FINAL CLEANUP ACTION PLAN

Cream Wine Site
Sunnyside, WA

December 2012
Washington Department of Ecology
Toxics Cleanup Program
Central Regional Office
Yakima, WA

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1.0 INTRODUCTION

This report presents the Washington State Department of Ecology's proposed cleanup action for the Cream Wine site (Site) (Facility Site # 46552166), located at 111 East Lincoln Avenue, Sunnyside, in Yakima County, Washington (Figure 1). This Cleanup Action Plan (CAP) is required as part of the Site cleanup process under the Model Toxics Control Act (MTCA), Ch. 70.105D Revised Code of Washington (RCW), implemented by the Washington State Department of Ecology (Ecology). The cleanup action decision is based on the Focused Site Assessment Report (FSA) and other relevant documents in the administrative record (see section 1.3).

This CAP outlines the following:

- The history of operations, ownership, and activities at the Site;
- The nature and extent of contamination;
- Cleanup levels for the Site that are protective of human health and the environment;
- The selected remedial action for the Site; and
- Compliance monitoring and institutional controls, as required.

1.1 DECLARATION

Ecology has selected this remedy because it will be protective of human health and the environment. Furthermore, the selected remedy is consistent with the preference of the State of Washington as stated in RCW 70.105D.030(1)(b) for permanent solutions.

1.2 APPLICABILITY

Cleanup levels specified in this cleanup action plan are applicable only to the Cream Wine Site. They were developed as a part of an overall remediation process under Ecology oversight using the authority of MTCA, and should not be considered as setting precedents for other sites.

1.3 ADMINISTRATIVE RECORD

The documents used to make the decisions discussed in this cleanup action plan are on file in the administrative record for the Site. Major documents are listed in the reference section. The entire administrative record for the Site is available for public review by appointment at Ecology's Central Regional Office, located at 15 West Yakima Avenue, Suite 200, Yakima, WA 98902-3452. Results from applicable studies and reports are summarized to provide background information pertinent to the CAP. These studies and reports include:

- Environmental Site Assessment, Blue Mountain Environmental Consulting, Inc., 2006
- Phase II Environmental Site Investigation and Retro Underground Storage Tanks (USTs) Site Closure, Blue Mountain Environmental Consulting, Inc., 2007
- Final Alternate Source Evaluation, Kennedy/Jenks Consultants 2008
- Revised Aquifer Evaluation for Production Well Use, Kennedy/Jenks Consultants 2008

- Summary of Shallow Soil and Groundwater Investigation, Kennedy/Jenks Consultants 2008
- Completion of Cleanup at Former Apex Winery Site Adjacent to Time Oil Property, Kennedy/Jenks Consultants 2009
- Report of Independent Actions Facility ID #46552116, Kennedy/Jenks Consultants 2010
- Phase I Environmental Site Assessment, Maul Foster & Alongi 2011
- Focused Site Assessment Report, Maul Foster & Alongi 2012 (includes a Terrestrial Ecological Evaluation [TEE] as Appendix H)

In addition to the Site studies listed above, a significant volume of applicable work has been completed on the Valley View Market (VVM) site to the west of the Site. Studies and reports completed for the VVM site include:

- Environmental Site Assessment, Alisto Engineering Group 1997
- Remedial Investigation/Feasibility Study Report, Maxim Technologies, Inc. 1991
- Corrective Action Plan and January 2000 Groundwater Monitoring Report, Time Oil Company 2000
- Monitoring Well Installation Report, Time Oil Company and Brown and Caldwell 2000
- Bioslurping System Installation Report, Brown and Caldwell 2000
- Remedial Investigation Report, Sound Environmental Strategies Corporation 2009
- In Situ Chemical Oxidation Work Plan, Sound Environmental Strategies Corporation 2010
- Simulation of well capture and advective transport with the operation of the on-site remediation system memorandum, SoundEarth Strategies, Inc. 2011
- Quarterly Groundwater Monitoring Reports, SoundEarth Strategies, Inc. 2010

1.4 CLEANUP PROCESS

Cleanup conducted under the MTCA process requires the preparation of specific documents either by the Potentially Liable Person (PLP) or by Ecology. These procedural tasks and resulting documents, along with the MTCA section that requires their completion, are listed below with a brief description of each task.

- Remedial Investigation and Feasibility Study – Washington Administrative Code (WAC) 173-340-350
  The RI/FS documents the investigations and evaluations conducted at the Site from the discovery phase to the RI/FS document. The RI collects and presents information on the nature and extent of contamination, and the risks posed by the contamination. The FS presents and evaluates Site cleanup alternatives and proposes a preferred cleanup alternative. The document is prepared by the PLP, approved by Ecology, and undergoes public comment. The FSA meets the RI/FS requirements for this Site.
- Cleanup Action Plan - WAC 173-340-380
  The CAP sets cleanup levels and standards for the Site, and selected the cleanup actions intended to achieve the cleanup levels. The document is prepared by Ecology, and undergoes public comment.
- Engineering Design Report, Construction Plans and Specifications - WAC 173-340-400

The report outlines details of the selected cleanup action, including any engineered systems and design components from the CAP. These may include construction plans and specifications with technical drawings. The document is prepared by the PLP and approved by Ecology. Public comment is optional.

- Operation and Maintenance Plan(s) - WAC 173-340-400
  These plans summarize the requirements for inspection and maintenance of cleanup actions. They include any actions required to operate and maintain equipment, structures, or other remedial systems. The document is prepared by the PLP and approved by Ecology.
- Cleanup Action Report - WAC 173-340-400
  The Cleanup Action Report is completed following implementation of the cleanup action, and provides details on the cleanup activities along with documentation of adherence to or variance from the CAP. The document is prepared by the PLP and approved by Ecology.
- Compliance Monitoring Plan - WAC 173-340-410
  Compliance Monitoring Plans provide details on the completion of monitoring activities required to ensure the cleanup action is performing as intended. It is prepared by the PLP and approved by Ecology.

2.0 SITE BACKGROUND

2.1 SITE HISTORY

The Site is currently vacant. The approximately 33,000 square feet main building existing on-site was originally constructed for a milk plant by the Morning Milk Company, which owned the property and operated the facility from approximately 1942 to 1946. Carnation acquired the property and owned and operated the facility from approximately 1946 to 1986. The Port of Sunnyside bought the property in 1986 and leased the facility to a winery in 1988, then sold it to the Seitz family in 1990. In 1992, the property was bought by Washington Hills Cellars (WHC) and used as a winery. Federal Agricultural Mortgage Corporation foreclosed on the property in 2007 because WHC was unable to make loan payments. Cream Wine leased the property for operation of a winery in 2007 and vacated it in 2010.

Groundwater at the Cream Wine Site was impacted by a release from an underground storage tank (UST) at the Valley View Market (VVM) site to the west of the Site at 107 West Lincoln Avenue, Sunnyside, Washington. In 1996, Time Oil Company discovered petroleum hydrocarbon contamination on the VVM site during installation of cathodic protection on the UST system. Time Oil Company initiated a remedial investigation on the VVM site and discovered that the release resulted in migration of petroleum hydrocarbons onto the Cream Wine Site. Time Oil Company has conducted remedial actions, including air sparging, soil vapor extraction, and in situ chemical oxidation, and greatly reduced the petroleum impacts to groundwater (and associated impacts form the fuel additive methyl tert-butyl ether [MTBE]). Based on these efforts, the contaminant concentration trends indicate that cleanup standards will be achieved in the near future. However, during investigations conducted for the petroleum cleanup, another contaminant of concern, tetrachloroethene (PCE), was detected in groundwater

on the Cream Wine Site at concentrations above state cleanup standards. Studies indicate that the PCE was not released from the fueling station, but is attributable to an off-Site source.

A number of recognized environmental conditions (RECs) were identified on the Site during the Phase I Environmental Site Assessment (MFA, 2011). These features were investigated during the focused site assessment and the only contamination found in association with these on-Site RECs was a lead exceedance in one soil sample collected adjacent to the former chemical storage building. Based on previous investigations, the source of the lead contamination in soil is likely a surface release from former site operations. There are no continuing sources of hazardous-substance releases at the Site.

2.2 SITE INVESTIGATIONS

Multiple investigations and remedial actions have been completed on the VVM site since 1997. Many of these investigations include information for the Cream Wine Site as it pertains to the cleanup of the petroleum hydrocarbon plume from the VVM site. In approximately 2005, PCE was detected in groundwater at the Site during a sampling event associated with the remedial system operation for the VVM site. Since that initial detection of PCE, additional investigation has been conducted at the Site to further characterize the nature and extent of PCE impacts in groundwater as well as to investigate the potential for environmental impacts associated with the RECs identified in the Phase I Environmental Site Assessment (MFA, 2011). The previous study findings are integrated into the FSA and this report.

2.3 PHYSICAL SITE CHARACTERISTICS

2.3.1 SITE LOCATION

The Site is located at 111 East Lincoln Avenue, Sunnyside, Washington, and is zoned heavy industrial. The Site comprises approximately 4.67 acres and is located in section 36, township 10 north, and range 22 east of the Willamette Meridian, on tax lots 221036-22006 (see Figure 1).

The Site is bordered by Lincoln Avenue and residential areas to the north; industrial development to the south; First Street, a residential area, and Valley View Market (VVM) to the west; and a commercial development to the east (Ken's Auto Wash & Quick Lube). The VVM property once included a laundry and dry cleaner that, based on Polk directory records, operated between 1968 and 1990.

For the Site's current features, see Figure 2. The Site has three structures:

- The winery/main building covers approximately 33,000 square feet. It is composed of many rooms, including processing rooms, storage room, cold rooms, boiler room, office rooms, rest rooms, a warehouse area, and a product testing laboratory. The building structure consists of various materials, including wood, metal, brick, and concrete block.
- The former chemical storage building covers approximately 200 square feet. It has a concrete floor and is constructed of concrete blocks.

- The remediation building covers approximately 200 square feet and houses the VVM groundwater remediation system.

2.3.2 Topography and Climate

The Site is located in the Lower Yakima Valley at the toe of Harrison Hill and is nearly flat topographically. The climate in the Yakima Valley is typified by hot and dry summers and cool and moist winters. The mean annual temperature is 48 to 54 degrees Fahrenheit and the mean annual precipitation is 6 to 12 inches (USDA, 2012).

2.3.3 Geology and Hydrogeology

The Site is located on late Pliocene lacustrine deposits composed of interbedded silt and fine-grain sands deposited by the Missoula Floods (Maxim, 1999). The lacustrine deposits may be up to 90 feet thick; they overlie coarse-grained fluvial deposits from former channels of the Columbia River. These fluvial deposits compose the Snipes Mountain Conglomerate and may range in thickness from 90 up to 450 feet (Maxim, 1999). Unconsolidated deposits in the area may be up to 2,000 feet thick and are underlain by the Wanapum Basalt, which is part of the Columbia River Basalt Group (SES, 2009). In the Sunnyside area, unconsolidated deposits are typically up to 400 feet thick (SES, 2009). Multiple aquifers are present in both the unconsolidated deposits and the basalts (SES, 2009).

Soil boring observations indicate that most of the Site is underlain by 10 to 15 feet of silt overlying an approximately 20- to 35-foot-thick deposit of interbedded silty sand and sandy silt, which most likely represent the lacustrine deposits discussed above. A dense silt and clay unit underlies the silty sand and sandy silt, generally at a depth of 40 feet below ground surface (bgs).

The silty sand and sandy silt deposits make up an unconsolidated, shallow aquifer that has been observed to be hydraulically disconnected from deeper groundwater present beneath the Site (Kennedy/Jenks, 2008). Groundwater was typically encountered between 11.5 and 22 feet bgs, and the average groundwater flow direction historically observed at the Site is toward the southeast (SES, 2011). The underlying silt and clay unit was characterized as unsaturated and likely acts as a fully confining unit, based on the observed absence of moisture and the hydraulic discontinuity between the shallow and deep groundwater units identified by previous investigations (Kennedy/Jenks, 2008).

3.0 Remedial Investigation

A remedial investigation was performed to assess the nature and extent of contamination in soil and groundwater, as described in the FSA.

3.1 Soil

The only indicator hazardous substance identified in soil is lead, which is limited to one exceedance in shallow soil at GP08 (1.0 bgs) (see Figure 2). Lead contamination is vertically bounded at GP08 at 5 feet bgs. Petroleum hydrocarbons were also detected in this sample, but at

concentrations below screening levels. Lead was detected in multiple other locations across the Site, but at concentrations well below screening levels. Acetone was detected at the Site in one sample collected from the stormwater swale at the eastern edge of the Site, but at a concentration below screening levels. Therefore, lead is the only indicator hazardous substance in soil at the Site and lead impacts are restricted to shallow soil in the area adjacent to the former chemical storage building.

3.2 GROUNDWATER

The only indicator hazardous substance identified in groundwater is PCE. Stable isotope data indicate that a single source is responsible for the PCE contamination, and the presence of PCE upgradient of the Site and downgradient of a former dry cleaner suggests that the source likely originated upgradient. Historical data indicate that there is a strong declining trend in PCE concentrations, and PCE has not been detected in groundwater downgradient of the Site. Given the estimated plume travel times and the rate of decline in concentrations, and based on the extent of current PCE detections, PCE concentrations in groundwater downgradient of the Site are not expected to exceed cleanup levels at any time in the future. Figure 3 shows PCE sampling results from the FSA.

Petroleum hydrocarbons, toluene, chloroform, and MTBE were also detected in groundwater at the Site. MTBE was detected at a concentration above screening levels in one well (RW09), a recovery well associated with the Time Oil Company remediation system; all other constituents were detected at concentrations below screening levels. Although MTBE was detected above screening levels, MTBE is a known groundwater contaminant associated with the UST release at the VVM site and is being actively remediated by Time Oil Company. In addition, MTBE was only detected in approximately 6 percent of the groundwater samples collected on-site during the FSA investigation. MTBE is not considered an indicator hazardous substance for the Site given the low frequency of detection, the fact that it originates from an off-site source (there are no known or suspected sources of MTBE on-site), and since off-Site remediation activities are addressing MTBE. Therefore, no remediation is required for MTBE at the Site.

3.3 RISKS TO HUMAN HEALTH AND THE ENVIRONMENT

The Site is zoned heavy industrial and is surrounded by a mix of industrial, commercial, and residential properties. It is anticipated that the Site will be redeveloped for industrial or commercial use.

Exposures to human populations could occur through contact with contaminated surface soil, dust entrained in air, or ingestion of contaminated groundwater. The shallow aquifer is not currently used and is not likely to be used in the future due to current zoning regulations (SES, 2009) and considering the presence of the deeper aquifer, from which existing production wells draw water. In addition, future construction activities for the proposed development will not include excavation to depths approaching the groundwater table. Production wells exist at the Site, but they draw water from a deeper aquifer that has been shown to be hydraulically segregated from the shallow aquifer containing the PCE plume. Therefore, the ingestion and direct contact pathways for groundwater are currently incomplete and are reasonably likely to

remain incomplete in the future. It is highly unlikely that any drinking water supplies have been impacted; however, since the shallow aquifer is a potential drinking water source, exposure due to ingestion of contaminated water is included as a potential risk. Since PCE contamination is not present in shallow groundwater (i.e., PCE was not detected at the water table but was detected in the deeper groundwater samples collected within the shallow aquifer) and PCE has not been detected beneath any occupied existing buildings or sites for planned buildings, vapor intrusion does not currently pose a threat and the groundwater-volatilization-to-indoor pathway is incomplete.

There are no surface water bodies on or adjacent to the Site. Therefore, the groundwater to surface water pathway is incomplete.

The leaching to groundwater pathway for soil is incomplete. Empirical evidence indicates that soil impacts are not causing unacceptable groundwater concentrations and the soil-to-drinking-water pathway was deemed incomplete, based on the current and likely future uses of shallow groundwater and the hydraulic segregation of shallow groundwater from the deep aquifer.

Exposure to environmental receptors is limited. There is substantial on-site human disturbance and development, and no important resources for wildlife. The surrounding area consists of industrial and residential properties unlikely to provide quality ecological habitat. Given low habitat quality, ecological exposure to soil at the Site is expected to be insignificant.

4.0 CLEANUP STANDARDS

MTCA requires the establishment of cleanup standards for individual sites. The two primary components of cleanup standards are cleanup levels and points of compliance. Cleanup levels determine the concentration at which a substance does not threaten human health or the environment. All environmental media that exceeds a cleanup level is addressed through a remedy that prevents exposure. Points of compliance represent the locations on the site where cleanup levels must be met.

4.1 OVERVIEW

The process for establishing cleanup levels involves the following:

- Determining which method to use;
- Developing cleanup levels for individual contaminants in each media;
- Determining which contaminants contribute to the majority of the overall risk in each media (indicator hazardous substance); and
- Adjusting the cleanup levels downward based on total site risk.

The MTCA Cleanup Regulation provides three options for establishing cleanup levels: Methods A, B, and C.

- Method A may be used to establish cleanup levels at routine sites or sites with relatively few hazardous substances.

- Method B is the standard method for establishing cleanup levels and may be used to establish cleanup levels at any site.
- Method C is a conditional method used when a cleanup level under Method A or B is technically impossible to achieve or may cause significantly greater environmental harm. Method C also may be applied to qualifying industrial properties.

The MTCA administrative rules define the factors used to determine whether a substance should be retained as an indicator for the Site. When defining cleanup levels at a site contaminated with several hazardous substances, Ecology may eliminate from consideration those contaminants that contribute a small percentage of the overall threat to human health and the environment. WAC 173-340-703(2) provides that a substance may be eliminated from further consideration based on:

- The toxicological characteristics of the substance which govern its ability to adversely affect human health or the environment relative to the concentration of the substance;
- The chemical and physical characteristics of the substance which govern its tendency to persist in the environment;
- The chemical and physical characteristics of the substance which govern its tendency to move into and through the environment;
- The natural background concentration of the substance;
- The thoroughness of testing for the substance;
- The frequency of detection; and
- The degradation by-products of the substance.

MTCA also considers the limits of analytical chemistry. If the practical quantitation limit of a substance is greater than the risk-based cleanup level, then the cleanup level can be set equal to that limit.

MTCA requires that the total risk from all contaminated media not exceed certain levels. The total site cancer risk shall not exceed $1x10^{-5}$, and the hazard index (calculated for chemicals with similar non-carcinogenic toxicity endpoints) shall not exceed 1. After the cleanup level for each media is developed, the risks from each chemical and media are summed. If the total site cancer risk and/or hazard index exceeds the levels listed above, then the cleanup levels are adjusted downward until cancer risk is less than $1x10^{-5}$ and the hazard index is less than or equal to 1 for each endpoint. MTCA does not specify how the risks can be adjusted, as long as the individual cleanup level standard for each chemical is not violated.

4.2 TERRESTRIAL ECOLOGICAL EVALUATION

WAC 173-340-7490 requires that sites perform a terrestrial ecological evaluation (TEE) to determine the potential effects of soil contamination on ecological receptors. Sites may be removed from further ecological consideration by either documenting an exclusion using the criteria set forth in WAC 173-340-7491 or conducting a simplified TEE procedure as set forth in WAC 173-340-7492. The simplified TEE provides an evaluation process that may be used to identify sites which do not have a substantial potential for posing a threat of significant adverse effects to terrestrial ecological receptors, and thus may be removed from further ecological

consideration during the remedial investigation and cleanup process. The simplified TEE exposure analysis procedure set forth under WAC 173-340-749(2)(a)(ii) and in MTCA Table 749-1 was completed as part of the FSA. The simplified TEE results indicate that the Site does not pose a substantial threat to potential ecological receptors and no further ecological evaluation is necessary. Therefore, environmental exposure pathways are deemed incomplete and cleanup levels were not established for ecological receptors.

4.3 Site Cleanup Levels

The FSA and previous investigations documented the presence of contamination in soil and groundwater at the Site. Cleanup levels will be developed for both of these media.

Because the Site has relatively few hazardous substances, limited exposure pathways, and was removed for further ecological consideration based on the results of the simplified terrestrial ecological evaluation, it is considered a "routine cleanup action". Therefore, Method A applies. Although the Site qualifies as an "industrial property" as defined in WAC 173-340-200, the proposed redevelopment is for commercial or industrial use. Therefore, the Method A, unrestricted land use values are appropriate for soil and groundwater.

Groundwater cleanup level development is shown in Table 1. If a state or federal drinking water standard exists for a contaminant, that standard is compared to MTCA risk-based criteria to determine if it is protective. If it is not protective, it is adjusted to a hazard quotient of 1 or cancer risk of $1x10^{-5}$. If no state or federal standard exists, then MTCA Method A criteria are applied.

Soil cleanup level development is shown in Table 2. Standards are evaluated for any state or federal laws and Method A values. The lowest of these standards is set as the preliminary cleanup level, unless that number is below background. As stated earlier, the Site was removed from terrestrial ecological evaluation; therefore, ecological standards do not apply.

4.4 Point of Compliance

The MTCA Cleanup Regulation defines the point of compliance as the point or points where cleanup levels shall be attained. Once cleanup levels are met at the point of compliance, the Site is no longer considered a threat to human health or the environment.

WAC 173-340-740(6) gives the point of compliance requirements for soil. The standard point of compliance for direct contact is soil within 15 feet of the ground surface throughout the entire site. This standard point of compliance is applied to soil on the Site.

The point of compliance for groundwater is defined in WAC 173-340-720(8). Groundwater points of compliance are established for the entire Site from the top of the saturated zone to the lowest potentially-affected portion of the aquifer. Alternatively, a conditional point of compliance may be set if it can be demonstrated that it is not practicable to meet cleanup levels throughout the site within a reasonable restoration time frame. This conditional point of compliance will be as close as practicable to the source, not to exceed the property boundary. A conditional point of compliance for groundwater is not proposed at this time.

5.0 CLEANUP ACTION SELECTION

5.1 REMEDIAL ACTION OBJECTIVES

The remedial action objectives describe the actions necessary to protect human health and the environment through eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route. These objectives are developed by evaluating the characteristics of the contaminated media, the characteristics of the hazardous substances present, migration and exposure pathways, and potential receptor points.

Soil has been contaminated with lead as a result of past activities at the Site. Groundwater at the Site has been contaminated with PCE as a result of off-Site, upgradient sources. Potentially complete exposure pathways for lead in soil include dermal contact or inhalation of dust. Ingestion is a potentially complete exposure pathway for PCE in groundwater. Potential soil receptors include on-site workers, trespassers, residents of nearby neighborhoods, passersby, and nearby off-site workers. Based on the current and reasonably anticipated future use of shallow groundwater, no groundwater receptors were identified; however, on-site workers and residents of nearby neighborhoods may be potential receptors if groundwater use changes in the future.

The following remedial action objectives are intended to address the significant potential exposure pathways:

- Prevent or minimize direct contact or ingestion of contaminated soil by humans or ecological receptors; and
- Prevent or minimize ingestion of contaminated groundwater by humans or ecological receptors.

5.2 CLEANUP ACTION ALTERNATIVES

Cleanup alternatives are evaluated as part of the Site FSA. The feasibility study included the evaluation of two options for soil and groundwater cleanup. The alternatives were scored and ranked using relevant criteria as described in WAC 173-340-360. Each of the considered alternatives includes a combination of one or more of the following remedial actions:

- Soil removal
- Monitored natural attenuation
- In situ groundwater treatment
- Groundwater monitoring

These remedial action options were combined to develop two alternatives, each intended to address all contaminated media at the Site. The following alternatives were developed based on the alternatives proposed in the FSA. Both Alternatives 1 and 2 include the same proposed remedy for lead-contaminated soil.

5.2.1 ALTERNATIVE 1: IN SITU TREATMENT AND SOIL REMOVAL

This alternative represents one of two options for groundwater remediation. Alternative 1 includes the following actions:

- Soil Removal
  - Excavate soil with lead concentrations exceeding the cleanup level, characterize, and dispose of the soil off-site at a permitted disposal facility. The initial area of excavation will be determined based on field screening results; the final excavation area will be determined by confirmation sampling of excavation sidewalls and floor.
  - Backfill excavation area with clean, imported fill to existing ground surface elevation and compact to a minimum of 92 percent, based on the Modified Proctor Test (ASTM, 2012).
- In Situ Treatment
  - Obtain an underground injection control permit for in situ chemical oxidation and conduct a pilot study to determine the effectiveness of this remedy. The pilot study will be conducted in the monitoring well that has exhibited the highest PCE concentrations on the Site (MW17) and will include two rounds of groundwater monitoring (one pre-injection and one post-injection) for VOC analysis at the pilot study well (MW17) and one down-gradient monitoring well (MW20).
  - If the pilot study results are favorable, conduct treatment injections in the eight monitoring wells exhibiting PCE cleanup level exceedances (wells RW02 through RW05, MW08, MW11, MW15, and MW17). Injection treatment at monitoring well MW17 will require permission to access the public right-of-way. If the in situ treatments are effective, cleanup levels may be achieved within 1 to 2 years.
  - Conduct quarterly monitoring and VOC analysis at four existing on-site monitoring wells (MW13, MW17, MW19, and MW20; see Figure 2) for at least one year, followed by periodic monitoring if necessary. The objectives of the groundwater monitoring are: (1) confirm effectiveness of the in situ chemical oxidation treatment; (2) collect the necessary data for making a determination of No Further Action, based on compliance with cleanup levels; and (3) confirm that PCE-impacted groundwater is not migrating past the POC or down-gradient of the Site property boundary.

5.2.2 ALTERNATIVE 2: MONITORED NATURAL ATTENUATION AND SOIL REMOVAL

Alternative 2 includes the same approach for remediation of lead-contaminated soil as Alternative 1. Groundwater contamination will be addressed through monitored natural attenuation. Data indicate that concentrations of PCE in groundwater are declining through natural processes and are likely to continue to decrease to below cleanup levels in a reasonable timeframe. If historical trends continue, cleanup levels may be achieved within 5 years. The remedial action for groundwater in this alternative would be to conduct analysis of groundwater through sampling of four existing on-site monitoring wells on a regular basis to track future trends until PCE concentrations achieve cleanup levels.

5.3 REGULATORY REQUIREMENTS

The MTCA Cleanup Regulation sets forth the minimum requirements and procedures for selecting a cleanup action. A cleanup action must meet each of the minimum requirements specified in WAC 173-340-360(2), including certain threshold and other requirements. This section outlines these cleanup action requirements and procedures as set forth in the regulation. Section 5.4 provides an evaluation of the cleanup alternatives with respect to these criteria.

5.3.1 THRESHOLD REQUIREMENTS

WAC 173-340-360(2)(a) requires that the cleanup action shall:

- Protect human health and the environment;
- Comply with cleanup standards (see Section 5.0);
- Comply with applicable state and federal laws (see Section 5.3.5); and
- Provide for compliance monitoring.

5.3.2 OTHER REQUIREMENTS

In addition, WAC 173-340-360(2)(b) states that the cleanup action shall:

- Use permanent solutions to the maximum extent practicable;
- Provide for a reasonable restoration time frame; and
- Consider public concerns

WAC 173-340-360(3) describes the specific requirements and procedures for determining whether a cleanup action uses permanent solutions to the maximum extent practicable. A permanent solution is defined as one where cleanup levels can be met without further action being required at the Site other than the disposal of residue from the treatment of hazardous substances. To determine whether a cleanup action uses permanent solutions to the maximum extent practicable, a disproportionate cost analysis is conducted. This analysis compares the costs and benefits of the cleanup action alternatives and involves the consideration of several factors, including:

- Protectiveness;
- Permanent reduction of toxicity, mobility and volume;
- Cost;
- Long-term effectiveness;
- Short-term risk;
- Implementability; and
- Consideration of public concerns.

The comparison of benefits and costs may be quantitative, but will often be qualitative and require the use of best professional judgment.

WAC 173-340-360(4) describes the specific requirements and procedures for determining whether a cleanup action provides for a reasonable restoration time frame.

5.3.3 GROUNDWATER CLEANUP ACTION REQUIREMENTS

At sites with contaminated groundwater, WAC 173-340-360(2)(c) requires that the cleanup action meet certain additional requirements. Permanent cleanup actions shall be used when possible, and if a non-permanent action must be used, the regulation requires that the following two requirements be met:

1) Treatment or removal of the source of the release shall be conducted for liquid wastes, areas of high contamination, areas of highly mobile contaminants, or substances that cannot be reliably contained; and
2) Groundwater containment (such as barriers) or control (such as pumping) shall be implemented to the maximum extent practicable.

5.3.4 CLEANUP ACTION EXPECTATIONS

WAC 173-340-370 sets forth the following expectations for the development of cleanup action alternatives and the selection of cleanup actions. These expectations represent the types of cleanup actions Ecology considers likely results of the remedy selection process; however, Ecology recognizes that there may be some sites where cleanup actions conforming to these expectations are not appropriate.

- Treatment technologies will be emphasized at sites with liquid wastes, areas with high concentrations of hazardous substances, or with highly mobile and/or highly treatable contaminants;
- To minimize the need for long-term management of contaminated materials, hazardous substances will be destroyed, detoxified, and/or removed to concentrations below cleanup levels throughout sites with small volumes of hazardous substances;
- Engineering controls, such as containment, may need to be used at sites with large volumes of materials with relatively low levels of hazardous substances where treatment is impracticable;
- To minimize the potential for migration of hazardous substances, active measures will be taken to prevent precipitation and runoff from coming into contact with contaminated soil or waste materials;
- When hazardous substances remain on-site at concentrations which exceed cleanup levels, they will be consolidated to the maximum extent practicable where needed to minimize the potential for direct contact and migration of hazardous substances;
- For sites adjacent to surface water, active measures will be taken to prevent/minimize releases to that water; dilution will not be the sole method for demonstrating compliance;
- Natural attenuation of hazardous substances may be appropriate at sites where 1) source control is conducted to the maximum extent practicable, 2) leaving contaminants on-site doesn't pose an unacceptable risk, 3) there is evidence that natural degradation is occurring and will continue to occur, and 4) appropriate monitoring is taking place; and
- Cleanup actions will not result in a significantly greater overall threat to human health and the environment than other alternatives.

5.3.5 Applicable, Relevant, and Appropriate, and Local Requirements

WAC 173-340-710(1) requires that all cleanup actions comply with all applicable state and federal law. It further states that the term "applicable state and federal laws" shall include legally applicable requirements and those requirements that the department determines "…are relevant and appropriate requirements." This section discusses applicable state and federal law, relevant and appropriate requirements, and local permitting requirements which were considered and were of primary importance in selecting cleanup requirements. If other requirements are identified at a later date, they will be applied to the cleanup actions at that time.

MTCA provides an exemption from the procedural requirements of several state laws and from any laws authorizing local government permits or approvals for remedial actions conducted under a consent decree, order, or agreed order (RCW 70.105D.090). However, the substantive requirements of a required permit must be met. The procedural requirements of the following state laws are exempted:

- Ch. 70.94 RCW, Washington Clean Air Act;
- Ch. 70.95 RCW, Solid Waste Management, Reduction, and Recycling;
- Ch. 70.105 RCW, Hazardous Waste Management;
- Ch. 75.20 RCW, Construction Projects in State Waters;
- Ch. 90.48 RCW, Water Pollution Control; and
- Ch. 90.58 RCW, Shoreline Management Act of 1971.

WAC 173-340-710(4) sets forth the criteria that Ecology evaluates when determining whether certain requirements are relevant and appropriate for a cleanup action. Table 3 lists the state and federal laws that contain the applicable or relevant and appropriate requirements that apply to the cleanup action at the Site. Local laws, which may be more stringent than specified state and federal laws, will govern where applicable.

5.4 Evaluation of Cleanup Action Alternatives

The requirements and criteria outlined in Section 5.3 are used to conduct a comparative evaluation of alternatives one and two and to select a cleanup action from those alternatives. Table 4 provides a summary of the ranking of the alternatives against the various criteria.

5.4.1 Threshold Requirements

5.4.1.1 Protection of Human Health and the Environment and Compliance with Cleanup Standards

Alternatives 1 and 2 reduce or eliminate risk from contaminated soil and groundwater through a combination of removal and monitored natural attenuation, or removal and chemical treatment. These remedial actions will eliminate exposure pathways and protect human health and the environment and will comply with cleanup standards.

5.4.1.2 Compliance with State and Federal Laws

The selected cleanup levels are consistent with MTCA. Additionally, local, state and federal laws related to environmental protection, health and safety, transportation, and disposal apply to each proposed alternative. During remedial design, the selected alternative will be designed to comply with applicable, relevant, and appropriate requirements.

5.4.1.3 Provision for Compliance Monitoring

There are three types of compliance monitoring which are: protection, performance, and confirmational. Protection monitoring is designed to protect human health and the environment during the construction and operation & maintenance phases of the cleanup action. Performance monitoring confirms that the cleanup action has met cleanup and/or performance standards. Confirmational monitoring confirms the long-term effectiveness of the cleanup action once cleanup standards have been met or other performance standards have been attained. Both cleanup alternatives require varying levels of all three types of compliance monitoring and therefore will meet this provision.

5.4.2 OTHER REQUIREMENTS

5.4.2.1 Use of Permanent Solutions to the Maximum Extent Practicable

As discussed previously, to determine whether a cleanup action uses permanent solutions to the maximum extent practicable, the disproportionate cost analysis specified in the regulation is used. The analysis compares the costs and benefits of the cleanup action alternatives and involves the consideration of several factors. The comparison of costs and benefits may be quantitative, but will often be qualitative and require the use of best professional judgment.

Costs are disproportionate to the benefits if the incremental costs of an alternative are disproportionate to the incremental benefits of that alternative. Based on the analysis described below, it has been determined that alternatives 1 and 2 have equal rankings for use of a permanent solution to the maximum extent practicable. Alternative 1 provides a higher degree of protection, but the cost is almost twice that of Alternative 2.

- Protectiveness

Protectiveness is a factor by which human health and the environment are protected by the cleanup action, including the degree to which existing risks are reduced; time required to reduce risk at the facility and attain cleanup standards; on-site and off-site risks resulting from implementing the cleanup action alternative; and improvement of the overall environmental quality. Both of the cleanup alternatives are protective. Alternative 1 has the highest degree of protectiveness because it is expected to reduce groundwater PCE concentrations below cleanup levels in a relatively short timeframe (1 to 2 years). Alternative 2 is less protective because a longer remediation timeframe is required to meet groundwater cleanup levels. The fate and transport analysis included in the FSA indicates that PCE concentrations in groundwater are expected to decline to below the cleanup level within 5 years if historical trends of natural

attenuation continue. Groundwater exposure pathways are deemed incomplete for both human and ecological receptors and PCE is not expected to migrate off-Site at concentrations above cleanup levels.

- Permanent Reduction of Toxicity, Mobility and Volume

Permanence is a factor by which the cleanup action alternative permanently reduces the toxicity, mobility, or volume of hazardous substances. It takes into account the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases, the degree of irreversibility of the waste-treatment process, and the characteristics and quantity of treatment residuals generated. Removal of soils is a permanent remedial action because it permanently eliminates the source of releases at the Site. Both alternatives are equivalently permanent with respect to groundwater, as PCE is destroyed by either natural or chemically-enhanced attenuation processes. Therefore, Alternatives 1 and 2 are ranked equally for permanence.

- Cleanup Costs

Costs are approximated based on specific design assumptions for each alternative. Although the costs provided by consultants are estimates based on design assumptions that might change, the relative costs can be used for this evaluation. The estimated cost for Alternative 1 ($274,200 to $338,300) is almost twice the cost for Alternative 2 ($176,700 to $182,300). For a detailed description of the costs involved with each alternative, please refer to the FSA.

Alternatives 1 and 2 include anticipated costs for disposing a portion of lead-contaminated soil above 100 mg/kg as hazardous waste. If this soil can be stabilized on-site, then costs can be reduced through disposal at a less expensive landfill.

- Long-Term Effectiveness

Long-term effectiveness includes the degree of certainty that the alternative will be successful; the reliability of the alternative for the expected duration of hazardous substances remaining on site at concentrations that exceed cleanup levels; the magnitude of residual risk with the alternative in place; and the effectiveness of controls required to manage treatment residues or remaining wastes. Long-term effectiveness of Alternative 1 is considered slightly higher than Alternative 2, since it has a greater likelihood of successfully decreasing PCE concentrations to below cleanup levels over a shorter timeframe.

- Short-Term Risk

Short-term risks to remediation workers, the public, and the environment are assessed under this criterion. Generally, short-term risks are expected to be linearly related to the amount of material handled, treated, and/or transported and disposed of (e.g., worker injury per cubic yard excavated [equipment failure], public exposure per cubic yard-mile transported [highway accident]).

This factor addresses the risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks. Potential exposure via transport, handling, and excavation required for both of the alternatives could lead to short-term risks. Alternative 2 requires less handling of oxidizing chemicals and mobilization of heavy equipment for groundwater treatment, and therefore involves lower short-term risks than Alternative 1.

- Implementability

This factor addresses whether the alternative can be implemented and is technically possible. The availability of necessary materials; regulatory requirements; scheduling; access for construction operations and monitoring; and integration with existing and neighboring site uses must be considered. The proposed alternatives are both well proven and have been employed at many sites throughout the United States; both are readily implementable and rank equivalently.

- Consider Public Concerns

This factor includes considering concerns from individuals; community groups; and local governments, tribes, federal and state agencies, and any other organization that may have an interest in or knowledge of the site and that may have a preferred alternative. Both alternatives provide opportunity for members of the public to review and comment on plans. No major concerns were raised by the public during community meetings that occurred during the investigation process.

5.4.2.2 Provide a Reasonable Restoration Time Frame

WAC 173-340-360(4) describes the specific requirements and procedures for determining whether a cleanup action provides for a reasonable restoration time frame, as required under subsection (2)(b)(ii). The factors that are used to determine whether a cleanup action provides a reasonable restoration time frame are set forth in WAC 173-340-360(4)(b) and include:

- Potential risks posed by the site to human health & the environment;
- Practicability of achieving a shorter restoration time frame;
- Current Site use and nearby resources that are or may be affected by the Site;
- Potential future use of the site and nearby resources that are or may be affected by the Site;
- Availability of alternative water supplies;
- Likely effectiveness and reliability of institutional controls;
- Ability to control and monitor migration of hazardous substances;
- Toxicity of hazardous substances; and
- Natural processes that reduce contaminant concentrations and are documented to occur.

Both alternatives include soil removal to cleanup levels, which provides flexibility for current and future Site use, reduces risk, and does not require institutional controls for soil. Alternative 1 provides groundwater treatment and would potentially provide the shortest restoration time

frame (1 to 2 years, if the treatment is effective) and would help control the migration of hazardous substances. Alternative 2 relies on natural attenuation; therefore, it is expected that alternative 2 will provide a potentially longer restoration timeframe (less than 5 years, if historical trends continue) than Alternative 1.

5.4.3 GROUNDWATER CLEANUP ACTION REQUIREMENTS

Cleanup actions that address groundwater must meet the specific requirements described in Section 5.3.3 in addition to those listed above. Both alternatives meet the requirement of a permanent groundwater cleanup action required under WAC 173-340-360(2)(c). Alternative 1 includes active groundwater treatment. Alternative 2 meets the requirement through natural attenuation, which is a form a treatment. Although the treatment will not actively be enhanced, monitoring will provide evidence that treatment is occurring under natural processes.

5.4.4 CLEANUP ACTION EXPECTATIONS

Specific cleanup action expectations are outlined in WAC 173-340-370 and are described in Section 5.3.4. Alternatives 1 and 2 address these expectations in the following manner:

- Alternatives 1 and 2 include source control measures through the targeted removal of accessible contaminated soils and groundwater treatment. Natural attenuation is an effective groundwater treatment because leaving contaminants on-site will not pose an unacceptable risk, degradation has been demonstrated to occur at the Site, and regular monitoring will be conducted. Soil removal and both groundwater treatment options effectively remove or reduce the overall threat to human health and the environment. These actions meets the following cleanup expectations:
    - Treatment technologies will be emphasized at sites with liquid wastes, areas with high concentrations of hazardous substances, or with highly mobile and/or highly treatable contaminants.
    - To minimize the need for long-term management of contaminated materials, hazardous substances will be destroyed, detoxified, and/or removed to concentrations below cleanup levels throughout sites with small volumes of hazardous substances.
    - To minimize the potential for migration of hazardous substances, active measures will be taken to prevent precipitation and runoff from coming into contact with contaminated soil or waste materials.
    - Natural attenuation of hazardous substances may be appropriate at sites where 1) source control is conducted to the maximum extent practicable, 2) leaving contaminants on-site doesn't pose an unacceptable risk, 3) there is evidence that natural degradation is occurring and will continue to occur, and 4) appropriate monitoring is taking place; and
    - Cleanup actions will not result in a significantly greater overall threat to human health and the environment than other alternatives.

The following cleanup expectations are not applicable to the Site:

- Engineering controls, such as containment, may need to be used at sites with large volumes of materials with relatively low levels of hazardous substances where treatment is impracticable.
- When hazardous substances remain on-site at concentrations which exceed cleanup levels, they will be consolidated to the maximum extent practicable where needed to minimize the potential for direct contact and migration of hazardous substances.
- For sites adjacent to surface water, active measures will be taken to prevent/minimize releases to that water; dilution will not be the sole method for demonstrating compliance.

5.5 DECISION

Based on the analysis described above, Alternative 1 was selected as the proposed remedial action for the Cream Wine Site. The alternative meets each of the minimum requirements for remedial actions and provides a potentially shorter timeframe (1 to 2 years) for achieving cleanup objectives.

Alternative 1 meets each of the threshold requirements and uses permanent solutions to the maximum extent practicable. The cost for alternative 2 is significantly less, but it is less protective in the short term and requires a potentially longer timeframe (approximately 5 years) to achieve reductions in groundwater concentrations of PCE to levels below the cleanup levels. Table 4 provides a summary of the relative ranking of each alternative in the decision process.

6.0 SELECTED REMEDIAL ACTION

The proposed cleanup action for the Site includes the excavation of all soils exceeding the cleanup level of 250 mg/kg for lead. Groundwater will be addressed through in situ chemical oxidation. Existing on-site wells can be used for the treatment and monitoring.

Compliance monitoring will take place, and will be established in a Compliance Monitoring Plan to be submitted to and approved by Ecology in conjunction with Engineering Design Plans. Protection monitoring will involve dust control during any work with contaminated soil. Performance monitoring will consist of the evaluation of groundwater sampling results. Confirmational monitoring will not take place until cleanup levels have been met.

Monitoring is required until such time as the Site meets MTCA requirements for demonstrating that remediation is complete.

6.1 GROUNDWATER MONITORING

Groundwater monitoring is required to determine effectiveness of the in situ treatment, and will include the quarterly sampling of wells for PCE. Groundwater monitoring shall be performed in accordance with the approved Compliance Monitoring Plan, with a short-term goal of measuring the effectiveness of the in situ treatment pilot study, and eventual full treatment, and a long-term goal of achieving cleanup levels. Additionally, groundwater data will be evaluated on an annual

basis using Ecology's Draft Vapor Intrusion Guidance (Ecology, 2009) to determine if risks from soil vapor remain at the Site.

6.2 INSTITUTIONAL CONTROLS

Institutional controls are measures undertaken to limit or prohibit activities that may interfere with the integrity of a cleanup action or result in exposure to hazardous substances at the Site. Such measures are required to assure both the continued protection of human health and the environment and the integrity of the cleanup action whenever hazardous substances remain at the Site at concentrations exceeding applicable cleanup levels. Institutional controls can include both physical measures and legal and administrative mechanisms. WAC 173-340-440 provides information on institutional controls, and the conditions under which they may be removed.

No institutional controls are planned for the Site at this time.

6.3 FINANCIAL ASSURANCES

WAC 173-340-440 states that financial assurance mechanisms shall be required at sites where the selected cleanup action includes engineered and/or institutional controls. Financial assurances are not required at this Site because no institutional controls are planned for the Site.

6.4 PERIODIC REVIEW

As long as groundwater cleanup levels have not been achieved, WAC 173-340-420 states that at sites where a cleanup action requires an institutional control or financial assurance, a periodic review shall be completed no less frequently than every five years after the initiation of a cleanup action. No institutional controls or financial assurances are planned for the Site; however, periodic reviews will be required at the Site until cleanup levels have been achieved in groundwater under the provision that additional review may be necessary to assure long-term protection of human health and the environment. After groundwater cleanup levels have been achieved, periodic reviews will cease.

7.0 REFERENCES CITED

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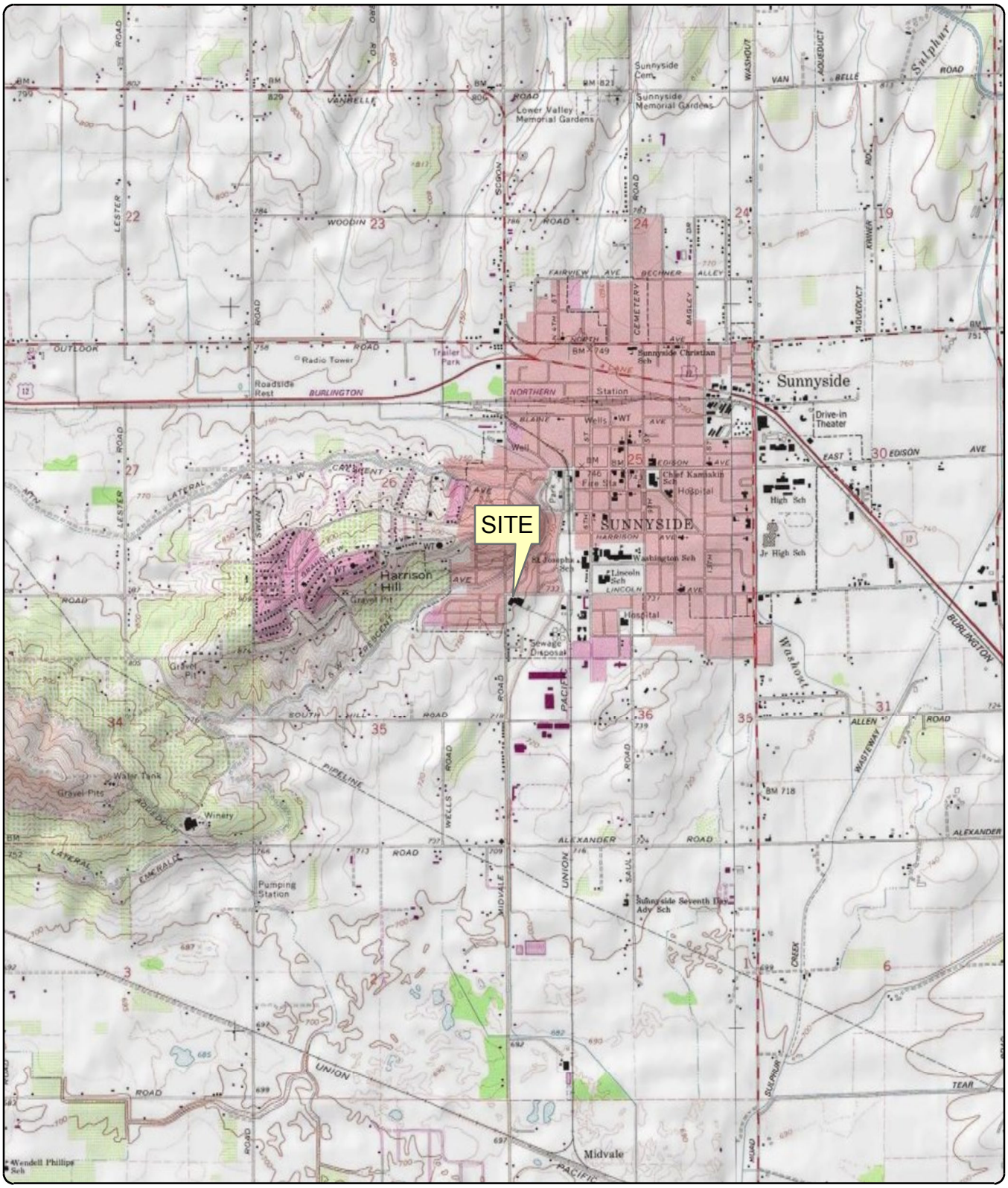

Site Address: 111 E Lincoln Ave, Sunnyside, Washington
Source: US Geological Survey (1990) 7.5-minute topographic quadrangle: Sunnyside
Section 36, Township 10 North, Range 22 East

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Figure 1
Site Location

Former Cream Wine Property
Port of Sunnyside
Sunnyside, Washington

0 1,500 3,000
Feet

Path: X:\0346.04\Projects\Fig1_Site Location.mxd
Print Date: 9/17/2012
Approved By: J. Pounds
Produced By: J. Schane
Project: 0346.04.02

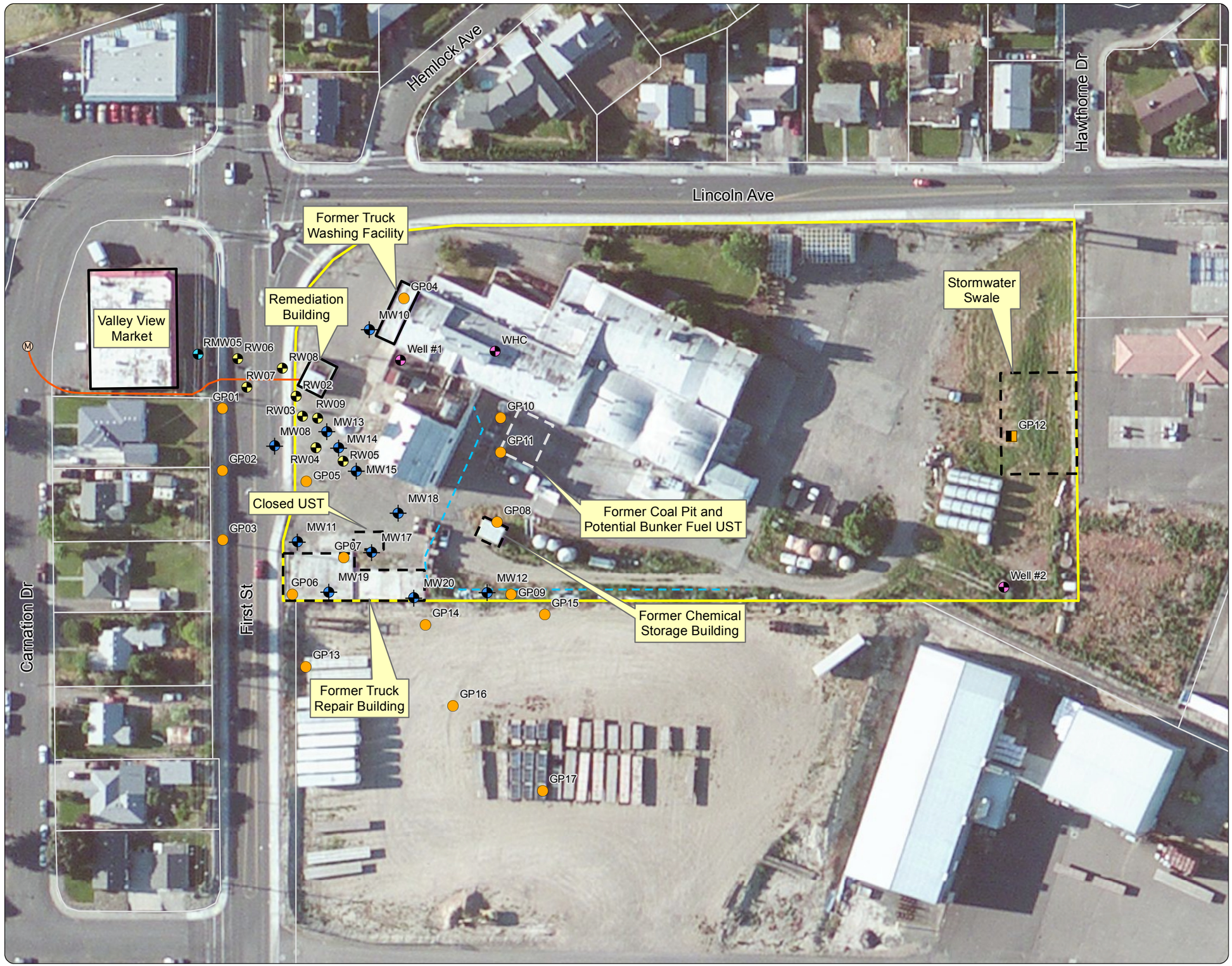

Figure 2
Site Features

Former Cream Wine Property
Port of Sunnyside
Sunnyside, Washington

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Legend

- Boring Location
- Monitoring Well
- Monitoring/Recovery Well
- Production Well
- Recovery Well
- Soil Sample Location
- Existing Manhole Sanitary Sewer
- Former Wastewater Line/ Former Open Ditch
- Discharge Line from Remediation Building
- Site Boundary (Approximate)
- Tax Lots (Approximate)

Note: Sample locations were surveyed by Gray's Survey and Engineering on June 18 and 19, 2012.

0 40 80
Feet

Source: Aerial photograph obtained from ESRI, Inc. ArcGIS Online/Bing Maps

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Path: X:\0346.04\Projects\Fig2_Site Features.mxd
Print Date: 9/19/2012
Approved By: J. Pounds
Produced By: J. Schane
Project: 0346.04.02

RW04		
1/25/2012	25 ft bgs	
PCE	**1.9**	

GP01		
1/26/2012	22.5 ft bgs	37.5 ft bgs
PCE	1 U	**1.9**

GP02		
1/26/2012	22.5 ft bgs	37.5 ft bgs
PCE	**1**	**4**

GP05		
1/24/2012	20 ft bgs	35 ft bgs
PCE	1 U	**10**

GP03		
1/26/2012	22.5 ft bgs	37.5 ft bgs
PCE	1 U	**2.6**

GP07		
1/23/2012	22.5 ft bgs	42.5 ft bgs
PCE	1 U	**17**

GP06		
1/24/2012	22.5 ft bgs	42.5 ft bgs
PCE	1 U	1 U

GP13		
6/19/2012	21 ft bgs	29 ft bgs
PCE	1 U	1 U

RMW09		
1/25/2012	25 ft bgs	DUP (1/26)
PCE	1 U	1 U

GP04		
1/25/2012	22.5 ft bgs	37.5 ft bgs
PCE	1 U	1 U

GP10		
1/27/2012	22.5 ft bgs	37.5 ft bgs
PCE	1 U	1 U

GP11		
1/27/2012	22.5 ft bgs	37.5 ft bgs
PCE	1 U	1 U

MW18	
1/23/2012	25 ft bgs
PCE	**15**

GP08		
1/25/2012	22.5 ft bgs	32.5 ft bgs
PCE	1 U	1 U

GP09		
1/25/2012	22.5 ft bgs	35 ft bgs
PCE	1 U	1 U

GP15		
6/19/2012	22 ft bgs	34 ft bgs
PCE	1 U	1 U

GP14		
6/19/2012	22 ft bgs	32 ft bgs
PCE	1 U	1 U

GP16		
6/19/2012	22 ft bgs	32 ft bgs
PCE	1 U	1 U

GP17		
6/19/2012	20 ft bgs	30 ft bgs
PCE	1 U	1 U

Figure 3
Groundwater PCE Results

Former Cream Wine Property
Sunnyside, Washington

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Legend

Sample Locations

- PCE Non-Detection
- PCE Detection - Below CUL
- PCE Detection - Above CUL

MW10 1 U 2008 — Historical PCE Data (Location, Concentration, Date)

Current PCE Data

Groundwater Flow Direction

Site Boundary (Approximate)

Tax Lots (Approximate)

Notes:
1. PCE = Tetrachloroethene
2. All concentrations are measured in micrograms per liter (µg/L).
3. **Bold** values exceed cleanup levels.
4. ft bgs = feet below ground surface
5. DUP = duplicate sample
6. U = Analyte was not detected at or above method detection limit
7. Average historical groundwater flow direction as reported by SES, 2011.
8. Historical data were obtained from SES, 2011.
9. Historical data for monitoring wells MW19 and MW20 were obtained from Kennedy/Jenks, 2009.
10. CUL = Model Toxics Control Act Method A Cleanup Level for PCE of 5 ug/L.

0 25 50
Feet

Source: Aerial photograph obtained from ESRI, Inc. ArcGIS Online/Bing Maps. Historical well data from SoundEarth Strategies (2011).

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Analyte	Max Concentration (C_m)	Human Health Criteria			Background	Indicator Hazardous Substance?	Basis	Final Cleanup Level
		Method A unrestricted	Method B, carcinogen	Method B, non-carcinogen				
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg			mg/kg
Metals								
Lead	876	250	NR	NR	15	yes		250
TPH								
Gasoline Range Organics	49	100	NR	NR		no	C_m<CUL	
Diesel Range Organics	155	2000	NR	NR		no	C_m<CUL	
Lube Oil Range Organics	399	2000	NR	NR		no	C_m<CUL	
Heavy Oil Range Organics	554	2000	NR	NR		no	C_m<CUL	
VOCs								
Acetone	0.199	NR	NR	72000		no	C_m<CUL	

Notes:
mg/kg = milligrams per kilogram
NR = not researched - no value exists for this parameter
TPH = total petroleum hydrocarbons
gray shading = selected cleanup level

Table 2. Soil Cleanup Levels Evaluation

Analyte	Max Conc-entration (C_m) µg/L	Applicable State & Federal Laws				MTCA Cancer Risk at MCL	MTCA Hazard Quotient at MCL	Is MCL Protective?	Adjusted MCL µg/L	Method A µg/L	Indicator Hazardous Substance?	Basis	Final Cleanup Level µg/L
		Federal MCL µg/L	Federal MCLG µg/L	State MCL µg/L	Minimum MCL µg/L								
Chloroform	2.1	80	0	80	80		0.988	yes		NR	no	C_m<CUL	
Methyl tert-butyl ether (MTBE)	250	NR	NR	NR	NR					21	no	(a)	
Tetrachloroethene (PCE)	17	5	0	5	5	$2.38x10^{-7}$	0.104	yes		5	yes		5
Toluene	6.2	1000	1000	1000	1000		1.56	no	640	1000	no	C_m<CUL	

Notes:

(a) not selected as an indicator hazardous substance due to the low detection frequency, active remediation, and off-site source.

C_m = maximum concentration

CUL = cleanup level

gray shading = selected cleanup level

Max = maximum

MCL = maximum contaminant level

MCLG = federal maximum contaminant level goal

NR = not researched - no value exists for this parameter

µg/L = micrograms per liter

Table 1. Groundwater Cleanup Levels Evaluation

Action	Citation	Comment
Cleanup Action Construction	29 CFR 1910	Occupational Safety and Health Act
	Chapter 43.21 RCW	State Environmental Policy Act
	40 CFR 260	Resource Conservation and Recovery Act
	Chapter 173-303 WAC	Washington Dangerous Waste Regulations
	Chapter 173-160 WAC	Minimum Standards for Construction and Maintenance of Wells
	Chapter 296-155 WAC	Safety Standard for Construction
	Chapter 173-340 WAC	Model Toxics Control Act
	Chapter 173-304 WAC	Minimum Functional Standards for Solid Waste Handling
	Yakima County Municipal Code, Title 13	Building and Construction
	Yakima County Municipal Code, Title 16	Environment
Cleanup Standards	Chapter 173-340 WAC	Model Toxics Control Act
	42 USC 300; 40 CFR 141 and 143	Safe Drinking Water Act
	33 USC 1251	Clean Water Act
	Chapter 246-290 WAC	Safe Drinking Water Act for Public Water Supplies
Soil Remediation	40 CFR 264	Resource Conservation and Recovery Act
	Chapter 70.95 RCW; Chapter 173-304 WAC	Minimum Functional Standards for Solid Waste Handling
	Chapter 174-50 WAC	Accreditation of Environmental Laboratories
Groundwater Remediation	Chapter 173-340 WAC	Model Toxics Control Act
	40 CFR 144 and 146	EPA Underground Injection Control Regulations
	40 CFR 141	Safe Drinking Water Act, Primary Drinking Water Regulations
	Chapters 173-150 and 173-154 WAC	State Water Code and Water Rights
	Yakima County Municipal Code, Title 12	Water and Sewage

Table 3. Applicable or Relevant and Appropriate Requirements for the Cleanup Action

Alternative	Description	Protectiveness	Permanence	Long-Term Effectiveness	Management of Short-Term Risks	Implementability	**Average**	Public Concerns	**Total Cost**
Alternative 1	In situ treatment with excavation and off-site disposal of all impacted soil	5	5	5	4	4	**4.6**	TBD	**$ 338,300**
Alternative 2	Monitored natural attenuation with excavation and off-site disposal of all impacted soil	4	5	4	5	4	**4.4**	TBD	**$ 182,300**

Table 4. Cleanup Action Alternatives Evaluation