Ecology Review Draft
Cleanup Action Plan
Pederson's Fryer Farms
Pierce County, Washington

June 15, 2012

Prepared for

Washington State Department of Ecology

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LIST OF ABBREVIATIONS AND ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
BGS	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CAP	Cleanup Action Plan
COC	Constituents of Concern
CUL	Cleanup Level
DCA	Disproportionate Cost Analysis
DRO	Diesel-range Organics
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
FS	Feasibility Study
ft	Feet
ft^2	Square Foot
GRO	Gasoline-range Organics
HBU	Highest Beneficial Use
ISCO	*In situ* Chemical Oxidation
LNAPL	Light Non-aqueous Phase Liquid
MTCA	Model Toxics Control Act
NFA	No Further Action
ORO	Oil-range Organics
PFF	Pederson's Fryer Farms
RAR	Remedial Action Reports
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
SEPA	State Environmental Policy Act
SVE	Soil Vapor Extraction
TEE	Terrestrial Ecological Evaluation
UST	Underground Storage Tank
WAC	Washington Administrative Code

1.0 INTRODUCTION

This Cleanup Action Plan (CAP) was prepared in preparation for cleanup of petroleum contamination in soil and groundwater at the former Pederson's Fryer Farms (PFF) property (FSID No. 6261637) located at 2901 72nd Street East in Tacoma, Washington and the adjacent petroleum-contaminated portion of the Tacoma City Water Pipeline Road property (collectively the Site; Figure 1). Responsibility for conducting the remedial action at the Site has been delegated to the Washington State Department of Ecology (Ecology). Landau Associates is assisting Ecology with implementing the remedial action at the Site. A combination of ozone sparging and focused excavations was determined to be the preferred remedial alternative based on a remedial investigation (RI), supplemental RI, and feasibility study (FS), which were documented in reports by Landau Associates (2011, 2012). Ecology concurred with the use of ozone sparging as the preferred remedial alternative during a teleconference call on May 2, 2012 (Coleman, M. 2012a) and granted permission to produce the CAP. Formal approval was transmitted via email on June 15, 2012 (Coleman, M. 2012b).

This CAP was prepared in accordance with the requirements of the Model Toxics Control Act (MTCA) as identified under Washington Administrative Code (WAC) 173-340-380(1)(a). This CAP provides some Site background information, but assumes the reader is generally familiar with the Site history, results of previous Site investigations, and current Site conditions.

1.1 SITE DESCRIPTION

The former PFF property is 3.47 acres in size and is a single tax parcel (parcel 0320262039) to the northwest of the intersection of 72nd Street East and Waller Road East in unincorporated Pierce County, between Tacoma and Puyallup. The property is currently zoned as Rural Neighborhood Center and is part of the Pierce County Mid-County Community Plan (Pierce County website 2012a). The property is currently occupied by five separate buildings: main storage warehouse [31,721 square feet (ft^2)], additional storage warehouse (6,400 ft^2), office building (2,538 ft^2), service garage (2,250 ft^2), and original house (2,838 ft^2; Pierce County website 2012b). Approximately 32,400 ft^2 of the Site is paved with asphalt. Aside from buildings and asphalt, the remaining portion of the Site is covered with gravel and landscaping. The current owner of the former PFF property is Waller Enterprises, LLC, who rents building space to tenants at four of the five buildings (currently). The former PFF property is shown on Figure 2.

The Pipeline Road property is a 24.74 acre single tax parcel (parcel 0320262039) located along the east side of the former PFF property that extends northwest from the intersection of 72nd Street East and Waller Road East to the intersection of East 40th Street and East K Street. Pipeline Road is a utility

corridor parcel owned by the City of Tacoma's potable water utility. That petroleum-contaminated portion of Pipeline Road included within the Site has overhead powerlines, asphalt and gravel pavement, and vegetated areas including some trees, shrubs, and tall grass. Pipeline Road is shown on Figure 2.

As summarized in Section 1.4, the former PFF property has been identified as the source of contamination impacting the Site. The Site is considered to be areas where petroleum-impacted soil and groundwater has come to be located. The Site includes six separate contaminated areas (or areas of concern) on the former PFF property, namely: Area A, Area B, Area C, Area E, Area F, and Area G. Area A extends from the former PFF property east onto the Pipeline Road property; no other areas of concern extend off of the former PFF property. The Site cleanup areas of concern and approximate extent of contamination are shown on Figure 2.

1.2 HISTORY AND BACKGROUND

PFF operated as a poultry processing facility from 1948 to 1998. The former PFF property originally consisted of six separate parcels [Environmental Partners, Inc. (EPI) 2003], which are discussed in the RI report (Landau Associates 2011). All six of the properties have been investigated and only 2901 72nd Street East (the former PFF property) is currently impacted by petroleum contamination (Landau Associates 2012).

Historically, the former PFF property served as the primary location of the former poultry processing plant where 10 separate underground storage tanks (USTs) have been identified. Area A included four USTs: two diesel, one gasoline, and one waste oil. Area B included two USTs (one diesel, one gasoline) and fuel pump islands. Area C included one heating oil UST. Area E included one diesel/heating oil UST. Area F and Area G included one gasoline UST each. Additional information regarding the individual USTs is presented in the RI report.

More than 10 pre-RI investigations were conducted at the Site between 1994 and 2005. The RI was conducted from late 2010 through April 2012. Source removal actions (or interim remedial actions) were conducted during pre-RI investigations and during the RI. The pre-RI investigations included removal of 9 of 10 USTs (from all areas of concern except Area E) and the two fuel pump islands as well as much of the contaminated soil mass that surrounded each. The UST and fuel pump island excavation cavities were refilled with treated soil and clean backfill material (EPI 2003). The Area E UST was decommissioned in place in 2011 during the RI; this UST is beneath a building and, therefore, not practicable to remove.

After the removal of the Area A USTS, pre-RI observations indicated that light non-aqueous phase liquid (LNAPL) petroleum was floating on the water in some of the monitoring wells in Area A. A pre-RI field study was employed to extract the LNAPL over a summer in 2005 (EPI 2005). Remedial

actions at the Site were terminated until the RI began in 2010. During the RI, it was determined that LNAPL is no longer present in Area A monitoring wells, but dissolved-phase petroleum is still present in groundwater and some petroleum may be sorbed in the soil matrix (Landau Associates 2011).

Residual soil and groundwater contamination has been delineated at the six areas of concern. The site characterization effort was started by EPI from 1998 to 2005, and was completed during the RI (Landau Associates 2011) and supplemental RI (Landau Associates 2012) by Landau Associates from 2010 to 2012. Based on the site characterization results, Landau Associates completed a FS (Landau Associates 2012). The FS identified ozone sparging and focused excavations as the preferred remedial alternative for Site cleanup. Ozone sparging will be applied to Area A, Area B, Area F, and Area G. Focused excavations will be conducted at Area C and Area E. Ecology concurs with the selection of ozone sparging and focused excavations as the preferred remedial alternative and approved of the alternative on June 15, 2012 (Coleman, M. 2012b).

1.3 GEOLOGY AND HYDROGEOLOGY

The Site lies within a broad upland drift plain (the South Tacoma drift plain) bounded to the northeast by the alluvial valley of the Puyallup River and to the west by the south Tacoma Channel Vashon[1] age glacial outwash feature (Jones et.al., 1999). The regional geology of the south Tacoma drift plain consists of older glacial and interglacial deposits overlain by a thick sequence of Vashon age drift. These Vashon drift deposits typically consist of advance outwash sand and gravels beneath glacial till and recessional outwash deposits. However, the Site geology encountered during pre-RI and RI investigations generally consisted of glacial lacustrine deposits [10 to 15 feet (ft) thick] overlying ablation till (greater than 50 ft thick) away from former excavation areas, where shallow backfill material was encountered; advance outwash deposits were not encountered at the Site. The glacial lacustrine typically consists of loose to medium dense, fine to medium sand and silt (relatively permeable). The ablation till is almost always very dense, has coarser soil texture and is typically well graded (less permeable). The former excavation backfill consists of highly permeable material.

Two water-bearing zones have been identified at the Site: shallow and deep. The shallow water-bearing zone is composed of perched groundwater within the backfill material, lacustrine deposits, and ablation till (Landau Associates 2011). Shallow groundwater levels are spatially variable throughout the Site with temporal distributions generally correlated with seasonal precipitation, causing a largely disconnected hydrogeologic environment. As a result, the shallow zone has no definable or significant flow direction and is not considered an aquifer requiring treatment or a direct media of concern.

[1] Vashon refers to the most recent glacial episode in the Puget Sound lowland; approximately 10,000 years before present.

The deep water-bearing zone is within the ablation till. Similar to the shallow zone, the deep zone is discontinuously saturated throughout the Site. The deep zone is only locally saturated at Area A and Area F where the largest and deepest pre-RI remedial excavations were conducted. The permeable nature of the former excavation backfill material within the former excavation cavity basins act as enhanced recharge areas, causing a localized deep groundwater zone and mounding (a radial groundwater flow direction). Only deep zone groundwater from Area A is contaminated; therefore, only the deep water-bearing zone of Area A requires treatment (Landau Associates 2012).

1.4 SUMMARY OF CURRENT SITE CONDITIONS AND SITE CONCEPTUAL MODEL

The Site constituents of concern include gasoline-range organics (GRO), diesel-range organics (DRO), oil-range organics (ORO), gasoline volatiles BTEX (or benzene, toluene, ethylbenzene, and xylenes), and naphthalene. The Site media of concern include soil (all areas of concern) and groundwater (Area A only). The primary release mechanisms at the Site areas of concern include historical releases from the USTs, fuel islands, and associated distribution piping to soil and groundwater; all but the Area E distribution piping were removed or decommissioned during pre-RI and RI activities. Secondary release mechanisms include leaching and infiltration from soil to groundwater.

Residual soil contamination exists at all six areas of concern. Petroleum-impacted soil above MTCA cleanup levels (CULs) is present as shallow as 1.5 ft below ground surface (BGS; Area F) and as deep as 50 ft BGS (Area A) and is beneath buildings, asphalt, and gravel.

As discussed above in Section 1.3, and in the FS report (Landau Associates 2012), shallow perched groundwater is not a medium of concern, but contaminated shallow perched groundwater within the remedial action areas will be treated or excavated concurrently with treatment or removal of surrounding contaminated soil. The deep groundwater zone is present perennially at Area A and is contaminated with petroleum constituents. Contamination has not been identified in the deep groundwater zone at the other areas of concern.

Air quality investigations performed during the RI and supplemental RI (Landau Associates 2012) involving the collection and evaluation of indoor air and soil gas indicated that the vapor intrusion pathway is not an exposure pathway of concern at the Site under existing conditions. Consequently, no additional investigation or evaluation of the vapor intrusion pathway is necessary at the Site, and soil gas and indoor are not specifically addressed by the cleanup. However, the cleanup actions addressing soil and groundwater described in this CAP will further reduce vapor intrusion risk at the Site through the treatment or removal of contaminant sources.

2.0 PROPOSED CLEANUP ACTION

The following sections describe the proposed cleanup action and summarize other cleanup actions evaluated. Descriptions and details of technical and engineering design elements will be provided under separate cover in an Engineering Design Report (EDR) after Ecology approval of this CAP.

2.1 GOALS AND OBJECTIVES OF THE CLEANUP ACTION

The specific cleanup goals and objectives for the Site include the following:

- Cleanup of all areas of the Site both on the former PFF property and Pipeline Road where contamination has come to be located
- Treatment of subsurface soil, and groundwater at the Site to meet the cleanup standards established in the CAP
- Protection of human health and the environment, including protection against direct contact with contaminated soil and direct contact or consumption of contaminated groundwater.

The selection of ozone sparging and focused excavations as the cleanup action to be performed at the Site will address each of these goals and objectives and complies with WAC 174-340-360.

2.2 GENERAL DESCRIPTION OF THE PROPOSED CLEANUP ACTION

The proposed cleanup action for the Site is to apply continuous injections of ozone to the subsurface to oxidize and treat the petroleum mass in soil and groundwater (Area A, Area B, Area F, and Area G), and excavation to remove and dispose of petroleum-contaminated soil where it is accessible and where ozone injection is impractical (Area C and Area E). The ozone generator/sparge unit is an automated system that generates ozone from atmospheric or containerized oxygen and injects the ozone to the subsurface in a continuous stream through sparge wells. Once injected, the ozone oxidizes the contaminant mass directly or indirectly by hydroxyl radicals (a reaction product of ozone). In addition to the oxidation of the contaminant mass, ozone sparging promotes aerobic biodegradation when ozone degrades to molecular oxygen and stimulates natural attenuation processes. The focused excavation work is anticipated to be relatively shallow and in the vadose zone, in fill material and native lactustrine deposits.

2.2.1 CLEANUP OF SITE MEDIA

Ozone sparging will be performed at the Site to oxidize and aerobically biodegrade (i.e. treat) the petroleum contamination that is sorbed to the soil and dissolved in groundwater. The destruction of petroleum contamination in soil and deep zone groundwater will prevent future potential leaching and

migration in groundwater. Focused excavations will target source areas in the vadose zone. Removal of the petroleum contaminated soil will prevent future potential leaching to deep groundwater.

Any residual petroleum contamination remaining in Site soil outside the treatment areas (e.g., outside the radius of influence of the ozone sparging treatment areas and the focused excavation areas) following the treatment period is expected to naturally attenuate. Similarly, after completion of active ozone sparging in the deep groundwater zone in Area A, any residual petroleum is anticipated to naturally attenuate. Removal of petroleum contaminated-soil from the source areas will also prevent perched water from being impacted by contacting contaminated soil.

2.2.2 SUMMARY OF OZONE SPARGING SYSTEM INSTALLATION/OPERATIONS

Ozone sparging will be applied via sparge wells to the vadose zone of Area A, Area B, Area F, and Area G, and the saturated zone/deep water-bearing zone of Area A. Each of these four areas of concern will have their own sparge well network. Each sparge well network and associated well screen placement will be designed to target the extent of contamination associated with each area of concern. Based on estimated radii of influence of about 20 ft for groundwater and 10 ft for soil, there will be (approximately) the following number of sparge wells (and type) per area:

- Area A vadose zone – 15 dual nested sparge wells
- Area A saturated zone/deep zone groundwater – 25 sparge wells
- Area B vadose zone – 10 sparge wells
- Area F vadose zone – 6 sparge wells
- Area G vadose zone – 2 sparge wells.

Of the areas of concern, only Area A extends off of the former PFF property to Pipeline Road. Of the approximate 40 sparge wells allocated to Area A, it is estimated that 17 of the wells (or approximately 43 percent of the sparge well network) would be installed on Pipeline Road. Ecology is working with the City of Tacoma regarding site access to Pipeline Road required to execute Site cleanup.

Ozone generator/sparge units (ozone unit) will inject ozone to a manifold system which directs ozone to the sparge well networks. Due to site layout, Area A/Area B will share a single ozone unit and Area F/Area G will each share a single ozone unit. Prior to operating the units, existing fencing may need to be adjusted and protective security fencing to house the ozone generator/sparge unit and manifold will be constructed. Both ozone units will be on the former PFF property. Conceptual drawings of ozone sparge well networks for Area A, Area B, Area F, and Area G are provided on Figure 3 through 6.

Since the ozone generator/sparging unit is automated, it is anticipated to require minimal operations and maintenance. The system will be monitored remotely during operation via remote

telemetry with routine Site visits for required visual inspection and maintenance of the ozone unit components. It is estimated that (collectively) all areas of concern would be treated within 2 to 3 years. The ozone trailer can be rented or purchased, but due to the treatment time estimate, it assumed that purchase of the trailer would be less expensive than renting one.

Approximately 100 soil confirmation samples will be collected via drilling throughout the sparging program for performance and compliance monitoring purposes. Up to 12 quarters of performance groundwater monitoring will be collected with an additional 4 quarters of compliance groundwater monitoring after completion of the sparging programs. One additional monitoring well for the Area A deep water-bearing zone will be installed.

2.2.3 SUMMARY OF FOCUSED EXCAVATIONS

Excavation of shallow soil contamination will be applied to Area C and Area E only. An engineered shoring system will have to be designed and installed for Area C excavation work due to the proximity to a building. Because Area E is beneath a building foundation, some demolition will be required. The assumed vertical limits of the excavations range between approximately 8 ft BGS (Area C) and up to 12 ft BGS (Area B). Based on the estimated limits of excavation shown on Figure 7 and Figure 8, the approximate soil volume that would be excavated is 55 cubic yards. The actual extent of excavation will be based on the results of field screening and soil compliance monitoring conducted during excavation.

The excavated soil that is contaminated will require treatment or disposal at a facility licensed to accept petroleum-contaminated soil (likely the Pierce County regional landfill). Based on the volume, depth, and locations of the excavations, it is anticipated that the design (including shoring design), permitting, excavation, and filling of the remedial excavations will take less than 3 to 6 months to complete. Soil confirmation samples will be collected during excavations for performance and compliance monitoring purposes.

2.3 OTHER ALTERNATIVES CONSIDERED

As part of the Site FS (Landau Associates 2012), four cleanup alternatives, including ozone sparging with focused excavations, were considered and evaluated. All four alternatives proposed to address Area C and Area E with focused excavations. Therefore, what made each alternative unique was how they addressed Area A, Area B, Area F, and Area G contamination. The three other alternatives considered were:

- *In Situ* Chemical Oxidation (ISCO) Injection and Excavation
  - ISCO (using RegenOx and ORC products):

    - Shallow and Deep Soil at Area A
    - Remedial Action for Groundwater at Area A
    - Shallow Soil at Area G
  - Excavation: Soil at Area B, Area C, Area E, and F
- Excavation and Enhanced Biodegradation
  - Excavation: Site-wide Shallow Soil
  - Enhanced Biodegradation:
    - Deep soil at Area A
    - Groundwater at Area A
- Soil Vapor Extraction (SVE), Excavation, and Enhanced Biodegradation
  - SVE: Shallow Gasoline-Impacted Soil (specifically Area B, Area F, and Area G)
  - Excavation: Shallow Diesel-Impacted Soil (Area A, Area C, and Area E)
  - Enhanced Biodegradation:
    - Deep Soil at Area A
    - Groundwater at Area A

2.4 RATIONALE FOR SELECTING PROPOSED ALTERNATIVE

As required under the FS process by MTCA, the costs and benefits associated with the evaluated remedial alternatives were compared using a disproportionate cost analysis (DCA). The DCA compared the relative environmental benefits of each alternative against those provided by the most permanent alternative evaluated. Costs are disproportionate to benefits if the incremental cost of the most permanent alternative exceeds the incremental degree of benefits achieved over the lower cost alternative [WAC 173-340-360(3)(e)(i)]. Alternatives that exhibit such disproportionate costs are considered "impracticable."

The DCA indicated that ozone sparging with focused excavations yielded the greatest overall benefit of the four alternatives evaluated for the Site. In addition to having the highest benefit score, this alternative had the lowest probable relative cost. Therefore, ozone sparging and focused excavations were identified as the preferred remedial alternative for the Site.

Furthermore, in its June 15, 2012 email (Coleman, M. 2012b), Ecology provided "formal concurrence with the FS's preferred alternative of *in situ* thermal remediation," and indicated that "in selecting *in situ* thermal remediation, the FS followed the substantive requirements of MTCA."

2.5 RESPONSIBILITY FOR CLEANUP ACTION

Responsibility for conducting remedial actions has been delegated to Ecology. Landau Associates has been retained by Ecology to provide an EDR for the cleanup, provide oversight during the cleanup, and to provide draft and final remedial action reports (RARs).

The Site is currently not covered by an Ecology Administrative Action; therefore, any state or local permits that are required will need to be obtained. Ecology will obtain needed permits and Pipeline Road site access with Landau Associates' support. Ecology will also be responsible for dissemination of the State Environmental Policy (SEPA) documents and any public outreach documents related to the Site cleanup action; Landau Associates will support Ecology upon request.

During the CAP process and before the EDR, Ecology will be responsible for overseeing the draft CAP public comment period; see Section 5.0. Once public comments are received and incorporated into the CAP, a final CAP will be produced. Following the CAP, Landau Associates will produce an EDR. Once the EDR is finalized, Ecology will solicit bids from contractors for the cleanup work.

During the Site cleanup work, the contractor will be responsible for implementing, operating, and maintaining the ozone sparging systems and will produce written reports or other written documents (deliverables) in accordance with the schedule to be negotiated between Landau Associates and Ecology. Similarly, the contractor responsible for the focused excavations will provide required documentation.

Once the cleanup is complete and the final RAR is produced, Ecology will evaluate the overall success of the cleanup and may issue a No Further Action (NFA) determination for the Site at its discretion.

3.0 CLEANUP STANDARDS

This section develops Site cleanup standards for chemical constituents that were detected in affected Site media. Cleanup standards consist of 1) CULs defined by regulatory criteria that are adequately protective of human health and the environment and, 2) the point of compliance at which the CULs must be met.

3.1 TERRESTRIAL ECOLOGICAL EVALUATION

Unless exclusion applies to a site, a terrestrial ecological evaluation (TEE) is required by the MTCA. A terrestrial ecological evaluation determines whether a release of hazardous substances to soil may pose a threat to the terrestrial environment; characterizes threats to terrestrial plants or animals; and establishes site-specific cleanup standards for the protection of terrestrial plants and animals.

Because the Site is almost entirely paved or covered with buildings or other physical barriers that will prevent ecological receptors from being exposed to soil contamination, and because existing Site contamination is already below the standard point of compliance or will be after completion of remediation [i.e. the standard point of compliance for soil contaminated with hazardous substances protective of terrestrial ecological receptors for a site is 15 ft BGS under WAC 173-340-7490(4)(b)], the Site qualifies for an exclusion under WAC 173-340-7491(1)(a)&(b). Per WAC 173-340-7491(1), no further evaluation is required if a Site meets any of the exclusion criteria under WAC 173-340-7491(1)(a) through (d). Because the Site meets at least one of these criteria, the cleanup standards for the Site do not include any terrestrial ecological considerations or criteria. The Ecology TEE evaluation form is provided as Appendix A.

3.2 CLEANUP STANDARDS

CULs for affected media developed under MTCA represent the concentrations of contaminants of concern (COCs) that are protective of human health and the environment for identified potential exposure pathways, based on the highest beneficial use (HBU) and the reasonable maximum exposure (RME) for each affected medium. The process for developing cleanup levels consists of identifying the HBU and RME for affected media, determining those that represent the greatest risk to human health or the environment, and determining the CULs that will provide for an acceptable level of risk associated with the COC in affected media. Based on previous investigations, CULs will be developed for the following COCs in Site soil:

- GRO
- DRO

- ORO
- BTEX
- Napthalene

CULs will be developed for the following COCs in Site groundwater:

- GRO
- DRO
- ORO
- Benzene
- Xylenes

CULs, remediation levels, and their respective points of compliance are presented in the sections below and summarized in Table 1 (soil) and Table 2 (groundwater).

3.2.1 CLEANUP LEVELS

Under MTCA, CULs determine at what level a particular hazardous substance does not threaten human health or the environment. The CULs for soil and groundwater are identified in this section.

3.2.1.1 Soil

MTCA regulations (WAC 173-340-704) indicate that "Method A may be used to establish CULs at sites that have few hazardous substances and … sites where numerical standards are available in this chapter for applicable state and federal laws for all indicator hazardous substances in the media for which the Method A cleanup level is being used." The Method A Soil CULs for GRO, DRO, ORO, BTEX constituents, and naphthalene have been selected as the soil CULs for the Site and are presented in Table 1.

These soil CULs are protective of human health due to direct contact or ingestion and is also protective of groundwater (i.e., groundwater in contact with soil or receiving leachate from soil would not be contaminated above the groundwater cleanup level).

3.2.1.2 Groundwater

Similar to the CULs for soil, the Method A Groundwater CULs for GRO, DRO, ORO, and BTEX constituents have been selected as the groundwater cleanup level for the Site and are presented in Table 2.

The groundwater CULs are protective of human health due to direct contact or consumption (i.e. potable water).

3.2.2 POINTS OF COMPLIANCE

Under MTCA, the point of compliance is the point or points at the Site where the CULs must be attained. The points of compliance for soil and groundwater are identified in this section.

3.2.2.1 Soil

The point of compliance for soil, as established under WAC 173-340-740(6), is as follows:

- For soil CULs based on human exposure via direct contact: throughout the Site from ground surface to 15 ft BGS
- For sites where soil CULs are based on the protection of groundwater: throughout the Site.

MTCA recognizes that for those cleanup actions that involve containment of hazardous substances, the soil CULs will typically not be met throughout the Site [WAC 173-340-740(6)(f)]. However, MTCA also recognizes that such cleanup actions may still comply with cleanup standards. The determination of the adequacy of soil cleanup will be based on the remedial action alternative's ability to comply with groundwater standards for the Site, to meet performance standards designed to minimize human or environmental exposure to affected soil, and to provide practicable treatment of affected soil.

For Site areas of concern where ozone sparging is being implemented (Area A, Area B, Area F, and Area G), the selected point of compliance for soil will be from ground surface to at least 15 ft BGS (although treatment will be performed well below 15 ft BGS at Area A), which is contingent upon confirmation that soil and groundwater CULs are being achieved; performance soil and groundwater samples will be used to measure compliance. For Area C and Area E where shallow remedial excavations will be performed, the selected point of compliance for soil will be from ground surface to 15 ft BGS; excavation soil confirmation samples will be used to measure compliance.

3.2.2.2 Groundwater

The standard point of compliance for groundwater, as established under WAC 173-340-720(8), is throughout the Site. The standard point of compliance has been selected for the Site. The existing shallow and deep well network (including any replacement or supplementary wells as needed due to use and configuration of the ozone sparging systems and sparge well networks) at the Site will be used to monitor remedial action performance and post-remedial groundwater quality at the Site.

4.0 POTENTIALLY APPLICABLE LAWS

In accordance with MTCA, all cleanup actions conducted under MTCA shall comply with applicable state and federal laws (WAC 173-340-710(1). MTCA defines applicable state and federal laws to include legally applicable requirements and those requirements that are relevant and appropriate. Collectively, these requirements are referred to as applicable or relevant and appropriate requirements (ARARs). This section provides a brief overview of potential ARARs for the Site cleanup. The primary ARAR is the MTCA cleanup regulation (WAC 173-340), especially with respect to the development of CULs and procedures for development and implementation of a cleanup under MTCA. Other than MTCA, the primary ARARs that may pertain to the cleanup action include the following:

- Federal Maximum Contaminant Levels (40 CFR Part 141)
- Washington Clean Air Act, Chapter 70.94 RCW
- Underground Injection Control Program (Chapter 173-218 WAC); Well Code 5X26
- Puget Sound Clean Air Agency, Regulation I
- Solid and Hazardous Waste Management (RCW 70.105; Chapter 173-303 WAC; 40 CFR 241, 257; Chapter 173-350 and 173-351 WAC) and Land Disposal Restrictions (40 CFR 268; WAC 173-303-340)
- Washington Industrial Safety and Health Act (RCW 49.17) and the Federal Occupational Safety and Health Act (29 CFR 1910, 1926)
- SEPA (RCW 43.21C and Chapter 197-11 WAC).

State and federal groundwater and air quality criteria are considered in the development of CULs. State Dangerous Waste Regulations may be applicable to contaminated soil removed from the Site during cleanup activities due to contamination characteristics. To date, all RI investigation derived waste has been characterized as non-hazardous (Landau Associates 2011, 2012).

Occupational health and safety regulations are applicable to ensuring worker safety while performing work and construction related to hazardous materials operations and any associated emergency response actions. These regulations are an integral part of developing and implementing site-specific health and safety plans that will be required for all contractors involved with performance of the remedial action.

Substantive SEPA requirements will be addressed concurrent with the site CAP to the degree applicable for the selected cleanup action. Ecology will be responsible for the dissemination of the SEPA documents and any public outreach documents; Landau Associates will support Ecology upon request.

5.0 PUBLIC PARTICIPATION/COMMUNICATIONS

Consideration of public concerns is an inherent part of the Site cleanup process under MTCA (see WAC 173-340-600). Ecology is responsible for providing public notice and the opportunity for public comments on this draft CAP per WAC 173-340-600(13). The formal public review and comment period will be approximately 30 days. After review and consideration of public comments, the contents of this document may be revised accordingly and Ecology will issue a final CAP and will publish its availability in the Site Register and by other appropriate methods per WAC 173-340-380(3).

6.0 SCHEDULE FOR IMPLEMENTATION

Upon finalizing the CAP and receiving approval during the SEPA process, the EDR will be produced. The EDR will serve as the comprehensive work plan document for implementing the remedial action. It is anticipated that the EDR and associated plans and specifications will be provided to Ecology during fall 2012. Based on the current anticipated schedule, installation of the ozone sparging system is likely to occur during late fall/early winter 2012. Installation and startup is anticipated to take approximately 2 months to complete. Upon initiation of active operation of the system (estimated to start December 2012), it is estimated that the systems will run up to 36 months (estimated to end December 2015), with the Area A contamination taking the longest to treat. As discussed in Section 2.2.2, confirmation sampling and monitoring of soil and groundwater will be conducted during active remediation. If the potential situation arises where Area A soil is confirmed to be below CULs, but Area A deep zone groundwater conditions are not yet below CULs, Ecology may allow active remediation using ozone sparging to discontinue and for monitored natural attenuation to be employed as the second and final phase of Area A deep groundwater remediation.

The focused excavation work will be conducted in 2013 during dry season conditions to minimize potential contact with perched shallow groundwater zones. As discussed in Section 2.2.3, soil confirmation samples will be collected at time of excavation.

Upon completion of active remediation including ozone sparging and focused excavations, groundwater will be sampled quarterly for 4 quarters with completion estimated by approximately the end of 2016 or early 2017.

7.0 REPORTING AND DATA SUBMISSION

A project SharePoint site exists and will be used during remediation to facilitate efficient reporting of data and project documents. The SharePoint site is a password-protected website maintained by Landau Associates. Data and documents will be posted to the website. Ecology and other stakeholders have issued passwords to access documents and data. Electronic copies of documents will also be made available for distribution upon request. Paper copies of documents will be sent out only for key deliverables or by specific request.

After startup of the ozone sparging systems, quarterly remediation status updates will be prepared during active performance of the cleanup action. These updates will be provided as memoranda or short letter reports to Ecology and will document system performance, performance sampling results, and monitoring results for the preceding 2 months. These reports will be posted to the SharePoint site on or before the 15th of the month following the end of the 2-month period.

Upon completion of the cleanup action and follow-up confirmation sampling, a draft Remedial Action Completion Report will be prepared for submittal to Ecology documenting the results and performance of the cleanup action, and summarizing performance sampling and monitoring results, and the results of confirmation sampling. If the confirmation sampling results adequately demonstrate that cleanup has successfully remediated soil to below the Site CULs, the report will include or be accompanied by a request for a NFA determination from Ecology. If evidence of residual contamination above CULs is identified by confirmation sampling (soil and groundwater), appropriate recommendations will be made for additional operation of the ozone sparging system, additional investigation, and/or a contingency cleanup action, as appropriate. After receipt of comments from Ecology, a final report will be prepared for submittal to Ecology and other stakeholders upon request.

In addition, all pertinent and applicable data collected during each of the sampling events will be submitted electronically to Ecology via Ecology's Electronic Information System online database application as required by WAC 173-340-840 and Ecology Toxics Cleanup Program Policy 840.

8.0 USE OF THIS DOCUMENT

This Cleanup Action Plan has been prepared for specific application to the former Pederson's Fryer Farms Site in Pierce County, Washington. The reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

This document has been prepared under the supervision and direction of the following key staff.

LANDAU ASSOCIATES, INC.

Lauren K. McIntire, EIT
Project Engineer

Piper Roelen, P.E.
Associate

Eric Weber, L.G.
Principal

EFW/PMR/LKM/jrc

9.0 REFERENCES

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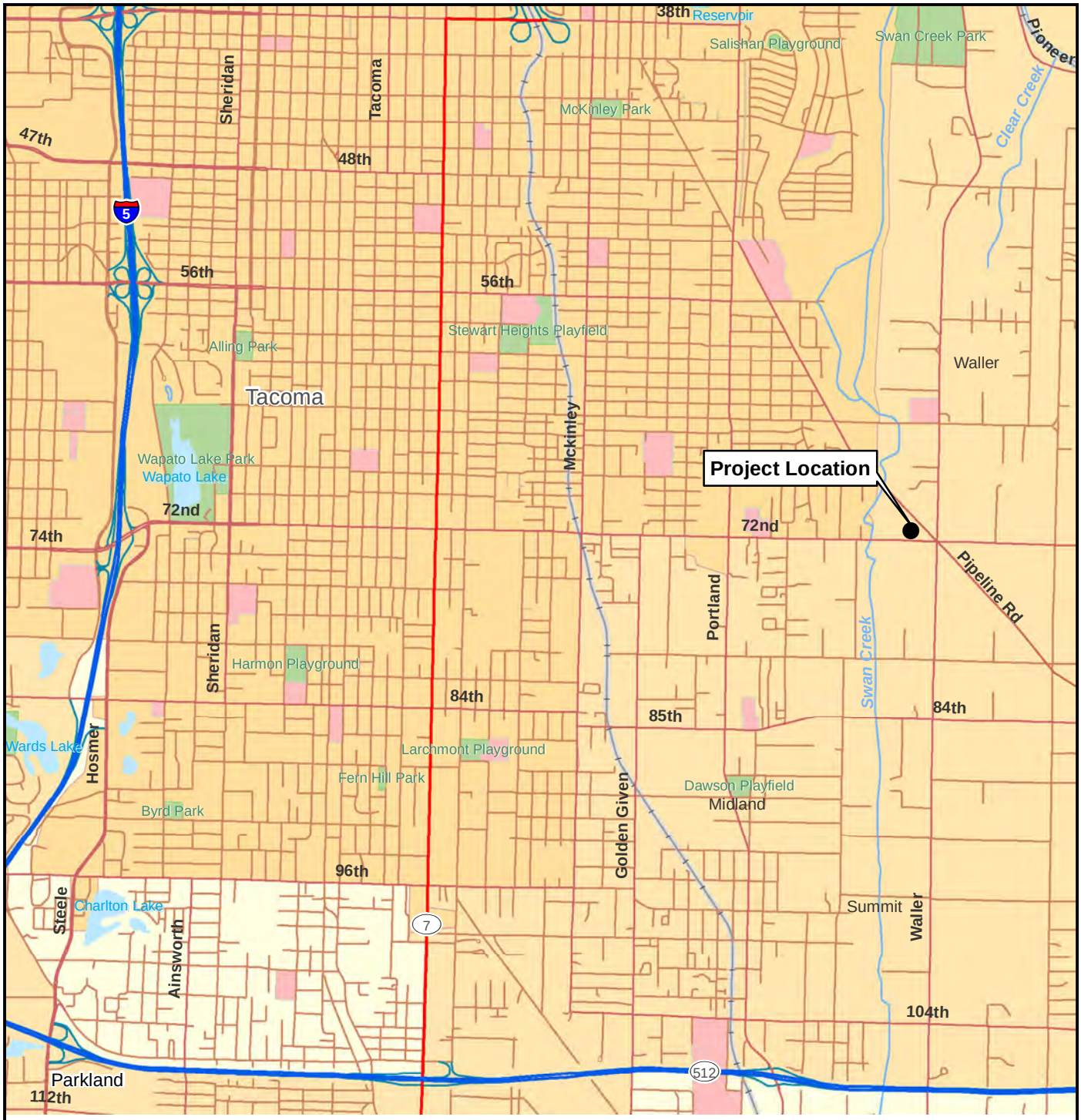


N

0 0.5 1

Miles

Data Source: ESRI 2008

Y:\Projects\136006\010\013\CAP Report\Fig1-Vicinity.mxd

LANDAU ASSOCIATES

Pederson's Fryer Farms Pierce County, Washington	**Vicinity Map**	Figure 1

Y:\Projects\136006\010\013\CAP Report\Fig2-SitePlan2.mxd 6/11/2012 NAD 1983 StatePlane Washington South FIPS 4602 Feet

Legend

- Soil Contamination
- Groundwater Contamination
- Smear Zone (40' to 55')
- Former Excavation Area
- Tax Parcel

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 70 140

Scale in Feet

Data Source: ESRI World Imagery; Pierce County GIS.

LANDAU ASSOCIATES

Pederson's Fryer Farms Pierce County, Washington	**Site Plan**	Figure 2

N

Waller Del G & Michelle B TTEE
Parcel #0320262012

Smith's Landing LLC
Parcel #0320262132

Tacoma Public Utilities 54" Potable Water Line

Tacoma Public Utilities Pipeline Road

MW-7R
A-2
MW-4
MW-19
A-3
MW-17
MW-25D
12000 Gal Diesel UST
MW-36D
A-1
550 Gal W. Oil UST
MW-26S
MW-5
MW-20
Tacoma City Water
Parcel #0320262136
Waller Enterprises LLC
Parcel #0320262077
6000 Gal Diesel UST
A-4
MW-18
8000 Gal Gasoline UST
MW-1
A-5
Treatment Compound
(Ozone Generator)
MW-27D
Northern Edge of
Area A
To Area B
Waller Enterprises LLC
Parcel #0320262039

DRAFT

Legend

- Existing Monitoring Well
- Decommissioned Monitoring Well
- Tax Parcel
- Former Excavation Area and USTs
- Groundwater Contamination
- Shallow Soil Contamination
- Smear Zone (40' to 55')
- Groundwater Sparge Well and Approximate Radius of Influence
- Nested Vadose Zone Sparge Well and Approximate Radius of Influence

Note
1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 10 20
Scale in Feet

Data Source: Pierce County GIS, ESRI World Imagery.

Y:\Projects\136006\010\013\CAP Report\Fig3-AreaAOzoneSparging.mxd 6/11/2012 NAD 1983 StatePlane Washington South FIPS 4602 Feet

LANDAU ASSOCIATES

Pederson's Fryer Farms Pierce County, Washington	**Area A** **Ozone Sparging Conceptual Design**	Figure 3

N

To Ozone Generator (Area A)

Waller Enterprises
Parcel #0320262039

Tacoma City Water
Parcel #0320262136

MW-28D

MW-9

MW-8

MW-10

MW-31D

Former 3,000 Gal
Diesel UST
(approx.)

Former 6,000 Gal
Gasoline UST
(approx.)

Former Pump
Islands
(approx.)

DRAFT

Legend

- Monitoring Well
- Tax Parcel
- Former Excavation Area and USTs
- Above MTCA Method A CUL
- Vadose Zone Sparge Well and Approximate Radius of Influence
- Soil Contamination

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Source: Pierce County GIS, ESRI World Imagery.

0 24

Scale in Feet

LANDAU ASSOCIATES

Pederson's Fryer Farms Pierce County, Washington	**Area B** **Ozone Sparging Conceptual Design**	Figure 4

Y:\Projects\136006\010\013\CAP Report\Fig4-AreaBOzoneSparging.mxd 6/11/2012 NAD 1983 StatePlane Washington South FIPS 4602 Feet

N

Tacoma City Water
Parcel #0320262136

MW-29D

Waller Enterprises LLC
Parcel #0320262039

Main Facility Building

MW-11

MW-35S

DRAFT

Former 2000 Gal
Gasoline UST

Former UST Piping

Treatment Shed
(Ozone Generator)

Building

Covered
Concrete
Driveway

To Area G

Legend

- Existing Monitoring Well
- Tax Parcel
- Former Excavation Area and UST
- Above MTCA Method A CUL
- Soil Contamination
- Vadose Zone Sparge Well and Approximate Radius of Influence

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Source: Pierce County GIS, ESRI World Imagery.

0 10 20

Scale in Feet

LANDAU ASSOCIATES

Pederson's Fryer Farms Pierce County, Washington	**Area F** **Ozone Sparging Conceptual Design**	Figure 5

Y:\Projects\136006\010\013\CAP Report\Fig5-AreaFOzoneSparging.mxd 6/11/2012 NAD 1983 StatePlane Washington South FIPS 4602 Feet

N

Former 2000 Gal
Gasoline UST

Treatment Compound
(Ozone Generator)

Covered
Concrete
Driveway

Building

Main Facility Building

MW-30D

MW-15

MW-16

Former 500 Gal
Gasoline UST

MW-33S

DRAFT

Y:\Projects\136006\010\013\CAP Report\Fig6-AreaGOzoneSparging.mxd 6/11/2012 NAD 1983 StatePlane Washington South FIPS 4602 Feet

Legend
- Existing Monitoring Well
- Tax Parcel
- Former Excavation Area and UST
- Above MTCA Method A CUL
- Soil Contamination
- Vadose Zone Sparge Well and Approximate Radius of Influence

Note
1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 10 20
Scale in Feet

Data Source: Pierce County GIS, Bing Maps Aerial Imagery 2010.

LANDAU ASSOCIATES

Pederson's Fryer Farms
Pierce County, Washington

Area G
Ozone Sparging Conceptual Design

Figure
6

N

Waller Enterprises LLC
Parcel #0320262077

Location of Former 500 Gal
Heating Oil UST Unknown

MW-7

MW-31D

MW-34S

DRAFT

Waller Enterprises LLC
Parcel #0320262039

Legend

- Monitoring Well
- Temporary Monitoring Well
- Tax Parcel
- Former Excavation Area
- Above MTCA Method A CUL
- Proposed Excavation Area
- Soil Contamination

Notes

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 10

Scale in Feet

Data Source: Pierce County GIS, ESRI World Imagery.

LANDAU ASSOCIATES

Pederson's Fryer Farms Pierce County, Washington	**Area C** **Excavation Anticipated Extents**	Figure 7

Y:\Projects\136006\010\013\CAP Report\Fig7-AreaCExcavationExtents.mxd 6/11/2012 NAD 1983 StatePlane Washington South FIPS 4602 Feet

N

MW38D

Covered Ramp Entry

Loading Dock

Former Boiler Room

Sawcut Hole for June 2011 Decommissioning

Main Facility Building

Existing 8000 Gal UST (Decommissioned In Place)

DRAFT

Legend

- Tax Parcel
- UST Piping
- Former Excavation Area
- Above MTCA Method A CUL
- Soil Contamination
- Proposed Excavation Area

Notes

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Source: Pierce County GIS, Bing Maps Aerial Imagery 2010.

0 20

Scale in Feet

LANDAU ASSOCIATES

Pederson's Fryer Farms Pierce County, Washington	**Area E** **Excavation Anticipated Extents**	Figure 8

Y:\Projects\136006\010\013\CAP Report\Fig8-AreaEExcavationExtents.mxd 6/11/2012 NAD 1983 StatePlane Washington South FIPS 4602 Feet

TABLE 1
SOIL CLEANUP STANDARDS AND APPLICABLE AREAS OF CONCERN
PEDERSON'S FRYER FARMS CAP

	Soil Remediation and Cleanup Levels (a)	Area A	Area B	Area C	Area E	Area F	Area G
TOTAL PETROLEUM HYDROCARBONS (mg/kg)							
NWTPH-Dx							
Diesel Range Organics	2000	X		X	X		
Lube Oil	2000			X	X		
NWTPH-Gx							
Gasoline Range Organics	30/100 (b)	X	X			X	X
BTEX (mg/kg) Method SW8021B							
Benzene	0.03	X	X			X	X
Toluene	7					X	
Ethylbenzene	6		X			X	
m, p-Xylene							
o-Xylene							
Total Xylenes	9 (c)		X			X	
PAHs (mg/kg) Method 8270C							
Naphthalene							
2-Methylnaphthalene							
1-Methylnaphthalene							
Total Naphthalenes	5 (d)	X			X		

mg/kg = milligrams per kilogram
(a) MTCA Method A CULs for Unrestricted Land
(b) Cleanup level is 30 mg/kg if benzene is present and 100 mg/kg if benzene is not present.
(c) Cleanup level cannot be exceeded by the sum of individual xylene concentrations.
(d) Cleanup level cannot be exceeded by the sum of Naphthalene, 2-Methylnaphthalene, and 1-Methylnaphthalene.

TABLE 2
GROUNDWATER CLEANUP STANDARDS AND APPLICABLE AREAS OF CONCERN
PEDERSON'S FRYER FARMS CAP

	Groundwater Remediation and Cleanup Levels (a)	Area A	Area B	Area C	Area E	Area F	Area G
TOTAL PETROLEUM HYDROCARBONS (mg/L)							
NWTPH-Dx							
Diesel Range Organics	0.5	X				X	
Lube Oil	0.5	X					
NWTPH-Gx							
Gasoline Range Organics	0.8/1.0 (b)	X				X	X
BTEX (µg/L) Method SW8021B / SW8260B							
Benzene	5					X	
Toluene	NA						
Ethylbenzene	NA						
m, p-Xylene	1000 (c)					X	
o-Xylene	1000 (c)					X	

mg/L = milligrams per liter
µg/L = micrograms per liter
(a) MTCA Method A CULs
(b) MTCA Method A cleanup level is 0.8 ug/L if benzene is present and 1.0 ug/L if benzene is not present.
(c) Cleanup level cannot be exceeded by the sum of individual xylene concentrations.

APPENDIX A

Terrestrial Ecological Evaluation Form

Voluntary Cleanup Program

Washington State Department of Ecology
Toxics Cleanup Program

TERRESTRIAL ECOLOGICAL EVALUATION FORM

Under the Model Toxics Control Act (MTCA), a terrestrial ecological evaluation is necessary if hazardous substances are released into the soils at a Site. In the event of such a release, you must take one of the following three actions as part of your investigation and cleanup of the Site:

1. Document an exclusion from further evaluation using the criteria in WAC 173-340-7491.
2. Conduct a simplified evaluation as set forth in WAC 173-340-7492.
3. Conduct a site-specific evaluation as set forth in WAC 173-340-7493.

When requesting a written opinion under the Voluntary Cleanup Program (VCP), you must complete this form and submit it to the Department of Ecology (Ecology). The form documents the type and results of your evaluation.

Completion of this form is not sufficient to document your evaluation. You still need to document your analysis and the basis for your conclusion in your cleanup plan or report.

If you have questions about how to conduct a terrestrial ecological evaluation, please contact the Ecology site manager assigned to your Site. For additional guidance, please refer to www.ecy.wa.gov/programs/tcp/policies/terrestrial/TEEHome.htm.

Step 1: IDENTIFY HAZARDOUS WASTE SITE	
Please identify below the hazardous waste site for which you are documenting an evaluation.	
Facility/Site Name: Former Pederson's Fryer Farms	
Facility/Site Address: 2901 72nd Street East, Tacoma, WA 98404	
Facility/Site No: 6261637	VCP Project No.: N/A; not site formally under VCP

Step 2: IDENTIFY EVALUATOR		
Please identify below the person who conducted the evaluation and their contact information.		
Name: Lauren McIntire		Title: Project Engineer
Organization: Landau Associates		
Mailing address: 950 Pacific Avenue, Suite 515		
City: Tacoma	State: WA	Zip code: 98402
Phone: 253.926.2493	Fax: 253.926.2531	E-mail: lmcintire@landauinc.com

Step 3: DOCUMENT EVALUATION TYPE AND RESULTS

A. Exclusion from further evaluation.

1. Does the Site qualify for an exclusion from further evaluation?

☒ Yes *If you answered **"YES,"** then answer **Question 2**.*

☐ No or Unknown *If you answered **"NO" or "UKNOWN,"** then skip to **Step 3B** of this form.*

2. What is the basis for the exclusion? *Check all that apply. Then skip to **Step 4** of this form.*

Point of Compliance: WAC 173-340-7491(1)(a)

☒ All soil contamination is, or will be,* at least 15 feet below the surface.

☐ All soil contamination is, or will be,* at least 6 feet below the surface (or alternative depth if approved by Ecology), and institutional controls are used to manage remaining contamination.

Barriers to Exposure: WAC 173-340-7491(1)(b)

☐ All contaminated soil, is or will be,* covered by physical barriers (such as buildings or paved roads) that prevent exposure to plants and wildlife, and institutional controls are used to manage remaining contamination.

Undeveloped Land: WAC 173-340-7491(1)(c)

☐ There is less than 0.25 acres of contiguous[#] undeveloped[±] land on or within 500 feet of any area of the Site and any of the following chemicals is present: chlorinated dioxins or furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, heptachlor epoxide, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, or pentachlorobenzene.

☐ For sites not containing any of the chemicals mentioned above, there is less than 1.5 acres of contiguous[#] undeveloped[±] land on or within 500 feet of any area of the Site.

Background Concentrations: WAC 173-340-7491(1)(d)

☐ Concentrations of hazardous substances in soil do not exceed natural background levels as described in WAC 173-340-200 and 173-340-709.

* An exclusion based on future land use must have a completion date for future development that is acceptable to Ecology.

[±] "Undeveloped land" is land that is not covered by building, roads, paved areas, or other barriers that would prevent wildlife from feeding on plants, earthworms, insects, or other food in or on the soil.

[#] "Contiguous" undeveloped land is an area of undeveloped land that is not divided into smaller areas of highways, extensive paving, or similar structures that are likely to reduce the potential use of the overall area by wildlife.

B. Simplified evaluation.

1. Does the Site qualify for a simplified evaluation?

☐ Yes *If you answered **"YES,"** then answer **Question 2** below.*

☐ No or Unknown *If you answered **"NO"** or **"UNKNOWN,"** then skip to **Step 3C** of this form.*

2. Did you conduct a simplified evaluation?

☐ Yes *If you answered **"YES,"** then answer **Question 3** below.*

☐ No *If you answered **"NO,"** then skip to **Step 3C** of this form.*

3. Was further evaluation necessary?

☐ Yes *If you answered **"YES,"** then answer **Question 4** below.*

☐ No *If you answered **"NO,"** then answer **Question 5** below.*

4. If further evaluation was necessary, what did you do?

☐ Used the concentrations listed in Table 749-2 as cleanup levels. *If so, then skip to **Step 4** of this form.*

☐ Conducted a site-specific evaluation. *If so, then skip to **Step 3C** of this form.*

5. If no further evaluation was necessary, what was the reason? *Check all that apply. Then skip to **Step 4** of this form.*

Exposure Analysis: WAC 173-340-7492(2)(a)

☐ Area of soil contamination at the Site is not more than 350 square feet.

☐ Current or planned land use makes wildlife exposure unlikely. Used Table 749-1.

Pathway Analysis: WAC 173-340-7492(2)(b)

☐ No potential exposure pathways from soil contamination to ecological receptors.

Contaminant Analysis: WAC 173-340-7492(2)(c)

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations that exceed the values listed in Table 749-2.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations that exceed the values listed in Table 749-2, and institutional controls are used to manage remaining contamination.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays, and institutional controls are used to manage remaining contamination.

C. Site-specific evaluation. A site-specific evaluation process consists of two parts: (1) formulating the problem, and (2) selecting the methods for addressing the identified problem. Both steps require consultation with and approval by Ecology. *See* WAC 173-340-7493(1)(c).

1. Was there a problem? *See* WAC 173-340-7493(2).

☐ Yes *If you answered **"YES,"** then answer **Question 2** below.*

☐ No *If you answered **"NO,"** then identify the reason here and then skip to **Question 5** below:*

- ☐ No issues were identified during the problem formulation step.
- ☐ While issues were identified, those issues were addressed by the cleanup actions for protecting human health.

2. What did you do to resolve the problem? *See* WAC 173-340-7493(3).

☐ Used the concentrations listed in Table 749-3 as cleanup levels. *If so, then skip to **Question 5** below.*

☐ Used one or more of the methods listed in WAC 173-340-7493(3) to evaluate and address the identified problem. *If so, then answer **Questions 3 and 4** below.*

3. If you conducted further site-specific evaluations, what methods did you use?
Check all that apply. See WAC 173-340-7493(3).

- ☐ Literature surveys.
- ☐ Soil bioassays.
- ☐ Wildlife exposure model.
- ☐ Biomarkers.
- ☐ Site-specific field studies.
- ☐ Weight of evidence.
- ☐ Other methods approved by Ecology. If so, please specify:

4. What was the result of those evaluations?

- ☐ Confirmed there was no problem.
- ☐ Confirmed there was a problem and established site-specific cleanup levels.

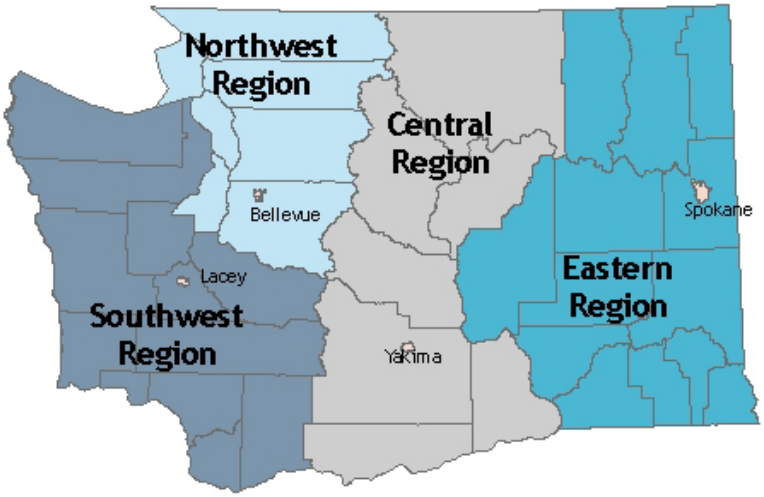
5. Have you already obtained Ecology's approval of both your problem formulation and problem resolution steps?

☐ Yes If so, please identify the Ecology staff who approved those steps:

☐ No

Step 4: SUBMITTAL

Please mail your completed form to the Ecology site manager assigned to your Site. If a site manager has not yet been assigned, please mail your completed form to the Ecology regional office for the County in which your Site is located.



Northwest Region: Attn: VCP Coordinator 3190 160th Ave. SE Bellevue, WA 98008-5452	**Central Region:** Attn: VCP Coordinator 15 W. Yakima Ave., Suite 200 Yakima, WA 98902
Southwest Region: Attn: VCP Coordinator P.O. Box 47775 Olympia, WA 98504-7775	**Eastern Region:** Attn: VCP Coordinator N. 4601 Monroe Spokane WA 99205-1295