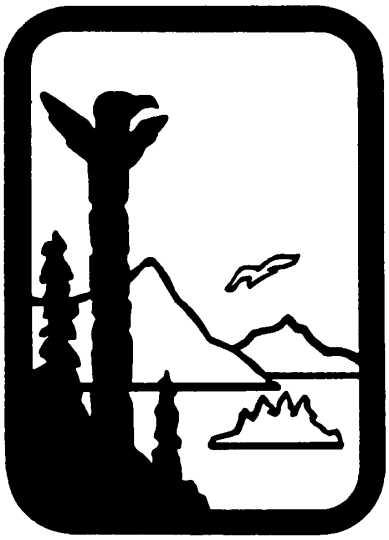
DEPARTMENT OF ENVIRONMENTAL CONSERVATION



GUIDANCE ON DECISION DOCUMENTION
UNDER THE SITE CLEANUP RULES
(18 AAC 75.325 – 18 AAC 75.390)

July 1999

Tony Knowles
Governor

Michele Brown
Commissioner

TABLE OF CONTENTS

INTRODUCTION 1
Preparation Reviews and Signature 2
CHAPTER I. INTERIM REMOVAL ACTION 4
Rational for interim removal action 4
Expectations for interim removal action 4
Description of action 4
CHAPTER II. SITE CHARACTERIZATION WORKPLAN 7
CHAPTER III. SITE CHARACTERIZATION REPORT 11
CHAPTER IV. GUIDANCE ON PREPARING RECORDS OF DECISION 15
PURPOSE OF THIS CHAPTER 15
PROCEDURES 15
Timing of the ROD 15
Proposed Plan and Public Comment Period 16
Preparation Reviews and Approval 16
Recording of ROD into Database 17
GENERIC FORMAT FOR ROD 17
Introduction 17
Site Information 17
Identification of Contaminants of Concern 18
Contaminant Concentrations/Extent of Contamination 18
Completed Exposure Pathways 18
Summary of Risk Assessment 18
Cleanup Levels 19
Comparative Analysis of Alternatives 19
Description of Cleanup Remedy 20
Applicable or relevant and appropriate standards (ARARs) 21
Summary of Public Involvement Activities/Responsiveness Summary 21
Review of Cleanup Action after Site Closure 21
CHAPTER V. CLEANUP PLAN 22
CHAPTER VI. FINAL CLEANUP REPORT 26

APPENDIX A. EXAMPLE OF ROD FOR A NON-COMPLEX SITE……A-1
APPENDIX B. EXAMPLE OF ROD FOR A SITE THAT INCORPORATES ALTERNATIVE CLEANUP LEVELS……B-1
APPENDIX C. EXAMPLE OF ROD FOR A COMPLEX SITE……...C-1
APPENDIX D, EXAMPLE OF ROD FOR A NO ACTION SITE……D-1

LIST OF FIGURES

Figure 1 Site Characterization and Cleanup Process.....3
Figure 2 Approval Letter for Interim Removal Action 5-6
Figure 3 Site Characterization Workplan Approval Letter 9-10
Figure 4 Site Characterization Approval Letter 13-14
Figure 5 Cleanup Plan Approval Letter.....24-25
Figure 6 NFRAP Letter 27-28
Figure 7 Site Closeout Letter……29-30

INTRODUCTION

The Alaska Department of Environmental Conservation (DEC) has developed rules which establish administrative procedures and standards to determine the necessity for and degree of cleanup required to protect human health, safety and welfare and the environment at contaminated sites under the Contaminated Sites Remediation Program (CSRP). These regulations which are found at 18 AAC 75.325 – 18 AAC 75.390 are collectively known as the site cleanup rules.

This "Guidance on Decision Documentation" (GDD) has been developed to provide advice to project managers for formally documenting key decisions made by DEC under the site cleanup rules. These decisions define key points in the overall process for characterizing and cleaning up contaminated sites. A flow chart which depicts this process is shown in *Figure 1*. The items in the ovals of the flowchart indicate documents and actions that are written or performed by DEC.

The following key decisions will require written DEC approval as well as documentation via entry into the CS Database:

Interim Removal Action
Site Characterization Workplan
Site Characterization Report
Record of Decision (ROD)
Cleanup Plan
Final Cleanup Report (Site Closure)

With the exception of the ROD, all of these key decisions are required by the site cleanup rules. These key decisions are shown as diamonds in the flow chart of Figure 1. Approval of the key decisions is via a decision document. The ROD is an administrative document which formally approves cleanup levels, describes the rationale for selection of the cleanup remedy and establishes the performance standards or goals for achieving clean up.

Each of these decision documents is described separately in this guidance. Examples of decision documents using standard formats are provided. The use of standard formats will allow the project manager to provide consistency to management and stakeholders with respect to decisions that are made by the CSRP under the site cleanup rules.

This guidance does not generally apply to sites being cleaned up under the Voluntary Cleanup Program (VCP). Decision documents related to the VCP are described in the *Handbook for Conducting Cleanups Under the Voluntary Cleanup Program*.

Preparation Reviews and Signature:

Decision documents should be drafted by the project manager, with input from the assigned attorney if necessary. The draft should be forwarded to the team leader or section manager for review. For Department of Defense (DOD) sites, the decision document can be drafted by the lead agency, however DEC must concur on the document. Briefings with management and peer reviews as needed should be conducted during review of the draft document. Upon management concurrence, the final decision document can be signed by the delegated official in the CSRP.

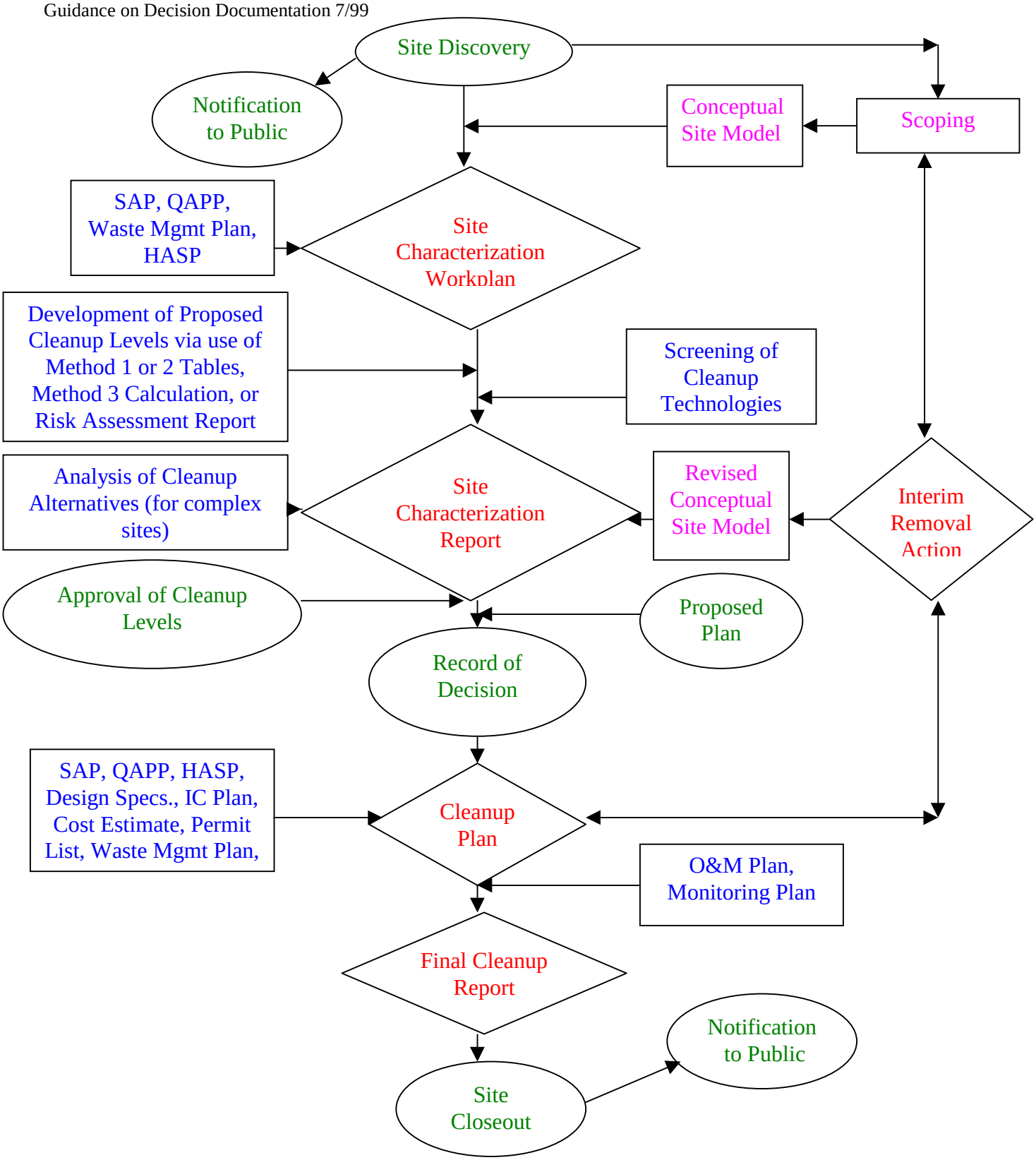


Figure 1: Site Characterization and Cleanup Process

CHAPTER I. INTERIM REMOVAL ACTION

Should an interim removal action be necessary at a site, it must be in conformance with the requirements of 18 AAC 75.330. An interim removal action can be performed at any time during the site characterization or cleanup process.

Documentation of approval of an interim removal action must be done in writing and by the DEC project manager entering the approval of the interim action into the Contaminated Sites Database.

An interim removal action approval document can take the form of a Memorandum if the removal action is undertaken by DEC, or a letter to the responsible person (RP) if the removal action is to be undertaken by the RP. The approval document should be signed by the DEC ES IV Supervisor. An example of this decision document is shown in *Figure 2.* The purpose of this document is to provide a concise written record of the decision to approve an appropriate removal action. At a minimum, the interim removal action approval document should include the following:

A. Rationale for interim removal action: The site cleanup rules at 18 AAC 75.330(a) state that an interim removal action may be necessary "to prevent (1) human or ecological exposure to a hazardous substance at the site; or (2) migration of a hazardous substance at or from the site". The approval document should therefore briefly state which of these reasons apply to the interim removal action. In addition, the approval document should briefly summarize any existing anecdotal and/or sampling and analytical data that was used to make the determination of the necessity for the removal action. Describe which exposure pathway(s) are being addressed by the removal action.

B. Expectations for the interim removal action: The site cleanup rules at 18 AAC 75.330(b) state that "An interim removal action must, to the extent practicable, contribute to the overall performance of any long-term cleanup action at the site." The approval document should clearly state what DEC's expectations for the interim removal action are. Examples of such expectations are given at 18 AAC 75.330(b)(1), (2) and (3). (e.g. "An interim removal action may provide for a partial cleanup for all or part of the site, but not achieve cleanup levels.")

C. Description of action: Describe the proposed removal action. Include if known;

- quantity and location of drums designated for removal,
- quantities of soil or sediment to be excavated,
- description of contaminants,
- applicable state or federal statutes and regulations such as; Solid Waste Management (18 AAC 60), Resource Conservation and Recovery Act (42 USC 6901 et seq.), and Toxic Substances Control Act (15 USC 2601 et seq.),

STATE OF ALASKA
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DIVISION OF SPILL PREVENTION AND RESPONSE
CONTAMINATED SITES REMEDIATION PROGRAM
410 WILLOUGHBY AVENUE, SUITE 105
JUNEAU, ALASKA 99801-1795

Date

Mr. I. R. Quark
ZZZ Wood Products
Enterprise, Alaska 99999-9999

Re: ZZZ Wood Products Mill Site
Approval of Interim Removal Action

Dear Mr. Quark;

The Alaska Department of Environmental Conservation (DEC) has completed review of ZZZ Wood Products' proposal to conduct an interim removal action at the ZZZ Wood Products (ZWP) mill site in Enterprise, Alaska. Based on this review, DEC has determined that the interim removal action will prevent human and environmental exposure to hazardous substances at the site and prevent the migration of hazardous substances from the site to groundwater and surface water. Therefore, DEC approves the proposal in accordance with 18 AAC 75.330(c).

DEC understands that approximately 400 cubic yards of surface and subsurface contaminated soils will be removed from the former paint shop, heavy duty shop and from drains surrounding the mill building. Based upon sampling results provided by ZWP, these soils contain in excess of 7,500 milligrams/kilogram (mg/kg) diesel range organics, 90 mg/kg carcinogenic petroleum aromatic hydrocarbons (PAHs), and 1 microgram/kilogram (µg/kg) dioxins/furans. Therefore, the removal action will eliminate significant sources of contamination and provide for a partial cleanup of the site.

The removal action must be conducted in accordance with applicable state and federal regulations. Soils removed from the site will be analyzed and sent to a regulated landfill, if necessary.

ZWP will be expected to provide information in the site characterization report on how to achieve cleanup levels for the final cleanup action.

If you have any questions, please call John Doe in the Contaminated Sites Remediation Program at (907)555-5555.

Sincerely,

DEC ES IV Supervisor

Figure 2. Approval Letter for Interim Removal Action

CHAPTER II. SITE CHARACTERIZATION WORKPLAN

Documentation of approval of the site characterization workplan must be done in writing. The DEC project manager must enter the approval of the workplan into the Contaminated Sites Database.

The site characterization workplan written approval can be in the form of a letter to the department's contractor, if the site characterization is being conducted by DEC, or to the RP if the site characterization is conducted by the RP.

Documentation of workplan approval should specify that the workplan will accomplish the specific tasks listed below:

- Evaluate the potential for threat to human health, safety and welfare and to the environment from site contamination.
- Locate sources of known contamination, including a description of potential ongoing releases into the soil, sediment, groundwater or surface water.
- Evaluate the size of the contaminated area and identify the extent and range of concentrations of each contaminant of concern.
- Identify the vertical depth to groundwater and the horizontal distance to nearby wells, surface water, and water supply intakes.
- Identify the soil type and determine if the soil is a continuing source for groundwater contamination.

The site characterization workplan must be prepared by a qualified person as per 18 AAC 75.335(b)(1). The site characterization workplan should ensure that sufficient data is collected to evaluate and interpret the physical and chemical characteristics of the site, as well as the topography, geology, and hydrogeology. All site characterization procedures should be consistent with DEC regulations and guidance.

In general, the site characterization workplan should include the following:

- Site map including proposed locations for soil samples, groundwater monitoring wells and any other proposed assessment structures.
- Draft site conceptual model which incorporates information about known and suspected sources of contamination, types of contaminants and affected media, known and potential sources of migration, known or potential routes of migration, and known or potential human and environmental receptors.
- If applicable, the workplan should include a plan to develop site maps of surface drainage, potentiometric surfaces, hydraulic gradients, and groundwater flow directions.
- Sampling and Analysis Plan - Sampling and analysis procedures should be consistent with the regulations at 18 AAC 75.355. In general, the Sampling and Analysis Plan should include

a description of the data being collected, a description of how the samples will be collected, handled and analyzed (including construction details of soil borings and groundwater monitoring wells), and a description of the laboratory and/or field analytical techniques that will be used.

- Quality Assurance/Quality Control (QA/QC) Plan - The objectives of the QA/QC plan are to ensure accuracy, precision, comparability, representativeness, and completeness of the data generated as relevant to sampling, analytical, and field measurement techniques.
- If applicable, Risk Assessment (RA) Workplan. The RA Workplan should include; a description of the scope of the human and/or environmental evaluation, an identification of data needs for the RA, and a description of the methodologies and assumptions to be used in the RA.
- A Waste Management Plan for handling, transporting and disposing of investigation-derived wastes, such as purged water from a boring or monitoring well, cuttings, mud and other wastes from well or boring installation and development and contaminated equipment and materials.
- Health and Safety Plan - A site-specific Health and Safety Plan, which adheres to applicable Alaska Department of Labor, OSHA, and NIOSH regulations and requirements, must be developed for the site characterization activities to be conducted.
- Schedule of Activities - A tentative schedule beginning with workplan preparation and ending with completion of a Site Characterization report.

The site characterization workplan should include a schedule for completion of the site characterization tasks. The site characterization workplan approval letter should confirm that DEC has agreed to the schedule as outlined in the workplan, and that any field and schedule changes must be approved by DEC prior to being implemented. The approval letter can be signed by the DEC project manager.

An example of a site characterization workplan approval letter is shown in *Figure 3*.

STATE OF ALASKA
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JUNEAU, ALASKA 99801-1795

Date

Mr. I. R. Quark
ZZZ Wood Products
Enterprise, Alaska 99999-9999

Re: ZZZ Wood Products Mill Site
Approval of Site Characterization Workplan

Dear Mr. Quark;

The Alaska Department of Environmental Conservation (DEC) has completed review of the document entitled *Site Characterization Workplan for the ZZZ Wood Products Site in Enterprise, Alaska, Federation Environmental, 1999* (Workplan). DEC received the Workplan on date. The Workplan meets the requirements of 18 AAC 75.335 and is therefore approved.

Specifically, the tasks outlined in the Workplan will evaluate the threat to human health, safety, welfare and the environment from site-related contamination. This will be done by; sampling and analyzing soil and groundwater for hazardous substances to determine contaminant concentrations and extent of contamination, determining contaminant source areas using both historical and sampling data, and utilization of well logs and borings to determine groundwater depth, gradient and aquifer characteristics. In addition, threats to human and ecological receptors will be evaluated through completion of a human health and environmental risk assessment.

Based upon the schedule outlined in the Workplan, DEC expects that the site characterization report will be submitted by date. Any field and schedule changes must be approved by DEC prior to being implemented.

If you have any questions, please call me at (907) 555-5555.

Sincerely,

Jane Doe,
Project Manager

Figure 3. Site Characterization Workplan Approval Letter

CHAPTER III. SITE CHARACTERIZATION REPORT

Documentation of approval of the site characterization report must be done in writing. The DEC project manager must enter the approval of the report into the Contaminated Sites Database.

The site characterization report written approval should be in the form of a letter to the RP if the site characterization is conducted by the RP or to the department's contractor, if the site characterization is being conducted by DEC.

The approval letter should state that the site characterization report adequately characterizes the nature and extent of contamination at the site. In addition, the site characterization report must have evaluated the potential threat posed by the conditions at the site to human health, safety and welfare and to the environment. The approval letter can be signed by the DEC project manager. An example of a site characterization report approval letter is shown in *Figure 4*.

The site characterization report should include the following data and information:

- Historical information, physical setting, site maps and area of concern maps.
- Results of all sampling analyses, copies of all laboratory data sheets and required laboratory deliverables pursuant to QA/QC requirements.
- Sampling Results Summary Table(s) of all analyses, including sampling locations, media and depth. To ensure that all chemicals of concern are included in evaluating cumulative risk, identify all contaminants that exceed one-tenth of either the soil ingestion or inhalation cleanup levels given in 18 AAC 5.341(c) and (d), whichever is more stringent, and one-tenth the groundwater cleanup level given in 18 AAC 75.345(b)(1).
- Identification of sources of contamination such as drums, tanks, surface impoundments, waste piles, landfills and heavily contaminated media (such as soil, and groundwater contaminated with dense non-aqueous phase liquids (DNAPLs)). If applicable, include maps depicting the horizontal and vertical extent of any free and/or residual product zones in groundwater or soil.
- Revised site conceptual model.
- Documentation of development of each proposed soil and groundwater cleanup level. Include calculations of the resulting cumulative risk for the proposed cleanup levels.
- List of prospective cleanup technologies. Technologies should have been screened for protectiveness, ability to meet cleanup levels, and implementability.
- If applicable, detailed calculations of site-specific levels under Method 3.
- If applicable, a site-specific risk assessment completed and in accordance with the RA Workplan and the procedures specified in the department's *Risk Assessment Procedures Manual.*
- If applicable, a summary of the results of any treatability, bench scale or pilot study conducted to support the selection of a cleanup remedy.
- If applicable, a summary of the results of any data collected to develop permit limitations for

any permits which may be required during potential cleanup actions.

- If applicable, stratigraphic logs which include soil/rock physical descriptions and field instrument readings detected during drilling for each soil boring, test pit and monitoring well. Include a description of odors, staining or other discoloration and field measurements of organic vapors.
- If applicable, and at the department's discretion, a Natural Resource Damage Assessment (NRDA) can be included as a supplement to the Site Characterization Report.

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JUNEAU, ALASKA 99801-1795

Date

Mr. I. R. Quark
ZZZ Wood Products
Enterprise, Alaska 99999-9999

Re: ZZZ Wood Products Mill Site
Approval of Site Characterization Report

Dear Mr. Quark;

The Alaska Department of Environmental Conservation (DEC) has completed review of the document entitled *Site Characterization Report for the ZZZ Wood Products Site in Enterprise, Alaska, Federation Environmental, 1999* (SC Report). DEC received the SC Report on date. The SC Report has adequately met the requirements of 18 AAC 75.335(2) and is therefore approved.

Based on information currently available to DEC, DEC concurs with the following specific conclusions of the SC Report:

1. Detectable levels of dioxins/furans, petroleum aromatic hydrocarbons (PAHs), heavy metals, volatile organic compounds (VOCs), and petroleum hydrocarbons (diesel-range and residual-range organics) were found in surface and subsurface soils throughout the site.

2. Soils containing PAHs, VOCs and petroleum hydrocarbons were above DEC cleanup levels listed in Tables B1 and B2 at 18 AAC 75.341.

3. Shallow groundwater contains carcinogenic PAHs above DEC cleanup levels listed in Table C at 18 AAC 75.345.

4. Latinum Cove has not been impacted by site-related contaminants.

5. Results of the human health risk assessment indicate that cumulative risks due to ingestion, inhalation or dermal contact by residents and workers with contaminated soil are above the 10^{-5} standard published at 18 AAC 75.325(f).

6. Results of the ecological risk assessment indicate that unacceptable risks at the site are posed to the tundra vole and shrew as the hazard quotients for these receptors exceed 1.0.

The SC Report included a screening and evaluation of four cleanup technologies including removal, excavation and treatment, and capping of contaminated soils, groundwater monitoring and institutional controls. DEC concurs with this evaluation.

Based upon the conclusions of the SC Report, DEC will issue a Proposed Plan for public comment. Upon conclusion of the public comment period, DEC will issue a Record of Decision which will serve as formal approval of the cleanup levels and document the selected cleanup action for the site.

If you have any questions, please call me at (907) 555-5555.

Sincerely,

John Doe
Project Manager

Figure 4. Site Characterization Approval Letter

CHAPTER IV. GUIDANCE ON PREPARING RECORDS OF DECISION

PURPOSE OF THIS CHAPTER

This Chapter consists of the "Guidance on Preparing Records of Decision Documentation" (ROD Guidance). The ROD Guidance has been developed to present standard formats for formally documenting cleanup decisions under 18 AAC 75, Article 3 administered by DEC via the Contaminated Sites Remediation Program (CSRP). The regulations to which this guidance applies are 18 AAC 75.325 through 18 AAC 75.390 otherwise referred to as the site cleanup rules.

This guidance applies to all CSRP cleanups. The following regulations may include additional provisions for documentation of cleanup decisions:

- Cleanups conducted pursuant to a Federal Facility Agreement (FFA) under Section 120 of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). These FFAs are negotiated between the federal agency responsible for the cleanup, DEC and EPA. The federal agency responsible for the cleanup is required to prepare a similar cleanup decision document under the FFA that includes input from DEC and EPA. Input from DEC must ensure that RODs issued pursuant to a FFA contain the elements described in this guidance document.
- Cleanups which are solely conducted under provisions of the federal Resource Conservation and Recovery Act (RCRA), or the Toxic Substances Control Act (TSCA). Note that cleanups conducted under RCRA or TSCA may still be subject to requirements of the site cleanup rules. However, DEC input into cleanup decisions conducted under these regulations must ensure that the elements of this guidance are adhered to.
- Three-party agreements in which DEC does not have a lead-agency role.

The function of the ROD is to document the final/interim cleanup decision reached by DEC under the site cleanup rules. The ROD documents the rationale for selection of the cleanup remedy, including the risks posed by the site to human health and the environment. The ROD establishes performance standards or goals for achieving clean up, and includes a blueprint for achieving those performance standards or goals. Performance standards are the measures of success of the cleanup action.

PROCEDURES

Timing of the ROD:

For cleanups conducted under the site cleanup rules, interim removal actions and emergency cleanups, the ROD should be signed by the authorized DEC official after the site is fully characterized and before the final cleanup action is initiated. The delegated authority to sign the ROD will be dependent upon the method for selecting the cleanup levels. For initial

response actions conducted pursuant to 18 AAC 75.315, the ROD should be signed as soon as the CSRP determines that the initial response action is protective of human health and the environment or prior to the initiation of the follow-up cleanup action. If the CSRP is in receipt of a spill cleanup report for the initial response action, the spill cleanup report should be used to support the ROD.

For sites being cleaned up under the Voluntary Cleanup Program (VCP), the Corrective Action Final Report (CAFR) approval/no further action letter should serve as the ROD.

Proposed Plan and Public Comment Period:

In general, complex sites and some sites where alternative cleanup levels are being proposed will have a high level of public interest/involvement. At these sites, a Proposed Plan should be prepared and made available for public comment. The Proposed Plan should be drafted by the project manager with input from the Community Involvement Specialist. If necessary, and in order to save time, the Proposed Plan can be prepared and submitted for public comment during preparation or review of the draft ROD. The public comment period should generally be for a total of 30 days.

If the site is not complex and there is not a high level of public interest then only a shortened Proposed Plan is necessary. The public should be allowed 15 days to comment on this plan.

Upon completion of the public comment period the final ROD should be prepared which incorporates a responsiveness summary. The final ROD and responsiveness summary should be mailed to all persons who submitted comments on the Proposed Plan or public notification. Additional information on public involvement procedures can be found in the department's *Interim Guidance for Public Involvement*.

Preparation Reviews and Approval:

The project manager should draft the ROD. If an attorney is assigned to the site, the attorney can provide input if necessary. If resources allow, the ROD can be initially drafted by DEC contractors. If appropriate, input can be provided by the responsible person.

For sites that are being cleaned up by federal agencies (e.g. Department of Defense) but are not subject to a CERCLA FFA, the ROD can be drafted by the federal agency. DEC must still review and approve the ROD.

The draft ROD should be forwarded to the team leader or section manager for review. Briefings with management and peer reviews if necessary should be conducted during preparation and review of the draft ROD. The final ROD should be signed by the authorized official of the CSRP and maintained in the site file.

Recording of ROD into Database:

Once the final ROD is signed, the project manager must record this as an action in the database. The date that is recorded in the database is the date that the ROD is signed. For RODs containing approval of alternative cleanup levels (ACLs), an additional date should be recorded in the database which is the date that the ACLs are approved.

GENERIC FORMAT FOR ROD

Regardless of the method used under the site cleanup rules to determine the cleanup levels at a site, the purpose of the ROD is to outline the decision-making process involved in the selection of the proposed cleanup action and to provide a description of the cleanup action. No further action decisions must also be documented in a ROD. There is no required length for a ROD, but in general the more complex the site, the more detailed the ROD. Based on site-specific circumstances, CSRP project managers in consultation with management will determine the level of complexity of a site and hence the level of detail necessary for the ROD.

The following sections describe the information that may be included in the ROD. *Appendices A through D* give examples of RODs with differing levels of detail depending on the complexity of the site.

I. Introduction:

This section should include the following:

1. Site name and location
2. Name and mailing address of responsible person
3. Database Record Key and CS file number.
4. Regulatory authority under which the site is being cleaned up.
   a. Waiver under 18 AAC 75.390 - If any portion of the site cleanup rules is being waived under 18 AAC 75.390 state which section the waiver applies to and include an explanation as to why that section is being waived.
5. If the site is complex and divided into operable units, describe the role of the operable unit cleanup strategy within the overall site cleanup strategy.

II Site Information:

This section describes the nature of the site and the conditions which justify the cleanup action. The following information should be included in this section:

1. Map of site showing location
2. Site use (e.g. tank farm, pulp mill, etc.),

3. Physical characteristics of site (e.g.. hydrogeology),
4. Description of contaminant(s) and media impacted (e.g. soil, air, ground water, surface water).
5. Prior cleanup actions taken (if appropriate).
6. Current and expected future land use.
7. Determination on the current and expected future use of groundwater
8. Enforcement history (if appropriate).

Where appropriate and convenient, other documents (e.g. site investigation report) can be referenced which include the above information.

III. Identification of Contaminants of Concern

Identify all contaminants of concern (COCs) at the site. COCs are generally those chemicals that are found in concentrations greater than the 18 AAC 75.341 Tables B1 and B2, and 18 AAC 75.345 Table C values. In addition, 18 AAC 75.340(k) and 18 AAC 75.345(k) require that all chemicals that are found in concentrations greater than one-tenth the soil ingestion and inhalation cleanup level in Table B1 of 18 AAC 75.341, or the groundwater cleanup level in Table C of 18 AAC 75.345, be included in calculating cumulative risk for the site. Therefore, those chemicals greater than one-tenth the Table B1 or Table C value should also be identified in the ROD.

IV. Contaminant Concentrations/Extent of Contamination:

Identify the range of on-site contaminant concentrations in all media. Identify the areal extent of contamination in all media. Where appropriate and convenient, other documents such as the site characterization report can be referenced which include information on the nature and extent of contamination. Provide figures, tables and maps as appropriate. Information presented in figures and tables should include, but may not be limited to; media tested, tests completed, number of samples collected, range of detected concentrations, and location of maximum concentration.

V. Completed Exposure Pathways:

Using the final site conceptual model, describe the completed exposure pathways at the site for each media of concern. In order for an exposure pathway to be complete it must contain the following elements; (1) a contaminant source, (2) a mechanism for hazardous substance release, (3) a transport mechanism to the various environmental media, (4) exposure media, (5) exposure route, and (6) receptors. Describe impacts on ecological receptors as appropriate.

VI. Summary of Risk Assessment:

Include a summary of the human health and/or ecological risk assessment, if one was

conducted at the site. The Risk Assessment Summary should include, at a minimum, a summary table completed for those exposure scenarios and chemicals that trigger the need for cleanup. Briefly describe the toxicity and exposure assessments that were used to calculate the cleanup levels. Describe any uncertainties related to the risk assessment.

VII. Cleanup Level(s):

Identify the procedure used to determine the cleanup level and briefly describe the rationale for choosing the particular procedure. Briefly describe any previous documentation which the department used to justify the procedure (e.g. site characterization report; risk assessment).

Identify the cleanup level(s) appropriate for each completed exposure pathway. The identified cleanup level(s) should be consistent with the land use for the site.

List the appropriate cleanup level(s) along with the basis for the cleanup level(s). [E.g.: Table A2 of 18 AAC 75.341, Table B1 of 18 AAC 75.341, EPA Maximum Contaminant Level at 40 C.F.R. 141.12, etc.] For groundwater, describe the point(s) of compliance where the cleanup levels must be met. If appropriate, describe any approved alternate point(s) of compliance and include a justification for such alternate point(s) of compliance.

For sites with multiple contaminants of concern, or sites with one contaminant that exists in multiple pathways, identify how the contaminants of concern were incorporated in the calculation of site-wide cumulative risk levels. Describe the process used to determine the cleanup levels for all contaminants of concern.

If alternate cleanup levels were approved (e.g. sites being cleaned up under Method 3, sites in which a site-specific risk assessment is used to calculate a cleanup level, or sites in which groundwater is not a current source of drinking water or a reasonable expected future source of drinking water), describe the justification for approving those cleanup levels. For sites in which the responsible party is the lead, justification for alternate cleanup levels should have been included in the site characterization report. Where applicable, institutional controls should be part of the cleanup remedy in order for alternate cleanup levels to be approved. The justification for choosing an alternate cleanup level for soil under Method 3 must be in accordance with 18 AAC 75.340(e). For groundwater, an alternate cleanup level equal to 10 times the cleanup level must be chosen in accordance with 18 AAC 75.345(b)(2). In addition, 18 AAC 75.340(h) and (i) provide additional rationale for the department to approve alternate cleanup levels, if site conditions warrant. Describe the exposure assumptions used to develop the alternative cleanup levels.

VIII. Comparative Analysis of Alternatives:

If cleanup alternatives were evaluated for the site, describe how the cleanup alternatives

were weighed against each other and compared to each other with respect to the following five criteria:

1. Protectiveness:

How well does each alternative protect human health, safety, and welfare or the environment, both during and after the cleanup action?

2. Practicable:

Are the technologies/techniques under consideration capable of being designed, constructed and implemented in a reliable and cost-effective manner? What alternatives are the most cost effective?

3. Short- and Long-term Effectiveness:

Are there potential adverse effects to human health, safety and welfare or the environment during construction or implementation of the alternative? How fast does the alternative reach cleanup goals? How well does the alternative protect human health, safety, and welfare or the environment after completion of the cleanup? What, if any, risks will remain at the site?

4. Regulations:

Will the alternative comply with all state and federal regulations?

5. Public Input:

Have comments received from the community regarding each alternative been considered and addressed?

IX. Description of Cleanup Action

Describe the cleanup action in detail. Include as appropriate: descriptions of treatment approaches, institutional controls, off-site disposal locations, permit requirements, monitoring requirements, projected timeframes for start and completion of cleanup and public involvement requirements as per 18 AAC 75.340(f) and (h), 18 AAC 75.340(b)(1)(c) and 18 AAC 75.345(b)(2) and (f). State the cleanup objectives for each media of concern and describe how the cleanup action will meet those cleanup objectives.

For sites where institutional controls are part of the cleanup action include a discussion of how the institutional controls will be enforced.

Document any short-term risks that may occur during implementation of the cleanup action. Document risks that may remain after completion of the cleanup action (including residual risk from untreated waste remaining at the site).

Describe any assumptions and uncertainties related to the cleanup action and the cleanup levels approved for the site.

X. Applicable or relevant and appropriate standards (ARARs)

If appropriate, and if the cleanup is being conducted under other statutes or regulations in addition to 18 AAC 75 Article 3, list the standards, requirements, criteria or limitations that are legally applicable, or relevant and appropriate under the circumstances presented by the site. For sites in which waste is to be removed off site, or treated on site, discuss how federal requirements such as RCRA and TSCA will be complied with. Evaluate the extent to which the cleanup action complies with ARARs or otherwise addresses ARARs.

XI. Summary of Public Involvement Activities/Responsiveness Summary

Summarize the activities that the department performed to inform and/or involve the public in cleanup decisions for the site. These activities would include the formation of a Citizens Advisory Committee or Restoration Advisory Board; preparation of a Public Participation Plan; preparation and distribution of newsletters; and public meetings.

For those sites in which the site cleanup rules require public, landowner and/or government agency consultation prior to selecting a cleanup action, include a brief explanation of the how DEC consulted with the public.

Include a Responsiveness Summary of comments received on the proposed cleanup action during the public comment period.

XII. Review of Cleanup Action after Site Closure

Under section 18 AAC 75.380(d)(1) of the site cleanup rules, DEC may require additional action if new information is discovered which leads DEC to make a determination that the cleanup is not protective of human health, safety, and welfare, or the environment. Therefore, language should be inserted into the ROD to reflect the possibility that the site may be reopened for further evaluation and cleanup even after site closure should the cleanup be determined to be not protective of human health, safety, and welfare or the environment.

CHAPTER V. CLEANUP PLAN

The requirement for a responsible person to submit a cleanup plan for review by the department is found in 18 AAC 75.360. The cleanup plan presents the technical specifications for the cleanup action. Wherever possible, and in accordance with 18 AAC 75.360(a)(1), timeframes for completion of cleanup tasks and related documentation should be included in the cleanup plan. DEC is required to approve the cleanup plan.

Documentation of approval of the cleanup plan must be done in writing. The DEC project manager must enter the approval of the plan into the Contaminated Sites Database.

The cleanup plan written approval should be in the form of a letter to the RP if the cleanup action is conducted by the RP, or to the department's contractor, if the cleanup action is being conducted by DEC. The DEC project manager should discuss the level of complexity of the cleanup action with their supervisor in order to determine the signatory authority for the approval letter. An example of a cleanup plan approval letter is shown in *Figure 5*.

According to 18 AAC 75.360, the cleanup plan must include:

- Provisions for the cleanup of soil and groundwater contaminated at levels exceeding the applicable cleanup levels determined under the site cleanup rules (18 AAC 75.325 - 18 AAC 75.390).
- Detailed specifications for the proposed cleanup technique.
- Provisions for minimizing contaminant migration to previously unaffected areas.
- Provisions for the transport of contaminated soil as a covered load in compliance with 18 AAC 60.015.
- Provisions for the disposal of contaminated soil and groundwater, including the location and method of disposal.

In addition, the following items should be included in the cleanup plan, as applicable:

- Identification of all approved cleanup levels in all environmental media of concern.
- A sampling and analysis plan (SAP) for post cleanup confirmatory sampling which includes: identification of sampling locations, depths and parameters to be analyzed.
- Identification of all on-site areas where cleanup action will be conducted which specifies the location of the cleanup treatment units, the volume of environmental media to be treated, the vertical and horizontal extent of the area to be cleaned up; and the location, depth and concentration of all contaminants in excess of the cleanup levels.
- A quality assurance project plan (QAPP).
- A waste management plan.
- A list of all required permits.
- A description of soil and sediment erosion control and monitoring, and dust and odor control and monitoring procedures to be implemented during cleanup activities.

- A health and safety plan
- A cost estimate for the cleanup action.
- A description of institutional controls to be employed at the site, along with a plan for enforcing those institutional controls.

STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
CONTAMINATED SITES REMEDIATION PROGRAM
410 WILLOUGHBY AVENUE, SUITE 105
JUNEAU, ALASKA 99801-1795

Date

Mr. I. R. Quark
ZZZ Wood Products
Enterprise, Alaska 99999-9999

Re: ZZZ Wood Products Mill Site
Approval of Cleanup Plan

Dear Mr. Quark;

The Alaska Department of Environmental Conservation (DEC) has completed review of the document entitled *Cleanup Plan for the ZZZ Wood Products Site in Enterprise, Alaska, Federation Environmental, 2000* (Cleanup Plan). DEC received the Cleanup Plan on date. The Cleanup Plan has adequately met the requirements specified in 18 AAC 75.360(a)(4) and is therefore approved.

Specifically, the tasks outlined in the Cleanup Plan include the following:

1. Provisions for excavation, treatment and placement back into on-site excavations of approximately 500 cubic yards of PAH-contaminated soils.

2. Technical specification for the bioremediation cells to be used for treatment of the PAH-contaminated soils.

3. Technical specifications for the two-foot soil cap to be placed over soils contaminated with arsenic and dioxins/furans.

4. An institutional controls plan for restricted access to the capped areas, and for the continuation of restricted groundwater use.

Based upon the schedule outlined in the Cleanup Plan, DEC expects that the cleanup action will begin by date. In addition, DEC expects receipt of the Long-Term Groundwater Monitoring Plan and the Operations and Maintenance Plan by [date].

If you have any questions, please call John Doe in the Contaminated Sites Remediation Program at (907) 555-5555.

Sincerely,

Designated Contaminated Sites Official

Figure 5. Cleanup Plan Approval Letter

CHAPTER VI. FINAL CLEANUP REPORT

The written final cleanup report is the last documentation that an RP must submit under the site cleanup rules. If the final cleanup action includes the use of institutional controls and/or long-term ground water monitoring, DEC will issue approval of the final cleanup report in the form of a letter which states that no further remedial action is planned for the site ("NFRAP letter").

An example of a NFRAP letter is found in *Figure 6*. If the rationale for issuance of the NFRAP letter is that institutional controls are being established, than the letter must be signed by the Contaminated Sites Program Manager. An example of a NFRAP letter is shown in *Figure 6.*

Approval of final site closeout cannot be given until the following site conditions are met:

1. Cleanup levels established at the site for all contaminants of concern in all media of concern have been met.

2. For soil, the risk from contaminants at the site do not exceed a cumulative carcinogenic risk level of 1 in 100,000 across all exposure pathways and a cumulative noncarcinogenic risk at a hazard index of 1.0 for each exposure pathway.

3. For groundwater, contaminant concentrations do not exceed the values found in Table C at 18 AAC 75.345.

4. There is no need for additional cleanup actions at the site.

5. There is no need for continued long-term groundwater monitoring at the site.

6. There is no need for continued institutional controls at the site.

STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
CONTAMINATED SITES REMEDIATION PROGRAM
410 WILLOUGHBY AVENUE, SUITE 105
JUNEAU, ALASKA 99801-1795

Date

Mr. I. R. Quark
ZZZ Wood Products
Enterprise, Alaska 99999-9999

Re: ZZZ Wood Products Mill Site
Approval of Final Cleanup Report/No Further Remedial Action Planned

Dear Mr. Quark;

The Alaska Department of Environmental Conservation (DEC) has completed review of the document entitled *Final Cleanup Report for the ZZZ Wood Products Site in Enterprise, Alaska, Federation Environmental, 2010*. DEC received the Final Cleanup Report on [date]. The Final Cleanup Report has adequately met the requirements specified in 18 AAC 75.380 and is therefore approved.

The Final Cleanup Report clearly documents that all cleanup actions specified in the Record of Decision and the Cleanup Plan for the ZWP site have been completed. These cleanup actions include:

1. Excavation, treatment and placement back into on-site excavations of 520 cubic yards of PAH-contaminated soils.

2. Treatment of the PAH-contaminated soils to DEC established cleanup levels.

3. A two-foot soil cap placed over soils contaminated with arsenic and dioxins/furans.

4. Implementation of institutional controls for restricted access to the capped areas, and for the continuation of restricted groundwater use.

Based on this information, the department determines that no further remedial action is planned for the site. However, institutional controls will remain in effect until such time as ZWP can demonstrate that cleanup levels for arsenic and dioxins/furans contaminated soil are reduced to levels established in 18 AAC 75.341 Table B1 and groundwater concentrations are reduced to clean up levels established at 18 AAC 75.345 Table C. This determination is subject to a future

department determination that the cleanup is not protective of human health, safety, or welfare, or of the environment.

If you have any questions, please call Jane Doe in the Contaminated Sites Remediation Program at (907) 555-5555.

Sincerely,

Designated Contaminated Sites Official

Figure 6. NFRAP Letter

STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
CONTAMINATED SITES REMEDIATION PROGRAM
410 WILLOUGHBY AVENUE, SUITE 105
JUNEAU, ALASKA 99801-1795

Date

Mr. I. R. Quark
ZZZ Wood Products
Enterprise, Alaska 99999-9999

Re: ZZZ Wood Products Mill Site
Approval of Final Cleanup Report/Site Closeout

Dear Mr. Quark;

The Alaska Department of Environmental Conservation (DEC) has completed review of the document entitled *Final Cleanup Report Addendum for the ZZZ Wood Products Site in Enterprise, Alaska, Federation Environmental, 2015*. DEC received the Final Cleanup Report Addendum on [date]. The Final Cleanup Report Addendum has adequately met the requirements specified in 18 AAC 75.380 and is therefore approved.

As demonstrated in the Final Cleanup Report Addendum, ZWP has removed the dioxin/furan contaminated soil to be treated in an off-site incinerator in accordance all federal and state requirements. In addition, the arsenic contaminated soil has been excavated and treated on site to meet the background cleanup levels. ZWP has also demonstrated that groundwater levels have declined below the cleanup levels established in 18 AAC 75.345 Table C. Cleanup levels established at the ZWP site for all contaminants of concern in all media of concern have now been met. Therefore, there is no further need to monitor groundwater or impose institutional controls at the site.

DEC has determined that the cleanup is complete. This determination is subject to a future department determination that the cleanup is not protective of human health, safety, or welfare, or of the environment.

If you have any questions, please call Jane Doe in the Contaminated Sites Remediation Program at (907) 555-5555.

Sincerely,

Designated Contaminated Sites Official

Figure 7: Site Closeout Letter

APPENDIX A

EXAMPLE OF ROD FOR A NON-COMPLEX SITE

CLEANUP DECISION DOCUMENT FOR XYZ JUNKYARD SITE

Site Name and Location: XYZ Junkyard: Southcentral, Alaska
Junction of Oil Spill Road and Recalcitrant Boulevard

Database Record Key: 9876 **File Number:** 6789

Responsible Person: Mydeadcar, Inc., 99 Lemon Dr., Carsrus, Alaska 99999

Contaminants of Concern/Media Impacted: Gasoline range organics (GRO) and polychlorinated biphenyls (PCBs) in surface and subsurface soil to 4 feet.
No groundwater contamination.

Regulatory Authorities: Site Cleanup Rules (18 AAC 75.325 - 18 AAC 75.390)
Toxic Substances Control Act (15 USC 2601 - 16 USC 2671)(TSCA)

Other relevant guidance/policy: Disposal of PCBs; Final Rule (40 CFR Parts 750 and 761)

On-site contaminant concentrations: GRO = 1400 mg/kg to 3000 mg/kg (no benzene detected)
PCBs (Aroclor 1254) = 25 mg/kg to 300 mg/kg

Cleanup Method: Method 2 (Tables B1 and B2 at 18 AAC 75.341)

Completed routes of exposure: Soil ingestion and inhalation to workers, customers and trespassers. No ecological receptors.

Cleanup Levels: GRO= 1400 mg/kg (Based on Table B2 at 18 AAC 75.341(d): Ingestion and inhalation levels for over 40" zone.) PCBs = 10mg/kg for surface soil to 2' in depth. 25 mg/kg for subsurface soil below 2' in depth (Based on Note #9 of Table B1 at 18 AAC 75.341.)

Cleanup Remedy: Removal and off-site disposal in a TSCA-regulated landfill of 250 cubic yards of PCB and mixed PCB/GRO-contaminated soil above 10 mg/kg PCBs up to 2' in depth and 25 mg/kg PCBs below 2'. On-site bioremediation of remaining 250 cubic yards of GRO-contaminated soil above 1400 mg/kg. Bioremediation will be done in accordance with the requirements of 18 AAC 75.360. With the approval of the landowner (Mr. Mydeadcar) and the city of Southcentral, institutional controls will include deed restrictions that will ensure that the site remain industrial, no day-care centers will be built, and no drinking water wells will be drilled on the property.

_____ _____
Project Manager Date

_____ _____
Delegated Contaminated Sites Official Date

APPENDIX B

EXAMPLE OF ROD FOR A SITE THAT INCORPORATES ALTERNATIVE CLEANUP LEVELS

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
CONTAMINATED SITES REMEDIATION PROGRAM

Fairview Clinic
February 30, 1999

File Number: _____
Database Record Key: _____

SITE INFORMATION

The Fairview Clinic is on a bluff above View Bay about 3 miles southwest of Whataview, Alaska. The Bureau of Pollution (BOP) is the responsible party (RP). The Clinic and its associated buildings are clustered on top of a low hill. Some permafrost is present particularly in the undeveloped muskeg. Soils are mostly silt with occasional lenses of fine sand. Away from the bluffs (0.5 to 1.0 mile) the groundwater table is at or near the surface year-round. Within the hospital complex the groundwater is at 5-19 ft. The groundwater flow direction is towards View Bay (southwest). A second aquifer between 80-90 ft underlies this perched aquifer. The drinking water for the Clinic is obtained from a well fed by the lower aquifer. The well is up gradient of the identified contamination. No contamination has been detected in the drinking water. The contamination at the site probably dates from 1952 or earlier. The perched aquifer beneath the main Clinic complex is contaminated mostly with diesel range organics (DRO). One monitoring well documented free-floating product in 1992 and in 1994. Another monitoring well documented tetrachloroethylene (PCE) contamination. There are six areas of DRO-contaminated soil. Contamination is mostly surficial (shallower than three ft) in five of these areas. In the remaining area contamination extends to the shallow perched aquifer (12-ft). Based on the Alaska Hazard Ranking Model (AHRM), this is a high priority site. Additional information can be found in the *Fairview Clinic Site Characterization Report, June 1997* (Site Characterization Report).

SITE HISTORY

Fuel handling practices of the past (leaks, minor spills and overfilling) is responsible for all DRO contamination in soil and groundwater. The contamination was discovered during excavations related to the construction of Clinic facilities. The source of PCE contamination in the shallow groundwater is solvents that were used in the maintenance facility.

The Federation Engineers (FE) conducted site investigations for the BOP in 1992 and 1997. They attempted some free-product recovery from June to July 1993 that was later abandoned as very little product (less than one gallon) was recoverable. Riker Associates conducted a risk assessment (RA) on behalf of the BOP in 1994 (*Risk Assessment for the Fairview Clinic Site,*

September 1994). DEC received the RA in 1995 and provided review comments.

In 1997 DEC met with the BOP to discuss the RA and asked the BOP to collect additional data (carcinogenic PAH, surficial soil, and, groundwater) to assist in making risk management decisions. The BOP submitted the data and requested alternative cleanup levels (ACLs) calculated under 18 AAC 75.340(e). The additional surficial soil data more accurately defined the contaminated areas. Results of the additional data are documented in the Site Characterization Report. These results indicate that approximately 500 cubic yards of surface soil is contaminated with carcinogenic PAHs and DRO. An additional 1,000 cubic yards of surface and subsurface soil (down to 5 feet) are contaminated only with DRO. The groundwater data showed that DRO contamination in the perched aquifer has increased in some areas and decreased in other areas. PCE contamination showed a definite lowering trend (decreased from 29 micrograms per liter (Φg/l) to 9.7 Φg/l).

COMPLETED ROUTES OF EXPOSURE

Results of the RA indicated the following:

1. *Groundwater* - Migration to groundwater is a pathway of concern since groundwater is contaminated with DRO and data has shown that DRO contamination has increased beneath some areas of the site. The perched aquifer is not a drinking water source, and, there is no current or anticipated future use of this groundwater. Riker Associates' modeling indicated that contamination would not reach View Bay. DEC will require institutional controls on the shallow perched aquifer which prevent future use of the groundwater for drinking water.

2. *Soil* - Inhalation of vapors from soils is considered a pathway.

CLEANUP LEVELS

The BOP calculated soil cleanup levels under Method 3 in accordance with 18 AAC 75.340(e). The migration to groundwater cleanup level was modified by using site-specific soil data for fraction organic carbon in soil and water-filled soil porosity. The specific calculations are provided in the Site Characterization Report.

1. *Table 1* compares the ACLs calculated by the BOP to the cleanup levels that are based on 18 AAC 75.341 Tables B1 and B2 of the DEC regulations.

Table 1: Comparison of soil cleanup levels for contamination at Fairview Clinic. All soil contamination levels are in mg/kg.

Contaminant	Table B2 18 AAC 75.341 migration to groundwater	Table B2 18 AAC 75.341 inhalation	THE BUREAU OF POLLUTION's calculated ACL
Diesel Range Organics	250	12500	2288
Benzene	0.02	9	0.05
Toluene	5.4	180	9.2
Ethylbenzene	5.5	89	6.4
Xylenes (total)	78	81	91
Benzo(a)pyrene	3		3
Chrysene	620		620
Indeno(1,2,3,-cd)pyrene	54		54
Benzo(k)fluor-anthene	200		200
Benzo(b)fluor-anthene	20		20
Benzo(a)-anthracene	6		6
Dibenzo(a,h)-anthracene	6		6

CLEANUP LEVELS SELECTED/BASIS

The ACLs calculated by the BOP are the soil cleanup levels selected for the site. The PCE cleanup level of 5 Φg/l is selected for groundwater. The soil ACLs are protective of human health, safety, or welfare, or the environment and were developed in accordance with DEC procedures as set forth in 18 AAC 75.240(e). The PCE standard for groundwater is based on the default cleanup level found in Table C at 18 AAC 75.345(b). Besides meeting petroleum hydrocarbon soil cleanup levels, chemical specific cleanup levels must be met for benzene, toluene, ethylbenzene, xylenes and the carcinogenic polynuclear aromatic hydrocarbons.

Cumulative Risk:
The resultant site-wide cumulative carcinogenic risk for the selected alternative cleanup levels will be 7.2×10^{-6} which meets the regulatory requirement of 18 AAC 75.325(g) that cumulative carcinogenic risk must not exceed 1.0×10^{-5}.

CLEANUP ALTERNATIVES ANALYZED

Three cleanup alternatives were analyzed by the BOP in the *Fairview Clinic Site Characterization Report, June 1997*:

Alternative 1:

A. Removal of approximately 600 cubic yards of surface soil (0-2 ft.) with contamination in excess of 5,000 ppm DRO.

B. Pumping free product from existing monitoring well AP-121.

C. Construction of interception trenches down gradient of the contamination at the sewage treatment plant.

D. Annual groundwater monitoring.

Alternative 2:

A. Removal of approximately 500 cubic yards of DRO-contaminated soil at the Above Ground Tank site.

B. Cap approximately 500 cubic yards of PAH and DRO-contaminated soils above cleanup level at the outfall area.

C. Monitoring and institutional controls at the Sewage Treatment Plant (STP) area.

D. No further action for all other areas.

Alternative 3:

A Removal of approximately 1500 cubic yards of PAH/DRO and DRO contaminated surface and subsurface soil above the cleanup level.

B. Free product recovery (if present) at the STP

C. Institutional controls on future use for the shallow groundwater.
D. Annual monitoring of contamination levels in the shallow groundwater.

CLEANUP ALTERNATIVE SELECTED/BASIS

The Site Characterization Report compared each of the three alternatives against each other with respect to five criteria (protectiveness, practicable, short- and long-term effectiveness, regulations and public input). Based on the information generated by the Site Characterization Report and the comparative analysis of alternatives, Alternative 3 was selected by DEC to be implemented at the Fairview Clinic site.

DESCRIPTION OF CLEANUP ACTION

The components of the cleanup action include the following:

1. Removal of approximately 1500 cubic yards of soil containing PAH and DRO contamination above the ACLs shown in Table 1.
2. Recovery of free product at the STP will be attempted using a shallow 8" diameter recovery well which will be converted to a 4" diameter monitoring well once recovery operations are completed.
3. The BOP will place a deed restriction on the site property to ensure to ensure that shallow groundwater will not be used in the future as drinking water.
4. Annual monitoring of shallow groundwater until PCE contamination reaches the cleanup level.

REVIEW OF CLEANUP ACTION AFTER SITE CLOSURE

Under 18 AAC 75.380(d)(1), DEC may require additional cleanup action if new information is discovered which leads DEC to make a determination that the cleanup described in this Record of Decision is not protective of human health, safety, and welfare or the environment.

SUMMARY OF PUBLIC INVOLVEMENT ACTIVITIES

A display advertisement style public notice was issued in the local newspaper announcing a 15-day comment period on the alternative cleanup levels. No public comments were received.

Approved by;

_____ _____

Contaminated Sites Program Manager Date

APPENDIX C

EXAMPLE OF ROD FOR A COMPLEX SITE

RECORD OF DECISION
ZZZ WOOD PRODUCTS: MILL OPERABLE UNIT
Data Record Key 9999 File Number 1111

1.0 INTRODUCTION

This Record of Decision (ROD) presents the selected cleanup action and supporting rationale for cleanup at the ZZZ Wood Products (ZWP) Mill facility in Enterprise, Alaska. As defined by a Commitment Agreement (CA) between the State of Alaska and ZWP (see Section 2.0), the ZWP Mill consists of all lands in or on which contaminants of concern may have been released by ZWP. The facility includes the main mill site and ancillary buildings, parking lots, and work yards. The facility also includes the Neutral Zone area, located immediately to the west and north of the ZWP facility. The ZWP Mill site is illustrated in Figure 1.

This ROD was developed in accordance with State of Alaska regulations governing the protection of human health and the environment from hazardous substances (18 Alaska Administrative Code, Part 75, Article 3) and is generally consistent with procedures set forth by the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 U.S.C. 9601 et seq.). This decision is based on the Administrative Record for the ZWP cleanup project, which is located in offices of the Alaska Department of Environmental Conservation (DEC) in Juneau, Alaska.

The State of Alaska and ZWP have agreed to the decisions outlined in this document. Concurring federal agencies include the United States Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, and the United States Forest Service.

2.0 SITE INFORMATION/BACKGROUND

A description of the site background is provided in the ZWP Current Situation/Site Conceptual Model Report (Federation Environmental 1996). A summary of the site background is provided below.

The ZWP facility is located approximately five miles east of Enterprise, Alaska in Section 4, Township 23 South, Range 13 East of the Romulus Meridian. The mill is situated on the shore of Latinum Cove, a small embayment of Quark Bay (see Figure 1). The mill site covers an area of approximately 70 acres. The mill property is owned by ZWP (southern two thirds) and the United States Department of Agriculture, Forest Service ([USFS] northern one third).

The ZWP facility began operations in 1953, and ceased operations in 1992. The mill used a magnesium acid sulfite process to produce high-grade wood fiber pulp. In the pulping process, several wastestreams were generated, including boiler ash, woodwaste, wastewater, and wastewater treatment sludge. Ash was disposed of in several ways over the lifetime of the mill, including discharge through the mill stacks, on-site burial, off-site burial at the general mill waste landfill and the Enterprise Municipal landfill, and for a short period in 1990, ash was slurried with mill wastewater for discharge into Quark Bay. Woodwaste was burned in the facility's power boilers, and was also disposed of at the Latinum Cove Landfill. Wastewater resulting from pulping processes was discharged to Quark Bay via the facility's permitted wastewater outfalls. In addition to these primary wastestreams, spills and incidental releases of chemicals, including petroleum products and solvents, have occurred at the site.

As a result of the industrial activities conducted on-site, the State of Alaska and ZWP entered into a CA following closure of the mill in 1993 (State of Alaska 1995). The CA requires DEC and ZWP to investigate and remediate chemicals of concern that are found to be at levels determined to be a threat to human health or the environment. The CA establishes the definition and boundaries of the ZWP Mill facility, and outlines procedures for conducting site characterization activities. The CA establishes a Technical Assistance Team (TAT), which includes representatives from the community, ZWP, two federal resource agencies, and the City of Enterprise. The CA identifies the financial responsibility of ZWP to conduct investigations and appropriate cleanup responses, and requires ZWP contractors to be available for TAT consultation.

The geology beneath the ZWP site consists mainly of unconsolidated marine and river deposits underlain by sandstone bedrock. Soils in the vicinity of the site have high natural levels of arsenic. Two groundwater aquifers have been identified beneath the site; an unconfined water table aquifer, and a confined bedrock aquifer. The soils of the unconfined water table aquifer consist of well-sorted river sands. The ZWP Mill received drinking water from a municipal supply as the groundwater beneath the site is too saline to be used as a drinking water source.

3.0 CONTAMINANT CONCENTRATIONS/EXTENT OF CONTAMINATION

Sampling of the ZWP site for the site characterization (SC) was conducted in August and September 1996, and in June 1997. A complete description of the sampling methodologies and results is presented in the ZWP Site Characterization Report (Federation Environmental 1998). Oversight of fieldwork activities summarized in this section was conducted by an independent DEC contractor. Results of the oversight evaluation and split samples collected during sampling activities indicate that the results of the site characterization samples are reproducible and representative of site conditions. Oversight functions and split sample results are detailed in the ZWP Oversight Report (Kirk & McCoy, 1997).

3.1 Soil Sampling

The ZWP Mill facility was divided into eleven subareas for purposes of the soil characterization. Each subarea represented a different potential source or location of contamination. A total of 74 samples were collected from various media within the eleven subareas to assess the need for cleanup actions and/or long-term cleanup responses. Target chemicals sampled included toxic metals, polychlorinated dibenzo-p-dioxins and furans (dioxins/furans), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), and petroleum compounds. Table 1 lists the subareas sampled, the number of sample locations at each subarea, and the analytical parameters of the samples collected.

Results of the sampling indicated the presence of detectable concentrations of dioxins/furans, toxic metals, PAHs, VOCs, and petroleum products in on-site soils. Table 2 summarizes the analytes positively detected in soil samples collected during the site characterization. Target chemicals not listed in Table 2 were not positively detected in the SC samples.

Review of the SC analytical data indicates that several of the on-site subareas contained PAHs and VOCs above published DEC soil cleanup levels for petroleum products (18 AAC 75.325). These areas were addressed through expedited cleanup actions, discussed in Section 4.0. Contaminant concentrations found in the remainder of the subareas were evaluated in human health and ecological risk assessments, discussed in Section 5.0 of this ROD.

3.2 Groundwater Sampling

Sixteen monitoring wells were drilled during the SC. Twelve of the wells are located in the unconsolidated water table aquifer with the remaining four wells located in the bedrock aquifer. Locations of these wells are shown in Figure 2. Groundwater flow direction is mainly to the south, toward Latinum Cove, however the groundwater gradient is very shallow and reversals of flow may occur due to tidal influences.

Groundwater analytical results show that samples taken from five of the twelve wells within the unconsolidated water table aquifer exceed the DEC groundwater cleanup levels for the carcinogenic PAHs benzo(a)anthracene and benzo(a)pyrene. Cores taken from monitoring wells east and west of the drain sediment location showed a slight oily sheen just above the water table elevation. Wells that were sampled closest to Latinum Cove did not show detected levels of contaminants. Contaminant concentrations measured from the monitoring wells are shown in Figure 2.

4.0 SUMMARY OF INTERIM CLEANUP ACTIONS

A complete description of the interim cleanup actions conducted at ZWP are documented in the ZWP Interim Cleanup Action Report (Federation Environmental 1997).

In response to the results of SC sampling at the site, interim cleanup actions were implemented at the ZWP Mill during June through August 1997. Specifically, the interim cleanup actions were performed at the following locations:

X Drain sediments, including sediments in building floor drains and the on-site storm drain system. SC samples indicated the presence of relatively high concentrations of petroleum hydrocarbons and dioxins/furans in these materials;

X Soils at the Heavy Duty Shop. SC samples indicated the presence of relatively high concentrations of diesel- and residual-range petroleum hydrocarbons in soils;

X Soils at the Paint Shop. SC samples indicated the presence of relatively high concentrations of diesel-range petroleum hydrocarbons, PAHs, and VOCs;

Table 3 summarizes the locations where interim cleanup actions were conducted, the quantities of contaminated materials removed, and the maximum detected contaminants after removal.

Since the majority of contaminants found at the site (except dioxins/furans) degrade through natural processes (biodegradation, volatilization), ZWP gained permission from DEC to remove the contaminated materials from their respective source locations, and place the contaminated materials in constructed on-site treatment cells. The cells are designed to allow natural degradation processes to reduce contaminant concentrations below DEC levels of concern. Soil/sediments in the cells are intersected with perforated pipe to allow air flow through the material, which stimulates biodegradation and volatilization. In addition, fertilizers are added to the soil in the cells to further stimulate biological breakdown of contaminants. Due to the presence of dioxins/furans in sediments removed from drains adjacent to the mill, these sediments were segregated and stored separately from other excavated materials. These sediments will be disposed off-site at a licensed facility.

The interim cleanup actions were implemented in accordance with 18 AAC 75.330. Cleanup levels for the contaminated soil were established under 18 AAC 75.341(c). ZWP will maintain the treatment cells until soils/sediment contaminant concentrations are below DEC cleanup levels. Maintenance will involve weekly inspections, periodic sampling, and addition of water and fertilizer to stimulate remediation processes. ZWP plans to return the treated soils to the

original excavation locations once cleanup levels are met.

5.0 SUMMARY OF SITE RISKS

A complete description of the human health and ecological risk assessments conducted for the ZWP Mill site is provided in the section entitled *Human Health and Environmental Risk Assessment* which is part of the ZWP Site Characterization Report (Federation Environmental 1998).

Human Health Risk Assessment

Risks to human health were estimated based on the assumption that exposures to individuals may occur from ZWP Mill site contaminant sources.

The human health risk assessment involves four primary steps: data evaluation and selection of contaminants of potential concern (COPCs); exposure assessment; toxicity assessment; and risk characterization. A brief summary of how these steps were applied to the ZWP Mill site is provided below.

The selection of COPCs was accomplished by comparing ZWP Mill site soil sample concentrations to one-tenth of the Table B2 value at 18 AAC 75.341 for the most stringent exposure pathway. These concentrations closely represent exposures to soil in a residential setting with an excess cancer risk of 1 X 10-6, or a toxic effects hazard quotient of 0.1. Additionally, inorganic chemicals were compared to background concentrations, and were eliminated as COPCs if background concentrations exceeded on-site sample concentrations.

The exposure assessment identifies the potential receptors of contaminants from the ZWP Mill site and quantifies the amount of chemicals potentially taken in by the receptors. In the risk assessment, an assumption was made that the site will always be used for industrial or commercial purposes; therefore, future exposure scenarios involving residential use of the site were not evaluated. Based on this assumption, the following human receptor groups were evaluated in the risk assessment:

- X An "average" Enterprise resident that may recreate in proximity to the ZWP Mill site;
- X A "native" peoples resident that may recreate and conduct subsistence activities in proximity to the ZWP Mill site;
- X A Enterprise resident that works at the mill site and may recreate in proximity to the ZWP Mill site; and

X A "native" peoples resident that works at the mill site, and may recreate and conduct subsistence activities in proximity to the ZWP Mill site.

The water table aquifer is not currently being used for drinking water and is too saline to expect that it would be used in the future as a drinking water source. Therefore, the most significant complete exposure pathway to the resident receptor groups identified above is inhalation of fugitive dust or volatilized chemicals originating from on-site soils. However, for these non-worker receptors, the exposure pathway assumes the mill will always be fenced, and therefore, exposures to fugitive dust and volatile chemicals are less for persons recreating near (but not on) the mill site. For the worker receptor groups identified above, exposure pathways evaluated included inhalation of on-site fugitive dust and volatilized chemicals, incidental ingestion of soil, and dermal contact with soil.

The toxicity assessment evaluates dose-response relationships for each of the COPCs selected for the ZWP Mill site. Toxicity data used in the toxicity assessment were obtained from standardized EPA and other health organization's databases. The toxicity data provides values for the risk of developing cancer per unit dose of carcinogenic COPCs, and the probability of experiencing non-cancer adverse health effects per unit dose of non-carcinogenic COPCs.

The risk characterization combines the exposure rates for each of the identified receptors with the toxicity information obtained for each COPC, resulting in numerical estimates of carcinogenic risk or non-cancer adverse health effects. For cancer risks the numerical estimates are summed across all exposure pathways. Table 4 summarizes the lifetime cancer risk estimates for the contaminants of concern in soil at the ZWP Mill site. Total cancer site-wide risks for soil are $1x10^{-2}$. The contaminants responsible for these estimates are carcinogenic PAHs, dioxins/furans and arsenic.

For non-cancer hazard indices the results are summed for each exposure pathway. A hazard quotient of 6 related to dermal contact with soil contaminated with arsenic and PAH compounds was derived for the native worker exposure scenario.

Ecological Risk Assessment

The ecological risk assessment (Ecological RA) involved three primary steps: problem formulation, analysis phase, and risk characterization. A brief summary of how these steps were applied to the ZWP Mill site is provided below.

In the problem formulation stage, the terrestrial ecosystem at the ZWP site was determined to be unsuitable for the support and maintenance of viable populations of mammalian or avian species. However, two areas at the mill were identified as being suitable habitat for populations of mammalian or avian species: the Mill Yard and the Photon Area. These two portions of the site

were evaluated quantitatively in the Ecological RA.

The problem formulation also identified the environmental attributes in the vicinity of the site that should be protected. These attributes, referred to as Assessment Endpoints, are identified in the Ecological RA as follows:

- X Maintenance of plant communities on the south side of the site to provide foraging and breeding habitat for terrestrial wildlife.

- X Maintenance of a viable terrestrial soil macroinvertebrate community on the south side of the site to provide foraging habitat for terrestrial wildlife.

- X Survival and reproductive success of bird populations occurring in contaminated upland habitat associated with the site; and

- X Survival and reproductive success of mammal populations occurring in contaminated upland habitat associated with the site.

Based on the assessment endpoints and a review of species' feeding strategies and status as threatened or endangered, a list of ecological receptors was selected for evaluation in the risk assessment. The receptors include: tundra vole; common shrew; short-tailed weasel; song sparrow, varied thrush, short-eared owl, northern goshawk, and sharp-shinned hawk. These receptors were determined to be the most representative indicators of the assessment endpoints listed above.

In the analysis phase of the risk assessment, specific methods to measure effects were identified for each assessment endpoint. For the ZWP Mill, the primary method to measure effects to ecological receptors was comparison of chemical doses as estimated by exposure modeling using SC sample data, to laboratory dose-response relationships. This is achieved through two primary activities: exposure analysis and ecological response profiles. The exposure analysis estimates the amount of contaminant uptake by ecological receptors using models and previous research available in scientific literature. The ecological response profiles summarize specific ecological effects associated with particular contaminants, and relate the effects to the assessment endpoints listed above.

The risk characterization combines the results of the exposure assessment and stressor-response evaluation to estimate risks to terrestrial receptors. Risks to terrestrial ecological receptors are expressed as hazard quotients (HQs), which infer the magnitude of potential adverse affects to ecological organisms. HQs exceeding 1.0 are considered by DEC to represent levels of potential ecological risk, and indicate the potential need for cleanup action. Table 5 summarizes the results of the risk characterization for the ecological assessment. Unacceptable risks from

contaminants at the site are posed to the tundra vole and shrew as the hazard quotients for these receptors exceed 1.0.

6.0 CLEANUP LEVELS

In accordance with 18 AAC 75.325(f) cumulative excess cancer risks across all pathways must not exceed 1 X 10-5 (i.e. 1 cancer occurrence per 100,000 people), and the cumulative non-cancer hazard index must not exceed 1.0 for each exposure pathway. Risk estimates exceeding these benchmarks are considered by DEC to represent levels of concern to human receptors, and indicate the potential need for cleanup action.

The results of the risk assessment suggest that under current and projected future uses of the ZWP Mill site, estimated carcinogenic risks due to PAHs, dioxins/furans and arsenic, are above levels of concern to DEC. Non-carcinogenic risks due to arsenic are also above levels of concern.

The DEC-approved cleanup levels for the contaminants of concern in soil at the ZWP site are shown in Table 6. As shown in Table 6, the cleanup levels have been adjusted downward so that the site-wide cumulative risk is no greater than $1x10^{-5}$. These cleanup levels are consistent with the expected future use of the site which is industrial/commercial. Site-specific cleanup levels for diesel range organics (DRO) and residual range organics (RRO) were approved based upon the exposure scenarios. For RRO the cleanup level is established at 400 milligrams per kilogram (mg/kg). For DRO the cleanup level is 2,000 mg/kg. Cleanup levels for the PAHs detected in groundwater are shown in Table 7. Since groundwater is not currently being used as a drinking water source, and will not be used in the future, the groundwater cleanup levels are ten times the levels found in Table C at 18 AAC 75.345. In addition, since there is no exposure to groundwater, cleanup levels for groundwater are not included in the site-wide cumulative risk calculation. The groundwater point of compliance is set at 100 feet upgradient of the ZWP property boundary which is depicted by the three down gradient monitoring wells with non-detectable concentrations of contaminants shown in Figure 2.

7.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

Four (4) alternatives were evaluated for cleanup of the ZWP site. These alternatives include:

Alternative #1: Excavation and treatment of remaining PAH-contaminated soils (approximately 500 cubic yards) in on-site bioremediation cells. Placement of treated soils back in to on-site excavations. Removal and off-site disposal in a hazardous waste landfill of approximately 200 cubic yards of soil containing arsenic and dioxin/furans. Treatment of groundwater via placement of groundwater treatment wall 20 feet upgradient of point of compliance wells. Estimated costs (including capital and operation & maintenance) = $2,000,000.

Alternative #2: Capping of all contaminated soils. Institutional controls to include future use

restrictions (deed restrictions). Groundwater monitoring. Estimated costs = $500,000.

Alternative #3: Excavation and treatment of remaining PAH-contaminated soils (approximately 500 cubic yards) in on-site bioremediation cells. Placement of treated soils back in to on-site excavations. Capping of excavations and remaining arsenic and dioxin/furan contaminated soils (200 cubic yards). Limited institutional controls to include land-use restrictions on groundwater and the area containing arsenic and dioxin/furan contamination. Groundwater monitoring. Estimated capital and O&M costs = $750,000.

Alternative #4: Groundwater monitoring with institutional controls to include land-use restrictions. Estimated capital and O&M costs = $50,000.

A detailed description of these alternatives can be found in the ZWP Site Characterization Report (Federation Environmental 1998).

The four alternatives were evaluated against five (5) criteria as follows:

1. *Practicable*: Are the alternatives capable of being designed, constructed and implemented in a reliable and cost-effective manner? Which alternative(s) are the most cost effective?

Alternatives 2, 3 and 4 are all capable of being designed, constructed and implemented in a cost-effective manner. Additional costs under Alternative 1 would be associated with wastes containing dioxins/furans which may need to be treated prior to disposal in order to comply with the land disposal restrictions under RCRA. Alternative 3 would be the most cost-effective as the majority of contaminated soil would be treated in an on-site bioremediation cell for minimal cost.

2. *Protectiveness*: How well does each alternative protect human health, safety, and welfare or the environment, both during and after construction?

Alternative 1, 2 and 3 would all be protective after construction as they would either eliminate the contaminant source or eliminate the potential exposure to the contaminant source. Alternative 4 would not be protective as exposure to contaminated soils by workers or trespassers would still be possible even if stringent institutional controls such as security measures (e.g. fencing, security guards, etc.) were implemented.

3. *Regulations*: Will the alternative comply with all state and federal regulations?

Alternatives 1, 2 and 3 will comply with all federal and state regulations. Alternative 4 would not comply with 18 AAC 75 as cumulative cancer risks remaining on site would be above the 1×10^{-6} standard.

4. *Short- and Long-Term Effectiveness:* Are there potential adverse effects to human health, safety, and welfare or the environment during construction or implementation of the alternative? How fast does the alternative reach cleanup goals? How long will the alternative protect human health, safety, and welfare or the environment after completion of the cleanup? What, if any, risks remain at the site?

Dust associated with excavation of contaminated soil under Alternatives 1, and 3 could pose airborne hazards. Alternatives 1 & 3 would reach cleanup levels for soils approximately one year after emplacement of contaminated soil in the bioremediation cells. It would take approximately ten years for groundwater to reach cleanup levels after completion of source removal under Alternatives 1 & 3. Under Alternatives 2 & 4 which do not include source removal, groundwater is expected to remain above cleanup levels for at least 50 years. Alternative 1 provides the most permanent remedy as all contaminants above cleanup levels will either be removed or treated. All risks of exposure would be eliminated under Alternatives 1, 2 and 3, however, risks of exposure to contaminated soil would still remain under Alternative 4.

5. *Public Input:* Have significant comments received from the community been considered?

DEC has carefully considered all comments submitted during the public comment period and has taken them into account during the selection of the cleanup action for the ZWP site. Members of the public were concerned about such things as site security, the use of local labor during construction of the cleanup action, potential airborne contaminants during construction activities, and the future use of the site for a park, subsistence gathering, or as a commercial facility.

8.0 DESCRIPTION OF THE CLEANUP REMEDY

The previous sections of this ROD demonstrate that a thorough evaluation of the presence, extent, and risks of contamination in the ZWP site was conducted. Based on the information generated by SC, the comparative analysis of alternatives, and the interim cleanup actions performed, DEC has selected Alternative 3 as the cleanup remedy for the ZWP site.

The selected remedy includes excavation and treatment of remaining PAH-contaminated soils (approximately 500 cubic yards) in on-site bioremediation cells, placement of treated soils back in to on-site excavations and capping of and grading of the excavations. In addition, the remaining arsenic and dioxin/furan contaminated soils will be capped with a two-foot soil cap. Limited institutional controls on the ZWP site property will include continued restrictions on the use of groundwater and prevention of excavations in the capped area containing arsenic and dioxin/furan contamination. Long-term groundwater monitoring will be implemented in order to ensure that contaminants do not migrate beyond the point of compliance which is 100 feet upgradient of the ZWP property boundary.

The main components of the cleanup remedy are described in detail below.

8.1 Treatment of PAH-Contaminated Soil

Approximately 500 cubic yards of soil contaminated with PAHs above the approved cleanup levels will be excavated and placed in on-site treatment cells. The cells will be 25 feet wide, 25 feet long and 2 feet deep. Four cells will be needed. The cells are designed to allow natural degradation processes to reduce contaminant concentrations below the cleanup levels. Soils in the cells are intersected with perforated pipe to allow air flow through the material, which stimulates biodegradation and volatilization. In addition, fertilizers are added to the soil in the cells to further stimulate biological breakdown of contaminants. Once the soils are treated, they will be placed back into the excavations which will then be regraded. A thin 6-inch revegetation layer will be placed over the regraded excavations and then the area will be reseeded.

8.2 Capping of Dioxin/Furan and Arsenic Contaminated Soil

Approximately 50 cubic yards of dioxin/furan contaminated soil which is located near the drain sediment area will be covered with a two foot soil cap. In addition, approximately 150 cubic yards of arsenic contaminated soil located in the northeast corner of the mill building will also be capped. The cap will consist of 18 inches of soil fill topped by a 6-inch layer of topsoil. The topsoil will be hydroseeded and revegetated.

8.3 Long-Term Groundwater Monitoring

Monitoring will include groundwater quality sampling of the water table and bedrock aquifers. The specific details of the monitoring program will be approved by DEC as part the cleanup plan required under 18 AAC 75.360. The groundwater quality monitoring program will include monitoring of wells along the point of compliance which has been established 100 feet upgradient of the ZWP property boundary. DEC expects that since the source of PAH contamination in groundwater will be cleaned up, PAH levels in groundwater should decline to below established cleanup levels. Groundwater monitoring results will be evaluated at least every two years to confirm that contaminant levels are declining. The groundwater monitoring program will be reassessed every five years to decide if the monitoring well network should be modified. Additional cleanup actions may be required in the event the evaluation of monitoring data show contaminant levels have significantly increased and pose a threat to human health, safety, and welfare or the environment.

8.4 Institutional Controls

The ZWP property is currently zoned for commercial/industrial use and DEC anticipates that future use of the site will be consistent with this zoning. DEC will require implementation of limited institutional controls at the site. These controls include the following:

1. Access restrictions in the areas where arsenic and dioxin/furan contaminated soils have been capped. Such restrictions shall include, but not be limited to fencing, signs, and/or surveillance.

2. Operation and maintenance and final closure of the soil treatment cells in accordance with 18 AAC 75.360, 18 AAC 75.375 and 18 AAC 75.380.

3. The ZWP facility will continue to receive drinking water from a municipal drinking water supply. Groundwater use as drinking water will continue to be restricted.

Based on information obtained during the site characterization, DEC believes that the cleanup actions described above will achieve protection of human health, safety and welfare or the environment at the ZWP site. However, DEC retains the right to re-assess the need for additional cleanup actions at the ZWP site if new information becomes available in the future. DEC will consult with the public and appropriate resource management agencies before any cleanup actions beyond those identified in this ROD are taken.

9.0 HISTORY OF COMMUNITY INVOLVEMENT

The public has been encouraged to participate throughout the site characterization process and through the selection of cleanup options for the site. A public meeting was held in Enterprise in October 1995 following signature of the CA by the State of Alaska and ZWP. In December 1995 the TAT was formed. The TAT consists of representatives from the community, ZWP, two federal resource agencies, and the City of Enterprise. and serves as a technical advisory body to DEC. TAT members review and comment on project documents and site activities.

In support of public participation, DEC prepared a *Public Participation Plan* for the ZWP site. The *Public Participation Plan* outlines the various ways DEC communicates and interacts with the Enterprise community about the environmental investigation and cleanup at the site, lists site contacts, TAT members, and community concerns, and identifies which site documents will be available for public comment and public involvement activities which may be used. To ensure the plan met the needs of the community, the plan was released for public comment prior to being finalized in March 1996. DEC regularly writes and sends newsletters to all interested parties, identified on a site mailing list maintained by DEC, and to the primary Enterprise newspaper, the Enterprise Sentinel. Newsletters cover topics from site status updates to explanations of technical subject matter. DEC conducted several public meetings and educational workshops for the Enterprise community about the site characterization, risk

assessment and analysis of cleanup alternatives.

DEC provided the public an opportunity to comment on the Proposed Plan for the cleanup of the ZWP site during the 30-day comment period which was held from January 1 to January 30, 1999. An availability session was held on January 15, 1999 where DEC staff discussed the proposed cleanup action with members of the community. Responses to public comment are included in the following section, the Responsiveness Summary.

10.0 RESPONSIVENESS SUMMARY FOR THE RECORD OF DECISION FOR CLEANUP ACTION AT THE ZZZ WOOD PRODUCTS, ENTERPRISE, ALASKA

This section summarizes and responds to substantive comments received during the public comment period following issuance of the Proposed Plan. Comments and responses in this section are arranged by topic. Those which applied to more than one topic were responded to under the heading considered the most appropriate. Paraphrasing was used to incorporate related concerns expressed in more than one comment. Every attempt has been made to respond to concerns raised during the comment period.

10.1 Cost of Cleanup

Comment:

Does the amount of protection afforded by the proposed cleanup action justify the costs of approximately $750,000?

Response:

DEC evaluated each of the potential cleanup alternatives for their cost-effectiveness. DEC believes that the combination of technologies identified in the selected cleanup action will reduce or eliminate the risks to human health, safety, and welfare or the environment in a cost-effective manner. The cleanup action is tailored so that removal and any necessary treatment are applied to the major source areas. Only a very small portion of the site will be capped. Therefore, the ZWP site can be economically reused by the community with only minimal institutional controls on the capped portion of the site.

10.2 Site Characterization

Comment:

Community members expressed concern about what they believe to be the limited number of soil samples taken during the characterization of the site and reported in the Site Characterization Report.

Response:

DEC believes that the sampling is adequate to characterize the nature and extent of the

contamination at the site. Oversight of fieldwork, including sampling activities, was conducted by an independent DEC contractor. Results of the oversight evaluation and split samples collected during sampling activities indicate that the results of the site characterization samples are reproducible and representative of site conditions. Oversight functions and split sample results are detailed in the ZWP Oversight Report (Kirk & McCoy, 1997).

10.3 Groundwater

1. Comment:

ZZZ Wood Products questioned why the groundwater needed to be cleaned up when it is not a source of drinking water.

Response:

DEC water quality regulations state that all waters of the state are considered resources of the state and therefore should not be polluted. The DEC contaminated sites (CS) regulations take into account the fact that groundwater that is already polluted is not currently be used for drinking water. Therefore, the CS regulations allow the use of 10 times the drinking water standard as a cleanup level if the groundwater is not used for drinking water. The use of this cleanup level for the ZWP site is consistent with this requirement.

Comment:

Several community members were concerned that contaminated groundwater could impact the water quality of Latinum Cove which is an important subsistence fishing resource.

Response:

Latinum Cove has not been influenced by groundwater contamination from the ZWP site. This is evidenced by the fact that contamination has not been detected in monitoring wells located near the Latinum Cove shoreline. Removal of the PAH-contaminated soils will eliminate the potential source of groundwater contamination, thereby ensuring future protection of the cove.

10.4 Construction of the Cleanup Action

Comment:

Several community members were concerned about airborne contamination possibly be caused by construction activities during the clean up.

Response:

The DEC CS regulations require ZZZ Wood Products to incorporate safety measures as part of the cleanup plan to ensure protection of the community during construction of the

cleanup. These measures must be implemented during construction, and would include dust suppression during excavation of the soils, thus preventing airborne contamination.

10.5 Future Use of the ZWP Site

Comment:

The Enterprise Greenway Society asked if the ZWP property could be turned into a park once the cleanup was completed.

Response:

The ZWP property is currently zoned for commercial/industrial use. The City of Enterprise's Master Plan indicates the property will remain commercial/industrial in the future. The cleanup for the ZWP site is also based on the premise that the property will remain commercial/industrial and is protective for this use only.

10.6 General Comments

Comment:

A local resident expressed her appreciation for the work that DEC has done to ensure that the cleanup proceeds quickly.

Response:

DEC thanks the commentor.

Comment:

Several commentors asked if ZWP will be required to hire local labor and equipment when they begin construction of the cleanup.

Response:

DEC cannot require ZWP to hire local labor, but can encourage they use local labor and equipment whenever possible.

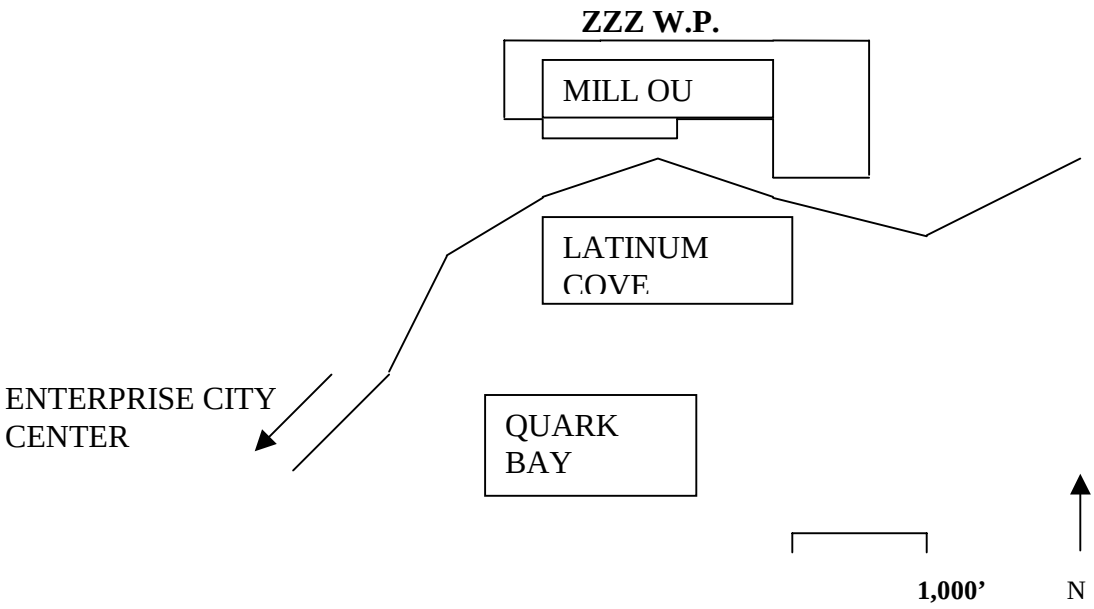

FIGURE 1: LOCATION OF ZZZ WOOD PRODUCTS

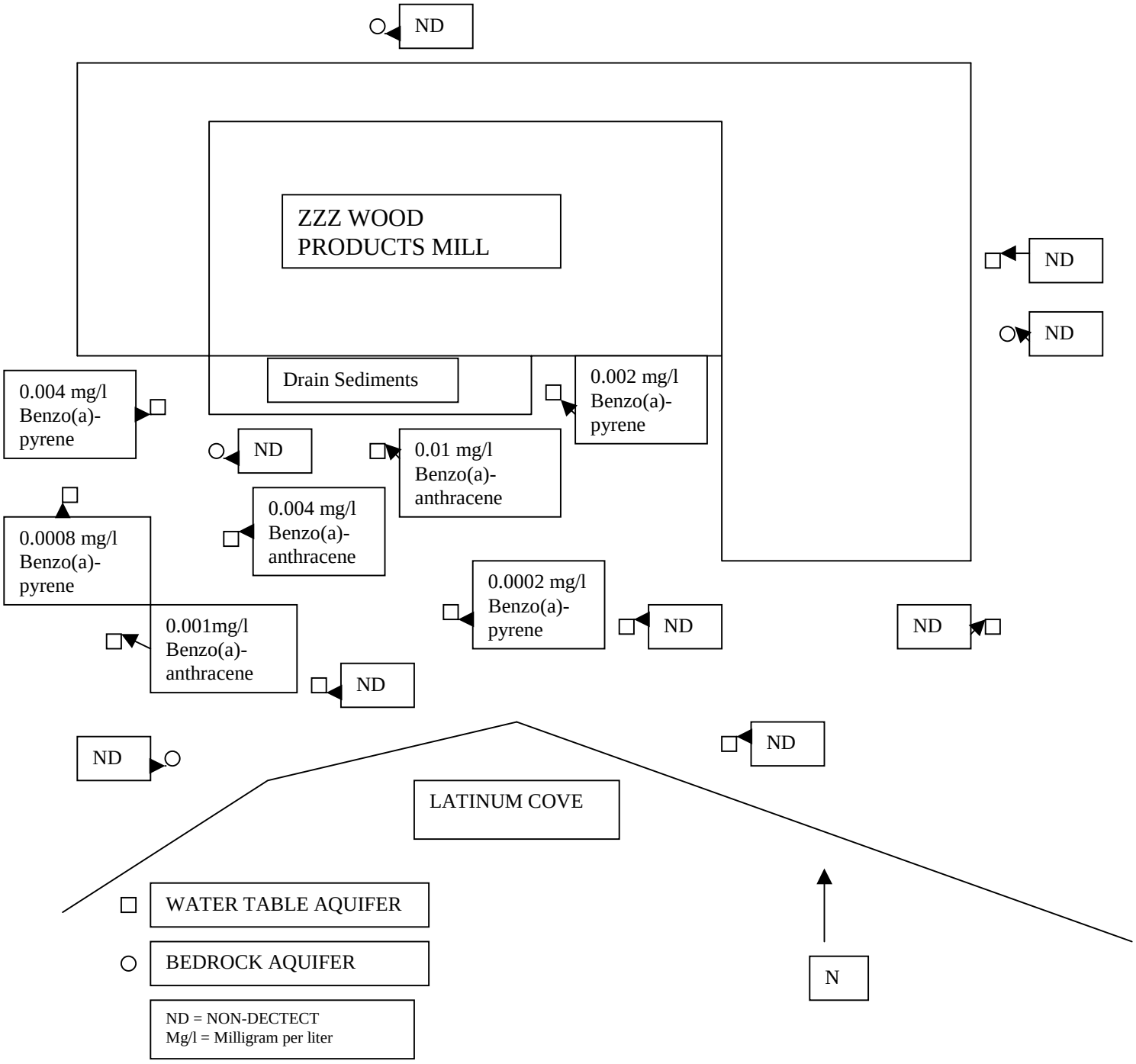

FIGURE 2: LOCATION AND CONTAMINANT CONCENTRATIONS OF GROUNDWATER MONITORING WELLS

Table 1

SI SAMPLE SUMMARY
MILL OPERABLE UNIT

Mill OU Subarea	No. Sampling Locations	Analytical Parameters
3.7-Acre Unpaved Area	13	Dioxins/Furans; Metals; PAHs; Phenols; TOC
Chip Storage Area	5	Dioxins/Furans; Metals; TOC
Fly Ash Hanger	5	Dioxins/Furans; Metals; TOC
Heavy Duty Shop	7	Dioxins/Furans; Metals; SVOCs; VOCs; GRO; DRO; TOC
Paint Shop Area	6	Dioxins/Furans; Metals; SVOCs; VOCs; GRO; TOC
Mill Yard Area	6	Dioxins/Furans; Metals; TOC
Sumps and Drains	22	Dioxins/Furans; Metals; PCBs; SVOCs; VOCs; GRO; DRO; RRO; TOC
Fuel Diesel Tank Area	4	Dioxins/Furans; Metals; DRO; RRO; TOC
Wood Room Area	2	Dioxins/Furans; Metals; PAHs; RRO; TOC
Hog Fuel Area	1	Dioxins/Furans; Metals; SVOCs; VOCs; TOC
Clarifier Area	3	Dioxins/Furans; Metals; PAHs; PCBs; GRO; DRO; RRO; TOC
TOTAL	**74**	

Key:
DRO = Diesel-range organics. OU = Operable Unit. SVOCs = Semivolatile organic compounds.
GRO = Gasoline-range organics. PCBs = Polychlorinated biphenyls. TOC = Total organic carbon.
PAHs = Polynuclear aromatic hydrocarbons. RRO = Residual-range organics. VOCs = Volatile organic compounds.

Reference: ZWP Mill Site Characterization Report; Federation Environmental, 1998.

Table 2

SUMMARY OF CONTAMINANT CONCENTRATIONS IN SOIL
MILL OU
ZZZ WOOD PRODUCTS

Contaminant	Minimum Detected Concentration	Maximum Detected Concentration	Location of Maximum Concentration
Dioxin/Furan TEQ	0.32 ng/kg	1,025.4 ng/kg	Drain Sediments
Metals			
Arsenic	1.0 mg/kg	122 mg/kg	3.7-Acre Area, surface soil
Barium	20 mg/kg	284 mg/kg	Clarifier Area, surface soil
Cadmium	0.6 mg/kg	4.0 mg/kg	Mill Yard, surface soil
Chromium	21 mg/kg	254 mg/kg	Paint Shop, surface soil
Copper	16 mg/kg	330 mg/kg	Paint Shop Area, surface soil
Lead	1.0 mg/kg	499 mg/kg	Paint Shop, surface soil
Mercury	0.05 mg/kg	2 mg/kg	Fuel/Diesel Tanks, surface soil
Nickel	12 mg/kg	212 mg/kg	3.7-Acre Area, surface soil
Silver	0.4 mg/kg	3.0 mg/kg	Heavy Duty Shop, surface soil
Zinc	21 mg/kg	1,190 mg/kg	Paint Shop, surface soil
PAHs			
2-Methylnaphthalene	0.08 mg/kg	0.3 mg/kg	Paint Shop, surface soil
Anthracene	0.002 mg/kg	33 mg/kg	Paint Shop, surface soil
Benz(a)anthracene	0.001 mg/kg	92 mg/kg	Paint Shop, surface soil
Benzo(a)pyrene	0.001 mg/kg	23 mg/kg	Paint Shop, surface soil
Benzo(b)fluoranthene	0.001 mg/kg	40 mg/kg	Paint Shop, surface soil
Benzo(ghi)perylene	0.005 mg/kg	18 mg/kg	Paint Shop, surface soil
Benzo(k)fluoranthene	0.001 mg/kg	38 mg/kg	Paint Shop, surface soil
Chrysene	0.001 mg/kg	110 mg/kg	Paint Shop, surface soil
Dibenz(ah)anthracene	0.15 mg/kg	9 mg/kg	Paint Shop, surface soil
Fluoranthene	0.01 mg/kg	290 mg/kg	Paint Shop, surface soil
Fluorene	0.002 mg/kg	12 mg/kg	Paint Shop, surface soil

PAHs Cont.			
Indeno(1,2,3-cd)pyrene	0.001 mg/kg	22 mg/kg	Paint Shop, surface soil
Naphthalene	0.425 mg/kg	2 mg/kg	Paint Shop, surface soil
Phenanthrene	0.003 mg/kg	200 mg/kg	Paint Shop, surface soil
Pyrene	0.001 mg/kg	240 mg/kg	Paint Shop, surface soil
VOCs			
1,2,4-Trimethylbenzene	1.0 Φg/kg	510 Φg/kg	Paint Shop, surface soil
1,3,5-Trimethylbenzene	5.0 Φg/kg	350 Φg/kg	Paint Shop, surface soil
2-Butanone	10 Φg/kg	25 Φg/kg	Chip Storage Area, ashcrete
4-Isopropyltoluene	1.6 Φg/kg	30 Φg/kg	Paint Shop, surface soil
4-Methyl 2-Pentanone	3.0 Φg/kg	4.0 Φg/kg	Heavy Duty Shop, surface soil
Acetone	30 Φg/kg	9,000 Φg/kg	Paint Shop, surface soil
Ethylbenzene	2.6 Φg/kg	36,000 Φg/kg	Paint Shop, surface soil
Isopropylbenzene	7.4 Φg/kg	48,000 Φg/kg	Paint Shop, surface soil
Methylene Chloride	4.0 Φg/kg	1,000 Φg/kg	Paint Shop, surface soil
Total Xylenes	14.6 Φg/kg	300,000 Φg/kg	Paint Shop, surface soil
n-Proplybenzene	14.5 Φg/kg	130,000 Φg/kg	Paint Shop, surface soil
Petroleum Hydrocarbons			
C-19-C36 Aliphatics	35 mg/kg	4,000 mg/kg	Heavy Duty Shop, surface soil
C9-C18 Aliphatics	14 mg/kg	3,500 mg/kg	Heavy Duty Shop, surface soil
Residual-range organics	229 mg/kg	5,440 mg/kg	Heavy Duty Shop, surface soil
Diesel-range organics	182 mg/kg	7,900 mg/kg	Heavy Duty Shop, surface soil

Key:

Φg/kg	=	Micrograms per kilogram.
Mg/kg	=	Milligrams per kilogram.
Ng/kg	=	Nanograms per kilogram.
OU	=	Operable Unit.
PAHs	=	Polynuclear aromatic hydrocarbons.
TEQ	=	Toxicity equivalent quotient.
VOCs	=	Volatile organic compounds.

Reference: Analytical database; Federation Environmental, 1997.

Table 3

SUMMARY OF INTERIM CLEANUP ACTIONS–MILL OU
ZZZ WOOD PRODUCTS

Location	Contaminants of Concern	Quantity Removed/Remediated	Confirmation Sampling Results (maximum concentration detected)
Drain Sediments	Petroleum, dioxins/furans	55 cubic yards	0.30 ng/kg dioxin/furan 200 mg/kg residual range organics
Heavy Duty Shop	Petroleum, PAHs	50 cubic yards	500 mg/kg residual range organics 1.5mg/kg benzo(a)pyrene
Paint Shop	Petroleum, VOCs	305 cubic yards	200 mg/kg diesel range organics 15 Φg/kg total xylenes

Key:

Φg/kg = Micrograms per kilogram.
mg/kg = Milligrams per kilogram.
OU = Operable Unit.
PAHs = Polynuclear aromatic hydrocarbons.
VOCs = Volatile organic compounds.

Source: Interim Cleanup Action Report; Federation Environmental, 1998.

TABLE 4
SUMMARY OF CANCER RISKS FOR CONTAMINANTS IN SOIL
ZZZ WOOD PRODUCTS

RECEPTOR/ SCENARIO	EXPOSURE ROUTE(S)	CPAH	DIOXINS /FURANS	ARSENIC	CUMULATIVE RISK
Enterprise Resident/ Recreational	Inhalation	$5x10^{-6}$	$5x10^{-5}$	$1x10^{-5}$	$7x10^{-5}$
Enterprise Resident/ Worker	Ingestion, dermal contact, inhalation	$1x10^{-5}$	$8x10^{-4}$	$5x10^{-4}$	$2x10^{-3}$
Native Resident/ Recreational	Inhalation	$7x10^{-6}$	$9x10^{-5}$	$5x10^{-4}$	$6x10^{-4}$
Native Resident/ Worker	Ingestion, dermal contact, inhalation	$8x10^{-5}$	$1x10^{-2}$	$3x10^{-3}$	$1x10^{-2}$
				Total Site-Wide Cumulative Risk	$1x10^{-2}$

KEY: CPAH = carcinogenic polycyclic aromatic hydrocarbons

Reference: Human Health and Environmental Risk Assessment *in ZWP Site Characterization Report* (Federation Environmental 1998).

Table 5

SUMMARY OF TERRESTRIAL ECOLOGICAL RISKS
ZZZ WOOD PRODUCTS

Receptor	Hazard Quotient
Tundra Vole	1.5
Song Sparrow	0.3
Shrew	2.0
Weasel	0.4

Reference: Human Health and Environmental Risk Assessment *in ZWP Site Characterization Report* (Federation Environmental 1998).

TABLE 6
CLEANUP LEVELS FOR SOIL
ZZZ WOOD PRODUCTS

CONTAMINANT	CLEANUP LEVEL	RISK LEVEL	
		CANCER	NON-CANCER
Arsenic	***100.0 mg/kg	***	***
Dioxins/Furans	0.00004 mg/kg	$1x10^{-6}$	
Benzo(a)anthracene	6.0 mg/kg	$2x10^{-6}$	
Benzo(a)pyrene	0.5 mg/kg	$2x10^{-6}$	
Benzo(b)fluoranthene	6.0 mg/kg	$2x10^{-6}$	
Dibenz(ah)anthracene	0.2 mg/kg	$1x10^{-6}$	
Indeno(1,2,3-cd)pyrene	5.0 mg/kg	$1x10^{-6}$	
	CUMULATIVE SITE-WIDE RISK	$1X10^{-5}$	

*** Site-specific background concentration from *ZZZ Wood Products Site Characterization Report.* This cleanup level was approved in accordance with 18 AAC 75.340(f)(1).

TABLE 7
CLEANUP LEVELS FOR GROUNDWATER
ZZZ WOOD PRODUCTS

Contaminant of Concern	*Table C Level	**Cleanup Level
Benzo(a)anthracene	0.001 mg/l	0.010 mg/l
Benzo(a)pyrene	0.0002 mg/l	0.0020 mg/l

- = Table C at 18 AAC 75.345

** = 10 times Table C value as per 18 AAC 75.345(b)(2)

mg/l = milligram per liter

The undersigned parties concur with this Record of Decision for the ZZZ Wood Products site.

_____ _____

ZZZ Official Date

_____ _____

Delegated DEC Official Date

APPENDIX D
EXAMPLE OF ROD FOR A NO ACTION SITE

CLEANUP DECISION DOCUMENT FOR FORT WHYME

Site Name and Location: Fort Whyme: Whyme, Alaska

Database Record Key: 0000 **File Number:** 00000

Responsible Person: Department of Defense, Washington, D.C.

Contaminants of Concern/Media Impacted: lead and chromium in surface soil.

Regulatory Authorities: Site Cleanup Rules (18 AAC 75.325 - 18 AAC 75.390)

On-site maximum contaminant concentrations: lead = 350 mg/kg:
chromium = 20 mg/kg

Completed routes of exposure: Soil ingestion and inhalation to residents, workers, and visitors. No ecological receptors. Groundwater is not impacted.

Cleanup Levels: lead = 400 mg/kg (Based on Footnote 11 to Table B1 at 18 AAC 75.341(d): residential cleanup level for lead).
chromium = 25 mg/kg (Based on background concentrations for Whyme Municipality which were calculated pursuant to DEC's *Technical Guidance Document on Determination of Background Concentrations)*

Cleanup Remedy: No action - On site contaminant concentrations are below cleanup levels.

_____ _____
Delegated DOD Official Date

_____ _____
Delegated Contaminated Sites Official Date