Independent Cleanup Pathway Report Preparation Guide

State of Oregon
Department of Environmental Quality

FINAL

Oregon
Department of Environmental Quality

Environmental Cleanup Division
811 SW Sixth Avenue
Portland, OR 97204

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ACKNOWLEDGEMENTS

The following Department of Environmental Quality staff participated in the development of this guide:

Jim Anderson
Marilyn Daniel
Ann Levine
Bob Schwarz
Amanda Spencer
Toby Scott
Rod Struck

Additional review was provided by:

Stuart M. Brown, Bridgewater Group
Rob B. Ede, Hahn & Associates
Terry A. Sprecher, PBS Environmental

DISCLAIMER

This document is intended solely as guide for employees of the Department of Environmental Quality. It does not constitute rulemaking by the Environmental Quality Commission and may not be relied upon to create a right or benefit, substantive or procedural, enforceable at law or in equity, by any person. The Department may take action at variance with this policy statement.

THE INDEPENDENT CLEANUP PATHWAY FINAL REPORT

The Independent Cleanup Pathway Final Report documents the site conditions and provides the information the Department of Environmental Quality (DEQ) needs to make a "No Further Action" determination under Oregon's Environmental Cleanup Law (ORS 465.200 - 900).

Guidance information is included in [brackets] under each report heading in this Guide. This Guide and an outline in Microsoft Word® can be downloaded from DEQ's web site, http://www.deq.state.or.us/wmc/cleanup/icp-main.htm. Please print your report double-sided on recycled paper to save resources.

PURPOSE

The Report Preparation Guide serves as a reminder for Independent Cleanup Pathway (ICP) project report preparation, and can be downloaded for use as a boilerplate. DEQ does not expect every ICP report to include every section in the outline. The Guide provides information on when specific sections can be omitted from the Final Report. Select the sections appropriate for your project that provide the information DEQ needs to complete a "No Further Action" determination. The Final Report should include adequate description and documentation of the following critical project elements:

- Identification of source areas.
- Characterization of the nature and extent of contamination.
- Identification of potential current and future migration routes.
- Completion of current and future land use determinations.
- Evaluation of the risk to potential human and environmental receptors.
- Completion of the remedy (removal action, remedial action, engineering or institutional controls) performed to protect human health and the environment, and treatment of hot spots of contamination to the extent feasible.
- Characterization of the residual contamination remaining after completion of the remedy.
- Quantification of the residual risk after completion of the remedy.
- Inclusion of a management plan for any long-term management required to maintain protectiveness of the remedy.

Using a consistent format saves time and money in the review process.

PUBLIC NOTICE AND COMMENT

The selection or approval of a remedial or removal action by DEQ is subject to public notice and comment as specified in OAR 465.320. The public comment period must be completed before DEQ can issue a "No Further Action" letter. Allow 60 days in the schedule to meet the Secretary of State's Bulletin publication schedule, and to complete the public comment period.

INDEPENDENT CLEANUP PATHWAY FINAL REPORT

For [insert name and location of site]

ECSI No:

Date:

Prepared For:
[Insert name, address and phone number of client.]

Prepared By:
[Insert name, address and phone number of authoring firm and Oregon Registered Geologist's or Professional Engineer's stamp.]

EXECUTIVE SUMMARY

[Summarize the investigation steps and results, and cleanup actions completed, if any. Include description of the source(s), nature, extent and distribution of contamination, potential migration pathways, and the current and future risk that contamination poses to human health and the environment. Show that any proposed or completed cleanup actions are protective of human health and the environment; and treats hot spots of contamination to the extent feasible. Describe the residual risk following completion of the removal or remedial action.]

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1.0 Introduction

1.1 Project Introduction

[Describe how the project was developed.]

1.2 Purpose and Objectives

[Present the purpose and objectives of the investigation, Feasibility Study and cleanup as appropriate and consistent with Oregon Administrative Rule (OAR) 340-122-0040. Copies of the pertinent sections of Oregon Revised Statutes (ORS) and Oregon Administrative Rules (OAR) are available by request from the Department of Environmental Quality. Internet access to ORS 465.200 et seq. is available at http://landru.leg.state.or.us/ors/465.html and to OAR 340-122 at http://arcweb.sos.state.or.us/banners/rules.htm]

2.0 Site Background

[The guidance document *"State Preliminary Assessments (PA) Guidance"*, DEQ, October 1998, may be helpful in compiling the information for this section. The document may be helpful in compiling the information for this section is available from DEQ, and can be downloaded from DEQ's web site: http://www.deq.state.or.us/wmc/cleanup/pascreen.htm]

2.1 Site Location

[Include site name, street address, latitude and longitude, township, range and section, tax block and lot numbers.]

2.2 Site Description

[Include a brief description of current site operations, the size of the site in acres, number, type and location of buildings. Describe hazardous substance/waste storage, disposal and treatment areas, site security measures, and adjacent land use near the facility including structures and activities. Provide a site location map showing areas within approximately a 1-mile radius of the site, and a scaled site/facility map that shows site topography, on-site structures, improvements, underground utilities, dry wells, and water supply wells. Also include any unique land or site features and flow direction of on-site drainage.]

2.3 Site History and Facility Operations

[Include current and past ownership and operating history.]

2.3.1 Ownership History

[Include dates of ownership and operators, names, type (Federal, private, State, etc.), leased, owned, etc. Historical information should go back as far as possible.]

2.3.2 Operating History

[Include past and current practices; dates of operations; production processes; hazardous substance use; current and historic waste and product storage practices; materials, product and waste handling and disposal practices; and any known or potential environmental problems. Include diagrams as needed to clarify past practices. Historical information should go back as far as possible. If applicable, include manufacturing, waste disposal, and storage process flow diagrams in the report. This information is essential to the scoping of the investigation and the selection of contaminants of interest.]

2.4 Regulatory History

[Describe the regulatory history for the site. Include all environmental permits held currently or in the past, and any history of permits violations.]

2.5 Previous Investigation

[Describe all previous environmental investigations that have been completed at the site. Include a discussion of known or potential problem(s): known or potential contaminants of interest; summary of existing analytical data; emergency or remedial actions; pathways affected or of concern. Include a brief statement regarding which pathways (groundwater, surface water, air, or direct contact) are affected or may be affected. Documented problems with drinking water, groundwater, or surface water contamination, documented releases, etc. Highlight any flags raised by previous investigations, e.g., wastes dumped on-site, stressed vegetation, odor or strange color of well water, unusual odors in buildings, etc.]

3.0 Environmental Setting

[The *"State Preliminary Assessments (PA) Guidance"*, DEQ, October 1998, provides helpful information for competing this section. The guidance can be downloaded from DEQ's web site: http://www.deq.state.or.us/wmc/cleanup/pascreen.htm. *"Guidance for Conducting Beneficial Water Use Determinations at Environmental Cleanup Sites,"* DEQ, July 1, 1998, also provides helpful information. The guidance document is available by request from DEQ, and can be downloaded from our web site at: http://www.deq.state.or.us/wmc/cleanup/guidelst.htm]

3.1 Climate Information

[Include annual precipitation, net precipitation; mean, minimum and maximum temperatures, and seasonally prevailing wind directions.]

3.2 Topography

[Describe study area and site surface features.]

3.3 Surface Water Hydrology

[Describe surface drainage paths, nearby surface water, and the receiving water for surface drainage. List all surface water intakes within 2 miles down gradient of the site. List the uses of the water, acres irrigated by surface water, population served by each drinking water intake, etc. Also include any recreational use, sensitive environments such as wetlands, salmon streams, or habitat for State or Federal threatened or endangered species. Include maps. Information on water rights and usage is available at the Oregon Water resources Department web page at http://www.wrd.state.or.us/]

3.4 Regional and Site Geology and Soils

[Stratigraphy and Lithology: Describe regional and site geology and soils including stratigraphy and lithology as pertinent to the site. Include physiographic setting, geologic units, and unusual/controlling regional or local geologic features.

An accurate understanding of subsurface stratigraphy and structure is a basic requirement for all investigation and remedial activities. The data must be presented in a manner that reduces or eliminates distortion. Stratigraphic cross-sections are the basic method used to visualize the subsurface. All cross sections must be prepared or reviewed by a geologist licensed in the State of Oregon. Please see Appendix I for more detailed information about preparing cross-sections, and surveying elevations and locations.

This section can be limited to basic information at sites that involve only soil contamination, and where residual contaminant concentrations are protective of ground water and surface water.]

3.5 Hydrogeology

[This section should provide adequate background information for DEQ to determine that the groundwater is protected from any residual contamination at the site. The type and location of the contamination will determine how much detail is needed.

For sites where contamination threatens groundwater, describe the regional and site hydrogeology. Include unusual/controlling local geologic features, aquifer and aquitard systems, depth to groundwater, and groundwater gradient. Include a hydrogeologic site conceptual model. Present the water use and population over a nine-section area (the USGS section in which the site is located and the eight surrounding sections). Include Water Resources Department boring logs, available on the web at http://www.wrd.state.or.us/. See guidance documents listed in the introduction to this chapter for additional information.]

4.0 Site Investigation

4.1 Site Characterization Plan

[Describe the Sampling and Analysis Plan. Include sampling objectives, rationale for the number and location of samples collected, and data quality objectives. Analytical detection limits should be below the acceptable risk level for each constituent. EPA Region 9's Preliminary Remediation Goals (PRGs) are often helpful in developing the data quality objectives. The PRGs can be accessed on the web at http://www.epa.gov/region09/waste/sfund/prg/index.htm Provide a diagram showing sampling location and depth, labeled with sample identification numbers.]]

4.2 Sampling Methods

[Detailed sampling methods can be placed in an appendix to describe soil sampling method, well installation procedures, well development and purging procedures, and how groundwater samples were collected. Include any other sampling methods used at the site (e.g., air, surface water, and/or sediment). Describe the type, amount, management and disposal of any investigation derived waste. Include disposal receipts in an appendix.]

4.3 Sampling Results

[Provide adequate sampling and analytical data to verify use of correct methodologies and confirm site characterization conclusions. The Final Report should include:

- Physical description of samples (e.g., soil type, appearance, moisture content, evidence of contamination, etc.)
- Tabulated sampling results.
- Data validation.
- Copies of laboratory reports, chain-of-custody forms, and lab QA/QC reports in an appendix.]

5.0 Sources, Nature and Extent of Contamination

[Discuss sampling results, and source areas. Include a diagram showing areal and vertical extent of contamination, and location and size of source areas. Groundwater sampling may be necessary to demonstrate "no impact to groundwater." See Subsection 7.3 below.]

5.1 Define the Source(s) of Contamination

[Describe the source(s) of contamination, and a general model describing how the contaminants were released and migrated.]

5.2 Nature of Contamination

[Describe what contaminants are present in environmental media based on historic land use, past practices, knowledgeable persons, and current and previous investigations. Is the contaminant a listed hazardous waste?]

5.3 Extent of Contamination

[Describe the contaminants present, and areal and vertical extent of contamination. Include diagrams. Provide isometric concentration maps or maps with posted results, if the number of samples is insufficient to support the development of isometric concentration lines.]

5.3.1 Soil

[Describe results of soil sampling. Include a figure with posted results.]

5.3.2 Groundwater

[Describe results of groundwater sampling, if any. Discuss the significance of any detected contamination. Provide isometric concentration maps or maps with posted results.

Note: Consult DEQ to determine if it is appropriate to continue in the ICP if groundwater contamination is detected at the site.]

5.3.3 Other Media

[Describe the results of the investigation of other media (air, surface water, and/or sediment).]

6.0 Exposure Pathway Summary

[Provide a basic model of the exposure pathways at the site. Include human and ecological receptors. See the following guidance documents:

- *Guidance for Conducting Deterministic Human Health Risk Assessment*, DEQ, December 1998. The guidance document is available by request from DEQ, and can be downloaded from our web site at http://www.deq.state.or.us/wmc/cleanup/guidelst.htm
- *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites Under OAR 340-122-0205 through 340-122-0360*, DEQ, September 29, 1999, available at http://www.deq.state.or.us/wmc/tank/rbdm.htm
- *Guidance for Ecological Risk Assessment, Level I – Scoping* DEQ, April 1997; available at http://www.deq.state.or.us/wmc/cleanup/guidelst.htm]

6.1 Groundwater Pathways of Exposure

6.2 Direct Contact (Soil, Structures) Pathways of Exposure

6.3 Surface Water and Sediment Pathways of Exposure

6.4 Air Pathways of Exposure

[The potential for airborne contaminants should be discussed. Likely scenarios at ICP sites are potential vapor intrusion into buildings, and dust entrained contaminants that become wind-borne.]

7.0 Contaminant Fate and Transport

[Describe the site-specific contaminant fate and transport as needed to determine that the remedy is protective of human health and the environment. An in depth evaluation of contaminant fate and transport is required for sites where DEQ selects the remedy, or sites where site-specific risk based cleanup standards are developed.]

7.1 Contaminant Transport

[Describe how the contaminant(s) migrated through environmental media following the release(s). For example, did the contamination follow a preferential flow path like a utility backfilled with porous and permeable material, or move through natural formations?]

7.2 Contaminant Degradation/Persistence

[Describe natural degradation and attenuation in the environment. Include the estimated time to reach protective levels in the source area and the plume. If natural attenuation is proposed, model contaminant transport over the time required for contaminants to attenuate to protective levels. Provide all modeling assumptions, and a sensitivity analysis.]

7.3 Demonstration of No Impact to Groundwater

[Provide the evidence that demonstrates the contamination at the sites exists in soil only, and has not and will not impact groundwater. Evidence could include depth to groundwater compared to the depth of contamination, leaching data, and groundwater sampling results, or fate and transport modeling.]

7.4 Preliminary Hot Spot Determination

[Present the preliminary hot spot determination. *Guidance for Identification of Hot Spots,* DEQ, April 1998, and *Pre-Calculated Hot Spot Look-up Tables Guidance,* November 1998, are available by request from DEQ and at our web site: http://www.deq.state.or.us/wmc/cleanup/guidelst.htm]

7.5 Conceptual Site Model

[Describe all known or suspected sources, consider how and where the contaminants are likely to move, and identify possible human and ecological receptors likely to be affected by the contamination based on the contaminant fate and transport discussion in Section 7. Please refer to guidance document *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites Under OAR 340-122-0205 through 340-122-0360*, DEQ, September 29, 1999, (RBDM Guidance) for more information. Section 2.2 of the RBDM Guidance contains a good explanation of what a conceptual site model is.

The guidance document is available by request from DEQ and at our web site http://www.deq.state.or.us/wmc/tank/rbdm.htm. Additional information is available in the guidance documents for conducting human health and ecological risk assessment available at http://www.deq.state.or.us/wmc/cleanup/guidelst.htm.]

7.6 Locality of the Facility

[Describe the locality of the facility defined consistent with OAR 340-122-115 (34):

> "Locality of the facility" means any point where a human or an ecological receptor contacts, or is reasonably likely to come into contact with, facility-related hazardous substances, considering:
>
> (a) The chemical and physical characteristics of the hazardous substances;
> (b) Physical, meteorological, hydrogeological, and ecological characteristics that govern the tendency for hazardous substances to migrate through environmental media or to move and accumulate through food webs;
> (c) Any human activities and biological processes that govern the tendency for hazardous substances to move into and through environmental media or to move and accumulate through food webs; and
> (d) The time required for contaminant migration to occur based on the factors described in Subsections (34)(a) through (c) of this rule.

Guidance for Conducting Beneficial Water Use Determinations at Environmental Cleanup Sites, DEQ, July 1, 1998, provides information and examples of how to complete a locality of facility determination.

The guidance document is available by request form DEQ and can be downloaded from the DEQ web site at http://www.deq.state.or.us/wmc/cleanup/guidelst.htm.]

8.0 Land and Water Use Determinations

8.1 Current and Future Land Use

[A default assumption of residential use is considered protective of human health by DEQ. If cleanup levels are based on other land use assumptions, describe the current and reasonably anticipated future land use in the Locality of the Facility. The rule, OAR 340-122-0080 (3)(e) states:

> (e) Current and reasonably anticipated future land use in the locality of the facility, considering:

(A) Current land use zoning and other land use designations;
(B) Land use plans as established in local comprehensive plans and land use implementing regulations of any governmental body having land use jurisdiction;
(C) Concerns of the facility owner, neighboring owners, and the community; and
(D) Any other relevant information such as development patterns and population projections.

The future land use consideration is an important component in evaluating if a proposed or completed remedial action is protective.

Further guidance is available in *Consideration of Land Use in Environmental Remedial Actions*, DEQ, July 1, 1998, available by request from DEQ and on the web at http://www.deq.state.or.us/wmc/cleanup/guidelst.htm.

At a minimum, DEQ needs the following information:

1. Current and reasonably likely future uses of all the properties in the locality of the facility. These uses may be gathered from the property owners/occupants by personal visit, by letter, by field survey, or by other clearly documented methods.
2. Current zoning and comprehensive plan maps and applicable regulations provided by the local jurisdiction for the properties within the locality of the facility.
3. Inquiries made and responses as to whether there are regional trends that are relevant to land uses and activities in the locality of the facility.
4. A summary of the results and conclusions along with supporting documentation as to what the current and reasonably likely future land uses are for each parcel within the locality of the facility.]

8.2 Beneficial Uses of Water

[A beneficial water use determination for groundwater is not required if a successful demonstration of no impact to groundwater has been completed in Section 7.3 above. If groundwater contamination is detected at the site, consult DEQ to determine if it is appropriate for the project to continue in the ICP.

Describe all current and reasonably likely future beneficial uses of groundwater and surface water by humans or ecological receptors. The requirements for the beneficial use survey are found in OAR 340-122-0080 (3)(f):

(f) Current and reasonably likely future beneficial uses of groundwater and surface water in the locality of the facility, considering:

(A) Federal, State, and local regulations governing the appropriation and/or use of water;
(B) Nature and extent of current groundwater and surface water uses;
(C) Suitability of groundwater and surface water for beneficial uses;
(D) The contribution of water to the maintenance of aquatic or terrestrial habitat;
(E) Any beneficial uses of water which the Water Resources Department or other Federal, State or local programs is managing in the locality of the facility;

(F) Reasonably likely future uses of groundwater and surface water based on:
(i) Historical land and water uses;
(ii) Anticipated future land and water uses;
(iii) Community and nearby property owners' concerns regarding future water use;
(iv) Regional and local development patterns;
(v) Regional and local population projections; and
(vi) Availability of alternate water sources including, but not limited to, public water supplies, groundwater sources, and surface water sources.

Guidance for Conducting Beneficial Water Use Determinations at Environmental Cleanup Sites, DEQ, July 1, 1998, is available by request from DEQ and on our web site at http://www.deq.state.or.us/wmc/cleanup/guidelst.htm.]

9.0 Risk Assessment

9.1 Baseline Human Health Risk Assessment

[ICP sites are of low or medium environmental priority, i.e. there is no imminent threat of release or exposure, and sensitive environments are not threatened. This allows for a somewhat simplified approach to risk assessment.

A full-blown baseline human health risk assessment is not required for sites that choose to use Numeric Soil Cleanup Levels (OAR 340-122-0045), Preliminary Remediation Goals (PRGs), or generic remedies (PCB, simple petroleum sites) to select their cleanup levels. The Numeric Soil Cleanup Levels and PRG are risk-based numbers. Simply show that the site fits the exposure assumptions used to develop the PRGs or Numeric Soil Cleanup Levels, or qualify for the generic remedy. The PRGs can be accessed on the EPA Region 9 web site at http://www.epa.gov/region09/waste/sfund/prg/index.htm

Sites with only petroleum contamination can follow the guidance document Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites Under OAR 340-122-0205 through 340-122-0360, DEQ, September 29, 1999, (RBDM Guidance). This guidance document also includes a generic remedy for simple sites. The guidance document is available by request from DEQ and at our web site at http://www.deq.state.or.us/wmc/tank/rbdm.htm.]

A site-specific baseline risk assessment is required if risk based site-specific cleanup standards will be used. The RBDM Guidance provides a framework for conducting a human health risk assessment appropriate to many ICP sites, and may serve as a guide even if other contaminants must be evaluated. A few additional steps are required for non-petroleum contaminants. The risk posed by each constituent must be calculated, and the cumulative risk must be added up. Risk associated with both the central tendency and the reasonable maximum exposure must be calculated. Tabulate final results for each pathway and receptor.

OAR 340-122-0084 (1) and (2) covers the baseline human health risk assessment. Probabilistic techniques are covered in OAR 340-122-0084 (5). Additional information is available in Guidance for Conduct of Deterministic Human Health Risk Assessments, DEQ December 1998, available at http://www.deq.state.or.us/wmc/cleanup/guidelst.htm].

9.2 Baseline Ecological Risk Assessment

[Ecological risk assessment is completed through a four-tiered approach. All sites must complete the Level I – Scoping described in Guidance for Ecological Risk Assessment, Level I – Scoping DEQ, April 1997.
The outcome of the scoping evaluation will determine if there is a need to continue with the next tier. Guidance on how to conduct each of the four tiers of ecological risk assessments is available from DEQ and on our web site at http://www.deq.state.or.us/wmc/cleanup/guidelst.htm]

10.0 Cleanup Standards and Hot Spots

10.1 Selection of Cleanup Standards

[Describe the cleanup standards selected for each contaminant of concern at this site.]

The standards for environmental cleanups are found in ORS 465.315 and OAR 340-122-0040. Examples of generic cleanup standards are:

- Numeric Soil Cleanup Levels (OAR 340-122-0045).
- Screening with Preliminary Remediation Goals http://www.epa.gov/region09/waste/sfund/prg/index.htm
- PCB Generic Remedy.
- Simple Petroleum Site Generic Remedy.

The report must demonstrate that the assumptions and receptors used to develop the generic cleanup levels are applicable to this site.

Site-specific cleanup standards can be developed from the baseline risk assessment by demonstrating what concentrations of contaminants are protective of the identified receptors. The acceptable risk level is defined in OAR 340-122-0115.]

10.2 Final Hot Spot Determination

[Describe any hot spots of contamination present at the site. Include a diagram showing the location of the hot spots. Hot spot of contamination are defined in OAR 340-122-0115 (31). Guidance on how to conduct a hot spot determination and pre-calculated hot spot look-up tables are available by request from DEQ and on our web site at http://www.deq.state.or.us/wmc/cleanup/guidelst.htm
.

11.0 Feasibility Study

[A full Feasibility Study is required if DEQ is asked to select the remedial action alternative. A Feasibility Study is not required for the ICP if DEQ is asked to approve a removal or remedial action that has already been completed.

The report must demonstrate that the proposed or completed removal or remedial action is protective of human health and the environment, and treats or treated hot spots of contamination to the extent feasible. Screening against the balancing factors is required if DEQ is asked to select or approve the remedial action alternative prior to implementation of the action. The program participant can opt for a more stringent, or more expensive remedy by his or her own choice.

The rules for completing a Feasibility Study are found in OAR 340-122-0085, and balancing factors are included in OAR 340-122-0090. The *Guidance for Conducting Feasibility Studies*, DEQ, July 1, 1998, is available by request from DEQ and on our web site at http://www.deq.state.or.us/wmc/cleanup/guidelst.htm].

11.1 Development of Remedial Action Alternatives

[Describe the remedial action alternatives that will be evaluated. The development of remedial action alternatives is described in OAR 340-122-0085.]

11.2 Evaluation of Remedial Action Alternatives

[All remedial actions approved by DEQ must be protective of human health and the environment, and treat hot spots to the extent feasible. The standards for remedial actions are specified in OAR 340-122-0040. Present the evaluation of each remedial action alternative for protectiveness, and the evaluation of the balancing factors in OAR 340-122-0090 (3).]

11.3 Recommended Remedial Action

[Present the recommended remedial action if DEQ is asked to complete the selection. The selection or approval of a remedial or removal action by DEQ is subject to public notice and comment as specified in OAR 465.320. Allow 60 days in the schedule to meet the Secretary of State's Bulletin publication schedule, and to complete the public comment period.]

12.0 Removal or Remedial Action Report

[Include this section for all sites where a remedial or removal action has been completed.]

12.1 Work Completed

[Please provide a detailed description of all work conducted to complete the removal or remedial action including waste management and disposal. Include diagrams. If contamination is removed from the site, include disposal receipts from the disposal facility.]

12.2 Verification Sampling

[Describe the sampling plan used and the results obtained from the post removal or remedial action verification sampling. Include data validation, and certification that the required remedial action criteria have been attained, and/or sampling results verifying that the remediation performs according to design specifications. Include tabulated results, and a diagram of the remediated area showing the sampling locations. Include laboratory reports in an appendix.]

12.3 Engineering Controls

[Describe any engineering controls proposed to maintain the protectiveness of the remedy. Provide as built drawings of all engineering controls installed at the site. Provide copies of final permits, as applicable. Sites with engineering controls remain listed in ECSI and receive a conditional NFA. The conditional NFA will be revoked if the engineering controls are not maintained.]

12.4 Institutional Controls

[Describe any institutional controls such as deed restrictions planned to maintain the protectiveness of the remedy. DEQ review and approval of the deed restrictions is required prior to recording. Sites with institutional controls remain listed in ECSI and receive a conditional NFA. Proof of recording in the county real property records must be provided prior to issuance of the conditional NFA. The conditional NFA will be revoked if the institutional controls are violated.]

13.0 Residual Risk

13.1 Residual Risk Assessment

[A residual risk assessment must be completed for sites where removal or remedial actions have been completed based on site-specific cleanup levels, or where the generic cleanup levels could not be achieved. This includes sites where the remedy is an engineering or institutional control. A residual risk assessment is not required for sites that are cleaned up to generic cleanup levels, when those levels are achieved. The requirements for the residual risk assessment are included in OAR 340-122-0084 (4), accessible on the web at http://arcweb.sos.state.or.us/banners/rules.htm]

13.2 Protection of Human Health and the Environment

[Describe how long term protection of public health and the environment will be achieved and maintained at the site. All remedial actions approved by DEQ must be protective of human health and the environment. The standards for remedial actions are specified in OAR 340-122-0040:

(1) Any removal or remedial action shall address a release or threat of release of hazardous substances in a manner that assures protection of present and future public health, safety, and welfare, and the environment.
(2) In the event of a release of a hazardous substance, remedial actions shall be implemented to achieve:
(a) Acceptable risk levels defined in OAR 340-122-0115, as demonstrated by a residual risk assessment; or
(b) Numeric soil cleanup levels specified in OAR 340-122-0045, if applicable; or
(c) Numeric cleanup standards developed as part of an approved generic remedy identified or developed by the Department under OAR 340-122-0047, if applicable; or
(d) For areas where hazardous substances occur naturally, the background level of the hazardous substances, if higher than those levels specified in Subsections (2)(a) through (2)(c) of this rule.
(3) In the event of a release of hazardous substances to groundwater or surface water constituting a hot spot of contamination, treatment shall be required in accordance with OAR 340-122-0085(5) and OAR 340-122-0090.
(4) A removal or remedial action shall prevent or minimize future releases and migration of hazardous substances in the environment. A removal or remedial action and related activities shall not result in greater environmental degradation than that existing when the removal or remedial action commenced, unless short-term degradation is approved by the Director under OAR 340-122-0050(4).
(5) A removal or remedial action shall provide long-term care or management, as necessary and appropriate, including but not limited to monitoring, operation, maintenance, and periodic review.]

13.3 Inspection and Maintenance Program

[An inspection and maintenance program is necessary to maintain the protectiveness of institutional and engineering controls used to manage residual risk. Include inspection and maintenance protocols and schedules. Record in county real property records with the deed restriction.]

13.4 Residuals Management Plan

[A residuals management plan is required if contamination that remains at the site might be mobilized in the future through utility work, excavation, construction activity, etc. Record in county real property records with the deed restrictions.]

14.0 References

[Include a List of References used to prepare the report.]

APPENDIX I

Cross Sections

In order to eliminate distortion, the cross-section line must be laid out across the site map as a single, straight line. The logged well will be projected perpendicularly onto the plane of the cross-section. Multiple cross-sections may be necessary to limit the distance that some wells must be projected. Cross-section locations will be based on professional judgment and designed to best illustrate stratigraphic and structural variation across the site. Bends in the line should be used only in rare instances and must be clearly marked on the finished diagram. Consideration should be given to preparing one cross-section perpendicular to and one parallel to the predominant groundwater flow direction. All cross sections prepared for a given site should be prepared at the same horizontal scale and vertical exaggeration. In general, the horizontal to vertical exaggeration (H:V) should not exceed a 10:1 ratio.

If the site is unusually complex geologically or contains structures with three-dimensional variability, fence diagrams may be required. In this case, the well logs should be reproduced at an equal scale on the site map with stratigraphic interpretation panels connecting key wells/borings.

Locations and Elevations

If possible, include all investigative or remedial structures in geographic information system databases to generate accurate site maps. Otherwise, use three-dimensional surveys. Report horizontal locations as Northing and Easting in the Oregon State Plan Coordinate System (SPCS). Report elevations in feet above Mean Sea Level. Report the datum used in both cases (e.g., horizontal - SPCS South; elevation - NGVD 1929).

Survey elevations of monitoring wells used to define a groundwater gradient or in which groundwater levels will be taken to an accuracy of $\pm$0.01 feet. Survey all other elevations (i.e., surface topography) and horizontal locations (e.g., property and building corners, drain locations) to an accuracy of $\pm$0.1 feet.

Report the initial reference point for the survey (e.g., Corps of Engineers Benchmark 419). The use of a Public Benchmark is preferred.

Surveyed locations are preferred. On very large or remote sites, Global Positioning System (GPS) horizontal locations may be used. If GPS locations are used, a two-receiver survey employing a fixed location base station occupying a three-dimensional known position must be used. GPS elevations are not acceptable due to lack of accuracy.