YYYY. a,a-Dimethylphenethylamine	E2. Dibenzo(a)anthracenes
H. 2,2'-Oxybis(1-chloropropane)	NN. Fluorene	TTT. 1-Methylnaphthalene	ZZZZ. Hexachloropropene	F2. Benzo(j)+(k)fluoranthene
I. 4-Methylphenol	OO. 4-Nitroaniline	UUU.Benzo(b)thiophene	A1. N-Nitrosodiethylamine	G2. Dibenzo(ah)+(ac)anthracene
J. N-Nitroso-di-n-propylamine	PP. 4,6-Dinitro-2-methylphenol	VVV.Benzonaphthothiophene	B1. N-Nitrosodi-n-butylamine	H2.
K. Hexachloroethane	QQ. N-Nitrosodiphenylamine	WWW.Benzo(e)pyrene	C1. N-Nitrosomethylethylamine	12.
L. Nitrobenzene	RR. 4-Bromophenyl-phenylether	XXX. 2,6-Dimethylnaphthalene	D1. N-Nitrosomorpholine	J2.
M. Isophorone	SS. Hexachlorobenzene	YYY. 2,3,5-Trimethylnaphthalene	E1. N-Nitrosopyrrolidine	К2.
N. 2-Nitrophenol	TT. Pentachlorophenol	ZZZ. Perylene	F1. Phenacetin	L2.
O. 2,4-Dimethylphenol	UU. Phenanthrene	AAAA. Dibenzothiophene	G1. 2-Acetylaminofluorene	M2.
P. Bis(2-chloroethoxy)methane	VV. Anthracene	BBBB. Benzo(a)fluoranthene	H1. Pronamide	N2.
Q. 2,4-Dichlorophenol	WW. Carbazole	CCCC. Benzo(b)fluorene	I1. Methyl methanesulfonate	02.
R. 1,2,4-Trichlorobenzene	XX. Di-n-butylphthalate	DDDD. cis/trans-Decalin	J1. Ethyl methanesulfonate	P2.
S. Naphthalene	YY. Fluoranthene	EEEE. Biphenyl	K1. o,o',o"-Triethylphosphorothioate	Q2.
T. 4-Chloroaniline	ZZ. Pyrene	FFFF. Retene	L1. n-Phenylene diamine	R2.
U. Hexachlorobutadiene	AAA. Butylbenzylphthalate	GGGG. C30-Hopane	M1. 1,4-Naphthoquinone	S2.
V. 4-Chloro-3-methylphenol	BBB. 3,3'-Dichlorobenzidine	HHHH. 1-Methylphenanthrene	N1. N-Nitro-o-toluidine	T2.
W. 2-Methylnaphthalene	CCC. Benzo(a)anthracene	IIII. 1,4-Dioxane	O1. 1,3,5-Trinitrobenzene	U2.
X. Hexachlorocyclopentadiene	DDD. Chrysene	JJJJ. Acetophenone	P1. Pentachlorobenzene	V2
Y. 2,4,6-Trichlorophenol	EEE. Bis(2-ethylhexyl)phthalate	KKKK. Atrazine	Q1. 4-Aminobiphenyl	W2
Z. 2,4,5-Trichlorophenol	FFF. Di-n-octylphthalate	LLLL. Benzaldehyde	R1. 2-Naphthylamine	X2
AA. 2-Chloronaphthalene	GGG. Benzo(b)fluoranthene	MMMM. Caprolactam	S1. Triphenylene	Y2.
BB. 2-Nitroaniline	HHH. Benzo(k)fluoranthene	NNNN. 2,6-Dichlorophenol	T1. Octachiorostyrene	Z2.
CC. Dimethylphthalate	III. Benzo(a)pyrene	OOOO. 1,2-Diphenylhydrazine	U1. Famphur	
DD. Acenaphthylene	JJJ. Indeno(1,2,3-cd)pyrene	PPPP. 3-Methylphenol	V1. 1,4-phenylenediamine	
EE. 2,6-Dinitrotoluene	KKK. Dibenz(a,h)anthracene	QQQQ. 3&4-Methylphenol	W1. Methapyrilene	
FF. 3-Nitroaniline	LLL. Benzo(g.h.i)perviene	RRRR. 4-Dimethyldibenzothiophene	X1. Pentachloroethane	

LDC #: 38181 AZA

• VALIDATION FINDINGS WORKSHEET Initial Calibration Verification

METHOD: GC/MS SVOA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was an initial calibration verification standard analyzed after each ICAL for each instrument?

N)N/A Were all %D within the validation criteria of 2005/30% %D?

#	Date	Standard ID	Compound	Finding %D (Limit: ≿90 %/30%)	Associated Samples	Qualifications
	09/08/23	SLI0134-SOV1	PPP (-2		1 3-6 MB (ND+ Dot	
	" / "		· · · · · · · · · · · · · · · · · · ·			
 						
	11/01/23	SLK0002-SCV1	PPP (-)	42.8	21 ND)	J/NJ/A (5)
	.701722	Still 0002= SCV I	TT 62	33.4		
					· · · · · · · · · · · · · · · · · · ·	
 						
			<u>.</u>	· · · · · · · · · · · · · · · · · · ·		
					· · · · ·	

LDC #: 58181 Å20

VALIDATION FINDINGS WORKSHEET Continuing Calibration



METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Prease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

<u>VA N/A</u> Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Y N N/A Were percent differences (%D) ≤20 % and relative response factors (RRF) within the method criteria?

	Date	Standard ID	Compound	Finding %D (Limit: <u><</u> 20.0%)	Finding RRF (Limit)	Associated Samples	Qualifications
	11/03/23	2023110318	LLL (-)	21-4		2 (Det)	J/UJ/A (5)
			· · · · · · · · · · · · · · · · · · ·				
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						-	
				······································			
	1			<u></u>			
					T. W		
	i						

Note: * Ave RRF failed method criteria but within validation criteria

LDC #: 58181 AZA

VALIDATION FINDINGS WORKSHEET Blanks

Page: 1 of 1 Reviewer: JVG

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

AN N/A Was a method blank analyzed for each matrix?

YN NA Was a method blank analyzed for each concentration preparation level?

YN N/A Was a method blank associated with every sample?

 $\frac{\sqrt{N}}{\sqrt{2}}$ Was the blank contaminated? If yes, please see qualification below. Blank extraction date: $\frac{09}{28}/23$ Blank analysis date: $\frac{10}{9}/23$

Associated Samples:

Conc. units: Wg /kg

A11

Code: 7

Blank ID								
BLI0794-8	lki	1	3	4				
22.0		58.6/451	71.6/	94.8/				
		/	1554	209 U				
lank extraction date:Blank analysis date: onc. units:Blank analysis date:Associated Samples:								
Blank ID			· · · · · · · · · · · · · · · · · · ·					
		_						
	BLI 0794-8 22.0	BLI 0794-B4K1 22.0 Blank analysis date	BLI 0794-B4K1 1 22.0 58.6/451/ Blank analysis date:	BLI 0794-B K_L 1 3 22.0 58.6/45 H 71.6/ 1 155 H 1	BLI0794-BUKI 1 3 4 22.0 58.6/45U 71.6/ 94.8/ 1 155U 209U 1 155U 209U 1 1 1 1 155U 209U 1 1 1	BLI0794-84K1 1 3 4 22.0 58.6/145.0 71.6/ 94.8/ // /155.0 /209.0 // /155.0 /209.0 // /155.0 /209.0 // /155.0 /209.0 // /155.0 /209.0 // /155.0 /209.0 // /155.0 /209.0 // // // // /155.0 /209.0 // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // // //	BLI0794-Bukit 1 3 4 22.0 58.6/45 U 71.6/ 94.8/ 209 U 209 U .	BLI0794-B KL 1 3 4 22.0 58.6/45 U 71.6/ 94.8/

LDC #: 58 81 A2A

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Page:	of	
Reviewer:	JVG	

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

YN N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed in this SDG? Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? Y NNA Cole: 8 MS MSD %R # MS/MSD ID Compound RPD (Limits) %R %R Limits **Associated Samples** Qualifications attached J Acts /A · J/NJ/A See 5/6 15 (NO+Det)) (() () () () () () () () () () ١ () () ()) (()) () () (() () X



Analytical Resources, LLC

Laboratory:

MS / MS DUPLICATE RECOVERY EPA 8270E

SDG:

<u>23I0569</u>

5/6

Client: <u>Anchor QEA, LLC</u>		2			Project: MBYC Analyzed: 10/19/23				Ø	1 5		
Matrix:							0/19/23 20:23		11	•7		
Batch:	<u>BLI0794</u>			Laboratory ID: <u>BLI0794-MS1</u>								
Preparation:	EPA 3546 (Microw	Sequen	Sequence Name: <u>Matrix Spike</u>									
Initial/Final: <u>15 g / 1 mL</u>						Source Sample: <u>DU-2A-20230919</u>						
СОМР	OUND	SPIKE ADDED (ug/kg dry)	CONCEN	MPLE NTRATION kg dry)	Q	MS CONCENTRATION (ug/kg dry)	Q	MS % REC. #	ŧ	Q LIM RE	ITS	
Phenol		1550	2	28.1	J	982		61.4		31 -	120	
Benzyl Alcohol		1550	1	ND	U	992		63.8		19 -	120	
2-Methylphenol		1550]	ND	U	883		56.8		11 -	120	
4-Methylphenol		1550]	ND	U	943		60.7		29 -	120	
Naphthalene		1550	5	51.7	J	1180		72.5		41 -	120	
Benzoic acid		7150]	ND	U	4710		65.9	_	10 -	120	
2-Methylnaphthal	ene	1550	4	40.0	J	1130		70.1		43 -	120	
Acenaphthylene		1550	2	27.6	J	1260		79.2		42 - 120		
Dimethylphthalate	e	1550	ND		U	1310		84.3		43 -	120	
Acenaphthene		1550	185			1580		89.7	9.7 45 - 120			
Dibenzofuran		1550	54.3		J	1330		82.2		43 - 120		
Fluorene		1550		103		1220		72.0		40 -	120	
Diethyl phthalate		1550	7	71.6	J	1620		99.7		43 -	140	
Pentachloropheno	ol	4040		ND	U	3780		93.6		33 -	133	
Phenanthrene	ИИ	1550	(D++)3	060		6990	Е	253	*	50-	150	JANS/A
Anthracene		1550		448		2260		117		37 -	120	
Carbazole		1550		210		1880		107		30 -	135	
Di-n-Butylphthala		1550	-	ND	U	1190		76.7		48 -	126	
Fluoranthene	<u> </u>	1550	Det) 5	800		9250	E	223	*	50-	150	Jdets/A
Pyrene	22	1550	4	720		7790	E	198	*	39 -	122	
Butylbenzylphtha		1550		78.4		1050		62.7		45 -	132	
Benzo(a)anthrace		1550	1	.860		4550		173	*	44 -	120	
Chrysene	000	1550	2	930		5930		193	*	47 -	120	J.
bis(2-Ethylhexyl)	phthalate EEE	1550	1	690		2150		29.5		10 -	130	JUJA
Di-n-Octylphthala	ate FFF	1550		68.1		400		21.4		10 -	124	_\V
Benzofluoranthen	nes, Total B2	3110	4	4110		8860		153		30 -	160	Jdets A
Benzo(a)pyrene	III	1550	2	2320		5130		181	*	37 -	120	
Indeno(1,2,3-cd)p	ругепе	1550		070		1960		57.3		30 -	160	,
Dibenzo(a,h)anth	racene KKK	1550		374		1140		49.3		30 -	160	Jdets A Jus A
Benzo(g,h,i)peryl	ene LLL	1550		020		1690		43.2		10,	150	$ \downarrow \mathcal{V} $

* Values outside of QC limits



MS / MS DUPLICATE RECOVERY EPA 8270E

DU-2A-20230919						
	5/6					

Laboratory: <u>Analytical Resources, LLC</u>				SDG:		<u>2310569</u>			P-20f2	
Client:	Project:		<u>MBYC</u>							
Matrix:	<u>Solid</u>			Analyzed:		<u>10/19/23 21:00</u>				
Batch:	BL10794			Laboratory ID:		BLI	0794-MSD1			
Preparation:		Sequen	ce Name:		rix Spike Dup					
Initial/Final:	EPA 3546 (Microv			•	Sample:					
	<u>15 g / 1 mL</u>			Source	Sample:	<u></u>	-2A-20230919			
		SPIKE	MSD		MSD			QC	LIMITS	
COME	OUND	ADDED (ug/kg dry)	CONCENTRATION (ug/kg dry)	Q	% REC. #		% RPD #	RPD	REC.	
Phenol		1550	915	\uparrow	57.1		7.05	30	31 - 120	
Benzyl Alcohol		1550	961		61.8		3.11	30	19 - 120	
2-Methylphenol	4	1550	ND2 637	*	41.0		32.3	30	50-150 J/15/A	
4-Methylphenol		1550	780		50.2		18.9	30	29 - 120	
Naphthalene		1550	1150		70.8	-	2.25	30	41 - 120	
Benzoic acid		7150	4490		62.7		4.92	30	10 - 120	
2-Methylnaphtha	ene	1550	1090		67.2		3.99	30	43 - 120	
Acenaphthylene		1550	1220		76.6	_	3.28	30	42 - 120	
Dimethylphthalat	e	1550	1300		83.3		1.16	30	43 - 120	
Acenaphthene		1550	1470		82.5		7.38	30	45 - 120	
Dibenzofuran		1550	1290		79.5		3.14	30	43 - 120	
Fluorene		1550	1180		69.5		3.22	30	40 - 120	
Diethyl phthalate		1550	1700	·	105		4.73	30	43 - 140	
Pentachloropheno	bl	4040	3380		83.7		11.2	30	33 - 133	
Phenanthrene	иц	1550	Pet) 6680	*, E	233	*	4.54	30	50-150 Jaets/A	
Anthracene		1550	2210		113		2.26	30	37 - 120	
Carbazole		1550	1910		109		1.50	30	30 - 135	
Di-n-Butylphthal	ate	1550	1320		85.0		10.3	30	48 - 126	
Fluoranthene		1550	Det) 9640	*, E	247	*	4.08	30	50-150 Jdets A	
Pyrene	ZZ	1550	7850	*, E	201	*	0.683	30	39-122	
Butylbenzylphtha	late	1550	1220		73.2		14.4	30	45 - 132	
Benzo(a)anthrace	ne CU	1550	2et) 4230	*	152	*	7.31	30	44 - 120	
Chrysene	000	1550	5640	*	174	*	5.02	30	47 - 120	
bis(2-Ethylhexyl)	phthalate EEE	1550	. 2230	1	34.7		3.66	30	47-120 10-130 JAJA 10-24	
Di-n-Octylphthal	ate FFF	1550	409		21.9		2.13	30	10-124	
Benzofluoranther	es, Total	3110	8380		137		5.55	30	30 - 160	
Benzo(a)pyrene		1550	4660	*	150	*	9.63	30	37 - 120	
Indeno(1,2,3-cd)	byrene	1550	2150		69.6		9.34	30	30 - 160	
Dibenzo(a,h)anth	racene	1550	1310	<u> </u>	60.3		13.9	30	30 - 160	
Benzo(g,h,i)peryl	ene	1550	1860	<u> </u>	54.0		9.47	30	10 - 150	
I-Methylnaphtha	lene	1550	1210		76.4		2.88	30	42 - 120	

* Values outside of QC limits
LDC #: 58/81 A2a

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

VA N/A Were laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG?

<u>V</u>N)N/A Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

#	LCS/LCSD ID	Compound	LCS %R	LCSD %R	%R Limits	RPD (Limits)	Associated Samples	Qualifications
	BLI0794-BS1	EEE	38.8	36.9	50-150	()	All (ND + Det)	J/1J/P (10)
		FFF	22.3	20.4	1	()		
		G		28.8		()		
		, Ĺ		42.3		()		
		Ģ				54.2(35)	(ND)	J dets/P(10)
						()		
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LDC #: 58181 A2a

VALIDATION FINDINGS WORKSHEET Target Analyte Quantitation and Reported RLs

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". <u>Y N N/A</u> <u>Y N N/A</u> Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the analyte? <u>Y N N/A</u> Were analyte quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Sample ID	Compound	Finding	Qualifications
	1	UN, YY, ZZ	> calrange	J dets / A (20)
		· · · · · · · · · · · · · · · · · · ·	0	
	· · · · · · · · · · · · · · · · · · ·	<u></u>		

Comments:

LDC #: 58/81 A2A

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Page:	 _of_	
Reviewer:	 JVG	

/

22

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data. YN N/A Was the overall quality and usability of the data acceptable?

Date Sample ID Compound Finding Qualifications ии > cal rame NR YY ZZ 2 All except above di

Comments: _____

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Meydenbauer Yacht Club
LDC Report Date:	January 30, 2024
Parameters:	Semivolatiles
Validation Level:	Stage 2B
Laboratory:	Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 2310569

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
DU-3A-20230918	2310569-02	Sediment	09/18/23
DU-2A-20230919	2310569-15	Sediment	09/19/23
DU-1A-20230919	2310569-16	Sediment	09/19/23
DU-2A-20230919MS	2310569-15MS	Sediment	09/19/23
DU-2A-20230919MSD	2310569-15MSD	Sediment	09/19/23

1

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Semivolatile Organic Compounds (SVOCs) by Environmental Protection Agency (EPA) SW 846 Method 8270E in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

2

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other
- 25 Less than reporting limit

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all analytes.

Average relative response factors (RRF) for all analytes were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all analytes.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Extraction Date	Analyte	Concentration (ug/Kg)	Associated Samples
BLI0794-BLK2	09/28/23	1,4-Dichlorobenzene 1,2-Dichlorobenzene	0.9 0.8	All samples in SDG 2310569

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Analyte Concentration (ug/Kg)	
DU-3A-20230918	1,4-Dichlorobenzene 1,2-Dichlorobenzene	3.9 4.0	14.5U 14.5U
DU-2A-20230919	1,4-Dichlorobenzene	2.6	15.5U
DU-1A-20230919	1,2-Dichlorobenzene	3.9	20.9U

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (50-150)	MSD (%R) (50-150)	Flag	A or P
DU-2A-20230919MS/MSD (DU-2A-20230919)	2,4-Dimethylphenol	29.6	17.4	UJ (all non-detects)	А

Relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	RPD (≤35)	Flag	A or P
DU-2A-20230919MS/MSD (DU-2A-20230919)	2,4-Dimethylphenol	52.3	NA	-

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Analyte	LCS %R (Limits)	LCSD %R (50-150)	Flag	A or P
BLI0794-BS2/BSD2 (All samples in SDG 23I0569)	2,4-Dimethylphenol	13.4	12.0	UJ (all non-detects)	Р

Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Data qualified due to MS/MSD %R, LCS/LCSD %R, and laboratory blank contamination are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Semivolatiles - Data Qualification Summary - SDG 2310569

Sample	Analyte	Flag	A or P	Reason (Code)
DU-2A-20230919	2,4-Dimethylphenol	UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (8)
DU-3A-20230918 DU-2A-20230919 DU-1A-20230919	2,4-Dimethylphenol	UJ (all non-detects)	Ρ	Laboratory control samples (%R) (10)

Meydenbauer Yacht Club Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 2310569

Sample	Analyte	Modified Final Concentration (ug/Kg)	A or P	Code
DU-3A-20230918	1,4-Dichlorobenzene 1,2-Dichlorobenzene	14.5U 14.5U	Α	7
DU-2A-20230919	1,4-Dichlorobenzene	15.5U	А	7
DU-1A-20230919	1,2-Dichlorobenzene	20.9U	A	7

7

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: 2310569 Laboratory: <u>Analytical Resources</u>, Inc., Tukwila, WA

LDC #: 58181A2b

Date: ٥١/٢٠/٧ Page: <u>۱</u> of <u>۱</u> Reviewer: <u>۷</u>۵ 2nd Reviewer: <u>۴</u>

METHOD: GC/MS Semivolatiles (EPA SW-846 Method 8270E-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
١.	Sample receipt/Technical holding times	A A	
П.	GC/MS Instrument performance check	A	
111.	Initial calibration/ICV	AIA	RSD & 20? 101 = 302
IV.	Continuing calibration	Ϋ́Α΄	RSD & 207. 101 = 30% 207 = 207.
V.	Laboratory Blanks	ŚW	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	ŚW	
IX.	Laboratory control samples	SW	usto
Х.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Target analyte quantitation	N	
XIII.	Target analyte identification	N	
XIV	Overall assessment of data	A	

Note: A = Acceptable

N = Not provided/applicable SW = See worksheet ND = No compounds detected R = Rinsate

FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank SB=Source blank OTHER:

	Client ID	Lab ID	Matrix	Date
1	DU-3A-20230918	2310569-02	Sediment	09/18/23
2	DU-2A-20230919	2310569-15	Sediment	09/19/23
3	DU-1A-20230919	2310569-16	Sediment	09/19/23
4	DU-2A-20230919MS	2310569-15MS	Sediment	09/19/23
5	DU-2A-20230919MSD	2310569-15MSD	Sediment	09/19/23
6				
7				
8				
9				
10				
Notes				
	BLI0794-BK2			
\square				

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS SVOA

A. Phenol	GG. Acenaphthene	MMM. Bis(2-Chloroisopropyl)ether	SSSS. 2/3-Dimethyldibenzothiophene (4MDT)	Y1. 3,3'-Dimethylbenzidine
B. Bis (2-chloroethyl) ether	HH. 2,4-Dinitrophenol	NNN. Aniline	TTTT. 1-Methyldibenzothiophene (1MDT)	Z1. o-Toluidine
C. 2-Chiorophenol	II. 4-Nitrophenol	OOO. N-Nitrosodimethylamine	UUUU 2,3,4,6-Tetrachlorophenol	A2. Benzo(j)fluoranthene
D. 1,3-Dichlorobenzene	JJ. Dibenzofuran	PPP. Benzoic Acid	VVVV. 1,2,4,5-Tetrachlorobenzene	B2. Benzofiuoranthenes, total
E. 1,4-Dichlorobenzene	KK. 2,4-Dinitrotoluene	QQQ. Benzyl alcohol	WWWW 2-Picoline	C2. trans-Decalin
F. 1,2-Dichlorobenzene	LL. Diethylphthalate	RRR. Pyridine	XXXX. 3-Methylcholanthrene	D2. cis-Decalin
G. 2-Methylphenol	MM. 4-Chlorophenyl-phenyl ether	SSS. Benzidine	YYYY. a,a-Dimethylphenethylamine	E2. Dibenzo(a)anthracenes
H. 2,2'-Oxybis(1-chloropropane)	NN. Fluorene	TTT. 1-Methylnaphthalene	ZZZZ. Hexachloropropene	F2. Benzo(j)+(k)fluoranthene
I. 4-Methylphenol	OO. 4-Nitroaniline	UUU.Benzo(b)thiophene	A1. N-Nitrosodiethylamine	G2. Dibenzo(ah)+(ac)anthracene
J. N-Nitroso-di-n-propylamine	PP. 4,6-Dinitro-2-methylphenol	VVV.Benzonaphthothiophene	B1. N-Nitrosodi-n-butylamine	H2.
K. Hexachloroethane	QQ. N-Nitrosodiphenylamine	WWW.Benzo(e)pyrene	C1. N-Nitrosomethylethylamine	12.
L. Nitrobenzene	RR. 4-Bromophenyl-phenylether	XXX. 2,6-Dimethylnaphthalene	D1. N-Nitrosomorpholine	J2.
M. Isophorone	SS. Hexachlorobenzene	YYY. 2,3,5-Trimethylnaphthalene	E1. N-Nitrosopyrrolidine	K2.
N. 2-Nitrophenol	TT. Pentachlorophenol	ZZZ. Perylene	F1. Phenacetin	L2.
O. 2,4-Dimethylphenol	UU. Phenanthrene	AAAA. Dibenzothiophene	G1. 2-Acetylaminofluorene	M2.
P. Bis(2-chloroethoxy)methane	VV. Anthracene	BBBB. Benzo(a)fluoranthene	H1. Pronamide	N2.
Q. 2,4-Dichlorophenol	WW. Carbazole	CCCC. Benzo(b)fluorene	I1. Methyl methanesulfonate	O2.
R. 1,2,4-Trichlorobenzene	XX. Di-n-butylphthalate	DDDD. cis/trans-Decalin	J1. Ethyl methanesulfonate	P2.
S. Naphthalene	YY. Fluoranthene	EEE. Biphenyl	K1. o,o',o''-Triethylphosphorothioate	Q2.
T. 4-Chloroaniline	ZZ. Pyrene	FFFF. Retene	L1. n-Phenylene diamine	R2
U. Hexachlorobutadiene	AAA. Butylbenzylphthalate	GGGG. C30-Hopane	M1. 1,4-Naphthoquinone	S2.
V. 4-Chloro-3-methylphenol	BBB. 3,3'-Dichlorobenzidine	HHHH. 1-Methylphenanthrene	N1. N-Nitro-o-toluidine	T2
W. 2-Methylnaphthalene	CCC. Benzo(a)anthracene	IIII. 1,4-Dioxane	O1. 1,3,5-Trinitrobenzene	U2.
X. Hexachlorocyclopentadiene	DDD. Chrysene	JJJJ. Acetophenone	P1. Pentachlorobenzene	V2
Y. 2,4,6-Trichlorophenol	EEE. Bis(2-ethylhexyl)phthalate	KKKK. Atrazine	Q1. 4-Aminobiphenyl	W2
Z. 2,4,5-Trichlorophenol	FFF. Di-n-octylphthalate	LLLL. Benzaldehyde	R1. 2-Naphthylamine	X2
AA. 2-Chloronaphthalene	GGG. Benzo(b)fluoranthene	MMMM. Caprolactam	S1. Triphenylene	Y2.
BB. 2-Nitroaniline	HHH. Benzo(k)fluoranthene	NNNN. 2,6-Dichlorophenol	T1. Octachlorostyrene	Z2.
CC. Dimethylphthalate	III. Benzo(a)pyrene	OOOO. 1,2-Diphenylhydrazine	U1. Famphur	
DD. Acenaphthylene	JJJ. Indeno(1,2,3-cd)pyrene	PPPP. 3-Methylphenol	V1. 1,4-phenylenediamine	
EE. 2,6-Dinitrotoluene	KKK. Dibenz(a,h)anthracene	QQQQ. 3&4-Methylphenol	W1. Methapyrilene	
FF. 3-Nitroaniline	LLL. Benzo(g.h.i)perylene	RRRR. 4-Dimethyldibenzothiophene	X1. Pentachloroethane	

LDC #: 58/81 A26

VALIDATION FINDINGS WORKSHEET Blanks

METHOD: GC/MS SVOA (EPA SW 846 Method 8270-SIM)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

M N N/A Was a method blank analyzed for each matrix?

Y N N/A Was a method blank analyzed for each concentration preparation level?

Was a method blank associated with every sample? Y N N/A

 V_{N} N/A Was the blank contaminated? If yes, please see qualification below. Blank extraction date: $v_{1}/v_{2}/v_{3}$ Blank analysis date: $v_{1}/v_{3}/v_{3}$

Conc. units: WG / KG

Associated Samples:

Αı/

Code: 7

Compound	Blank ID					 	
	B2 I 0794-B	lk2 (5x)	1	2	3		
E	0.9	4.5	3.9/14.50	2.6/15.54			
F	0,8	4.0	40/	,	3.9/20.9U		
1							
		ан. С					
Blank extraction date	- RI	ank analysis da	ate:				
Conc. units:	0		Asso	ciated Sample	S:	 	
	Biank ID		Asso	ociated Sample	S:		
Conc. units:			Asso	ociated Sample	s:		
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LDC #: 58181 A26

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

METHOD: GC/MS PAH (EPA SW 846 Method 8270-SIM)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed in this SDG?

N) N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	MS/MSD ID	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Associated Samples	Qualifications
	4/5	0	29.6	17.4	50-150	()	2 (WD)	J/UJ/A (8)
		0				52.3 (35)		Jdets/A (9)
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LDC #: 58/81 A26

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

METHOD: GC/MS PAH (EPA SW 846 Method 8270-SIM)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Were laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed every 20 samples for each matrix or whenever N N/A a sample extraction was performed? N)N/A

Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

) #		Compound	LCS %R	LCSD %R	%R Limits	RPD (Limits)	Associated Samples	Qualifications
	BLI0794-BS2/BS	102 0	13.4	12,0	50-150	()	AII (ND)	J/1J/P(10)
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Meydenbauer Yacht Club
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	LDC Report Date:	January 29, 2024
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- Parameters: Chlorinated Pesticides
- Validation Level: Stage 2B
- Laboratory: Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 2310569

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
DU-3A-20230918	2310569-02	Sediment	09/18/23
DU-2A-20230919	2310569-15	Sediment	09/19/23
DU-1A-20230919	2310569-16	Sediment	09/19/23
DU-2A-20230919MS	2310569-15MS	Sediment	09/19/23
DU-2A-20230919MSD	2310569-15MSD	Sediment	09/19/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Chlorinated Pesticides by Environmental Protection Agency (EPA) SW 846 Method 8081B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other
- 25 Less than reporting limit

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For analytes where average calibration factors were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the analytes, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all analytes.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (50-150)	MSD (%R) (50-150)	Flag	A or P
DU-2A-20230919MS/MSD (DU-2A-20230919)	beta-BHC trans-Chlordane 4,4'-DDD	38.0 47.1 20.6	- - -	J (all detects) UJ (all non-detects)	A

Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XII. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XIII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Data qualified due to MS/MSD %R are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Chlorinated Pesticides - Data Qualification Summary - SDG 2310569

Sample	Analyte	Flag	A or P	Reason (Code)
DU-2A-20230919	beta-BHC trans-Chlordane 4,4'-DDD	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (8)

Meydenbauer Yacht Club Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 23I0569

No Sample Data Qualified in this SDG

6

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: <u>2310569</u> Laboratory: <u>Analytical Resources, Inc., Tukwila, WA</u>

LDC #: 58181A3a

Date: <u>01/77/14</u> Page: <u>1 of 1</u> Reviewer: <u>104</u> 2nd Reviewer: <u>1</u>

METHOD: GC Chlorinated Pesticides (EPA SW-846 Method 8081B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
١.	Sample receipt/Technical holding times	A/A	
11.	GC Instrument Performance Check	Á	
III.	Initial calibration/ICV	A / A	RSDE Z17. M ICVE 202 202 Z0?
IV.	Continuing calibration	A	ZDE 20?
V.	Laboratory Blanks	'A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	ŚW	
IX.	Laboratory control samples	A	Les by
Х.	Field duplicates	2	
XI.	Target analyte quantitation	N.	
XII.	Target analyte identification	N	
	Overall assessment of data	L A	

Note:

A = Acceptable N = Not provided/applicable

SW = See worksheet

ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate							
TB = Trip blank							
ED - Endersont	١.,						

SB=Source blank OTHER:

EB = Equipment blank

Client ID Lab ID Matrix Date ł DU-3A-20230918 2310569-02 Sediment 09/18/23 1 2 DU-2A-20230919 2310569-15 Sediment 09/19/23 3 DU-1A-20230919 2310569-16 Sediment 09/19/23 DU-2A-20230919MS 23I0569-15MS Sediment 09/19/23 4 5 DU-2A-20230919MSD 23I0569-15MSD 09/19/23 Sediment 6 7 8 9 10 11

Notes:

1010	lotes.						
	BLIO782-BIK1						

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	K. Endrin	U. Toxaphene	EE. 2,4'-DDT	OO. trans-Heptachlor epoxide
B. beta-BHC	L. Endosulfan II	V. Aroclor-1016	FF. Hexachlorobenzene	PP. Mirex
C. delta-BHC	M. 4,4'-DDD	W. Aroclor-1221	GG. Chlordane	QQ cis-Chlordane
D. gamma-BHC	N. Endosulfan sulfate	X. Aroclor-1232	HH. Chlordane (Technical)	RR. trans-Chlordane
E. Heptachlor	O. 4,4'-DDT	Y. Aroclor-1242	II. Aroclor 1262	SS. Hexachlorobutadiene
F. Aldrin	P. Methoxychlor	Z. Aroclor-1248	JJ. Aroclor 1268	TT. Kepone
G. Heptachlor epoxide	Q. Endrin ketone	AA. Aroclor-1254	KK. Oxychlordane	UU. Chlorpyrifos
H. Endosulfan I	R. Endrin aldehyde	BB. Aroclor-1260	LL. trans-Nonachlor	W
I. Dieldrin	S. alpha-Chlordane	CC. 2,4'-DDD	MM. cis-Nonachlor	WW.
J. 4,4'-DDE	T. gamma-Chlordane	DD. 2,4'-DDE	NN. cis-Heptachlor epoxide	XX.

Notes:

LDC #: 58181 A3a

VALIDATION FINDINGS WORKSHEET <u>Matrix Spike/Matrix Spike Duplicates</u>

Page: <u></u>of <u></u>

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A" <u>Y N N/A</u> Were matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? <u>Y N N/A</u> Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	MS/MSD ID	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Associated Samples	Qualifications
	4/5	B	78.0		50-150	()	2 (ND)	J/11J/A (8)
		ŔŔ	47.1			()		
	-24102-1	М	20.6			()	(Det) (Np)	
		М				117 (35)		J dets /A (9)
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Meydenbauer Yacht Club
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LDC Report Date: January 29, 2024

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 2B

Laboratory: Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 2310569

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
DU-3A-20230918	2310569-02	Sediment	09/18/23
DU-2A-20230919	2310569-15	Sediment	09/19/23
DU-1A-20230919	2310569-16	Sediment	09/19/23
DU-2A-20230919MS	23I0569-15MS	Sediment	09/19/23
DU-2A-20230919MSD	2310569-15MSD	Sediment	09/19/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Biphenyls (PCBs) by Environmental Protection Agency (EPA) SW 846 Method 8082A

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other
- 25 Less than reporting limit

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all analytes.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all analytes.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Meydenbauer Yacht Club Polychlorinated Biphenyls - Data Qualification Summary - SDG 2310569

No Sample Data Qualified in this SDG

Meydenbauer Yacht Club

Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 23I0569

No Sample Data Qualified in this SDG

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: 2310569 Laboratory: Analytical Resources, Inc., Tukwila, WA

LDC #: 58181A3b

01 Date: Page:_ Reviewer: 2nd Reviewer:

METHOD: GC Polychlorinated Biphenyls (EPA SW-846 Method 8082A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
Ι.	Sample receipt/Technical holding times	A, A	
н.	Initial calibration/ICV	A A	RSDE 20% ICVE 20% 21) E 20%
111.	Continuing calibration	A	2012207.
IV.	Laboratory Blanks	A	
V.	Field blanks	N	
VI.	Surrogate spikes	Á	
VII.	Matrix spike/Matrix spike duplicates	'À	
VIII.	Laboratory control samples	A	us D
IX.	Field duplicates	N	
Х.	Target analyte quantitation	, N	
XI.	Target analyte identification	N	
XII	Overall assessment of data	A	

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank OTHER:

	Client ID	Lab ID	Matrix	Date
1	DU-3A-20230918	2310569-02	Sediment	09/18/23
2	DU-2A-20230919	2310569-15	Sediment	09/19/23
3	DU-1A-20230919	2310569-16	Sediment	09/19/23
4	DU-2A-20230919MS	2310569-15MS	Sediment	09/19/23
5	DU-2A-20230919MSD	2310569-15MSD	Sediment	09/19/23
6				
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Votes				

NOLE	Notes.						
	BLIO785-BLKI						

Laboratory Data Consultants, Inc. **Data Validation Report**

LDC Report Date:	January 29, 2024
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Parameters: Metals

Validation Level: Stage 2B

Analytical Resources, Inc., Tukwila, WA Laboratory:

Sample Delivery Group (SDG): 2310569

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
DU-3A-20230918	2310569-02	Sediment	09/18/23
DU-2A-20230919	2310569-15	Sediment	09/19/23
DU-1A-20230919	2310569-16	Sediment	09/19/23
DU-2A-20230919MS	2310569-15MS	Sediment	09/19/23
DU-2A-20230919MSD	2310569-15MSD	Sediment	09/19/23
DU-2A-20230919DUP	2310569-15DUP	Sediment	09/19/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Metals by Environmental Protection Agency (EPA) SW 846 Method 6020B Mercury by EPA SW 846 Method 7471B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other
- 25 Less than reporting limit

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (75-125)	MSD (%R) (75-125)	Flag	A or P
DU-2A-20230919MS/MSD (All samples in SDG 23l0569)	Antimony	27.3	34	UJ (all non-detects)	A
DU-2A-20230919MS/MSD (All samples in SDG 23l0569)	Mercury	-	71.4	J (all detects)	A

For DU-2A-20230919MS/MSD, although the MS percent recovery was severely low (<30%) for antimony, using professional judgment, the associated sample results were qualified as estimated (UJ) since the MSD recovery was greater than 30%.

Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Duplicate Sample

Laboratory duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (≤20)	Flag	A or P
DU-2A-20230919DUP	Arsenic	20.2	J (all detects)	A
(All samples in SDG 2310569)	Copper	26.9	J (all detects)	

IX. Serial Dilution

Serial dilution was not performed for this SDG.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Data qualified due to MS/MSD %R and DUP RPD are summarized and presented in the Data Qualification Summary.
Meydenbauer Yacht Club Metals - Data Qualification Summary - SDG 23l0569

Sample	Analyte	Flag	A or P	Reason (Code)
DU-3A-20230918 DU-2A-20230919 DU-1A-20230919	Antimony	UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (8)
DU-3A-20230918 DU-2A-20230919 DU-1A-20230919	Mercury	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (8)
DU-3A-20230918 DU-2A-20230919 DU-1A-20230919	Arsenic Copper	J (all detects) J (all detects)	A	Laboratory duplicate sample (RPD) (9)

Meydenbauer Yacht Club Metals - Laboratory Blank Data Qualification Summary - SDG 2310569

No Sample Data Qualified in this SDG

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Laboratory: Analytical Resources, Inc., Tukwila, WA

LDC #: 58181A4a

SDG #: 2310569

METHOD: Metals (EPA SW-846 Method 6020B/7471B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

Validation Area Comments A<u>/</u> A Sample receipt/Technical holding times Ι. Å II. ICP/MS Tune A III. Instrument Calibration A ICP Interference Check Sample (ICS) Analysis IV. A V. Laboratory Blanks N VI. Field Blanks SW VII. Matrix Spike/Matrix Spike Duplicates 5W VIII. Duplicate sample analysis N) IX. Serial Dilution LS A Laboratory control samples Х. J XI. Field Duplicates XII. Internal Standard (ICP-MS) XIII. Target Analyte Quantitation Ν A XIV Overall Assessment of Data

Note: A = Acceptable

N = Not provided/applicable SW = See worksheet ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank OTHER:

	Client ID	Lab ID	Matrix	Date
1	DU-3A-20230918	2310569-02	Sediment	09/18/23
2	DU-2A-20230919	2310569-15	Sediment	09/19/23
3	DU-1A-20230919	2310569-16	Sediment	09/19/23
4	DU-2A-20230919MS	2310569-15MS	Sediment	09/19/23
5	DU-2A-20230919MSD	2310569-15MSD	Sediment	09/19/23
6	DU-2A-20230919DUP	2310569-15DUP	Sediment	09/19/23
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Date: 1/22/22
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Reviewer: NF
2nd Reviewer:

LDC #: 58181A4a

VALIDATION FINDINGS WORKSHEETS Matrix Spike/Matrix Spike Duplicates

METHOD: Trace Metals (EPA SW 846 Methods 6010/6020/7000)

MS/MSD analysis was performed by the laboratory. All MS/MSD percent recoveries (%R) and relative percent differences (RPDs) were within the acceptable limits with the following exceptions:

MS/MSD ID	Matrix	Analyte	MS %R	MSD %R	%R Limit	RPD	RPD Limit	Associated Samples	Qualification	Det/ND
4-5	sed	Sb	27.3	34	75-125			All	J/R/A (8)	ND
		Hg		71.4	75-125			All	J/UJ/A (8)	Det

VALIDATION FINDINGS WORKSHEETS

Laboratory Duplicates

METHOD: Trace Metals (EPA SW 846 Methods 6010/6020/7000)

Laboratory duplicate analysis was performed by the laboratory. All laboratory duplicates were with the relative percent difference (RPD) for samples >5X the reporting limits with the exceptions listed below. If samples were <5X the reporting limits, the difference was within 1X the reporting limit for water samples and within 2X the reporting limit for soil samples for all samples with the exceptions listed

Duplicate ID	Matrix	Analyte	RPD	RPD Limit	Difference (units)	Difference Limit	Associated Samples	Qualification	Det/ND
6	sed	As	20.2	20			All	Jdet/A (9)	Det
		Cu	26.9	20			All	Jdet/A (9)	Det
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Comments:

Laboratory Data Consultants, Inc. **Data Validation Report**

Project/Site Name:	Gasco, In-Situ Stabilization
LDC Report Date:	February 26, 2024
Parameters:	Wet Chemistry
Validation Level:	Stage 2B

Analytical Resources, Inc., Tukwila, WA Laboratory:

Sample Delivery Group (SDG): 2310569

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
DU-3A-20230918	2310569-02	Sediment	09/18/23
DU-2A-20230919	2310569-15	Sediment	09/19/23
DU-1A-20230919	2310569-16	Sediment	09/19/23
DU-2A-20230919MS	23I0569-15MS	Sediment	09/19/23
DU-2A-20230919MSD	2310569-15MSD	Sediment	09/19/23
DU-2A-20230919DUP	2310569-15DUP	Sediment	09/19/23
DU-2A-20230919TRP	2310569-15TRP	Sediment	09/19/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Ammonia as Nitrogen by Standard Method 4500-NH3 H Particle Size and Total Volatile Solids by Puget Sound Estuary Protocol (PSEP) Sulfide by Standard Method 4500-S2 D Total Organic Carbon by Environmental Protection Agency (EPA) SW 846 Method 9060A Total Solids by Standard Method 2540G

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other
- 25 Less than reporting limit

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
DU-3A-20230918	Sulfide	11 days	7 days	J (all detects)	Р
DU-2A-20230919 DU-1A-20230919	Sulfide	10 days	7 days	J (all detects)	Р

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Laboratory Duplicate Sample/Laboratory Triplicate Sample

Laboratory duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

Laboratory triplicate (TRP) sample analysis was performed on an associated project sample. Results were within QC limits with the following exceptions:

TRP ID (Associated Samples)	Analyte	%RSD (≤20)	Flag	A or P
DU-2A-20230919TRP	Total solids	24.9	J (all detects)	A
(All samples in SDG 23l0569)	Total volatile solids	26.3	J (all detects)	

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Data qualified due to technical holding time and TRP %RSD are summarized and presented in the Data Qualification Summary.

Gasco, In-Situ Stabilization Wet Chemistry - Data Qualification Summary - SDG 2310569

Sample	Analyte	Flag	A or P	Reason (Code)
DU-3A-20230918 DU-2A-20230919 DU-1A-20230919	Sulfide	J (all detects)	Ρ	Technical holding times (1)
DU-3A-20230918 DU-2A-20230919 DU-1A-20230919	Total solids Total volatile solids	J (all detects) J (all detects)	A	Laboratory triplicate sample (%RSD) (24)

Gasco, In-Situ Stabilization Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 2310569

No Sample Data Qualified in this SDG

.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 1/22/24
Page:of
Reviewer: NF
2nd Reviewer:

Laboratory: Analytical Resources, Inc., Tukwila, WA

METHOD: (Analyte) Ammonia-N (SM4500-NH3 H), Particle Size (PSEP), Sulfide (SM4500-S2 D), Total Volatile Solids (PSEP), Total Solids (SM2540G), TOC (EPA SW-846 Method 9060A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
١.	Sample receipt/Technical holding times	A,SW	
11	Initial calibration	A	
111.	Calibration verification	A	
IV	Laboratory Blanks	A	
v	Field blanks	\mathbb{N}	
VI.	Matrix Spike/Matrix Spike Duplicates	A	
VII.	Duplicate sample analysis	500	
VIII.	Laboratory control samples	A	Les
IX.	Field duplicates	N	
Х.	Target Analyte Quantitation	N	
XI	Overall assessment of data	A	

Note: A = Acceptable

LDC #: 58181A6 SDG #: 2310569

> N = Not provided/applicable SW = See worksheet

ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank OTHER:

	Client ID	Lab ID	Matrix	Date
1	DU-3A-20230918	2310569-02	Sediment	09/18/23
2	DU-2A-20230919	2310569-15	Sediment	09/19/23
3	DU-1A-20230919	2310569-16	Sediment	09/19/23
4	DU-2A-20230919MS	2310569-15MS	Sediment	09/19/23
5	DU-2A-20230919MSD	2310569-15MSD	Sediment	09/19/23
6	DU-2A-20230919DUP	2310569-15DUP	Sediment	09/19/23
7	DU-2A-20230919TRP	2310569-15TRP	Sediment	09/19/23
8	-DU-2A-20230919QUAD	-2310569-15QUAD	Sediment	09/19/23
9				
10				
11				
12				
13				
14				
Votes); }			

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

All elements are applicable to each sample as noted below.

Sample ID	Target Analyte List
1-3	NH3-N, Particle Size, S=, Total Solids, TVS, TOC
QC	
4, 6-7	S=, TOC
4-6	NH3-N
6-7	Total Solids, TVS
······································	
······································	

VALIDATION FINDINGS WORKSHEETS Holding Time

METHOD: Inorganics

All samples were properly preserved and within the requried holding time with the following

			Analyte: S= Holding Time: 7d			Code: 1
Sample ID	Sampling Date	Analysis Date	Total Time from Collection to Analysis	Qualifier	Det/ND	
1	09/18/23 16:25	09/29/23 13:24	11	J/UJ/P	Det	
2	09/19/23 14:23	09/29/23 13:50	10	J/UJ/P	Det	1
3	09/19/23 17:27	09/29/23 13:25	10	J/UJ/P	Det	
]

VALIDATION FINDINGS WORKSHEETS Laboratory Duplicates

METHOD: Inorganics

Laboratory duplicate analysis was performed by the laboratory. All laboratory duplicates were within the relative percent difference (RPD) for samples >5X the reporting limits with the exceptions listed below. If samples were <5X the reporting limits, the difference was within 1X the reporting limit for water samples and within 2X the reporting limit for soil samples for all samples with the exceptions listed below.

Dup/Tripl ID		Analyte	RPD	RPD Limit	RSD	RSD Limit	Difference (units)	Associated Samples	Qualification	Det/ND
6-7	sed	Total Solids			24.9	20		All	Jdet/A (24)	Det
		TVS			26.3	20		All	Jdet/A (24)	Det
										· · · · · · · · · · · · · · · · · · ·
										·

Comments:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Meydenbauer Yacht Club
LDC Report Date:	February 26, 2024
Parameters:	Polychlorinated Dioxins/Dibenzofurans
Validation Level:	Stage 2B
Laboratory:	Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 2310569

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
DU-3A-20230918	2310569-02	Sediment	09/18/23
DU-2A-20230919	2310569-15	Sediment	09/19/23
DU-1A-20230919	2310569-16	Sediment	09/19/23
DU-2A-20230919DUP	2310569-15DUP	Sediment	09/19/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for High Resolution Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Dioxins/Dibenzofurans by Environmental Protection Agency (EPA) Method 1613B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Less than reporting limit
- 25 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

The static resolving power was at least 10,000 (10% valley definition).

III. Initial Calibration and Initial Calibration Verification

A five point initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all analytes and less than or equal to 35.0% labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The concentrations of the initial calibration verification (ICV) standard were within the QC limits for all analytes and labeled compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for all analytes and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Extraction Date	Analyte	Concentration (ng/Kg)	Associated Samples
BLJ0058-BLK1	10/04/23	1,2,3,4,6,7,8-HpCDF 1,2,3,4,6,7,8-HpCDD OCDF OCDD	0.336 0.663 1.12 6.75	All samples in SDG 23I0569

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates/Laboratory Duplicate Sample

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

Laboratory duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (≤30)	Flag	A or P
DU-2A-20230919DUP (DU-2A-20230919)	Total PeCDF Total TCDD Total PeCDD	38.5 33.3 32.5	J (all detects) J (all detects) J (all detects)	A

VIII. Laboratory Control Samples/Standard Reference Materials

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits,

Standard reference material (SRM) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target analytes were within QC limits.

XI. Target Analyte Quantitation

All target analyte quantitations were within validation criteria with the following exceptions:

Sample	Analyte	Flag	A or P
All samples in SDG 23l0569	All analytes reported by the laboratory as estimated maximum possible concentration (EMPC).	J (all detects)	A
DU-2A-20230919 DU-1A-20230919	All analytes flagged "X" by the laboratory due to chlorinated diphenyl ether (CDPE) interference.	J (all detects)	A

Sample	Analyte	Finding	Criteria	Flag	A or P
All samples in SDG 23I0569	OCDD	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	Р

Raw data were not reviewed for Stage 2B validation.

XII. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XIII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Data qualified due to DUP RPD, results reported by the laboratory as EMPCs, CDPE interference, and results exceeding the calibration range are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Polychlorinated Dioxins/Dibenzofurans - Data Qualification Summary - SDG 2310569

Sample	Analyte	Flag	A or P	Reason (Code)
DU-2A-20230919	Total PeCDF Total TCDD Total PeCDD	J (all detects) J (all detects) J (all detects)	A	Laboratory duplicate sample (RPD) (9)
DU-3A-20230918 DU-2A-20230919 DU-1A-20230919	All analytes reported by the laboratory as estimated maximum possible concentration (EMPC).	J (all detects)	A	Target analyte quantitation (EMPC) (23)
DU-2A-20230919 DU-1A-20230919	All analytes flagged "X" by the laboratory due to polychlorinated diphenyl ether (PCDPE) interference.	J (all detects)	A	Target analyte quantitation (CDPE) (24)
DU-3A-20230918 DU-2A-20230919 DU-1A-20230919	OCDD	J (all detects)	Р	Target analyte quantitation (exceeded range) (20)

Meydenbauer Yacht Club

Polychlorinated Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG 23I0569

No Sample Data Qualified in this SDG

VALIDATION COMPLETENESS WORKSHEET LDC #: 58181A21 SDG #: 2310569

Stage 2B

Laboratory: Analytical Resources, Inc., Tukwila, WA

METHOD: HRGC/HRMS Polychlorinated Dioxins/Dibenzofurans (EPA Method 1613B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments	
١.	Sample receipt/Technical holding times	A/A		
н.	HRGC/HRMS Instrument performance check	Ι Α΄		
<u>III.</u>	Initial calibration/ICV	AIA	RSD & 20/35? ?D & QC limits	ICVE QC limits
IV.	Continuing calibration	A'	20 & aclimits	
v.	Laboratory Blanks	SK		
VI.	Field blanks	N		
VII.	Matrix spike/Matrix spike duplicates	N/S_{W}	4	
VIII.	Laboratory control samples	A	US SRM	
IX.	Field duplicates	Ň		
Х.	Labeled Compounds	Á		
XI.	Target analyte quantitation	SIN		
XII.	Target analyte identification	N		
XIII	Overall assessment of data	A		
Note:	A = Acceptable ND = N	lo compounds	detected D = Duplicate	SB=Source blank

Note:

N = Not provided/applicable SW = See worksheet

ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank SB=Source blank OTHER:

			· · · · · · · · · · · · · · · · · · ·			
	Client ID	·		 Lab ID	Matrix	Date
1	DU-3A-20230918			 2310569-02	Sediment	09/18/23
2	DU-2A-20230919		, 	 2310569-15	Sediment	09/19/23
3	DU-1A-20230919		·	 2310569-16	Sediment	09/19/23
4	DU-2A-20230919DUP			2310569-15DUP	Sediment	09/19/23
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6						
7						
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9						
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otes				 		
	BL J0058-B1K1					
Τ				<u> </u>		

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:

LDC #: <u>58 81</u> A2			VALIDATI	ON FINDIN <u>Blan</u>		SHEET				ge:of) er:JVG
YNN/A Wasam	below for all que samples associ ethod blank per	estions answe ated with a me formed for eac	red "N". Not a ethod blank? ch matrix and	applicable que		ction was perf		An (5 5 8 7	
Compound	Blank ID				San	nple Identificatio	on			
	BLJ0058-	B4K1(5K)								
0	0. 37%	1.68								
F	0.663	3.315								
Q	1-12	5.6								
G	6.75	33.75								
Blank extraction date:	Blank a	analysis date:		-						
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Compound	Blank ID			1	San	ple Identificatio	on		1	
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LDC #: 58181 A21

VALIDATION FINDINGS WORKSHEET Duplicate Analysis

Page: <u></u>_____of___/ Reviewer: <u>____JVG</u>

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N/A Was a duplicate sample analyzed for each matrix in this SDG?

 $\sqrt[Y]{N}$ Were all duplicate sample relative percent differences (RPD) ≤ 30 ?

F#	Duplicate ID	Compound	RPD (Limits)	Associated Samples	Qualifications
	4	N	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2 (Det)	Jdet/A (9)
		Ř	33.3 (<)		
		Ś	32.5 (≤)		
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Comments:

LDC #: <u>58181A21</u>

VALIDATION FINDINGS WORKSHEET Target Analyte Quantitation and Reported RLs

METHOD: GC/MS Dioxins/Dibenzofurans (Method 1613B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

<u>Y N N/A</u> <u>Y N N/A</u> Were the correct internal standard (IS), quantitation ions and relative response factors (RRF) used to quantitate the analyte? Were analyte quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors (if necessary)?

#	Date	Associated Samples	Compound	Finding	Qualifications
		All	-	All analytes reported as estimated maximum possible concentration (EMPC).	Jdets/A (23)
		2, 3	-	All analytes flagged "X" by the laboratory indicates possible CDPE interference	J dets/A (24)
		A . 1	C		2
		<u>A</u> 11	Ģ	> cal range	J dets / P (20)
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				I	
					· · · · · · · · · · · · · · · · · · ·
	<u> </u>	, dilutions perform	A)		



Anchor QEA, LLC 720 Olive Way Suite 1900 Seattle, WA 98101 ATTN: Ms. Ali Judkins ajudkins@anchorqea.com April 26, 2024

SUBJECT: Meydenbauer Yacht Club - Data Validation

Dear Ms. Judkins,

Enclosed are the final validation reports for the fraction listed below. This SDG was received on March 22, 2024. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #58751:

SDG

24A0339

Fraction

Polychlorinated Dioxins/Dibenzofurans

The data validation was performed under Stage 2B guidelines. The analysis was validated using the following documents, as applicable to each method:

- Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023)
- USEPA National Functional Guidelines (NFG) for High Resolution Superfund Methods Data Review (November 2020)

Please feel free to contact us if you have any questions.

Sincerely,

Marto

Stella Cuenco scuenco@lab-data.com Project Manager/Senior Chemist

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	Stage 2B EQ	JIS/EDD	LD	C#	58	751	I (A	nc	hoi	^r Er	nvir	oni	me	nta	- 8	Sea	ttle	e, N	IA /	Me	eyd	enl	bau	er	Yad	cht	Clu	ıb)									
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Shaded cells indicate Stage 4 validation (all other cells are Stage 2B validation). These sample counts do not include MS, MSD, or DUP's.

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Meydenbauer Yacht Club
--------------------	------------------------

LDC Report Date: April 24, 2024

Parameters: Polychlorinated Dioxins/Dibenzofurans

Validation Level: Stage 2B

Laboratory: Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 24A0339

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
C-1-A-20230919	24A0339-01	Sediment	09/19/23
C-4-A-20230919	24A0339-02	Sediment	09/19/23
C-5-A-20230919	24A0339-03	Sediment	09/19/23
C-6-A-20230919	24A0339-04	Sediment	09/19/23
C-2-A-20230919	24A0339-05	Sediment	09/19/23
C-3-A-20230919	24A0339-06	Sediment	09/19/23
C-4-A-20230919DUP	24A0339-02DUP	Sediment	09/19/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for High Resolution Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Dioxins/Dibenzofurans by Environmental Protection Agency (EPA) Method 1613B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

The static resolving power was at least 10,000 (10% valley definition).

III. Initial Calibration and Initial Calibration Verification

A five point initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all analytes and less than or equal to 35.0% labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The concentrations of the initial calibration verification (ICV) standard were within the QC limits for all analytes and labeled compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for all analytes and labeled compounds with the following exceptions:

Date	Analyte	%R (77-129)	Associated Samples	Affected Analyte	Flag	A or P
02/21/24	13C12-1,2,3,4,7,8,9-HpCDF	75.0	All samples in SDG 24A0339	1,2,3,4,7,8,9-HpCDF Total HpCDF	J (all detects) J (all detects)	А

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Extraction Date	Analyte	Concentration (ng/Kg)	Associated Samples
BMA0488-BLK1	01/23/24	1,2,3,4,6,7,8-HpCDD OCDF OCDD	0.341 0.336 3.75	All samples in SDG 24A0339

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates/Laboratory Duplicate Samples

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

Laboratory duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (≤30)	Flag	A or P
C-4-A-20230919DUP (C-4-A-20230919)	Total HpCDD	30.2	J (all detects)	A

VIII. Ongoing Precision Recovery

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target analytes were within QC limits with the following exceptions:

Sample	Labeled Compound	%R (24-169)	Affected Analyte	Flag	A or P
C-6-A-20230919	13C12-2,3,7,8-TCDF	17.2	2,3,7,8-TCDF Total TCDF	J (all detects) J (all detects)	Р
C-3-A-20230919	13C12-2,3,7,8-TCDF	22.3	2,3,7,8-TCDF Total TCDF	J (all detects) J (all detects)	Р

XI. Target Analyte Quantitation

All target analyte quantitations were within validation criteria with the following exceptions:

Sample	Analyte	Flag	A or P
All samples in SDG 24A0339	All analytes reported by the laboratory as estimated maximum possible concentration (EMPC).	J (all detects)	A
1-A-20230919All analytes flagged "X" by the laboratory due to chlorinated diphenyl ether (CDPE) interference.5-A-202309192-A-202309193-A-202309193-A-20230919		J (all detects)	A

Sample	Analyte	Finding	inding Criteria		A or P
All samples in SDG 24A0339	OCDD	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	Р

Raw data were not reviewed for Stage 2B validation.

XII. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XIII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Data qualified due to continuing calibration %R, DUP RPD, labeled compound %R, results reported by the laboratory as EMPCs, CDPE interference, and results exceeding the calibration range are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Polychlorinated Dioxins/Dibenzofurans - Data Qualification Summary - SDG 24A0339

Sample	Analyte	Flag	A or P	Reason (Code)
C-1-A-20230919 C-4-A-20230919 C-5-A-20230919 C-6-A-20230919 C-2-A-20230919 C-3-A-20230919	1,2,3,4,7,8,9-НрСDF Total HpCDF	J (all detects) J (all detects)	A	Continuing calibration (%R) (5)
C-4-A-20230919	Total HpCDD	J (all detects)	А	Laboratory duplicate sample (RPD) (9)
C-6-A-20230919 C-3-A-20230919	2,3,7,8-TCDF Total TCDF	J (all detects) J (all detects)	Ρ	Labeled compounds (%R) (19)
C-1-A-20230919 C-4-A-20230919 C-5-A-20230919 C-6-A-20230919 C-2-A-20230919 C-3-A-20230919	All analytes reported by the laboratory as estimated maximum possible concentration (EMPC).	J (all detects)	A	Target analyte quantitation (EMPC) (23)
C-1-A-20230919 C-4-A-20230919 C-5-A-20230919 C-2-A-20230919 C-3-A-20230919	All analytes flagged "X" by the laboratory due to polychlorinated diphenyl ether (PCDPE) interference.	J (all detects)	A	Target analyte quantitation (CDPE) (24)
C-1-A-20230919 C-4-A-20230919 C-5-A-20230919 C-6-A-20230919 C-2-A-20230919 C-3-A-20230919	OCDD	J (all detects)	Ρ	Target analyte quantitation (exceeded range) (20)

Meydenbauer Yacht Club

Polychlorinated Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG 24A0339

No Sample Data Qualified in this SDG

Meydenbauer Yacht Club

Polychlorinated Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG 24A0339

No Sample Data Qualified in this SDG
VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: <u>24A0339</u> Laboratory: <u>Analytical Resources</u>, Inc., Tukwila, WA

LDC #: 58751A21

Date:	04/24/24
Page:_	of
Reviewer:	
2nd Reviewer:	A

METHOD: HRGC/HRMS Polychlorinated Dioxins/Dibenzofurans (EPA Method 1613B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments	
I.	Sample receipt/Technical holding times	A,A		
١١.	HRGC/HRMS Instrument performance check	A		
- 111.	Initial calibration/ICV	AIA	RSDE 20/35% COVE QC limits	WE &C limits
IV.	Continuing calibration	SHY	Cove ac limits	
V.	Laboratory Blanks	SW		
VI.	Field blanks	Ń		
VII.	Matrix spike/Matrix spike duplicates /LD	N/SW	<u>.</u>	
VIII.	Laboratory control samples	A	OPR	
IX.	Field duplicates	N		
Х.	Labeled Compounds	SM		
XI.	Target analyte quantitation	Syri		
XII.	Target analyte identification	N	· · · · · · · · · · · · · · · · · · ·	
	Overall assessment of data	A		

Note:

N = Not provided/applicable SW = See worksheet

A = Acceptable

ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank OTHER:

	Client ID			Lab ID	Ma	trix	Date
1	C-1-A-20230919	 		24A0339-01	Se	diment	09/19/23
2	C-4-A-20230919		 	24A0339-02	Se	diment	09/19/23
3	C-5-A-20230919			24A0339-03	Se	diment	09/19/23
4	C-6-A-20230919	١		24A0339-04	Se	diment	09/19/23
5	C-2-A-20230919			24A0339-05	Se	diment	09/19/23
6	C-3-A-20230919			24A0339-06	Se	diment	09/19/23
7	C-4-A-20230919DUP			24A0339-02DUP	Se	diment	09/19/23
8							
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Votes	:		 				
~	BMADAV8-BIK1	7					
		;					

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: <u></u>of) Reviewer: <u>JVG</u>

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

YN N/A Was a routine calibration performed at the beginning of each 12 hour period?

Y(N/N/A Were all concentrations within method QC limits for unlabeled and labeled compounds?

YN N/A Did all routine calibration standards meet the Ion Abundance Ratio criteria?

#	Date	Standard ID	Compound	2R G one (limits)	Ion Abundance Ratio	Associated Samples	Qualifications
	02/21/20	SMB0178-1012	13012-P	75.0 (77-123)		All (Det)	JUJA
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LDC #:	58	757	A21	
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VALIDATION FINDINGS WORKSHEET Blanks

Page:	<u> </u>
Reviewer:	JVG

5 SX]

AI

Associated samples:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

YN N/A Were all samples associated with a method blank?

Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?

Y/N N/A Was the method blank contaminated?

	vvas ule m		contarninateu	
Blank extract	ion date: <u>৾</u> প	123/24	Blank analysis date:	02/21/24
Conc. units:	ng Ikar			· ·

Compound	Blank ID		Sample Identification						
	BMA0488-	B1K1 (5X)							
F	0.341	1.705							
Q	0. 336	1.68							
Ģ	3.75	18.75							

Blank extraction date:_____ Blank analysis date:___

Conc. units:___

- Associated Samples:

Compound	Blank ID	Sample Identification							

VALIDATION FINDINGS WORKSHEET Duplicate Analysis

Page: <u>l</u>of <u>l</u> Reviewer: <u>JVG</u>

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was a duplicate sample analyzed for each matrix in this SDG?

<u>Y N N/A</u> Were all duplicate sample relative percent differences (RPD) ≤ 30 ?

#	Duplicate ID	Compound	RPD (Limits)	Associated Samples	Qualifications
	7	U	30.2 (≤ 30)	2	J dets (A (9)
	,		(≤)		
			(≤)		
			(<)		
			(≤)		
		A	RPD's 7306(≤)		NA (25xRL)
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Comments:_____

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VALIDATION FINDINGS WORKSHEET

Labeled Compounds

Page:<u>l</u>of_) Reviewer:_JVG

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

X(N)N/A Are all labeled compound recoveries within limits?

Y')N	<u>N/A</u> Wa	s the S/N ratio all interna	l standard peaks <u>></u> 10?			
#	Date	Lab ID/Reference	Labeled Compound	Associated Compound	% Recovery (Limits)	()9) Qualifications
		4	13C12-H	H (Det)	17.2 (24-169)	J/UJ/p+V
			37 CL4 - A		34.1 (35-197)	NQ (clean-up Sta
		6	13C12-H	H (Der)	22.3 (24-169)	JUJIP+U
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LDC #: <u>58751A21</u>

VALIDATION FINDINGS WORKSHEET Target Analyte Quantitation and Reported RLs

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (Method 1613B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Y N N/A Were the correct internal standard (IS), quantitation ions and relative response factors (RRF) used to quantitate the analyte? Were analyte quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors (if necessary)?

#	Date	Associated Samples	Compound	Finding	Qualifications
		All	-	All analytes reported as estimated maximum possible concentration (EMPC).	Jdets/A (23)
		1-3, 5, 6	Н	Analyte flagged "X" by the laboratory indicates possible CDPE interference	J dets/A (24)
		ALL ·	G	> cal range	Jdets/P (20)
					· · · ·
Not	e; No dilutior	performed			



Anchor QEA, LLC 720 Olive Way Suite 1900 Seattle, WA 98101 ATTN: Ms. Ali Judkins ajudkins@anchorqea.com November 11, 2024

SUBJECT: Meydenbauer Yacht Club - Data Validation

Dear Ms. Judkins,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on September 25, 2024. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #59780:

SDG #

24H0337

Fraction

Semivolatile Organic Compounds, Chlorinated Pesticides, Polychlorinated Biphenyls, Metals, Wet Chemistry, Polychlorinated Dioxins/Dibenzofurans

The data validation was performed under Stage 2B guidelines. The analysis was validated using the following documents, as applicable to each method:

- Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023)
- USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020)
- USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (November 2020)
- USEPA National Functional Guidelines (NFG) for High Resolution Superfund Methods Data Review (November 2020)
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014; update VI, July 2018

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco scuenco@lab-data.com Project Manager/Senior Chemist

	12 pages-AD	/												Att	ach	mer	nt 1																				_
	Stage 2B EC	QUIS/EDD	LC	DC#	± 59	780) (A	nc	hoi	r Er	nvir	on	me	ntal	- \$	Sea	ttle	, N	/A/	' Me	eyd	enl	bau	ier	Yad	cht	Clu	ub)									
LDC	SDG#	DATE REC'D	(3) DATE DUE	SV (827		(808)	31B)		32A)	/747	71B)	(161	3B)	то (906	0A)	To Sol (254	ids		_				_		-		_										
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Meydenbauer Yacht Club
LDC Report Date:	October 22, 2024
Parameters:	Semivolatile Organic Compounds
Validation Level:	Stage 2B
Laboratory:	Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 24H0337

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
DU-1Z-20230919	24H0337-01	Sediment	08/16/23
DU-1Z-20230919DL	24H0337-01DL	Sediment	08/16/23
DU-2Z-20230919	24H0337-02	Sediment	08/16/23
DU-3Z-20230919	24H0337-03	Sediment	08/16/23
DU-3Z-20230919MS	24H0337-03MS	Sediment	08/16/23
DU-3Z-20230919MSD	24H0337-03MSD	Sediment	08/16/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Semivolatile Organic Compounds (SVOCs) by Environmental Protection Agency (EPA) SW 846 Method 8270E

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the gualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For analytes where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the analytes, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all analytes were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all analytes.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes with the following exceptions:

Date	Analyte	%D	Associated Samples	Flag	A or P
09/07/24	Acenaphthylene Fluorene	22.2 21.7	DU-1Z-20230919 DU-2Z-20230919	UJ (all non-detects) UJ (all non-detects)	A
09/09/24	Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)perylene	34.5 33.9 39.6	DU-1Z-20230919DL DU-3Z-20230919	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

Sample	Internal Standards	Area (Limits)	Affected Analyte	Flag	A or P
DU-1Z-20230919	Chrysene-d12	300860 (324966.5-1299866)	Benzo(a)anthracene Chrysene Pyrene	J (all detects) J (all detects) J (all detects)	Ρ
DU-1Z-20230919	Di-n-octylphthalate-d4	323678 (801465-1602930)	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate	J (all detects) J (all detects)	Р
DU-1Z-20230919	Perylene-d12	203443 (267013.5-1068054)	Benzo(g,h,i)perylene Benzo(a)pyrene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene	J (all detects) UJ (all non-detects)	Ρ

XII. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed not reportable as follows:

Sample	Analyte	Reason	Flag	A or P
DU-1Z-20230919DL	All analytes	Results from undiluted analyses were more usable.	Not reportable	-

Data qualified due to continuing calibration %D and internal standard area are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Semivolatile Organic Compounds - Data Qualification Summary - SDG 24H0337

Sample	Analyte	Flag	A or P	Reason (Code)
DU-1Z-20230919 DU-2Z-20230919	Acenaphthylene Fluorene	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (5)
DU-3Z-20230919	Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (5)
DU-1Z-20230919	Benzo(a)anthracene Chrysene Pyrene Bis(2-ethylhexyl)phthalate Butylbenzylphthalate Benzo(g,h,i)perylene Benzo(a)pyrene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene	J (all detects) UJ (all non-detects)	P	Internal standards (area) (19)
DU-1Z-20230919DL	All analytes	Not reportable	-	Overall assessment of data (24)

Meydenbauer Yacht Club

Semivolatile Organic Compounds - Laboratory Blank Data Qualification Summary - SDG 24H0337

No Sample Data Qualified in this SDG

Meydenbauer Yacht Club Semivolatile Organic Compounds - Field Blank Data Qualification Summary -SDG 24H0337

No Sample Data Qualified in this SDG

LDC #: 59780A2a SDG #: 24H0337

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 10/2/124 Page: \ of \ Reviewer: MP 2nd Reviewer:

Laboratory: Analytical Resources, Inc., Tukwila, WA

METHOD: GC/MS Semivolatiles (EPA SW-846 Method 8270E)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
١.	Sample receipt/Technical holding times	A A	
<u>II.</u>	GC/MS Instrument performance check	A	
.	Initial calibration/ICV	A.A	$RSD \leq 201$. r^2 $1CV \leq 301$.
IV.	Continuing calibration	SW	D≤ 30'1.
V.	Laboratory Blanks	A	-
<u>VI.</u>	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS
Х.	Field duplicates	N	
XI.	Internal standards	SW	
XII.	Target analyte quantitation	Stor N	
XIII.	Target analyte identification	N	
	Overall assessment of data	SW	

A = Acceptable Note:

N = Not provided/applicable SW = See worksheet

ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank OTHER:

	Client ID	Lab ID	Matrix	Date
1	DU-1Z-20230919	24H0337-01	Sediment	08/16/23
2	DU-1Z-20230919DL	24H0337-01DL	Sediment	08/16/23
3	DU-2Z-20230919	24H0337-02	Sediment	08/16/23
4	DU-3Z-20230919	24H0337-03	Sediment	08/16/23
5	DU-3Z-20230919MS	24H0337-03MS	Sediment	08/16/23
6	DU-3Z-20230919MSD	24H0337-03MSD	Sediment	08/16/23
7				
8				
9				
10				
Notes				

1	BMH03916-BLK1			

TARGET ANALYTE LIST

METHOD: GC/MS SVOC

A. Phenol	GG. Acenaphthene	MMM. Bis(2-Chloroisopropyl)ether	SSSS. 2/3-Dimethyldibenzothiophene	Y1. 3,3'-Dimethylbenzidine
B. Bis (2-chloroethyl) ether	HH. 2,4-Dinitrophenol	NNN. Aniline	TTTT. 1-Methyldibenzothiophene	Z1. o-Toluidine
C. 2-Chlorophenol	II. 4-Nitrophenol	OOO. N-Nitrosodimethylamine	UUUU 2,3,4,6-Tetrachlorophenol	A2. Benzo(j)fluoranthene
D. 1,3-Dichlorobenzene	JJ. Dibenzofuran	PPP. Benzoic Acid	VVVV. 1,2,4,5-Tetrachlorobenzene	B2. Benzofluoranthenes, total
E. 1,4-Dichlorobenzene	KK. 2,4-Dinitrotoluene	QQQ. Benzyl alcohol	WWWW 2-Picoline	C2. trans-Decalin
F. 1,2-Dichlorobenzene	LL. Diethylphthalate	RRR. Pyridine	XXXX. 3-Methylcholanthrene	D2. cis-Decalin
G. 2-Methylphenol	MM. 4-Chlorophenyl-phenyl ether	SSS. Benzidine	YYYY. a,a-Dimethylphenethylamine	E2. Dibenzo(a)anthracenes
H. 2,2'-Oxybis(1-chloropropane)	NN. Fluorene	TTT. 1-Methylnaphthalene	ZZZZ. Hexachloropropene	F2. Benzo(j)+(k)fluoranthene
I. 4-Methylphenol	OO. 4-Nitroaniline	UUU.Benzo(b)thiophene	A1. N-Nitrosodiethylamine	G2.
J. N-Nitroso-di-n-propylamine	PP. 4,6-Dinitro-2-methylphenol	VVV.Benzonaphthothiophene	B1. N-Nitrosodi-n-butylamine	H2
K. Hexachloroethane	QQ. N-Nitrosodiphenylamine	WWW.Benzo(e)pyrene	C1. N-Nitrosomethylethylamine	12.
L. Nitrobenzene	RR. 4-Bromophenyl-phenylether	XXX. 2,6-Dimethylnaphthalene	D1. N-Nitrosomorpholine	J2.
M. Isophorone	SS. Hexachlorobenzene	YYY. 2,3,5-Trimethylnaphthalene	E1. N-Nitrosopyrrolidine	K2.
N. 2-Nitrophenol	TT. Pentachlorophenol	ZZZ. Perylene	F1. Phenacetin	L2.
O. 2,4-Dimethylphenol	UU. Phenanthrene	AAAA. Dibenzothiophene	G1. 2-Acetylaminofluorene	M2.
P. Bis(2-chloroethoxy)methane	VV. Anthracene	BBBB. Benzo(a)fluoranthene	H1. Pronamide	N2.
Q. 2,4-Dichlorophenol	WW. Carbazole	CCCC. Benzo(b)fluorene	11. Methyl methanesulfonate	O2.
R. 1,2,4-Trichlorobenzene	XX. Di-n-butylphthalate	DDDD. cis/trans-Decalin	J1. Ethyl methanesulfonate	P2
S. Naphthalene	YY. Fluoranthene	EEEE. Biphenyl	K1. o,o',o''-Triethylphosphorothioate	Q2.
T. 4-Chloroaniline	ZZ. Pyrene	FFFF. Retene	L1. n-Phenylene diamine	R2.
U. Hexachlorobutadiene	AAA. Butylbenzylphthalate	GGGG. C30-Hopane	M1. 1,4-Naphthoguinone	S2.
V. 4-Chloro-3-methylphenol	BBB. 3,3'-Dichlorobenzidine	HHHH. 1-Methylphenanthrene	N1. N-Nitro-o-toluidine	T2.
W. 2-Methylnaphthalene	CCC. Benzo(a)anthracene	IIII. 1,4-Dioxane	O1. 1,3,5-Trinitrobenzene	U2.
X. Hexachlorocyclopentadiene	DDD. Chrysene	JJJJ. Acetophenone	P1. Pentachlorobenzene	V2
Y. 2,4,6-Trichlorophenol	EEE. Bis(2-ethylhexyl)phthalate	KKKK. Atrazine	Q1. 4-Aminobiphenyl	W2
Z. 2,4,5-Trichlorophenol	FFF. Di-n-octylphthalate	LLLL. Benzaldehyde	R1. 2-Naphthylamine	X2
AA. 2-Chloronaphthalene	GGG. Benzo(b)fluoranthene	MMMM. Caprolactam	S1. Triphenylene	Y2.
BB. 2-Nitroaniline	HHH. Benzo(k)fluoranthene	NNNN. 2,6-Dichlorophenol	T1. Octachiorostyrene	Z2.
CC. Dimethylphthalate	III. Benzo(a)pyrene	OOOO. 1,2-Diphenylhydrazine	U1. Famphur	
DD. Acenaphthylene	JJJ. Indeno(1,2,3-cd)pyrene	PPPP. 3-Methylphenol	V1. 1,4-phenylenediamine	
EE. 2,6-Dinitrotoluene	KKK. Dibenz(a,h)anthracene	QQQQ. 3&4-Methylphenol	W1. Methapyrilene	
FF. 3-Nitroaniline	LLL. Benzo(g,h,i)perylene	RRRR. 4-Dimethyldibenzothiophene	X1. Pentachloroethane	

LDC #: <u>59780A2a</u>

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

Page: <u>1</u> of <u>1</u> Reviewer: MP

METHOD: GC/MS Semivolatiles (EPA SW-846 Method 8270E)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". \bigcirc N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each in

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

YO N/A Were percent differences (%D) ≤20 % and relative response factors (RRF) within the method criteria?

				%D	Finding RRF		
#	Date	Standard ID	Analyte	(Limit ≤20.0%)	(Limit)	Associated samples	Qualifications (5)
	9/7/2024	SMI0106-ICV1	DD	22.2		1, 3	J/UJ/A (ND)
			NN	21.7		+	¥
	9/9/2024	SMI0110-ICV1	JJJ	34.5		2, 4	J/UJ/A (ND)
			ккк	33.9		1	
			LLL	39.6		1	T T
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LDC #: 59780A2a

VALIDATION FINDINGS WORKSHEET Internal Standards

Page: <u>1</u> of <u>1</u> Reviewer: <u>MP</u>

METHOD: GC/MS Semivolatiles (EPA SW-846 Method 8270E)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y(N)N/AWere all internal standard area counts within -50 to +200% of the associated calibration standard?(Y)N N/AWere the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

		Internal			
#	Sample ID	Standard	%R (Limits)	Associated Analytes	Qualifications (19)
	1	CRY	300860 (324966.5-1299866)	CCC, DDD, ZZ	J/UJ/P (det)
		Di-n-octylphthalate-d4	323678 (801465-1602930)	EEE, AAA	J/UJ/P (det)
		PRY	203443 (267013.5-1068054)	LLL, III, KKK, JJJ	J/UJ/P (det+ND)
					╤╤╬╔╌╗╔┶╔╬╗╬╗╬╗╬╗╧╗╧╗╗╤╤╤

IS1 (DCB) = 1,4-Dichlorobenzene-d4 IS2 (NPT) = Naphthalene-d8 IS3 (ANT) = Acenaphthene-d10 IS4 (PHN) = Phenanthrene-d10 IS5 (CRY) = Chrysene-d12 IS6 (PRY) = Perylene-d12 LDC #: _____59780A2a _____

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

METHOD: GC/MS Semivolatiles (EPA SW-846 Method 8270E)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N/A Was the overall quality and usability of the data acceptable?

#	Sample ID	Analyte	Findings	Qualifications (24)
	2	All	Higher dilution	NR
		·		
	· · · · · · · · · · · · · · · · · · ·			
			<u> </u>	

Laboratory Data Consultants, Inc. Data Validation Report

LDC Report Date: October 22, 2024

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory:Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 24H0337

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
DU-1Z-20230919	24H0337-01	Sediment	08/16/23
DU-2Z-20230919	24H0337-02	Sediment	08/16/23
DU-3Z-20230919	24H0337-03	Sediment	08/16/23
DU-3Z-20230919MS	24H0337-03MS	Sediment	08/16/23
DU-3Z-20230919MSD	24H0337-03MSD	Sediment	08/16/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Chlorinated Pesticides by Environmental Protection Agency (EPA) SW 846 Method 8081B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For analytes where average calibration factors were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the analytes, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all analytes with the following exceptions:

Date	Standard	Column	Analyte	%D	Associated Samples	Flag	A or P
08/27/24	SMH0356-SCV2	1	2,4'-DDE 2,4'-DDT Oxychlordane trans-Nonachlor	22.4 23.4 27.0 28.5	All samples in SDG 24H0337	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A
08/27/24	SMH0356-SCV2	1	2,4'-DDD	26.8	All samples in SDG 24H0337	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Column	Surrogate	%R (30-160)	Affected Analyte	Flag	A or P
DU-1Z-20230919	1	Decachlorobiphenyl	245	All analytes	J (all detects)	Р
DU-2Z-20230919	2	Decachlorobiphenyl	239	All analytes	NA	-

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (50-150)	MSD (%R) (50-150)	Flag	A or P
DU-3Z-20230919MS/MSD (DU-3Z-20230919)	trans-Chlordane cis-Chlordane 4,4'-DDE	40.7 36.2 -	35.1 33.1 47.3	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A

Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XII. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XIII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Data qualified due to ICV %D, surrogate %R, and MS/MSD %R are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Chlorinated Pesticides - Data Qualification Summary - SDG 24H0337

Sample	Analyte	Flag	A or P	Reason (Code)
DU-1Z-20230919 DU-2Z-20230919 DU-3Z-20230919	2,4'-DDE 2,4'-DDT Oxychlordane trans-Nonachlor	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A	Initial calibration verification (%D) (5)
DU-1Z-20230919 DU-2Z-20230919 DU-3Z-20230919	2,4'-DDD	J (all detects) UJ (all non-detects)	A	Initial calibration verification (%D) (5)
DU-1Z-20230919	All analytes	J (all detects)	Р	Surrogates (%R) (13)
DU-3Z-20230919	trans-Chlordane cis-Chlordane 4,4'-DDE	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (8)

Meydenbauer Yacht Club

Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 24H0337

No Sample Data Qualified in this SDG

Meydenbauer Yacht Club Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 24H0337

No Sample Data Qualified in this SDG

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 0121124 Page: \ of Reviewer: 2nd Reviewer:

Laboratory: Analytical Resources, Inc., Tukwila, WA

LDC #: 59780A3a

SDG #: 24H0337

METHOD: GC Chlorinated Pesticides (EPA SW-846 Method 8081B)

Chilr Lanes 3 4, 4- DDE ONLy The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
<u>I.</u>	Sample receipt/Technical holding times	A/A	
<u>II.</u>	GC Instrument Performance Check	A	
111.	Initial calibration/ICV	A,SW	$PSD \leq 201$. $ICV \leq 201$.
IV.	Continuing calibration	A	$D \leq 101$
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	ŚW	
VIII.	Matrix spike/Matrix spike duplicates	SW	
IX.	Laboratory control samples	A	lcs
Х.	Field duplicates	Ň	
XI.	Target analyte quantitation	Stor N	
XII.	Target analyte identification	N	
	Overall assessment of data	A	

A = Acceptable N = Not provided/applicable SW = See worksheet

Note:

ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank SB=Source blank OTHER:

	Client ID	Lab ID	Matrix	Date
1	DU-1Z-20230919	24H0337-01	Sediment	08/16/23
2	DU-2Z-20230919	24H0337-02	Sediment	08/16/23
3	DU-3Z-20230919	24H0337-03	Sediment	08/16/23
4	DU-3Z-20230919MS	24H0337-03MS	Sediment	08/16/23
5	DU-3Z-20230919MSD	24H0337-03MSD	Sediment	08/16/23
6				
7				
8				
9				
10				
11				
12				
Votes				
$\left \right $	BMH0394-BLK1			

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	K. Endrin	U. Toxaphene	EE. 2,4'-DDT	OO. trans-Heptachlor epoxide
B. beta-BHC	L. Endosulfan II	V. Aroclor-1016	FF. Hexachlorobenzene	PP. Mirex
C. delta-BHC M. 4,4'-DDD		W. Aroclor-1221	GG. Chlordane	QQ cis-Chlordane
D. gamma-BHC	N. Endosulfan sulfate	X. Aroclor-1232	HH. Chlordane (Technical)	RR. trans-Chlordane
E. Heptachlor	O. 4,4'-DDT	Y. Aroclor-1242	II. Aroclor 1262	SS. Hexachlorobutadiene
F. Aldrin	P. Methoxychlor	Z. Aroclor-1248	JJ. Aroclor 1268	TT. Kepone
G. Heptachlor epoxide	Q. Endrin ketone	AA. Aroclor-1254	KK. Oxychlordane	UU. Chlorpyrifos
H. Endosulfan I	R. Endrin aldehyde	BB. Aroclor-1260	LL. trans-Nonachlor	w
I. Dieldrin	S. alpha-Chlordane	CC. 2,4'-DDD	MM. cis-Nonachlor	WW.
J. 4,4'-DDE	T. gamma-Chiordane	DD. 2,4'-DDE	NN. cis-Heptachlor epoxide	XX.

Notes:

LDC #: 59780A3a

VALIDATION FINDINGS WORKSHEET Initial Calibration Verification

Page: <u>1</u> of <u>1</u> Reviewer: <u>MP</u>

METHOD: GC Chlorinated Pesticides (EPA SW-846 Method 8081B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

() N/A Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y WN/A

Did the initial calibration verification standards meet the %D / %R validation criteria of <20.0% / 80-120%?

			Detector/		%D		
#	Date	Standard ID	Cloumn	Analyte	(Limit ≤20.0%)	Associated samples	Qualifications (5)
	8127124	SMH0356-SCV2	1	DD	22.4	All (ND)	J/UJ/A
			1	CC	26.8	All (ND+det)	
			1	EE	23.4	All (ND)	
			1	КК	27.0		
			1	LL	28.5	*	*
					· ·		

						· · · · · · · · · · · · · · · · · · ·	

LDC #: _59780A3a

VALIDATION FINDINGS WORKSHEET Surrogate Recovery

METHOD: GC Chlorinated Pesticides (EPA SW-846 Method 8081B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Were surrogates spiked into all samples, standards and blanks?

Did all surrogate percent recoveries (%R) meet the QC limits?

#	Sample	Detector/ Column	Surrogate	%R (30-160)	Qualifications (13)
	1	1	В	245	Jdet/P
				·····	
	2 (ND)	2	В	239	Å

Letter	Surrogate Compound	Comments		
A Tetrachloro-m-xylene		TCMX		
В	Decachlorobiphenyl	DCB		

LDC #: _59780A3a

VALIDATION FINDINGS WORKSHEET <u>Matrix Spike(MS)/Matrix Spike Duplicates(MSD)</u>

Page: <u>1</u> of <u>1</u> Reviewer: <u>MP</u>

METHOD: GC Chlorinated Pesticides (EPA SW-846 Method 8081B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed in this SDG?

Y N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

	MS/MSD						Associated	
#	ID	Analyte	MS %R	MSD %R	%R Limits	RPD (≤35)	Samples	Qualifications (8)
	4/5	RR	40.7	35.1	50-150		3 (ND)	J/UJ/A
		QQ	36.2	33.1	1			
		J		47.3			4	+

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Meydenbauer Yacht Club
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LDC Report Date: October 22, 2024

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 2B

Laboratory: Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 24H0337

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
DU-1Z-20230919	24H0337-01	Sediment	08/16/23
DU-2Z-20230919	24H0337-02	Sediment	08/16/23
DU-3Z-20230919	24H0337-03	Sediment	08/16/23
DU-3Z-20230919MS	24H0337-03MS	Sediment	08/16/23
DU-3Z-20230919MSD	24H0337-03MSD	Sediment	08/16/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Biphenyls (PCBs) by Environmental Protection Agency (EPA) SW 846 Method 8082A

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the gualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other
I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all analytes.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all analytes with the following exceptions:

Date	Standard	Column	Analyte	%D	Associated Samples	Affected Analyte	Flag	A or P
08/21/24	MH0272-SCV1	1	Aroclor 1260	22.5	All samples in SDG 24H0337	Aroclor 1248 Aroclor 1254 Aroclor 1260	J (all detects) UJ (all non-detects)	A

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

The sample results for detected analytes from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Analyte	RPD	Flag	A or P
DU-1Z-20230919	Aroclor 1248	59.4	J (all detects)	А
DU-2Z-20230919	Aroclor 1254	44.2	J (all detects)	A

XI. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Data qualified due to ICV %D and RPD between two columns are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Polychlorinated Biphenyls - Data Qualification Summary - SDG 24H0337

Sample	Analyte	Flag	A or P	Reason (Code)
DU-1Z-20230919 DU-2Z-20230919 DU-3Z-20230919 DU-3Z-20230919	Aroclor 1248 Aroclor 1254 Aroclor 1260	J (all detects) UJ (all non-detects)	A	Initial calibration verification (%D) (5)
DU-1Z-20230919	Aroclor 1248	J (all detects)	A	Target analyte quantitation (RPD between two columns) (12)
DU-2Z-20230919	Aroclor 1254	J (all detects)	A	Target analyte quantitation (RPD between two columns) (12)

Meydenbauer Yacht Club

Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 24H0337

No Sample Data Qualified in this SDG

Meydenbauer Yacht Club Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG 24H0337

No Sample Data Qualified in this SDG

LDC #: <u>59780A3b</u>	VALIDATION COMPLETENESS WORKSHEET
SDG #: <u>24H0337</u>	Stage 2B
Laboratory: Analytical Resource	es, Inc., Tukwila, WA



METHOD: GC Polychlorinated Biphenyls (EPA SW-846 Method 8082A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area			Comme	nts	
1.	Sample receipt/Technical holding times	A.A				
11.	Initial calibration/ICV	A/Su	RSD4'	20°1. ICV = 2	CTI.	
111.	Continuing calibration	A	D 4 20	l.		
IV.	Laboratory Blanks	A				
V.	Field blanks	Ň				
VI.	Surrogate spikes	A				
VII.	Matrix spike/Matrix spike duplicates	A				
VIII.	Laboratory control samples	A	LCS			
IX.	Field duplicates	N			· · · · · · · · · · · · · · · · · · ·	
X.	Target analyte quantitation	SW-M				
XI.	Target analyte identification					
XII	Overall assessment of data	7				
Note:	Index: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank N = Not provided/applicable R = Rinsate TB = Trip blank OTHER: SW = See worksheet FB = Field blank EB = Equipment blank					
	Client ID			Lab ID	Matrix	Date
1	DU-1Z-20230919			24H0337-01	Sediment	08/16/23
2	DU-2Z-20230919			24H0337-02	Sediment	08/16/23
3	DU-3Z-20230919			24H0337-03	Sediment	08/16/23
4	DU-3Z-20230919MS			24H0337-03MS	Sediment	08/16/23
5	DU-3Z-20230919MSD			24H0337-03MSD	Sediment	08/16/23
6						
7						
8						
9						
10						
11						
12						
13						
Notes:				<u> </u>		
$ \downarrow\downarrow\downarrow$	3MH 0395-BLKS					

VALIDATION FINDINGS WORKSHEET

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METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	K. Endrin	U. Toxaphene	EE. 2,4'-DDT	OO. trans-Heptachlor epoxide
B. beta-BHC	L. Endosulfan II	V. Arocior-1016	FF. Hexachlorobenzene	PP. Mirex
C. delta-BHC	M. 4,4'-DDD	W. Aroclor-1221	GG. Chlordane	QQ cis-Chlordane
D. gamma-BHC	N. Endosulfan sulfate	X. Aroclor-1232	HH. Chlordane (Technical)	RR. trans-Chlordane
E. Heptachlor	O. 4,4'-DDT	Y. Aroclor-1242	II. Aroclor 1262	SS. Hexachlorobutadiene
F. Aldrin	P. Methoxychlor	Z. Aroclor-1248	JJ. Aroclor 1268	TT. Kepone
G. Heptachlor epoxide	Q. Endrin ketone	AA. Aroclor-1254	KK. Oxychlordane	UU. Chlorpyrifos
H. Endosulfan I	R. Endrin aldehyde	BB. Aroclor-1260	LL. trans-Nonachlor	w
I. Dieldrin	S. alpha-Chlordane	CC. 2,4'-DDD	MM. cis-Nonachlor	WW.
J. 4,4'-DDE	T. gamma-Chlordane	DD. 2,4'-DDE	NN. cis-Heptachlor epoxide	XX

Notes:

LDC #: 59780A3b

VALIDATION FINDINGS WORKSHEET **Initial Calibration Verification**

Page: <u>1</u> of <u>1</u> Reviewer: <u>MP</u>

METHOD: GC Polychlorinated Biphenyls (EPA SW-846 Method 8082A)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Did the initial calibration verification standards meet the %D / %R validation criteria of <20.0% / 80-120%?

			Detector/		%D		
#	Date	Standard ID	Column	Analyte	(Limit ≤20.0%)	Associated samples	Qualifications (5)
	8/21/2024	MH0272-SCV1	1	BB	22.5	All (ND+det)	J/UJ/A (qual Z, AA, BB)
						· · · · · · · · · · · · · · · · · · ·	
[
	······						

LDC #: <u>59780A3b</u>

VALIDATION FINDINGS WORKSHEET Target Analyte Quantitation and Reported RLs

Page: <u>2</u> of <u>2</u> Reviewer: MP

METHOD: GC Polychlorinated Biphenyls (EPA SW-846 Method 8082A)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

X N/A Were the target analytes positively identified on a cifferent column or detector?

N/A Were relative percent difference (RPD) of detected analytes between two columns/detectors >40%?

#	Sample ID	Analyte	%RPD Between Two Columns/Detectors Limit (≤40%)	Qualifications (12)
	1	Z	59.4	Jdet/A
	2	AA	44.2	+
	,			
		·		

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Meydenbauer Yacht Club

LDC Report Date: October 15, 2024

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 24H0337

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
DU-1Z-20230919	24H0337-01	Sediment	08/16/24
DU-2Z-20230919	24H0337-02	Sediment	08/16/24
DU-3Z-20230919	24H0337-03	Sediment	08/16/24
DU-1Z-20230919MS	24H0337-01MS	Sediment	08/16/24
DU-1Z-20230919MSD	24H0337-01MSD	Sediment	08/16/24
DU-1Z-20230919DUP	24H0337-01DUP	Sediment	08/16/24

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Metals by Environmental Protection Agency (EPA) SW 846 Method 6020B Mercury by EPA SW 846 Method 7471B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration (mg/Kg)	Associated Samples
PB (prep blank)	Mercury	0.00665	All samples in SDG 24H0337

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration (mg/Kg)	Modified Final Concentration (mg/Kg)
DU-3Z-20230919	Mercury	0.181	0.231U

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (75-125)	MSD (%R) (75-125)	Flag	A or P
DU-1Z-20230919MS/MSD (All samples in SDG 24H0337)	Mercury	142	-	J (all detects)	A

Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Duplicates

Laboratory duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

IX. Serial Dilution

Serial dilution was not performed for this SDG.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIII. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Data qualified due to MS/MSD %R and laboratory blank contamination are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Metals - Data Qualification Summary - SDG 24H0337

Sample	Analyte	Flag	A or P	Reason (Code)
DU-1Z-20230919 DU-2Z-20230919 DU-3Z-20230919	Mercury	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (8)

Meydenbauer Yacht Club Metals - Laboratory Blank Data Qualification Summary - SDG 24H0337

Sample	Analyte	Modified Final Concentration (mg/Kg)	Code
DU-3Z-20230919	Mercury	0.231U	7

Job Name

Metals - Field Blank Data Qualification Summary - SDG 0000

No Sample Data Qualified in this SDG

Stage 2B

Laboratory: Analytical Resources, Inc., Tukwila, WA

SDG #: 24H0337

METHOD: Metals (EPA SW-846 Method 6020B/7471B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
١.	Sample receipt/Technical holding times	AIA	
<u> </u>	ICP/MS Tune	A	
.	Instrument Calibration	A	
IV.	Continuing calibration	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Laboratory Blanks	50	
VII.	Field Blanks	N	
VIII.	Matrix Spike/Matrix Spike Duplicates	SW	
IX.	Duplicate sample analysis	A	
X .	Serial Dilution	N	
XI.	Laboratory control samples	A	Les
XII.	Field Duplicates	N	
XIII.	Internal Standard (ICP-MS)	A	
XIV.	Target Analyte Quantitation	N	
	Overall Assessment of Data	<u> </u>	

Note: A = Acceptable

N = Not provided/applicable SW = See worksheet ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank OTHER:

nt ID	Lab ID	Matrix	Date
1Z-20230919	24H0337-01	Sediment	08/16/28 24
2Z-20230919	24H0337-02	Sediment	08/16/23
3Z-20230919	24H0337-03	Sediment	08/16/23
1Z-20230919MS	24H0337-01MS	Sediment	08/16/28
1Z-20230919MSD	24H0337-01MSD	Sediment	08/16/25
1Z-20230919DUP	24H0337-01DUP	Sediment	08/16/25
12-2023UST-81-R1	24H0337=01TRP	Sediment	08/16/28
	IZ-20230919 2Z-20230919 3Z-20230919 IZ-20230919MS IZ-20230919MSD IZ-20230919DUP	IZ-20230919 24H0337-01 IZ-20230919 24H0337-02 IZ-20230919 24H0337-03 IZ-20230919MS 24H0337-01MS IZ-20230919MSD 24H0337-01MSD IZ-20230919DUP 24H0337-01DUP	IZ-20230919 24H0337-01 Sediment IZ-20230919 24H0337-02 Sediment IZ-20230919 24H0337-03 Sediment IZ-20230919MS 24H0337-01MS Sediment IZ-20230919MSD 24H0337-01MSD Sediment IZ-20230919DUP 24H0337-01DUP Sediment

METHOD: Trace Metals (EPA SW 846 Methods 6010/6020/7000) Soil preparation factor applied (if applicable):

Sample Concentration, unless otherwise noted: mg/			l: mg/kg	Associated Sample	s: All				
				Sample Identification					
Analyte	PB (mg/kg)	Maximum ICB/CCB (units)	Action Level	3					
Hg	0.00665		0.03325	0.181/0.231U (7)					
						-			

Comments: The listed analyte concentration is the highest ICB or CCB detected in the analysis. The action level, when applicable, is established at 5X the highest ICB, CCB, or PB concentration.

VALIDATION FINDINGS WORKSHEETS

Matrix Spike/Matrix Spike Duplicates

METHOD: Trace Metals (EPA SW 846 Methods 6010/6020/7000)

MS/MSD analysis was performed by the laboratory. All MS/MSD percent recoveries (%R) and relative percent differences (RPDs) were within the acceptable limits with the following exceptions:

MS/MSD ID	Matrix	Analyte	MS %R	MSD %R	%R Limit	RPD	RPD Limit	Associated Samples	Qualification	Det/ND
4-5	sed	Hg	142		75-125			All	Jdet/A (8)	Det
	1									
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LDC Report# 59780A6

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Meydenbauer Yacht Club
LDC Report Date:	October 16, 2024
Parameters:	Wet Chemistry
Validation Level:	Stage 2B
Laboratory:	Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 24H0337

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
DU-1Z-20230919	24H0337-01	Sediment	08/16/24
DU-2Z-20230919	24H0337-02	Sediment	08/16/24
DU-3Z-20230919	24H0337-03	Sediment	08/16/24
DU-1Z-20230919MS	24H0337-01MS	Sediment	08/16/24
DU-1Z-20230919MSD	24H0337-01MSD	Sediment	08/16/24
DU-1Z-20230919DUP	24H0337-01DUP	Sediment	08/16/24
DU-1Z-20230919TRP	24H0337-01TRP	Sediment	08/16/24

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Total Organic Carbon by Environmental Protection Agency (EPA) SW 846 Method 9060A

Total Solids by Standard Method 2540G

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other

,

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
DU-2Z-20230919 DU-3Z-20230919	Total organic carbon	18 days	14 days	J (all detects)	Ρ

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits.

Relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	RPD (≤20)	Flag	A or P
DU-1Z-20230919MS/MSD (All samples in SDG 24H0337)	Total organic carbon	23.2	J (all detects)	A

VII. Laboratory Triplicates

Laboratory triplicate (TRP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Data qualified due to technical holding time and MS/MSD RPD are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Wet Chemistry - Data Qualification Summary - SDG 24H0337

Sample	Analyte	Flag	A or P	Reason (Code)
DU-2Z-20230919 DU-3Z-20230919	Total organic carbon	J (all detects)	Ρ	Technical holding times (1)
DU-1Z-20230919 DU-2Z-20230919 DU-3Z-20230919	Total organic carbon	J (all detects)	А	Matrix spike/Matrix spike duplicates (RPD) (9)

Meydenbauer Yacht Club Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 24H0337

No Sample Data Qualified in this SDG

Meydenbauer Yacht Club Wet Chemistry - Field Blank Data Qualification Summary - SDG 24H0337

No Sample Data Qualified in this SDG

LDC #:	59780A6	VALIDATION COMPLETENESS WORKSHEET
SDG #:	24H0337	Stage 2B
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Laboratory: Analytical Resources, Inc., Tukwila, WA

METHOD: (Analyte) Total Solids (SM2540G), TOC (EPA SW-846 Method 9060A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
Ι.	Sample receipt/Technical holding times	A /SW	
11	Initial calibration	A	
Ш.	Continuing calibration	A	
١V	Laboratory Blanks	A	
v	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	
VII.	Duplicate sample analysis / Triplicate	A	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
Х.	Target Analyte Quantitation	N	
L xi	Overall assessment of data	LA	

A = AcceptableN = Not provided/applicable Note:

SW = See worksheet

ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank OTHER:

	Client ID	Lab ID	Matrix	Date
1	DU-1Z-20230919	24H0337-01	Sediment	08/16/25 24
2	DU-2Z-20230919	24H0337-02	Sediment	08/16/28
3	DU-3Z-20230919	24H0337-03	Sediment	08/16/23
4	DU-1Z-20230919MS	24H0337-01MS	Sediment	08/16/28
5	DU-1Z-20230919MSD	24H0337-01MSD	Sediment	08/16/23
6	DU-1Z-20230919DUP	24H0337-01DUP	Sediment	08/16/23
7	DU-1Z-20230919TRP	24H0337-01TRP	Sediment	08/16/28
8				
9				
10				
11				
12				
13				-
14				
15	1			
Note	9S:			

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VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

All elements are applicable to each sample as noted below.

Sample ID	Target Analyte List	
1-3	Total Solids, TOC	
00		
QC 4-7		
4-7	ТОС	

VALIDATION FINDINGS WORKSHEETS

Holding Time

METHOD: Inorganics

All samples were properly preserved and within the requried holding time with the following

			Analyte: TOC Holding Time: 14d			
Sample ID	Sampling Date	Analysis Date	Total Time from Collection to Analysis	Qualifier	Det/ND	CODE: 1
2	08/16/24 09:50	09/03/24 01:18	18	J/UJ/P	Det	1 .
3	08/16/24 09:50	09/03/24 01:48	18	J/UJ/P	Det	

Preservation							
Sample ID	Preservation	Preservation Requirement (pH)	Qualifier	Det/ND			

LDC #: 59780A6

-

METHOD: Inorganics

MS/MSD analysis was performed by the laboratory. All MS/MSD percent recoveries (%R) and relative percent differences (RPDs) were within the acceptable limits with the following exceptions:

MS/MSD ID	Matrix	Analyte	MS %R	MSD %R	%R Limit	RPD	RPD Limit	Associated Samples	Qualification	Det/ND
4-5	sed	TOC				23.2	20	All	J/UJ/A (9)	Det
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Comments:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Meydenbauer Yacht Club

LDC Report Date: October 22, 2024

Parameters: Polychlorinated Dioxins/Dibenzofurans

Validation Level: Stage 2B

Laboratory: Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 24H0337

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
DU-1Z-20230919	24H0337-01	Sediment	08/16/23
DU-2Z-20230919	24H0337-02	Sediment	08/16/23
DU-3Z-20230919	24H0337-03	Sediment	08/16/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for High Resolution Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Dioxins/Dibenzofurans by Environmental Protection Agency (EPA) Method 1613B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Less than reporting limit

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

The static resolving power was at least 10,000 (10% valley definition).

III. Initial Calibration and Initial Calibration Verification

A five point initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all analytes and less than or equal to 35.0% labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The concentrations of the initial calibration verification (ICV) standard were within the QC limits for all analytes and labeled compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for all analytes and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Extraction Date	Analyte	Concentration (ng/Kg)	Associated Samples
BMI0060-BLK1	09/05/24	OCDD	4.39	DU-1Z-20230919 DU-2Z-20230919

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates/Laboratory Duplicate Sample

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Labeled Compounds

All labeled compound percent recoveries (%R) and ion abundance ratios (IAR) were within QC limits with the following exceptions:

Sample	Labeled Compound	%R (24-169)	Affected Analyte	Flag	A or P
DU-2Z-20230919	13C12-2,3,7,8-TCDF	23.1	2,3,7,8-TCDF Total TCDF	UJ (all non-detects) UJ (all non-detects)	Ρ

XI. Target Analyte Quantitation

All target analyte quantitations were within validation criteria with the following exceptions:

Sample	Analyte	Flag	A or P
All samples in SDG 24H0337	All analytes reported by the laboratory as estimated maximum possible concentration (EMPC).	J (all detects)	A
DU-1Z-20230919	All analytes flagged "X" by the laboratory due to chlorinated diphenyl ether (CDPE) interference.	J (all detects)	А

XII. Target Analyte Identification

Raw data were not reviewed for Stage 2B validation.

XIII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Data qualified due to labeled compound %R, results reported by the laboratory as EMPCs, and CDPE interference are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Polychlorinated Dioxins/Dibenzofurans - Data Qualification Summary - SDG 24H0337

Sample	Analyte	Flag	A or P	Reason (Code)
DU-2Z-20230919	2,3,7,8,-TCDF Total TCDF	UJ (all non-detects) UJ (all non-detects)	Р	Labeled compounds (%R) (19)
DU-1Z-20230919 DU-2Z-20230919 DU-3Z-20230919	All analytes reported by the laboratory as estimated maximum possible concentration (EMPC).	J (all detects)	A	Target analyte quantitation (EMPC) (23)
DU-1Z-20230919	All analytes flagged "X" by the laboratory due to chlorinated diphenyl ether (CDPE) interference.	J (all detects)	A	Target analyte quantitation (CDPE) (24)

Meydenbauer Yacht Club

Polychlorinated Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG 24H0337

No Sample Data Qualified in this SDG

Meydenbauer Yacht Club Polychlorinated Dioxins/Dibenzofurans - Field Blank Data Qualification Summary -SDG 24H0337

No Sample Data Qualified in this SDG

LDC #: <u>59780A21</u>	VALIDATION COMPLETENESS WORKSHEET
SDG #: 24H0337	Stage 2B
Laboratory: Analytical Resou	urces, Inc., Tukwila, WA



METHOD: HRGC/HRMS Polychlorinated Dioxins/Dibenzofurans (EPA Method 1613B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
1.	Sample receipt/Technical holding times	A/A	
.	HRGC/HRMS Instrument performance check	A	
- 111.	Initial calibration/ICV	AA	ASD = 20 1351. ICV = QC limits
IV.	Continuing calibration	A	$D \leq QC$ limits
V .	Laboratory Blanks	SW	
VI.	Field blanks	N	
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	A	LCS/LCSD
IX.	Field duplicates	Ň	•
X.	Labeled Compounds	SW	
XI.	Target analyte quantitation	SWM	
XII.	Target analyte identification	N	
	Overall assessment of data		

Note: A = Acceptable

SW = See worksheet

ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank OTHER:

N = Not provided/applicable

	Client ID	Lab ID	Matrix	Date
1 1	DU-1Z-20230919	24H0337-01	Sediment	08/16/23
2	DU-2Z-20230919	24H0337-02	Sediment	08/16/23
32	DU-3Z-20230919	24H0337-03	Sediment	08/16/23
4				
5				
6				
7				
8				
9				
10				
11				
Notes	:			
1	BMINUG-BLK1		·	
2	BM I0319-BLK1			

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

.,

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:
LDC #: _____59780A21 ______

VALIDATION FINDINGS WORKSHEET Blanks

Page: <u>1</u> of <u>1</u> Reviewer: <u>MP</u>

,

METHOD: HRGC/HRMS Polychlorinated Dioxins/Dibenzofurans (EPA Method 1613B)

Blank extra	ction date: 9	/5/24	Associat	ted samples: <u>1-2</u>				
A	nalyte	Blank ID (ng/kg)			Sa	mple Identifica	tion	
		BMI0060-BLK1	5X					
G		4.39	21.95				·	
				u			·	
							· · · · · · · · · · · · · · · · · · ·	

VALIDATION FINDINGS WORKSHEET Labeled Compounds

Page: _	1	of	1
Reviewer:		M	>

METHOD: HRGC/HRMS Polychlorinated Dioxins/Dibenzofurans (EPA Method 1613B)

#	Sample ID	Labeled Compound	%R (24-169)	Affected Analyte	Qualifications (19)
	2	13C12-2,3,7,8-TCDF	23.1	H, V	J/UJ/P (ND)
			·		
		· · · · · · · · · · · · · · · · · · ·			
 					

VALIDATION FINDINGS WORKSHEET <u>Target Analyte Quantitation</u>

Page: <u>1</u> of <u>2</u> Reviewer: <u>MP</u>

METHOD: HRGC/HRMS Polychlorinated Dioxins/Dibenzofurans (EPA Method 1613B)

#	Associated samples	Finding	Qualifications
	All	Results flagged "EMPC" by the lab as estimated maximum possible concentration	Jdet/A (23)
	1	Results flagged "X" by the lab indicated possible CDPE interference	Jdet/A (24)
	· · · · · · · · · · · · · · · · · · ·		



Anchor QEA, LLC 720 Olive Way Suite 1900 Seattle, WA 98101 ATTN: Ms. Ali Judkins ajudkins@anchorqea.com December 13, 2024

SUBJECT: Meydenbauer Yacht Club - Data Validation

Dear Ms. Judkins,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on November 14, 2024. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #60074:

SDG

Fraction

24J0121

Polychlorinated Biphenyls

The data validation was performed under Stage 2B guidelines. The analysis was validated using the following documents, as applicable to each method:

- Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023)
- USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020)
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014; update VI, July 2018

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco scuenco@lab-data.com Project Manager/Senior Chemist

LDC #60074 (Anchor Environmental - Seattle, WA / Meydenbauer Yacht Club)

LDC	SDG#	Received Date	(21) Due Date	Validation Level	EPA 8082
Matrix T	Matrix Type:				Sediment
A	24J0121	11/14/24	12/6/24	Stage 2B	1
Total			PM: SC		1

These sample counts do not include DLs, REs, MS/MSD, and DUPs. EDD: EQuIS

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Meydenbauer Yacht Club
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LDC Report Date: December 10, 2024

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 2B

Laboratory: Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 24J0121

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
DU-2Z-20230919	24J0121-01	Sediment	08/16/2024
DU-2Z-20230919DUP	24J0121-01DUP	Sediment	08/16/2024

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Biphenyls (PCBs) by Environmental Protection Agency (EPA) SW 846 Method 8082A

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality assurance and quality control (QA/QC) summary reports.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the gualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For analytes where average calibration factors were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the analytes, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Surrogates/Internal Standards

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

All internal standard percent recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates/Laboratory Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

Laboratory duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

The sample results for detected analytes from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Analyte	RPD	Flag	A or P
DU-2Z-20230919	Aroclor 1248	84.7	J (all detects)	A

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Data qualified due to RPD between two columns are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Polychlorinated Biphenyls - Data Qualification Summary - SDG 24J0121

Sample	Analyte	Flag	A or P	Reason (Code)
DU-2Z-20230919	Aroclor 1248	J (all detects)	A	Target analyte quantitation (RPD between two columns) (12)

Meydenbauer Yacht Club

Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 24J0121

No Sample Data Qualified in this SDG

Meydenbauer Yacht Club

Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG 24J0121

No Sample Data Qualified in this SDG

VALIDATION COMPLETENESS WORKSHEET

LDC #: 60074A SDG #: 24J0121 Laboratory: ARI labs (Analytical Resources, Inc.), Tukwila, WA SW 846 Method Method: PCBs (EPA 8082)

Date: 11/18/2024 Page: 1 of 1 Reviewer: 6 2nd Reviewer:

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Com	ments	
Ι	Sample receipt/Technical holding times	A/A			
II	Initial calibration $/ 1C$	A/A	RSD 6 20% Care 20%	12	INE 20%
III	Continuing calibration	A	CAVE 20%		
IV	Laboratory Blanks	A I			
V	Field blanks	N	ana an		
VI	Surrogate spikes /15	A/A			
VII	Matrix spike/Matrix spike duplicates / LD	N/A	······································		
VIII	Laboratory control samples	A	LCS/D		
IX	Field duplicates	Ň			
Х	Target Analyte Quantitation	SW			
XI	Overall assessment of data	A	11 a.		

A = Acceptable

SW = See worksheet

ND = Not detected N = Not provided/applicable NQ = Not qualifiedFD = Field duplicate FT = Field triplicate TB = Trip blank FB = Field blank

AB= Ambient blank R = RinsateSB = Source blank

EB = Equipment blank

	Client ID	Lab ID	QC Type	Matrix	Date	Stage
1	DU-2Z-20230919	24J0121-01		Sediment	08/16/2024	Stage 2B
2	DU-2Z-20230919DUP	24J0121-01DUP	DUP	Sediment	08/16/2024	Stage 2B
				_		

Notes:

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1	

VALIDATION FINDINGS WORKSHEET Target Analyte Quantitation and Reported CRQLs

Page: <u></u>of____ Reviewer: JVG

METHOD: <u>/</u> GC __ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Level IV/D Only

<u>Y N N/A</u> <u>Y N N/A</u> Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Did the reported results for detected target analytes agree within 10.0% of the recalculated results?

Did the percent difference of detected analytes between two columns/detectors <40%?

If no, please see findings bellow.

#	Compound Name	Sample ID	%RPD Between Two Columns/Detectors Limit (≤ 40%)	Qualifications
	Arodor 1248	1	84.7	J dets /A (12)
				·
			······	
				· · · · · · · · · · · · · · · · · · ·
			· · · · · · · · · · · · · · · · · · ·	
[

Comments:



Anchor QEA, LLC 720 Olive Way Suite 1900 Seattle, WA 98101 ATTN: Ms. Ali Judkins ajudkins@anchorqea.com February 21, 2025

SUBJECT: Meydenbauer Yacht Club - Data Validation

Dear Ms. Judkins,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on December 24, 2024. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #60325:

SDG #

24J0184

Fraction

Semivolatile Organic Compounds, Polychlorinated Biphenyls, Metals, Organochlorine Pesticides, Polychlorinated Dioxins/Dibenzofurans, Wet Chemistry

The data validation was performed under Stage 2B guidelines. The analysis was validated using the following documents, as applicable to each method:

- Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023)
- USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020)
- USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (November 2020)
- USEPA National Functional Guidelines (NFG) for High Resolution Superfund Methods Data Review (November 2020)
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014; update VI, July 2018

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco scuenco@lab-data.com Project Manager/Senior Chemist

LDC #60325 (Anchor Environmental - Seattle, WA / Meydenbauer Bay Yacht Club (MBYC))

LDC	SDG#	Received Date	(21) Due Date	Validation Level	SVOCs (8270E-SIM)	Pesticides (8081B)	PCBs (8082A)	Dioxins (1613B)	Zinc (6020B)	Mercury (7471B)	TOC (9060A)	Total Solids (2540G)
Matrix T	ype:				Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
A	24J0184	12/24/24	1/16/25	Stage 2B	1	2	1	1	1	1	1	1
Total			PM: SC		1	2	1	1	1	1	1	1

These sample counts do not include MS/MSD, and DUPs.

EDD: EQuIS

WO APJ-121323

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Meydenbauer Yacht Club
LDC Report Date:	February 13, 2025
Parameters:	Semivolatile Organic Compounds
Validation Level:	Stage 2B
Laboratory:	Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 24J0184

	Laboratory Sample		Collection
Sample Identification	Identification	Matrix	Date
C-3-Z-20230919	24J0184-01	Sediment	09/19/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Semivolatile Organic Compounds (SVOCs) by Environmental Protection Agency (EPA) SW 846 Method 8270E

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality assurance and quality control (QA/QC) summary reports.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The reported result was an estimated quantity value.
- U (Non-detected): The analyte was analyzed for, but was not detected above the level of the adjusted detection limit or quantitation limit, as appropriate.
- UJ (Non-detected): The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- NJ (Tentatively identified): The analyte has been "tentatively identified" or "presumptively identified" as present, and the associated numerical value was the estimated concentration in the sample.
- R (Rejected): The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the gualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

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Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
C-3-Z-20230919	All analytes	416	365	J (all detects) UJ (all non-detects)	Р

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all analytes.

Average relative response factors (RRF) for all analytes were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all analytes with the following exceptions:

Date	Analyte	%D	Associated Samples	Flag	A or P
11/21/24	Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)perylene	42.0 33.7 35.9	All samples in SDG 24J0184	NA	-

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes with the following exceptions:

Date	Analyte	%D	Associated Samples	Flag	A or P
11/25/24	Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)perylene	38.5 33.8 44.3	All samples in SDG 24J0184	NA	-

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blank

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. Surrogate recoveries (%R) were not within QC limits. Using professional judgment, no data were qualified when one base or one acid surrogate %R was outside the QC limits and the %R was greater than or equal to 10%.

VIII. Matrix Spike/Matrix Spike Duplicate

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Sample

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Analyte	LCS %R (50-150)	LCSD %R (50-150)	Flag	A or P
BMK0030-BS1/BSD1 (All samples in SDG 24J0184)	Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)perylene	153 - -	165 154 157	NA	-

Relative percent differences (RPD) were within QC limits.

X. Field Duplicate

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Data qualified due to technical holding time are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Semivolatile Organic Compounds - Data Qualification Summary - SDG 24J0184

Sample	Analyte	Flag	A or P	Reason (Code)
C-3-Z-20230919	All analytes	J (all detects) UJ (all non-detects)	Р	Technical holding times (1)

Meydenbauer Yacht Club

Semivolatile Organic Compounds - Laboratory Blank Data Qualification Summary - SDG 24J0184

No Sample Data Qualified in this SDG

Meydenbauer Yacht Club

Semivolatile Organic Compounds - Field Blank Data Qualification Summary - SDG 24J0184

No Sample Data Qualified in this SDG

VALIDATION COMPLETENESS WORKSHEET

LDC #: 60325A SDG #: 24J0184 Laboratory: ARI labs (Analytical Resources, Inc.), Tukwila, WA

Date:	1/8/2025
Page:	1071
Reviewer:	SVY
2nd Reviewer:	A

Method: Semivolatiles (EPA 8270E SHM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I	Sample receipt/Technical holding times	A (SIN)	
Π	GC/MS Instrument performance check	Â	· · · · · · · · · · · · · · · · · · ·
III	Initial Calibration/ ICV	A SW	RSD = 20/2 IQ = 30/2
IV	Continuing calibration	- SN	$\frac{R_{SD} \leq 20}{CW \leq 20} \qquad 101 \leq 302$
V	Laboratory Blanks	A A	
VI	Field blanks	N	,
VII	Surrogate spikes	SN	(NOWS, only 1 out NQ)
VIII	Matrix spike/Matrix spike duplicates	N	٢۶
IX	Laboratory control samples	Śh	Lesto
Х	Field duplicates	N N	
XI	Internal standards	Ä	
XII	Target analyte quantitation	N	
XIII	Overall assessment of data	A	

Note:

A = AcceptableND = Not detectedN = Not provided/applicableNQ = Not qualifiedSW = See worksheetFD = Field duplicate

FT = Field triplicate TB = Trip blank FB = Field blank

SB = Source blank EB = Equipment blank

AB= Ambient blank

R = Rinsate

IX 10X

	Client ID	Lab ID	QC Туре	Matrix	Date	Stage
1	C-3-Z-20230919	24J0184-01		Sediment	09/19/2023	Stage 2B
·						

(Frozen)

Notes:

BMK0030-BLKA	

VALIDATION FINDINGS WORKSHEET Technical Holding Times

Page: 1 of 1 Reviewer: JVG

Samples identified below have exceeded the cooler temperature validation criteria of 0-6 deg C or the technical holding time criteria.

Sample ID	Matrix	Preserved	Sampling date	Extraction date	Analysis date	(365 days) Total # of days	Qualifier
All	Sed	Y	9/19/2023	11/8/2024	11/25/2024	416	J/UJ/P (1)
(ND+DET))							
			<u></u>				
	·						

TECHNICAL HOLDING TIME CRITERIA:

EXTRACTABLES: Water: Soils: Frozen: Extracted within 7 days, analyzed within 40 days Extracted within 14 days, analyzed within 40 days Extracted within 365 days, analyzed within 40 days

VALIDATION FINDINGS WORKSHEET Initial Calibration Verification

Page: _1_ of _1_ Reviewer: _JVG_

METHOD: GC/MS SVOC (EPA SW 846 Method 8270E)

A second source verification standard was analyzed after each ICAL for each instrument.

All analytes met the second source verification standards validation criteria with the exceptions identified below.

#	Date	Standard ID	Analyte	%D (Limit ≤30.0%)	Associated samples	Qualifications
	11/21/2024	SMK0248-SCV1	Indeno(1,2,3-cd)pyrene	42.0	ALL (ND)	J det/Ą (5)
			Dibenzo(a,h)anthracene	33.7		
			Benzo(g,h,i)perylene	35.9	X	
	-					
						•
				-		
			1			

DOD %D 20%

NFG Method criteria

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VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: 1 of 1 Reviewer: JVG

METHOD: GC/MS SVOC (EPA SW 846 Method 8270E)

Continuing calibration standards were analyzed at the required frequencies.

The retention times for all calibrated compounds were within their respective acceptance windows.

All analytes met the continuing calibration standards validation criteria with the exceptions identified below.

				%D		RRF		
#	Date	Standard ID	Compound	(Limit ≤20%)	RRF	Limits	Associated samples	Qualifications
	11/25/2024	SMK0337-ICV1	Indeno(1,2,3-cd)pyrene	38.5			ALL (ND)	J det/A (5)
			Dibenzo(a,h)anthracene	33.8				
			Benzo(g,h,i)perylene	44.3				X
					_			
								· · · ·
						· · · · · · · · · · · · · · · · · · ·		
					_			

DOD %D 20%/50% NFG 20%

RRF: 0.05

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page: 1 of 1 Reviewer: JVG

METHOD: GC/MS SVOC (EPA SW 846 Method 8270E)

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) and Relative percent differences (RPD) were within QC limits with the exceptions identified below.

	• · · /	LCS	LCSD			RPD		
LCS/LCSD	Analyte	%R	%R	%R Limits	RPD	Limits	Associated samples	Qualifications
BMK0030-BS1/BSD1	Indeno(1,2,3-cd)pyrene	153	165	50-150			ALL (ND)	J det/P (10)
	Dibenzo(a,h)anthracene	-	154					
	Benzo(g,h,i)perylene	-	157	<u> </u>			×	Y
			-					

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Meydenbauer Yacht Club
LDC Report Date:	February 13, 2025
Parameters:	Organochlorine Pesticides
Validation Level:	Stage 2B
Laboratory:	Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 24J0184

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
C-3-Z-20230919	24J0184-01	Sediment	09/19/23
C-3-Z-20230919DL	24J0184-01DL	Sediment	09/19/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Organochlorine Pesticides by Environmental Protection Agency (EPA) SW 846 Method 8081B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality assurance and quality control (QA/QC) summary reports.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The reported result was an estimated quantity value.
- U (Non-detected): The analyte was analyzed for, but was not detected above the level of the adjusted detection limit or quantitation limit, as appropriate.
- UJ (Non-detected): The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- NJ (Tentatively identified): The analyte has been "tentatively identified" or "presumptively identified" as present, and the associated numerical value was the estimated concentration in the sample.
- R (Rejected): The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
C-3-Z-20230919 C-3-Z-20230919DL	All analytes	419	365	J (all detects) UJ (all non-detects)	Ρ

II. GC/ECD Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all analytes.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all analytes with the following exceptions:

Date	Standard	Column	Analyte	%D	Associated Samples	Flag	A or P
11/11/24	SMK0132-SCV2	STX-CLP1	2,4'-DDE 2,4'-DDD 2,4'-DDT Oxychlordane trans-Nonachlor	24.5 29.5 27.4 29.2 27.2	All samples in SDG 24J0184	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A
11/11/24	SMK0132-SCV2	STX-CLP2	2,4'-DDD 2,4'-DDT trans-Nonachlor	29.1 26.9 26.1	All samples in SDG 24J0184	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes with the following exceptions:

Date	Standard	Column	Analyte	%D	Associated Samples	Flag	A or P
11/22/24	SMK0300-ICV1	STX-CLP2	trans-Chlordane cis-Chlordane 4,4'-DDE	21.5 21.5 21.5	C-3-Z-20230919DL	J (all detects) J (all detects) J (all detects)	A
11/22/24	SMK0300-CCV1	STX-CLP2	trans-Chlordane cis-Chlordane 4,4'-DDE	20.3 20.1 20.5	C-3-Z-20230919	J (all detects) J (all detects) J (all detects)	A

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blank

No field blanks were identified in this SDG.

VII. Surrogates/Internal Standards

Surrogates were added to all samples as required by the method. Surrogate recoveries (%R) were not within QC limits for sample C-3-Z-20230919DL. No data were qualified for samples analyzed at greater than or equal to 5X dilution.

All internal standard areas and retention times were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicate

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Sample

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicate

No field duplicates were identified in this SDG.

XI. Target Analyte Quantitation

The sample results for detected analytes from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Analyte	RPD	Flag	A or P
C-3-Z-20230919	4,4'-DDE trans-Chlordane	43.7 41.8	J (all detects) J (all detects)	A
C-3-Z-20230919DL	4,4'-DDE trans-Chlordane	42.2 49.3	J (all detects) J (all detects)	A

Raw data were not reviewed for Stage 2B validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed not reportable as follows:

Sample	Analyte	Reason	Flag	A or P
C-3-Z-20230919DL	All analytes	Results from undiluted analyses were more usable.	Not reportable	-

Data qualified due to technical holding time, ICV %D, continuing calibration %D, and RPD between two columns are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Organochlorine Pesticides - Data Qualification Summary - SDG 24J0184

Sample	Analyte	Flag	A or P	Reason (Code)
C-3-Z-20230919	All analytes	J (all detects) UJ (all non-detects)	Ρ	Technical holding times (1)
C-3-Z-20230919	2,4'-DDE 2,4'-DDD 2,4'-DDT Oxychlordane trans-Nonachlor	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A	Initial calibration verification (%D) (5)
C-3-Z-20230919	trans-Chlordane cis-Chlordane 4,4'-DDE	J (all detects) J (all detects) J (all detects)	A	Continuing calibration (%D) (5)
C-3-Z-20230919	4,4'-DDE trans-Chlordane	J (all detects) J (all detects)	A	Target analyte quantitation (RPD between two columns) (12)
C-3-Z-20230919DL	All analytes	Not reportable	-	Overall assessment of data (22)

Meydenbauer Yacht Club

Organochlorine Pesticides - Laboratory Blank Data Qualification Summary - SDG 24J0184

No Sample Data Qualified in this SDG

Meydenbauer Yacht Club

Organochlorine Pesticides - Field Blank Data Qualification Summary - SDG 24J0184

No Sample Data Qualified in this SDG

VALIDATION COMPLETENESS WORKSHEET

LDC #: 60325A SDG #: 24J0184 Laboratory: ARI labs (Analytical Resources, Inc.), Tukwila, WA Date: 1/8/2025 Page: 1 of 1 Reviewer: **NG** 2nd Reviewer: NG

Method: Organochlorine Pesticides (EPA 8081B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Cor	nments
I	Sample receipt/Technical holding times	A /SW		
II	GC/ECD Instrument performance check	Á		
III	Initial Calibration/ ICV	A'/94/	RSD = 20%	ICNE ZOZ
IV	Continuing calibration	Śł/	RSD = 20% Car = 20%	
V	Laboratory Blanks	A		
VI	Field blanks	N N		
VII	Surrogate spikes	574/A	#2 (no WS.	dil-NQ)
VIII	Matrix spike/Matrix spike duplicates	N	03	
IX	Laboratory control samples	Å	LCS D	
Х	Field duplicates	'N		
XI	Target analyte quantitation	ŚW		
XII	Overall assessment of data	SW		

Note:

A = AcceptableND = Not detectedN = Not provided/applicableNQ = Not qualifiedSW = See worksheetFD = Field duplicate

FT = Field triplicate TB = Trip blank FB = Field blank

SB = Source blank EB = Equipment blank

AB= Ambient blank

R = Rinsate

	Client ID	Lab ID	QC Type	Matrix	Date	Stage
1	C-3-Z-20230919	24J0184-01		Sediment	09/19/2023	Stage 2B
2	C-3-Z-20230919DL	24J0184-01DL		Sediment	09/19/2023	Stage 2B
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(Prozen)

Notes:

BMK 0231- BUKI	

VALIDATION FINDINGS WORKSHEET Technical Holding Times

Page: 1 of 1 Reviewer: JVG

Samples identified below have exceeded the cooler temperature validation criteria of 0-6 deg C or the technical holding time criteria.

Sample ID	Matrix	Preserved	Sampling date	Extraction date	Analysis date	(365 days) Total # of days	Qualifier
All	Sed	Y	9/19/2023	11/11/2024	11/22/2024	419	J/UJ/P (1)
(ND+DET))							·····
					······		
	·						

TECHNICAL HOLDING TIME CRITERIA:

EXTRACTABLES: Water: Soils: Frozen: Extracted within 7 days, analyzed within 40 days Extracted within 14 days, analyzed within 40 days Extracted within 365 days, analyzed within 40 days
VALIDATION FINDINGS WORKSHEET Initial Calibration Verification

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

A second source verification standard was analyzed after each ICAL for each instrument.

All analytes met the second source verification standards validation criteria with the exceptions identified below.

					%D		
#	Date	Standard ID	Column/Detector	Analyte	(Limit ≤20.0%)	Associated samples	Qualifications
	11/11/2024	SMK0132-SCV2	STX-CLP1	2,4'-DDE	24.5	All (ND)	J/UJ/A (5)
			STX-CLP1	2,4'-DDD	29.5		
			STX-CLP2	2,4'-DDD	29.1		
			STX-CLP1	2,4'-DDT	27.4		
			STX-CLP2	2,4'-DDT	26.9		
			STX-CLP1	Oxychlordane	29.2		
			STX-CLP1	trans-Nonachlor	27.2		
			STX-CLP2	trans-Nonachlor	26.1	Ł	
							······································
	· · · · ·						
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VALIDATION FINDINGS WORKSHEET <u>Continuing Calibration</u>

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Continuing calibration standards were analyzed at the required frequencies.

The retention times for all calibrated compounds were within their respective acceptance windows.

All analytes met the continuing calibration standards validation criteria with the exceptions identified below.

					%D		
#	Date	Standard ID	Column	Compound	(Limit ≤20.0%)	Associated samples	Qualifications
	11/22/24	SMK0300-ICV1	STX-CLP2	trans-Chlordane (beta-Chlordane)	21.5	2, MB (Det)	J det/A (5)
			STX-CLP2	cis-Chlordane (alpha-chlordane)	21.5		
			STX-CLP2	4,4'-DDE	21.5		
	1122/24	SMK0300-CCV1	STX-CLP2	trans-Chlordane (beta-Chlordane)	20.3	1 (DET)	
			STX-CLP2	cis-Chlordane (alpha-chlordane)	20.1		
			STX-CLP2	4,4'-DDE	20.5	/	
						•	

VALIDATION FINDINGS WORKSHEET Target Analyte Quantitation and Reported RLs

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

RLs /LOQs were adjusted for sample dilutions and dry weight.

The reported results for detected target analytes agree within 10.0% of the recalculated results.

The relative percent difference (RPD) of detected analytes between two columns/detectors were <40% except those identified below.

#	Sample ID	Compound Name	%RPD Between Two Columns/Detectors	Qualifications
#				Qualifications
	1	4,4'-DDE	43.7	J det/A (12)
		trans-Chlordane (beta-Chlordane)	41.8	
	2	4,4'-DDE	42.2	
		cis-Chlordane (alpha-chlordane)	49.3	
				-
Comments				

LDC #: 60325A

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Page: 1 of 1 Reviewer: JVG

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

All available information pertaining to the data were reviewed for data quality, uncertainty and bias using professional judment to compliment the overall assessment made below.

#	Sample ID	Analyte	Findings	Qualifications
<u></u>	2	All	higher RLs	NR (22)
			(confirmation run)	
omments:				

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Meydenbauer Yacht Club
LDC Report Date:	February 13, 2025
Parameters:	Polychlorinated Biphenyls
Validation Level:	Stage 2B
Laboratory:	Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 24J0184

	Laboratory Sample		Collection	
Sample Identification	Identification	Matrix	Date	
C-3-Z-20230919	24J0184-01	Sediment	09/19/23	

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Biphenyls (PCBs) by Environmental Protection Agency (EPA) SW 846 Method 8082A

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality assurance and quality control (QA/QC) summary reports.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The reported result was an estimated quantity value.
- U (Non-detected): The analyte was analyzed for, but was not detected above the level of the adjusted detection limit or quantitation limit, as appropriate.
- UJ (Non-detected): The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- NJ (Tentatively identified): The analyte has been "tentatively identified" or "presumptively identified" as present, and the associated numerical value was the estimated concentration in the sample.
- R (Rejected): The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For analytes where average calibration factors were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the analytes, all coefficients of determination (r^2) were greater than or equal to 0.990.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all analytes.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all analytes.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blank

No field blanks were identified in this SDG.

VI. Surrogates/Internal Standards

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Column	Surrogate	%R (44-120)	Affected Analyte	Flag	A or P
C-3-Z-20230919	ZB5	Tetrachloro-m-xylene	41.6	All analytes	J (all detects) UJ (all non-detects)	Ρ

4

All internal standard areas and retention times were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicate

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Sample

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicate

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

The sample results for detected analytes from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Analyte	RPD	Flag	A or P
C-3-Z-20230919	Aroclor 1248 Aroclor 1254	81.7 63.2	J (all detects) J (all detects)	A

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Data qualified due to surrogate %R and RPD between two columns are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Polychlorinated Biphenyls - Data Qualification Summary - SDG 24J0184

Sample	Analyte	Flag	A or P	Reason (Code)
C-3-Z-20230919	All analytes	J (all detects) UJ (all non-detects)	Ρ	Surrogates (%R) (13)
C-3-Z-20230919	Aroclor 1248 Aroclor 1254	J (all detects) J (all detects)	A	Target analyte quantitation (RPD between two columns) (12)

Meydenbauer Yacht Club

Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 24J0184

No Sample Data Qualified in this SDG

Meydenbauer Yacht Club

Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG 24J0184

No Sample Data Qualified in this SDG

VALIDATION COMPLETENESS WORKSHEET

LDC #: 60325A 24J0184 SDG #: ARI labs (Analytical Resources, Inc.), Tukwila, WA Laboratory:

Date: 1/8/2025 Page: 104/ Reviewer: W 2nd Reviewer:

Method: PCBs (EPA 8082A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments	
I	Sample receipt/Technical holding times	A/A		
II	Initial Calibration/ ICV	A/A	RSDE 20% M INE	20/2
III	Continuing calibration	' 'A'``	RSDE 20% r INE CNE ZOL	
IV	Laboratory Blanks	A		
V	Field blanks	A A		
VI	Surrogate spikes / 1>	SW/A		
VII	Matrix spike/Matrix spike duplicates		05	
VIII	Laboratory control samples	Á	LCS/D	
IX	Field duplicates	Å		
X	Target analyte quantitation	SW		
XI	Overall assessment of data	A		

Note:

A = Acceptable

ND = Not detected N = Not provided/applicable NQ = Not qualified SW = See worksheet FD = Field duplicate FT = Field triplicate TB = Trip blank

AB= Ambient blank SB = Source blank

R = Rinsate

FB = Field blank

EB = Equipment blank

	Client ID	Lab ID	QC Type	Matrix	Date	Stage
1	C-3-Z-20230919	24J0184-01		Sediment	09/19/2023	Stage 2B

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Notes:

BONJOGGI- BUKS	

VALIDATION FINDINGS WORKSHEET Surrogate Recovery

Page: 1 of 1 Reviewer: JVG

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Surrogates were added to all samples as required by the method.

All surrogate recoveries (%R) were within QC limits with the exceptions identified below.

	Sample	Detector/				
#	ID	Column	Surrogate Compound	%R	(Limits)	Qualifications
	1 (ND+DET)	ZB5	A	41.6	44-120	J/UJ/P
				······································		
					· · · · · · · · · · · · · · · · · · ·	

Surrogate Compound

A Tetrachloro-m- xylene

B Decachlorobiphenyl (DCB)

VALIDATION FINDINGS WORKSHEET <u>Target Analyte Quantitation and Reported RLs</u>

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

RLs /LOQs were adjusted for sample dilutions and dry weight.

The reported results for detected target analytes agree within 10.0% of the recalculated results.

The relative percent difference (RPD) of detected analytes between two columns/detectors were <40% except those identified below.

#	Sample ID	Compound Name	%RPD Between Two Columns/Detectors	Qualifications
	1	Aroclor 1248	81.7	J det/A , (12)
		Aroclor 1254	63.2	
				· ·
				· · · · · · · · · · · · · · · · · · ·
Comments:				

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Meydenbauer Yacht Club
LDC Report Date:	February 13, 2025
Parameters:	Polychlorinated Dioxins/Dibenzofurans
Validation Level:	Stage 2B
Laboratory:	Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 24J0184

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
C-3-Z-20230919	24J0184-01	Sediment	09/19/23
C-3-Z-20230919DUP	24J0184-01DUP	Sediment	09/19/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for High Resolution Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Dioxins/Dibenzofurans by Environmental Protection Agency (EPA) Method 1613B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality assurance and quality control (QA/QC) summary reports.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The reported result was an estimated quantity value.
- U (Non-detected): The analyte was analyzed for, but was not detected above the level of the adjusted detection limit or quantitation limit, as appropriate.
- UJ (Non-detected): The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- NJ (Tentatively identified): The analyte has been "tentatively identified" or "presumptively identified" as present, and the associated numerical value was the estimated concentration in the sample.
- R (Rejected): The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

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Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards/Labeled Compounds (High Res)
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Less than reporting limit

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

The static resolving power was at least 10,000 (10% valley definition).

III. Initial Calibration and Initial Calibration Verification

A five point initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all analytes and less than or equal to 35.0% labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The concentrations of the initial calibration verification (ICV) standard were within the QC limits for all analytes and labeled compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for all analytes and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Extraction Date	Analyte	Concentration (ng/Kg)	Associated Samples
BMJ0702-BLK1	11/05/24	OCDD	0.465	All samples in SDG 24J0184

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

VI. Field Blank

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicate/Laboratory Duplicate

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

Laboratory duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Ongoing Precision Recovery

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicate

No field duplicates were identified in this SDG.

X. Labeled Compounds

All labeled compound percent recoveries (%R) and ion abundance ratios (IAR) were within QC limits.

XI. Target Analyte Quantitation

All target analyte quantitations were within validation criteria with the following exceptions:

Sample	Analyte	Finding	Flag	A or P
C-3-Z-20230919	1,2,3,4,7,8-HxCDD	Analytes reported by the laboratory as estimated maximum possible concentration (EMPC).	J (all detects)	Р
C-3-Z-20230919	2,3,7,8-TCDF	Analytes flagged "X" by the laboratory due to chlorinated diphenyl ether (CDPE) interference.	J (all detects)	Р

Sample	Analyte	Finding	Criteria	Flag	A or P
C-3-Z-20230919	OCDD	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	Р

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Data qualified due to results reported by the laboratory as EMPCs, CDPE interference, and result exceeding the calibration range are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Polychlorinated Dioxins/Dibenzofurans - Data Qualification Summary - SDG 24J0184

Sample	Analyte	Flag	A or P	Reason (Code)
C-3-Z-20230919	1,2,3,4,7,8-HxCDD	J (all detects)	Ρ	Target analyte quantitation (EMPC) (23)
C-3-Z-20230919	2,3,7,8-TCDF	J (all detects)	Р	Target analyte quantitation (CDPE interference) (24)
C-3-Z-20230919	OCDD	J (all detects)	Ρ	Target analyte quantitation (exceeded range) (20)

Meydenbauer Yacht Club

Polychlorinated Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG 24J0184

No Sample Data Qualified in this SDG

Meydenbauer Yacht Club

Polychlorinated Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG 24J0184

No Sample Data Qualified in this SDG

VALIDATION COMPLETENESS WORKSHEET

LDC #: 60325A SDG #: 24J0184 Laboratory: ARI labs (Analytical Resources, Inc.), Tukwila, WA

Date:	1/8/2025
Page:	1 of 1
Reviewer:	NG
2nd Reviewer:	A

Method: Dioxins and Furans (EPA 1613B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments	
I	Sample receipt/Technical holding times	A/A		
II	HRGC/HRMS Instrument performance check	A		
III	Initial Calibration/ ICV	A/A	RSDE 20/352	INERCIIM
IV	Continuing calibration	A	RSDE 20/382 Care QC limits	
V	Laboratory Blanks	SN		
VI	Field blanks	N		
VII	Matrix spike/Matrix spike duplicates /Lb	N/A		
VIII	Laboratory control samples	Ă	OPR	
IX	Field duplicates	N		
X	Labeled Compounds	A		
XI	Target analyte quantitation	SK		
XII	Overall assessment of data	A		

Note:	A = Acceptable	ND = Not detected	FT = Field triplicate	AB= Ambient blank	R = Rinsate
	N = Not provided/applicable	NQ = Not qualified	TB = Trip blank	SB = Source blank	
	SW = See worksheet	FD = Field duplicate	FB = Field blank	EB = Equipment blank	

	Client ID	Lab ID	QC Type	Matrix	Date	Stage
1	C-3-Z-20230919	24J0184-01		Sediment	09/19/2023	Stage 2B
2	C-3-Z-20230919DUP	24J0184-01DUP	DUP	Sediment	09/19/2023	Stage 2B
				·		

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Notes:

-	- BMJ6702- BLK1	

VALIDATION FINDINGS WORKSHEET Blanks

Page: 1 of 1 Reviewer: JVG

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (Method 1613B)

Blank extraction date: 11/05	/24	Blank analysis date: <u>12/18/24</u>
Conc. Units: ng/Kg		Associated samples: All (>5x)
Analyte	Blank ID	Sample Identification
	BMJ0702-BLK1	
OCDD	0.465	

LDC #: 60325A

VALIDATION FINDINGS WORKSHEET <u>Target Analyte Quantitation</u>

Page: 1 of 1 Reviewer: JVG

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (Method 1613B)

Sample ID	Analyte	Finding	Qualification
1	1,2,3,4,7,8-HxCDD	Analyte reported as estimated maximum possible concentration (EMPC)	Jdet/P (23)
1	2,3,7,8-TCDF	Analyte flagged "X" by the laboratory indicates possible CDPE interference	J det/P (24)
1	OCDD	> cal range	J det/P (20)
			· · ·

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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Mey	denbauer Yacht Club
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LDC Report Date: February 13, 2025

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 24J0184

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
C-3-Z-20230919	24J0184-01	Sediment	09/19/23
C-3-Z-20230919MS	24J0184-01MS	Sediment	09/19/23
C-3-Z-20230919DUP	24J0184-01DUP	Sediment	09/19/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Metals by Environmental Protection Agency (EPA) SW 846 Method 6020B Mercury by EPA SW 846 Method 7471B

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality assurance and quality control (QA/QC) summary reports.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The reported result was an estimated quantity value.
- U (Non-detected): The analyte was analyzed for, but was not detected above the level of the adjusted detection limit or quantitation limit, as appropriate.
- UJ (Non-detected): The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- NJ (Tentatively identified): The analyte has been "tentatively identified" or "presumptively identified" as present, and the associated numerical value was the estimated concentration in the sample.
- R (Rejected): The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the gualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

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Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Initial Calibration

All criteria for the initial calibration of each method were met.

IV. Initial and Continuing Calibration Verification

Initial and continuing calibration verification (ICV/CCV) frequency and analysis criteria of each method were met.

V. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

VI. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

VII. Field Blank

No field blanks were identified in this SDG.

VIII. Matrix Spike/Matrix Spike Duplicate

Matrix spike (MS) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits.

IX. Laboratory Duplicate

Laboratory duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (≤20)	Difference (mg/Kg) (≤0.1988)	Flag	A or P
C-3-Z-20230919DUP (All samples in SDG 24J0184)	Zinc Mercury	24.5	0.257	J (all detects) J (all detects)	A

X. Serial Dilution

Serial dilution was not performed for this SDG.

XI. Laboratory Control Sample

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

XII. Field Duplicate

No field duplicates were identified in this SDG.

XIII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

XIV. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Data qualified due to DUP RPD and difference are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Metals - Data Qualification Summary - SDG 24J0184

Sample	Analyte	Flag	A or P	Reason (Code)
C-3-Z-20230919	Zinc	J (all detects)	A	Laboratory duplicates (RPD) (9)
C-3-Z-20230919	Mercury	J (all detects)	A	Laboratory duplicates (difference) (9)

Meydenbauer Yacht Club Metals - Laboratory Blank Data Qualification Summary - SDG 24J0184

No Sample Data Qualified in this SDG

Job Name Metals - Field Blank Data Qualification Summary - SDG 0000

No Sample Data Qualified in this SDG

VALIDATION COMPLETENESS WORKSHEET

LDC #: 60325A SDG #: 24J0184 Laboratory: ARI labs (Analytical Resources, Inc.), Tukwila, WA

Date: 1/8/2025 Page: 1/1 Reviewer: h 2nd Reviewer:

Method: Metals (EPA 6020B) Zinc, Mercury (EPA 7471B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I	Sample receipt/Technical holding times	A/A	
II	ICP/MS Tune	Á	
III	Initial calibration	A	
IV	ICV/ Continuing calibration	A	
V	ICP Interference Check Sample (ICS) Analysis	A	
VI	Laboratory Blanks	A	
VII	Field blanks	N	
VIII	Matrix spike/Matrix spike duplicates	A	
IX	Laboratory duplicates	SW	
Х	Serial Dilution	N	
XI	Laboratory control samples	A	LCS
XII	Field duplicates	N	
XIII	Internal Standard (ICP-MS)	A	
XIV	Target analyte quantitation	N	
XV	Overall assessment of data	A	

Note:

A = Acceptable

SW = See worksheet

ND = Not detected N = Not provided/applicableNQ = Not qualified FD = Field duplicate FT = Field triplicate TB = Trip blank FB = Field blank

SB = Source blank EB = Equipment blank R = Rinsate

AB= Ambient blank

	Client ID	Lab ID	QC Type	Matrix	Date	Stage
1	C-3-Z-20230919	24J0184-01		Sediment	09/19/2023	Stage 2B
2	C-3-Z-20230919MS	24J0184-01MS	MS	Sediment	09/19/2023	Stage 2B
3	C-3-Z-20230919DUP	24J0184-01DUP	DUP	Sediment	09/19/2023	Stage 2B

Notes:

VALIDATION FINDINGS WORKSHEETS

Laboratory Duplicates

Page 1 of 1 Reviewer: NF

METHOD: Trace Metals (EPA SW 846 Methods 6010/6020/7000)

Laboratory duplicate analysis was performed by the laboratory. All laboratory duplicates were with the relative percent difference (RPD) for samples >5X the reporting limits with the exceptions listed below. If samples were <5X the reporting limits, the difference was within 1X the reporting limit for water samples and within 2X the reporting limit for soil samples for all samples with the

Duplicate ID	Matrix	Analyte	RPD	RPD Limit	Difference (mg/kg)	Difference Limit	Associated Samples	Qualification	Det/ND
3	w	Zn	24.5	20			All	J/UJ/A (9)	Det
		Hg			0.257	0.1988	All	J/UJ/A (9)	Det
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Comments:

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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Meydenbauer Yacht Club

LDC Report Date: February 13, 2025

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Analytical Resources, Inc., Tukwila, WA

Sample Delivery Group (SDG): 24J0184

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
C-3-Z-20230919	24J0184-01	Sediment	09/19/23
C-3-Z-20230919DUP	24J0184-01DUP	Sediment	09/19/23
C-3-Z-20230919TRP	24J0184-01TRP	Sediment	09/19/23

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Analysis Plan for Maintenance Dredging Evaluation at Meydenbauer Bay Yacht Club, Bellevue, Washington (February 2023) and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (November 2020). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Total Organic Carbon by Environmental Protection Agency (EPA) SW 846 Method 9060A Total Solids by Standard Method 2540C

Total Solids by Standard Method 2540G

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality assurance and quality control (QA/QC) summary reports.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The reported result was an estimated quantity value.
- U (Non-detected): The analyte was analyzed for, but was not detected above the level of the adjusted detection limit or quantitation limit, as appropriate.
- UJ (Non-detected): The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- NJ (Tentatively identified): The analyte has been "tentatively identified" or "presumptively identified" as present, and the associated numerical value was the estimated concentration in the sample.
- R (Rejected): The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Qualification Codes

- 1 Holding Times
- 2 Sample Preservation (Cooler Temp)
- 3 Sample Custody
- 4 Missing Deliverables
- 5 Calibration
- 6 Field Blanks
- 7 Laboratory Blanks
- 8 Matrix Spike (%)
- 9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
- 10 Laboratory Control Sample
- 11 ICP Interference Check
- 12 RPD Between Two Columns
- 13 Surrogates
- 14 Field Duplicates
- 15 Peak Resolution
- 16 ICP Serial Dilution
- 17 Chemical Recoveries
- 18 Trip Blanks
- 19 Internal Standards
- 20 Linear Range Exceeded
- 21 Potential False Positives
- 22 Do not use, other result more technically sound
- 23 Estimated Maximum Possible Concentration
- 24 Other

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I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
C-3-Z-20230919	Total solids Total organic carbon	12 months 12 months	6 months 6 months	J (all detects) J (all detects)	Ρ

II. Initial Calibration

All criteria for the initial calibration of each method were met when applicable.

III. Initial and Continuing Calibration Verification

Initial and continuing calibration verification (ICV/CCV) frequency and analysis criteria of each method were met when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blank

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicate

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Laboratory Duplicate/Laboratory Triplicate

Laboratory duplicate (DUP) and triplicate (TRP) sample analyses were performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Sample/Standard Reference Material

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

Standard reference material (SRM) samples were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicate

No field duplicates were identified in this SDG.

X. Target Analyte Quantitation

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Data qualified due to technical holding time are summarized and presented in the Data Qualification Summary.

Meydenbauer Yacht Club Wet Chemistry - Data Qualification Summary - SDG 24J0184

Sample	Analyte	Flag	A or P	Reason (Code)
C-3-Z-20230919	Total solids Total organic carbon	J (all detects) J (all detects)	Р	Technical holding times (1)

Meydenbauer Yacht Club Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 24J0184

No Sample Data Qualified in this SDG

Meydenbauer Yacht Club Wet Chemistry - Field Blank Data Qualification Summary - SDG 24J0184

No Sample Data Qualified in this SDG

VALIDATION COMPLETENESS WORKSHEET

LDC #: 60325A SDG #: 24J0184 ARI labs (Analytical Resources, Inc.), Tukwila, WA Laboratory:

Date: 1/8/2025 Page: \/ ١ Reviewer: 2nd Reviewer:

Method: Total Solids (SM 2540 G), Total Organic Carbon (EPA 9060A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area	,		Comments	
I	Sample receipt/Technical holding times	A/SW			
II	Initial calibration	A'			
III	ICV/ Continuing calibration	A			
IV	Laboratory Blanks	A			
V	Field blanks	N			
VI	Matrix spike/Matrix spike duplicates	N			
VII	Laboratory duplicates / Triplicates	A			
VIII	Laboratory control samples	A	LCS	SRM	
IX	Field duplicates	N			
X	Target analyte quantitation	N			
XI	Overall assessment of data	A			

Note:

A = AcceptableND = Not detected N = Not provided/applicable NQ = Not qualifiedSW = See worksheet

FD = Field duplicate

FT = Field triplicate TB = Trip blank

FB = Field blank

AB= Ambient blank SB = Source blank

R = Rinsate

EB = Equipment blank

	Client ID	Lab ID	QC Type	Matrix	Date	Stage
1	C-3-Z-20230919	24J0184-01		Sediment	09/19/2023	Stage 2B
2	C-3-Z-20230919DUP	24J0184-01DUP	DUP	Sediment	09/19/2023	Stage 2B
3	C-3-Z-20230919TRP	24J0184-01TRP	TRP	Sediment	09/19/2023	Stage 2B
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Notes:

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

All elements are applicable to each sample as noted below.

Sample ID	Target Analyte List
1	TOC, Total Solids
QC	
2	Total Solids
2-3	ТОС
•	

VALIDATION FINDINGS WORKSHEETS

Holding Time

METHOD: Inorganics

All samples were properly preserved and within the requried holding time with the following

		Analyte: Total Solids Holding Time: 6mo				
Sample ID	Sampling Date	Analysis Date	Total Time from Collection to Analysis (months)	Qualifier	Det/ND	CODE: 1
1	09/19/23 15:45	10/15/24 09:04	12	J/R/P	Det	

		Analyte: TOC Holding Time: 6mo				
Sample ID	Sampling Date	Analysis Date	Total Time from Collection to Analysis (months)	Qualifier	Det/ND	
1	09/19/23 15:45	10/31/24 05:45	12	J/R/P	Det	