MS4 Quality Assurance Project Plan

Port of Anchorage
Storm Water Management Program
Anchorage, Alaska

Prepared For:

Port of Anchorage
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Prepared By:

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A. PROJECT MANAGEMENT ELEMENTS

This section of the QAPP includes discussion of sampling processes, sample analysis, collection of historical data, and management of data. The data generation and acquisition elements address data collection and sample handling aspects of the Quality Assurance Project Plan (QAPP) in accordance with U.S. Environmental Protection Agency (EPA) guidance documents (EPA QA/R-5 and EPA QA/G-5).

A.1 TITLE AND APPROVAL SHEET

A.2 TABLE OF CONTENTS

A.3 DISTRIBUTION LIST

TABLE A-1: DISTRIBUTION LIST

Organization	Storm Water Pollution Prevention (SWPP) Position	Name	Title	Telephone Number
Port of Anchorage	SWPP Team Leader	Stuart Greydanus	Port Operations and Maintenance Manager	907.343.6202
	SWPP Team Member	Sharen Walsh, PE	Deputy Port Director	907.343.6203
		Stephen Ribuffo	Port Director	907.343.6201
Port of Anchorage/Municipality of Anchorage		Sandy Imlach	Maintenance Supervisor	907.343.6208
Anchorage Fueling and Service Company/AFSC		Amanda Tuttle	Environmental Manager	907.249.4205
Tesoro Alaska Petroleum Co.		Dave Zuker	Terminal Manager	907.261.7203
Matson		Brad Brown	Safety & Security Manager	907.263.5054
Totem Ocean Trailer Express, Inc.		Billy Godwin	Terminal Operations Manager	907.265.7218
Alaska Soil Recycling, Div. of Anchorage Sand & Gravel Co., Inc. (ABI)		Brad Quade	Manager	907.348.6700
Delta Western		Cheryl Fultz	Environmental Compliance Specialist	206.357.1728
		Tou Yang	Terminal Operator	907.376.4644
Alaska Department of Environmental Conservation (ADEC)	Regulatory Oversight	Jim Rypkema	Storm Water and Wetlands Program Manager	907.334.2288
R&M Consultants, Inc. (R&M)	Environmental Compliance	Kristi McLean	Group Manager – Environmental Services	907.646.9689

A.4 PROJECT/TASK ORGANIZATION

TABLE A-2: PROJECT ROLES AND RESPONSIBILITIES

Organization	Name	Project Title	Responsibilities
Port of Anchorage	Sharen Walsh, PE	POA Project Manager	Ensure compliance with the SWMP, MS4 Permit, and the QAPP
ADEC	Jim Rypkema	ADEC Project Manager	Review inspection and sampling results from monitoring activities to assess regulatory compliance with the MS4 Permit.
R&M	Kristi McLean, LEED AP BD+C	R&M Project Manager	Planning and execution oversight of sampling and permitting activities. Preparing sampling and permitting reports. ADEC QEP
	Christopher Fell, CPG	R&M Lead Sampler and Data QA/QC reviewer	Collecting samples and reviewing analytical data for QA/QC concerns. ADEC QEP
	Emily Bentti	R&M Lead Sampler	ADEC QEP
	Abraham Schmidt	R&M Lead Sampler	ADEC QEP

NOTES:
See the Acronyms and Abbreviations section for definitions.

A.5 PROBLEM DEFINITION/BACKGROUND

Under the National Pollutant Discharge Elimination System (NPDES) storm water program, operators of municipal separate storm sewer systems (MS4) require permit authorization for storm water discharges. The Port of Anchorage (Port) was issued its own individual MS4 permit under the NPDES by the Environmental Protection Agency (EPA) in 1995. The Alaska Department of Environmental Conservation (ADEC) reissued permit coverage under the Alaska Pollutant Discharge Elimination System (APDES) system effective 1 August 2015. As an MS4 operator, the Port is required to develop a Storm Water Management Program (SWMP) designed to prevent pollutants from being introduced into surface waters due to storm water runoff. Part of the SWMP is development of this QAPP to detail plans and procedures used to collect, document, and analyze samples in support of the SWMP.

Additional background details are provided in the project MS4 Monitoring Program Plan.

A.6 PROJECT/TASK DESCRIPTION

Meeting the MS4 Permit goals requires laboratory analysis of storm water system performance in preventing discharge of pollutants to Cook Inlet waters. Sample collection and analytical analysis activities will be performed in support of the following activities prescribed by the 2015 MS4 permit:

- Dry Weather Inspections
- Wet Weather Inspections
- Industrial and High Risk Runoff Inspections.

Additional information about the various inspections is provided in the Monitoring Program Plan.

A.7 QUALITY OBJECTIVES AND CRITERIA

This section defines quality objectives for the project and the performance criteria to achieve those objectives. A systematic planning process is utilized to define these quality objectives and performance criteria.

A.7.1 GOALS OF THE STUDY

Goals of sampling events conducted according to this QAPP are to:

- Provide analytical data to assess compliance with the MS4 permit
- Measure the effectiveness of the Port's SWMP
- Characterize storm water discharges
- Measure the chemical, physical, and biological impacts to the receiving waters resulting from storm water discharges
- Assist with detection of pollutant sources
- Detect illicit discharges to the MS4.

A.7.2 INFORMATIONAL INPUTS

Informational inputs include the 2015 MS4 Permit, the SWMP, and the Monitoring Program Plan.

A.7.3 BOUNDARIES OF STUDY

The study is physically bound by the property controlled by the Port, and chemically by the chemical parameters defined in the 2015 MS4 Permit.

A.7.4 ANALYTICAL APPROACH

Analytical data will be collected according to the parameters outlined in the MS4 permit and as specified in Section B of the QAPP. These analytical data will be used to evaluate the goals outlined in Section A.7.1 of the QAPP.

A.7.5 ACCEPTANCE CRITERIA

Analytical data will be evaluated according to ADEC guidance in 18 AAC 70. Specific analytes are defined in Section B.4 of the QAPP. Data must meet quality control criteria defined in Section B.5 of the QAPP to be accepted by the program. Detection of an analyte exceeding the ADEC levels (Screening Levels) specified in 18 AAC 70 will trigger additional sampling requirements as defined in Section B.1 of the QAPP

A.7.6 SURFACE WATER ANALYSIS

Surface water samples will be collected in the quantities defined in Section B.1.

A.8 SPECIAL TRAINING NEEDS/CERTIFICATION

TABLE A-3: TRAINING AND CERTIFICATION REQUIREMENTS

Position/Organization	Training/Certification
Environmental Compliance Manager (R&M)	• ADEC Qualified Environmental Professional (18 AAC 75 333) • HAZWOPER
Lead Sampler (R&M)	• ADEC Qualified Environmental Professional or Sampler (18 AAC 75 333) • HAZWOPER • First Aid / CPR
Assistant Samplers (R&M)	• HAZWOPER • First Aid / CPR
Analytical Laboratory (SGS North America, Inc.)	• ADEC Approval for Contaminated Sites Analysis Including Underground Storage Tank Sites (18 AAC.78.800)

NOTES:
See the Acronyms and Abbreviations table for definitions.

A.9 DOCUMENTS AND RECORDS

Complete, detailed documentation is essential for recording field sampling data and observations made as part of field work associated with this QAPP. Standard documentation procedures for field work are presented in 90-RM-SP: Field Documentation Standard Procedure included in Appendix B.

A.9.1 FIELD DOCUMENTATION

General documentation and record keeping best practices include the following:

- Taking notes in a dedicated, bound, numerated field book
- Using indelible ink
- Crossing out errors or changes with a single line and then initialing and dating the change
- For field forms, filling out or noting “not applicable” or “N/A” for any fields not used. Do not leave blank spaces.
- Signing, dating, and crossing out any remaining space on a field book page the end of each day.
- Make a clear distinction between data and observations/opinion.

General content recommendations for field book notes are as follows:

- Include names/titles for all personnel onsite that are associated with the project each day, including site visitors
- Site condition notes (e.g. weather)
- Include numerous sketches and maps to illustrate the field site or feature.
- Make note of field forms completed with identifying information
- Make note of samples collected and media screened, as appropriate
- Document sample locations
- Note any deviations from the QAPP along with the reasoning

- Include Chain-of-Custody information.

A.9.2 FIELD DOCUMENT MANAGEMENT

Enacting the MS4 Monitoring Program Plan at the Port will generate multiple documents that will be necessary to meet the reporting requirements of the MS4 permit.

Anticipated documents generated as part of enacting the QAPP include:

- Field Books
- Discharge Monitoring Reports
- Chains-of-Custody
- Analytical Laboratory Level II Reports.

Hard-copy documents will be scanned and stored in an electronic project file maintained by the entity performing the activity. Both the hard-copy documents and electronic versions shall be retained for a period of at least three years from the date of the sample, measurement, report or application, or for the term of the MS4 permit. See 2016 SWMP Section 9.4.1 for additional information.

A.9.3 REPORTING DOCUMENTS

Formal documentation in the Detailed Annual Report will be generated based on sampling events during the year and are retained on file and are available on request:

- Description of sampling events
- Methods and procedures used
- Analytical data summary
- Quality assessment of the analytical data
- Analytical data reports, including completed chains-of-custody
- Copies of field notes and any field forms.

Reporting documents resulting from work completed under the QAPP or as part of a Stakeholder specific monitoring and sampling plan will be submitted to the Port for use in assessing discharges to the MS4 system and to use in preparation of the Detailed Annual Report.

B. DATA GENERATION AND ACQUISITION ELEMENTS

Data generation and acquisition elements address data collection and sample handling aspects of the QAPP in accordance with EPA guidance documents (EPA QA/R-5 and EPA QA/G-5). This section of the QAPP includes discussion of sampling processes, sample analysis, collection of historical data, and data management.

B.1 SAMPLING PROCESS DESIGN

Data generated and collected for the project should take into account the following items:

- Type and number of samples
- Design of the sampling program
- Sample locations and frequencies
- Sample matrices (water)
- Measurement parameters
- Rationale for the design.

SAMPLING PROGRAM

Primary samples will be collected for analytical or field screening analysis of storm water discharge as defined in the MS4 Monitoring Program Plan in Table 2-3 for the main program and according to Stakeholder specific plans as described in Section 2.2.2 of the MS4 Monitoring Program Plan, as applicable.

Sample locations and frequencies are described in Sections 2.1.2 and 2.2.1 of the MS4 Monitoring Program Plan and in the Stakeholder specific plans. Sampling locations are shown on Drawing A-01 included in Appendix A.

The sampling program is based on the 1995 and 2015 MS4 Permits and the associated SWMP plans.

B.2 SAMPLING METHODS

Storm water discharge (surface water) samples will be collected using the dip, scoop or peristaltic pump methods. The dip or scoop methods are preferred, but access issues may result in the peristaltic method being necessary to collect samples. Collection of samples will be conducted in accordance with standard field data collection and documentation procedures that are provided in Appendix B and are listed in Table B-1.

TABLE B-1: STANDARD FIELD PROCEDURES

Procedure Name	Purpose
20-RM-SP Surface Water Sampling	Provide standard sediment sampling procedures to meet ADEC Draft Field Sampling Guidance requirements for analytical sample collection.
90-RM-SP Environmental Field Documentation	Guide collection of documentation of field observations and sampling to support reporting and data analysis.

Samples will be named to show the following information:

- Year sampled
- Month sampled
- Outfall or sample location.

Sample identification will be as follows:

TABLE B-2: SAMPLE IDENTIFICATION NAMING CONVENTION

Sample Type	Year (yyyy)	Month (mm)	Outfall/Sample Location Number	Compiled Sample Identification
Primary	2016	01	001	201601-001
Duplicate	2016	01	008*	201601-008*

NOTES:
*Duplicate samples will all be given outfall number 008 as it does not exist and will keep the duplicate blind to the laboratory but easily identifiable to sampling and data management personnel.

B.3 SAMPLE HANDLING AND CUSTODY

Samples will be handled and custody managed in accordance with standard procedures 20-RM-SP. Samples should be taken to the lab within the timeframe specified by the preservative used and sampling requirements.

B.4 ANALYTICAL METHODS

Samples collected in accordance with the QAPP will be analyzed for the analytical parameters by an ADEC approved laboratory. Sampling parameters, the analytical test method, and the project screening levels are provided in Table B-3 for parameters requiring an analytical laboratory and in Table B-4 for field screening parameters. Sampling frequency is discussed in the MS4 Monitoring Program Plan. The proposed analytical laboratory name, address, and phone number are provided below:

SGS North America, Inc (SGS)
200 West Potter Drive
Anchorage, Alaska, 99518
907.562.2343

TABLE B-3: ANALYTICAL PARAMETERS

Parameter	Analytical Method	Project Screening Level (mg/L)
TAH*	EPA 602 / SW 8260B	0.010
TAqH*	EPA 602 / SW 8260B and EPA 610; SW 8270 SIM	0.015
Total Cadmium	SW 6020A	None
Total Copper	SW 6020A	None
Total Lead	SW 6020A	None
Total Zinc	SW 6020A	None
Hardness (as $CaCO_3$)	SM 2340B	None
Total Phosphorous	SM 4500P-B,E	None
Nitrate plus Nitrite Nitrogen	SM 4500NO3-F	None
Total Kjeldahl Nitrogen (TKN)	EPA 4500N-D	None
Total Suspended Solids (TSS)	SM 2540D	None
Total Dissolved Solids (TDS)	SM 2540C	None
Biochemical Oxygen Demand, 5-Day (BOD_5)	SM 5210B	None
Chemical Oxygen Demand (COD)	EPA 410.4	None

NOTES:
* TAH and TAqH are the summation of multiple analytes as defined in 18 AAC 70, and as shown in Tables B-5 and B-6.
See the Acronyms and Abbreviations table for definitions.

TABLE B-4: FIELD SCREENING PARAMETERS

Parameter	Screening Method	Project Screening Level
Flow (cfs)	Visual estimate	Not Applicable
Estimated Volume (gallons)	Visual estimate	Not Applicable
Temperature	YSI Instruments, or similar	< 15 °C
pH	YSI Instruments, or similar	6.5 to 8.5
Dissolved Oxygen	YSI Instruments, or similar	> 6.0 mg/L and <17 mg/L
Turbidity (NTU)	YSI Instruments, or similar	< 50 NTU or the natural condition of Cook Inlet (400 to 600 NTU).
Sheen	Washington State Department of Ecology Publication 10-09-057, page 35	Virtually None

NOTES:
See the Acronyms and Abbreviations table for definitions.

TAH will be calculated as follows:

- The summation of detected concentrations of compounds listed for EPA Method 602 will be calculated (Table B-5)
- For non-detect (ND) values, the limit of detection (LOD) value shall be used
- If no LOD value was reported, two times the method detection limit shall be used.

TABLE B-5: TAH ANAYLTES (SW 8260)

Parameter	Analytical Method	Project Screening Level
Benzene	1,2-Dichlorobenzene	Toluene
Chlorobenzene	1,3-Dichlorobenzene	Total Xylenes
Ethylbenzene	1,4-Dichlorobenzene	--

TAqH will be calculated as follows.

- The summation of detected concentrations of compounds listed for EPA Method 610 and 602 will be calculated (Tables B-5 and B-6)
- For ND values, the LOD value shall be used
- If no LOD value was reported, two times the method detection limit shall be used.

TABLE B-6: TAQH ADDITIONAL ANALYTES (SW 8270 SIM)

Parameter	Analytical Method	Project Screening Level
Acenaphthene	Benzo(g,h,i)perylene	Indeno(1,2,3-cd)pyrene
Acenaphthylene	Benzo(k)fluoranthene	Naphthalene
Anthracene	Chrysene	Phenanthrene
Benzo(a)anthracene	Dibenzo(a,h)anthracene	Pyrene
Benzo(a)pyrene	Fluoranthene	--
Benzo(b)fluoranthene	Fluorene	--

B.5 QUALITY CONTROL

Samples will be collected by a qualified environmental professional or qualified sampler and reporting will be conducted by a qualified environmental professional, as defined in 18 AAC 75 and 18 AAC 78.

Duplicate samples will be collected at the rate of one per 10 primary samples. Duplicate(s) will be submitted to the laboratory in the same manner as regular samples for all contaminants of concern, and the results compared to the primary samples. An ADEC laboratory data review checklist will be prepared for each set of laboratory data and included with the report.

Temperature blanks will be provided by the analytical laboratory at the rate of one per cooler. Trip blanks for volatile analyses (e.g. AK101, SW 8260) will be provided by the analytical laboratory at the rate of one per analysis per cooler. Blanks will be taken to the site and handled like all other samples during sampling efforts. The temperature blank will indicate whether the samples arrived at the laboratory within the acceptable temperature range. The trip blank(s) for volatile analyses (e.g. AK101, SW 8260) will be analyzed by the laboratory to ensure that handling has not contaminated the samples.

B.6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

Initial inspection, testing, and assurance that sample collection and measurement kits meet the technical specifications as specified by the method and/or each method's Standard Procedure (Listed in Table B-1 and provided in Appendix B) are the responsibility of field sampling personnel. Inspections shall be performed upon receipt of the equipment/instrumentation and prior to use. Field personnel shall also ensure that all of the reagent bottles deployed with the kits are dated with the expiration dates prior to being used and that expiration information is included in field notes.

B.7 INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

Field instruments and equipment shall be calibrated before use following the calibration procedures described in each Standard Procedure, listed in Table B-1 and provided in Appendix B, or according to manufacturer recommendations.

All commercial laboratory instrumentation and equipment used in the analysis for this project shall be calibrated prior to sample analysis in accordance with the technical specifications and procedures specified in the analytical method used.

B.8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

Monitoring equipment and supplies are ordered from various manufacturers (see each method's Standard Procedure, listed in Table B-1 and provided in Appendix B for criteria) and are inspected upon arrival by project personnel. Broken bottles, incomplete kits and reagents or instruments that do not meet standards will be returned to the supplier for replacement.

B.9 NON-DIRECT MEASUREMENTS

None planned.

B.10 DATA MANAGEMENT

Field notes and forms shall be scanned and retained as discussed in Section A.9.3 to prevent record loss.

C. ASSESSMENT AND OVERSIGHT ELEMENTS

The assessment and oversight elements address activities affecting project implementation and associated QA/QC aspects of the QAPP in accordance with EPA guidance documents (EPA QA/R-5 and EPA QA/G-5). This section of the QAPP includes discussion of project history and objectives, roles and responsibilities, training, and documentation.

C.1 ASSESSMENTS AND RESPONSE ACTIONS

Reports generated under this plan will be provided to the Port of Anchorage for coordination with ADEC. The Port and ADEC (in communication with the Port) may note deficiencies or other non-conforming resulting from the sampling events or with the sampling events specifically following assessment of the reports. The Port will communicate with the report authors to address any deficiencies or other non-conforming issues as they arise. The Monitoring Program Plan and/or QAPP will be amended as necessary.

C.2 REPORTS TO MANAGEMENT

Reports to management will occur after each sampling event in the form of a memo or letter report documenting the event. Sampling events are scheduled for twice per year in accordance with Section 2.2 in the Monitoring Program Plan. Additional sampling events are likely to occur under the Stakeholder specific monitoring plans specified by the MS4 Permit.

D. DATA VALIDATION AND USABILITY ELEMENTS

The data validation and usability elements address data QA aspects of the QAPP in accordance with EPA guidance documents (EPA QA/R-5 and EPA QA/G-5). This section of the QAPP includes procedures used to assess if data conforms to the specified criteria to determine if project objectives will be satisfied after the data collection phase of the project.

D.1 DATA REVIEW, VERIFICATION, AND VALIDATION

The criteria for data validation will follow those specified in this QAPP or as specified in the EPA-approved methods. An in-depth data review audit may be performed using the EPA QA/G-8, Guidance on Environmental Data Verification and Data Validation, June 2001.

D.2 VERIFICATION AND VALIDATION METHODS

D.2.1 VERIFICATION

The primary goal of verification is to document that applicable method, procedural and contractual requirements were met in field sampling and laboratory analysis. Verification checks to see if the data was complete, if sampling and analysis matched QAPP requirements, and if laboratory Standard Operating Procedures (SOPs) were followed.

Verification of data compiled for a sampling event is the responsibility of the sampling entity's staff.

D.2.2 VALIDATION

Data validation determines whether the data sets were of the right type, quality and quantity to meet the requirements of the project-specific intended use as described in this QAPP. Data validation also evaluates sampling and analysis anomalies, and the effect that these anomalies have on the overall use of the data. All data generated will be validated in accordance with the QA/QC requirements specified in the methods and the technical specifications outlined in this QAPP. Raw field data will be maintained by the collection entity. Raw laboratory data will be maintained by the laboratory. The laboratory may archive the analytical data into their laboratory data management system. All data will be kept a minimum of 3 years. The summary of all laboratory analytical results will be reported to the collection entity. Data validation will be performed by the laboratory for all analyses prior to the release of data. All data will be validated according to the laboratory's Quality Management Plan (QMP) and SOPs. The rationale for any anomalies in the QA/QC of the laboratory data will be provided with the data results. Completed Chain-of-Custody or Transmission forms will be sent back from the laboratory with the data results.

Data will be qualified as necessary. Unacceptable data (i.e., data that do not meet the QA measurement criteria of precision, accuracy, representativeness, comparability and completeness) will not be used or if used, the problems with the data will be clearly noted in the reports. Any actions taken to correct QA/QC problems in sampling, sample handling, and analysis will be noted. The collection entity will record any QA/QC issues and QA/QC corrective actions taken in the sampling event reports. The Relative Percent Difference (RPD) will be calculated between field duplicate samples to determine if QA/QC objectives for field precision have been met (based on

ADEC criteria). The collection entity will compare the sample information in the field log notebooks and/or data field sheets with the laboratory analytical results to ensure that no transcription errors have occurred, and to check the RPD between duplicate samples sent "blind" to the laboratory. Laboratories calculate and report the RPD of analytical duplicate samples and MS/MSD samples and report this information to ADEC in the QC data sheets which accompany the data results. RPDs that are greater than the project requirements will be noted. The Port or their consultants will decide if any QA/QC corrective action will be taken if the RPDs exceed the project's goals. If evidence of QA/QC non-compliance is observed with the data, additional sampling and analysis may be required.

D.3 RECONCILIATION WITH USER REQUIREMENTS

Data and related information obtained during the course of sampling events will be maintained in the project file. The original quality objectives and criteria (Section A.7) will be checked against the information obtained and determine if the data generated meet the original intent. If there are discrepancies, these will be addressed before the next sampling event.

APPENDIX A
MAPS

APPENDIX B
STANDARD PROCEDURES

20-RM-SP Surface Water Sampling Standard Procedure
90-RM-SP Environmental Field Documentation Standard Procedure

Purpose and Scope

To provide standard documentation procedures for environmental projects complying with the Alaska Department of Environmental Conservation (ADEC) Field Sampling Guidance (ADEC, 2016b).

This procedure applies to R&M Consultants, Inc. (R&M) Earth Sciences Department employees. This procedure is designed to work in conjunction with ADEC Field Sampling Guidance (ADEC, 2016b). If project specific procedures in the work plan conflict with this standard procedure, the approved work plan shall apply.

Key Responsibilities

ADEC Qualified Environmental Professional (ADEC, 2016a and ADEC, 2015)

- Develops and executes the work plan and associated sampling plan/procedures in accordance with regulatory guidance and instructs the ADEC Qualified Sampler (if present) on project procedures prior to initiating the field sampling effort.
- Meets the 18 AAC 75 or 18 AAC 78 qualifications as a Qualified Environmental Professional.
- Collects samples, completes field documentation, and performs site work in accordance with regulatory guidance.
- Manages and supervises the work of ADEC Qualified Samplers, if present.

ADEC Qualified Sampler (ADEC, 2016a and ADEC, 2015)

- Meets the 18 AAC 75 or 18 AAC 78 qualifications as a Qualified Sampler
- Collects samples and performs site work in accordance with regulatory guidance.
- Completes field documentation regarding the collected samples.

Standard Field Documentation

Field documentation is meant to allow a reader to understand sampling activities and to allow assessment of the adequacy of the practices used. Field notes should be comprehensive, legible, and descriptive. Any changes or errors need to be clearly marked and tracked to maintain data integrity. This section is based on ADEC, 2009 and ADEC, 2016b.

Error/Edit Tracking

- Errors should be crossed out with a single line and initialed and dated
- Edits should be initialed and dated, preferably with a different color indelible ink.
- Unused cells in a table, or large blank spaces on logbook pages should be lined out, signed, and dated.
- A key should be present to cross-reference initials or signatures with a specific person.

Standard Requirements

- Logbooks pages or loose forms must be paginated
- Notes must be indelible, waterproof ink is preferred, colored pencil may be appropriate on drawings.

Typical Logbook Entries

The following information should be entered into the logbook.

- Page Header
  - Date, Project Number, Project Name, Name of Person taking notes (Each Page)
- Page Text
  - Entries should include time stamps
  - Weather and other environmental observations
  - Names and purpose/title of each person on site that day
  - Description of safety or tailgate meetings
  - PPE level used
  - Daily objectives
  - Summaries of discussions with site visitors
  - Instrumentation calibration data
    - Expiration date of standard measures, if applicable
    - Calibration readings
    - Readings meet specification or manual
  - Location of activity and site conditions
    - Sketches and tables are most valuable
    - Photo locations (may need a separate sketch)
      - Use dots with arrows to show location and direction facing
    - Sampling and field screening locations
  - Field Observations and comments
  - Deviations from work plan or standard procedure protocols (Include why the change was made)
  - Sample collection information (should match sample labels and follow standard procedure documentation protocols).
  - Global positioning system (GPS) coordinates in NAD83 or WGS84 and the projection using a recreational grade GPS. Alternatively, mark locations with swing ties to site features on a sketch.
  - Presence of standalone field maps or forms that would be needed to understand site activities (e.g. groundwater sampling or boring log forms).
- Sketches
  - May be generated over multiple days, just make a note on the sketch that indicates the date range over which the sketch was generated.
  - Include an orientation arrow (typically north, but may be a prominent site feature in rare occasions).
  - Actual scale, or not to scale (N.T.S.).
- Include site features to allow the sketch to be located (e.g. building corners, concrete structures, cliffs/major slope breaks, and/or poles)
- Include descriptions of chains-of-custody (COC) and any relevant sample handling notes.
  - COC number
  - Date shipped, name of shipper, tracking number, intended destination
  - Description of cooler packing (e.g. number of ice gel packs, use of custody seals)

Typical Form Data Entry

- Fill out all fields on the form. Unused sections should be lined out, signed, and dated.
- At a minimum, forms should include the date, project number, project name, name of person taking notes.

Sample Naming Convention

If a project has a historic sample naming convention, such as for long term groundwater monitoring projects, then the historical naming convention will be continued and this section will not apply.

Table 1A: Soil / Water / Vapor Analytical Sample Identification

Project Location ID	Year	Sample Type	Sample Type Location	Sample Number	Example
ANC	16	[See Below]	01	01	ANC16-TH01-01

Table 1B: Soil Sample Type Codes

Sample Type Code	Definition	Sample Type Code	Definition
TH	Test Boring/Hole	ES	Excavation Clearance Sidewall
TP	Test Pit	EF	Excavation Clearance Floor
TT	Test Trench	LF	Land Farm
HA	Hand Auger	WC	Waste Characterization (General)
SE	Sediment	SP	Stockpile Characterization

Table 1C: Water / Vapor Sample Type Codes

Sample Type Code	Definition	Sample Type Code	Definition
MW	Monitoring Well / Piezometer	WW	Waste Water Characterization
TW	Temporary Monitoring Well	OV	Outdoor Air (Vapor)
SW	Surface Water	IV	Indoor Air (Vapor)
TW	Tap Water	SV	Soil Gas (Vapor)

Table 2A: Trip Blank Analytical Sample Identification

Project Location ID	Year	Media Type	Trip Blank Code	Sample Number	Example
ANC	16	[See Below]	QC	01	ANC16-WA-QC01

Table 2B: Media Type Codes

Media Type Code	Definition	Media Type Code	Definition
WA	Water	VA	Vapor / Soil Gas
SO	Soil	SE	Sediment

Common features in soil, water, vapor, and trip blank sampling identification include the following:

- **Project Location ID:** 3 letter alphanumeric code for the project or site location (e.g. ANC for Anchorage or KBK for Kalsin Bay, Kodiak).
- **Year:** 2 digit numeric code for the last 2 digits of the year.
- **Sample Number:** 2 digit code that auto-increments per sample type/per location.
- **Duplicates/Triplicates:** Utilize the next auto-incrementing sample number, **LOG DUPLICATES / TRIPLICATES IN NOTES**
- **Matrix Spike/Matrix Spike Duplicates:** Use the same auto-incrementing sample number as the primary, **LOG MS/MSDs IN NOTES**

References

ADEC (Alaska Department of Environmental Conservation), 2016a. Oil and Other Hazardous Substances (18 AAC 75). 8 May 2016.

ADEC, 2016b. Field Sampling Guidance. March 2016.

ADEC, 2015. Underground Storage Tanks (18 AAC 78). 17 June 2015.

ADEC, 2009. Site Characterization Work Plan and Reporting Guidance for Investigation of Contaminated Sites. 23 September 2009.

RAE (RAE Systems, Inc.), 2010. Technical Note TN-106, Correction Factors, Ionization Energies, and calibration characteristics.

Purpose and Scope

To provide standard surface water sampling procedures for environmental projects complying with the Alaska Department of Environmental Conservation (ADEC) Field Sampling Guidance (ADEC, 2016b) and Environmental Protection Agency Groundwater and Surface Water Operating Procedures (EPA, 2013a and EPA 2013b).

This procedure applies to R&M Consultants, Inc. (R&M) Earth Sciences Department employees. This procedure is designed to work in conjunction with ADEC Field Sampling Guidance (ADEC, 2016b). If project specific procedures in the work plan conflict with this standard procedure, the approved work plan shall apply.

Key Responsibilities

ADEC Qualified Environmental Professional (ADEC, 2016a and ADEC, 2015)

- Develops and executes the work plan and associated sampling plan/procedures in accordance with regulatory guidance and instructs the ADEC Qualified Sampler (if present) on project procedures prior to initiating the field sampling effort.
- Meets the 18 AAC 75 or 18 AAC 78 qualifications as a Qualified Environmental Professional.
- Collects samples, completes field documentation, and performs site work in accordance with regulatory guidance.
- Manages and supervises the work of ADEC Qualified Samplers, if present.

ADEC Qualified Sampler (ADEC, 2016a and ADEC, 2015)

- Meets the 18 AAC 75 or 18 AAC 78 qualifications as a Qualified Sampler
- Collects samples and performs site work in accordance with regulatory guidance.
- Completes field documentation regarding the collected samples.

Procedure Preparation

Sampling can be broken into discreet steps that include preparation and documentation. These steps are discussed below.

Preparation

Prior to beginning sample collection the following tasks should be performed to streamline the sampling process.

- Decontaminate any re-usable sampling equipment between collection of each sample or clear away any disposable sampling equipment and deposit into the appropriate waste stream
- Lay out sample containers and collection tools (i.e. tubing, pump, containers, etc) on a clean surface such as an unused trash bag or cooler top
- Most samples will require multiple containers if multiple analyses are requested. Make sure the appropriate mix of containers are available
- Complete portions of sample labels that will not vary between samples
    - Sampler name, date, analyses, preservative
    - DO NOT use a felt tip pen (i.e. sharpie) to fill out sample labels, it may cause false positives for some analyses
- Begin sample entry in the field log book or on a boring log (see Documentation)

Documentation

Proper documentation of sampling activities is critical to generation of usable data results to support analysis of the media being tested. A complete accounting of sampling activities allows a sampling event to be reviewed by regulators to assess the validity of the resultant data. At a minimum, the following data should be collected for sample labels, the logbook, and the chain-of-custody.

Sample Labels

The following information must be present on a sample label affixed to each sample container:

- Sample number or ID
- Sampler name or initials
- Date collected
- Time collected
- Analyses requested (applicable to the type of container, may vary from container to container for a sample with multiple analyses requested)
- Preservatives used (may vary per container, i.e. HNO_3, HCl, etc.)

Logbook

The following information should be entered into the logbook:

- Location of the sample (a drawing or sketch is often best), coordinates if taking recreational GPS measurements
- Sample number, sampler name or initials, date collected, time collected, analyses requested
- Preservatives used (if any)
- Number and type of containers used
- Type of sample (e.g. primary, duplicate, trip blank, MS/MSD)

Chain-of-Custody

- Provided by each laboratory.
- Ensure all data matches the sample labels and logbook exactly.
- If shipping samples, the chain-of-custody must be signed, dated, and time stamped immediately preceding sealing of the cooler.
- If delivering directly to a laboratory, the chain-of-custody must be signed, dated, and time stamped immediately preceding transferring custody of the sample cooler to the laboratory technician.

Collection Methods

Samples may be collected from a variety of locations that may include lakes, streams, outfalls, etc. using the methods described below. These procedures are adapted from ADEC and EPA guidance (ADEC, 2016b, EPA 2013a, and EPA 2013b).

Prior to beginning sample collection the following tasks should be performed to streamline the sampling process. The following information must be present on a sample label affixed to each sample container:

- Sample number or ID
- Sampler name or initials
- Date collected
- Time collected
- Analyses requested (applicable to the type of container, may vary from container to container for a sample with multiple analyses requested)
- Preservatives used (may vary per container, i.e. HNO_3, HCl, etc.)

Dip Method

Samples may be collected directly into sample containers when the surface water source is safely accessible by wading or other means. The sampler should face upstream if there is a current and collect the sample without disturbing the bottom sediment. The surface water sample should always be collected prior to the collection of a sediment sample at the same location. The sampler should be careful not to displace the preservative from a pre-preserved sample container, such as the 40-ml VOC vial.

Scoop Method

Stainless steel scoops provide a means of collecting surface water samples from surface water bodies that are too deep to access by wading. They have a limited reach of about eight feet and if samples from distances too far to access using this method are needed, a mobile platform, such as a boat, may be required. Stainless steel scoops are useful for reaching out into a body of water to collect a surface water sample. The scoop may be used directly to collect and transfer a surface water sample to the sample container, or it may be attached to an extension in order to access the selected sampling location.

Peristaltic Pump Method

A peristaltic pump can be used to collect a water sample from any depth if the pump is located at or near the surface water elevation. There is no suction limit for these applications. The use of a metal conduit to which the tubing is attached, allows for the collection of a vertical sample (to about a 25-foot depth) which is representative of the water column. The tubing intake is positioned in the water column at the desired depth by means of the conduit. Using this method, discrete samples may be collected by positioning the tubing intake at one depth or a vertical composite may be collected by moving the tubing intake at a constant rate vertically up and down the water column over the interval to be composited.

Samples for VOC analysis cannot be collected directly from the peristaltic pump discharge or from the vacuum jug. If a peristaltic pump is used for sample collection and VOC analysis is required, the VOC sample must be collected using one of the "soda straw" variations. Ideally, the tubing intake will be placed at the depth from which the sample is to be collected and the pump will be run for several minutes to fill the tubing with water representative of that interval. After several minutes, the pump is turned off and the tubing string is retrieved. The pump speed is then reduced to a slow pumping rate and the pump direction is reversed. After turning the pump back on, the sample stream is collected into the VOC vials as it is pushed from the tubing by the pump. Care must be taken to prevent any water that was in contact with the silastic pump head tubing from being incorporated into the sample.

Preservation

Immediately following sample collection and labeling, the sample container(s) should be placed in a pre-chilled cooler maintained under the direct control of the ADEC qualified environmental professional or sampler until custody is relinquished through a chain-of-custody to another responsible party.

References

ADEC (Alaska Department of Environmental Conservation), 2016a. Oil and Other Hazardous Substances (18 AAC 75). 8 May 2016.

ADEC, 2016b. Field Sampling Guidance. March 2016a.

ADEC, 2015. Underground Storage Tanks (18 AAC 78). 17 June 2015.

EPA (U.S. Environmental Protection Agency), 2013a, SESD Operating Procedure: Groundwater Sampling. SESDPROC-301-R3.

EPA, 2013b. SESD Operating Procedure: Surface Water Sampling. SESDPROC-201-R3.