NEW 7000 GPM MARTIN CONTROL STATION
CONSTRUCTION PROJECT
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1.0 INTRODUCTION

1.1 General

This report presents the results of our geotechnical and hazardous materials assessments for the Martin Pressure Control Station Replacement Project. Our assessment has been based on existing information that is available from published sources, other sources in the public domain, our own in-house project files, and a limited subsurface exploration program. This work has been accomplished in general accordance with contract number 673-2 dated October 5, 2011 and amended on January 9, 2012 between OBEC Consulting Engineers (OBEC) and Shannon & Wilson (S&W).

1.2 Project Understanding

We understand that the Medford Water Commission (MWC) uses water from two sources: Big Butte Springs and the Rogue River. Big Butte Springs is the commission’s principle source of water, with water from the Rogue River being used as a supplemental source when summer demand exceeds Big Butte Spring’s supply. Martin Pressure Control Station (MPCS) is one of three control stations in the MWC’s water distribution system. The control stations perform dual functions depending on the time of year; during the summer months, they pump water coming from the Duff Water Treatment Plant (Rogue River source) into the distribution system. In the winter months, when water is supplied only from the Big Butte Springs source (which is located at a much higher elevation than Rogue River), these facilities act as pressure control stations, reducing the pressure of water flowing into the low level service zone.

Further, we understand that the Medford Water Commission is preparing to upgrade the water transmission and distribution system. The proposed upgrades will include resizing the pumping and pressure reducing valve capacities at the control stations. During preliminary design of the system upgrade, it was determined that greater benefit would be achieved by replacing the Martin Control Station rather than retrofitting the existing pumps and valves. We understand that the new control station will be constructed adjacent to the existing station.
1.3 Scope of Work

Our scope of work includes two tasks:

1. Geotechnical Assessment; this task includes a discussion of subsurface soil and bedrock conditions and presents recommendations for foundation design and pipe bedding and backfill requirements for the new MPCS. This assessment has been based upon a review of available data including as-built drawings for the existing structures provided by OBEC, published literature, and our experience on nearby sites. A limited subsurface exploration program consisting of five (5) backhoe test pits was conducted on January 12, 2012. As-built drawings are included in Appendix A.

2. Limited Hazardous Materials Assessment; this task includes two subtasks as follows:

   2a. Limited Phase I Environmental Site Assessment; includes a search of the U.S. Environmental Protection Agency (EPA) and Oregon Department of Environmental Quality (DEQ) and Oregon State Fire Marshal (OSFM) databases in an attempt to locate known or suspect hazardous material conditions that may have had an impact on the project site. The search radius has been limited to approximately 1,000 feet of the property boundaries. Historical research has also been made in an attempt to identify the land use on the project site and adjacent properties over the past 50 years. This task does not meet the requirements of a Phase I Environmental Site Assessment as defined by the American Society for Testing and Materials (ASTM) Standard E 1527-05.

   2b. Hazardous Building Materials Survey (HBMS) for the existing MPCS; includes identification and testing of suspect asbestos containing building materials (ACBM), lead based paint, and potentially hazardous florescent lamps and lamp ballasts.

2.0 GEOTECHNICAL ASSESSMENT

2.1 Subsurface Explorations

Subsurface conditions at the project site were explored with 5 backhoe test pits, designated TP-1 through TP-5. Excavation of the test pits was subcontracted by Shannon & Wilson, Inc. to T&M Excavation of Medford, Oregon. The test pits were excavated on Thursday January 12, 2012, using a John Deere 310SE rubber-tired backhoe. A Shannon & Wilson field engineer was on site to observe the excavations, collect soil and rock samples, and to describe the materials encountered. The samples were returned to our laboratory and were reviewed to verify the field descriptions; no laboratory testing was performed. The locations of the test pits are shown in Figure 2, Site Plan.
2.2 General Geology and Subsurface Conditions

The Medford area is underlain at depth by Cretaceous age sedimentary rock. This unit, equivalent to the Hornbrook Formation of Wells (1956), consists of hard conglomerate and sandstone overlain by mudstone with thick sandstone interbeds (Beaulieu and Hughes, 1977). Maximum thickness of the Hornbrook Formation in the Medford area is about 600 feet. The Hornbrook Formation laps onto older intrusive and metamorphic rocks to the west which are associated with the Klamath Mountains province. The Hornbrook Formation crops out locally in isolated patches and hills west of Bear Creek, although most of the formation is overlain by terraced Quaternary alluvial deposits.

East of Bear Creek, the Hornbrook Formation is overlain by sandstone and siltstone of the middle to late Eocene age Payne Cliffs formation (informally named by McKnight, 1971, 1984). The Payne Cliffs formation is thickest along the eastern margin of the Bear Creek Valley and thins westward; it is probably not present west of Bear Creek. The formation consists predominantly of arkosic and micaceous sandstone and conglomerate, but the upper part of the formation is dominated by volcaniclastic material. Quartzite clasts, as well as other metamorphic and granitic clasts, are common in the conglomerate layers of the rock and in soils developed from the formation.

The Payne Cliffs formation is overlain by up to 60 feet of unconsolidated gravel, sand, silt and clay deposited by streams during the Quaternary Period. Based on the provided as-built drawings, this formation is relatively shallow at the site.

Throughout much of the Bear Creek valley, dark brown clayey soils have developed from weathering of the underlying alluvial materials. These soils have a low permeability and are subject to ponding and locally to high ground water.

2.3 Seismic Setting

The Medford area is subject to seismic events from three major sources: the Cascadia Subduction Zone (CSZ), at the interface between the Juan de Fuca plate and the North American plate; intraslab faults within the Juan de Fuca plate; and crustal faults in the North American plate. Maximum magnitude for a CSZ event is expected to be in the range of Moment Magnitude (MW) 8 to 9 with a possible reoccurrence interval of 500 to 600 years (Barnett and others, 2004). Intraslab events have occurred on a frequent basis in the Puget Sound, but there is no strong historical evidence for such events in Oregon. Known and suspected crustal faults in the region have been characterized by the United States Geological Survey (USGS) and the Oregon Department of Geology and Mineral Industries (DOGAMI).
According to the USGS Quaternary Fault and Fold Database of the United States (Personius, S.F., 2002), the nearest mapped Quaternary fault is the Sky Lakes Fault Zone approximately 50 kilometers to the east northeast of the site. The next nearest fault system is the Waleshead Fault Zone located approximately 170 kilometers west of the site. These faults are listed below in Table 2 along with their estimated slip rate and the age of their most recent period of deformation. These two fault systems are defined as “Class A” faults by the USGS. Class A faults are those for which there is demonstrable evidence of tectonic movement during the Quaternary Period and which are known or presumed to be associated with large-magnitude earthquakes.

### TABLE 1: QUATERNARY FAULTS NEAREST TO THE MARTIN PRESSURE CONTROL STATION PROJECT SITE

<table>
<thead>
<tr>
<th>Name</th>
<th>Distance and Direction from Site</th>
<th>Most Recent Deformation*</th>
<th>Slip rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sky Lakes Fault Zone</td>
<td>50 Km East Northeast</td>
<td>&lt;130 Ka</td>
<td>&lt;0.2 mm/yr</td>
</tr>
<tr>
<td>Waleshead Fault Zone</td>
<td>170 Km West</td>
<td>&lt;130 Ka</td>
<td>&lt;0.2 mm/yr</td>
</tr>
</tbody>
</table>

*Ka= “Kilo-annum,” or thousand years.

#### 2.4 Subsurface Conditions

Our interpretation of conditions underlying the MPCS site was initially based upon the as-built drawings (included in Appendix A) provided by OBEC for the existing adjacent structure and then confirmed by our test pit exploration program. The explorations exposed from 0.8 to 1.5 feet of soil overlying sandstone bedrock. The soil/rock units are described as follows:

- Fill: brown silty sandy gravel with cobbles; loose to medium dense, low plasticity fines, fine- to coarse-grained sand, fine to coarse, subrounded to rounded gravel and cobbles; includes some scattered well rounded quartzite clasts.

- Sandstone: low to moderate strength (unconfined compressive strength field-estimated at 1,000 to 8,000 pounds per square inch), moderately weathered, slightly orange-brown, massive, fine to coarse-grained, micaceous, moderately well cemented.

The backhoe used to excavate the test pits was unable to excavate more than about 6-inches into the sandstone bedrock. In our opinion, a much larger excavator might be able to excavate a little deeper into the rock, but a hydraulic rock hammer will likely be necessary to complete excavation of the valve vault and pipeline trenches.
2.5 Material Descriptions

In the field, soil samples were classified visually in general accordance with ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Consistency, color, relative moisture, degree of plasticity, peculiar odors, and other distinguishing characteristics of the samples were noted. Once returned to the laboratory, soil samples were re-examined and field classifications were modified as necessary. Terminology used in the soil classifications is defined in Figure 3, Soil Classification and Log Key.

2.6 Logs of Explorations

Summary logs of explorations are presented in Figures 4 through 8. Soil descriptions and interfaces on the logs are interpretive, and actual changes may be gradual. A graphic log and our interpretation of the soil/rock encountered is shown on the left-hand portion of the logs. The right-hand portion of the test pits logs, shows sample locations and designations.

2.7 Ground Water

Groundwater was not encountered in the test pit explorations. Ground water in this area is believed to lie in the range of 10 to 12 feet below the ground surface and should be expected to vary with the seasons. Ground water levels are typically highest in late spring and lowest in late fall.

3.0 ENGINEERING RECOMMENDATIONS

3.1 General

We understand that the proposed structure will be 24 feet by 52 feet in area and will be an above ground precast concrete structure on spread footings. The structure will be placed on approximately 2 feet of structural fill to raise the building above existing grades. The interior of the building will house a work area, restroom, and a below grade (approximately 6 feet below existing grade) utility vault that will be approximately 18 by 40 feet in area.

Based on the explorations, as discussed above, and studies of the existing structure as-built plans, we anticipate that the site subsurface conditions consist of about 1.5 feet of fill soil overlying low to moderate strength sandstone. Engineering recommendations presented in this section are based on these subsurface conditions.

Based on these conditions, the primary geotechnical factors influencing the design and construction of this project are the presence of possible compressible materials above the sandstone and difficult excavation conditions in shallow sandstone.
The following sections provide our geotechnical engineering recommendations for the foundation design of the proposed structure as well as geotechnical construction considerations.

### 3.2 Seismic Design Considerations

Seismic evaluation of this site has been completed in accordance with Table 1613.5.2 of the 2010 Oregon Structural Specialty Code (OSSC) which is based on the 2009 International Building Code (2009 IBC). Based on assumed site subsurface conditions, we recommend that the parameters for Site Class B be used for this site. The following paragraphs describe required seismically-related hazard evaluations on site.

- **Strong Ground Motions:** The maximum considered earthquake (MCE) ground motions at the bedrock level are obtained from the United States Geological Survey’s Earthquake Ground Motion interactive deaggregation website ([http://eqint.cr.usgs.gov/deaggint/2002/index.php](http://eqint.cr.usgs.gov/deaggint/2002/index.php)) as $S_S = 0.57g$ and $S_1 = 0.26g$. Adjusting for site class effect using Site Class B coefficients, the design earthquake spectral response accelerations at 0.2 and 1 second are obtained as $S_{DS} = 0.38g$ and $S_{DI} = 0.17g$, respectively. The peak ground acceleration experienced during the design earthquake will be approximately 0.15g. The ground motions are based on a probabilistic hazard analysis performed by the USGS and the seismic site classification of the project site.

- **Liquefaction and lateral spread:** Considering the subsurface conditions and the area seismicity, the site is considered to have a relatively low risk potential for soil liquefaction. Thus, the potential of liquefaction settlement, slope stability, and induced lateral spreading is also considered low.

- **Fault rupture:** The nearest Quaternary fault mapped by the U.S. Geological Survey (Personius, 2002a) is the Sky Lakes Fault Zone, which is a series of over lapping north and northwest trending fault segments located about 50 km east-northeast of the project site. In our opinion this fault does not represent a fault rupture hazard to the project.

- **Tsunami and Seiche:** Due to the absence of a large water course in the vicinity of the site, the site has no risk of tsunami or seiche.

### 3.3 Foundation Recommendations

#### 3.3.1 Shallow Foundations

Based on the subsurface conditions, and our understanding of the proposed site grades, it is our opinion that the proposed structures can be supported on conventional shallow foundations bearing on the shallow bedrock or properly compacted crushed rock pads placed on bedrock. We understand that the proposed footing loads are less than 1000 pounds per square foot (psf). All
footings should be underlain by at least 6 inches of compacted crushed rock overlying bedrock. Crushed rock placed under footings should be clean, compacted crushed rock with less than 5 percent passing the U.S No 200 sieve and meeting the requirements of Oregon Standard Specifications for Construction Section (OSSC) 00330.14 – Selected Granular Backfill.

In our opinion, continuous wall footings should have a minimum width of 18 inches and column spread footings should have a minimum width of 24 inches.

Exterior footings and foundations in unheated areas should be located at a depth of at least 18 inches below the final exterior grade to provide adequate frost protection and soil cover. Interior foundations can be located at a minimum depth of 12 inches in accordance with the IBC. Footings placed on or near slopes should be embedded such that the setback from the face of the slope to the footing should be a minimum of H/3 where H is the height of the overall slope.

Based on our understanding of the proposed loads, footings constructed as described above founded crushed rock pads placed on bedrock, settlements are anticipated to be less than 1-inch. Differential settlement will be on the order of 50 percent of the maximum.

We recommend that lateral earth pressures be resisted with passive lateral earth pressures and frictional resistance between soils and on the bottom of foundations. In our opinion, the factored passive equivalent fluid pressure is 250H for footings embedded in fill. Factored pressure is recommended as an allowable value to limit horizontal deflections. An allowable friction factor of 0.4 for mass concrete on the crushed rock pad can be used for those portions of the foundations with lateral forces on the foundation.

Unsuitable soil zones encountered at the bottom of the foundation excavations should be removed to the level of firm subgrade. Cavities formed as a result of excavation of unsuitable soil zones should be backfilled with lean concrete or compacted crushed gravel fill.

3.3.2 Slab-on-Grade Floors

Support for slab-on-grade floors can be obtained from the bedrock or compacted granular structural fill between the slab and the native soil. We recommend that at least 6 inches of free-draining crushed aggregate be placed between the floor slab and the approved subgrade to provide a capillary break and a smooth bearing surface. Crushed aggregate material should be composed of free-draining (less than 8 percent passing U.S. No. 200 sieve according to ASTM D1140), 1 ½-inch minus crushed aggregate material placed and compacted to a minimum 92 percent of ASTM D1557.
A subgrade modulus value of 150 pounds per cubic inch (pci) may be used to design the floor slabs, provided the site is prepared as recommended and the floor slab is underlain by 6 inches of imported crushed aggregate.

### 3.3.3 Embedded and Retaining Wall Recommendations

For any proposed general retaining walls on the site, we assume that each wall will be designed as a yielding wall under static and seismic loading conditions. Embedded walls, and those walls structurally tied against movement should be designed for at-rest pressures. To prevent the hydrostatic pressure buildup behind each wall, we assume that the wall will be backfilled with imported free-draining crushed rock with less than 5 percent passing the U.S No. 200 sieve. An adequate subsurface drain system should be installed behind the retaining walls to eliminate any hydrostatic pressure on the walls. We further assume that each wall will have a level backfill. Based upon the above design information and assumptions, the lateral earth pressures on the embedded and retaining walls were evaluated as equivalent fluid pressures and are described below.

In our opinion, the static lateral earth pressure on any proposed retaining walls consists of two components: the static active or at-rest soil earth pressure and static surcharge pressure. The seismic lateral earth pressure on the walls consists of three components: the static active or at-rest earth pressure, static surcharge pressure, and the seismic earth pressure. The static active pressure may be calculated as 40 pounds per cubic foot (pcf) for level backfill. The static at rest pressure may be calculated as 60 pcf for level backfill. The earthquake force can be calculated as an inverted triangular pressure with a maximum pressure of 8H applied at 0.6H above the base of the retaining wall used in the design, where H is the height of the wall. The lateral earth pressure components, as equivalent fluid pressure, are also presented in Table 2.

**TABLE 2: LATERAL EARTH PRESSURE FOR RETAINING WALLS**

<table>
<thead>
<tr>
<th>Retaining Wall Back Slope</th>
<th>Static Active Pressure (psf)</th>
<th>Static At Rest Pressure (psf)</th>
<th>Surcharge Active Pressure (psf)</th>
<th>Seismic Pressure (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level Backfill</td>
<td>40H</td>
<td>60H</td>
<td>0.31q*</td>
<td>8H</td>
</tr>
</tbody>
</table>

*q is defined as the surcharge pressure at the surface*

We recommend that lateral loads be resisted with passive lateral earth pressures and frictional resistance between soils and on the bottom of the foundation. In our opinion, the partial passive equivalent fluid pressure is 140H. An allowable friction factor of 0.30 for mass concrete on the native silt soils can also be used. Partial passive pressure is recommended since the large amounts of wall movement that would be necessary to mobilize full passive resistance will
probably be considered unacceptable by the structural engineer. Therefore, a partial pressure is recommended as an allowable value to limit horizontal deflections.

3.4 Geotechnical Construction Considerations

3.4.1 Site Preparation

We recommend that existing structures, gravel, pavement, topsoil, and soft wet soils in the construction area be stripped from the site. Depending on the site stripping methods, the removal of unsuitable surface material may cause considerable disturbance and loosening of the subgrade. We recommend that the disturbed soils be recompacted or removed from the site. A representative of the geotechnical engineer of record should determine the depth of removal for these unsuitable soils at the time of construction.

After stripping and excavating to the proposed subgrade level, as required, the site should be proof-rolled with a fully loaded 10 to 12 yard dump truck, or other suitably loaded rubber tired construction vehicle or self-propelled compaction equipment with a static weight of at least 6 tons. Soils observed to rut or deflect excessively under the moving load, or are otherwise judged to be unsuitable, should be over-excavated and replaced with properly compacted fill. The proof-rolling and over-excavation activities should be witnessed by the geotechnical engineer of record.

All footing excavations should be over-excavated to bedrock and prepared as described above in the Foundation Recommendations section.

During wet periods, increases in moisture content of the soils can cause significant reduction in the soil strength and support capabilities. In addition, soils that become wet may be slow to dry, and thus significantly retard the progress of grading and compaction activities. It will be advantageous to perform earthwork and foundation construction activities during dry weather.

If grading operations take place in wet weather, all excavations should be performed using a smooth-bladed tracked backhoe, working from areas where material has yet to be removed or from the already placed structural fill. Subgrade areas should be cleanly cut to firm undisturbed soil. Should construction take place during wet weather, we recommend that a representative of the geotechnical engineer of record be present to observe the subgrade in order to evaluate whether additional preparation is required.

3.4.2 Excavation

Based upon the subsurface conditions described above, our previous experience in this area and information provided to OBEC by MWC staff, excavation into sandstone will be
required for the proposed vault. We anticipate that excavations in the sandstone can be completed with an excavator-mounted hydraulic hammer.

Temporary earth slopes may be cut at a steepness of about 1.5 horizontal to 1 vertical (1.5H:1V) above the groundwater table. Permanent earth slopes should be dressed to 2H:1V or flatter and protected from erosion. All excavations should be completed in accordance with applicable Occupational Safety and Health Administration and state regulations. The contractor should be responsible for selection of the excavation and dewatering methods, monitoring the trench excavations for safety, and providing shoring, as required, to protect personnel and adjacent improvements.

Excavation and construction operations may expose the on-site soils to inclement weather conditions. The stability of exposed soils may rapidly deteriorate due to a change in moisture content (i.e. wetting or drying) or the action of heavy or repeated construction traffic. Accordingly, foundation excavations should be adequately protected from the elements, and from the action of repetitive or heavy construction loadings.

We do not anticipate that shoring will be required onsite, however, if needed we recommend that all of the excavation shoring be designed by the contractor.

3.4.3 General Site Drainage Considerations

Water should not be allowed to collect in the footing excavations or on prepared subgrades for floor slabs. Positive site drainage should be maintained throughout construction activities. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff.

The site grading plan should be developed to provide rapid drainage of surface water away from the buildings and to inhibit infiltration of surface water around the perimeter of buildings. Careful consideration should be given to the potential impact of landscaped areas and/or sprinkler systems on adjacent foundations and floor slabs. Roof runoff should be piped to a storm sewer or approved disposal area away from the foundation materials. An adequate subsurface drain system should be installed behind subsurface walls, such as retaining walls or foundation walls.

3.4.4 Fill Materials

3.4.4.1 Native Structural Fill

Native material used for fill onsite should be screened such that it contains no organics or other deleterious materials and the particle size is less than 6 inches. Fill should be
placed in maximum lifts of 8 inches of loose material and should be compacted within the range of 2 percentage points below to 2 percentage points above the optimum moisture content value. If water must be added, it should be uniformly applied and thoroughly mixed into the soil by diskin or scarifying. Each lift of the compacted fill should be tested by a representative of the geotechnical engineer prior to placement of subsequent lifts. The fill should extend horizontally outward beyond the exterior perimeter of the building and footings a distance equal to the height of the fill or 5 feet; whichever is greater, prior to sloping. Also, fill should extend horizontally outward from the exterior perimeter of the pavement a distance equal to the height of the fill or 3 feet; whichever is greater, prior to sloping. We anticipate that native material will be too fine-grained for use as fill during periods of wet weather. If construction is completed during the wet season, free draining structural fill as described below should be used.

3.4.4.2 Imported Structural Fill

If imported fill material is required, imported fill material may consist of relatively well-graded soils that are free of debris and organic matter and that can be compacted to the specified density. Typical structural fill materials include clean sand, gravel, washed rock, crushed rock, quarry spalls, well-graded mixtures of sand and gravel (commonly called “gravel borrow” or “pit-run”), and miscellaneous mixtures of silt, sand, and gravel. The maximum particle size should be restricted to 6 inches. If construction occurs during wet weather, fill materials should contain less than 5 percent material passing the No. 200 sieve. Imported structural fill should be compacted in accordance with OSSC 00330.40 and the recommendations in the section above.

3.4.4.3 Trench Backfill

We recommend that utility trenches be backfilled, in the pipe zone, with material that is suitable for compaction and which has the ability to be worked under the curvature of the pipe. We believe that on-site soils are not suitable for bedding or pipe zone backfill. The bedding material for the piping should consist of well graded granular material such as ¾ inch minus crushed aggregate. The recommended minimum thickness of granular bedding below the invert of the pipes is 6 inches. The thickness of the bedding may, however, have to be increased depending on the pipe diameter or if wet or weak subgrade conditions are encountered. After installing the pipe on the bedding, a granular material should be used for the pipe zone which typically extends at least 12 inches above the top of the pipe or as set out by the local Authority. Pipe zone compaction should be 90 percent of ASTM D1557. Above the pipe zone, the trench backfill should be either select native soil for non-settlement sensitive areas or structural fill for areas where settlement needs to be limited such as under buildings, roads, sidewalks, or other utilities.
3.4.4.4 Free-Draining Crushed Aggregate Fill and Retaining Wall Backfill

Between the structured fill and building slab-on-grade, we recommend a free-draining crushed aggregate as described above. Also, for retaining wall backfill, we recommend using a free-draining crushed rock with a non-woven geotextile placed between the backfill and the native soils.

If needed, fill material during wet weather construction should consist of a free-draining, clean, granular fill with less than 5 percent passing the No. 200 sieve according to ASTM D1140, such as crushed rock and gravel. Sand should not be used as a free-draining material.

Structural fill should be compacted in accordance with OSSC 00330.40 and the recommendations in the section above.

4.0 HAZARDOUS MATERIALS ASSESSMENT

4.1 General

We have performed a limited Hazardous Materials Assessment (HMA) for the MPCS Replacement Project. The objectives of the HMA are to (1) identify past uses of the proposed new building site and adjacent areas that may have lead to hazardous materials or petroleum products being released into structures on the property or into the ground, or groundwater of the property, and (2) identify potentially hazardous building materials in the existing pressure control building, which is to be demolished.

4.2 Site Assessment

We performed a search of the DEQ Facility Profiler and other online databases as appropriate in an attempt to locate known or suspect hazardous material conditions that may have had an impact on Tax Lots 100 and 200. The search radius has been limited to approximately 1,000 feet of the property boundaries. We have also reviewed historical aerial photographs in an attempt to identify historical uses of these properties over the past 50 years. Our historic search has been limited to the subject and adjacent properties. This task does not meet the requirements of a Phase I Environmental Site Assessment as defined by the American Society for Testing and Materials (ASTM) Standard E 1527-05.

4.2.1 Physical setting

The MPCS site is located in an urban area and surrounded primarily by commercial/retail and light industrial facilities. The Medford-Jackson County Airport is about one-half mile directly west of the site. The site and adjacent areas are nearly flat with a slight slope toward the
west and south. There is no surface water on the site, but Hopkins Canal flows toward the southwest approximately 200 feet southeast of the existing MPCS structure. Bear Creek is located about 9,000 feet southwest of the site and flows toward the northwest and a confluence with Rogue River.

Site soils have been mapped by National Resource Conservation Service (2011). Agate-Winlo complex soils cover most of the MPCS site and grade northward to Coker Clay. The Agate-Winlo complex consists of loam to clay loam to gravelly sandy loam. These soils have developed on alluvial fan surfaces of 0 to 5 percent slope where they were formed from alluvial materials derived from igneous, metamorphic and sedimentary rock. The Agate-Winlo soils vary from well to poorly drained. The Agate-Winlo soils grade northward across the project site to Coker Clay, which also occurs on alluvial fan deposits with 0 to 3 percent slopes. Coker Clay has developed from clayey alluvium derived from tuff breccia. These soils are somewhat poorly drained and a typical profile is greater than 6 feet thick.

Site geologic and groundwater conditions are discussed above in Section 2.0.

4.2.2 Historic Records

Sanborn Fire Insurance Maps were not available for the project area. A Sanborn Map search report is included in Appendix B.

Aerial photographs dated 1952, 1960, 1969, 1979, 1994, 2001 and 2005 were obtained from the University of Oregon Library. A recent photograph from Google Earth™ has been used as the base for Figure 2. The photos listed above provide seven snapshots during a 59-year history of the area. Copies of the aerial photographs are included in Appendix C and a discussion of our observations and findings gleaned from the photographs follows:

- A large orchard is present; northwest and across Crater Lake Highway from the MPCS site in the 1952, 1960, 1969, and 1979 photos.
- In the 1952 and 1960 photographs, land south and east of the orchard appears to have been primarily used for pasture or hay and grain crops; a small field of row crops is visible north of the MPCS site and east of Crater Lake Highway in the 1952 photograph. Several farmsteads are also present. A few small commercial (?) facilities are located along Delta Waters Road.
- By 1969, a large industrial facility has replaced some of the farmsteads southeast of Crater Lake Highway and Webfoot Road; a large warehouse building is present northeast of Crater Lake Avenue and Delta Waters Road; several of the small industrial/commercial enterprises along Delta Waters Road have expanded; the present MPCS facility first appears in the 1969 photograph.
Commercial development has continued to expand east of Crater Lake Highway in 1979, completely replacing former agricultural uses, although the large orchard west of the highway remains.

The orchard has been cleared prior to 1994 and a large commercial (“Big Box”) retail store is present west of Crater Lake Highway; several acres of vacant land are still present north of Delta Waters Road and west of Crater Lake Highway.

By 2001, the Safeway store and other retail outlets have been constructed on the site directly west and across Crater Lake Highway from the MPCS site; commercial/industrial facilities now occupy nearly the entire map area, except for the farmstead and two single family homes located east of Crater Lake Highway and south of Ford Drive and the triangle-shaped parcel that is the site of the MPCS, which except for the station itself, appears largely unchanged since 1952.

The 2005 photograph appears much the same as in 2001, except that the small farmstead and single family homes located east of Crater Lake Avenue and north of Ford Drive have been removed; the land remains vacant.

The 2010 Google™ image in Figure 2, shows that the farm site, vacant in 2005, has now been redeveloped for an automobile dealer.

4.2.3 Regulatory Review

A review of regulatory agency records was conducted for the project area and nearby properties to identify known or potential sources of contamination that could adversely impact the project. Records were obtained using the DEQ Facility Profiler and the OSFM Hazardous Material Incident Reports. A summary of our findings is presented in the following paragraphs.

4.2.4 Comprehensive Environmental Response, Compensation, and Liability Information (CERCLIS) Database

CERCLIS contains data on potentially hazardous waste sites that have been reported to the EPA and are either proposed for or are on the National Priorities List (NPL). No CERCLIS sites are listed for Jackson County, Oregon.

4.2.5 Environmental Cleanup Site Information (ECSI) Database

DEQ ECSI-listed sites include suspected and confirmed hazardous waste sites. Our search identified 2 ECSI sites within approximately 1,000 feet of the project. The two cleanup sites are listed in Table 3 and shown in Figure 2, Potential Contaminant Sources. Copies of DEQ’s Site Summary Reports are included in Appendix D.
TABLE 3. ECSI LISTED FACILITIES WITHIN 1,000 FEET OF THE PROJECT SITE

<table>
<thead>
<tr>
<th>Figure 2 Reference</th>
<th>Site ID</th>
<th>Site Name and Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ECSI 3854</td>
<td>Lava Lanes II  2978 Crater Lake Hwy   Medford, OR  97501</td>
</tr>
<tr>
<td>2</td>
<td>ECSI 3381</td>
<td>Chancler Equipment 3086 Crater Lake Highway Medford, OR  97504</td>
</tr>
</tbody>
</table>

The two sites listed above are related and were once part of the same parcel. Contamination consisted of petroleum hydrocarbons that were leaked onto the ground during the maintenance and repair of heavy equipment. Cleanup activities have been completed and DEQ has issued “No Further Action Required” (NFA) letters for both sites.

4.2.6 Solid Waste Landfills

No DEQ-permitted landfills were identified within a 1- mile radius of the MPCS site.

4.2.7 Leaking Underground Storage Tanks

From our search of DEQ’s Facility Profiler web pages 6 leaking underground storage tank (LUST) sites were identified within approximately 1,000 feet of the project site. Information on the six LUST sites is summarized in Table 4 and shown in Figure 2, Potential Contaminant Sources. Copies of DEQ’s LUST database information are included in Appendix D.

TABLE 4: LUST SITES WITHIN APPROXIMATELY 1,000 FEET OF THE PROJECT SITE

<table>
<thead>
<tr>
<th>Figure 2 Reference</th>
<th>DEQ ID</th>
<th>Site Name &amp; Location</th>
<th>Site Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15-89-0009</td>
<td>Truax Arco 3000 Crater Lake Hwy</td>
<td>Cleanup completed 3/5/1989; Site status: CLOSED.</td>
</tr>
<tr>
<td>2</td>
<td>15-90-0079</td>
<td>Robert S. Forrest Sales 1862 Delta Waters Road</td>
<td>Cleanup completed 7/10/1990; Site status: CLOSED.</td>
</tr>
<tr>
<td>3</td>
<td>15-90-0085</td>
<td>Coca Cola 3074 Crater Lake Ave.</td>
<td>Cleanup Completed 8/16/1990; Site status: CLOSED.</td>
</tr>
<tr>
<td>4</td>
<td>15-90-0158</td>
<td>McLaughlin Plumbing &amp; Heating 2985 Crater Lake Hwy</td>
<td>Cleanup Completed 10/10/2001; Site status: CLOSED.</td>
</tr>
<tr>
<td>5</td>
<td>15-93-0130 15-05-2491</td>
<td>Rogue Valley Transportation Dist. 3200 Crater Lake Ave.</td>
<td>Two incidents are reported: Cleanup was completed on the first 1/1/1994 and on the second 12/20/2005; Site status: CLOSED.</td>
</tr>
</tbody>
</table>
As shown in the table, above, cleanup activities have been completed and DEQ has issued NFA letters for each of these LUST facilities.

### 4.2.8 Underground Storage Tanks

No active UST facilities are present on the subject property. However, one adjacent site does have an active and permitted underground storage tank (UST) system, and another adjacent site had two USTs which have been decommissioned. These two UST sites are identified in Table 5.

#### TABLE 5: UST FACILITIES ADJACENT TO THE PROJECT SITE

<table>
<thead>
<tr>
<th>Figure 2 Reference</th>
<th>DEQ ID</th>
<th>Site Name</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2450</td>
<td>Coca Cola Bottling Co. 3074 Crater Lake Ave.</td>
<td>Two (2) USTs were decommissioned on this site.</td>
</tr>
<tr>
<td>2</td>
<td>2634</td>
<td>Rogue Valley Transportation Dist. 3200 Crater Lake Ave.</td>
<td>Five (5) active and permitted USTs are present on this site.</td>
</tr>
</tbody>
</table>

### 4.2.9 Resource Conservation and Recovery Act (RCRA) Generator Sites

RCRA generators are facilities that generate or store hazardous waste. Three RCRA generators are located within approximately 1,000 feet of the project site and listed in Table 6. Copies of DEQ’s Hazardous Waste Site Reports for these three sites are included in Appendix D.

#### TABLE 6. RCRA GENERATORS WITHIN 1,000 FEET OF THE PROJECT SITE

<table>
<thead>
<tr>
<th>Figure 2 Reference</th>
<th>EPA ID</th>
<th>Site Name</th>
<th>Type of Generator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ORD987173044</td>
<td>Coca Cola Bottling Co. 3074 Crater Lake Ave.</td>
<td>CEG* Status: Licensed, but inactive since 12/31/1993</td>
</tr>
<tr>
<td>2</td>
<td>ORR000001594</td>
<td>Sears Roebuck &amp; Co. 3130 Crater Lake Ave.</td>
<td>CEG Status: Active</td>
</tr>
<tr>
<td>3</td>
<td>ORQ000025160</td>
<td>HD Supply Waterworks, Ltd. 3384 Crater Lake Ave.</td>
<td>CEG Status: Licensed, but inactive since 10/30/2008</td>
</tr>
</tbody>
</table>

*CEG=Conditionally Exempt Small Quantity Generator
It is important to note that appearance on this list means that these facilities are licensed to handle hazardous waste, but does not imply a contaminated site, or that mishandling of hazardous wastes has occurred. These facilities must report the amount and type of waste generated and how the waste was disposed. Conditionally Exempt Generators produce 100 kilograms or less per month of hazardous waste, or 1 kilogram or less per month of acutely hazardous waste.

### 4.2.10 Hazardous Substance Incidents

There were no hazardous substance incidents or spill responses identified on the MPCS site according to OSFM and DEQ databases. However, three incident responses occurred on adjacent properties, these are listed in Table 7. A copy of the OSFM’s database entry is included in Appendix E.

**TABLE 7: HAZARDOUS MATERIAL INCIDENTS WHICH PROMPTED A FIRE DEPARTMENT RESPONSE**

<table>
<thead>
<tr>
<th>Figure 2 Reference</th>
<th>Date of Incident</th>
<th>Incident Location</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sep. 29, 2001</td>
<td>Sears Roebuck &amp; Co. 3130 Crater Lake Ave.</td>
<td>Medford FD responded to a natural gas leak from a heater inside the repair facility. The gas was switched off and the building was evacuated and ventilated.</td>
</tr>
<tr>
<td>2</td>
<td>Jun. 5, 1997</td>
<td>Sears Roebuck &amp; Co. 3130 Crater Lake Ave.</td>
<td>Medford FD responded; two containers of waste oil fell over inside a delivery truck and spilled out onto the pavement. Rice hulls were spread to absorb the spill.</td>
</tr>
<tr>
<td>3</td>
<td>Feb. 21, 2001</td>
<td>Rogue Valley Transportation District 3200 Crater Lake Ave.</td>
<td>Medford FD responded to a natural gas leak of approximately 1,000 cubic feet. No other information is available.</td>
</tr>
</tbody>
</table>

### 4.2.11 Pesticide Use on Agricultural Land

The historical research conducted for this assessment has identified the presence of past orchards (we presume them to have been pear and/or peach orchards) about 300 feet northwest and across Crater Lake Highway from the existing MPCS facility. The orchards were present from prior to 1952 until at least 1979. The orchards were then replaced by a Safeway store and other “big-box” retail facilities between the mid 1980s and the early 1990s. No orchards were identified on or immediately adjacent to the project area.

Fruit orchard operations have been known to result in the contamination of soils within orchards and on adjacent lands due to pesticide/herbicide use. Possible contaminants include products from the decomposition of the pesticides and heavy metal residuals. Soil contamination resulting from past pesticide/herbicide use on nearby fruit orchards should be considered...
potentially possible, although this HMA has not identified documented evidence of contamination on the MPCS site or on adjacent lands.

4.3 Hazardous Building Materials Survey

The Hazardous Building Materials Survey (HBMS) for the MPCS Replacement Project was performed by Western States Environmental Services of Medford, Oregon under subcontract to Shannon & Wilson. The HBMS has evaluated the potential presence of asbestos-containing building materials (ACBM), lead-containing paint (LCP) and PCB-containing fluorescent light ballasts in the existing MPCS structure.

4.3.1 Asbestos Survey and Analysis

All areas of the existing control station building were inspected for the presence of “suspect” ACBM. Three samples were collected and catalogued for analysis. The samples were taken from the restroom wall system, the restroom cove base, and the building roof system. The samples were then forwarded to EMSL Analytical, Inc, of San Leandro, CA, for analysis utilizing Polarized Light Microscopy (PLM). Each of the three samples were found to be “non-detect” for asbestos. A copy of Western States Environmental Services’ report is included in Appendix E.

4.3.2 Lead Paint Analysis

All areas of the building were tested for the presence of lead paint via Lead Check™, a federally (EPA) approved on-site test allowing for immediate results indicating the presence of lead in paint. A painted interior surface, exterior surface and exterior door trim were tested; each test was “non-detect” for lead. A copy of Western States Environmental Services’ report is included in Appendix E.

4.3.3 Fluorescent Lights Analysis

All florescent light fixtures (a total of six) were visually inspected for the presence of PCB ballast and mercury light tubes. All fixtures were visually confirmed to utilize PCB containing ballasts and mercury containing light tubes. A copy of Western States Environmental Services’ report is included in Appendix E.

4.3.4 Hazardous Materials Summary of Findings

The following key findings are noted from the hazardous materials assessment:
The potential for impacts to the MPCS site from the hazardous material conditions and incidents identified in the database search and shown in Figure 2 are very low in our opinion.

Soil contamination resulting from past pesticide/herbicide use on nearby fruit orchards should be considered potentially possible, although this HMA has not identified documented evidence of contamination on the MPCS site or on adjacent lands.

The results of tests made on building materials in the existing MPCS structure have determined that no asbestos is present at the sample locations selected and no other materials are suspect for asbestos. Asbestos abatement is not required prior to structure demolition.

Lead was not detected in paint at the locations tested and no other painted surfaces are suspect for lead.

PCB’s were discovered in the operating light fixtures.

### 4.3.5 Recommendations

To assist in planning and design of the new Martin Pressure Control Station Facility we offer the following recommendations:

- We recommend that the prospective project contractor be advised of the potential presence of pesticide, herbicide, and heavy metal residuals in site soils.
- Florescent light ballasts and the associated light tubes should be removed and disposed appropriately prior to any demolition activity. We have provided a DEQ Fact Sheet in Appendix G as a reference for the management and disposal of waste lamps.

### 5.0 LIMITATIONS

The conclusions and recommendations contained in this report are based upon information sources cited herein. Within the limitations of the scope, schedule, and budget, the evaluations and conclusions presented in this report were prepared in accordance with generally accepted professional engineering and environmental principles and practice in this area at the time this report was prepared. We make no warranty, either express or implied. Our conclusions and recommendations are based on our understanding of the project as described in this report and the site conditions as interpreted from the references cited.

If, during final design and construction, conditions different from those described in this report are observed or appear to be present, we should be advised at once so that we can review these conditions and reconsider our conclusions where necessary. If there is a substantial lapse of time
between the submission of the final design report and the start of work at the site, or if conditions have changed because of natural forces or construction operations at or adjacent to the site, we recommend that this report be reviewed to determine the applicability of the conclusions concerning the changed conditions due to the time lapse.

This report was prepared for the exclusive use of OBEC Consulting Engineers and their design team and the Medford Water Commission. It should be made available to prospective contractors for information on the factual data only, and not as a warranty of geologic conditions such as those interpreted from data presented in this report.

Shannon & Wilson, Inc., has prepared a document, “Important Information about your Geotechnical Report,” to assist you and others in understanding the use and limitations of our report. This document is included in Appendix H at the end of this report.
6.0 REFERENCES


SITE PLAN

7000 GPM Martin Control Station
Medford, Oregon

LEGEND

- Location and Designation of Test Pit

TP-1

- Asphalt Pavement

- Landscaping

- Chain Link Fence

Reference: Drawing entitled, "General Construction, Martin Control Station, Medford, Jackson County," provided by OBEC Consulting Engineers, dated November 29, 2011.
Shannon & Wilson, Inc. (S&W), uses a soil classification system modified from the Unified Soil Classification System (USCS). Elements of the USCS and other definitions are provided on this page. Soil descriptions are based on visual-manual procedures (ASTM D 2488) unless otherwise noted.

### S&W CLASSIFICATION OF SOIL CONSTITUENTS

**MAJOR** constituents compose more than 50 percent, by weight, of the soil. Major constituents are capitalized (i.e., SAND).

Minor constituents compose 12 to 50 percent of the soil and precede the major constituents (i.e., silty SAND). Minor constituents preceded by "slightly" compose 5 to 12 percent of the soil (i.e., slightly silty SAND).

Trace constituents compose 0 to 5 percent of the soil (i.e., slightly silty SAND, trace of gravel).

### GRAIN SIZE DEFINITION

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>SIEVE NUMBER AND/OR SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINES</td>
<td>&lt; #200 (0.8 mm)</td>
</tr>
<tr>
<td>SAND*</td>
<td>- Fine</td>
</tr>
<tr>
<td></td>
<td>#200 to #40 (0.8 to 0.4 mm)</td>
</tr>
<tr>
<td></td>
<td>- Medium</td>
</tr>
<tr>
<td></td>
<td>#40 to #10 (0.4 to 2 mm)</td>
</tr>
<tr>
<td></td>
<td>- Coarse</td>
</tr>
<tr>
<td></td>
<td>#10 to #4 (2 to 5 mm)</td>
</tr>
</tbody>
</table>

| GRAVEL*     | #4 to 3/4 inch (5 to 19 mm) |
|            | 3/4 to 3 inches (19 to 76 mm) |

| COBBLES     | 3 to 12 inches (76 to 305 mm) |
|            | > 12 inches (305 mm)          |

*Unless otherwise noted, grain size varies from fine to coarse.

### MOISTURE CONTENT DEFINITIONS

- **Dry**: Absence of moisture, dusty, dry to the touch
- **Moist**: Damp but no visible water
- **Wet**: Visible free water, from below water table

---

### UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

(From ASTM D 2487 & 2488)

<table>
<thead>
<tr>
<th>MAJOR DIVISIONS</th>
<th>GROUP/GRAPHIC SYMBOL</th>
<th>TYPICAL DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COARSE-GRAINED SOILS</strong> (more than 50% retained on No. 200 sieve)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gravels (more than 50% of coarse fraction retained on No. 4 sieve)</td>
<td>GW</td>
<td>Clean Gravels (less than 5% fines)</td>
</tr>
<tr>
<td></td>
<td>GP</td>
<td>Poorly graded gravels, gravel/sand mixtures, little or no fines</td>
</tr>
<tr>
<td>Gravels with Fines (more than 12% fines)</td>
<td>GC</td>
<td>Silty gravels, gravel-sand-silt mixtures</td>
</tr>
<tr>
<td>Sands (50% or more of coarse fraction passes the No. 4 sieve)</td>
<td>SW</td>
<td>Clean Sands (less than 5% fines)</td>
</tr>
<tr>
<td></td>
<td>SP</td>
<td>Poorly graded sand, gravelly sands, little or no fines</td>
</tr>
<tr>
<td>Sands with Fines (more than 12% fines)</td>
<td>SM</td>
<td>Silty sands, sand-silt mixtures</td>
</tr>
<tr>
<td></td>
<td>SC</td>
<td>Clayey sands, sand-clay mixtures</td>
</tr>
</tbody>
</table>

| **FINE-GRAINED SOILS** (50% or more passes the No. 200 sieve) |                      |                                                                                     |
| Silts and Clays (liquid limit less than 50) | ML                    | Inorganic silts of low to medium plasticity, rock flour, sandy silts, gravelly silts, or clayey silts with slight plasticity |
|                   | CL                    | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays |
| Organic           | OL                    | Organic silts and organic silty clays of low plasticity                             |
| Organic           | CH                    | Inorganic clays of medium to high plasticity, sandy fat clay, or gravelly fat clay  |
| Organic           | MH                    | Inorganic silts, micaceous or diatomaceous fine sands or silty soils, elastic silt   |
| Organic           | OH                    | Organic clays of medium to high plasticity, organic silts                           |

| **HIGHLY-ORGANIC SOILS** | PT | Primarily organic matter, dark in color, and organic odor                           |

### NOTES

1. Dual symbols (symbols separated by a hyphen, i.e., SP-SM, slightly silty fine SAND) are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart.

2. Borderline symbols (symbols separated by a slash, i.e., CL/ML, silty CLAY/clayey SILT; GW/SW, sandy GRAVEL/gravelly SAND) indicate that the soil may fall into one of two possible basic groups.

---

7000 GPM Martin Control Station
Medford, Oregon

SOIL CLASSIFICATION AND LOG KEY

January 2012

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 3
### Rock Classification and Log Key

#### Rock Strength

<table>
<thead>
<tr>
<th>Description</th>
<th>Designation</th>
<th>Approximate Unconfined Compressive Strength (psi)</th>
<th>Field Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>(use soil description)</td>
<td>R0</td>
<td>28-100</td>
<td>Indented by thumb nail</td>
</tr>
<tr>
<td>Very Low Strength</td>
<td>R1</td>
<td>100 - 1,000</td>
<td>Crumbles under firm blows with point of geology pick, can be peeled with a pocket knife</td>
</tr>
<tr>
<td>Low Strength</td>
<td>R2</td>
<td>1,000 to 4,000</td>
<td>Can be peeled with a pocket knife with difficulty, shallow indentation made by firm blows of geology pick</td>
</tr>
<tr>
<td>Moderate Strength</td>
<td>R3</td>
<td>4,000 to 8,000</td>
<td>Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geology hammer</td>
</tr>
<tr>
<td>Medium High Strength</td>
<td>R4</td>
<td>8,000 to 16,000</td>
<td>Specimen requires more than one blow with a geology hammer to fracture it</td>
</tr>
<tr>
<td>High Strength</td>
<td>R5</td>
<td>16,000 to 32,000</td>
<td>Specimen requires many blows of geology hammer to fracture it</td>
</tr>
<tr>
<td>Very High Strength</td>
<td>R6</td>
<td>&gt;32,000</td>
<td>Specimen can only be chipped with a geology pick</td>
</tr>
</tbody>
</table>

#### Weathering

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh</td>
<td>No visible signs of rock material weathering: perhaps slight discoloration on major discontinuity surfaces.</td>
</tr>
<tr>
<td>Slightly Weathered</td>
<td>Slight penetration of discoloration away from fracture. Fractures may contain thin filling.</td>
</tr>
<tr>
<td>Moderately Weathered</td>
<td>Partial to complete discoloration away from fracture. Rock not friable except for poorly cemented rock. Fractures may contain thick filling.</td>
</tr>
<tr>
<td>Highly Weathered</td>
<td>All rock is discolored. Rock is friable except for poorly cemented rock. Corestones may be present.</td>
</tr>
<tr>
<td>Completely Weathered</td>
<td>All rock is decomposed and/or disintegrated to soil. The original mass is still largely intact.</td>
</tr>
</tbody>
</table>

### Structure Spacing Terms

<table>
<thead>
<tr>
<th>Stratigraphic</th>
<th>Spacing</th>
<th>Discontinuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Thick (massive)</td>
<td>More than 10 ft.</td>
<td>Very Wide</td>
</tr>
<tr>
<td>Thick</td>
<td>3 ft. - 10 ft.</td>
<td>Wide</td>
</tr>
<tr>
<td>Medium</td>
<td>1 ft. - 3 ft.</td>
<td>Moderately Close</td>
</tr>
<tr>
<td>Thin</td>
<td>2 in. - 1 ft.</td>
<td>Close</td>
</tr>
<tr>
<td>Very Thin (laminated)</td>
<td>Less than 2 in.</td>
<td>Very Close</td>
</tr>
</tbody>
</table>

* Refers to apparent spacing along core axis unless measured orthogonal to discontinuity; should then report for each set


**Note:** Unconfined Compressive Strength (UCS) on Log of Boring estimated from point load tests.
Medium dense brown silty sandy GRAVEL with cobbles; moist; low plasticity fines; fine to coarse sand; fine to coarse subrounded gravel.

SANDSTONE: low to moderate strength (R2-R3), light brown; massive; moderately weathered; fine- to coarse-grained; micaceous; moderately well cemented.

PAYNE CLIFFS FORMATION

Completed - January 12, 2012

Excavated with John Deere 310SE rubber-tired backhoe provided by T&M Excavation of Medford, Oregon.

Equipment refusal on hard rock at 2.0 feet.

NOTE: Lines between units are approximate and transitions may be gradual.
### Classification of Material

**FILL**

- Medium dense brown silty sandy GRAVEL: moist; low plasticity fines; occasional cobbles; fine to coarse sand; fine to coarse subrounded to rounded gravel; moderately consolidated. (GP-GM)

- **SANDSTONE:** low to moderate strength (R2-R3), light brown; massive; moderately weathered; fine- to coarse-grained; micaceous; moderately well cemented.

### Payne Cliffs Formation

- Completed - January 12, 2012

### Log of Test Pit TP-2

<table>
<thead>
<tr>
<th>Elev. Depth</th>
<th>Ground Water</th>
<th>Samples</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.</td>
<td>Type</td>
</tr>
<tr>
<td>0.8</td>
<td></td>
<td>S-1</td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td>S-2</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**

Lines between units are approximate and transitions may be gradual.

---

7000 GPM Martin Control Station
Medford, Oregon

**LOG OF TEST PIT TP-2**

January 2012 24-1-03671-001

**SHANNON & WILSON, INC.**
Geotechnical and Environmental Consultants

**FIG. 6**
Medium dense brown silty sandy GRAVEL; moist; low plasticity fines; occasional cobbles; fine to coarse sand; fine to coarse subrounded gravel. (GP-GM)

SANDSTONE: low to moderate strength (R2-R3), light brown; massive; moderately weathered; fine- to coarse-grained; micaceous; moderately well cemented.

PAYNE CLIFFS FORMATION

Completed - January 12, 2012

Equipment refusal on hard rock at 2.0 feet.

Excavated with John Deere 310SE rubber-tired backhoe provided by T&M Excavation of Medford, Oregon.
Medium dense brown silty sandy GRAVEL; moist; low plasticity fines; occasional cobbles; fine to coarse sand; fine to coarse subrounded gravel. (GP-GM)

FILL

SANDSTONE: low to moderate strength (R2-R3), slightly yellow-brown; massive; moderately weathered; fine- to coarse-grained; micaceous; moderately well cemented.

PAYNE CLIFFS FORMATION

Completed - January 12, 2012

Excavated with John Deere 310SE rubber-tired backhoe provided by T&M Excavation of Medford, Oregon.

Equipment refusal on hard rock at 1.5 feet.

NOTE:
Lines between units are approximate and transitions may be gradual.

LEGEND
Jar Sample

7000 GPM Martin Control Station
Medford, Oregon

LOG OF TEST PIT TP-4

January 2012 24-1-03671-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 8
Medium dense dark brown silty SAND with gravel; moist; low plasticity fines; fine to coarse sand; fine to coarse subrounded gravel; contains scattered rounded quartzite clasts. (SM)

SANDSTONE: low to moderate strength (R2-R3), slightly yellow-brown; massive; moderately weathered; fine- to coarse-grained; micaceous; moderately well cemented.

PAYNE CLIFFS FORMATION

Completed - January 12, 2012

Excavated with John Deere 310SE rubber-tired backhoe provided by T&M Excavation of Medford, Oregon.

Equipment refusal on hard rock at 2.0 feet.

NOTE:
Lines between units are approximate and transitions may be gradual.
LEGEND

- ECSI Listed Facility
- RCRA Generators
- Hazardous Material Incident
- LUST Site
- UST Facility

NOTICE
For more information on contaminants see text and appendix D.

POTENTIAL CONTAMINANT SOURCES

Martin Pressure Control Station Replacement
Medford, Oregon

January 2012 24-1-03671-001

SHANNON & WILSON, INC. ENVIRONMENTAL AND ENGINEERING CONSULTANTS

FIG. 10
APPENDIX A

As-Built Drawing
APPENDIX B

EDR Sanborn Map Search Report
Martin Pressure Control Station
Crater Lake Avenue  Opposite Forest Hills Drive
Medford, OR 97504

Inquiry Number: 3211441.1
November 21, 2011
Certified Sanborn® Map Report

Site Name: Martin Pressure Control Station
Client Name: Shannon & Wilson, Inc.
Crater Lake Avenue Opposite Forest Hills
Medford, OR 97504
3990 SW Collins Way
Lake Owego, OR 97035
EDR Inquiry # 3211441.1 Contact: Kim Elliott

The complete Sanborn Library collection has been searched by EDR, and fire insurance maps covering the target property location provided by Shannon & Wilson, Inc. were identified for the years listed below. The certified Sanborn Library search results in this report can be authenticated by visiting www.edrnet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by Sanborn Library LLC, the copyright holder for the collection.

Certified Sanborn Results:

Site Name: Martin Pressure Control Station
Address: Crater Lake Avenue Opposite Forest Hills
City, State, Zip: Medford, OR 97504
Cross Street: 24-1-03671-001
Project: Martin Pressure Control Station
Certification #: 7A4A-424B-99BC

UNMAPPED PROPERTY
This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

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APPENDIX C

HISTORIC AERIAL PHOTOGRAPHS
LEGEND

Project Site

NOTE
Aerials were georeferenced.

Martin Pressure Control Station Replacement
Medford, Oregon

SITE PLAN

January 2012  24-1-03671-001
LEGEND

Project Site

NOTE
Aerials were georeferenced.

1960 AERIAL

Martin Pressure Control Station Replacement
Medford, Oregon

January 2012

24-1-03671-001

SHANNON & WILSON, INC.

C-2
LEGEND

△ Project Site

NOTE
Aerials were georeferenced.

Martin Pressure Control Station Replacement
Medford, Oregon

1979 AERIAL

January 2012 24-1-03671-001

SHANNON & WILSON, INC.

C-4
APPENDIX D

DEQ SITE INFORMATION REPORTS
Land Quality

Environmental Cleanup

DEQ Home > Land Quality > Environmental Cleanup > ECSI > Site Summary Full Report

Environmental Cleanup Site Information (ECSI) Database
Site Summary Full Report - Details for Site ID 3381, Chancler Equipment

This report shows data entered as of November 27, 2011 at 1:54:47 PM

This report contains site details, organized into the following sections: 1) Site Photos (appears only if the site has photos); 2) General Site Information; 3) Site Characteristics; 4) Substances Contamination Information; 5) Investigative, Remedial and Administrative Actions; and 6) Site Environmental Controls (i.e., institutional or engineering controls; appears only if DEQ has applied one or more such controls to the site). A key to certain acronyms and terms used in the report appears at the bottom of the page.

Go to DEQ’s Facility Profiler to see a site map as well is information on what other DEQ programs may be active at this site.

General Site Information

Site ID: 3381
Site Name: Chancler Equipment
CERCLIS No:
Address: 3086 Crater Lake Hwy, Medford 97504
Region: Western
County: Jackson
Investigation Status: No further action required
Brownfield Site: No NPL Site: No
Orphan Site: No Study Area: No
Property: Twnshp/Range/Sect: 37S, 1W, 7
Tax Lots: 500, 600, portion of 501
Latitude: 42.3611 deg.
Site Size:
Longitude: -122.8566 deg.

Other Site Names:

Site Characteristics

Contamination at this site is documented (both visually and from analytical testing) to be primarily heavy fuel oils thought to derive from heavy equipment historically stored on the property. Soil contamination was isolated to specific areas where maintenance/repair was conducted on machinery; where machinery leaked oil on the ground; and areas where an AST was located (southeast portion of property). Given
the nature of these releases and subsequent removals/investigations that explored the extent of various releases, it is unlikely that spills/releases greater than 25 gallons have historically occurred.

Although there has been some confusion about the nature and extent of petroleum hydrocarbons releases to groundwater, the present viewpoint is that a shallow, perched on-site aquifer may have been impacted. However, this seasonal aquifer is recharged by Hopkins Canal and it is not believed to recharge underlying regional aquifers due to a semi-impervious confining unit. Moreover, this site is zoned commercial and all surrounding properties are serviced by a secured water source (City of Medford).

Manner and Time of Release:
Hazardous Substances/Waste Types:
Pathways:
Environmental/Health Threats:
Status of Investigative or Remedial Action: (1/7/03 CW/VCS) Although there has been some confusion about the nature and extent of petroleum hydrocarbons releases to groundwater, the present viewpoint is that a shallow, perched on-site aquifer may have been impacted. However, this seasonal aquifer is recharged by Hopkins Canal and it is not believed to recharge underlying regional aquifers, due to a semi-impervious confining unit. Moreover, this site is zoned commercial and all surrounding properties are serviced by a secured water source (City of Medford).

Based upon a review of relevant reports and conversations with David Graham (EMS) and DEQ staff familiar with this site, DEQ recommends an unqualified No Further Action (NFA) for Chancler Equipment Parcel 2. No written or verbal comments were received during the public comment period (December 1 through 31, 2002). As a result, DEQ finalized the NFA decision in January 2003.

Data Sources:

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<th>Investigative, Remedial and Administrative Actions</th>
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<td>PRELIMINARY ASSESSMENT EQUIVALENT</td>
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<tr>
<td>Site added to database</td>
</tr>
<tr>
<td>NO FURTHER STATE ACTION REQUIRED (Primary Action)</td>
</tr>
</tbody>
</table>

Key to Certain Acronyms and Terms in this Report:

**CERCLIS No.**: The U.S. EPA's Hazardous Waste Site Identification number, shown only if EPA has been involved at the site.

**Region**: DEQ divides the state into three regions, Eastern, Northwest, and Western; the regional office shown is responsible for site investigation/cleanup.
NPL Site: Is this site on EPA's National Priority List (i.e., a federal Superfund site)? (Y/N).

Orphan Site: Has DEQ's Orphan Program been active at this site? (Y/N). The Orphan Program uses state funds to clean up high-priority sites where owners and operators responsible for the contamination are absent, or are unable or unwilling to use their own resources for cleanup.

Study Area: Is this site a Study Area? (Y/N). Study Areas are groupings of individual ECSI sites that may be contributing to a larger, area-wide problem. ECSI assigns unique Site ID numbers to both individual sites and to Study Areas.

Pathways: A description of human or environmental resources that site contamination could affect.

Lead Pgm: This column refers to the Cleanup Program affiliation of the DEQ employee responsible for the action shown. SAS or SAP = Site Assessment; VCS or VCP = Voluntary Cleanup; ICP = Independent Cleanup; SRS or SRP = Site Response (enforcement cleanup); ORP = Orphan Program.

You may be able to obtain more information about this site by contacting Cliff Walkey at the Western regional office or via email at walkey.cliff@deq.state.or.us. If this does not work, you may contact Gill Wistar at (503) 229-5512, or via email at wistar.gill@deq.state.or.us or contact the Western regional office.

[print version]

For more information about ECSI call Gill Wistar at 503-229-5512 or email.

For more information about DEQ's Land Quality programs, visit the DEQ contact page.

Oregon Department of Environmental Quality
Headquarters: 811 SW Sixth Ave., Portland, OR 97204-1390
Phone: 503-229-5696 or toll free in Oregon 1-800-452-4011
Oregon Telecommunications Relay Service: 1-800-735-2906 FAX: 503-229-6124

The Oregon Department of Environmental Quality is a regulatory agency authorized to protect Oregon's environment by the State of Oregon and the Environmental Protection Agency.
Environmental Cleanup Site Information (ECSI) Database

Site Summary Full Report - Details for Site ID 3854, Lava Lanes II

This report shows data entered as of November 27, 2011 at 2:04:25 PM

This report contains site details, organized into the following sections: 1) Site Photos (appears only if the site has photos); 2) General Site Information; 3) Site Characteristics; 4) Substance Contamination Information; 5) Investigative, Remedial and Administrative Actions; and 6) Site Environmental Controls (i.e., institutional or engineering controls; appears only if DEQ has applied one or more such controls to the site). A key to certain acronyms and terms used in the report appears at the bottom of the page.

Go to DEQ's Facility Profiler to see a site map as well as information on what other DEQ programs may be active at this site.

**General Site Information**

- **Site ID:** 3854
- **Site Name:** Lava Lanes II
- **Address:** 2978 Crater Lake Hwy Medford 97501
- **County:** Jackson
- **CERCLIS No:**
- **Region:** Western
- **Investigation Status:** No further action required
- **Brownfield Site:** No
- **NPL Site:** No
- **Orphan Site:** No
- **Study Area:** No
- **Property:** Twshp/Range/Sect: 37S, 1W, 18
  - **Latitude:** 42.3597 deg.
  - **Longitude:** -122.8609 deg.
- **Tax Lots:** 2000
- **Site Size:** 0.71 Acres

**Other Site Names:** Former Wilson Equipment Facility

**Site Characteristics**

- **General Site Description:** The site encompasses approximately .71 acres, and is located in Jackson County in the city of Medford. It is designated as tax lot 2000. At the present time, the site is vacant and has had some improvements. Tax lot 2000 was formerly part of a larger commercial lot. It was subdivided in 1999 when the major portion was sold to Lava Lanes Bowling and Sports Bar, and lot 2000 was left undeveloped. The northwest portion of the property was formerly occupied by an RV sales operation on a paved lot. A day use trailer was used as the office. The southwest portion of the property formerly contained the S.G. Wilson Equipment Rental and Repair office and two repair
shops. Northeast portions of the property were used for heavy equipment storage. The S.G. Wilson structures, the RV Sales Office, and the heavy equipment were removed in 1999, and the site has been extensively filled and graded for commercial redevelopment (parking lot paving, storm water diversions, and Lone Pine Creek reconfiguration).

Site History: Between 1969 and 1986, a concrete septic tank maker occupied the site. Between 1990 and 1999, S.G. Wilson Equipment Rental Yard and Repair Shop operated at the site. The site is currently owned by the Steve and April Wilson Trust. Rental Yard and Repair Shop site operations primarily included: Virgin material storage of antifreeze, oils and solvents; Used oil and diesel fuel tank storage; and Rental equipment storage.

Contamination Information: Phase I, II, and III environmental assessments have been completed. Contamination was limited to surface spills related with changing oil and servicing heavy equipments. The petroleum contaminated soils have been hauled off to another property under a permitted soil remediation program.

Manner and Time of Release:
Hazardous Substances/Waste Types:
Pathways:
Environmental/Health Threats:

Status of Investigative or Remedial Action: (5/11/04 NHG/VCS) DEQ received an intent-to-participate for the VCP on 9/03/03. A Phase I Environmental Assessment completed at the Lava Lanes II site in 1999 identified four areas of concern. These areas were further evaluated and addressed (1999-2000) prior to joining DEQ’s Voluntary Cleanup Program. From September 2003 through April 2004, DEQ evaluated the initial work completed and identified several data gaps. These data gaps were subsequently addressed by the environmental contractor and DEQ. Remedial activities consisting of soil excavation and off-site disposal and treatment was implemented at the 4 AOC. Approximately 500-1000 cubic yards of impacted soil were removed, and the confirmation soil samples collected from the excavated areas indicated petroleum hydrocarbons either below the applicable cleanup levels -- or not present. Groundwater was not assessed because it was not encountered during the excavations.

Since 1999, the site has been extensively graded and reconfigured as a result of on-site and adjacent commercial development. The soil excavation, grading, and filling adequately mitigated any potential threat to human health or the environment posed by the petroleum hydrocarbons. Based on this information, DEQ concluded that no additional investigations or removals were required. The notification for DEQ’s recommendation and comment period was published in the Secretary of State’s Bulletin and the local Medford paper. A DEQ News Release was also issued. The comment period was held from April 1, 2004 through April 30, 2004. No comments were received. DEQ issued the no further action on May 7, 2004.

Data Sources:
1) Phase 1 ESA, 03/99, Coleman Creek Consulting(CCC)
2) Phase 2 ESA Soil Sampling, 06/99, CCC
3) Phase 2 ESA Soil and Water Sampling, 6/99, CCC
4) Phase 3 ESA Soil Excavation and Sampling, 4/00, CCC
5) Data Gap Supplements, Western States Environmental, 1/20/04
6) Decision Summary Review, Western States Environmental, 3/3/04

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mhtml:file://Y:\3671 7000 GPM Martin Control Station\Data\Facility Profiler\ECSI\ECSI 3854 Lava Lan... 12/1/2011
No information is available

Investigative, Remedial and Administrative Actions

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<td>Nancy Gramlich</td>
<td>ICP</td>
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</table>

Key to Certain Acronyms and Terms in this Report:

**CERCLIS No.**: The U.S. EPA's Hazardous Waste Site identification number, shown only if EPA has been involved at the site.

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You may be able to obtain more information about this site by contacting Nancy Gramlich at the Western regional office or via email at gramlich.nancy@deq.state.or.us. If this does not work, you may contact Gil Wistar at (503) 229-5512, or via email at wistar.gil@deq.state.or.us or contact the Western regional office.

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Headquarters: 811 SW Sixth Ave., Portland, OR 97204-1390
Phone: 503-229-5696 or toll free in Oregon 1-800-452-4011
Oregon Telecommunications Relay Service: 1-800-735-2900 FAX: 503-229-6124

The Oregon Department of Environmental Quality is a regulatory agency authorized to protect Oregon's environment by the State of Oregon and the Environmental Protection Agency.
# Leaking Underground Storage Tanks (LUST) Site Information

**Log Nbr:** 15-89-0009  
**Site Name:** FRANKO #36 / TRUAX ARCO  
**Address:** 5000 CRATER LAKE HWY  
**City:** MEDFORD  
**Zip Code:** 97501  
**File Status:** No Further Action  
**County:** JACKSON  
**Status:** CLOSED  
**Received Date:** 2/20/1989  
**UST Facility Id:** 6121  
**Regulated Tank:** YES  
**Discovery:** DECOMMISSIONING  
**Source:** Tank  
**Contaminants Released:** MiscGas  
**Free Product Removed:** Groundwater, Delineated Soil  
**Free Vapor Removed:**  
**Groundwater Delineated:**  
**Soil Delineated:**  
**Compliance Monitoring:**  
**Release Stopped Date:** 2/20/1989  
**Cleanup Start Date:** 2/20/1989  
**Cleanup End Date:** 3/5/1989  

This information may not reflect current status of site. For further detail, refer to the DEQ Regional Office file.

---

This page last updated: January 9, 2006  
DEQ Online is the official web site for the Oregon Department of Environmental Quality.
Leaking Underground Storage Tanks (LUST) Site Information

Log Nbr: 15-90-0079
Site Name: ROBERT S. FORREST, SALES
Address: 1862 DELTA WATERS ROAD
City: MEDFORD
Site Type: Heating Oil Tank (HOT)
Zip Code: 97504
File Status: No Further Action
Regulated Tank: YES

Cause: OVERFILL
Media Affected
Soil

Contaminants Released
Diesel

Free Product Removed:
Delineate Groundwater:
Delineate Soil:
Free Vapor Removed:
Groundwater
Delineated:
Soil Delineated:
Compliance Monitoring:
CAP Requested:
CAP Submitted:
CAP Approved:

Release Stopped Date: 7/7/1990
Cleanup Start Date: 7/7/1990
Cleanup End Date: 7/10/1990

Status: CLOSED
Received Date: 7/10/1990
UST Facility Id: 4662
County: JACKSON

Assessment Information
Source: Not Reported
Discovery: DECOMMISSIONING

Management Information

This information may not reflect current status of site.
For further detail, refer to the [DEQ Regional Office file](#).

This page last updated: January 9, 2006
DEQ Online is the official website for the Oregon Department of Environmental Quality.
Leaking Underground Storage Tanks (LUST) Site Information

Log Nbr: 15-90-0085
Site Name: COGA-COLA
Address: 3047 CRATER LAKE AVE
City: MEDFORD
Site Type: Heating Oil Tank (HOT):

Basic Incident Information
Status: CLOSED
Received Date: 6/27/1990
UST Facility ID: 2450
County: JACKSON
Zip Code: 97501
File Status: No Further Action
Regulated Tank: YES

Assessment Information
Source: Not Reported
Discovery: DECOMMISSIONING

Cause: UNKNOWN
Media Affected
- Soil

Contaminants Released
- MiscGas

Free Product Removed:
Free Vapor Removed:
Groundwater Delineated:
Soil Delineated:
Compliance Monitoring:

Management Information
Release Stopped Date: 6/27/1990
Cleanup Start Date: 6/27/1990
Cleanup End Date: 8/16/1990
CAP Requested:
CAP Submitted:
CAP Approved:

No Work Reported Information For This Incident

This information may not reflect current status of site.
For further detail, refer to the DEQ Regional Office file.

This page last updated: January 9, 2006
DEQ Online is the official website for the Oregon Department of Environmental Quality.
Leaking Underground Storage Tanks (LUST) Site Information

Leaking Underground Storage Tank (LUST) Site Information

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Assessment Information

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Free Vapor Removed:

CAP Requested:

CAP Submitted:

CAP Approved:

Management Information

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No Work Reported. Information for this incident.

This information may not reflect current status of site. For further detail, refer to the DEQ Regional Office file.

This page last updated: January 9, 2006
DEQ Online is the official web site for the Oregon Department of Environmental Quality.
Leaking Underground Storage Tanks (LUST) Site Information

Leaking Underground Storage Tank (LUST) Site Information

Log Nbr: 15-93-0130
Site Name: ROGUE VALLEY TRANSPORTATION DISTRICT
Address: 3200 CRATER LAKE AVE
City: MEDFORD
Site Type: Heating Oil Tank (HOT)
Cause: NOT REPORTED
Media Effected: Soil
Contaminants Released: Other Petro
Free Product Removed: Free Vapor Removed: Groundwater Delineated: Soil Delineated: Compliance Monitoring:
Delineate Groundwater: Delineate Soil:

Basic Incident Information
Status: CLOSED
Received Date: 8/15/1993
UST Facility Id: 2834
County: JACKSON
File Status: No Further Action
Regulated Tank: YES
Assessment Information
Source: Piping
Discovery: OTHER

Release Stopped Date: 8/15/1993
Cleanup Start Date: 8/15/1993
Cleanup End Date: 1/1/1994

Management Information
This information may not reflect current status of site.
For further detail, refer to the DEQ Regional Office file.

This page last updated: January 9, 2006
DEQ Online is the official web site for the Oregon Department of Environmental Quality.
Leaking Underground Storage Tanks (LUST) Site Information

Log Nbr: 15-98-0015
Site Name: WEST MAIN RENTALS & SALES
Address: 1923 DELTA WATERS RD
City: MEDFORD
Zip Code: 97504
Site Type: Heating Oil Tank (HOT):
County: JACKSON

Basic Incident Information
Status: CLOSED
Received Date: 3/5/1998
UST Facility Id: 5609
Regulated Tank: YES

File Status: No Further Action

Assessment Information
Source: Not Reported
Discovery: DECOMMISSIONING

Cause: UNKNOWN

Media Affected
- Soil

Contaminants Released
- Misc Gas
- Diesel

Free Product Removed:

Free Vapor Removed:
- Groundwater
- Delineated
- Soil Delineated:
- Compliance Monitoring
- CAP Requested:
- CAP Submitted:
- CAP Approved:

Delineate Groundwater:

Delineate Soil:

Release Stopped Date: 3/5/1998
Cleanup Start Date: 3/5/1998
Cleanup End Date: 10/2/1998

Management Information

No Work Reported Information For This Incident

This information may not reflect current status of site.
For further detail, refer to the DEQ Regional Office file.

This page last updated: January 9, 2006
DEQ Online is the official website for the Oregon Department of Environmental Quality.
# Leaking Underground Storage Tanks (LUST) Site Information

**Site Name:** ROGUE VALLEY TRANSPORTATION DISTRICT  
**Address:** 3200 CRATER LAKE AVE  
**City:** MEDFORD  
**Zip Code:** 97504  
**Site Type:** Soil Matrix Cleanup  
**Heating Oil Tank (HOT):**  
**Cause:** NOT REPORTED  
**Status:** CLOSED  
**Received Date:** 11/18/2005  
**UST Facility Id:** 2634  
**County:** JACKSON  
**File Status:** Regulated Tank: YES  
**Assessment Information:**  
**Source:** Piping  
**Discovery:** DECOMMISSIONING  
**Free Product Removed:**  
**Delineate Groundwater:**  
**Delineate Soil:** YES  
**Free Vapor Removed:**  
**Groundwater Delineated:**  
**Soil Delineated:** YES  
**Compliance Monitoring:**  
**Release Stopped Date:** 5/25/2005  
**Cleanup Start Date:** 11/17/2005  
**Cleanup End Date:** 7/13/2006

**Work Reported Information:**  
**Work Reported:** Soil Matrix Cleanup  
**Reported By:** Data Conversion 2006  
**Reported Date:** 12/20/2005  
**Soil Matrix Cleanup**  
**Pump Pipe & Tank Services**  
**Reported Date:** 9/9/2005

---

This information may not reflect current status of site.  
For further detail, refer to the [DEQ Regional Office](#) file.

---

This page last updated: January 6, 2006  
DEQ Online is the official web site for the Oregon Department of Environmental Quality.
Oregon DEQ Hazardous Waste Site Report

<table>
<thead>
<tr>
<th>EPA ID:</th>
<th>ORD987173044</th>
<th>Inactive (12/31/1993)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Name:</td>
<td>Coca Cola Bottling Co</td>
<td></td>
</tr>
<tr>
<td>Employee count:</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Location:</td>
<td>3074 CRATER LAKE AVE, MEDFORD OR 97501, JACKSON County</td>
<td></td>
</tr>
<tr>
<td>Latitude:</td>
<td>42°21'41.0000&quot;</td>
<td></td>
</tr>
<tr>
<td>Longitude:</td>
<td>-122°51'21.0000&quot;</td>
<td></td>
</tr>
<tr>
<td>SIC Codes:</td>
<td>5149 - GROCERIES RELATED PRODUCTS</td>
<td></td>
</tr>
</tbody>
</table>

Facility Is a Hazardous Waste Generator
Current Status: CEG as of 12/31/1993

Hazardous Waste Generation Reporting History

<table>
<thead>
<tr>
<th>Report Year</th>
<th>Generator Status</th>
<th>Number of Waste Streams</th>
<th>Tons Generated</th>
<th>Sent Date</th>
<th>Received Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>CEG</td>
<td>0</td>
<td></td>
<td>12/30/1993</td>
<td>03/02/1994</td>
</tr>
<tr>
<td>1992</td>
<td>CEG</td>
<td>0</td>
<td></td>
<td>12/29/1992</td>
<td>01/03/1994</td>
</tr>
<tr>
<td>1991</td>
<td>CEG</td>
<td>0</td>
<td></td>
<td>11/01/1991</td>
<td>04/01/1992</td>
</tr>
</tbody>
</table>
# Oregon DEQ Hazardous Waste Site Report

<table>
<thead>
<tr>
<th>EPA ID:</th>
<th>ORQ000025160</th>
<th>Inactive (10/30/2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Name:</td>
<td>HD Supply Waterworks, Ltd - WW3090</td>
<td></td>
</tr>
<tr>
<td>Employee count:</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Activity Start:</td>
<td>2/6/2006</td>
<td></td>
</tr>
<tr>
<td>Location:</td>
<td>3384 CRATER LAKE AVE MEDFORD OR 97504-9799 JACKSON County</td>
<td></td>
</tr>
<tr>
<td>Latitude:</td>
<td>42.3549</td>
<td>-122.8557</td>
</tr>
<tr>
<td>Longitude:</td>
<td>42° 21' 53.8000&quot;</td>
<td>-122° 51' 20.5000&quot;</td>
</tr>
</tbody>
</table>

**SIC Codes:**

Facility is a Hazardous Waste Generator
Current Status: CEG as of 10/30/2008

## Hazardous Waste Generation Reporting History

<table>
<thead>
<tr>
<th>Report Year</th>
<th>Generator Status</th>
<th>Number of Waste Streams</th>
<th>Tons Generated</th>
<th>Sent Date</th>
<th>Received Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>CEG</td>
<td>0</td>
<td></td>
<td>11/05/2008</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>CEG</td>
<td>0</td>
<td></td>
<td>12/11/2007</td>
<td>04/01/2008</td>
</tr>
<tr>
<td>2006</td>
<td>CEG</td>
<td>0</td>
<td></td>
<td>12/15/2006</td>
<td>03/27/2007</td>
</tr>
</tbody>
</table>
Oregon DEQ Hazardous Waste Site Report

EPA ID: ORR000001594  Activity: Active
Common Name: Sears Roebuck & Co 3350
Location: 3130 CRATER LAKE AVE MEDFORD OR 97504 JACKSON County
Latitude: 42.3620  42° 21' 43.5158"  Longitude: -122.8541  -122° 51' 14.9901"
SIC Codes: 7699 - REPAIR SHOPS & RELATED SERVICE

Facility is a Hazardous Waste Generator
Current Status: CEG as of 12/31/2009

Hazardous Waste Generation Reporting History

<table>
<thead>
<tr>
<th>Report Year</th>
<th>Generator Status</th>
<th>Number of Waste Streams</th>
<th>Tonnage Generated</th>
<th>Sent Date</th>
<th>Received Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>CEG</td>
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<td></td>
<td>12/16/2009</td>
<td>03/09/2010</td>
</tr>
<tr>
<td>2008</td>
<td>CEG</td>
<td>0</td>
<td></td>
<td>12/17/2008</td>
<td>03/27/2009</td>
</tr>
<tr>
<td>2007</td>
<td>CEG</td>
<td>0</td>
<td></td>
<td>12/11/2007</td>
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</tr>
<tr>
<td>2003</td>
<td>CEG</td>
<td>0</td>
<td></td>
<td>12/30/2003</td>
<td>03/02/2004</td>
</tr>
<tr>
<td>2002</td>
<td>CEG</td>
<td>0</td>
<td></td>
<td>12/24/2002</td>
<td>03/03/2003</td>
</tr>
<tr>
<td>2001</td>
<td>CEG</td>
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<td></td>
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<td>03/04/2002</td>
</tr>
<tr>
<td>2000</td>
<td>CEG</td>
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<td></td>
<td>01/05/2001</td>
<td>03/15/2001</td>
</tr>
<tr>
<td>1999</td>
<td>CEG</td>
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<td>01/06/2000</td>
<td>03/15/2000</td>
</tr>
<tr>
<td>1998</td>
<td>CEG</td>
<td>0</td>
<td></td>
<td>01/15/1999</td>
<td>03/18/1999</td>
</tr>
<tr>
<td>1997</td>
<td>SQG</td>
<td>2</td>
<td>0.742</td>
<td>01/06/1998</td>
<td>03/27/1998</td>
</tr>
</tbody>
</table>

Waste Stream: Gasoline  Source: Discarding off-specification material
Waste Codes: D001, D018  CAS Codes:
Form: Halogenated solvent

Reported: 1288.00 LB = 584.00 KG  Managed Onsite: 0.00 KG

Shipments:
- 05/23/1997  437719  TXD077603371  187.00 LB  Fuel blending
- 02/19/1997  306697  TXD077603371  367.00 LB  Fuel blending
- 03/31/1997  006472  TXD077603371  367.00 LB  Fuel blending
- 01/28/1997  006279  TXD077603371  367.00 LB  Fuel blending

Waste Stream: Petroleum naphtha from parts cleaner.
Source: Flush rinsing
Waste Codes: D008, D039  CAS Codes:
Form: Paint thinner or petroleum distillates

Reported: 348.40 LB = 158.00 KG  Managed Onsite: 0.00 KG

mhtml://Y:\0671 7000 GPM Martin Control Station\Data\Facility Profiler\RCRA\RCRA Sears.mht  12/2/2011
<table>
<thead>
<tr>
<th>Shipments</th>
<th>Date</th>
<th>Code</th>
<th>Weight</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>07/25/97</td>
<td>ORD000712067</td>
<td>60.30 LB</td>
<td>Other treatment</td>
</tr>
<tr>
<td></td>
<td>12/18/97</td>
<td>ORD000712067</td>
<td>73.70 LB</td>
<td>Other treatment</td>
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<tr>
<td></td>
<td>03/13/97</td>
<td>ORD000712067</td>
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<tr>
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<td>ORD000712067</td>
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<td></td>
<td>10/07/97</td>
<td>ORD000712067</td>
<td>67.00 LB</td>
<td>Other treatment</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>SQG</th>
<th>1.129</th>
<th>12/30/1996</th>
<th>03/13/1997</th>
</tr>
</thead>
</table>

Waste: Waste gasoline from answer appliances

Source: Other production-derived one-time and intermittent processes

Waste Codes: D001, D018

CAS Codes:

Form: Other organic liquids

Reported: 2088.00 LB = 938.00 KG

Managed Onsite: 0.00 KG

<table>
<thead>
<tr>
<th>Shipments</th>
<th>Date</th>
<th>Code</th>
<th>Weight</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>03/08/96</td>
<td>055070</td>
<td>367.00 LB</td>
<td>Fuel blending</td>
</tr>
<tr>
<td></td>
<td>04/25/96</td>
<td>126039</td>
<td>367.00 LB</td>
<td>Fuel blending</td>
</tr>
<tr>
<td></td>
<td>05/31/96</td>
<td>056220</td>
<td>367.00 LB</td>
<td>Fuel blending</td>
</tr>
<tr>
<td></td>
<td>07/29/96</td>
<td>197922</td>
<td>233.00 LB</td>
<td>Fuel blending</td>
</tr>
<tr>
<td></td>
<td>08/30/96</td>
<td>265103</td>
<td>367.00 LB</td>
<td>Fuel blending</td>
</tr>
<tr>
<td></td>
<td>10/21/96</td>
<td>C45592</td>
<td>367.00 LB</td>
<td>Fuel blending</td>
</tr>
</tbody>
</table>

Waste: Waste petroleum naphtha from parts washer

Source: Other production-derived one-time and intermittent processes

Waste Codes: D008, D018, D039, D040

CAS Codes:

Form: Nonhalogenated solvent

Reported: 422.10 LB = 191.00 KG

Managed Onsite: 0.00 KG

<table>
<thead>
<tr>
<th>Shipments</th>
<th>Date</th>
<th>Code</th>
<th>Weight</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>01/18/96</td>
<td>456209</td>
<td>67.00 LB</td>
<td>Fractionation/distillation</td>
</tr>
<tr>
<td></td>
<td>03/22/96</td>
<td>598648</td>
<td>73.70 LB</td>
<td>Fractionation/distillation</td>
</tr>
<tr>
<td></td>
<td>06/03/96</td>
<td>794317</td>
<td>67.00 LB</td>
<td>Fractionation/distillation</td>
</tr>
<tr>
<td></td>
<td>08/12/96</td>
<td>884073</td>
<td>73.70 LB</td>
<td>Fractionation/distillation</td>
</tr>
<tr>
<td></td>
<td>10/21/96</td>
<td>350343</td>
<td>67.00 LB</td>
<td>Fractionation/distillation</td>
</tr>
<tr>
<td></td>
<td>12/20/96</td>
<td>888108</td>
<td>73.70 LB</td>
<td>Fractionation/distillation</td>
</tr>
</tbody>
</table>

APPENDIX E

OREGON STATE FIRE MARSHAL
HAZARDOUS MATERIAL INCIDENT REPORTS
<table>
<thead>
<tr>
<th>IncZipCode</th>
<th>IncNumber</th>
<th>IncLocation</th>
<th>IncCity</th>
<th>IncDate</th>
<th>DeptRsp</th>
<th>Chem1</th>
<th>AmtReleased</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>97504</td>
<td>970306</td>
<td>3130 CRATER LAKE AVE</td>
<td>MEDFORD</td>
<td>6/5/1997</td>
<td>MEDFORD FIRE DEPT</td>
<td>WASTE OIL (MOTOR &amp; TRANSMISSION)</td>
<td>25 GALLONS</td>
<td>TWO CONTAINERS OF WASTE TRANSMISSION FLUID OR WASTE MOTOR OIL BEING TRANSPORTED IN A DELIVERY TRUCK FELL OVER &amp; SPILLED. SPILL INSIDE OF TRUCK WAS ABSORBED BY RICE HULLS. SPILLS ONTO THE PAVEMENT WERE ALSO BEING SPREAD WITH RICE HULLS. RESPONSIBLE PARTY WAS ADVISED TO CONTACT THE LOCAL WASTE DISPOSAL COMPANY FOR INFO ON DISPOSAL OF ABSORBED MATERIAL</td>
</tr>
<tr>
<td>97504</td>
<td>010077</td>
<td>3200 CRATER LAKE AVE</td>
<td>MEDFORD</td>
<td>2/21/2001</td>
<td>MEDFORD FIRE DEPT</td>
<td>NATURAL GAS</td>
<td>1000 CF</td>
<td>SEE ATTACHED (OSFM NOTE: THERE WAS NO ATTACHED TO THIS REPORT)</td>
</tr>
<tr>
<td>97504</td>
<td>950544</td>
<td>3244 TAHIITAN (IN AREA OF)</td>
<td>MEDFORD</td>
<td>10/17/1995</td>
<td>MEDFORD FIRE DEPT</td>
<td>NO CHEMICAL INVOLVED</td>
<td>0</td>
<td>DISPATCHED TO AN ODOR INVESTIGATION OF AN INSECTICIDE TYPE SMELL IN A RESIDENTIAL NEIGHBORHOOD. FOUND A FAINT INSECTICIDE ODOR WHICH RAPIDLY DISSIPATED. UNABLE TO LOCATE A SOURCE. 8125: C/O SHAFER, ENG COOPER, F/F GREEN.</td>
</tr>
<tr>
<td>97504</td>
<td>000320</td>
<td>3269 Sycamore</td>
<td>MEDFORD</td>
<td>4/25/2000</td>
<td>MEDFORD FIRE DEPT</td>
<td>NATURAL GAS</td>
<td>100 CF</td>
<td>SEE GREEN SHEET. (OSFM NOTE: NO SHEET IN FILE)</td>
</tr>
</tbody>
</table>


APPENDIX F

WESTERN STATES ENVIRONMENTAL SERVICES
HAZARDOUS BUILDING MATERIALS REPORT
HAZARDOUS MATERIALS SURVEY

Martin Control Station, Hwy 62, Medford, OR

Introduction

Western States Environmental Services was contracted by Kim Elliott of Shannon & Wilson, Inc of Lake Oswego, OR on November 10, 2011, to perform a hazardous materials survey of a PP&L substation on Hwy 62 in Medford Oregon. The purpose of this activity was to determine the presence of asbestos containing building materials (ACBM), Lead Paint, PCB’s and Mercury Florescent Tubes prior to a building demolition.

Asbestos Survey

Ken Olmstead of Western States Environmental Services collected samples of suspect ACBM from the building on November 18, 2011. Mr. Olmstead is an accredited Building Inspector according to the Asbestos Hazard Emergency Response Act and Asbestos School Hazard Abatement Reauthorization Act (AHERA/ASHARA), Certification IR-11-0906B exp. 3-04-12. Western States Environmental Services, Inc is also a certified lead paint renovation, repair and painting rule contractor as per 40 CFR 745.80, Subpart E, License LBPR158993, exp. 8/10/2015, as administered by the Oregon Construction Contractors Board.

Asbestos Analysis

All areas of the work zone were inspected for the presence of “suspect” ACBM. Samples were collected and catalogued for analysis. Samples were then forwarded to EMSL Analytical, Inc, of San Leandro, CA, for analysis utilizing Polarized Light Microscopy (PLM).

Analysis Results

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Location</th>
<th>Appearance</th>
<th>Friable / non-Friable</th>
<th>% / Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Martin – 1</td>
<td>Bathroom Wall System</td>
<td>White</td>
<td>Friable</td>
<td>Non-Detect</td>
</tr>
<tr>
<td>Martin – 2</td>
<td>Bathroom Cove Base</td>
<td>Gray</td>
<td>Friable</td>
<td>Non-Detect</td>
</tr>
<tr>
<td>Martin – 3</td>
<td>Roofing System</td>
<td>Black</td>
<td>Friable</td>
<td>Non-Detect</td>
</tr>
</tbody>
</table>

Asbestos Lab Results – See Attached
Lead Paint Analysis

All areas of the building were tested for the presence of lead paint via Lead Check™, a federally (EPA) approved on-site test allowing for immediate results indicating the presence of lead in paint.

### Lead Paint Analysis Results

<table>
<thead>
<tr>
<th>Sample Location</th>
<th>Appearance</th>
<th>Stable / non-stable</th>
<th>Detect / non-Detect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior Wall</td>
<td>Blue</td>
<td>Stable</td>
<td>Non-Detect</td>
</tr>
<tr>
<td>Exterior Wall</td>
<td>White</td>
<td>Stable</td>
<td>Non-Detect</td>
</tr>
<tr>
<td>Exterior Door Trim</td>
<td>Various</td>
<td>Stable</td>
<td>Non-Detect</td>
</tr>
</tbody>
</table>

### Florescent Lights Analysis

All Florence light fixtures were visually inspected for the presence of PCB ballast and mercury light tubes. All fixtures (6 ea.) were visually confirmed to utilize PCB containing ballasts and mercury containing light tubes.

### Recommendations

According to OR-DEQ statute, all areas testing positive (> 1%) for asbestos must be abated either directly by the homeowner in the case of a residence, or by an accredited / Oregon licensed, Asbestos Abatement Contractor prior to demolition. The laboratory results determined that no asbestos is present at the sample locations selected and no other materials are suspect for asbestos. Asbestos abatement is not required prior to remodel work or structure demolition.

Additionally, lead based paint is known to have possible health effects if breathed during remodel and demolition activities. In this case no lead paint was detected so no personnel protective equipment (PPE) is required during any future activities.

PCB’s were discovered in the operating light fixtures. These ballasts and the associated light tubes should be removed and disposed appropriately prior to any demolition activity.

### Additional Notes
Although every effort has been made to determine the presence of these hazardous materials, it is possible that some materials may be hidden in inaccessible areas such as inside wall cavities, interior building ceilings, crawl spaces, etc. Therefore caution should be exercised during demolition to be continually observant of additional “possible” hazardous materials. If suspect materials are discovered, work should stop and sampling should be undertaken to determine if a hazard exists and appropriate remediation procedures exercised if positive.

Regards,

John Early
November 22, 2011
APPENDIX G

DEQ FACT SHEET: WASTE LAMPS & BALLASTS
Waste Lamps & Ballasts

This fact sheet provides guidance to individuals that create and manage waste lamps and ballasts. Complete management regulations can be found in the Code of Federal Regulations (CFR), Title 40, Part 273 and 261 and the Oregon Administrative Rule (OAR) Chapter 340, Division 113.

Environmental concerns
Fluorescent lamps and High Intensity Discharge (HID) lamps, including mercury vapor, high-pressure sodium, and metal halide lamps from businesses, can contain levels of mercury and lead that make them hazardous waste when disposed. Mercury and lead are toxic metals that can accumulate in living tissue and cause adverse health effects. Businesses and governments in Oregon discard several million lamps each year, making these lamps the largest source of mercury in our solid waste-stream. When a lamp is broken, or placed in a landfill or incinerator, metals are released into the environment that may contaminate the air, surface or groundwater.

Lamp ballasts manufactured prior to 1978 likely contain polychlorinated biphenyls (PCBs). When released into the environment, PCBs persist for many years and bioaccumulate in organisms. Studies have shown that PCBs cause cancer in animals, and repeated exposure to PCBs has shown adverse reproductive and developmental effects in animals. Exposure to PCBs can cause liver damage, nausea, dizziness, eye irritation and bronchitis in humans.

Management of lamps as universal waste
The universal waste rule was designed to encourage the collection of certain hazardous wastes that are generated by a wide variety of businesses and institutions. Depending on your individual situation, other options may be preferred to managing your waste lamps as universal waste. A summary of lamp management options is presented in a table on page 2. For specific requirements, refer to the rules listed in the table.

Advantages of managing waste lamps under the universal waste rule are:
- Universal wastes are not counted towards hazardous waste generator status;
- No manifesting required unless the waste lamps are transported through states or treated or disposed in states that do not recognize mercury-containing lamps as a universal waste;
- Increased storage time available; and
- Reduced administrative requirements for record-keeping, training, and emergency preparedness.

Universal waste management requirements
Handlers of waste lamps managed under the universal waste rule must:
- Manage lamps in a way that prevents releases of the waste to the environment;
- Contain lamps in containers such as cardboard boxes or fiber drums, which are adequate to prevent breakage;
- Keep containers closed;
- Minimize lamp breakage and immediately clean up any broken or damaged lamps; and,
- Store broken lamps in a closed, structurally sound container.

Universal waste handlers are prohibited from crushing lamps, or diluting lamps with other wastes. Waste lamps must be sent to a universal waste destination facility for recycling or disposal.

Labeling and marking
Each container of waste lamps must be labeled or marked clearly with one of the following phrases: "Universal Waste—Lamps", "Waste Lamps," or "Used Lamps."

Accumulation time
Waste lamps may be accumulated for up to 1 year. Accumulation of universal waste lamps longer than 1 year is permitted if the handler can demonstrate, if inspected by the Department, that more time is needed to accumulate the quantities necessary to facilitate proper recovery, treatment or disposal.
### Mercury Containing Lamp Management Options

<table>
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<tr>
<th>Management As</th>
<th>Conditions Which Must Be Met</th>
<th>Applicable Rules</th>
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<tr>
<td>Universal Waste</td>
<td>Management of waste subject to applicable universal waste management standards.</td>
<td>See 40 CFR Part 273* and OAR 340 Division 113**</td>
<td>Universal waste rule is designed to encourage collection of waste. Waste lamps are ultimately subject to hazardous waste management requirements when treated or disposed.</td>
</tr>
<tr>
<td>Conditionally Exempt Hazardous Waste</td>
<td>Generator of waste lamps must be a conditionally exempt generator (&lt;220 lbs. hazardous waste generated per month and &lt;2,200 lbs. hazardous waste stored at any one time).</td>
<td>See 40 CFR 261.5</td>
<td>Waste lamps may be disposed of in solid waste landfill, if allowed by the operator.</td>
</tr>
<tr>
<td>Solid Waste</td>
<td>Waste lamps must not exhibit hazardous waste characteristics.</td>
<td>See OAR 340-102-0011 for hazardous waste determination requirements</td>
<td>Some fluorescent lamps do not exhibit hazardous waste characteristics.</td>
</tr>
<tr>
<td>Hazardous Waste</td>
<td>Generator must follow applicable hazardous waste regulations.</td>
<td>See 40 CFR 260-266, 268, OAR 340 Divisions 100 to 106, and 108</td>
<td>Most restrictive management requirements. Waste must be sent directly to permitted hazardous waste facility.</td>
</tr>
</tbody>
</table>

* 40 CFR is Title 40 of the Code of Federal Regulations and contains the Federal environmental regulations.
** OAR 340 is Chapter 340 of the Oregon Administrative Rules and contains the State environmental regulations.

**Lamp crushing**

Crushing of universal waste lamps is prohibited under the universal waste regulations. However, crushing is allowed if the waste will be managed as hazardous waste. (See discussion below under "Management of Waste Lamps as Hazardous Waste").

**Management of waste lamps as hazardous waste**

Generators of waste lamps may decide, in lieu of the management as universal waste, to manage their waste lamps as hazardous waste. Management of lamps as hazardous waste is more restrictive than under the universal waste rule and, depending on the amount of hazardous waste generated, may:

- Limit the time waste can be accumulated;
- Be subject to hazardous waste generation fees;
- Require additional training, emergency preparedness and contingency plans to be developed; and
- Require annual reporting of waste generated.

**Conditionally exempt hazardous waste**

Waste lamps may be managed as conditionally-exempt generator waste if the generator of the waste is a conditionally-exempt hazardous waste generator. A conditionally-exempt hazardous waste generator is a generator that produces less than 220 pounds of hazardous waste per month. When determining if they are conditionally-exempt, hazardous waste generators must count all their hazardous waste (lamps and other hazardous waste) generated during the calendar month.
To remain "conditionally-exempt" from the more stringent hazardous waste management requirements, generators who produce less than 220 pounds of hazardous waste must:

- Ensure delivery of their waste to a hazardous waste disposal or recycling facility, or a solid waste disposal facility, and
- Accumulate no more than 2,200 pounds of hazardous waste at any one time.

**Crushing lamps**

Crushing lamps is permitted if the waste lamps are managed under the hazardous waste regulations or if the waste lamps are determined to be a solid waste. Lamps must be crushed in commercially available crushing units that are designed to control mercury emissions.

Crushing is allowed provided that the generator of the lamps:

- Crushes lamps in a well-ventilated and monitored area to ensure compliance with applicable OSHA exposure limits for mercury;
- Ensures that employees crushing lamps are thoroughly familiar with proper waste mercury handling and emergency procedures; and
- Stores crushed tubes in closed, non-leaking containers.

When making a decision to crush lamps, be aware that the crushing may add additional costs to prepare lamps for disposal or recycling. In addition, lamp recyclers may prefer whole lamps to crushed ones. Crushing units also can pose health and environmental risks because of the release of mercury vapors.

**Management of waste lamps as solid waste**

Waste lamps may be managed as solid waste if they do not exhibit a hazardous waste characteristic. In many cases, any such characteristic exhibited will be for mercury. Waste lamps used in special situations, such as photo processing, or larger HID lamps, can also exhibit hazardous waste characteristics for cadmium or lead.

To manage waste lamps as solid waste, a generator must first determine that their lamps do not exhibit a hazardous waste characteristic.

- Testing a representative sample of the waste, using the Toxicity Characteristic Leaching Procedure (TCLP); or,
- Using process knowledge of the waste. In this case, knowledge of the waste could be obtained from the manufacturer. Lamp manufacturers now offer low mercury lamps that do not exhibit hazardous waste characteristics. Be sure to have documentation from the manufacturer that the lamps you are using have been tested and are not hazardous waste. You must be able to demonstrate that the data used in your waste determination is for the type of lamps (i.e., the brand and model) you are disposing.

For more information regarding how to perform a hazardous waste determination, refer to the Department's Hazardous Waste Determination Fact Sheet.

**Lamp collection services**

The following is a partial list of firms that offer waste lamp services. DEQ does not endorse specific recyclers or disposal firms.

DEQ, by providing the list, does not imply that the companies are in compliance with applicable laws. DEQ cautions generators to personally evaluate the services and compliance status of any company they use to manage their waste.

- Allied Environmental, White City, OR 541-772-1723
- Earth Protection Services, Tigard, OR 503-620-2466
- Environmental Protection Services, Brooks, OR 503-474-1586
- Northwest Hazmat, Springfield, OR 541-988-9823
- Garris Environmental, White City, OR 541-830-1100
- Safety-Kleen, Clackamas, OR 503-655-5798
- The Retrofit Companies, Sherwood, OR 503-625-2760
- Waste-Pro, LaGrande, OR 541-963-5459
- AERC, Hayward, CA 510-429-1129
- EcoLights NW, Seattle WA 206-343-1247
- Lighting Resources, Ontario CA 800-572-9253
- Philips Services Corporation, Washougal, WA 800-547-2436
- Veolia Environmental Services, Vancouver, WA 360-260-0882

A generator may do this by:
Management of lamp ballasts

Light ballasts are the primary electrical components of fluorescent light fixtures and are generally located within the fixture under a metal cover plate. In older ballasts, a tar-like substance surrounds the components of the ballast that is designed to muffle the noise that is inherent in the operation of these ballasts.

Before the U.S. Environmental Protection Agency (EPA) banned the manufacture of PCBs in 1978, PCBs were commonly used in ballasts. All lamp ballasts manufactured since 1978 that do not contain PCBs should be marked by the manufacturer with the statement "No PCBs."

For ballasts manufactured prior to 1978, or for those that do not contain a statement regarding PCB content, you should assume that they contain PCBs.

PCB-containing ballasts contain approximately 1 to 1½ ounces of PCBs. If the ballast fails, PCBs may drip out of the fixture. If it does, measures should be taken to limit or avoid personal exposures.

Disposal of ballasts containing PCBs

The best option for non-leaking PCB ballasts is to recycle them at a facility with EPA approval for recycling PCB ballasts. Use a broker with EPA interim status as a PCB commercial storage facility to transport them to the recycling facility. Non-leaking PCB ballasts that are not recycled must be managed and disposed at a PCB disposal facility.

Leaking PCB ballasts must be managed as PCB waste and disposed in a facility regulated under the Federal Toxic Substances Control Act (TSCA).

Brokers that collect PCB ballasts:

EcoLights Northwest, Seattle, WA  
(206) 343-1247

Facilities with EPA approval for recycling fluorescent light ballasts:

(Call company for shipping guidelines.)

- Earth Protection Services, Inc., 
  Tigard, OR  (503) 620-2466
- Mercury Waste Solutions, MN  
  (877) 636-6514
- Onyx Environmental Services, Vancouver, WA  
  (877) 652-6292
- Trans-Cycle Industries, AL  
  (800) 909-9997

Additional information from DEQ

- Universal Waste Regulations
- Universal Waste Handler Fact sheet
- Hazardous Waste Determination Fact Sheet
- Oregon Hazardous Waste Regulations

For more information on Hazardous Waste Management, contact DEQ at (503) 229-5913 or visit our website.

For PCB disposal information contact EPA Region X at (503) 326-3399 or visit:

http://yosemite.epa.gov/R10/OWCM.NSF/pcb/pcb

Need technical assistance managing waste?

DEQ Technical assistance is available:

- Free on-site visits
- Free telephone consultations
- Hazardous waste training

DEQ Technical assistance can help you:

- Understand how hazardous waste regulations apply to your business
- Determine which wastes are hazardous
- Complete reporting forms
- Manage wastes better
- Reduce disposal costs
- Minimize the waste you produce
- Determine what areas need improvement

If you would like technical assistance or have any questions about your hazardous waste determination responsibilities, please contact the DEQ field office nearest you:

- Bend  (541) 388-6146
- Medford  (541) 776-6010
- Portland  (503) 229-5263

For more information on technical assistance, please visit:  
www.deq.state.or.us/lq/hw/technicalassistance.htm

Alternative Formats

Alternative formats of this document can be made available. Contact the DEQ Office of Communication and Outreach for more information:  
(503) 229-5696.
APPENDIX H

IMPORTANT INFORMATION ABOUT
YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT
Important Information About Your Geotechnical/Environmental Report

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors, which were considered in the development of the report, have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.
A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based on interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland