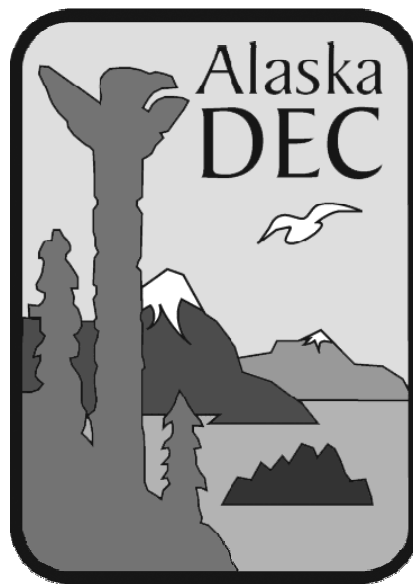


ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF SPILL PREVENTION AND RESPONSE CONTAMINATED SITES PROGRAM



Site Characterization Work Plan and Reporting Guidance for Investigation of Contaminated Sites

September 23, 2009

Site Characterization Work Plan and Reporting Guidance for Investigation of Contaminated Sites

Recommended Elements and Their Regulatory Basis

Introduction

The purpose of this guidance is two-fold. First, it is designed to increase the consistency of site characterization work plans and reports submitted by numerous consultants working on contaminated sites throughout Alaska. Second, it presents criteria to assist project managers in the Alaska Department of Environmental Conservation (DEC) with their work plan and report reviews under Title 18 of the Alaska Administrative Code, Chapter 75, Section 335 (18 AAC 75.335). While developing and reviewing work plans keep in mind that, per 18 AAC 75.335 (b), the work plan should be designed to:

- Determine if a discharge or release of a hazardous substance has occurred;
- Identify each (potential) hazardous substance at the site, include the concentration and extent of contamination; this information must be sufficient to determine cleanup options;
- Identify site characteristics or conditions that could result in ongoing site contamination including the potential for leaching of in situ contamination and the presence of leaking barrels, drums, tanks, [pipelines], other containers [or other sources];
- Evaluate the potential threat to human health, safety, and welfare, and to the environment from site contamination;
- Identify any interim removal action necessary under 18 AAC 75.330;
- Locate sources of known site contamination, including a description of potential releases into soil, sediment, groundwater, or surface water;
- Evaluate the size of the contaminated area, including the concentrations and extent of any soil, sediment, groundwater, or surface water contamination;
- Identify the vertical depth to groundwater and the horizontal distance to nearby wells, surface water, and water supply intakes;
- Evaluate the potential for surface water runoff from the site and the potential for surface water or sediment; and
- Identify the soil type and determine if the soil is a continuing source of groundwater contamination.

The work plan and report checklists which follow combine DEC regulations, Contaminated Sites Program (CSP) requirements, and ASTM International criteria. **The checklists are general guidelines; due to the inherent variability between contaminated sites, all elements of the checklists may not be required for every site work plan.** DEC staff, working with third party consultants, must determine which elements of this guidance document are applicable during the site characterization design and reporting stages.

The site cleanup rules require DEC site characterization work plan and report approval. After a work plan or report is received, CSP staff must ensure a systematic and consistent review. While the checklists are tools for establishing the completeness of a work plan or report, Tables 1 and 2 will help reviewers determine quality and regulatory compliance. The left hand column of each table presents the specific regulatory citation in 18 AAC

75.335. The right hand column describes review criteria for evaluating each regulatory requirement. The criteria are used when conducting a review, preparing comments on a draft or final submittal, and preparing approval correspondence. Submittals that meet these criteria are typically ready for approval; however, it is important to note that additional criteria may be applicable on a site-specific basis.

The items of a work plan or report detailed in this document are elements that can be used to convey a complete understanding of what is happening at a contaminated site. However, not all elements or items in this document will always be required by a project manager due to variability with site specific needs. How this document is used is up to the discretion of the project manager. One option for use is to review a work plan or report and then check the applicable sections or elements in this document which need to be addressed in more detail. It is up to the project manager to provide a copy of the items to be addressed back to the consultant or Responsible Party.

Elements of a Complete Work Plan

Cover Page

- Name and signature of qualified person who prepared the work plan
- Site name
- DEC file number

Table of Contents

- List including page numbers, tables, figures, and appendices

Acronyms and Abbreviations

- List all acronyms and abbreviations used in the work plan

Introduction

- Project objectives
- Project time table
- List of qualified persons working onsite

Site description and background

- Current site location map with legend, orientation (north arrow) and scale
- Current vicinity map with legend, orientation, and scale
- Legal description/plat number
- Latitude and longitude datum
- Street address
- Dated aerial photographs
- Interviews with previous land owners, Responsible Parties, or others
- Description of prior land use
- Current institutional controls in place, if any
- Location of site structures/utilities/potable water sources
- Location of property lines, buildings and nearby roads
- Presence of vent/fill pipes from an underground storage tank (UST), above ground storage tank (AST), drums, waste piles, septic systems, or other potential sources of contamination
- Evidence of leaks or stained soils
- Known contaminant sources

Contaminants of Potential Concern (COPCs)

- Tabular list of COPCs
- Cleanup levels
- Screening levels
- Analysis to be performed

Preliminary Conceptual Site Model

- Description of potential receptors
- Potential migration pathways
- Potential points of exposure

Sampling plan

- Description of problem to be studied
- Actions and decision that may result
- Data use objectives
- Decision unit identification
- Narrative of sample locations and rationale
- Scaled site diagram with proposed sampling locations (include legend and orientation arrow)
- How will modifications/deviations to the approved plan be handled

Field screening

Discussion of method for interval/location of field screening sample

- Test kits
- Specification of test kit use, sensitivity, interferences
 - Hand held devices
- Headspace methodology
- Direct push UltraViolet Optical Screening Tool (UVOST™), Rapid Optical Screening Tool (ROST™)
- Chain of Custody

Sample collection methods- *describe in detail how any of the methods will be used*

Soil samples

- Test pits
- Borings
- Direct push
- Other (specify)

Groundwater samples

- Method of well installation and development
- Purging techniques
- Low flow methods
- Well measurements and instrumentation used
- Groundwater elevations/benchmarks or measuring points (methodology)
- Groundwater flow direction
- Use of bailers, pumps, or passive diffusion systems
- Specified parameters of measurement

Other matrices

- Soil gas
 - Leak detection methods
- Indoor air
 - Summa canisters
 - Certification of cleanliness
 - Date and calibration of control valves
 - Unique Identification (ID) number
- Surface water
- Outdoor air

- Sediment
- Biota
- Pore water

Field quality control measures

- Proposed quality control samples (temp. blanks, trip blanks, etc.)
- Sample preservation methods
- Unique ID number
- Use of cooler and “ice”

Investigative derived waste management

- Use of liners
- Covered stockpiles
- Purge water
- Other (list)

Field documentation

Log books and recorded field observations

- Date
- Weather and other salient observations
- Sampling team members
- Documentation of instrument calibration
- Location of activity and site conditions
- Field observations and comments
- Changes to sampling protocol
- Site photographs
- Site sketches
- Survey and location of sampling points
- Global Positioning System (GPS) coordinates

Analytical Methods

- Name of laboratory completing analysis

Request for analysis

- Turnaround times
- Types of containers to be used
- Type of preservation used
- Sample volumes to be collected
- Method detection limits

Soil

- Potential constituents
- U.S. Environmental Protection Agency (EPA)/Laboratory method

Groundwater

- Potential constituents

- EPA/Laboratory method
- Surface water
 - Potential constituents
 - EPA/Laboratory method
- Sediment
 - Potential constituents
 - EPA/Laboratory method
- Other
 - Potential constituents
 - EPA/Laboratory method

Other

- Other project specific needs as determined by the project manager

Tables and Figures

- Include pertinent data in tabular form
- Figures with legend or key as applicable

Appendices

- List of reference documents or pertinent information that will be reviewed by DEC and used by field staff i.e. qualified persons resumes.

Upon completion of the work plan phase of the project, a report must be submitted under 18 AAC 335 (c). One purpose of the report is to provide a complete description of the nature and extent of contamination detected during the field sampling and analysis process. The report is also intended to propose any additional site characterization required to identify the limits of contaminated soil and groundwater, interim cleanup actions, or, if the site characterization is considered to be complete, how the contamination will be cleaned up. The site characterization report presents the findings of the implemented work plan. Site figures, maps, the preliminary Conceptual Site Model, and other information from the work plan are updated. New supporting tables and figures are added.

Elements of a Complete Characterization Report

Cover Page

- Name and signature of qualified person responsible for collecting samples.
- Name and signature of qualified person responsible for interpreting the data.
- Name and signature of qualified person responsible for reporting the data.
- Site name
- DEC file number

Table of Contents

- List of page numbers, tables, figures, and appendices

Acronyms and Abbreviations

- List all acronyms and abbreviations used in the work plan

Executive Summary

Introduction

- Project objectives
- Recap of site history
- Legal description
- Current owner operator
- Responsible party
- Latitude and longitude datum
- Other pertinent information that the project manager may deem necessary

Field work

- Narrative of field activities-include who, what, when, where, and how activities occurred
- Narrative of field modifications/deviations and how they were handled

Results and Findings- narrative of site conditions that communicate the nature and extent of contamination present based on the following:

- Analytical results (tabular form) and narrative of findings
 - Soil data
 - Field screening results
 - Analytical results
 - Groundwater analytical data
 - Other environmental media analytical data (such as air, surface water, and sediment)
- Conceptual Site Model (updated)
- Update of maps and figures with text boxes indicating results
 - Location and depth of samples including monitoring wells
 - Cross sectional view with contamination plumes
 - Plan view with contamination plumes
 - Ground water contour map

- Exploration logs
 - Borings
 - Well installation logs

Proposed Cleanup Levels

- Include proposed cleanup levels, and narrative to explain why they are appropriate for the site
- Cumulative risk evaluation, if applicable

Proposed Cleanup Techniques

- Include proposed cleanup techniques and discussion of why they were selected or what further information is required to select

Data Quality

- Accuracy
- Precision
- Completeness
- Representativeness
- Comparability
- Sensitivity
- Consultant data quality assessment

Conclusions

- Discussion of conclusions

Recommendations

Tables and Figures

- Updated tables and figures with information based on findings and results
- Historical sample results in tabular form
- Groundwater flow direction and gradient
- Statistical analysis of data trends

Appendices

- Laboratory report
 - Copy with analyst signature
 - Laboratory Quality Control information
 - Case narrative of data qualifiers
 - Chain of custody forms
 - Laboratory sample receipt forms
- Technical memorandum requirements
 - DEC Laboratory Data Review checklist
 - Consultant Quality Assurance narrative

- Field notes
- Photos

Table 1- Work Plan Regulatory Requirements and Review Criteria

Work Plan Design Element	DEC Review Criteria
<p>18 AAC 75.335 (b)(1) Prepared by a qualified person.</p>	<p>Verify preparer meets qualified person criteria according to the definition in 18 AAC 75.990(100).</p>
<p>...335(b)(2)(A) Determine if a discharge or release of a hazardous substance has occurred. ...335 (b)(2)(B) Identify each (potential) hazardous substance at the site, include the concentration and extent of contamination; this information must be sufficient to determine cleanup options.</p>	<p>Sampling approach and data use objectives are clearly stated. Field screening and analytical sampling methods are presented and discussed. SOPs and field Quality Control measures are provided. The site diagram clearly shows proposed contaminant sampling location(s). Analytical methods and the proposed laboratory are provided.</p>
<p>...335(b)(2)(C) Identify site characteristics or conditions that could result in ongoing site contamination including the potential for leaching of insitu contamination and the presence of leaking barrels, drums, tanks, [pipelines], other containers [or other sources].</p>	<p>Site characteristics, such as the presence of preferential contaminant migration pathways, are considered. Potential contaminant sources are identified and discussed. The potential for sub-surface leaching is considered and discussed.</p>
<p>...335 (b)(2)(D) Evaluate the potential threat to human health, safety, and welfare, and to the environment from site contamination.</p>	<p>The preliminary conceptual site model (CSM) depicts suspected contaminant sources and potential human health and ecological exposure pathways. The workplan is designed to gather more information about pathways such as the presence/absence of nearby drinking water wells.</p>
<p>...335 (b)(2)(E) Identify any interim removal action necessary under 18 AAC 75.330.</p>	<p>Proposed interim removal actions reflect an immediate exposure concern, on-going release or other valid reason for immediate action.</p>
<p>...335 (b)(2)(F) Locate sources of known site contamination, including a description of potential releases into soil, sediment, groundwater, or surface water.</p>	<p>All potential source areas and releases to environmental media are identified and are supported by the information in the preliminary CSM.</p>
<p>...335 (b)(2)(G) Evaluate the size of the contaminated area, including the concentrations and extent of any soil, sediment, groundwater, or surface water contamination.</p>	<p>The sampling approach is designed to determine both the lateral and vertical extent of contamination.</p>
<p>...335 (b)(2)(H)</p>	<p>If necessary, the work plan is designed to</p>

Work Plan Design Element	DEC Review Criteria
Identify the vertical depth to groundwater and the horizontal distance to nearby wells, surface water, and water supply intakes.	determine the depth to groundwater and to measure the horizontal distance to nearby receptors.
<p>...335 (b)(2)(I) Evaluate the potential for surface water runoff from the site and the potential for surface water or sediment contamination.</p>	The sampling approach accounts for surface water runoff and is supported by the information in the CSM.
<p>...335 (b)(2)(J) Identify the soil type and determine if the soil is a continuing source of groundwater contamination.</p>	The sampling approach accounts for soil-water partitioning characteristics and the potential for contaminants to leach to groundwater.

Table 2-Site Characterization Report Review and Approval Criteria

Site Characterization Report	DEC Review Criteria
18 AAC 75.335 (c) (1) Prepared by qualified person.	Qualified according to the definition in 18 AAC 75.990(100).
18 AAC 75.335 (c) (2) Sets out information obtained from activities in accordance with a site characterization work plan.	Information in the report matches the approved site work plan. The report includes the updated CSM, exploration logs, and a description of unique hydro geologic conditions or other site-specific conditions. Any deviations from the approved work plan are presented, explained, and documented.
18 AAC 75.335 (c) (3) Sets out results of sampling and analysis.	Sampling results are well organized in tabular format. Field screening results can be matched with the corresponding analytical samples. Sample locations are depicted on the site diagram and can be easily cross-referenced against data tables. The requirements in the March 2009 <i>Environmental Laboratory Data and Quality Assurance Requirements</i> technical memorandum have been met.
18 AAC 75.335 (c) (4) Demonstrates that the inspections, sampling and analysis performed adequately characterize the extent of hazardous substance contamination.	Sampling results and the report’s narrative conclusions either clearly support that characterization sampling has defined the extent of contamination, both vertically and horizontally, or else identify additional site characterization efforts intended to complete the delineation of the contamination.
18 AAC 75.335 (c) (5) Proposes cleanup techniques for the site.	The efficacy of the proposed cleanup method is clearly explained and accounts for site-specific variables and limiting factors.

References

ADEC, Policy Guidance on Developing Conceptual Site Models, November 30, 2005

ADEC, Monitoring Well Guidance, February 2009

ADEC, Underground Storage Tanks Procedures Manual, Guidance For treatment of Petroleum-Contaminated Soil and Water and Standard Sampling Procedures, November 7, 2002

ADEC, Technical Memorandum- Environmental Laboratory Data and Quality Assurance Requirements, March 2009

ASTM International, 2008 Annual Book of ASTM Standards, Volume 11.05, 1527-05 “Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process”

ASTM International, 2008 Annual Book of ASTM Standards, Volume 11.05, 1903-97 “Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process”