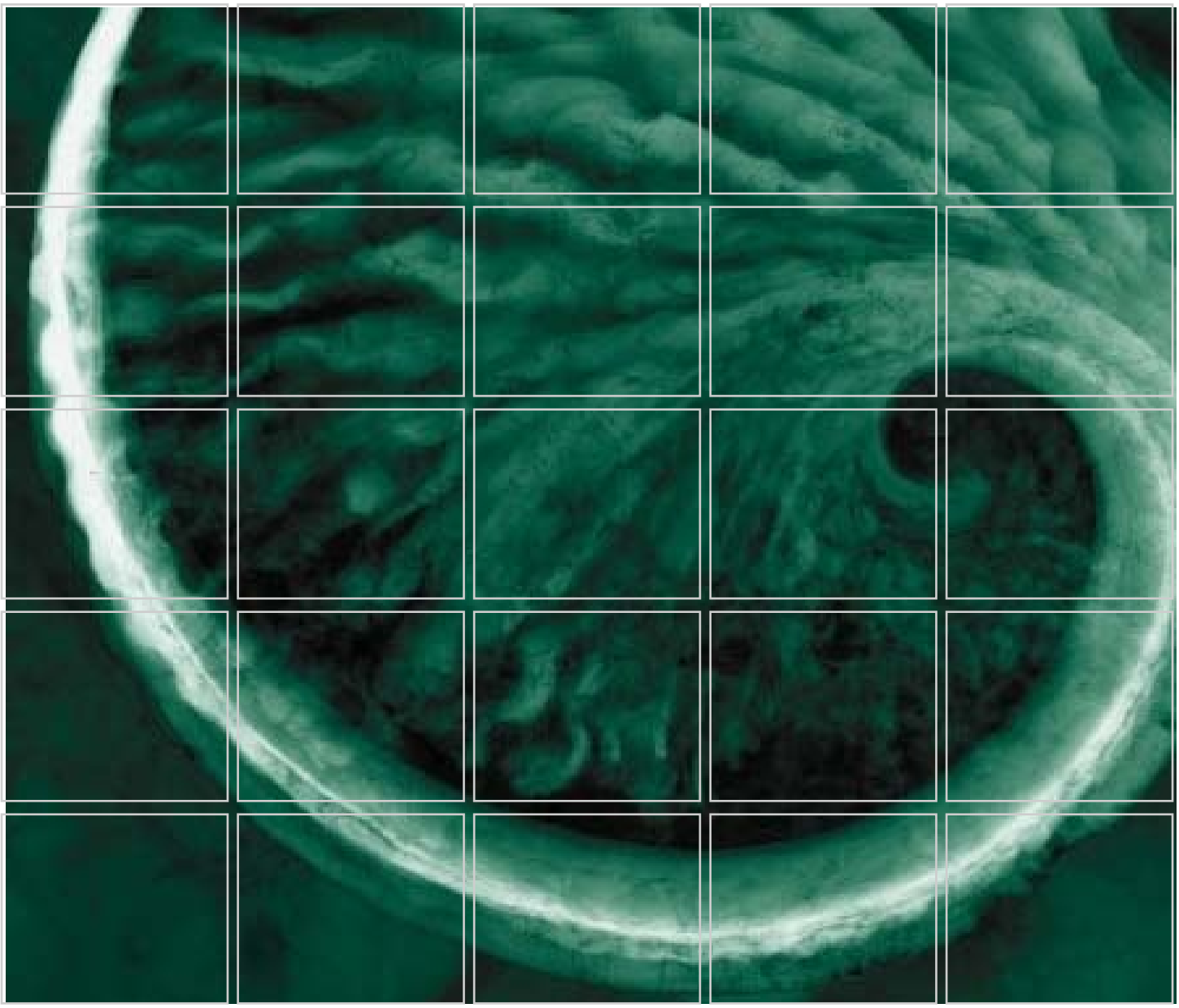

Hot Spot Evaluation Update

Arkema Inc. Facility
Portland, Oregon

January 2012

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Prepared for:
Legacy Site Services LLC

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ERM

Legacy Site Services LLC

Hot Spot Evaluation Update

January 2012

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TABLE OF CONTENTS

LIST OF FIGURES ***III***

LIST OF TABLES ***V***

LIST OF ACRONYMS ***VI***

1.0 INTRODUCTION ***1***

1.2 OBJECTIVES ***1***

1.3 REPORT ORGANIZATION ***1***

2.0 SITE BACKGROUND ***3***

2.1 BACKGROUND ***3***

2.1.1 Site Description *3*

2.1.2 Site History *3*

3.0 PRELIMINARY HOT SPOT SCREENING CRITERIA ***5***

3.1 PRELIMINARY WATER HOT SPOTS ***5***

3.2 PRELIMINARY SOIL HOT SPOTS ***6***

3.2.1 Preliminary Highly Concentrated Hot Spots *7*

3.2.2 Preliminary Highly Mobile Hot Spots *8*

3.2.3 Not Reliably Containable *10*

3.3 NON-AQUEOUS PHASE LIQUIDS ***10***

4.0 HOT SPOT EVALUATION ***11***

4.1 PRELIMINARY GROUNDWATER HOT SPOTS ***11***

4.1.1 Metals *11*

4.1.2 Chloride and Perchlorate *11*

4.1.3 Volatile Organic Compounds *12*

4.1.4 Pesticides and Herbicides *13*

4.1.5 Furans *13*

4.2 PRELIMINARY HIGHLY CONCENTRATED HOT SPOTS ***14***

4.2.1 Human Exposure Routes *14*

4.2.2 Ecological Exposure Routes *15*

4.3 PRELIMINARY HIGHLY MOBILE HOT SPOTS 15
4.3.1 Leaching to Groundwater 15

4.4 NON-AQUEOUS PHASE LIQUIDS 17

5.0 PRELIMINARY POTENTIAL HOT SPOT AREAS 18

5.1 PRELIMINARY GROUNDWATER HOT SPOTS 18

5.2 PRELIMINARY HIGHLY CONCENTRATED HOT SPOTS 18

5.3 PRELIMINARY HIGHLY MOBILE HOT SPOTS 19

5.4 NON-AQUEOUS PHASE LIQUIDS 19

6.0 REFERENCES 20

LIST OF FIGURES

(Figures immediately follow the text)

Figure 1-1 Site Vicinity Map

Figure 1-2 Site Layout

Figure 3-1 Soil Boring Locations

Figure 4-1 Metals in Groundwater – Shallow Zone

Figure 4-2 Metals in Groundwater – Intermediate Zone

Figure 4-3 Metals in Groundwater – Deep Zone

Figure 4-4 Metals in Groundwater – Gravel and Basalt Zones

Figure 4-5 Chloride in Groundwater - Shallow Zone

Figure 4-6 Chloride in Groundwater - Intermediate Zone

Figure 4-7 Chloride in Groundwater - Deep Zone

Figure 4-8 Chloride in Groundwater – Gravel and Basalt Zones

Figure 4-9 Perchlorate in Groundwater - Shallow Zone

Figure 4-10 Perchlorate in Groundwater - Intermediate Zone

Figure 4-11 Perchlorate in Groundwater - Deep Zone

Figure 4-12 VOCs in Groundwater - Shallow Zone

Figure 4-13 VOCs in Groundwater - Intermediate Zone

Figure 4-14 VOCs in Groundwater - Deep Zone

Figure 4-15 VOCs in Groundwater – Gravel and Basalt Zones

Figure 4-16 Pesticides in Groundwater - Shallow Zone

Figure 4-17 Pesticides in Groundwater - Intermediate Zone

Figure 4-18 Pesticides in Groundwater - Deep Zone

Figure 4-19 Pesticides in Groundwater – Gravel and Basalt Zones

Figure 4-20 TEQ Concentrations in Groundwater - Shallow Zone

Figure 4-21 TEQ Concentrations in Groundwater - Intermediate Zone

Figure 4-22 TEQ Concentrations in Groundwater - Deep Zone

Figure 4-23 TEQ Concentrations in Groundwater – Gravel and Basalt Zones

Figure 4-24 Highly Concentrated Soil - Human Exposure Soil

Figure 4-25 Highly Concentrated Soil - Ecological Exposure

Figure 4-26 Metals in Soil - Leaching to Groundwater

Figure 4-27 VOCs and SVOCs in Soil - Leaching to Groundwater

Figure 4-28 Pesticides in Soil - Leaching to Groundwater

Figure 4-29 TEQ Concentrations in Soil - Leaching Groundwater

Figure 5-1 Preliminary Groundwater Hot Spot Area

Figure 5-2 Preliminary Highly Concentrated Hot Spot Area - Soil

Figure 5-3 Preliminary Highly Mobile Hot Spot Area – Leaching to Groundwater

LIST OF TABLES

(Tables immediately follow the figures)

Table 3-1 *Hot Spot Receptor Pathway Evaluation Soil Sample Collection Summary*

Table 3-2 *Indirect Exposure Pathway Based Screening Criteria*

Table 3-3 *Direct Exposure Pathway Based Screening Criteria*

Table 4-1 *Metals and Inorganic Compounds in Groundwater*

Table 4-2 *Volatile Organic Compounds in Groundwater*

Table 4-3 *Pesticides and Herbicides in Groundwater*

Table 4-4 *TEQ Concentrations in Groundwater*

Table 4-5 *Potential Highly Concentrated Human Health Exposure - Lot 1 & 3*

Table 4-6 *Potential Highly Concentrated Human Health Exposure - Lot 3 & 4*

Table 4-7 *Potential Highly Concentrated Ecological Exposure - Lot 1 & 2*

Table 4-8 *Metals in Soil – Potential Leaching to Groundwater*

Table 4-9 *Volatile Organic Compounds and Semi-Volatile Organic Compounds in Soil – Potential Leaching to Groundwater*

Table 4-10 *Pesticides in Soil – Potential Leaching to Groundwater*

Table 4-11 *TEQ Concentrations in Soil – Potential Leaching to Groundwater*

LIST OF ACRONYMS

AWQC	Ambient Water Quality Criteria
BERA	Biological and Ecological Risk Assessment
bgs	Below ground surface
BHC	Benzene hexachloride
COPC	Chemical of potential concern
DAF	Dilution and attenuation factor
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DNAPL	Dense non-aqueous phase liquid
EPA	United States Environmental Protection Agency
ERM	Environmental Resources Management
FS	Feasibility Study
HHRA	Human Health Risk Assessment
HSE	Hot Spot Evaluation
JSCS	Joint Source Control Strategy
LSS	Legacy Site Services LLC
NAPL	Non-aqueous phase liquid
OAR	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality
RI	Remedial Investigation
RSL	Regional screening level
SCM	Source control measure
SVOC	Semi-volatile organic compound
TEQ	2,3,7,8-Tetrachlorodibenzondioxin Toxicity Equivalent Quotient
VOC	Volatile organic compound

1.0 INTRODUCTION

Environmental Resources Management (ERM) has prepared this *Hot Spot Evaluation* (HSE) *Report* on behalf of Legacy Site Services LLC (LSS), agent for Arkema Inc. (Arkema), for the former Arkema Portland Plant (the site) located at 6400 Northwest Front Avenue in Portland, Oregon (Figure 1-1). This HSE has been prepared pursuant to the Order on Consent requiring source control measures and a feasibility study (FS), issued by the Oregon Department of Environmental Quality (ODEQ) and signed 31 October 2008 (ODEQ No. LQVC-NWR-08-04) (Consent Order). This HSE has been prepared in accordance with Oregon Administrative Rules (OAR) 340-122-090, the ODEQ *Guidance for the Identification of Hot Spots* (ODEQ 1998), and discussions with ODEQ including a meeting held between ODEQ and representatives of LSS on 29 November 2011.

The purpose of this HSE is to identify areas of the site to be included in the FS. These identified areas will be further evaluated and refined for final site remedies in the FS.

1.2 OBJECTIVES

The objectives of the HSE were to:

- Determine the types of hot spots at the site, promulgated screening criteria and appropriate data sets to be screened in accordance with the ODEQ guidance documents and instructions;
- Identify areas of the site (i.e. "hot spots") that will be considered in the FS.

1.3 REPORT ORGANIZATION

The remainder of this report is organized as follows:

- Section 2 provides a description of the site and the site history.
- Section 3 describes the types of hot spots and presents the HSE screening criteria and data sets.
- Section 4 details the results of the HSE.

- Section 5 provides a summary of the preliminary hot spot areas that will be considered in the FS.
- Section 6 lists the references cited.

2.0 SITE BACKGROUND

2.1 BACKGROUND

The site history is documented in the *Uplands Remedial Investigation* (RI) *Report Lots 3 & 4 and Tract A – Revision 1* (RI Report) (ERM 2005). A brief historical description of site activities is provided below.

2.1.1 Site Description

The site is located at 6400 Northwest Front Avenue in the northwest industrial area of Portland, Oregon. The facility is bounded by Front Avenue on the north and west, the Willamette River on the east, and an asphalt roofing manufacturer on the south. The site is located on the southwest bank of the lower Willamette River between River mile 6.9 and River mile 7.6, immediately upstream of the Burlington Northern Santa Fe Railroad Bridge (Figure 1-1). The property is located adjacent to the Portland Harbor Superfund site. A site layout is presented in Figure 1-2.

2.1.2 Site History

Inorganic chemicals were manufactured at the site from 1941 until 2001, when the facility was closed and chemical manufacturing was discontinued. For most of the site's history, the chemical activities involved electrolytic decomposition of brine solutions to manufacture inorganic chemicals, including sodium chlorate, chlorine, sodium hydroxide, hydrogen, and hydrochloric acid. Other chemical manufacturing processes during the site's operational history included the production of dichlorodiphenyltrichloroethane (DDT) from 1947 to 1954 and ammonium perchlorate from 1958 to 1962 (ERM 2005).

Decommissioning and removal of the manufacturing infrastructure were completed in early 2005. The only structure remaining is the office building at the site entrance on Front Street and some concrete floor slabs left in place as environmental caps. Arkema maintains leases from the Oregon Department of State Lands for the dock area along the Willamette River, but the docks are not currently in use.

Arkema (formerly known as ATOFINA Chemicals, Inc.; Elf Atochem North America, Inc.; and the Pennwalt Corporation) has conducted

investigations and performed a number of Interim Remedial Measures (also referred to as Source Control Measures [SCMs]) in the upland portion of the site since 1994. In 1995, Arkema (then known as Elf Atochem) submitted an intent to participate in the ODEQ Voluntary Cleanup Program, an agreement that was later signed with the ODEQ in 1996. In 1998, Arkema signed a voluntary agreement with the ODEQ to complete an RI and FS of the former DDT manufacturing area. The RI/FS was later expanded to include other areas and chemicals at the site (e.g., hexavalent chromium and perchlorate). The RI Report was submitted to the ODEQ in December 2005 (ERM 2005).

In 2008, Arkema and the ODEQ entered into the Consent Order for the upland portion of the site. The upland Consent Order requires submittal of various documents in support of upland source control (i.e., groundwater, storm water, and erodible soil) and the upland FS (data gaps investigation). An HSE was one of the documents specified in the Consent Order and is a required part of the upland FS process under the Oregon Environmental Cleanup Rules (Oregon Administrative Rules [OAR] 340-122). Data generated during the RI process and subsequent Data Gaps Investigation (ERM 2010) were used in this HSE.

A Human Health Risk Assessment (HHRA) (Integral 2008) and a Biological and Ecological Risk Assessment (BERA) (Integral 2009) have been performed for the site. The ODEQ approved the assumptions and conclusions of the HHRA in March 2009, and approved the assumptions and conclusion of the BERA in October 2011, with the exception of the potential risk associated with furans.

3.0 PRELIMINARY HOT SPOT SCREENING CRITERIA

This section describes the types of preliminary hot spots and respective ODEQ mandated screening criteria. The preliminary hot spots are broadly separated into two groups of media that may be impacted by contaminants: water media (consisting of groundwater and surface water) and media other than water (consisting of soil and non-aqueous phase liquids [NAPLs]). A summary of the types of media considered, the ODEQ mandated screening criteria, and the screened data are provided in Table 3-1 and 3-2.

3.1 PRELIMINARY WATER HOT SPOTS

A groundwater or surface water hot spot is defined as:

For groundwater or surface water, hazardous substances having a significant adverse effect on beneficial uses of water or waters to which the hazardous substances would be reasonably likely to migrate and for which treatment is reasonably likely to restore or protect such beneficial uses within a reasonable time, as determined in a feasibility study (OAR 340-122-115[31][a]).

There are no direct surface water exposure routes present at the site. Per the conclusions of the HHRA (Integral 2008) and BERA (Integral 2009), the applicable beneficial use of groundwater is recharge to surface water (i.e., the Willamette River). There is no current or likely future use of site groundwater as drinking water. Per the JSCS, one of the uses of the Willamette River is aquatic habitat. Per ODEQ hot spot guidance (ODEQ 1998), a significant adverse effect on the beneficial use of waters to which the hazardous substance would reasonably migrate is defined as "a current or reasonably likely future exceedance of applicable or relevant state or local water quality standards or criteria". The ODEQ mandated aquatic life water quality criteria that are required to be used in this HSE are:

- ODEQ 2011 Ambient Water Quality Criteria (AWQC) for chronic exposure;
- ODEQ 2011 AWQC for fish consumption;
- United States Environmental Protection Agency (EPA) 2009 National Recommended Water Quality Criteria; and

- Oak Ridge National Laboratory Tier II Screening Level Values.

In the absence of applicable aquatic life criteria, for purposes of performing this preliminary analysis, published criteria were used in the following order of preference:

- EPA Region IX 2009 Regional Screening Levels (RSLs) for Tap Water; and
- EPA Region IX 2009 RSL Maximum Contaminant Levels.

LSS notes that the water quality criteria described above are the screening levels provided in the Portland Harbor Joint Source Control Strategy (JSCS). The screening criteria were used to delineate potential groundwater hot spots. A determination of whether these criteria are applicable and relevant to site groundwater and whether treatment is required to restore or protect the beneficial use(s) within a reasonable time will be made in the FS. Per the ODEQ hot spot guidance (ODEQ 1998), this evaluation of treatment timeframe determines whether the identified potential hot spots are indeed actual hot spots. LSS notes that the designation of an area as a preliminary hot spot does not necessarily require that active treatment be implemented in the remedial action, only that this area must be included in the remedial alternatives considered in the sitewide FS.

LSS notes that the use of surface water criteria for purposes of screening groundwater is extremely conservative and inappropriate as ecological receptors are not exposed directly to groundwater. Use of these surface water screening values does not take into account natural attenuation (EPA 1998) and the significant natural mixing that occurs as groundwater disperses and ultimately interacts with surface water.

3.2 PRELIMINARY SOIL HOT SPOTS

Soil and other media hot spots are defined as:

[OAR 34-122]-115(31)(a): If hazardous substances present a risk to human health or the environment exceeding the acceptable risk level, the extent to which the hazardous substances:

> *(A) Are present in concentrations exceeding the risk-based concentrations corresponding to:*
>
> > *(i) 100 times the acceptable risk level for human exposure to each individual carcinogen*

(ii) 10 times the acceptable risk level for human exposure to each individual non-carcinogen
(iii) 10 times the acceptable risk level for individual ecological receptors or population of ecological receptors to each individual hazardous substance

(B) Are reasonably likely to migrate to such an extent that the conditions specified in subsection (a) or paragraphs (b)(A) or (b)(C) would be created; or

(C) Are not likely containable, as determined in the feasibility study.

Soil is generally considered the most common media susceptible to contamination with hazardous substances. The following subsections present the ODEQ mandated screening criteria and data sets applicable to site soils.

The assessment of preliminary hot spots in media other than water requires an evaluation of the site's baseline risk. The HHRA and BERA constituted the evaluation of baseline risk at the site. These risk assessments form the basis of identifying areas of contamination that are "highly concentrated," "highly mobile," or "not reliably contained."

As agreed with the ODEQ in a meeting on 29 November 2011, the riverbank soils are not included in this HSE. Potential preliminary hot spots in riverbank soils will be addressed in the Riverbank SCM. The development of the Riverbank SCM will require submittal, and ODEQ approval, of an evaluation of remedial alternatives. Additionally, portions of the riverbank, such as the area between Docks 1 and 2, are likely to be included in the in-water early action at the site.

3.2.1 Preliminary Highly Concentrated Hot Spots

3.2.1.1 Human Exposures

Several potential site soil exposure scenarios, dependent on the current depth of the soils, were identified in the HHRA. The HHRA concluded that site soils did not present an unacceptable non-carcinogenic risk to human health that would result in a hot spot (i.e., the maximum hazard quotient was less than 10). However, the HHRA concluded that for specific exposure pathways, some site soils did present a potentially unacceptable risk to human health for a limited number of carcinogenic compounds. Table 3-1 summarizes the soil exposure routes that may result in a potentially unacceptable risk to human health, the screening criteria source, the applicable preliminary hot spot multipliers, and the

appropriate data sets to be screened. Table 3-3 presents the ODEQ mandated screening criteria for individual exposure pathways and compounds.

3.2.1.2 *Ecological Exposures*

The BERA identified that ecological receptors would only be potentially exposed to the top three feet of site soils. Additionally, the areas that ecological receptors may be present were limited to Lots 1 and 2, which are depicted in Figure 1-2. Therefore, only data from soil samples collected between 0 and 3 feet below ground surface (bgs) in Lots 1 and 2 were screened against the ODEQ hot spot criteria for ecological receptors.

Table 3-1 summarizes the soil exposure routes that may result in potentially unacceptable risk to ecological receptors, the ODEQ screening criteria source, the preliminary hot spot multipliers, and the appropriate data sets to be screened. Table 3-3 presents the ODEQ-mandated screening criteria for individual exposure pathways and compounds.

LSS notes that, per email correspondence with the ODEQ on 8 November 2011, the draft HSE will not include an analysis of preliminary hot spots based on the ecological bioaccumulation pathway for furans presented in the *Addendum to January 16, 2009 Arkema Upland Level II ERA Ecological Soil Screening Level Values for PCDDs and PCDFs*, dated 17 June 2011, or the ODEQ redline, completed on 11 October 2011, of the *Review of Ecological Soil Screening Level Values for PCDDS and PCDFS Technical Memorandum*, dated 17 November 2010. The addendum to the HSE will include an evaluation of the ecological bioaccumulation pathway for furans based on the results of the proposed site-specific invertebrate uptake testing.

3.2.2 ***Preliminary Highly Mobile Hot Spots***

The assessment of "highly mobile" hot spots includes two migration routes: infiltration or leaching to groundwater and storm water runoff. Per ODEQ guidance (ODEQ 1998), an assessment of preliminary highly mobile hot spots is only required in instances when it is reasonably likely that these migration routes exist at the site. Based on site conditions, leaching to groundwater and erodible soil via storm water runoff are considered potential contaminant migration pathways.

3.2.2.1 *Potential Leaching to Groundwater*

The identification of potential preliminary highly mobile hot spots from a leaching to groundwater pathway is based on the current and future beneficial use of groundwater at the site (i.e., recharge of surface water as aquatic habitat). The highly mobile hot spot soil screening criteria are based on the respective ODEQ mandated aquatic habitat water quality criteria presented in Section 3.1 above. Per the ODEQ guidance and agency comments on the *Draft Upland Draft Upland Hot Spot Evaluation-Rev 2* (ERM 2006b) that were provided in a letter dated 19 June 2006, the calculated preliminary highly mobile hot spot soil screening criteria for the leaching-to-groundwater pathway were derived by applying a dilution and attenuation factor (DAF) of 20 to the respective ambient water quality criteria. The calculated preliminary highly mobile hot spot soil screening criteria for the leaching-to-groundwater pathway are presented in Table 3-2. The compounds included in the highly mobile HSE were those compounds identified as COPCs in the RI (ERM 2005). All available non-saturated soil data was screened against the leaching to groundwater criteria.

LSS notes that the use of a DAF is an over simplistic method for developing screening criteria for the purpose of identifying preliminary potential hot spots. Several additional considerations can be applied in the detailed assessment of migration potential (i.e., highly mobile hot spots), including site- and compound-specific parameters (e.g., partitioning factors), areal extent, overall mass present, distance to receptors, and others. This type of detailed, compound-specific assessment will be conducted as necessary as part of the FS process.

As discussed above, LSS notes that the use of surface water criteria for purposes of screening groundwater is extremely conservative as ecological receptors are not exposed directly to groundwater. Use of these surface water screening values does not take into account natural attenuation and the significant natural mixing which occurs as groundwater interacts with surface water.

3.2.2.2 *Erodible Soil Via Storm Water Runoff*

Erodible soils are generally considered shallow soils that can be mobilized in storm water runoff and directly discharged to the receiving water body. The media at the site that was evaluated for potentially highly mobile hot spots through potential migration in stormwater were shallow upland soil (note that per Section 3.2, riverbank soil is not included in this HSE).

Screening criteria specific to surface soils potentially mobilized in storm water runoff were not developed, because this type of hot spot, if any, will be collocated with either a preliminary highly concentrated hot spot or a preliminary leaching-to-groundwater hot spot. The leaching-to-groundwater criteria are based on chronic exposure pathways and extremely conservative water quality screening values, particularly for bioaccumulative COPCs. The ODEQ mandated preliminary highly mobile hot spot screening criteria for these COPCs are typically below detection limits; therefore, any historical detection is identified as a potential hot spot. Therefore, preliminary hot spot screening levels for the leaching-to-groundwater pathway will be lower (more conservative) than preliminary potential hot spot screening levels for erodible soil.

3.2.3 Not Reliably Containable

As required by the Environmental Cleanup Rules, the extent of not reliably containable hot spots will be determined in the FS. This assessment will be performed in the evaluation of the "long-term reliability" when selecting a remedial action alternative.

3.3 NON-AQUEOUS PHASE LIQUIDS

NAPLs are generally considered to produce highly concentrated, highly mobile, and/or not reliably containable hot spots. For the purpose of identifying NAPL hot spots, a presence or absence criterion was applied to available site data.

4.0 HOT SPOT EVALUATION

This section provides a summary of the HSE.

4.1 PRELIMINARY GROUNDWATER HOT SPOTS

This section provides the HSE results for groundwater contaminants. The most recent available groundwater monitoring results (August 2009) were used to delineate preliminary groundwater hot spots. These groundwater monitoring results have been reported previously in the *Sitewide Groundwater Monitoring Report – August 2009 Monitoring Event* (ERM 2010a).

4.1.1 Metals

The results of the preliminary groundwater hot spot screening for metals are presented in Table 4-1. The preliminary metals hot spots identified in the Shallow, Intermediate, Gravel, and Basalt Zones are presented in Figures 4-1 through 4-4, respectively. The preliminary hot spots shown in these figures indicate monitoring wells where one or more compounds were present at concentrations greater than the hot spot screening criteria.

Arsenic was the metal contaminant with the greatest number and extent of preliminary hot spot exceedences. Arsenic is known to be a common metal in soils in the region; background concentrations of arsenic in soil and groundwater often exceed both risk-based water quality and hot spot screening criteria. Hexavalent chromium was the second-most prevalent contaminant with preliminary hot spot exceedences.

LSS notes that the majority of monitoring wells located along the upgradient boundary of the Arkema property have metals concentrations in excess of the ODEQ mandated hot spot screening criteria. These results indicate that groundwater with metals impacts in excess of the hot spot screening criteria is migrating onto the Arkema site.

4.1.2 Chloride and Perchlorate

The results of the preliminary groundwater hot spot screening for chloride and perchlorate are presented in Table 4-1. The chloride hot spots identified in the Shallow, Intermediate, Gravel, and Basalt zones are

presented in Figures 4-5 through 4-8, respectively. Chloride is present in groundwater throughout the site at concentrations in excess of the chronic AWQC. For the purpose of evaluating remedial alternatives in the FS, the entire site is considered a preliminary groundwater hot spot. LSS notes that the designation of an area as a "preliminary hot spot" does not necessarily require that active treatment be implemented.

Perchlorate in groundwater exceeded the preliminary hot spot criteria in the Shallow, Intermediate, and Deep zones. The preliminary perchlorate hot spots in these zones are presented in Figures 4-9 through 4-11, respectively. The preliminary perchlorate hot spot is located within the Chlorate Area in Lots 3 and 4. This location is consistent with historical production of perchlorate at the site.

4.1.3 Volatile Organic Compounds

The results of the preliminary groundwater hot spot screening for volatile organic compounds (VOCs) are presented in Table 4-2. The preliminary VOC hot spots in groundwater within the Shallow, Intermediate, Deep, and Gravel/Basalt zones are presented in Figures 4-12 through 4-15, respectively.

Groundwater VOCs above the ODEQ mandated chronic aquatic life hot spot screening criteria included: carbon disulfide, carbon tetrachloride, chlorobenzene, chloroethane, chloroform, methyl chloride, methyl tert-butyl ether, methylene chloride, 1,2-dichlorobenzene, 1.4-dichlorobenzene, tetrachloroethene, trichloroethene, and vinyl chloride.

The extent of preliminary groundwater VOC hot spots identified in the Shallow and Intermediate zones is generally limited to Lots 3 and 4. These preliminary hot spots are primarily due to the presence of chlorobenzene, chloroethane, chloroform, tetrachloroethene, trichloroethene, and vinyl chloride.

Preliminary hot spots identified on Lots 1 and 2 are generally present in the deeper groundwater zones (i.e., Deep, Gravel, and Basalt zones) and are primarily associated with 1,2-dichlorobenzene, 1,4-dichlorobenzene, chlorobenzene, trichloroethene, and vinyl chloride. Concentrations of groundwater VOCs on Lots 1 and 2 tend to increase with depth.

LSS notes that there is a source control evaluation being conducted by SLLI/Rhone Poulenc, upgradient of the Arkema site, to assess the contribution of VOCs to groundwater across the Arkema site, particularly

within Lots 1 and 2. The exceedences of the ODEQ mandated VOC hot spot criteria in the deeper aquifers on Lots 1 and 2 are associated with upgradient sources (e.g., SLLI/Rhone Poulenc), and has been well established through numerous documents produced by both SLLI/Rhone Poulenc and LSS.

4.1.4 *Pesticides and Herbicides*

The results of the preliminary groundwater hot spot screening for pesticides and herbicides are presented in Table 4-3. The preliminary pesticide hot spots in groundwater within the Shallow, Intermediate, Deep, and Gravel/Basalt zones are presented in Figures 4-16 through 4-19, respectively.

Pesticides in groundwater above the ODEQ chronic aquatic life hot spot screening criteria included: dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethylene (DDE), DDT, alpha-benzene hexachloride (BHC), delta-BHC, gamma-BHC (Lindane), heptachlor, heptachlor epoxide, and total chlordane.

The extent of preliminary pesticide hot spots in groundwater is generally widespread across the site in the Shallow, Intermediate, and Deep zones, and due to detections of DDE, DDD, and DDT. The preliminary hot spot criteria for these compounds are equal to the laboratory detection limits. Detection at any level therefore results in designation as a preliminary hot spot. The highest concentrations of pesticides in groundwater are observed in Lots 3 and 4, in the vicinity of the former DDT manufacturing area.

4.1.5 *Toxicity Equivalent Quotient*

The preliminary groundwater hot spot screening criteria for furans is based on the 2,3,7,8-tetrachlorodibenzondioxin (TCDD) toxicity equivalent quotient (TEQ), as calculated using the World Health Organization's 2005 Toxicity Equivalency Factors. The results of the TEQ preliminary groundwater hot spot screening are presented in Table 4-4. The preliminary hot spots in groundwater within the Shallow, Intermediate, Deep, and Gravel/Basalt zones are presented in Figures 4-20 through 4-23, respectively.

The TEQ groundwater hot spot criterion was exceeded in multiple locations across the site. The preliminary hot spot criteria for these

compounds are equal to the laboratory detection limits. Detection at any level therefore results in a designation as a preliminary hot spot.

The extent of the preliminary TEQ hot spot in the Shallow Zone groundwater is generally widespread across the site. The extent of preliminary TEQ hot spot in Intermediate, Deep and Basalt Zone groundwater is generally limited to Lots 1 and 2.

LSS notes that the majority of monitoring wells located along the upgradient boundary of the Arkema property have TEQ concentrations in excess of the ODEQ mandated hot spot screening criteria. These results indicate that groundwater with TEQ impacts in excess of the hot spot screening criteria is migrating onto the Arkema site.

4.2 PRELIMINARY HIGHLY CONCENTRATED HOT SPOTS

This section presents the results of the HSE for potential direct exposure to soil by human and ecological receptors.

4.2.1 Human Exposure Routes

The HHRA identified three human health exposure routes with potentially unacceptable carcinogenic risks: outdoor worker from exposure to surface soils, outdoor worker from exposure to surface and subsurface soils after redevelopment, and construction worker exposure to surface and subsurface soils. The compounds identified in the HHRA that posed a potentially unacceptable carcinogenic risk were arsenic, DDD, DDE, and DDT. These exposure routes and soil screening data sets are summarized in Table 3-1. The preliminary hot spot screening criteria for human health exposure to carcinogenic compounds is based on a hundred-fold increase in the ODEQ mandated risk-based screening criteria. This means that the hot spot screening criteria is based on the exposure concentration at which the increase in carcinogenic risk is 10-4.

The results of the HSE for human exposure routes for Lots 1 and 2 and Lots 3 and 4 are presented in Tables 4-5 and 4-6, respectively, and summarized in Figure 4-24. The only preliminary highly concentrated hot spots for human exposure were for the individual compounds DDD, DDE, DDT, and the total of DDD, DDE, DDT (referred to as DDX).

The preliminary highly concentrated hot spots for human receptors on Lots 3 and 4 are primarily located in surface and subsurface soils in the

vicinity of the former DDT manufacturing area and are a result of DDX exceedences. There are no preliminary highly concentrated hot spots for human receptors on Lots 1 and 2.

Arsenic and the Aroclor 1248 were identified in the HHRA as contributing to the overall potentially unacceptable carcinogenic risk. However, no detections of these compounds exceeded the individual hot spot screening criteria for human health.

4.2.2 Ecological Exposure Routes

The BERA concluded that ecological receptors would likely only be potentially exposed to surface soils on Lots 1 and 2 (from 0 to 3 feet bgs). The BERA identified three compounds—chromium, lead, and DDX—that could potentially result in an unacceptable risk to ecological receptors.

The results of the HSE for ecological exposure routes for Lots 1 and 2 are presented in Table 4-7 and summarized in Figure 4-25. All except one of the surface soil samples from Lots 1 and 2 exceeded the ODEQ mandated ecological hot spot screening criteria for DDX. The preliminary hot spot criteria for these compounds are equal to the laboratory detection limits. Detection at any level therefore results in a designation as a preliminary hot spot. The extent of preliminary highly concentrated hot spots for ecological exposure extends across Lots 1 and 2, but is limited to surface soils (less than 3 feet bgs).

4.3 PRELIMINARY HIGHLY MOBILE HOT SPOTS

This section presents the results of the evaluation of indirect exposure to soil containing preliminary highly mobile hot spots. The site soil data was only screened against the leaching-to-groundwater criteria for highly mobile hot spots. Preliminary highly mobile hot spot criteria based on erodible soil in storm water (i.e., mandated JSCS bioaccumulative sediment criteria) are all greater than the respective AQWC-based leaching-to-groundwater criteria. Therefore, any location that is flagged for a leaching-to-groundwater exceedence would also be flagged as an erodible soil hot spot.

4.3.1 Leaching to Groundwater

As described in Section 3.2.2 above, preliminary highly mobile hot spot screening criteria for individual compounds were developed by applying

a DAF of 20 to the most stringent preliminary groundwater hot spot criteria. Per ODEQ directed changes, a DAF of 1 was used for developing a screening criterion for perchlorate. The preliminary highly mobile HSE results for metals, organic compounds (VOCs and semi-volatile organic compounds [SVOCs]), pesticides, and TEQ are summarized below. The use of a generic DAF is a conservative assumption intended for preliminary screening purposes. Site-specific DAFs, based on characteristic leaching data for individual compounds (e.g., DDT), will be developed as part of the FS in order to more appropriately define the delineation of any highly mobile hot spots.

4.3.1.1 *Metals*

The results of the preliminary highly mobile HSE for metals in soil are presented in Table 4-8 and summarized in Figure 4-26. The preliminary highly mobile metals hot spot extends across the majority of the site and is primarily due to exceedence of the arsenic and lead screening criteria. The arsenic leaching-to-groundwater criteria is 0.28 milligrams per kilogram is based on the AWQC for arsenic. However, regional natural background concentrations of arsenic in soil are typically an order of magnitude higher (7 milligrams per kilogram). Further delineation of "actual" hot spots of arsenic, and lead in soil above regional background concentrations will be performed as part of the FS.

4.3.1.2 *Volatile Organic Compounds and Semi-Volatile Organic Compounds*

The results of the preliminary highly mobile HSE for VOCs and SVOCs in soil are presented in Table 4-9 and summarized in Figure 4-27. The preliminary highly mobile VOC and SVOC hot spot is limited to subsurface soils in the Acid Plant Area (Lots 3 and 4) and is primarily due to exceedences of chlorobenzene. There are also limited exceedences of tetrachloroethene in the subsurface soils. The preliminary highly mobile VOC and SVOC hot spot also corresponds closely to the preliminary highly concentrated hot spot for human health exposure in this area.

4.3.1.3 *Pesticides*

The results of the preliminary highly mobile HSE for pesticides in soil are presented in Table 4-10 and summarized in Figure 4-28. The preliminary highly mobile pesticide hot spot extends across the majority of the site and is primarily due to exceedences of DDD, DDE, DDT, and DDX in surface and subsurface soils. The highest concentrations of pesticides in surface and subsurface soils were observed in Lots 3 and 4, in the vicinity of the

former DDT manufacturing area. There are also limited exceedences of alpha-BHC, chlordane, and endrin. These limited exceedences are collocated with DDX exceedences. The preliminary highly mobile pesticide hot spot also corresponds closely to the preliminary highly concentrated hot spot for human health exposure in this area.

The preliminary hot spot criteria are based on a conservative generic DAF applied to extremely low bioaccumulative AWQCs, which result in screening criteria equal to the laboratory detection limits. Detection at any level results in a designation as a "hot spot." A site-specific DAF for DDX, based on site-specific leaching data, will be developed as part of the FS process in order to more appropriately delineate any highly mobile hot spots.

4.3.1.4 *Toxicity Equivalent Quotient*

The results of the preliminary highly mobile HSE for TEQ concentrations in soil are presented in Table 4-11 and summarized in Figure 4-29. The preliminary highly mobile hot spot extends across Lots 1, 2, 3, and parts of Lot 4, and is due to exceedences of the TEQ in surface and subsurface soils. The highest TEQ levels in surface and subsurface soils were observed in the vicinity of the former maintenance shop and chlorine cell room. The preliminary hot spot criteria for these compounds are equal to the laboratory detection limits. Detection at any level therefore results in designation as a preliminary hot spot. A site-specific DAF based on site-specific leaching data, will be developed as part of the FS process in order to more appropriately delineate any highly mobile hot spots.

4.4 *NON-AQUEOUS PHASE LIQUIDS*

Investigations conducted in 2006 as part of the implementation of interim SCMs have delineated the extent of dense non-aqueous phase liquid (DNAPL) chlorobenzene at the site (ERM 2006a). The extent of DNAPL used for this HSE was based on the results of these investigations and is shown in Figure 4-30. The extent of DNAPL is limited to the bottom portion (less than 1 foot) of the Shallow Zone, in the vicinity of the former Manufacturing Process Residue pond in the Acid Plant Area.

5.0 PRELIMINARY POTENTIAL HOT SPOT AREAS

This section presents the types of hot spots and areas that will be included in the FS.

5.1 PRELIMINARY GROUNDWATER HOT SPOTS

The preliminary groundwater hot spots in the Shallow, Intermediate, Deep, and Gravel and Basalt Zones that will be evaluated in the FS are presented in Figure 5-1. The extent of these preliminary potential hot spots encompasses all locations where concentrations of one or more constituents exceeded the ODEQ mandated screening criteria (chronic AWQC for aquatic habitat).

The identification of a preliminary groundwater hot spot does not necessarily indicate that an exceedence of AQWC is currently occurring at the point of discharge to the receiving surface water body, or that exposure to receptors is occurring. Additional evaluation of groundwater connections and the actual receptor exposure concentrations to constituents in groundwater will be conducted in the FS.

LSS notes that a Groundwater SCM is currently being implemented at the site. This Groundwater SCM is not primarily designed for treatment of groundwater hot spots; however, due to its presence (when completed), some capture and treatment of preliminary groundwater hot spots and actual groundwater hot spots as determined in the FS, if any, will likely occur.

5.2 PRELIMINARY HIGHLY CONCENTRATED HOT SPOTS

The preliminary highly concentrated hot spots in surface and subsurface soils that will be evaluated in the FS are presented in Figure 5-2. The extent of these potential hot spots encompasses all locations where concentrations of one or more constituents exceeded the ODEQ mandated screening criteria for human or ecological exposure.

5.3 *PRELIMINARY HIGHLY MOBILE HOT SPOTS*

The preliminary highly mobile hot spots in surface and subsurface soils that will be evaluated in the FS are presented in Figure 5-3. The extent of these potential hot spots encompasses all locations where concentrations of one or more constituents exceeded the ODEQ mandated screening criteria for leaching to groundwater.

As discussed in Section 4.3, the highly mobile leaching-to-groundwater hot spot criteria are more stringent than the potentially erodible soil criteria (i.e., JSCS bioaccumulative sediment criteria). The leaching-to-groundwater hot spot criteria are based on a conservative, generic DAF applied to the ODEQ mandated AWQC. A site-specific DAF for individual contaminants will be developed in the FS through additional evaluation of site-specific leaching data.

LSS notes that a Storm Water SCM is currently being implemented at the site. The Storm Water SCM is intended to prevent the potential for recontamination of in-water sediments through mobilization of upland surface soils in storm water. The Storm Water SCM is not intended to treat or remove highly mobile or highly concentrated hot spots; however, some capping, removal, and treatment of actual hot spot soils, if any, will occur during implementation of the Storm Water SCM.

5.4 *NON-AQUEOUS PHASE LIQUIDS*

The DNAPL hot spot that will be evaluated in the FS is presented in Figure 4-30. The extent of this potential hot spot encompasses all locations where the presence of DNAPL has been inferred at the site based on previous investigations.

LSS notes that implementation of the Groundwater SCM will prevent potential transport of dissolved-phase contamination from the DNAPL hot spot off-site.

6.0 REFERENCES

ERM-West, Inc. (ERM). 2005. *Upland Remedial Investigation Report Lots 3 & 4 and Tract A – Revision 1*, ERM.

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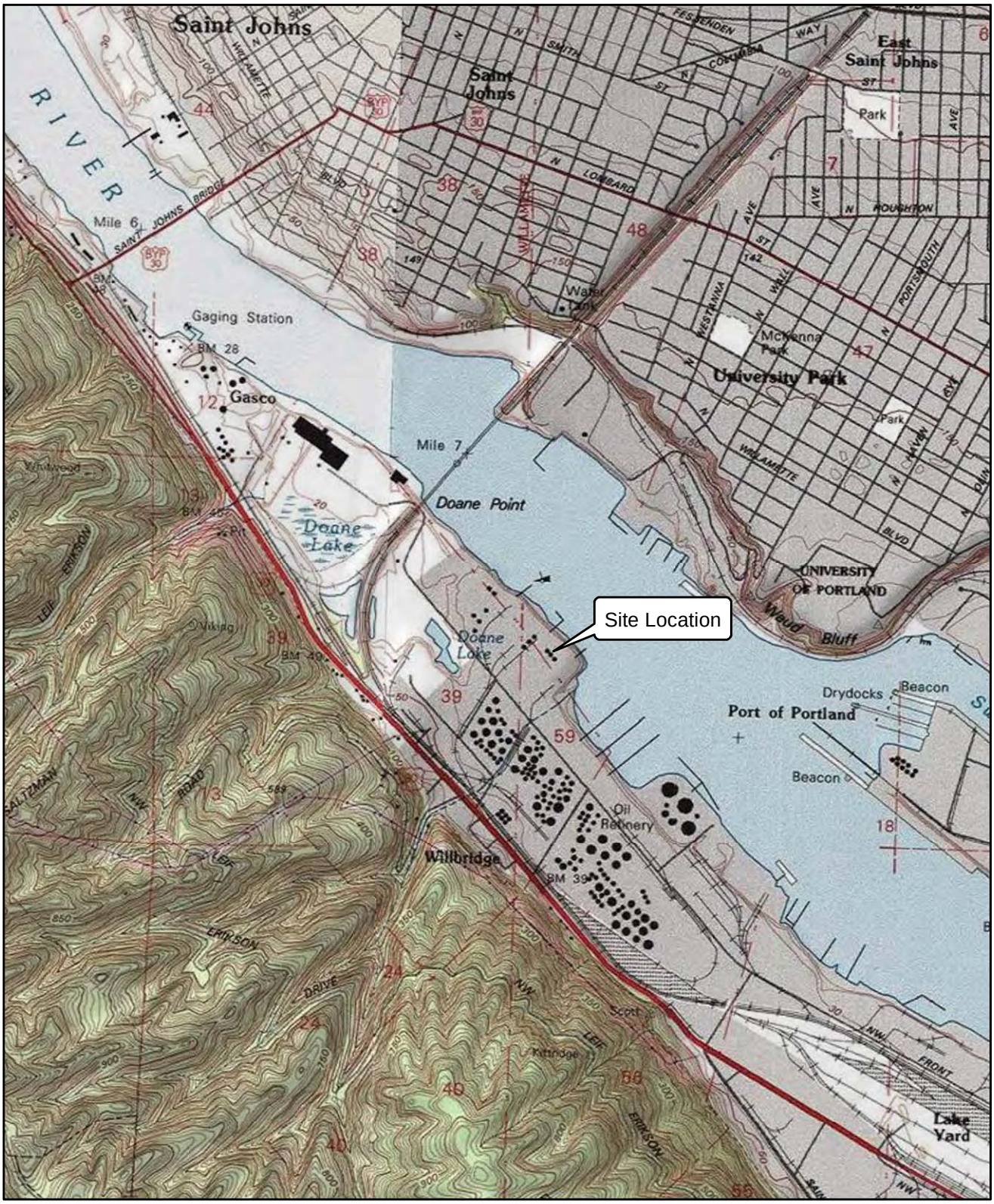
Figures

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\SiteLocation.mxd



N

0.5 0.4 0.3 0.2 0.1 0 0.5 Miles

2,000 1,000 0 2,000 Feet

Scale 1:24,000

Figure 1-1
Site Location
Hot Spot Evaluation
Arkema, Portland, OR

USGS 7.5 Minute Topographic Quadrangles:
Linnton, OR 1990
Portland, OR 1990

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\SiteLayout.mxd

Legend

- Lot Boundaries
- Site Boundary

Aerial Photography: June 2009

200 100 0 200 Feet

Scale 1:2,400

N

Figure 1-2
Site Layout
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\Metalsshallow.mxd

Legend

- No Metals Exceeded the Aquatic Habitat Criteria
- One or More Metals Exceeded the Aquatic Habitat Criteria

Aerial Photography: June 2009

Aquatic Habitat Criteria is the minimum screening criteria of:

ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption

EPA 2004 National Recommended Water Quality Criteria-Chronic

Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-1

Metals in Groundwater
Shallow Zone
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

ERM

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\Metalsintermediate.mxd

Legend

- No Metals Exceeded the Aquatic Habitat Criteria
- One or More Metals Exceeded the Aquatic Habitat Criteria

Aerial Photography: June 2009

Aquatic Habitat Criteria is the minimum screening criteria of:

ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption

EPA 2004 National Recommended Water Quality Criteria-Chronic

Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-2

Metals in Groundwater
Intermediate Zone
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\MetalsDeep.mxd

Legend

- No Metals Exceeded the Aquatic Habitat Criteria
- One or More Metals Exceeded the Aquatic Habitat Criteria

Aerial Photography: June 2009

Aquatic Habitat Criteria is the minimum screening criteria of:

ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption

EPA 2004 National Recommended Water Quality Criteria-Chronic

Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-3

Metals in Groundwater

Deep Zone

Hot Spot Evaluation

Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

ERM

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\MetalsBasalt.mxd

Legend

- No Metals Exceeded the Aquatic Habitat Criteria
- One or More Metals Exceeded the Aquatic Habitat Criteria

Aerial Photography: June 2009

Aquatic Habitat Criteria is the minimum screening criteria of:

ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption

EPA 2004 National Recommended Water Quality Criteria-Chronic

Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-4

Metals in Groundwater
Gravel and Basalt Zones
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\ChlorideShallow.mxd

Legend

- Chloride Does Not Exceed Aquatic Habitat Criteria
- Chloride Exceeds Aquatic Habitat Criteria

Aerial Photography: June 2009
Aquatic Habitat Criteria is the minimum screening criteria of:
ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption
EPA 2004 National Recommended Water Quality Criteria-Chronic
Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-5
Chloride in Groundwater
Shallow Zone
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\ChlorideIntermediate.mxd

Legend

- Chloride Does Not Exceed Aquatic Habitat Criteria
- Chloride Exceeds Aquatic Habitat Criteria

Aerial Photography: June 2009
Aquatic Habitat Criteria is the minimum screening criteria of:
ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption
EPA 2004 National Recommended Water Quality Criteria-Chronic
Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-6

Chloride in Groundwater
Intermediate Zone
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

Legend

- Chloride Does Not Exceed Aquatic Habitat Criteria
- Chloride Exceeds Aquatic Habitat Criteria

Aerial Photography: June 2009

Aquatic Habitat Criteria is the minimum screening criteria of:

ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption

EPA 2004 National Recommended Water Quality Criteria-Chronic

Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-7

Chloride in Groundwater

Deep Zone

Hot Spot Evaluation

Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

ERM

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\ChlorideDeep.mxd

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\ChlorideBasalt.mxd

Legend

- Chloride Does Not Exceed Aquatic Habitat Criteria
- Chloride Exceeds Aquatic Habitat Criteria

Aerial Photography: June 2009

Aquatic Habitat Criteria is the minimum screening criteria of:
ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption
EPA 2004 National Recommended Water Quality Criteria-Chronic
Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-8

Chloride in Groundwater
Gravel and Basalt Zones
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\PerchlorateShallow.mxd

Legend

- Perchlorate Does Not Exceed Aquatic Habitat Criteria
- Perchlorate Exceeds Aquatic Habitat Criteria

Aerial Photography: June 2009

Aquatic Habitat Criteria is the minimum screening criteria of:

ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption

EPA 2004 National Recommended Water Quality Criteria-Chronic

Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-9

Perchlorate in Groundwater

Shallow Zone

Hot Spot Evaluation

Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

ERM

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\PerchlorateIntermediate.mxd

Legend

- Perchlorate Does Not Exceed Aquatic Habitat Criteria
- Perchlorate Exceeds Aquatic Habitat Criteria

Aerial Photography: June 2009
Aquatic Habitat Criteria is the minimum screening criteria of:
ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption
EPA 2004 National Recommended Water Quality Criteria-Chronic
Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet
Scale 1:2,400

N

Figure 4-10
Perchlorate in Groundwater
Intermediate Zone
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\PerchlorateDeep.mxd

Legend

- Perchlorate Does Not Exceed Aquatic Habitat Criteria
- Perchlorate Exceeds Aquatic Habitat Criteria

Aerial Photography: June 2009

Aquatic Habitat Criteria is the minimum screening criteria of:

ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption

EPA 2004 National Recommended Water Quality Criteria-Chronic

Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-11

Perchlorate in Groundwater

Deep Zone

Hot Spot Evaluation

Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\VOCsShallow.mxd

Legend

- No VOCs Exceeded the Aquatic Habitat Criteria
- One or More VOC Exceeded the Aquatic Habitat Criteria

Aerial Photography: June 2009
VOC - Volatile Organic Compound
Aquatic Habitat Criteria is the minimum screening criteria of:
ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption
EPA 2004 National Recommended Water Quality Criteria-Chronic
Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-12
VOCs in Groundwater
Shallow Zone
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\VOCsIntermediate.mxd

Legend

- No VOCs Exceeded the Aquatic Habitat Criteria
- One or More VOC Exceeded the Aquatic Habitat Criteria

Aerial Photography: June 2009
VOC - Volatile Organic Compound
Aquatic Habitat Criteria is the minimum screening criteria of:
ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption
EPA 2004 National Recommended Water Quality Criteria-Chronic
Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-13

VOCs in Groundwater
Intermediate Zone
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\VOCsDeep.mxd

Legend

- No VOCs Exceeded the Aquatic Habitat Criteria
- One or More VOC Exceeded the Aquatic Habitat Criteria

Aerial Photography: June 2009
VOC - Volatile Organic Compound
Aquatic Habitat Criteria is the minimum screening criteria of:
ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption
EPA 2004 National Recommended Water Quality Criteria-Chronic
Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-14
VOCs in Groundwater
Deep Zone
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\VOCsBasalt.mxd

Legend

- No VOCs Exceeded the Aquatic Habitat Criteria
- One or More VOC Exceeded the Aquatic Habitat Criteria

Aerial Photography: June 2009
VOC - Volatile Organic Compound
Aquatic Habitat Criteria is the minimum screening criteria of:
ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption
EPA 2004 National Recommended Water Quality Criteria-Chronic
Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-15

VOCs in Groundwater
Gravel and Basalt Zones
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\Pesticidesshallow.mxd

Legend

- No Pesticides Exceeded the Aquatic Habitat Criteria
- One or More Pesticides Exceeded the Aquatic Habitat Criteria

Aerial Photography: June 2009

Aquatic Habitat Criteria is the minimum screening criteria of:
ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption
EPA 2004 National Recommended Water Quality Criteria-Chronic
Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-16

Pesticides in Groundwater
Shallow Zone
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\Pesticidesintermediate.mxd

Legend

- No Pesticides Exceeded the Aquatic Habitat Criteria
- One or More Pesticides Exceeded the Aquatic Habitat Criteria

Aerial Photography: June 2009

Aquatic Habitat Criteria is the minimum screening criteria of:
ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption
EPA 2004 National Recommended Water Quality Criteria-Chronic
Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-17

Pesticides in Groundwater
Intermediate Zone
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

ERM

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\PesticidesDeep.mxd

Legend

- No Pesticides Exceeded the Aquatic Habitat Criteria
- One or More Pesticides Exceeded the Aquatic Habitat Criteria

Aerial Photography: June 2009

Aquatic Habitat Criteria is the minimum screening criteria of:
ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption
EPA 2004 National Recommended Water Quality Criteria-Chronic
Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-18
Pesticides in Groundwater
Deep Zone
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

ERM

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\PesticidesBasalt.mxd

Legend

- No Pesticides Exceeded the Aquatic Habitat Criteria
- One or More Pesticides Exceeded the Aquatic Habitat Criteria

Aerial Photography: June 2009

Aquatic Habitat Criteria is the minimum screening criteria of:
ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption
EPA 2004 National Recommended Water Quality Criteria-Chronic
Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-19

Pesticides in Groundwater
Gravel and Basalt Zones
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

ERM

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 GW SCM and Upland FS\GIS\HotSpotScreeningDec11\TEQshallow.mxd

Legend

- TEQ Concentrations Do Not Exceed the Aquatic Habitat Criteria
- TEQ Concentrations Exceed the Aquatic Habitat Criteria

Aerial Photography: June 2009
TEQ - Toxicity Equivalency Quotient
Aquatic Habitat Criteria is the minimum screening criteria of:
ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption
EPA 2004 National Recommended Water Quality Criteria-Chronic
Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-20
TEQ Concentrations in Groundwater
Shallow Zone
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 GW SCM and Upland FS\GIS\HotSpotScreeningDec11\TEQIntermediate.mxd

Legend

- TEQ Concententrations Do Not Exceed the Aquatic Habitat Criteria
- TEQ Concentrations Exceed the Aquatic Habitat Criteria

Aerial Photography: June 2009
TEQ - Toxicity Equivalency Quotient
Aquatic Habitat Criteria is the minimum screening criteria of:
ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption
EPA 2004 National Recommended Water Quality Criteria-Chronic
Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-21

TEQ Concentrations in Groundwater
Intermediate Zone
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 GW SCM and Upland FS\GIS\HotSpotScreeningDec11\TEQDeep.mxd

Legend

- TEQ Concentrations Do Not Exceed the Aquatic Habitat Criteria
- TEQ Concentrations Exceed the Aquatic Habitat Criteria

Aerial Photography: June 2009

TEQ - Toxicity Equivalency Quotient

Aquatic Habitat Criteria is the minimum screening criteria of:

ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption

EPA 2004 National Recommended Water Quality Criteria-Chronic

Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-22

TEQ Concentrations in Groundwater

Deep Zone

Hot Spot Evaluation

Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 GW SCM and Upland FS\GIS\HotSpotScreeningDec11\TEQBasalt.mxd

Legend

- TEQ Concentrations Do Not Exceed the Aquatic Habitat Criteria
- TEQ Concentrations Exceed the Aquatic Habitat Criteria

Aerial Photography: June 2009

TEQ - Toxicity Equivalency Quotient

Aquatic Habitat Criteria is the minimum screening criteria of:

ODEQ Ambient Water Quality Criteria-Chronic Exposure and Fish Consumption

EPA 2004 National Recommended Water Quality Criteria-Chronic

Oak Ridge National Laboratory Tier II Screening Criteria

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-23

TEQ Concentrations in Groundwater
Gravel and Basalt Zones
Hot Spot Evaluation
Arkema, Portland, OR

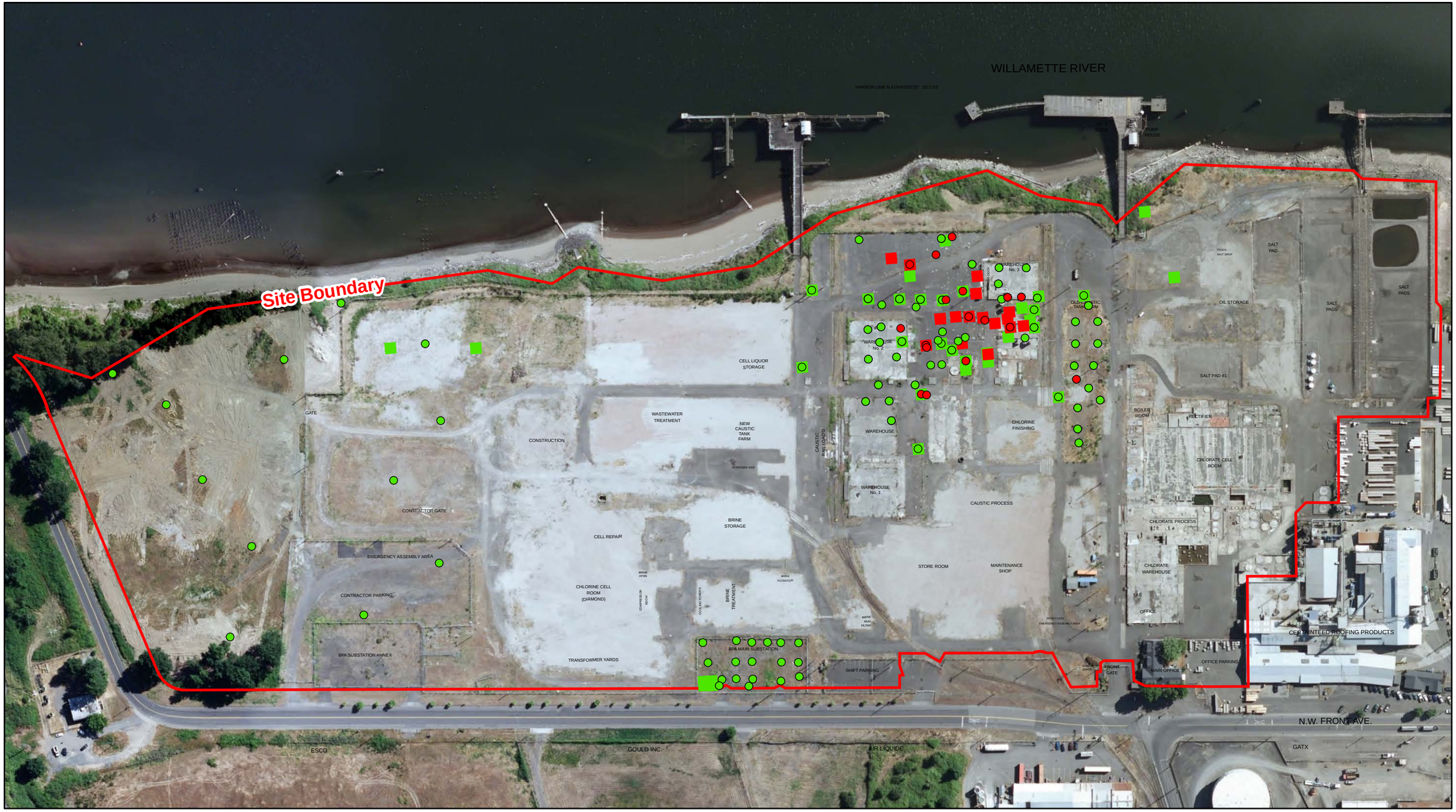
Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\HumanHealthSoil.mxd



Legend

Human Health Exposure Preliminary Hot Spot Soil Screening

- Surface Soil Non-Exceedence
- Surface Soil Exceedence
- Subsurface Soil Non-Exceedence
- Subsurface Soil Exceedence

Notes:
Aerial Photography: June 2009
Surface Soil is 0-3 feet below ground surface
Subsurface Soil is > 3 feet below ground surface
Human Health screening values are based on the ODEQ
Risk-based Decision Making Vlaues for Industrial Landuse

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-24

Highly Concentrated Human Health Exposure Surface and Subsurface Soil Hot Spot Evaluation

Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

ERM

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\EcoSoil.mxd

Legend

Ecological Exposure Preliminary Hot Spot Screening

- Surface Soil Non-Exceedence
- Surface Soil Exceedence

Notes:
Aerial Photography: June 2009
Surface Soil is 0-3 feet below ground surface
Subsurface Soil is > 3 feet below ground surface
Ecological Exposure screening criteria are based on Guidance for Ecological Risk Assessment Level II Benchmark Values.

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-25

Highly Concentrated Ecological Exposure Surface and Subsurface Soil Hot Spot Evaluation Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

ERM

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\MetalsLeach.mxd

Legend

- Surface Soil Non-Exceedence
- Surface Soil Exceedence
- Subsurface Soil Non-Exceedence
- Subsurface Soil Exceedence

Aerial Photography: June 2009
Surface Soil is 0-3 feet below ground surface
Subsurface Soil is > 3 feet below ground surface

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-26
Metals in Soil
Leaching to Groundwater
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\VOCsLeach.mxd

Legend

- Surface Soil Non-Exceedence
- Surface Soil Exceedence
- Subsurface Soil Non-Exceedence
- Subsurface Soil Exceedence

Aerial Photography: June 2009
Surface Soil is 0-3 feet below ground surface
Subsurface Soil is > 3 feet below ground surface

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-27
VOCs and SVOCs in Soil Leaching to Groundwater Hot Spot Evaluation
Arkema, Portland, OR

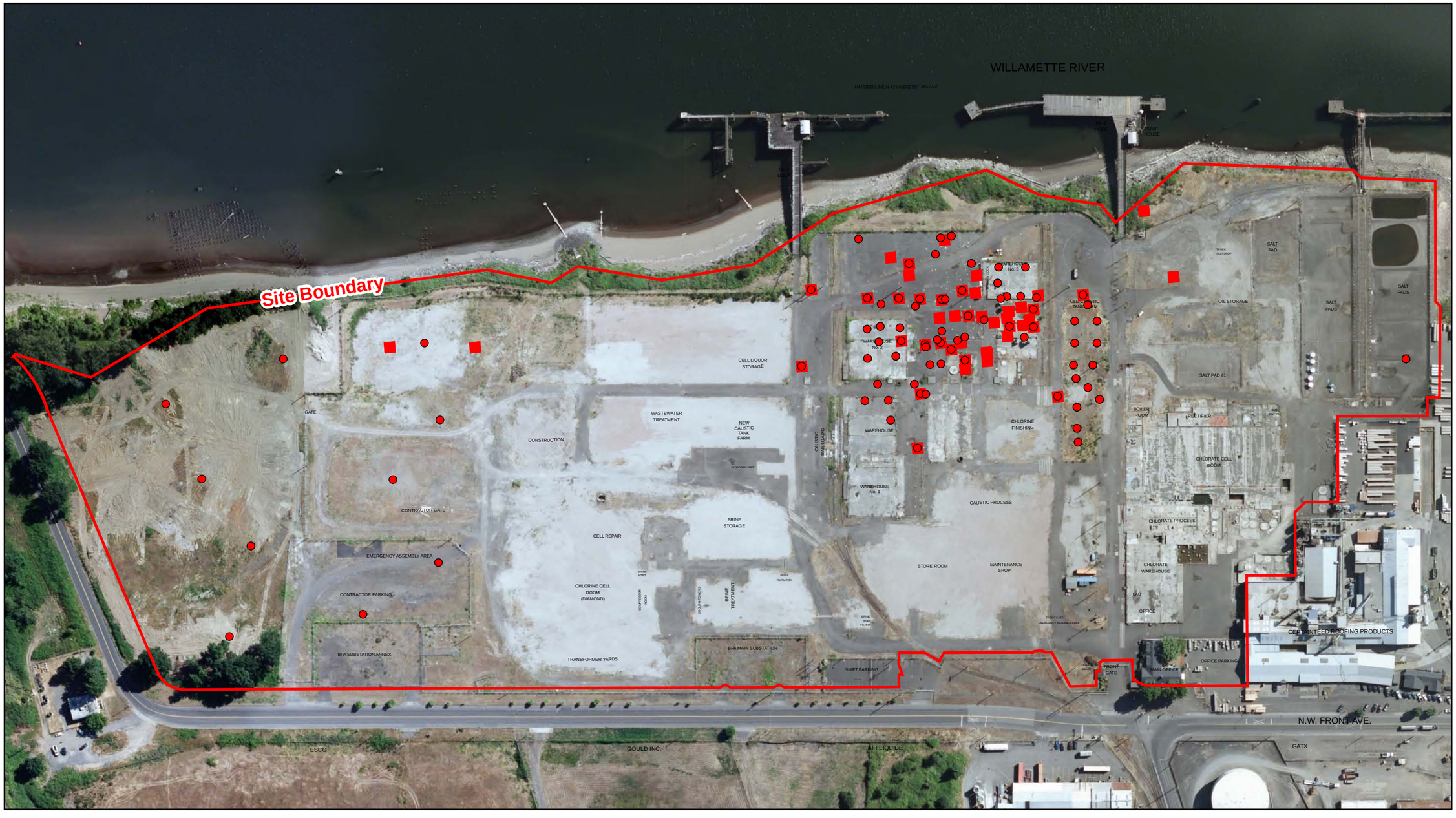
Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\PesticideLeach.mxd



Legend

- Surface Soil Non-Exceedence
- Surface Soil Exceedence
- Subsurface Soil Non-Exceedence
- Subsurface Soil Exceedence

Aerial Photography: June 2009
Surface Soil is 0-3 feet below ground surface
Subsurface Soil is > 3 feet below ground surface

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-28
Pesticides in Soil
Leaching to Groundwater
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 GW SCM and Upland FS\GIS\HotSpotScreeningDec11\TEQLeach.mxd

Legend

- Surface Soil Non-Exceedence
- Surface Soil Exceedence
- Subsurface Soil Non-Exceedence
- Subsurface Soil Exceedence

Aerial Photography: June 2009
Surface Soil is 0-3 feet below ground surface
Subsurface Soil is > 3 feet below ground surface

200 100 0 200 Feet

Scale 1:2,400

N

Figure 4-29
TEQ Concentrations in Soil
Leaching to Groundwater
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\DNAPL.mxd

Legend

Inferred Extent of DNAPL

Aerial Photography: June 2009
DNAPL - Dense Non-Aqueous Phase Liquid

Feet
200 100 0 200
Scale 1:2,400

N

Figure 4-30
Extent of DNAPL
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\GroundwaterHotspot.mxd

Legend

Groundwater Hot Spot Area

- Shallow Zone
- Intermediate Zone
- Deep Zone
- Gravel and Basalt Zones

Aerial Photography: June 2009

200 100 0 200 Feet

Scale 1:2,400

N

Figure 5-1

Preliminary Groundwater Hot Spots
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\HighConcHotSpotSoil.mxd

Legend

- Surface Soil Hot Spot Area
- Subsurface Soil Hot Spot Area

Aerial Photography: June 2009
Surface Soil is 0-3 feet below ground surface
Subsurface Soil is > 3 feet below ground surface

200 100 0 200 Feet

Scale 1:2,400

N

Figure 5-2
Preliminary Highly Concentrated Hot Spot - Soil Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Project: 0093634.3

Date: 12/16/2011

Drawn By: Mike Appel

File: F:\Projects\Arkema Portland\GIS Figures\0093634 Riverbank Soil Screening\GIS\HotSpotScreeningDec11\HighlyMobileHotSpot.mxd

Legend

Highly Mobile Hot Spot Area

Aerial Photography: June 2009
Surface Soil is 0-3 feet below ground surface
Subsurface Soil is > 3 feet below ground surface

200 100 0 200 Feet

Scale 1:2,400

N

Figure 5-3
Preliminary Highly Mobile Hot Spot
Leaching to Groundwater
Hot Spot Evaluation
Arkema, Portland, OR

Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, Oregon 97204

Tables

Table 3-1

Hot Spot Receptor Pathway Evaluation
Hot Spot Evaluation Update
Arkema Facility
Portland, Oregon

Type of Hot Spot		Rationale for Screening Criteria	Note	Potential Receptor Pathway		DEQ Mandated Screening Values to be Used	Data Set to be Screened	Compounds
				Area of Site	Receptor Pathway			
Groundwater								
1	Preliminary Groundwater Hot Spot	Per DEQ directed and previous comments, direct comparison to surface AWQC are applicable	Beneficial Use classification is currently presumed for aquatic habitat.	Site Wide	Surface Water	ODEQ AWQC, EPA NRWCQ, ORNL. EPA Tap Water RSLs or MCLs used if no aquatic habitat criteria available.	April 2009 Groundwater Monitoring data.	All COPCs
Soil								
2	Preliminary Highly Concentrated Hot Spot - Human Exposure	Risk-based values from HHRA for receptor pathways with potential "Unacceptable Risk"[(a)]	Only calculated for pathways resulting in potential unacceptable risk[(a)] calculated in HHRA; screening values are pathway-specific.	Lots 1 & 2	Outdoor Worker - Cancer	100x Site Specific RBC	Lot 1& 2 Soil (0-3 ft)	As, DDT
					Outdoor worker after redevelopment - Cancer	100x Site Specific RBC	Lot 1& 2 Soil (0-15 ft)	As, DDT
				Lots 3 & 4	Outdoor worker - Cancer	100x Site Specific RBC	Lot 3 & 4 Soil (0-3 ft)	DDT, DDD, DDE
					Outdoor worker after redevelopment - Cancer	100x Site Specific RBC	Lot 3 & 4 Soil (all)	DDT, DDD, DDE
					Construction worker - Cancer	100x Site Specific RBC	Lot 3 & 4 Soil (0-15 ft)	DDT
3	Preliminary Highly Concentrated Hot Spot - Ecological Receptors	Risk-based values from BERA for receptor pathways with potential Unacceptable Risk. No Threatened or Endangered Species identified.	Only calculated for pathways resulting in potential unacceptable risk as identified in BERA.	Upland	Plant	10x Ecological SLV	Lots 1 and 2 data; Soil <1 foot	Cr, Pb
					Invertebrate	10x Ecological SLV	Lots 1 and 2 data; Soil <1 foot	Cr
					Bird	10x Ecological SLV	Lots 1 and 2 data; Soil <1 foot	Cr, Pb, DDX. Excludes Furans
					Mammal	10x Ecological SLV	Lots 1 and 2 data; Soil <1 foot	DDX
4	Preliminary Highly Mobile Hot Spot	DEQ RBDM lookup values, or AWQC x DAF 20 values as per DEQ directed comments	Only perform if levels lower than "highly concentrated" values	Site Wide	Leaching to Groundwater	RBDM Values or DAF x Surface Water Criteria	All soil data, excluding Acid Plant Area soil data prior to removal IRM	All COPCs
5	Preliminary Erodible Soil	Based on soil/stormwater JSCS SLVs	Only perform if levels lower than "highly concentrated" values or other hot spot criteria	Upland Surface Soils	Surface Water	10x JSCS SLV	Surface soil	All COPCs
Other								
6	Preliminary DNAPL	Yes/no presence of DNAPL in sample	Use DNAPL delineation report findings	Site Wide	N/A	Presence/Absence	All soil and groundwater	DNAPL
7	Preliminary Not Reliably Containable	Criterion in Feasibility Study	To Be Determined during Feasibility Study	N/A	N/A	N/A	N/A	N/A

Notes:
a = Unacceptable risk under a determinsitic risk assessment is defined as greater than 1 x 10E-5 for sum of all carcinogenic compounds; greater than 1 x 10E-6 for individual carcinogenic compounds; or a Hazard Index greater than 1 for non-carcinogenic compounds.
AWQC = Ambient Water Quality Criteria, Table 20 from OAR 340-040 (2004)
COPC = Chemical of Potential Concern
DNAPL = Dense Non-Aqueous Phase Liquid
DAF = Dilution and Attentuation Factor
DDT = Dichloro-diphenyl-trichloroethane
DDD = Dichloro-diphenyl-dichloroethane
DDE = Dichloro-diphenyl-chloroethane
DEQ = Oregon Department of Environmental Quality
HHRA = Human Health Risk Assessment
Hot Spot Guidance = Oregon Department of Environmental Quality, *Guidance for Identification of Hot Spots* (April 1998)
JSCS SLV = Joint Source Control Strategy Screening Level Values from *Portland Harbor Joint Source Control Strategy Final December 2005, Table 3-1* .
MCL =Maximum Contaminant Level (USEPA. *Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. RSL Table Update.* Sept 2008).
N/A = Not Applicable
PECs = MacDonald DD, Ingersoll C.G., Berger T.A. (2000). Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. *Environmental Contaminations and Toxicity* 39: 20-31.
PRG = Preliminary Remediation Goal, (USEPA. *Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. RSL Table Update.* Sept 2008).
RBC = Risk-Based Concentration
RBDM =Risk-Based Decision Making, Oregon Department of Environmental Quality. *Risk-Based Decision Making* (October 2008).
SBV = Screening Benchmark Values, Oregon Department of Environmental Quality, Guidance for Ecological Risk Assessment - Level II Screening Benchmark Values (April 1998)
TEQ = 2,3,7,8-Tetrachlorodibenzo-p-dioxin Toxicity Equivalence Quotient

Table 3-2

Indirect Exposure Pathway Based Screening Criteria
Hot Spot Evaluation Update
Arkema Facility
Portland, Oregon

Type of Hot Spot[1]		Preliminary Groundwater							Highly Mobile	Other
Media		Groundwater							Soil	
Exposure Pathway		NRWQC Fish Consumption	Portland Harbor Fish Consumption	Ecological Receptor			MCL[3]	PRG[2]	Leaching to Groundwater	DNAPL
Contaminant of Concern	CAS	Organism Only 17.5 g/day	Organism Only 175 g/day	EPA 2009 NRWQC Chronic	DEQ 2011 AWQC[1] Chronic	Oak Ridge National Laboratory	Drinking Water	Tap Water		
Units		**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg/kg**	
Hot Spot Multiplier		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**20**	
Metals										
Antimony	7440-36-0	640	64		1600 c	30	6	15	600	
Arsenic (total)	7440-38-2	0.14	0.014	150		3.1	10	0.045	0.28	
Arsenite (As III)	22569-72-8				190				3800	
Chromium-total	7440-47-3						100		2000	
Hexavalent chromium	18540-29-9			11	11 b			110	220	
Copper	7440-50-8			2.7	3.6 b		1300	1400	54	
Lead	7439-92-1			0.54	0.54 b		15	15	10.8	
Mercury	7439-97-6	0.146	0.0146	0.77	0.012 b	1.3	2	11	0.24	
Nickel	7440-02-0	4600	460	16	49 b			730	320	
Selenium	7782-49-2	4200	420	5	35 b		50	180	100	
Zinc	7440-66-6	26000	2600	36	33 b		5000	11000	660	
Chloride	1688-70-06				230000 a				4600000	
Perchlorate	14797-73-0						15	24.5	15	
Volatile Organic Compounds										
1,1,1-Trichloroethane						11	200	840	220	
1,1-Dichloroethane						47		1200	940	
1,2-Dichloroethane		37	3.7		20000 c	910	5	0.73	74	
1,1-Dichloroethene		7100	710						14200	
cis-1,2-Dichloroethene						590	70	61	11800	
trans-1,2-Dichloroethene		10000	1000				100	110	20000	
2-Butanone						14000		7100	280000	
Acetone						1500		5500	30000	
Benzene		51	5.1			130	5	1.2	102	
Bromodichloromethane								1.1	22	
Bromoform		140	14					8.5	280	
Carbon disulfide						0.92		1000	18.4	
Carbon tetrachloride		1.6	0.16			9.8		0.51	3.2	
Chlorobenzene	108-90-7	1600	160		50 c	64	100	91	1000	Yes
Chloroethane								23	460	
Chloroform	67-66-3	470	47		1240 c	28		0.17	560	
Chloromethane								2.1	42	
Trichlorofluoromethane								1300	26000	
Methylene chloride		590	59			2200		8.9	1180	
Naphthalene					620 c	12	0.2	6.2	240	
Tetrachloroethene	127-18-4	3.3	0.33		840	98	5	0.12	6.6	
Toluene		15000	1500			9.8	1000	2300	196	
Trichloroethene		30	3		21900	47	5	0.17	60	
m,p Xylenes						1.8			36	
o-Xylene						13		1400	260	
Xylenes (total)								37	740	
Vinyl chloride		2.4	0.24				2	0.015	4.8	
Semi-Volatile Organic Compounds										
1,2-Dichlorobenzene	95-50-1	1300	130		763 c	14	600	49	280	
1,3-Dichlorobenzene	541-73-1	960	96		763 c	71		14	1420	
1,4-Dichlorobenzene	106-46-7	190	19		763 c	15	75	28	300	
1,2,4-Trichlorobenzene	120-82-1	70	7			110	70	8.2	140	
Butylbenzyl phthalate	85-68-7	1900	190		3 c	19		7300	60	
Carbazole	86-74-8							3.4	68	
Diethyl phthalate	84-66-2	44000	4400		3 c	210		29000	60	
Dimethyl phthalate	131-11-3	1100000	110000		3 c			370000	60	
Di-n-butyl phthalate	84-74-2	4500	450		3 c			3700	60	
bis[2-ethylhexyl]phthalate	117-81-7	2.2	0.22		3 c		6	4.8	4.4	
Benzoic acid	65-85-0					42		1500000	840	
Benzyl alcohol	100-51-6					8.6		11000	172	
Dibenzofuran	132-64-9					3.7		12	74	
2-Methylphenol	95-48-7					13		1800	260	
3- and 4-Methylphenol	106-44-5							180	3600	
2,4,5-Trichlorophenol	95-95-4	3600	360					3700	7200	
2,4,6-Trichlorophenol	88-06-2	2.4	0.24		970 c			6.1	4.8	
2,4-Dichlorophenol	120-83-2	290	29		365 c			110	580	
2,4-Dimethylphenol	105-67-9	850	85					730	1700	
Isophrone	78-59-1	960	96					71	1920	
Pentachlorophenol	87-86-5	3	0.3	15	13		1	0.56	6	
Phenol	108-95-2	1700000	170000		2560 c			11000	51200	
2-Chlorophenol	95-57-8	150	15		2000 c			30	300	
Acenapthene	83-32-9	990	99		520 c		0.2	370	1980	
Anthracene	120-12-7	40000	4000			0.73	0.2	1800	14.6	
Benz[a]anthracene	56-55-3	0.018	0.0018			0.027	0.2	0.092	0.036	
Benzo[b]fluoranthene	205-99-2	0.018	0.0018				0.2	0.092	0.036	
Benzo[k]fluoranthene	207-08-9	0.018	0.0018				0.2	0.92	0.036	
Benzo[ghi]perylene	191-24-2						0.2		4	
Benzo[a]pyrene	50-32-8	0.018	0.0018				0.2	0.0092	0.036	
Chrysene	218-01-9	0.018	0.0018				0.2	0.092	0.036	
Fluoranthene	206-44-0	140	14				0.2	1500	280	

Table 3-2

Indirect Exposure Pathway Based Screening Criteria
Hot Spot Evaluation Update
Arkema Facility
Portland, Oregon

Type of Hot Spot[1]		Preliminary Groundwater							Highly Mobile	Other
Media		Groundwater							Soil	
Exposure Pathway		NRWQC Fish Consumption	Portland Harbor Fish Consumption	Ecological Receptor			MCL[3]	PRG[2]	Leaching to Groundwater	DNAPL
Contaminant of Concern	CAS	Organism Only 17.5 g/day	Organism Only 175 g/day	EPA 2009 NRWQC Chronic	DEQ 2011 AWQC[1] Chronic	Oak Ridge National Laboratory	Drinking Water	Tap Water		
Units		**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg/kg**	
Hot Spot Multiplier		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**20**	
Fluorene	86-73-7	5300	530			3.9	0.2	240	78	
Hexachlorobenzene	118-74-1	0.00029	0.000029				1	0.042	0.00058	
Hexachlorobutadiene	87-68-3	18	1.8		9.3 c			0.86	36	
Hexachloroethane	67-72-1	3.3	0.33		540 c	12		4.8	6.6	
Indeno [1,2,3-cd] pyrene	193-39-5	0.018	0.0018				0.2	0.092	0.036	
2-Methylnaphthalene	91-57-6					2.1	0.2		42	
Phenanthrene	85-01-8						0.2		4	
Pyrene	129-00-0	4000	400				0.2	180	8000	
Pesticides										
Alpha-BHC	319-84-6	0.0049	0.000049			2.2		0.011	0.00098	
Delta-BHC	319-86-8							0.037	0.74	
Gamma-BHC [Lindane]	58-89-9	1.8	0.18		0.08 a			0.052	1.6	
Chlordane (total)	57-74-9	0.00081	0.000081	0.0043	0.0043		2	0.19	0.00162	
Total DDD	72-54-8	0.00031	0.000031			0.011		0.28	0.00062	
Total DDE	72-55-9	0.00022	0.000022					0.2	0.00044	
Total DDT	50-29-3	0.00022	0.000022	0.001	0.001	0.013		0.2	0.00044	
Dieldrin	60-57-1	0.000054	0.0000054	0.056	0.0019 b			0.0042	0.000108	
Endosulfan I*	959-98-8	89	8.9	0.056	0.056 b	0.051		220	1.02	
Endosulfan sulfate	1031-07-8	89	8.9						178	
Endrin	72-20-8	0.06	0.006	0.036	0.0023 b	0.061		11	0.046	
Endrinaldehyde	7421-93-4	0.3	0.03						0.6	
Heptachlor epoxide	102-45-73	0.000039	0.0000039	0.0038	0.0038 a		0.2	0.0074	0.000078	
2,3,7,8-TCDD TEQ	1746-01-6	5.1E-09	5.1E-10				0.00003	0.00000045	1.02E-08	

Notes:
a = *Aquatic Life Water Quality Summary: Table 33a*
b = *Aquatic Life Water Quality Summary: Table 20*
c = *Water Quality Guidance Values Summary: Table 33c*
1 = Oregon Department of Environmental Quality, *Guidance for Identification of Hot Spots* (April 1998)
2 = PRG: Regional Screening Level (USEPA. *Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. RSL Table Update.* Sept 2008).
3 = MCL: Maximum Contaminant Level (USEPA. *Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. RSL Table Update.* Sept 2008).
Selected Preliminary Groundwater Hot Spot Screening Criteria
AWQC = Ambient Water Quality Criteria from OAR 340-040 (2004)
DNAPL = Dense Non-Aqueous Phase Liquid
DDT = Dichloro-diphenyl-trichloroethane
DDD = Dichloro-diphenyl-dichloroethane
DDE = Dichloro-diphenyl-chloroethane
DEQ = Oregon Department of Environmental Quality
MCL =Maximum Contaminant Level (USEPA. Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. RSL Table Update. Sept 2008).
NRWQC = National Recommended Water Quality Criteria (United Environmental Protection Agency, 2009)
PRG = Preliminary Remediation Goal (USEPA. Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. RSL Table Update. Sept 2008).
TCDD = 2,3,7,8-Tetrachlorodibenzo-p-dioxin
TEQ = Toxicity Equivalence Quotient

Table 3-3

Direct Exposure Pathway Based Screening Criteria
Hot Spot Evaluation Update
Arkema Facility
Portland, Oregon

Media		**Soil**				
Type of Hot Spot[1]		**Preliminary Highly Concentrated**				
Exposure/Receptor Pathway		**Human Exposure[2]**			**Ecological Receptors[3]**	
		Outdoor Worker Cancer	**Construction Worker Cancer**	**Trespasser Cancer**	**Plant**	**Bird**
Contaminant of Concern	**Units**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**
Hot Spot Multiplier(4)	**CAS**	**100**	**100**	**100**	**10**	**10**
Inorganics						
Arsenic (total)	7440-38-2	170	1300	1100	180	430
Arsenite (As III)						
Chromium (total)	7440-47-3				10	260
Chromium (VI)					--	--
Perchlorate	14797-73-0					
Chloride	16887-00-6					
Lead	7439-92-1				1200	110
Zinc	7440-66-6					
Organics						
Chlorobenzene	108-90-7				--	--
Tetrachloroethene (PCE)	127-18-4					
Chloroform	67-66-3				--	--
DDD	72-54-8	1100			0.93	0.21
DDE	72-55-9	770			0.93	0.21
DDT	50-29-3	770	5800		0.93	0.21
PCBs						
Polychlorinated biphenyls (PCBs)	1336-36-3				400	--
Aroclor 1248	12672-29-6				--	--
Aroclor 1260	11096-82-5				--	--
2,3,7,8-TCDD TEQ	1746-01-6	0.002	0.015	0.013	--	TBD

-- = Compound included in reference document, but no value assigned for specific pathway
mg/kg = milligrams per kilogram
ug/L = micrograms per liter

1 = Oregon Department of Environmental Quality, Guidance for Identification of Hot Spots (April 1998)
2 = Human Exposure Pathways with unacceptable risk as determined in Human Health Risk Assessment, Arkema Site: Upland Areas, Integral, M
3 = Ecological Exposure Pathways with unacceptable risk as determined in Draft Arkema Upland Level II Screening Ecological Risk Assessement,
4 = Human Health Hazard Quotient less than 10 Ecological Exposure Pathways with unacceptable risk as determined in Draft Arkema Upland Le
Value to be used for Highly Mobile Hot Spot
RBDM =Risk-Based Decision Making, Oregon Department of Environmental Quality. Risk-Based Decision Making (October 2008).
SBV = Screening Benchmark Values, Oregon Department of Environmental Quality, Guidance for Ecological Risk Assessment - Level II Screening
TEQ = 2,3,7,8-Tetrachlorodibenzo-p-dioxin Toxicity Equivalence Quotient
SSL = Soil Screening Level
NA = Not Applicable
DNAPL = Dense Non-Aqueous Phase Liquid
DDT = Dichloro-diphenyl-trichloroethane
DDD = Dichloro-diphenyl-dichloroethane
DDE = Dichloro-diphenyl-chloroethane
DEQ = Oregon Department of Environmental Quality
HHRA = Human Health Risk Assessment

Table 4-1
Metals and Inorganic Compounds in Groundwater
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Wells	Aquifer	Chromium, VI Comp. N mg/l	Aluminum D mg/l	Aluminum T mg/l	Arsenic D mg/l	Arsenic T mg/l	Cadmium D mg/l	Cadmium T mg/l	Copper D mg/l	Copper T mg/l	Lead D mg/l	Lead T mg/l	Manganese D mg/l	Manganese T mg/l	Nickel, Metal and other D mg/l	Nickel, Metal and other T mg/l	Zinc D mg/l	Zinc T mg/l	Chloride mg/l	Perchlorate ug/l
NRWQC Fish Consumption		--	--	--	0.00014	0.00014	--	--	--	--	--	--	0.1	0.1	4.6	4.6	26	26	--	--
Portland Harbor Fish Consumption		--	--	--	0.000014	0.000014	--	--	--	--	--	--	0.01	0.01	0.46	0.46	2.6	2.6	--	24
EPA NRWQC Chronic		0.011	0.087	0.087	0.15	0.15	0.000094	0.000094	0.0027	0.0027	0.00054	0.00054	--	--	0.016	0.016	0.036	0.036	--	--
DEQ AWQC Chronic		0.011	--	--	--	--	0.0038	0.0038	0.0036	0.0036	0.00054	0.00054	--	--	0.049	0.049	0.033	0.033	230	--
ORNL		--	--	--	0.0031	0.0031	--	--	--	--	--	--	0.12	0.12	--	--	--	--	--	--
MWA-2	Shallow												0.744						340	3.9
MWA-3	Shallow																		147	1240
MWA-4	Shallow	< 0.0037 UJ																	200	582
MWA-5	Shallow																		152	< 1.7 U
MWA-6R	Shallow	0.36 J																	2520	< 1.7 U
MWA-7(I)	Intermediate																		245	< 1.7 U
MWA-8I	Intermediate				0.0487 J								0.0807						1020	< 1.7 U
MWA-9I	Intermediate																		2870	465
MWA-10I	Intermediate	0.6 J			< 0.00300 U														2160	< 0.68 U
MWA-11I(D)	Deep	0.04 J			0.342														1090	< 0.34 U
MWA-12I(D)	Deep				0.0523														43.3	< 1.7 U
MWA-13D	Deep																		2550	
MWA-14I(D)	Deep				0.0263 J														2590	< 0.68 U
MWA-15R	Shallow	< 0.0037 UJ			< 0.00300 U														156	
MWA-16I	Intermediate	1.6 J																	2470	< 1.7 U
MWA-17SI	Shallow																		1080	378
MWA-18	Shallow	0.34 J																	270	< 0.34 U
MWA-19	Shallow	0.5 J																	406	< 3.4 U
MWA-20	Shallow	0.071 JT			0.0568 J														164	< 3.4 U
MWA-22	Shallow	0.048 J			0.11														2870	< 3.4 U
MWA-23	Shallow	0.0047 J			0.0299 J														13.6	
MWA-24	Shallow	0.086 J			0.534														237	17.9
MWA-25	Shallow	1.1 J			0.217														469	14900 T
MWA-26	Shallow	0.11											0.0718						107	69.5
MWA-27	Shallow	0.3 J																	173	146
MWA-28I(D)	Deep	< 0.0037 UJ			0.439														5.72	< 0.34 U
MWA-29	Shallow	< 0.0037 UJ																	3750	< 1.7 U
MWA-30	Shallow	1.1 J			0.0412 J								0.0754						12900	< 6.8 U
MWA-31I(D)	Deep	9.3 J																	54300	1840
MWA-32I	Intermediate	0.21 J			0.0218 J														2520	29900
MWA-33	Shallow	0.014 J			0.0464 J														929	< 0.68 U
MWA-34I	Intermediate	< 0.037 UJ			0.066														740	< 3.4 U
MWA-35	Shallow	0.11 J			0.0318 J														599	5380
MWA-36	Shallow	0.43 J			0.147														263	4320
MWA-37	Shallow	0.57 JT			0.142 T														739	10500 T
MWA-38	Shallow	0.49			0.0984														77	8160
MWA-39	Shallow	0.0042 J																	178	< 0.68 U
MWA-40	Shallow	0.042 J			0.0801														220	< 1.7 U
MWA-41	Shallow	< 0.0037 UJ											< 0.0150 U						26.3	< 0.34 U
MWA-42	Shallow	< 0.0037 UJ			0.0939 J														816	< 3.4 U
MWA-43	Shallow	< 0.0037 UJ											0.0523						1710 T	< 20 UT
MWA-44	Shallow	< 0.037 UJ			0.0373 J								0.0843						443	55.9
MWA-45	Shallow	0.085 J			0.0269 J														332	309
MWA-46	Shallow	< 0.037 UJ																	651	< 3.4 U
MWA-47	Shallow	0.11 J																	2110	< 1.7 U
MWA-48I	Intermediate	0.052 J			< 0.00300 U								2.22						4010	175000
MWA-49I	Intermediate	< 0.0037 UJ			0.0101 J														7560	58900
MWA-50I	Intermediate	< 0.0037 U																	4550	< 1.7 U
MWA-51I	Intermediate	< 0.25 UJT			0.0721 T														2780	< 3.4 U
MWA-52I	Intermediate	< 0.0037 UJ											0.103						1110	2810
MWA-53I	Intermediate	< 0.0037 UJ																	5980	< 1.7 U
MWA-54I	Intermediate	0.21 J																	2750	< 3.4 U
MWA-55I	Intermediate	0.34 J			0.0151 J														2600	69100
MWA-56D	Deep	< 0.0037 UJ																	22800	2140
MWA-57D	Deep	< 0.0037 UJ																	15400	5070
MWA-58D	Deep	< 0.0037 UJ																	33600	128000
MWA-59D	Deep	< 0.0037 U																	37600	1670
MWA-60	Shallow												0.679						470	< 0.68 U
MWA-61	Shallow																		473	489
MWA-62	Shallow	< 0.0037 UJ			< 0.00300 U														34.1	864

Table 4-1
Metals and Inorganic Compounds in Groundwater
Hot Spot Evaluation Update
Arkema, Inc. Facility
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Wells	Aquifer	Chromium, VI Comp. N mg/l	Aluminum D mg/l	Aluminum T mg/l	Arsenic D mg/l	Arsenic T mg/l	Cadmium D mg/l	Cadmium T mg/l	Copper D mg/l	Copper T mg/l	Lead D mg/l	Lead T mg/l	Manganese D mg/l	Manganese T mg/l	Nickel, Metal and other D mg/l	Nickel, Metal and other T mg/l	Zinc D mg/l	Zinc T mg/l	Chloride mg/l	Perchlorate ug/l
MWA-63	Shallow		< 0.0150 U	**0.0321 J**	< 0.00300 U	< 0.00300 U	< 0.000300 U	**0.000367 J**	**0.00223 J**	< 0.00200 U	< 0.00700 U	< 0.00700 U	< 0.0150 U	**0.641**	**0.00495 J**	**0.00541 J**	< 0.00200 U	**0.00225 J**	**690**	< 0.68 U
MWA-64I	Intermediate				**0.054**														**1590**	< 3.4 U
MWA-65I	Intermediate	< 0.0037 UJ																	**2220**	
MWA-66I	Intermediate	< 0.0037 UJ																	**1720**	**1250 T**
MWA-67SI	Shallow				< 0.00300 U								**2.22**						**2420**	**528**
MWA-68SI	Shallow	< 0.0037 UJ			< 0.00300 U														**355**	**12800**
MWA-69	Shallow				< 0.00300 U														**297**	< 1.7 U
MWA-70I	Intermediate	< 0.0037 U																	**5200**	< 1.7 U
MWA-71	Shallow				**0.0106 J**	< 0.00300 U													**68.1**	
MWA-72	Shallow				**0.00719 J**														**18.7**	
MWA-73	Shallow				**0.00499 J**														**10.5**	
MWA-74I	Intermediate				< 0.00300 U	< 0.00300 U													**25.4**	
MWA-75I	Intermediate				**0.0187 J**														**29.7**	
MWA-75I	Intermediate				**0.0183 J**														**29.6**	
MWA-76G	Gravel				**0.00782 J**	< 0.00300 U													**42.4**	
MWA-77G	Gravel				**0.00585 J**														**28.3**	
NMP-3D	Shallow																		**86.5**	
NMP-4D	Shallow																		**1710 T**	
PMP-4	Shallow																		**41.6 T**	
PMP-6	Shallow																		**268**	
PMP-5	Shallow																		**730**	
RP-02-49	Intermediate		**0.0177 J**	< 0.0150 U	< 0.00300 U	< 0.00300 U	**0.00125 J**	**0.00127 J**	**0.00285 J**	**0.00358 J**	< 0.00700 U	< 0.00700 U	**9.05**	**9.1**	**0.027 J**	**0.0289 J**	**0.00641 J**	**0.00768 J**	**7390**	
RP-02-66	Basalt		< 0.0150 U	< 0.0150 U	**0.00631 J**	< 0.00300 UJ	**0.000779 J**	**0.000958 J**	**0.00454 J**	**0.00332 J**	< 0.00700 U	< 0.00700 U	**0.871**	**0.84**	**0.00726 J**	**0.00683 J**	< 0.00200 U	< 0.00200 U	**8400**	
RP-08-23	Shallow				< 0.0150 U	**0.0243 J**													**55.7 T**	
RP-08-80	Intermediate				< 0.00300 U	**0.0031 JT**													**2130 T**	
RP-08-107	Basalt				< 0.00300 U	< 0.00300 U													**796**	
RP-09-35	Shallow				**0.0729 J**	**0.126 J**													**405**	< 6.8 U
RP-09-47	Intermediate				**0.00962 J**	**0.00565 J**													**4120**	
RP-09-64	Basalt				**0.00786 J**	< 0.00300 UJ													**3100**	
RP-10-30	Shallow				< 0.00300 U	**0.00393 J**													**9.56**	
RP-10-60	Intermediate				**0.0122 J**	**0.00743 J**													**98.5**	
RP-10-97	Gravel				< 0.00300 U	< 0.00300 U													**12.1**	
RP-10-130	Basalt				< 0.00300 U	< 0.00300 U													**79.2**	
RP-13-11	Intermediate				**0.0132 J**	**0.00878 J**													**84**	
RP-13-22	Intermediate				**0.00634 JT**	**0.00313 J**													**194**	
RP-13-33	Gravel				**0.00464 J**	< 0.00300 U													**907 JT**	
RP-13-43	Basalt				**0.00449 J**	**0.00358 J**													**2110**	
RP-14-26	Intermediate				**0.206 J**	**0.203**													**494**	
RP-14-39	Gravel				**0.229 J**	**0.237**													**1420**	
W-19-D	Basalt		< 0.0150 U	< 0.0150 U	**0.00551 J**	**0.0047 J**	**0.000672 J**	< 0.000300 UJ	< 0.00200 U	**0.00202 J**	< 0.00700 U	< 0.00700 U	**0.531**	**0.58**	**0.00819 J**	**0.00799 J**	< 0.00200 U	< 0.00200 U	**2180**	
W-19-I	Deep		< 0.1 UT	< 0.1 UT	**0.00578 JT**	**0.00591 JT**	**0.00052 JT**	**0.000538 JT**	< 0.00405 UT	**0.00236 JT**	< 0.05 UT	< 0.05 UT	**6.22 T**	**6.42 T**	**0.0254 JT**	**0.0243 JT**	< 0.02 UT	< 0.02 UT	**494**	

Notes:
mg/L - milligrams per liter
U - Undetected at detection limit shown
R - Rejected
J - Estimated
D - Dilution
Concentration above applicable screening criteria
BOLD - Detected
ft = Feet
T = Total
D = Dissolved
AWQC = Ambient Water Quality Criteria from OAR 340-040 (2004)
DEQ = Oregon Department of Environmental Quality
NRWQC = National Recommended Water Quality Criteria (United StatesEnvironmental Protection Agency, 2009)
ORNL = Oakridge National Laboratory Tier SVC

Wells	Aquifer	1,1,1-Trichloroethane ug/l	1,1,2-Trichloroethane ug/l	1,1-Dichloroethane ug/l	1,1-Dichloroethene ug/l	2-Butanone ug/l	Acetone ug/l	Benzene ug/l	Bromoform ug/l	Carbon disulfide ug/l	Carbon tetrachloride ug/l	Chlorobenzene ug/l	Chloroethane ug/l	Chloroform ug/l
NRWQC Fish Consumption		--	16	--	7100	--	--	51	140	--	1.6	1600	--	470
Portland Harbor Fish Consumption		--	1.6	--	710	--	--	5.1	14	--	0.16	160	--	47
EPA NRWQC Chronic		--	--	--	--	--	--	--	--	--	--	--	--	--
DEQ AWQC Chronic		--	9400	--	--	--	--	--	--	--	--	50	--	1240
ORNL		11	1200	47	--	14000	1500	130	--	0.92	9.8	64	--	28
MWA-2	Shallow	< 60.0 U	< 65.0 U	< 40.0 U	< 60.0 U	< 1750 UJ	< 3880 UJ	< 45.0 U	< 50.0 U	< 70.0 U	< 30.0 U	18200	< 55.0 U	50 J
MWA-3	Shallow	< 0.120 UJ	0.14 J	0.5 J	< 0.120 UJ	< 3.50 UJ	< 7.76 UJ	< 0.0900 UJ	< 0.100 UJ	< 0.140 UJ	< 0.0600 UJ	5.85 J	< 0.110 UJ	22.2 J
MWA-4	Shallow	< 0.240 U	< 0.260 U	0.34 J	< 0.240 U	< 7.00 UJ	< 15.5 UJ	< 0.180 U	< 0.200 U	< 0.280 U	< 0.120 U	36.4	< 0.220 U	1.1
MWA-5	Shallow	< 0.240 U	< 0.260 U	1.64	< 0.240 U	< 7.00 UJ	< 15.5 UJ	< 0.180 U	< 0.200 U	< 0.280 U	< 0.120 U	14.6	0.74 J	< 0.180 U
MWA-6R	Shallow	< 2.40 U	< 2.60 U	< 1.60 U	< 2.40 U	< 70.0 U	< 155 U	< 1.80 U	< 2.00 U	< 2.80 U	< 1.20 U	1520	< 2.20 U	< 1.80 U
MWA-7(I)	Intermediate	< 0.600 U	< 0.650 U	< 0.400 U	< 0.600 U	< 17.5 U	< 38.8 U	< 0.450 U	< 0.500 U	< 0.700 U	< 0.300 U	< 0.250 U	< 0.550 U	< 0.450 U
MWA-8I	Intermediate	< 2.40 U	< 2.60 U	< 1.60 U	< 2.40 U	< 70.0 UJ	< 155 UJ	< 1.80 U	< 2.00 U	< 2.80 U	< 1.20 U	746	< 2.20 U	< 1.80 U
MWA-9I	Intermediate	< 120 U	< 130 U	< 80.0 U	< 120 U	< 3500 U	< 7760 U	< 90.0 U	< 100 U	< 140 U	< 60.0 U	61600	< 110 U	< 90.0 U
MWA-10I	Intermediate	< 12.0 U	< 13.0 U	< 8.00 U	< 12.0 U	< 350 UJ	< 776 UJ	< 9.00 U	< 10.0 U	< 14.0 U	< 6.00 U	7050	< 11.0 U	< 9.00 U
MWA-11I(D)	Deep	< 0.120 U	< 0.130 U	< 0.0800 U	< 0.120 U	< 3.50 U		0.1 J	< 0.100 U	< 0.140 U	< 0.0600 U	< 0.0500 U	< 0.110 U	< 0.0900 U
MWA-12I(D)	Deep	< 0.120 U	< 0.130 U	< 0.0800 U	< 0.120 U	< 3.50 U	< 7.76 U	< 0.0900 U	< 0.100 U	< 0.140 U	< 0.0600 U	< 0.0500 U	< 0.110 U	< 0.0900 U
MWA-13D	Deep	< 1.20 UJ	< 1.30 UJ	< 0.800 UJ	< 1.20 UJ	< 35.0 UJ	< 77.6 UJ	< 0.900 U	< 1.00 UJ	< 1.40 UJ	< 0.600 UJ	520 J	< 1.10 UJ	2.1 J
MWA-14I(D)	Deep	< 0.240 U	< 0.260 U	0.64 J	< 0.240 U	< 7.00 UJ	< 15.5 UJ	< 0.180 U	< 0.200 U	< 0.280 U	< 0.120 U	< 0.100 U	< 0.220 U	< 0.180 U
MWA-15R	Shallow	< 24.0 U	< 26.0 U	< 16.0 U	< 24.0 U	< 700 U		< 18.0 U	< 20.0 U	< 28.0 U	< 12.0 U	23500	< 22.0 U	122
MWA-16I	Intermediate	< 0.240 U	< 0.260 U	0.76 J	< 0.240 U	< 7.00 UJ	< 15.5 UJ	< 0.180 U	< 0.200 U	< 0.280 U	< 0.120 U	90.5	< 0.220 U	< 0.180 U
MWA-17SI	Shallow	< 12.0 UJ	< 13.0 UJ	< 8.00 UJ	< 12.0 UJ	< 350 UJ	< 776 UJ	< 9.00 UJ	< 10.0 UJ	< 14.0 UJ	< 6.00 UJ	6870 J	< 11.0 UJ	153 J
MWA-18	Shallow	< 0.120 UJ	< 0.130 UJ	< 0.0800 UJ	< 0.120 UJ	< 3.50 UJ	< 7.76 UJ	< 0.0900 UJ	< 0.100 UJ	0.14 J	< 0.0600 UJ	0.93 J	< 0.110 UJ	0.3 J
MWA-19	Shallow	< 0.120 U	< 0.130 U	0.64	< 0.120 U	< 3.50 UJ	< 7.76 UJ	< 0.0900 U	< 0.100 U	< 0.140 U	< 0.0600 U	0.39 J	< 0.110 U	0.21 J
MWA-20	Shallow	< 2.40 U	< 2.60 U	< 1.60 U	< 2.40 U	< 70.0 U	< 155 U	4 J	< 2.00 U	< 2.80 U	< 1.20 U	1780	< 2.20 U	< 1.80 U
MWA-22	Shallow	< 0.600 U	< 0.650 U	1.35	< 0.600 U	< 17.5 U	83 J	1.45	< 0.500 U	1.5	< 0.300 U	123	< 0.550 U	< 0.450 U
MWA-24	Shallow	< 0.120 U	< 0.130 U	< 0.0800 U	< 0.120 U	< 3.50 UJ	< 7.76 UJ	0.11 J	< 0.100 U	< 0.140 U	< 0.0600 U	< 0.0500 U	< 0.110 U	< 0.0900 U
MWA-30	Shallow	< 0.480 UJ	< 0.520 UJ	< 0.320 UJ	< 0.480 UJ	< 14.0 UJ	< 31.0 UJ	< 0.360 UJ	< 0.400 UJ	< 0.560 UJ	< 0.240 UJ	< 0.200 UJ	< 0.440 UJ	< 0.360 UJ
MWA-31I(D)	Deep	< 1 UJT	< 1 UJT	< 1 UJT	< 1 UJT	< 20 UJT	< 40 UJT	< 1 UJT	< 1 UJT	0.66 JT	< 1 UJT	< 1 UJT	< 1 UJT	16.4 JT
MWA-32I	Intermediate	< 0.240 UJ	< 0.260 UJ	0.52 J	< 0.240 UJ	< 7.00 UJ	< 15.5 UJ	< 0.180 UJ	< 0.200 UJ	< 0.280 UJ	< 0.120 UJ	0.18 J	< 0.220 UJ	2.74 J
MWA-34I	Intermediate	< 25 UT	< 25 UT	< 25 UT	< 25 UT	< 500 UJT	< 1000 UJT	< 61 UT	< 25 UT	< 50 UT	< 25.0 UT	3270 T	< 25 UT	< 25 UT
MWA-42	Shallow	< 0.600 U	< 0.650 U	< 0.400 U	< 0.600 U	< 17.5 U	< 38.8 U	< 0.450 U	< 0.500 U	0.9 J	< 0.300 U	129	< 0.550 U	1.15 J
MWA-44	Shallow	< 0.240 U	< 0.260 U	0.32 J	< 0.240 U	< 7.00 UJ	< 15.5 UJ	< 0.180 U	< 0.200 U	< 0.280 U	< 0.120 U	5.48	< 0.220 U	< 0.180 U
MWA-45	Shallow	< 0.120 U	< 0.130 U	0.49 J	< 0.120 U	< 3.50 U	< 7.76 U	0.15 J	< 0.100 U	< 0.140 U	< 0.0600 U	1.37	< 0.110 U	0.43 J
MWA-46	Shallow	< 0.240 U	< 0.260 U	1.84	< 0.240 U	< 7.00 UJ	< 15.5 UJ	< 0.180 U	< 0.200 U	< 0.280 U	< 0.120 U	1.54	< 0.220 U	< 0.180 U
MWA-47	Shallow	< 0.240 U	< 0.260 U	< 0.160 U	< 0.240 U	< 7.00 UJ	< 15.5 UJ	< 0.180 U	< 0.200 U	< 0.280 U	< 0.120 U	0.88 J	< 0.220 U	0.24 J
MWA-49I	Intermediate	< 2.40 U	< 2.60 U	< 1.60 U	< 2.40 U	< 70.0 UJ	< 155 UJ	< 1.80 U	< 2.00 U	< 2.80 U	< 1.20 U	< 1.00 U	< 2.20 U	364
MWA-50I	Intermediate	< 0.240 U	< 0.260 U	< 0.160 U	< 0.240 U	< 7.00 UJ	< 15.5 UJ	< 0.180 U	< 0.200 U	< 0.280 U	< 0.120 U	0.68 J	< 0.220 U	< 0.180 U
MWA-51I	Intermediate	< 0.600 UJ	< 0.650 UJ	1.25 J	< 0.600 UJ	< 17.5 UJ	< 38.8 UJ	< 0.450 U	< 0.500 UJ	< 0.700 UJ	< 0.300 UJ	336 J	< 0.550 UJ	0.7 J
MWA-54I	Intermediate	< 0.600 U	< 0.650 U	0.6 J	< 0.600 U	< 17.5 U		0.5 J	< 0.500 U	< 0.700 U	< 0.300 U	7.3	< 0.550 U	< 0.450 U
MWA-55I	Intermediate	< 0.600 U	< 0.650 U	1.2 J	< 0.600 U	< 17.5 U	< 38.8 U	< 0.450 U	< 0.500 U	< 0.700 U	< 0.300 U	0.9 J	< 0.550 U	59.8
MWA-56D	Deep	< 1.20 U	< 1.30 U	< 0.800 U	< 1.20 U	< 35.0 UJ	< 77.6 UJ	< 0.900 U	3.6 J	< 1.40 U	< 0.600 U	< 0.500 U	< 1.10 U	328
MWA-57D	Deep	< 0.600 U	< 0.650 U	< 0.400 U	< 0.600 U	< 17.5 U	< 38.8 U	< 0.450 U	< 0.500 U	< 0.700 U	< 0.300 U	< 0.250 U	< 0.550 U	35.8
MWA-58D	Deep	< 2.40 U	< 2.60 U	< 1.60 U	< 2.40 U	< 70.0 UJ	< 155 UJ	< 1.80 U	< 2.00 U	< 2.80 U	< 1.20 U	2 J	< 2.20 U	476
MWA-59D	Deep	< 0.120 U	< 0.130 U	0.14 J	< 0.120 U	< 3.50 UJ	< 7.76 UJ	< 0.0900 U	< 0.100 U	< 0.140 U	< 0.0600 U	0.27 J	< 0.110 U	8.32
MWA-60	Shallow	< 0.600 U	< 0.650 U	1.55 J	< 0.600 U	< 17.5 UJ	< 38.8 UJ	0.8 J	< 0.500 U	< 0.700 U	< 0.300 U	247	< 0.550 U	< 0.450 U
MWA-61	Shallow	2.4 J	< 2.60 UJ	< 1.60 UJ	< 2.40 UJ	< 70.0 UJ	< 155 UJ	< 1.80 UJ	< 2.00 UJ	< 2.80 UJ	< 1.20 UJ	715 J	< 2.20 UJ	93.6 J
MWA-62	Shallow	0.33 J	< 0.130 U	< 0.0800 U	< 0.120 U	< 3.50 U	< 7.76 U	< 0.0900 U	< 0.100 U	< 0.140 U	< 0.0600 U	2.62	< 0.110 U	5.51
MWA-63	Shallow	< 24.0 U	< 26.0 U	< 16.0 U	< 24.0 U	< 700 UJ	< 1550 UJ	< 18.0 U	< 20.0 U	< 28.0 U	< 12.0 U	< 10.0 U	< 22.0 U	9800
MWA-64I	Intermediate	< 6.00 U	< 6.50 U	< 4.00 U	< 6.00 U	< 175 UJ	< 388 UJ	< 4.50 U	< 5.00 U	< 7.00 U	< 3.00 U	2070	< 5.50 U	256
MWA-65I	Intermediate	< 6.00 U	< 6.50 U	< 4.00 U	< 6.00 U	< 175 U	< 388 U	< 4.50 U	< 5.00 U	< 7.00 U	< 3.00 U	3050	< 5.50 U	< 4.50 U
MWA-66I	Intermediate	< 12.0 U	< 13.0 U	< 8.00 U	< 12.0 U	< 350 UJ	< 776 UJ	< 9.00 U	< 10.0 U	< 14.0 U	< 6.00 U	7780	< 11.0 U	13 J
MWA-67SI	Shallow	< 120 U	< 130 U	< 80.0 U	< 120 U	< 3500 UJ	< 7760 UJ	< 90.0 U	< 100 U	< 140 U	370 J	200000	< 110 U	2240
MWA-68SI	Shallow	< 12.0 U	< 13.0 U	< 8.00 U	< 12.0 U	< 350 UJ	< 776 UJ	< 9.00 U	< 10.0 U	< 14.0 U	< 6.00 U	8080	267	73
MWA-69	Shallow	< 12.0 U	< 13.0 U	< 8.00 U	< 12.0 U	< 350 UJ	< 776 UJ	< 9.00 U	< 10.0 U	< 14.0 U	< 6.00 U	6930	586	62
MWA-71	Shallow	< 0.240 U	< 0.260 U	< 0.160 U	< 0.240 U	< 7.00 UJ	< 15.5 UJ	< 0.180 U	< 0.200 U	0.48 J	< 0.120 U	< 0.100 U	< 0.220 U	< 0.180 U
MWA-72	Shallow	< 0.120 U	< 0.130 U	< 0.0800 U	< 0.120 U	< 3.50 U	< 7.76 U	0.38 J	< 0.100 U	< 0.140 U	< 0.0600 U	0.42 J	< 0.110 U	< 0.0900 U
MWA-73	Shallow	< 0.120 U	< 0.130 U	< 0.0800 U	< 0.120 U	< 3.50 U	< 7.76 U	< 0.0900 U	< 0.100 U	< 0.140 U	< 0.0600 U	0.63	< 0.110 U	< 0.0900 U
MWA-74I	Intermediate	< 0.120 U	< 0.130 U	< 0.0800 U	< 0.120 U	< 3.50 UJ	< 7.76 UJ	< 0.0900 U	< 0.100 U	< 0.140 U	< 0.0600 U	1.13	< 0.110 U	< 0.0900 U
MWA-75I	Intermediate	< 0.120 U	< 0.130 U	0.68	< 0.120 U	< 3.50 U	< 7.76 U	< 0.0900 U	< 0.100 U	< 0.140 U	< 0.0600 U	0.71	< 0.110 U	< 0.0900 U
MWA-75I	Intermediate	< 0.120 U	< 0.130 U	0.66	0.43 J	< 3.50 U	< 7.76 U	< 0.0900 U	< 0.100 U	< 0.140 U	< 0.0600 U	0.85	< 0.110 U	< 0.0900 U
MWA-76G	Gravel	< 0.120 U	< 0.130 U	< 0.0800 U	< 0.120 U	< 3.50 UJ	< 7.76 UJ	< 0.0900 U	< 0.100 U	< 0.140 U	< 0.0600 U	< 0.0500 U	< 0.110 U	0.22 J
MWA-77G	Gravel	< 0.120 U	< 0.130 U	< 0.0800 U	< 0.120 U	< 3.50 U	< 7.76 U	0.31 J	< 0.100 U	< 0.140 U	< 0.0600 U	< 0.0500 U	< 0.110 U	< 0.0900 U
NMP-3D	Shallow	< 25 UT	< 25 UT	< 25 UT	< 25 UT	< 500 UT		< 25 UT	< 25 UT	< 50 UT	< 25.0 UT	4920 T	31 T	177 T
NMP-4D	Shallow	< 120 U	< 130 U	< 80.0 U	< 120 U	< 3500 U		< 90.0 U	< 100 U	< 140 U	< 60.0 U	112000	< 110 U	380 J
PMP-4	Shallow	4.8 J	< 2.60 U	< 1.60 U	< 2.40 U	< 70.0 UJ	< 155 UJ	< 1.80 U	< 2.00 U	< 2.80 U	< 1.20 U	1120	< 2.20 U	27.4
PMP-6	Shallow	< 2.40 U	< 2.60 U	< 1.60 U	< 2.40 U	< 70.0 UJ	< 155 UJ	< 1.80 U	< 2.00 U	< 2.80 U	< 1.20 U	618	5.2 J	72
PMP-5	Shallow	< 2.40 U	< 2.60 U	< 1.60 U	< 2.40 U	< 70.0 UJ	< 155 UJ	< 1.80 U	< 2.00 U	< 2.80 U	< 1.20 U	1420	3.8 J	90.4
RP-02-49	Intermediate	< 0.600 U	< 0.650 U	< 0.400 U	< 0.600 U	< 17.5 UJ		< 0.450 U	< 0.500 U	< 0.700 U	< 0.300 U	39.1	< 0.550 U	< 0.450 U
RP-02-66	Basalt	< 0.600 U	< 0.650 U	< 0.400 U	< 0.600 U	< 17.5 U	< 38.8 U	< 0.450 U	< 0.500 U	< 0.700 U	< 0.300 U	34.8	< 0.550 U	< 0.450 U
RP-08-23	Shallow	< 0.240 U	< 0.260 U	< 0.160 U	< 0.240 U	< 7.00 UJ		0.32 J	< 0.200 U	< 0.280 U	< 0.120 U	26.8	< 0.220 U	< 0.180 U
RP-08-80	Intermediate	< 2.40 U	< 2.60 U	< 1.60 U	< 2.40 UJ	< 70.0 UJ		< 1.80 UJ	< 2.00 U	< 2.80 U	< 1.20 U	176	< 2.20 U	< 1.80 U
RP-08-107	Basalt	< 2.40 U	< 2.60 U	< 1.60 U	< 2.40 U	< 70.0 UJ		3.6 J	< 2.00 U	< 2.80 U	< 1.20 U	350	< 2.20 U	< 1.80 U
RP-09-35	Shallow	< 0.240 U	< 0.260 U	< 0.160 U	< 0.240 U	< 7.00 UJ		< 0.180 U	< 0.200 U	< 0.280 U	< 0.120 U	< 0.100 U	< 0.220 U	< 0.180 U
RP-09-47	Intermediate	< 0.120 U	< 0.130 U	< 0.0800 U	< 0.120 U	< 3.50 UJ		< 0.0900 U	< 0.100 U	< 0.140 U	< 0.0600 U	< 0.0500 U	< 0.110 U	< 0.0900 U
RP-09-64	Basalt	< 0.120 U	< 0.130 U	< 0.0800 U	< 0.120 U	< 3.50 UJ		< 0.0900 U	< 0.100 U	< 0.140 U	< 0.0600 U	0.08 J	< 0.110 U	0.17 J
RP-10-30	Shallow	< 0.120 UJ	< 0.130 UJ	< 0.0800 UJ	< 0.120 UJ	< 3.50 UJ		1.28 J	< 0.100 UJ	< 0.140 UJ	< 0.0600 UJ	0.23 J	< 0.110 UJ	< 0.0900 UJ
RP-10-60	Intermediate	< 0.120 UJ	< 0.130 UJ	< 0.0800 UJ	< 0.120 UJ	< 3.50 UJ		< 0.0900 UJ	< 0.100 UJ	< 0.140 UJ	< 0.0600 UJ	< 0.0500 UJ	< 0.110 UJ	< 0.0900 UJ
RP-10-97	Gravel	< 0.120 UJ	< 0.130 UJ	< 0.0800 UJ	< 0.120 UJ	< 3.50 UJ		< 0.0900 UJ	< 0.100 UJ	< 0.140 UJ	< 0.0600 UJ	< 0.0500 UJ	< 0.110 UJ	< 0.0900 UJ
RP-10-130	Basalt	< 0.120 UJ	< 0.130 UJ	< 0.0800 UJ	< 0.120 UJ	< 3.50 UJ		< 0.0900 UJ	< 0.100 UJ	< 0.140 UJ	< 0.0600 UJ	< 0.0500 UJ	< 0.110 UJ	< 0.0900 UJ
RP-13-11	Intermediate	< 0.120 U	< 0.130 U	< 0.0800 U	< 0.120 U	< 3.50 U	< 7.76 U	< 0.0900 U	< 0.100 U	< 0.140 U	< 0.0600 U	< 0.0500 U	< 0.110 U	< 0.0900 U
RP-13-22	Intermediate	< 0.120 U	< 0.130 U	< 0.0800 U	< 0.120 U	< 3.50 U	< 7.76 U	< 0.0900 U	< 0.100 U	< 0.140 U	< 0.0600 U	< 0.0500 U	< 0.110 U	< 0.0900 U
RP-13-33	Gravel	< 0.600 U	< 0.650 U	< 0.400 U	< 0.600 U	< 17.5 U		< 0.450 U	< 0.500 U	< 0.700 U	< 0.300 U	< 0.250 U	< 0.550 U	< 0.450 U
RP-13-43	Basalt	< 1.20 U	< 1.30 U	< 0.800 U	< 1.20 U	< 35.0 U		1.1 J	< 1.00 U	< 1.40 U	< 0.600 U	129	< 1.10 U	< 0.900 U
RP-14-26	Intermediate	< 1 UT	< 1 UT	< 1 UT	< 1 UT	< 20 UT		< 1 UT	< 1 UT	< 2 UT	< 1.00 UT	< 1.00 UT	< 1 UT	32.7 T
RP-14-39	Gravel	< 0.240 U	< 0.260 U	< 0.160 U	< 0.240 U	< 7.00 U		< 0.180 U	< 0.200 U	< 0.280 U	< 0.120 U	< 0.100 U	< 0.220 U	3.56
W-19-D	Basalt	< 5 UT	< 5 UT	< 5 UT	2.95 JT	< 100 UT	< 200 UT	1.35 JT	< 5 UT	< 10 UT	< 5 UT	164 T	< 5 UT	< 5 UT
W-19-I	Deep	< 0.120 U	< 0.130 U	< 0.0800 U	< 0.120 U	< 3.50 U	< 7.76 U	< 0.0900 U	< 0.100 U	< 0.140 U	< 0.0600 U	0.08 J	< 0.110 U	< 0.0900 U

Wells	Cis-1,2-Dichloroethene ug/l	Ethyl benzene ug/l	m,p Xylenes ug/l	Methyl chloride ug/l	Methyl tert butyl ether ug/l	Methylene chloride ug/l	Naphthalene ug/l	o-Xylene ug/l	1,2-Dichlorobenzene ug/l	1,3-Dichlorobenzene ug/l	1,4-Dichlorobenzene ug/l	Tetrachloroethene ug/l	Toluene ug/l	Trans-1,2-Dichloroethene ug/l	Trichloroethene ug/l	Vinyl chloride ug/l
NRWQC Fish Consumption	--	2100	--	--	--	590	--	--	1300	960	190	3.3	15000	10000	30	2.4
Portland Harbor Fish Consumption	--	210	--	--	--	59	--	--	130	96	19	0.33	1500	1000	3	0.24
EPA NRWQC Chronic	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DEQ AWQC Chronic	--	--	--	--	--	--	620	--	763	763	763	840	--	--	21900	--
ORNL	590	7.3	1.8	--	37 *	2200	12	13	14	71	15	98	9.8	--	47	--
MWA-2	< 45.0 U	< 30.0 U	< 105 U	< 40.0 U	< 45.0 U	< 80.0 U	< 45.0 U	< 35.0 U	< 35.0 U	< 30.0 U	< 60.0 U	< 55.0 U	< 55.0 U	< 50.0 U	< 40.0 U	< 50.0 U
MWA-3	1.34 J	< 0.0600 UJ	< 0.210 UJ	< 0.0800 UJ	< 0.0900 UJ	< 0.160 U	< 0.0900 UJ	< 0.0700 UJ	< 0.0700 UJ	< 0.0600 UJ	< 0.120 UJ	17 J	< 0.110 U	< 0.100 UJ	3.05 J	< 0.100 UJ
MWA-4	5.08	< 0.120 U	< 0.420 U	< 0.160 U	< 0.180 U	< 0.320 U	< 0.180 U	< 0.140 U	< 0.140 U	< 0.120 U	0.66 J	1.38	< 0.220 U	< 0.200 U	2.38	0.36 J
MWA-5	< 0.180 U	< 0.120 U	< 0.420 U	< 0.160 U	< 0.180 U	< 0.320 U	< 0.180 U	< 0.140 U	< 0.140 U	< 0.120 U	< 0.240 U	< 0.220 U	< 0.220 U	< 0.200 U	< 0.160 U	< 0.200 U
MWA-6R	9 J	< 1.20 U	< 4.20 U	< 1.60 U	2 J	7.8 J	< 1.80 U	< 1.40 U	< 1.40 U	< 1.20 U	< 2.40 U	13.6	< 2.20 U	5.4 J	6.6 J	< 2.00 U
MWA-7(I)	< 0.450 U	< 0.300 U	< 1.05 U	< 0.400 U	< 0.450 U	< 0.800 U	< 0.450 U	< 0.350 U	< 0.350 U	< 0.300 U	< 0.600 U	< 0.550 U	< 0.550 U	< 0.500 U	< 0.400 U	< 0.500 U
MWA-8I	< 1.80 U	< 1.20 U	< 4.20 U	< 1.60 U	< 1.80 U	< 3.20 U	< 1.80 U	< 1.40 U	< 1.40 U	< 1.20 U	< 2.40 U	< 2.20 U	< 2.20 U	< 2.00 U	< 1.60 U	< 2.00 U
MWA-9I	< 90.0 U	< 60.0 U	< 210 U	< 80.0 U	< 90.0 U	< 160 U	< 90.0 U	< 70.0 U	80 J	< 60.0 U	< 120 U	< 110 U	< 110 U	< 100 U	< 80.0 U	< 100 U
MWA-10I	< 9.00 U	< 6.00 U	< 21.0 U	< 8.00 U	< 9.00 U	< 16.0 U	< 9.00 U	< 7.00 U	< 7.00 U	< 6.00 U	< 12.0 U	< 11.0 U	< 11.0 U	< 10.0 U	< 8.00 U	< 10.0 U
MWA-11I(D)	< 0.0900 U	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	< 0.0700 U	< 0.0700 U	< 0.0600 U	< 0.120 U	< 0.110 U	< 0.110 U	< 0.100 U	< 0.0800 U	< 0.100 U
MWA-12I(D)	< 0.0900 U	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	< 0.0700 U	< 0.0700 U	< 0.0600 U	< 0.120 U	< 0.110 U	< 0.110 U	< 0.100 U	< 0.0800 U	< 0.100 U
MWA-13D	< 0.900 UJ	< 0.600 UJ	< 2.10 UJ	< 0.800 UJ	< 0.900 UJ	< 1.60 U	< 0.900 UJ	< 0.700 UJ	< 0.700 UJ	< 0.600 UJ	< 1.20 UJ	< 1.10 UJ	< 1.10 UJ	< 1.00 UJ	< 0.800 UJ	< 1.00 UJ
MWA-14I(D)	< 0.180 U	< 0.120 U	< 0.420 U	< 0.160 U	< 0.180 U	< 0.320 U	< 0.180 U	< 0.140 U	< 0.140 U	< 0.120 U	< 0.240 U	< 0.220 U	< 0.220 U	< 0.200 U	< 0.160 U	< 0.200 U
MWA-15R	< 18.0 U	< 12.0 U	< 42.0 U	< 16.0 U	48 J	170 J	< 18.0 U	< 14.0 U	< 14.0 U	< 12.0 U	< 24.0 U	22 J	< 22.0 U	< 20.0 U	< 16.0 U	< 20.0 U
MWA-16I	0.62 J	< 0.120 U	< 0.420 U	< 0.160 U	< 0.180 U	< 0.320 U	< 0.180 U	< 0.140 U	< 0.140 U	< 0.120 U	< 0.240 U	< 0.220 U	< 0.220 U	0.56 J	< 0.160 U	< 0.200 U
MWA-17SI	< 9.00 UJ	< 6.00 UJ	< 21.0 UJ	< 8.00 UJ	< 9.00 UJ	< 16.0 U	< 9.00 UJ	< 7.00 UJ	< 7.00 UJ	< 6.00 UJ	12 J	30 J	< 11.0 UJ	< 10.0 UJ	< 8.00 UJ	< 10.0 UJ
MWA-18	0.98 J	< 0.0600 UJ	< 0.210 UJ	< 0.0800 UJ	< 0.0900 UJ	< 0.160 UJ	< 0.0900 UJ	< 0.0700 UJ	< 0.0700 UJ	< 0.0600 UJ	< 0.120 UJ	0.82 J	< 0.110 U	< 0.100 UJ	0.29 J	< 0.100 UJ
MWA-19	0.82	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	< 0.0700 U	< 0.0700 U	< 0.0600 U	< 0.120 U	14.8	< 0.110 U	< 0.100 U	3.83	< 0.100 U
MWA-20	< 1.80 U	< 1.20 U	< 4.20 U	< 1.60 U	< 1.80 U	< 3.20 U	< 1.80 U	< 1.40 U	< 1.40 U	< 1.20 U	< 2.40 U	< 2.20 U	< 2.20 U	< 2.00 U	< 1.60 U	< 2.00 U
MWA-22	36.5	< 0.300 U	< 1.05 U	< 0.400 U	0.9	3.7	0.85	< 0.350 U	< 0.350 U	< 0.300 U	< 0.600 U	< 0.550 U	< 0.550 U	< 0.500 U	< 0.400 U	0.85
MWA-24	< 0.0900 U	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	< 0.0700 U	< 0.0700 U	< 0.0600 U	< 0.120 U	< 0.110 U	< 0.110 U	< 0.100 U	< 0.0800 U	< 0.100 U
MWA-30	< 0.360 UJ	< 0.240 UJ	< 0.840 UJ	< 0.320 UJ	< 0.360 UJ	< 0.640 UJ	< 0.360 UJ	< 0.280 UJ	< 0.280 UJ	< 0.240 UJ	< 0.480 UJ	< 0.440 UJ	< 0.440 UJ	< 0.400 UJ	< 0.320 UJ	< 0.400 UJ
MWA-31I(D)	< 1 UJT	< 1 UJT	< 2 UJT	< 4 UJT	< 2 UJT	< 0.4 UT	< 4 UJT	< 1 UJT	< 1 UJT	< 1 UJT	< 1 UJT	< 1 UJT	< 0.28 UJT	< 1 UJT	< 1 UJT	< 1 UJT
MWA-32I	< 0.180 UJ	< 0.120 UJ	< 0.420 UJ	< 0.160 UJ	< 0.180 UJ	< 0.320 U	< 0.180 UJ	< 0.140 UJ	0.18 J	< 0.120 UJ	< 0.240 UJ	0.62 J	< 0.220 U	< 0.200 UJ	< 0.160 UJ	< 0.200 UJ
MWA-34I	< 25.0 UT	< 25.0 UT	< 50.0 UT	< 100 UT	4.5 JT	< 17 UT	< 100 UT	< 25 UT	< 25 UT	< 25.0 UT	< 25.0 UT	< 25.0 UT	< 25.0 UT	< 25.0 UT	< 25 UT	< 25 UT
MWA-42	< 0.450 U	< 0.300 U	< 1.05 U	< 0.400 U	< 0.450 U	< 0.800 U	< 0.450 U	< 0.350 U	< 0.350 U	< 0.300 U	< 0.600 U	12.4	0.7 J	< 0.500 U	8.35 J	< 0.500 U
MWA-44	1.64	< 0.120 U	< 0.420 U	< 0.160 U	< 0.180 U	< 0.320 U	< 0.180 U	< 0.140 U	< 0.140 U	< 0.120 U	< 0.240 U	< 0.220 U	< 0.220 U	< 0.200 U	0.56 J	< 0.200 U
MWA-45	0.35 J	0.08 J	0.34 J	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	0.07 J	< 0.0700 U	< 0.0600 U	< 0.120 U	2.31	0.66	< 0.100 U	0.53	< 0.100 U
MWA-46	1.84	< 0.120 U	< 0.420 U	< 0.160 U	< 0.180 U	< 0.320 U	< 0.180 U	< 0.140 U	< 0.140 U	< 0.120 U	< 0.240 U	1.06	< 0.220 U	< 0.200 U	0.24 J	< 0.200 U
MWA-47	< 0.180 U	< 0.120 U	< 0.420 U	< 0.160 U	< 0.180 U	< 0.320 U	< 0.180 U	< 0.140 U	0.2 J	< 0.120 U	< 0.240 U	< 0.220 U	0.64 J	< 0.200 U	< 0.160 U	< 0.200 U
MWA-49I	< 1.80 U	< 1.20 U	< 4.20 U	< 1.60 U	< 1.80 U	< 3.20 U	< 1.80 U	< 1.40 U	< 1.40 U	< 1.20 U	< 2.40 U	< 2.20 U	< 2.20 U	< 2.00 U	< 1.60 U	< 2.00 U
MWA-50I	< 0.180 U	0.16 J	0.76 J	< 0.160 U	< 0.180 U	< 0.320 U	< 0.180 U	0.32 J	< 0.140 U	< 0.120 U	0.24 J	< 0.220 U	0.78 J	< 0.200 U	< 0.160 U	< 0.200 U
MWA-51I	< 0.450 UJ	< 0.300 UJ	< 1.05 UJ	< 0.400 UJ	< 0.450 UJ	< 0.800 UJ	< 0.450 UJ	< 0.350 UJ	< 0.350 UJ	< 0.300 UJ	< 0.600 UJ	< 0.550 UJ	< 0.550 UJ	< 0.500 UJ	< 0.400 UJ	< 0.500 UJ
MWA-54I	< 0.450 U	< 0.300 U	< 1.05 U	< 0.400 U	0.8 J	2.1 J	< 0.450 U	< 0.350 U	< 0.350 U	< 0.300 U	< 0.600 U	< 0.550 U	< 0.550 U	< 0.500 U	< 0.400 U	< 0.500 U
MWA-55I	< 0.450 U	< 0.300 U	< 1.05 U	< 0.400 U	< 0.450 U	< 0.800 U	< 0.450 U	< 0.350 U	< 0.350 U	< 0.300 U	< 0.600 U	< 0.550 U	0.55 J	< 0.500 U	< 0.400 U	< 0.500 U
MWA-56D	< 0.900 U	< 0.600 U	< 2.10 U	< 0.800 U	< 0.900 U	< 1.60 U	< 0.900 U	< 0.700 U	< 0.700 U	< 0.600 U	< 1.20 U	< 1.10 U	< 1.10 U	< 1.00 U	< 0.800 U	< 1.00 U
MWA-57D	< 0.450 U	< 0.300 U	< 1.05 U	< 0.400 U	< 0.450 U	< 0.800 U	< 0.450 U	< 0.350 U	< 0.350 U	< 0.300 U	< 0.600 U	< 0.550 U	0.8 J	< 0.500 U	< 0.400 U	< 0.500 U
MWA-58D	< 1.80 U	< 1.20 U	< 4.20 U	< 1.60 U	< 1.80 U	< 3.20 U	< 1.80 U	< 1.40 U	< 1.40 U	< 1.20 U	< 2.40 U	< 2.20 U	< 2.20 U	< 2.00 U	< 1.60 U	< 2.00 U
MWA-59D	< 0.0900 U	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	0.12 J	< 0.0700 U	< 0.0700 U	< 0.0600 U	< 0.120 U	< 0.110 U	0.81	< 0.100 U	< 0.0800 U	< 0.100 U
MWA-60	7.4	< 0.300 U	< 1.05 U	< 0.400 U	< 0.450 U	< 0.800 U	< 0.450 U	< 0.350 U	< 0.350 U	< 0.300 U	< 0.600 U	< 0.550 U	< 0.550 U	< 0.500 U	0.9 J	< 0.500 U
MWA-61	< 1.80 UJ	< 1.20 UJ	< 4.20 UJ	< 1.60 UJ	2.8 J	< 3.20 U	< 1.80 UJ	< 1.40 UJ	< 1.40 UJ	< 1.20 UJ	< 2.40 UJ	37.2 J	< 2.20 UJ	< 2.00 UJ	4.8 J	< 2.00 UJ
MWA-62	0.36 J	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	< 0.0700 U	< 0.0700 U	< 0.0600 U	< 0.120 U	7.44	0.49 J	< 0.100 U	0.35 J	< 0.100 U
MWA-63	< 18.0 U	< 12.0 U	< 42.0 U	< 16.0 U	< 18.0 U	< 32.0 U	< 18.0 U	< 14.0 U	< 14.0 U	< 12.0 U	< 24.0 U	186	< 22.0 U	< 20.0 U	36 J	< 20.0 U
MWA-64I	< 4.50 U	< 3.00 U	< 10.5 U	< 4.00 U	< 4.50 U	< 8.00 U	< 4.50 U	< 3.50 U	< 3.50 U	< 3.00 U	< 6.00 U	89	< 5.50 U	< 5.00 U	< 4.00 U	< 5.00 U
MWA-65I	< 4.50 U	< 3.00 U	< 10.5 U	< 4.00 U	< 4.50 U	< 8.00 U	< 4.50 U	< 3.50 U	< 3.50 U	< 3.00 U	< 6.00 U	< 5.50 U	< 5.50 U	< 5.00 U	< 4.00 U	< 5.00 U
MWA-66I	< 9.00 U	< 6.00 U	< 21.0 U	< 8.00 U	< 9.00 U	< 16.0 U	< 9.00 U	< 7.00 U	< 7.00 U	< 6.00 U	< 12.0 U	< 11.0 U	< 11.0 U	< 10.0 U	< 8.00 U	< 10.0 U
MWA-67SI	< 90.0 U	< 60.0 U	< 210 U	< 80.0 U	< 90.0 U	< 160 U	< 90.0 U	< 70.0 U	< 70.0 U	< 60.0 U	< 120 U	840	< 110 U	< 100 U	< 80.0 U	< 100 U
MWA-68SI	< 9.00 U	< 6.00 U	< 21.0 U	98 J	< 9.00 U	< 16.0 U	< 9.00 U	< 7.00 U	10 J	< 6.00 U	15 J	18 J	< 11.0 U	< 10.0 U	< 8.00 U	< 10.0 U
MWA-69	< 9.00 U	< 6.00 U	< 21.0 U	< 8.00 U	< 9.00 U	< 16.0 U	< 9.00 U	< 7.00 U	12 J	< 6.00 U	42 J	< 11.0 U	< 11.0 U	< 10.0 U	< 8.00 U	< 10.0 U
MWA-71	< 0.180 U	< 0.120 U	< 0.420 U	< 0.160 U	< 0.180 U	< 0.320 U	< 0.180 U	< 0.140 U	< 0.140 U	< 0.120 U	< 0.240 U	< 0.220 U	< 0.220 U	< 0.200 U	< 0.160 U	< 0.200 U
MWA-72	< 0.0900 U	0.26 J	1.06	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	0.39 J	0.87	< 0.0600 U	0.19 J	< 0.110 U	1.94	< 0.100 U	< 0.0800 U	< 0.100 U
MWA-73	< 0.0900 U	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	< 0.0700 U	0.37 J	< 0.0600 U	0.16 J	< 0.110 U	< 0.110 U	< 0.100 U	< 0.0800 U	< 0.100 U
MWA-74I	< 0.0900 U	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	< 0.0700 U	0.89	< 0.0600 U	< 0.120 U	< 0.110 U	0.4 J	< 0.100 U	< 0.0800 U	< 0.100 U
MWA-75I	< 0.0900 U	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	< 0.0700 U	1.99	< 0.0600 U	0.3 J	< 0.110 U	< 0.110 U	< 0.100 U	< 0.0800 U	< 0.100 U
MWA-75I	< 0.0900 U	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	< 0.0700 U	2.44	< 0.0600 U	0.33 J	< 0.110 U	< 0.110 U	< 0.100 U	< 0.0800 U	< 0.100 U
MWA-76G	< 0.0900 U	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	< 0.0700 U	< 0.0700 U	< 0.0600 U	< 0.120 U	< 0.110 U	0.5	< 0.100 U	< 0.0800 U	< 0.100 U
MWA-77G	< 0.0900 U	0.13 J	0.46 J	< 0.0800 U	< 0.0900 U	< 0.160 U	0.09 J	0.11 J	< 0.0700 U	< 0.0600 U	< 0.120 U	< 0.110 U	1.51 J	< 0.100 U	< 0.0800 U	< 0.100 U
NMP-3D	< 25.0 UT	< 25.0 UT	< 50.0 UT	< 100 UT	10 JT	36 JT	< 100 UT	< 25 UT	7 JT	< 25.0 UT	9.25 JT	< 25.0 UT	< 25.0 UT	< 25.0 UT	< 25 UT	< 25 UT
NMP-4D	< 90.0 U	< 60.0 U	< 210 U	< 80.0 U	230 J	920 J	< 90.0 U	< 70.0 U	< 70.0 U	< 60.0 U	< 120 U	< 110 U	< 110 U	< 100 U	< 80.0 U	< 100 U
PMP-4	< 1.80 U	< 1.20 U	< 4.20 U	< 1.60 U	< 1.80 U	< 3.20 U	< 1.80 U	< 1.40 U	< 1.40 U	< 1.20 U	< 2.40 U	4.6 J	< 2.20 U	< 2.00 U	< 1.60 U	< 2.00 U
PMP-6	< 1.80 U	< 1.20 U	< 4.20 U	< 1.60 U	< 1.80 U	< 3.20 U	< 1.80 U	< 1.40 U	< 1.40 U	< 1.20 U	< 2.40 U	7 J	< 2.20 U	< 2.00 U	< 1.60 U	< 2.00 U
PMP-5	< 1.80 U	< 1.20 U	< 4.20 U	< 1.60 U	< 1.80 U	< 3.20 U	< 1.80 U	< 1.40 U	< 1.40 U	< 1.20 U	< 2.40 U	19	< 2.20 U	< 2.00 U	< 1.60 U	< 2.00 U
RP-02-49	1.1 J	< 0.300 U	< 1.05 U	< 0.400 U	0.7 J	< 0.800 U	< 0.450 UJ	< 0.350 U	114	< 0.300 U	32	< 0.550 U	< 0.550 U	< 0.500 U	1.3 J	2.6
RP-02-66	3.05	< 0.300 U	< 1.05 U	< 0.400 U	< 0.450 U	< 0.800 U	< 0.450 U	< 0.350 U	133	4.15	40.2	< 0.550 U	< 0.550 U	< 0.500 U	1.3 J	2.05 J
RP-08-23	< 0.180 U	< 0.120 U	< 0.420 U	< 0.160 U	< 0.180 U	< 0.320 U	< 0.180 UJ	< 0.140 U	0.22 J	< 0.120 U	< 0.240 U	< 0.220 U	< 0.220 U	< 0.200 U	< 0.160 U	< 0.200 U
RP-08-80	4.8 J	< 1.20 U	< 4.20 U	< 1.60 U	2 J	< 3.20 U	< 1.80 UJ	< 1.40 U	392	11.6	128	< 2.20 U	< 2.20 UJ	< 2.00 U	4.6 J	10
RP-08-107	5 J	< 1.20 U	< 4.20 U	< 1.60 U	2.4 J	< 3.20 U	< 1.80 UJ	< 1.40 U	701	23.4	247	< 2.20 U	< 2.20 U	< 2.00 U	6.2 J	18.6
RP-09-35	< 0.180 U	< 0.120 U	< 0.420 U	< 0.160 U	< 0.180 U	< 0.320 U	< 0.180 UJ	< 0.140 U	< 0.140 U	< 0.120 U	< 0.240 U	< 0.220 U	< 0.220 U	< 0.200 U	< 0.160 U	< 0.200 U
RP-09-47	< 0.0900 U	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 UJ	< 0.0700 U	< 0.0700 U	< 0.0600 U	0.12 J	< 0.110 U	< 0.110 U	< 0.100 U	< 0.0800 U	< 0.100 U
RP-09-64	< 0.0900 U	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 UJ	< 0.0700 U	0.09 J	< 0.0600 U	< 0.120 U	0.16 J	< 0.110 U	< 0.100 U	< 0.0800 U	< 0.100 U
RP-10-30	< 0.0900 UJ	< 0.0600 UJ	< 0.210 UJ	< 0.0800 UJ	< 0.0900 UJ	< 0.160 UJ	< 0.0900 UJ	0.16 J	0.32 J	< 0.0600 UJ	< 0.120 UJ	< 0.110 UJ	0.51 J	< 0.100 UJ	< 0.0800 UJ	< 0.100 UJ
RP-10-60	< 0.0900 UJ	0.08 J	< 0.210 UJ	< 0.0800 UJ	< 0.0900 UJ	< 0.160 UJ	< 0.0900 UJ	0.12 J	< 0.0700 UJ	< 0.0600 UJ	< 0.120 UJ	< 0.110 UJ	< 0.110 UJ	< 0.100 UJ	12.5 J	< 0.100 UJ
RP-10-97	< 0.0900 UJ	< 0.0600 UJ	< 0.210 UJ	< 0.0800 UJ	< 0.0900 UJ	< 0.160 UJ	< 0.0900 UJ	< 0.0700 UJ	< 0.0700 UJ	< 0.0600 UJ	< 0.120 UJ	< 0.110 UJ	< 0.110 UJ	< 0.100 UJ	0.74 J	< 0.100 UJ
RP-10-130	< 0.0900 UJ	< 0.0600 UJ	< 0.210 UJ	< 0.0800 UJ	< 0.0900 UJ	< 0.160 UJ	< 0.0900 UJ	< 0.0700 UJ	< 0.0700 UJ	< 0.0600 UJ	< 0.120 UJ	< 0.110 UJ	0.15 J	< 0.100 UJ	0.63 J	< 0.100 UJ
RP-13-11	< 0.0900 U	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	< 0.0700 U	< 0.0700 U	< 0.0600 U	< 0.120 U	< 0.110 U	0.22 J	< 0.100 U	< 0.0800 U	< 0.100 U
RP-13-22	< 0.0900 U	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	< 0.0700 U	< 0.0700 U	< 0.0600 U	< 0.120 U	< 0.110 U	< 0.110 U	< 0.100 U	< 0.0800 U	< 0.100 U
RP-13-33	< 0.450 U	< 0.300 U	< 1.05 U	< 0.400 U	0.7 J	< 0.800 U	< 0.450 U	< 0.350 U	6.65	< 0.300 U	2.85	< 0.550 U	< 0.550 U	< 0.500 U	< 0.400 U	< 0.500 U
RP-13-43	4.8 J	< 0.600 U	< 2.10 U	< 0.800 U	< 0.900 U	< 1.60 U	< 0.900 U	< 0.700 U	372	11.9	120	< 1.10 U	< 1.10 U	< 1.00 U	3.7 J	9.7
RP-14-26	0.18 JT	< 1.00 UT	< 2.00 UT	< 4 UT	0.23 JT	< 0.52 UT	< 0.180 U	< 1 UT	< 1 UT	< 1.00 UT	< 1.00 UT	1.28 T	0.24 JT	< 1.00 UT	0.74 JT	< 1 UT
RP-14-39	< 0.180 U	< 0.120 U	< 0.420 U	< 0.160 U	< 0.180 U	< 0.320 U	< 0.180 U	< 0.140 U	< 0.140 U	< 0.120 U	< 0.240 U	0.44 J	< 0.220 U	< 0.200 U	0.3 J	< 0.200 U
W-19-D	5.5 JT	< 5.00 UT	< 10.0 UT	< 20 UT	< 10.0 UT	< 3.8 UT	< 0.900 U	< 5 UT	298 T	8.75 T	90.7 T	< 5.00 UT	< 5.00 UT	2.1 JT	3.7 JT	9.65 T
W-19-I	< 0.0900 U	< 0.0600 U	< 0.210 U	< 0.0800 U	< 0.0900 U	< 0.160 U	< 0.0900 U	< 0.0700 U	0.16 J	0.09 J	0.12 J	< 0.110 U	< 0.110 U	< 0.100 U	0.75	< 0.100 U

Notes
ug/L = Micrograms per liter
Blank Cell = Not sampled
< = Compound not detected above the method detection limit

BOLD - Detected
ft = Feet
T = Total
D = Dissolved
AWQC = Ambient Water Quality Criteria from OAR 340-040 (2004)
DEQ = Oregon Department of Environmen Concentration above applicable screening criteria
NRWQC = National Recommended Water Quality Criteria (United StatesEnvironmental Protection Agency, 2009)
ORNL = Oakridge National Laboratory Tier SVC

Data Qualifiers:
U = compound was not detected above the associated numerical value
J = Estimated value. Analyte detected at a level less than the Reporting Limit (RL).
Ja = Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.
RL1 = Reporting limit raised due to sample matrix effects.
A = Total value based on limited number of analytes
T = Result derived or selected from >1 reported value.

Table 4-3
Pesticides and Herbicides in Groundwater
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Wells	Aquifer	DDD ug/l	DDE ug/l	DDT ug/l	DDx ug/l	alpha-BHC ug/l	delta-BHC ug/l	Lindane ug/l	alpha-Chlordane ug/l	Dieldrin ug/l	Endosulfan I ug/l	Endosulfan sulfate ug/l	Endrin ug/l	Endrin aldehyde ug/l	Heptachlor ug/l	Heptachlor epoxide ug/l	Total Chlordanes ug/l	2,4,5-TP (Silvex) ug/l	2,4-D ug/l
NRWQC Fish Consumption		**0.00031**	**0.00022**	**0.00022**	**0.00022 ***	**0.0049**	**--**	**1.8**		**0.0000054**	**89**	**89**	**0.06**	**0.3**	**0.000079**	**0.000039**	**0.00081**	**--**	**--**
Portland Harbor Fish Consumption		**0.000031**	**0.000022**	**0.000022**	**0.000022 ***	**0.000049**	**--**	**0.18**		**0.0000054**	**8.9**	**8.9**	**0.006**	**0.03**	**0.0000079**	**0.0000039**	**0.000081**	**--**	**--**
EPA NRWQC Chronic		**--**	**--**	**--**	**--**	**--**	**--**	**--**		**0.056**	**0.056**	**--**	**0.036**	**--**	**0.0038**	**0.0038**	**0.0043**	**--**	**--**
DEQ AWQC Chronic		**--**	**--**	**--**	**--**	**--**	**--**	**0.08**		**0.0019**	**0.056**	**--**	**0.0023**	**--**	**0.0038**	**0.0038**	**0.0043**	**--**	**--**
ORNL		**0.28**	**--**	**--**	**0.2 ***	**2.2**	**--**	**--**		**--**	**0.051**	**--**	**0.061**	**--**	**--**	**--**	**--**	**50 ***	**70 ***
MWA-2	Shallow	< 0.286 U	< 0.286 U	**0.191**	**0.191 A**	< 0.190 U	**0.284**	< 0.190 U	< 0.190 U	< 0.190 U	< 0.190 U	< 0.190 U	< 0.381 U	< 0.476 U	< 0.190 U	< 0.190 U	< 0.19 UA		
MWA-3	Shallow	**0.384**	**0.226**	**1.43**	**2.04 A**	< 0.0240 U	< 0.0240 U	**0.0976**	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0962 UA		
MWA-4	Shallow	**9.07**	< 0.476 U	< 0.476 U	**9.07 A**	< 0.238 U	< 0.238 U	< 0.476 U	< 0.238 U	< 0.238 U	< 0.238 U	< 0.238 U	< 0.238 U	< 0.238 U	< 0.238 U	< 0.238 U	< 0.952 UA		
MWA-5	Shallow	**0.0151**	< 0.00476 U	**0.0126**	**0.0277 A**	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA		
MWA-6R	Shallow	**0.0566 J**	**0.052 J**	**0.0917 J**	**0.2 JA**	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0952 UA		
MWA-7(I)	Intermediate	< 0.0191 U	< 0.0191 U	< 0.0191 U	< 0.0383 UA	< 0.0191 U	< 0.0191 U	< 0.0191 U	< 0.0191 U	< 0.0191 U	< 0.0191 U	< 0.0191 U	< 0.0191 U	< 0.0191 U	< 0.0191 U	< 0.0191 U	< 0.0383 UA		
MWA-8I	Intermediate	< 0.0190 U	< 0.00952 U	**0.0194**	**0.0194 A**	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.019 UA		
MWA-9I	Intermediate	**1.44**	< 0.240 U	< 0.120 U	**1.44 A**	< 0.120 U	< 0.240 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.481 UA		
MWA-10I	Intermediate	**0.0438 J**	< 0.0240 U	**0.0329 J**	**0.0767 JA**	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0962 UA		
MWA-11I(D)	Deep	**0.658**	**0.0459 J**	**0.0599 J**	**0.764 JA**	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0962 UA		
MWA-12I(D)	Deep	**0.0135 T**	< 0.00948 UT	**0.00598 JT**	**0.0195 JA**	< 0.00948 UT	< 0.00948 UT	< 0.00948 UT	< 0.00948 UT	< 0.00948 UT	< 0.00948 UT	< 0.00948 UT	< 0.00948 UT	< 0.00948 UT	< 0.00948 UT	< 0.00948 UT	< 0.00948 UA		
MWA-13D	Deep	**0.0744 J**	< 0.0481 U	**0.0294 J**	**0.104 JA**	< 0.0240 U	< 0.0481 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0962 UA		
MWA-14I(D)	Deep	**0.019**	< 0.00476 U	**0.0078 J**	**0.0268 JA**	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA		
MWA-15R	Shallow	**111**	**21.9**	**702**	**835 A**	< 0.962 U	< 0.481 U	**0.683 J**	< 0.481 U	< 1.44 U	< 1.92 U	< 0.481 U	< 0.962 U	< 3.37 U	**2.54**	< 0.481 U	< 3.37 UA		
MWA-16I	Intermediate	**0.0101 J**	< 0.00966 U	< 0.00966 U	**0.0101 JA**	< 0.00966 U	< 0.0193 U	< 0.00966 U	< 0.00966 U	< 0.00966 U	< 0.00966 U	< 0.00966 U	< 0.00966 U	< 0.00966 U	< 0.00966 U	< 0.00966 U	< 0.0193 UA		
MWA-17SI	Shallow	< 5.24 U	< 0.952 U	**0.64 J**	**0.64 JA**	< 0.238 U	**1.23**	**0.431 J**	< 0.238 U	< 0.238 U	< 0.238 U	< 0.238 U	< 0.476 U	< 0.238 U	< 0.238 U	< 0.238 U	< 0.952 UA		
MWA-18	Shallow	**0.0155**	**0.00671 J**	**0.00789 J**	**0.0301 JA**	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00976 UA		
MWA-19	Shallow	**0.183 J**	**0.175 J**	**1.14**	**1.5 JA**	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.19 UA		
MWA-20	Shallow	< 0.00476 U	< 0.00476 U	**0.00836 J**	**0.00836 JA**	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA		
MWA-22	Shallow	< 0.144 U	< 0.0481 U	< 0.0481 U	< 0.144 UA	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0962 UA		
MWA-29	Shallow	< 0.00476 U	< 0.00476 U	< 0.00952 U	< 0.00952 UA	**0.014**	< 0.00952 U	< 0.00952 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA		
MWA-30	Shallow	**0.148**	< 0.00943 U	< 0.00943 U	**0.148 A**	< 0.00943 U	< 0.00943 U	< 0.00943 U	< 0.00472 U	< 0.00943 U	< 0.00943 U	< 0.00943 U	< 0.00943 U	< 0.00943 U	< 0.00472 U	< 0.00472 U	< 0.00943 UA		
MWA-31I(D)	Deep	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA		
MWA-32I	Intermediate	**0.0568 J**	< 0.0481 U	< 0.0240 U	**0.0568 JA**	< 0.0481 U	< 0.0481 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0962 UA		
MWA-33	Shallow	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0952 UA	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0952 UA		
MWA-34I	Intermediate	< 0.0200 U	< 0.0100 U	< 0.0100 U	< 0.02 UA	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.0100 U	< 0.02 UA		
MWA-42	Shallow	**0.104**	**0.152**	< 0.0952 U	**0.256 A**	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0952 UA		
MWA-44	Shallow	**0.16**	**0.0324 J**	**0.0433 J**	**0.236 JA**	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0962 UA		
MWA-45	Shallow	**0.00484 J**	< 0.00476 U	**0.00667 J**	**0.0115 JA**	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA		
MWA-46	Shallow	**0.429**	**0.176 J**	**0.728**	**1.33 JA**	< 0.0481 U	< 0.0481 U	< 0.0481 U	< 0.0481 U	< 0.0481 U	< 0.0481 U	< 0.0481 U	< 0.0481 U	< 0.0481 U	< 0.0481 U	< 0.0481 U	< 0.192 UA		
MWA-47	Shallow	**0.2**	**0.0353 J**	**0.0931 J**	**0.328 JA**	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0952 U	< 0.0238 U	< 0.0238 U	< 0.0476 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0952 UA		
MWA-49I	Intermediate	**0.0402 J**	**0.0394 J**	**0.269**	**0.349 JA**	< 0.0481 U	< 0.0481 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0962 UA		
MWA-50I	Intermediate	< 0.00952 U	< 0.00476 U	< 0.00952 U	< 0.00952 UA	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA		
MWA-51I	Intermediate	**0.113**	< 0.0481 U	**0.0363 J**	**0.149 JA**	< 0.0240 U	< 0.0481 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0240 U	< 0.0962 UA		
MWA-54I	Intermediate	**0.0477 JT**	**0.00991 JT**	**0.0303 JT**	**0.0879 JA**	< 0.00952 UT	< 0.00952 UT	< 0.00952 UT	< 0.00952 UT	< 0.00952 UT	< 0.00952 UT	< 0.00952 UJT	< 0.00952 UT	< 0.00952 UJT	< 0.00952 UT	< 0.00952 UT	< 0.00952 UA		
MWA-55I	Intermediate	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0952 UA	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0952 UA		
MWA-56D	Deep	< 0.00488 U	< 0.00976 U	**0.0069 J**	**0.0069 JA**	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00976 U	< 0.00976 U	< 0.00976 UA		
MWA-57D	Deep	< 0.00476 U	**0.00515 J**	**0.00709 J**	**0.0122 JA**	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA		
MWA-58D	Deep	< 0.00472 U	< 0.00943 U	**0.0286**	**0.0286 A**	< 0.0189 U	< 0.0142 U	< 0.0189 U	< 0.00472 U	< 0.00472 U	< 0.00943 U	< 0.00472 U	< 0.00472 U	< 0.00472 U	< 0.0142 U	< 0.00943 U	< 0.00943 UA		
MWA-59D	Deep	< 0.00478 U	< 0.00478 U	**0.00794 J**	**0.00794 JA**	< 0.00957 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00957 UA		
MWA-60	Shallow	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0952 UA	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0190 U	< 0.0952 UA		
MWA-61	Shallow	**0.356 J**	< 0.119 U	< 0.119 U	**0.356 JA**	< 0.119 U	< 0.238 U	< 0.238 U	< 0.119 U	< 0.119 U	< 0.119 U	< 0.119 U	< 0.119 U	< 0.119 U	< 0.476 U	< 0.119 U	< 0.476 UA		
MWA-62	Shallow	**0.599 J**	**0.553 J**	**30.8**	**32 JA**	< 0.192 U	< 0.192 U	< 0.192 U	< 0.192 U	< 0.192 U	< 0.192 U	< 0.192 U	< 0.192 U	< 0.192 U	**0.701 J**	< 0.192 U	< 0.769 UA		
MWA-63	Shallow	< 0.00952 U	< 0.00476 U	**0.00574 J**	**0.00574 JA**	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA		
MWA-64I	Intermediate	**0.029 J**	< 0.0238 U	**0.0319 J**	**0.0609 JA**	< 0.0238 U	< 0.0476 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0238 U	< 0.0952 UA		
MWA-65I	Intermediate	**1.44**	**0.0728 J**	**0.479**	**1.99 JA**	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	< 0.0476 U	**0.196**	< 0.0476 U	< 0.19 UA		
MWA-66I	Intermediate	< 0.0340 U	< 0.00485 U	**0.0062 J**	**0.0062 JA**	< 0.00485 U	< 0.00485 U	< 0.00485 U	< 0.0243 U	< 0.00485 U	< 0.00485 U	< 0.00485 U	< 0.00485 U	< 0.00485 U	< 0.0437 U	< 0.00485 U	< 0.0243 UA		
MWA-67SI	Shallow	< 0.571 U	< 0.190 U	**0.303**	**0.303 A**	< 0.381 U	< 0.667 U	< 0.286 U	< 0.190 U	< 0.190 U	< 0.190 U	< 0.286 U	< 0.381 U	< 0.190 U	< 0.476 U	< 0.190 U	< 0.19 UA		
MWA-68SI	Shallow	< 1.20 U	< 0.120 U	**1.22**	**1.22 A**	< 0.120 U	< 0.240 U	< 0.240 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 1.20 U	< 0.120 U	< 0.481 UA		
MWA-69	Shallow	**57 T**	**4.06 T**	**66.2 T**	**127 A**	< 0.481 UT	< 0.481 UT	< 0.721 UT	< 0.481 UT	< 0.481 UT	< 1.2 UT	< 0.481 UT	< 0.481 UT	< 0.481 UT	**0.546 JT**	< 0.481 UT	< 0.952 UA		
MWA-71	Shallow	**0.0717**	< 0.00478 U	**0.0125**	**0.0842 A**	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00478 U	< 0.00957 UA	< 0.233 U	< 0.229 U
MWA-72	Shallow	< 0.00476 U	**0.00942 J**	< 0.00476 U	**0.00942 JA**	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 U	< 0.00476 U	**0.00483 J**	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA	< 0.233 U	< 0.229 U
MWA-73	Shallow	**0.107**	**0.0264**	**0.0394**	**0.173 A**	< 0.00980 U	< 0.00980 U	< 0.00980 U	< 0.00980 U	< 0.0196 U	< 0.00980 U	< 0.00980 U	< 0.00980 U	< 0.00980 U	< 0.00980 U	< 0.00980 U	< 0.0196 UA	< 0.233 U	< 0.229 U
MWA-74I	Intermediate	< 0.00957 U	< 0.00957 U	**0.0122 J**	**0.0122 JA**	< 0.00957 U	< 0.00957 U	< 0.00957 U	< 0.00957 U	< 0.00957 U	< 0.00957 U	< 0.00957 U	< 0.00957 U	< 0.00957 U	< 0.00957 U	< 0.00957 U	< 0.0191 UA	< 0.233 U	< 0.229 U
MWA-75I	Intermediate	< 0.00490 U	< 0.00980 U	< 0.00980 U	< 0.0098 UA	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.0098 UA	< 0.233 U	< 0.229 U
MWA-75I	Intermediate	< 0.00488 U	**0.00595 J**	< 0.00976 U	**0.00595 JA**	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00488 U	< 0.00976 UA	< 1 UT	< 1 UT
MWA-76G	Gravel	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.0098 UA	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.00490 U	< 0.0098 UA	< 0.233 U	< 0.229 U
MWA-77G	Gravel	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA	< 0.233 U	< 0.229 U
NMP-3D	Shallow	**1.03 JT**	**0.255 JT**	**6.54 T**	**7.83 JA**	< 0.385 UT	< 0.385 UT	< 0.385 UT	< 0.385 UT	< 0.385 UT	< 0.385 UT	< 0.385 UT	< 0.577 UT	< 0.385 UT	< 0.385 UT	< 0.385 UT	< 0.385 UA		

Table 4-3
Pesticides and Herbicides in Groundwater
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Wells	Aquifer	DDD ug/l	DDE ug/l	DDT ug/l	DDx ug/l	alpha-BHC ug/l	delta-BHC ug/l	Lindane ug/l	alpha-Chlordane ug/l	Dieldrin ug/l	Endosulfan I ug/l	Endosulfan sulfate ug/l	Endrin ug/l	Endrin aldehyde ug/l	Heptachlor ug/l	Heptachlor epoxide ug/l	Total Chlordanes ug/l	2,4,5-TP (Silvex) ug/l	2,4-D ug/l
NMP-4D	Shallow	**28.4**	**8.26**	**302**	**339 A**	< 0.485 U	< 0.485 U	< 0.485 U	< 0.971 U	< 2.43 U	< 0.971 U	**0.767 J**	< 0.971 U	< 1.46 U	< 0.971 U	< 0.485 U	< 0.971 UA		
PMP-4	Shallow	**0.245 J**	**0.166 J**	**5.5**	**5.91 JA**	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.120 U	< 0.481 UA		
PMP-6	Shallow	**1.38**	**0.463 J**	**14.8**	**16.6 JA**	< 0.240 U	< 0.481 U	< 0.240 U	< 0.240 U	< 0.240 U	< 0.240 U	< 0.240 U	< 0.240 U	< 0.240 U	**0.643**	< 0.240 U	< 0.962 UA		
PMP-5	Shallow	**2.86**	**0.724 J**	**15.8**	**19.4 JA**	< 0.240 U	**0.561 J**	< 0.240 U	< 0.240 U	< 0.962 U	< 0.240 U	< 0.240 U	< 0.240 U	< 0.240 U	< 0.481 U	< 0.240 U	< 0.962 UA		
RP-02-49	Intermediate	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.0192 UA	< 0.0192 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.0192 UA	**9.99**	< 0.229 U
RP-02-66	Basalt	< 0.0190 U	< 0.00952 U	< 0.00952 U	< 0.019 UA	< 0.0190 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.019 UA	**9.17**	< 0.229 U
RP-08-23	Shallow	**0.119**	**0.024**	< 0.00952 U	**0.143 A**	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.019 UA	< 0.233 U	< 0.229 U
RP-08-80	Intermediate	< 0.00957 U	< 0.00957 U	< 0.0287 U	< 0.0287 UA	< 0.0287 U	< 0.0191 U	< 0.00957 U	< 0.0287 U	< 0.0191 U	< 0.00957 U	< 0.00957 U	< 0.00957 U	< 0.00957 U	< 0.00957 U	< 0.00957 U	< 0.0287 UA	**27.4**	**0.333 J**
RP-08-107	Basalt	< 0.0385 U	< 0.00962 U	< 0.0192 U	< 0.0385 UA	< 0.0481 U	< 0.00962 U	< 0.0192 U	< 0.0192 U	< 0.00962 U	< 0.0192 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.0288 U	< 0.0192 UA	**45.2 J**	**0.585 J**
RP-09-35	Shallow	**0.0558**	**0.0427**	< 0.00962 U	**0.0985 A**	< 0.00481 U	< 0.00962 U	< 0.00481 U	< 0.00481 U	< 0.00962 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00962 U	< 0.00481 U	< 0.0144 UA	< 0.233 U	**0.486 J**
RP-09-47	Intermediate	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00962 UA	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00962 UA	< 0.233 U	< 0.229 U
RP-09-64	Basalt	**0.00699 JT**	< 0.00952 UT	< 0.00952 UT	**0.00699 JA**	< 0.00952 UT	< 0.00952 UT	< 0.00952 UT	< 0.00952 UT	< 0.00952 UT	< 0.00952 UT	< 0.00952 UT	< 0.00952 UT	< 0.00952 UT	< 0.00952 UT	< 0.00952 UT	< 0.00952 UA	< 0.233 U	< 0.229 U
RP-10-30	Shallow	< 0.00976 UJ	< 0.00976 UJ	< 0.00976 UJ	< 0.00976 UJA	< 0.00488 UJ	< 0.00488 UJ	< 0.00488 UJ	**0.025 J**	< 0.00488 UJ	< 0.00976 UJ	< 0.00488 UJ	< 0.00488 UJ	< 0.00488 UJ	< 0.00488 UJ	< 0.00976 UJ	**0.025 JA**	< 0.233 UJ	< 0.229 UJ
RP-10-60	Intermediate	< 0.00962 UJ	< 0.00481 UJ	< 0.00481 UJ	< 0.00962 UJA	< 0.00481 UJ	< 0.00481 UJ	< 0.00481 UJ	< 0.00481 UJ	< 0.00481 UJ	< 0.0192 UJ	< 0.00481 UJ	< 0.00481 UJ	< 0.00481 UJ	< 0.00481 UJ	< 0.00962 UJ	< 0.00962 UJA	< 0.233 UJ	< 0.229 UJ
RP-10-97	Gravel	< 0.00513 UJ	< 0.00513 UJ	< 0.00513 UJ	< 0.0103 UJA	< 0.00513 UJ	< 0.00513 UJ	< 0.00513 UJ	< 0.00513 UJ	< 0.00513 UJ	< 0.00513 UJ	< 0.00513 UJ	< 0.00513 UJ	< 0.00513 UJ	< 0.00513 UJ	< 0.00513 UJ	< 0.0103 UJA	< 0.233 UJ	< 0.229 UJ
RP-10-130	Basalt	< 0.00500 UJ	< 0.00500 UJ	< 0.00500 UJ	< 0.01 UJA	< 0.00500 UJ	< 0.00500 UJ	< 0.00500 UJ	< 0.00500 UJ	< 0.00500 UJ	< 0.00500 UJ	< 0.00500 UJ	< 0.00500 UJ	< 0.00500 UJ	< 0.00500 UJ	< 0.00500 UJ	< 0.01 UJA	< 0.233 UJ	< 0.229 UJ
RP-13-11	Intermediate	**0.222**	< 0.0192 U	< 0.00962 U	**0.222 A**	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.0192 UA	< 0.233 U	< 0.229 U
RP-13-22	Intermediate	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.0192 UA	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.0192 UA	< 0.233 U	< 0.229 U
RP-13-33	Gravel	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.0192 UA	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.0385 U	< 0.00962 U	< 0.00962 U	< 0.00962 U	< 0.0192 UA	**5.31**	< 0.229 U
RP-13-43	Basalt	< 0.00976 U	< 0.00976 U	< 0.0195 U	< 0.0195 UA	< 0.0195 U	< 0.00976 U	< 0.00976 U	< 0.0195 U	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.0195 UA	**17.6**	< 0.229 U
RP-14-26	Intermediate	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00962 UA	< 0.00481 U	< 0.00962 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00481 U	< 0.00962 UA	< 1 UT	< 1 UT
RP-14-39	Gravel	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00476 U	< 0.00952 UA	< 0.233 U	< 0.229 U
W-19-D	Basalt	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.019 UA	< 0.0286 U	< 0.00952 U	< 0.00952 U	< 0.0190 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.00952 U	< 0.019 UA	**21.1**	< 0.229 U
W-19-I	Deep	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.0195 UA	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.00976 U	< 0.0195 UA	< 0.233 U	< 0.229 U

Notes
ug/L = Micrograms per liter
Blank Cell = Not sampled
< = Compound not detected above the method detection limit

BOLD - Detected
ft = Feet
T = Total
D = Dissolved
AWQC = Ambient Water Quality Criteria from OAR 340-040 (2004)
DEQ = Oregon Departmer Concentration above applicable screening criteria
NRWQC = National Recommended Water Quality Criteria (United StatesEnvironmental Protection Agency, 2009)
ORNL = Oakridge National Laboratory Tier SVC
ug/L = Micrograms per liter
Blank Cell = Not sampled
< = Compound not detected above the method detection limit
DDT = Dichloro-diphenyl-trichloroethane
DDD = Dichloro-diphenyl-dichloroethane
DDE = Dichloro-diphenyl-chloroethane
DDx = Sum of DDD, DDE, and DDT isomers
* = Crtieria is based on MCL

Data Qualifiers:
U = compound was not detected above the associated numerical value
J = Estimated value. Analyte detected at a level less than the Reporting Limit (RL)
Ja = Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliabilit
RL1 = Reporting limit raised due to sample matrix effects.
A = Total value based on limited number of analytes
T = Result derived or selected from >1 reported value

Table 4-4
TEQ Concentrations in Groundwater
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Wells	Aquifer	TEQ pg/l
NRWQC Fish Consumption		**5.1E-09**
Portland Harbor Fish Consumption		**5.1E-10**
EPA NRWQC Chronic		**--**
DEQ AWQC Chronic		**--**
ORNL		**--**
MWA-10i	Intermediate	0 UT
MWA-15r	Shallow	**14.4**
MWA-16i	Intermediate	0 UT
MWA-2	Shallow	0 UT
MWA-30	Shallow	0 UT
MWA-32i	Intermediate	0 UT
MWA-4	Shallow	**42.1**
MWA-46	Shallow	**5**
MWA-63	Shallow	0 UT
MWA-67si	Shallow	**0.54**
MWA-6r	Shallow	**2.1159**
MWA-7(I)	Intermediate	**2.03 JT**
MWA-12I(D)	Deep	**0.243 JT**
MWA-71	Shallow	**0.496 JT**
MWA-72	Shallow	**0.233 JT**
MWA-73	Shallow	**0.0497 JT**
MWA-74I	Intermediate	**0.911 JT**
MWA-75I	Intermediate	0 UT
MWA-75I	Intermediate	**0.181 JT**
MWA-76G	Gravel	**0.476 JT**
MWA-77G	Gravel	**0.0924 JT**
RP-02-49	Intermediate	**0.18 JT**
RP-02-66	Basalt	**0.265 JT**
RP-08-23	Shallow	**0.523 JT**
RP-08-80	Intermediate	**0.1 JT**
RP-08-107	Basalt	**0.0603 JT**
RP-09-35	Shallow	**1.91 JT**
RP-09-47	Intermediate	**0.641 JT**
RP-09-64	Basalt	**0.649 JT**
RP-10-30	Shallow	**0.621 JT**
RP-10-60	Intermediate	**1.06 JT**
RP-10-97	Gravel	**0.693 JT**
RP-10-130	Basalt	**0.751 JT**
RP-13-11	Intermediate	**0.476 JT**
RP-13-22	Intermediate	**0.0935 JT**
RP-13-33	Gravel	**3.56 JT**
RP-13-43	Basalt	**0.286 JT**
RP-14-26	Intermediate	**1.68 JT**
RP-14-39	Gravel	**0.0036 JT**
W-19-D	Basalt	0 UT
W-19-I	Deep	**0.242 JT**

Notes
pg/L = Picograms per liter
Blank Cell = Not sampled
< = Compound not detected above the method detection limit
BOLD - Detected
ft = Feet
T = Total
D = Dissolved
AWQC = Ambient Water Quality Criteria from OAR 340-040 (2004)
DEQ = Oregon Department of Environmental Quality
NRWQC = National Recommended Water Quality Criteria (United States Environmental Protection Agency, 2009)
ORNL = Oakridge National Laboratory Tier SVC
TEQ = 2,3,7,8-Tetrachlorodibenzodioxin Toxicity Equivalent Quotient

Data Qualifiers:
U = compound was not detected above the associated numerical value
J = Estimated value. Analyte detected at a level less than the Reporting Limit (RL).
T = Result derived or selected from >1 reported value.

Table 4-5
Potential Highly Concentrated Human Health Exposure - Lot 1 & 2
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Sample Locations	Start Depth (ft)	End Depth (ft)	Arsenic mg/kg	DDD mg/kg	DDE mg/kg	DDT mg/kg	DDX mg/kg
Outdoor Worker - Cancer			**170**	**1100**	**770**	**770**	**770**
Outdoor worker after redevelopment - Cancer			**170**	**110**	**770**	**770**	**770**
B-125	3	5	**20.8**	**0.219**	**0.0928**	**0.19**	**0.502 a**
B-125	8	10	**4.8 j**	**0.537**	**0.232**	**0.349**	**1.12 a**
B-126	3	5	**13.3**	**0.358**	**1.1**	**4**	**5.46 a**
B-126	8	10	**2.21 j**	**0.000577 j**	**0.00505**	**0.0215 j**	**0.0271 ja**
SS1-1	0	1	**6.62**	**0.1517242**	**0.2486387**	**0.729416**	**1 a**
SS1-2	0	1	**5.31**	**0.065**	**0.11**	**1.98 j**	**2.16 ja**
SS1-3	0	1	**16.2**	**6.21**	**2.7**	**138**	**147 a**
SS1-4	0	1	**76.1**	**0.925 j**	**1.24**	**11.4**	**13.5 ja**
SS1-5	0	1	**18.6**	**0.113**	**0.329**	**2.79**	**3.23 a**
SS2-1	0	1	**10.9**	**0**	**1**	**7**	**8 a**
SS2-2	0	1	**6.03**	**0.168**	**0.325**	**5.84**	**6.33 a**
SS2-3	0	1	**9.51**	**0.461**	**0.667**	**11**	**12.1 a**
SS2-4	0	1	**4.74**	**0.0716**	**0.161**	**1.33**	**1.56 a**
SS2-5	0	1	**3.31**	**0.0497**	**0.0858**	**0.516**	**0.652 a**
SS2-6	0	1	**2.8**	**0.0165 u**	**0.0561**	**0.396**	**0.452 a**
SS2-7	0	1	**5.09**	**0.0165 u**	**0.0258**	**0.178**	**0.204 a**

Notes:
mg/kg - milligrams per kilogram
u - Undetected at detection limit shown
r - Rejected
j - Estimated
d - Dilution

BOLD - Detected
ft = Feet

Table 4-6
Potential Highly Concentrated Human Health Exposure - Lot 3 & 4
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Location	Start Depth (ft)	End Depth (ft)	DDD (mg/kg)	DDE (mg/kg)	DDT (mg/kg)	DDX (mg/kg)	Aroclor 1248 (mg/kg)
Outdoor Worker - Cancer	**0**	**3**	**1100**	**770**	**770**	**770**	**980**
Outdoor Worker After Redevelopment - Cancer	**0**	**15**	**1100**	**770**	**770**	**770**	**980**
Construction Worker - Cancer	**0**	**15**	**1100**	**770**	**5800**	**5800**	**4400**
AP-2	0	4	**2.6**	**4.2**	**220**	**227 A**	
AP-2	4	6	**3.3 T**	**2.5 T**	**130 T**	**136 A**	
AP-3	8	10	**120 T**	71 UT	**2600 T**	**2720 A**	
AP-4	0	2	**40**	**15**	**2400**	**2460 A**	
AP-5	0	2	**2.7**	**3.35**	**275**	**281 A**	
B-100	0	0.5	**32 T**	31 U	**3300 T**	**2970 A**	
B-100	0.5	1.5	**0.22**	**0.098**	**20**	**20.3 A**	
B-100	8	10	**54 T**	20 U	**1500 T**	**1550 A**	
B-100	12	14	**19**	0.7 U	**390**	**409 A**	
B-101	0	0.5	5.5 U	5.5 U	**230 T**	**230 A**	
B-101	0.5	1.5	**0.063 T**	0.055 U	**5 T**	**5.06 A**	
B-101	12	14	0.0012 U	0.0012 U	0.014 U	**0.014 A**	
B-102	0	0.5	5.5 U	5.5 U	**62**	**62 A**	
B-102	0.5	1.5	0.055 U	**0.13**	**0.41**	**0.54 A**	
B-103	0	0.5	0.0057 U	**0.11**	0.07 U	**0.11 A**	
B-103	0.5	1.5	0.0055 U	0.0055 U	0.0055 U	**0.0055 A**	
B-104	0	0.5	0.0055 U	0.12 U	**0.032 T**	**0.032 A**	
B-104	0.5	1.5	0.0055 U	**0.0084**	**0.031**	**0.0394 A**	
B-104	12	14	**0.01**	**0.018**	**0.093**	**0.121 A**	
B-105	0	0.5	26 U	**32**	**240**	**272 A**	
B-105	0.5	1.5	0.56 U	**0.9**	**10**	**10.9 A**	
B-106	0	0.5	2.6 U	**4.5**	**81**	**85.5 A**	
B-106	0.5	1.5	0.55 U	0.55 U	**3.3**	**3.3 A**	
B-107	0	0.5	**13**	5.7 U	**98**	**111 A**	
B-107		2	**2.8**	**3.5**	**300**	**0**	
B-107	0.5	1.5	**0.087 T**	**0.058**	**0.77**	**0.915 A**	
B-108	0	0.5	560 U	560 U	**2900**	**2900 A**	
B-108	0.5	1.5	590 U	590 U	**5400**	**5400 A**	
B-109	0	0.5	57 U	57 U	**710**	**710 A**	
B-109	0.5	1.5	60 U	60 U	**300**	**300 A**	
B-110	0.5	1.5	58 U	58 U	**240**	**240 A**	
B-110	1.5	2.5	**0.7**	0.65 U	**15**	**15.7 A**	
B-110	2.5	3.5	0.68 U	0.68 U	**3.4**	**3.4 A**	
B-110	3.5	4.5	0.066 U	0.066 U	**0.59**	**0.59 A**	
B-111	0	1	56 U	56 U	**390**	**390 A**	
B-111	1	2	62 U	62 U	**1300**	**1300 A**	
B-111	2	3	59 U	59 U	**870**	**870 A**	
B-111	3	4	61 U	61 U	**720**	**720 A**	
B-111	7	8	0.67 U	0.67 U	**7**	**7 A**	
B-112	0	0.5	**11 T**	5.5 U	**96**	**107 A**	
B-112		2	**2.7**	**3.35**	**275**	**281 A**	
B-112	0.5	1.5	5.6 U	5.6 U	**23**	**23 A**	
B-112	2	4	0.064 U	0.064 U	**0.5**	**0.5 A**	
B-112	4	6	0.68 U	0.68 U	**2.1**	**2.1 A**	
B-112	6	8	**0.077**	0.0072 U	0.11 U	**0.077 A**	
B-113	0	0.5	**1.4 T**	0.54 U	**14**	**15.4 A**	
B-113	0.5	1.5	5.9 U	5.9 U	**40**	**40 A**	
B-113	2	4	0.0071 U	0.0066 U	0.06 U	**0.06 A**	
B-113	4	6	0.66 UT	0.66 UT	**2.5 T**	**2.5 A**	
B-113	6	8	**0.042 T**	**0.041 T**	0.045 U	**0.083 A**	
B-114	0	0.5	5.3 U	5.3 U	**23**	**23 A**	
B-114	0.5	1.5	**14**	6 U	**120**	**134 A**	
B-114	2	4	0.0067 UT	0.0067 U	0.056 U	**0.056 A**	
B-114	4	6	0.065 U	0.065 U	**0.47 T**	**0.47 A**	

Table 4-6
Potential Highly Concentrated Human Health Exposure - Lot 3 & 4
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Location	Start Depth (ft)	End Depth (ft)	DDD (mg/kg)	DDE (mg/kg)	DDT (mg/kg)	DDX (mg/kg)	Aroclor 1248 (mg/kg)
B-114	6	8	0.0073 U	0.0073 U	0.0073 U	**0.0073 A**	
B-115	0	0.5	**0.019**	**0.029**	**0.2**	**0.248 A**	
B-115	0.5	1.5	56 U	56 U	**510**	**510 A**	
B-115	4	6	8.3 U	8.3 U	**41**	**41 A**	
B-115	6	8	89 U	89 U	**500**	**500 A**	
B-49	2	2.5	**48**	**44**	**3600**	**3690 A**	
B-49	7	8	0.015 U	0.015 U	**0.135 T**	**0.135 A**	
B-50	0.5	1	0.01 U	0.01 U	**0.02**	**0.02 A**	
B-50	5	5.5	0.012 U	**0.018**	0.012 U	**0.018 A**	
B-51	0.5	1	0.01 U	**0.197**	**1.8**	**2 A**	
B-51	5	5.5	**0.075**	**0.423**	**2.4**	**2.9 A**	
B-52	0.5	1	0.01 U	0.01 U	**0.03**	**0.03 A**	
B-52	5	5.5	0.01 U	0.01 U	**0.048**	**0.048 A**	
B-53	4.5	6	**80**	**14**	**16000**	**16100 A**	
B-54	4	5	**0.7**	**1.3**	**21**	**22.6 A**	
B-55	6	7	**36**	1 U	**297**	**333 A**	
B-55	12	13	**0.289**	**0.021**	**2.8**	**3.11 A**	
B-56	4	5	**4.9**	**3.2**	**454**	**462 A**	
B-56	19	20	0.01 U	0.01 U	0.01 U	**0.01 A**	
B-57	0	1	**0.32**	**29**	**23**	**52.3 A**	
B-57	4	5	**0.19**	**12**	**8.4**	**20.6 A**	
B-58	1	2	0.02 U	**0.047**	**0.355**	**0.402 A**	
B-58	4	5	**0.132**	**0.1**	**2.1**	**2.33 A**	
B-61	5	6	**620 T**	**38 T**	**7000 T**	**7660 A**	
B-61	6	7	**60 T**	**8.2 T**	**920 T**	**988 A**	
B-61	7	8	**1 T**	**0.19 T**	**33 T**	**34.2 A**	
B-61	11	12	**32 T**	**3 T**	**400 T**	**435 A**	
B-61	21	22	**1.2 T**	**0.18 T**	**21 T**	**22.4 A**	
B-62	4	5	**0.0855 T**	**0.36 T**	**3.9 T**	**4.24 A**	
B-65	0	2	**22 T**	**17**	**1100**	**1140 A**	
B-65	12	14	**15 T**	**3.8**	**760**	**779 A**	
B-66	0	2	**13 T**	**5**	**520**	**538 A**	
B-66	4	6	**2.1**	**0.86**	**84**	**87 A**	
B-66	12	14	**1.6 T**	**0.65**	**49**	**51.3 A**	
B-91	0	0.5	**0.82 T**	**2.1**	**120**	**123 A**	
B-91	0.5	1.5	0.054 U	0.1 U	**3.8 T**	**3.8 A**	
B-92	0	0.5	**0.33 T**	**0.83**	**39**	**40.2 A**	
B-92	0.5	1.5	**0.004 T**	**0.022**	**0.033 T**	**0.059 A**	
B-93	0	0.5	**0.012 T**	**0.53**	**1 T**	**1.54 A**	
B-93	0.5	1.5	**0.0037 T**	0.0048 U	**0.032**	**0.0357 A**	
B-94	0	0.5	**8.8 T**	**4.4**	**1300**	**1310 A**	
B-94	0.5	1.5	0.0054 U	0.016 U	**0.56 T**	**0.56 A**	
B-95	0	0.5	**0.066 T**	**0.91**	**16**	**17 A**	
B-95	0.5	1.5	0.012 U	0.027 U	**1.1**	**1.1 A**	
B-96	0	0.5	**2.2 T**	**190**	**440**	**632 A**	
B-96	0.5	1.5	0.06 U	**4.7**	**4.2**	**8.9 A**	
B-97	0	0.5	**0.0026**	**0.044**	**0.096**	**0.143 A**	
B-97	0.5	1.5	**0.0041 T**	**0.11**	**0.17**	**0.284 A**	
B-98	0	0.5	**0.023 T**	0.036 U	**0.9**	**0.923 A**	
B-98	0.5	1.5	0.022 U	0.066 U	**1.6**	**1.6 A**	
B-99	0	0.5	**0.0032**	**0.055**	**0.094 T**	**0.152 A**	
B-99	0.5	1.5	**0.0032 T**	0.0012 U	0.008 U	**0.0032 A**	
CS-1	0	1	0.005 U	0.005 U	0.005 U	**0.005 A**	
CS-2	0	1	0.005 U	0.005 U	0.005 U	**0.005 A**	
E-SETCON	0	1	0.5 U	**15**	**1400**	**1420 A**	
IB-20	3	4	**320**	**100**	**13000**	**13400 A**	
IB-25	4	5	0.05 U	0.05 U	**0.87**	**0.87 A**	
IB-25	8	9	160 U	**86**	**3900**	**3990 A**	

Table 4-6
Potential Highly Concentrated Human Health Exposure - Lot 3 & 4
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Location	Start Depth (ft)	End Depth (ft)	DDD (mg/kg)	DDE (mg/kg)	DDT (mg/kg)	DDX (mg/kg)	Aroclor 1248 (mg/kg)
IB-27	5	6	230	8.3	6300	6540 A	
IB-32	0	1	16	25	2700	2740 A	
IB-36	0	1	1.9	2.3	340	344 A	
IB-37	3	4	16	2.3	1400	1420 A	
IB-39	4	5	0.37 U	2.2	61	63.2 A	
IB-41	0	1	2.4	3.9	200	206 A	
IB-43	1	2	96	70	5100	5270 A	
IB-44	4	5	19	1.3	55	75.3 A	
IB-46	6	7	68	29	6500	6600 A	
IB-47	0	1	1.7	6.9	330	339 A	
IB-6	1	2	12	7.7	960	980 A	
IB-6	3	4	0.05 U	0.05 U	1.1	1.1 A	
IB-73	0.5	1	0.11 U	0.11 U	1.4	1.4 A	
IB-74	0.5	1	0.12 U	0.12 U	1.7	1.7 A	
IB-79	0.5	1	72 T	19	4100	4190 A	
IB-79	1	1.5	4.5 T	2.3 T	160 T	167 A	
IB-80	0.5	1	5.4 U	5.4 U	100	100 A	
IB-81	0.5	1	0.11 U	0.13	1	1.13 A	
IB-86	8	10	2.4	0.5	16	18.9 A	
IB-87	2	4	10 T	0.75 T	280 T	291 A	
IB-88	6	8	14 T	1.2 T	460	475 A	
IB-88	8	10	0.028	0.0071 T	2.1	2.14 A	
IB-89	6	8	240 T	63	9000	9300 A	
IB-89	8	10	48 T	2.5	700	751 A	
IB-90	2	4	13 T	7.4	340	360 A	
IB-91	0	2	91 T	51 T	4200 T	4340 A	
IB-91	2	4	7.3 T	3.3	980	991 A	
IB-93	8	10	200 T	16	6900	7120 A	
IB-94	0	2	4.5 T	4.2	850	859 A	
IB-95	0	2	13 T	28 T	390	431 A	
IB-95	4	6	5.6 T	1.2 T	270	277 A	
IB-96	8	10	0.0096 T	0.0049 T	0.18	0.195 A	
MWA-20	10	11.5	0.072 T	0.041 T	0.3 T	0.413 A	
MWA-20	15	16.5	0.005 U	0.005 U	0.014	0.014 A	
PS-1	0	0.5	1.1	1.6	40	42.7 A	
PS-1		1	3	5.4	250	258 A	
PS-2	0	0.5	45	24	2000	2070 A	
PS-2		1	9.9	19	380	409 A	
S-1	0.416667	0.66667	0.013	5.2	0.89	6.1 A	
S-1	1.166667	1.41667	0.014	2.7	1.3	4.01 A	
S-2	0	0.33333	0.013 T	0.086	0.33	0.429 A	
S-3	0	0.33333	0.054 T	0.15 T	1.8	2 A	
S-4	0	0.33333	0.049 T	0.12	1.3	1.47 A	
S-5	0	0.33333	0.16	0.39	2	2.55 A	
S-6	0	0.33333	5.8 T	4.1	260	270 A	
S-7	0	0.33333	25 T	40	1600	1670 A	
S-8	0	0.33333	21 T	12	1600	1630 A	
US-01	0	0.5	0.42	0.89	6.6	7.91 A	
US-01	2	2.5	38	53	690	781 A	
US-01	2.5	4	16 T	8.5 T	1100 T	1120 A	
US-02	0	0.5	0.113	0.151	1.9	2.16 A	
US-02	2	2.5	0.01 U	0.012	0.239	0.251 A	
US-03	0	0.5	9	6.6	140	156 A	
US-03	2	2.5	1.1	3.2	25	29.3 A	
VP-21	6	8	200	83 U	2000	2200 A	
VP-21	14	16	0.21 T	0.067 U	2	2.21 A	
VP-22	8	10	140	74 U	1200	1340 A	
VP-22	14	16	0.018	0.0067 U	0.15	0.168 A	

Table 4-6
Potential Highly Concentrated Human Health Exposure - Lot 3 & 4
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Location	Start Depth (ft)	End Depth (ft)	DDD (mg/kg)	DDE (mg/kg)	DDT (mg/kg)	DDX (mg/kg)	Aroclor 1248 (mg/kg)
VP-23	8	10	670 U	670 U	**1700**	**1700 A**	
VP-23	14	16	**9.2**	7.1 U	**55**	**64.2 A**	
VP-24	6	8	**42 T**	**13**	**100**	**155 A**	
VP-24	14	16	**1.1**	0.7 U	**9.2**	**10.3 A**	
OCTF-1	0.5	0.5	**0.0495**	**0.0564**	**0.291**	**0.397 A**	0.067 U
OCTF-1	1	1	**0.0275**	**0.0235**	**0.0815**	**0.133 A**	0.067 U
OCTF-10	0.5	0.5	**0.0176**	**0.167**	**0.715**	**0.9 A**	
OCTF-10	1	1	**0.0184**	**0.0956**	**1.34**	**1.45 A**	
OCTF-11	0.5	0.5	**360**	**18200**	**13300**	**31900 A**	
OCTF-11	1	1	3350 U	**12300**	**3290**	**15600 A**	
OCTF-12	0.5	0.5	**0.208**	**5.28**	**5.71**	**11.2 A**	
OCTF-12	1	1	**0.0215**	**0.664**	**0.164**	**0.85 A**	
OCTF-13	0.5	0.5	**0.144**	**7.87**	**0.672**	**8.69 A**	
OCTF-13	1	1	**0.248**	**14.6**	**6.74**	**21.6 A**	
OCTF-2	0.5	0.5	**39.6**	**5.95**	**17.7**	**63.3 A**	6.7 U
OCTF-2	1	1	**4.59**	**0.48**	**1.81**	**6.88 A**	1.68 U
OCTF-3	0.5	0.5	**0.0999**	0.067 U	**0.0109**	**0.111 A**	0.067 U
OCTF-3	1	1	**0.362**	**0.132**	**0.187**	**0.681 A**	0.335 U
OCTF-4	0.5	0.5	**0.0167**	**0.0189**	**0.0575**	**0.0931 A**	0.067 U
OCTF-4	1	1	**7.91**	**1.16**	**1.1**	**10.2 A**	6.7 U
OCTF-5	0.5	0.5	**0.01**	**0.0158**	0.0067 U	**0.0258 A**	0.067 U
OCTF-5	1	1	0.0067 U	**0.0118**	0.0067 U	**0.0118 A**	0.067 U
OCTF-6	0.5	0.5	**0.0499**	**0.0429**	**0.0932**	**0.186 A**	0.067 U
OCTF-6	1	1	**0.0267**	**0.0686**	**0.0215**	**0.117 A**	0.067 U
OCTF-7	0.5	0.5	0.0067 U	**0.226**	**0.0238**	**0.25 A**	0.067 U
OCTF-7	1	1	**0.131**	**2.99**	0.67 U	**3.12 A**	1.68 U
OCTF-8	0.5	0.5	**0.0283**	**0.0454**	**0.0941**	**0.168 A**	0.067 U
OCTF-8	1	1	0.0067 U	**0.0163**	**0.0371**	**0.0534 A**	0.067 U
OCTF-9	0.5	0.5	**0.0474**	**0.0213**	**0.0367**	**0.105 A**	0.067 U
OCTF-9	1	1	**0.0774**	**0.0354**	**0.0482**	**0.161 A**	0.067 U
PD31&32B	0	0					**0.12**
PD31&32S	0	0					**0.12 J**
PD41-BE	0	0					0.12 U
PD41-SE	0	0					0.12 U
PD41-BW	0	0					0.13 U
PD41-SW	0	0					0.13 U
PD72-SW	0	0					0.13 U
PD72-SE	0	0					0.12 U
PD72-BW	0	0					0.12 U
PD72-BE	0	0					0.12 U
PD97-S	0	0					0.12 U
PD97-B	0	0					0.12 U
PD100-B	0	0					0.12 U
BPA-1	0.25	1.25					0.12 U
BPA-2	0.3	1.3					0.12 U
BPA-3	0.3	1.3					0.12 U
BPA-4	0.3	1.3					0.13 U
BPA-5	0.3	1.3					0.12 U
BPA-6	0.3	1.3					0.13 U
BPA-7	0.4	1.4					0.12 U
BPA-8	0.5	1.5					0.12 U
BPA-9	0.3	1.3					0.12 U
BPA-10	0.3	0.3					0.12 U
BPA-11	0.5	0.5					0.12 U
BPA-12	0.3	1.3					0.12 U
BPA-13	0.3	1.3					0.12 U
BPA-14	0.5	1.5					0.12 U
BPA-15	1	2					0.12 U

Table 4-6
Potential Highly Concentrated Human Health Exposure - Lot 3 & 4
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Location	Start Depth (ft)	End Depth (ft)	DDD (mg/kg)	DDE (mg/kg)	DDT (mg/kg)	DDX (mg/kg)	Aroclor 1248 (mg/kg)
BPA-16	0.2	1.2					0.12 U
BPA-17	0.3	1.3					0.12 U
BPA-18	0.4	1.4					0.12 U
BPA-19	3	3.5					**0.12 J**
BPA-20	3	3.5					**0.59**
BPA-21	3	3.5					**0.12**
BPA-22	3	3.5					**0.12**
BPA-23	3	3.5					**0.12 J**
BPA-24	3	3.5					**0.59 J**

Notes:
mg/kg - milligrams per kilogram
U - Undetected at detection limit shown
R - Rejected
J - Estimated
D - Dilution
BOLD - Detected
ft = Feet

Table 4-7
Potential Highly Concentrated Ecological Exposure - Lot 1 & 2
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Sample Locations	Start Depth (ft)	End Depth (ft)	Chromium (mg/kg)	Lead (mg/kg)	DDX (mg/kg)
Plant			**10**	**1200**	**0.93**
Invertebrate			**0.4**	**1700**	**--**
Bird			**260**	**110**	**0.21**
Mammal			**260**	**110**	**0.21**
SS1-1	0	1	**0.113**	**34.8**	**1.13 t**
SS1-2	0	1	**0.0341**	**28.8**	**2.16 t**
SS1-3	0	1	**0.0356**	**41.5**	**147 t**
SS1-4	0	1	**0.0281**	**56.3**	**12.60 t**
SS1-4D	0	1	**0.0351**	**53.2**	**13.50 t**
SS1-5	0	1	**0.0322**	**30.4**	**3.23 t**
SS2-1	0	1	**0.064**	**30.5**	**7.58 t**
SS2-2	0	1	**0.195**	**34.9**	**6.33 t**
SS2-3	0	1	**0.0265**	**31.9**	**12.10 t**
SS2-4	0	1	**0.0151**	**13.3**	**1.56 t**
SS2-5	0	1	**0.016**	**11.6**	**0.65 t**
SS2-6	0	1	**0.0138**	**27.8**	**0.45 t**
SS2-7	0	1	**0.0156**	**22.2**	**0.20 t**

Notes:
mg/kg - milligrams per kilogram
u - Undetected at detection limit shown
r - Rejected
j - Estimated
d - Dilution
BOLD - Detected
ft = Feet
DDT = Dichloro-diphenyl-trichloroethane
DDD = Dichloro-diphenyl-dichloroethane
DDE = Dichloro-diphenyl-chloroethane
DDX = Total of DDD, DDE, and DDT isomers

Table 4-8
Metals in Soil - Potential Leaching to Groundwater
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Boring	Start Depth (ft)	End Depth (ft)	Soil Sample Interval	Arsenic (mg/kg)	Chromium Total (mg/kg)	Chromium VI (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)
Leaching To Groundwater				**0.28**	**2000**	**220**	**10.8**	**660**
Background				**7**	**42**	**--**	**17**	**86**
B-122	0	2	Shallow	**2.42 j**				
B-123	0	2	Shallow	**13.2**				
B-124	0	2	Shallow	**4.7 j**				
B-127	10	12	Deep	**4.56 j**				
B-127	15	17	Deep	**3.27 j**				
B-128	10	12	Deep	**1.59 j**				
B-128	15	17	Deep	**3.05 j**				
B-129	0	2	Shallow	**17.3**				
B-71	0	4	Shallow		**13.1 j**			
B-71	8	12	Deep		**19.8 j**	1.57 u		
B-71	16	20	Deep		**15.3 j**			
B-72	0	4	Shallow		**19.6 j**			
B-72	12	16	Deep		**20.2 j**			
B-73	0	4	Shallow		**20.6 j**			
B-73	8	12	Deep		**12.9 j**			
B-73	16	20	Deep		**16 j**			
B-74	0	4	Shallow		**106 j**			
B-74	6	8	Deep		**235 j**			
B-74	10	12	Deep		**565 j**			
B-74	14	16	Deep		**194 j**			
B-74	16	20	Deep		**221 j**			
B-75	0	4	Shallow		**59.1 j**			
B-75	4	6	Deep		**76.6 j**			
B-75	8	10	Deep		**68.8 j**	**9.72 j**		
B-75	12	14	Deep		**221 j**			
B-75	16	18	Deep		**86.8 j**			
B-75	20	22	Deep		**110 j**			
B-76	2	4	Shallow		**29.2 j**			
B-76	4	6	Deep		**52.1 j**			
B-76	8	10	Deep		**668 j**			
B-76	12	14	Deep		**1090 j**			
B-76	16	18	Deep		**154 j**			
B-76	18	22	Deep		**122 j**			
B-77	2	4	Shallow		**79 j**			
B-77	4	6	Deep		**116 j**			
B-77	8	10	Deep		**172 j**	**69 j**		
B-77	12	16	Deep		**411 j**			
B-77	18	20	Deep		**104 j**			
B-77	22	24	Deep		**133 j**			
B-78	0	4	Shallow		**31 j**			
B-78	4	6	Deep		**30 j**			
B-78	8	10	Deep		**20.8 j**			
B-78	12	14	Deep		**9.48 j**			
B-78	16	18	Deep		**38.1 j**			
B-78	20	24	Deep		**133 j**			
B-79	0	4	Shallow		**30.6 j**			

Table 4-8
Metals in Soil - Potential Leaching to Groundwater
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Boring	Start Depth (ft)	End Depth (ft)	Soil Sample Interval	Arsenic (mg/kg)	Chromium Total (mg/kg)	Chromium VI (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)
Leaching To Groundwater				**0.28**	**2000**	**220**	**10.8**	**660**
Background				**7**	**42**	**--**	**17**	**86**
B-79	8	12	Deep		**20.6 j**			
B-79	16	20	Deep		**14.9 j**			
B-80	0	4	Shallow		**40.2 j**			
B-80	4	6	Deep		**75.8 j**			
B-80	8	10	Deep		**222 j**	**16.2 j**		
B-80	12	14	Deep		**93.3 j**			
B-80	16	20	Deep		**776 j**			
B-81	0	4	Shallow		**36.3 j**			
B-81	8	12	Deep		**135 j**			
B-81	16	20	Deep		**257 j**			
B-82	0	4	Shallow		**13.8 j**			
B-82	8	12	Deep		**14.2 j**			
B-83	0	4	Shallow		**119 j**			
B-83	8	12	Deep		**157 j**			
B-84	2	4	Shallow		**134 j**			
B-84	4	6	Deep		**72.6 j**			
B-84	8	10	Deep		**34.8 j**	**41.1 j**		
B-84	12	14	Deep		**28 j**			
B-84	16	18	Deep		**33.7 j**			
B-84	20	22	Deep		**148 j**			
B-86	0	4	Shallow		**18.3 j**			
B-86	4	8	Deep		**21.1 j**			
B-86	12	16	Deep		**27.9 j**			
B-87	0	4	Shallow		**18.6 j**			
B-87	4	8	Deep		**23.3 j**			
B-87	12	16	Deep		**10.4 j**			
B-88	0	4	Shallow		**182 j**			
B-88	6	8	Deep		**189 j**			
B-88	10	12	Deep		**1640 j**			
B-88	14	16	Deep		**52.2 j**			
B-88	18	20	Deep		**21 j**			
B-88	22	24	Deep		**32 j**			
B-90	2	4	Shallow		**74.5 j**			
B-90	4	6	Deep		**74.6 j**			
B-90	8	10	Deep		**297 j**			
B-90	12	14	Deep		**117 j**			
B-90	16	18	Deep		**49.4 j**			
B-90	20	24	Deep		**32.6 j**			
IB-44	0	1	Shallow		**85.7**		**47.9**	**394 j**
B-125	3	5	Deep	**20.8**				
B-125	8	10	Deep	**4.8 j**				
B-126	3	5	Deep	**13.3**				
B-126	8	10	Deep	**2.21 j**				
SS1-2	0	1	Shallow	**5.31**	**34.1**		**28.8**	**84.8**
SS1-3	0	1	Shallow	**16.2**	**35.6**		**41.5**	**178**
SS1-4	0	1	Shallow	**76.1**	**28.1**		**56.3**	**119**

Table 4-8
Metals in Soil - Potential Leaching to Groundwater
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Boring	Start Depth (ft)	End Depth (ft)	Soil Sample Interval	Arsenic (mg/kg)	Chromium Total (mg/kg)	Chromium VI (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)
Leaching To Groundwater				**0.28**	**2000**	**220**	**10.8**	**660**
Background				**7**	**42**	**--**	**17**	**86**
SS1-4D	0	1	Shallow	**55**	**35.1**		**53.2**	**147**
SS1-5	0	1	Shallow	**18.6**	**32.2**		**30.4**	**223**
SS2-2	0	1	Shallow	**6.03**	**195**		**34.9**	**124**
SS2-3	0	1	Shallow	**9.51**	**26.5**		**31.9**	**95**
SS2-4	0	1	Shallow	**4.74**	**15.1**		**13.3**	**56.5**
SS2-5	0	1	Shallow	**3.31**	**16**		**11.6**	**62.7**
SS2-6	0	1	Shallow	**2.8**	**13.8**		**27.8**	**74**
SS2-7	0	1	Shallow	**5.09**	**15.6**		**22.2**	**88.1**

Notes:
mg/kg - milligrams per kilogram
u - Undetected at detection limit shown
r - Rejected
j - Estimated
d - Dilution
Concentration above applicable screening criteria and background level
Concentration above applicable screening criteria and below background level
BOLD - Detected
ft = Feet
Background = Oregon Default Background Concentrations for Metals (DEQ, 28 October 2002)

Table 4-9
Volatile Organic Compounds and Semi-Volatile Organic Compounds in Soil - Potential Leaching to Groundwater
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Boring Number	Start Depth (ft)	End Depth (ft)	Soil Sample Interval	1,1,1-Trichloroethane (mg/kg)	1,1-Dichloroethane (mg/kg)	1,1-Dichloroethene (mg/kg)	1,2- Dichlorobenzene g/kg)	1,3- Dichlorobenzene g/kg)	1,4- Dichlorobenzene g/kg)	1,2-Dichloroethane (mg/kg)	2-Butanone (mg/kg)	Acetone (mg/kg)	Benzene (mg/kg)	Bromochloromethane (mg/kg)	Bromoform (mg/kg)	Carbon disulfide (mg/kg)	Carbon tetrachloride (mg/kg)	Chlorobenzene (mg/kg)	Chloroethane (mg/kg)	Chloroform (mg/kg)	cis-1,2-Dichloroethene (mg/kg)	Methylene chloride (mg/kg)	Naphthalene	Tetrachloroethene (mg/kg)	Toluene (mg/kg)	trans-1,2-Dichloroethene (mg/kg)	Trichloroethene (mg/kg)	Vinyl chloride (mg/kg)	Total Xylenes (mg/kg)
Leaching To Groundwater Screening Levels				**220**	**940**	**74**	(m **280**	(m **1420**	(m **300**	**14200**	**280000**	**30000**	**102**	**22**	**280**	**18**	**3**	**1000**	**460**	**560**	**11800**	**1180**	**240**	**7**	**196**	**20000**	**60**	**5**	**740**
B-49	7	8	Deep	0.005 u	0.005 u	0.005 u				0.005 u	0.02 ur	0.05 ur	0.005 u	0.005 u	0.005 u	0.005 uj	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.01 u		0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	
B-50	5	5.5	Deep	0.005 u	0.005 u	0.005 u				0.005 u	0.02 ur	0.05 ur	0.005 u	0.005 u	0.005 u	0.005 uj	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.01 u		0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	
B-51	5	5.5	Deep	0.005 u	0.005 u	0.005 u				0.005 u	0.02 ur	0.05 ur	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.01 u		0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	
B-52	5	5.5	Deep	0.005 u	0.005 u	0.005 u				0.005 u	0.02 ur	0.05 ur	0.005 u	0.005 u	0.005 u	0.005 uj	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.01 u		0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	
B-54	4	5	Deep	0.005 u	0.005 u	0.005 u				0.005 u	0.02 ur	0.05 ur	0.005 u	0.005 u	0.005 u	0.005 uj	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.01 u		0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	
B-54	9	10	Deep	0.005 u	0.005 u	0.005 u				0.005 u	0.02 ur	0.05 ur	0.005 u	0.005 u	0.005 u	0.005 uj	0.005 u	**0.007**	0.005 u	0.005 u	0.005 u	0.01 u		0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	
B-55	6	7	Deep	5 u	5 u	5 u				5 u	200 ur	200 ur	5 u	5 u	5 u	5 u	5 u	**4100**	5 u	5 u	5 u	10 u		**14**	5 u	5 u	5 u	5 u	
B-55	12	13	Deep	0.005 u	0.005 u	0.005 u				0.005 u	0.02 ur	0.05 ur	0.005 u	0.005 u	0.005 u	0.005 uj	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.01 u		0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	
B-56	4	5	Deep	0.005 u	0.005 u	0.005 u				0.005 u	0.02 ur	0.05 ur	0.005 u	0.005 u	0.005 u	0.005 uj	0.005 u	**0.007**	0.005 u	0.005 u	0.005 u	0.01 u		0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	
B-56	19	20	Deep	0.005 u	0.005 u	0.005 u				0.005 u	0.02 ur	0.05 ur	0.005 u	0.005 u	0.005 u	0.005 uj	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.01 u		0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	
B-91	0.5	1.5	Shallow	0.0058 u	0.0058 u	0.0058 u				0.0058 u	0.023 u	0.058 u	0.0058 u	0.0058 u	0.0058 u	0.0058 u	0.0058 u	0.0058 u	0.0058 u	0.0058 u	0.0058 u	0.012 u		0.0058 u	0.0058 u	0.0058 u	0.0058 u	0.0058 u	
B-92	0.5	1.5	Shallow	0.0059 u	0.0059 u	0.0059 u				0.0059 u	0.024 u	0.059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.012 u		0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	
B-93	0.5	1.5	Shallow	0.0055 u	0.0055 u	0.0055 u				0.0055 u	0.022 u	0.055 u	0.0055 u	0.0055 u	0.0055 u	0.0055 u	0.0055 u	0.0055 u	0.0055 u	0.0055 u	0.0055 u	0.011 u		0.0055 u	0.0055 u	0.0055 u	0.0055 u	0.0055 u	
B-94	0.5	1.5	Shallow	0.0054 u	0.0054 u	0.0054 u				0.0054 u	0.022 u	0.054 u	0.0054 u	0.0054 u	0.0054 u	0.0054 u	0.0054 u	0.0054 u	0.0054 u	0.0054 u	0.0054 u	0.011 u		0.0054 u	0.0054 u	0.0054 u	0.0054 u	0.0054 u	
B-95	0.5	1.5	Shallow	0.0059 u	0.0059 u	0.0059 u				0.0059 u	0.024 u	0.059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.012 u		0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	
B-96	0.5	1.5	Shallow	0.006 u	0.006 u	0.006 u				0.006 u	0.024 u	0.06 u	0.006 u	0.006 u	0.006 u	0.006 u	0.006 u	0.006 u	0.006 u	0.006 u	0.006 u	0.012 u		0.006 u	0.006 u	0.006 u	0.006 u	0.006 u	
B-97	0.5	1.5	Shallow	0.0052 u	0.0052 u	0.0052 u				0.0052 u	0.021 u	0.052 u	0.0052 u	0.0052 u	0.0052 u	0.0052 u	0.0052 u	0.0052 u	0.0052 u	0.0052 u	0.0052 u	0.011 u		0.0052 u	0.0052 u	0.0052 u	0.0052 u	0.0052 u	
B-98	0.5	1.5	Shallow	0.0056 u	0.0056 u	0.0056 u				0.0056 u	0.023 u	0.056 u	0.0056 u	0.0056 u	0.0056 u	0.0056 u	0.0056 u	0.0056 u	0.0056 u	0.0056 u	0.0056 u	0.012 u		0.0056 u	0.0056 u	0.0056 u	0.0056 u	0.0056 u	
B-99	0.5	1.5	Shallow	0.0053 u	0.0053 u	0.0053 u				0.0053 u	0.021 u	0.053 u	0.0053 u	0.0053 u	0.0053 u	0.0053 u	0.0053 u	0.0053 u	0.0053 u	0.0053 u	0.0053 u	0.011 u		0.0053 u	0.0053 u	0.0053 u	0.0053 u	0.0053 u	
B-100	0.5	1.5	Shallow	0.0053 u	0.0053 u	0.0053 u				0.0053 u	0.021 u	0.016 u	0.0053 u	0.0053 u	0.0053 u	0.0053 u	0.0053 u	**0.0011**	0.0053 u	0.0053 u	0.0053 u	0.0041 u		0.0053 u	0.0053 u	0.0053 u	0.0053 u	0.0053 u	
B-100	8	10	Deep	37 u	37 u	37 u				37 u	1500 ur	1500 ur	37 u	37 u	37 u	37 u	37 u	**1800**	37 uj	37 u	37 u	58 u		37 u	37 u	37 u	37 u	37 u	
B-100	12	14	Deep	35 u	35 u	35 u				35 u	1400 ur	1400 ur	35 u	35 u	35 u	35 u	35 u	**2600**	35 uj	35 u	35 u	58 u		35 u	35 u	35 u	35 u	35 u	
B-101	0.5	1.5	Shallow	0.0057 u	0.0057 u	0.0057 u				0.0057 u	0.023 u	**0.074 j**	0.0057 u	0.0057 u	0.0057 u	0.0057 u	0.0057 u	**0.0023 j**	0.0057 u	0.0057 u	0.0057 u	0.0086 u		0.0057 u	0.0057 u	0.0057 u	0.0057 u	0.0057 u	
B-101	12	14	Deep	0.14 u	0.14 u	0.14 u				0.14 u	5.5 ur	5.5 ur	0.14 u	0.14 u	0.14 u	0.14 u	0.14 u	**12**	0.14 uj	0.14 u	0.14 u	0.28 u		0.14 u	0.14 u	0.14 u	0.14 u	0.14 u	
B-110	9.5	10.5	Deep	0.079 u	0.079 u	0.079 u				0.079 u	3.2 ur	3.2 ur	0.079 u	0.079 u	0.079 u	0.079 u	0.079 u	**0.37**	0.079 ur	0.079 u	0.079 u	0.16 u		0.079 u	0.079 u	0.079 u	0.079 u	0.079 u	
B-111	9	10	Deep	0.0077 u	0.0077 u	0.0077 u				0.0077 u	0.031 uj	0.077 u	0.0077 u	0.0077 u	0.0077 u	0.0077 u	0.0077 u	0.0077 u	0.0077 u	0.0077 u	0.0077 u	0.016 u		0.0077 u	0.0077 u	0.0077 u	0.0077 u	0.0077 u	
IB-21	0	10	Deep	270 uj	270 uj	270 uj				270 uj	11000 ur	11000 ur	270 uj	270 uj	270 uj	270 uj	270 uj	**8800 j**	270 uj	270 uj	270 uj	540 uj		270 uj	270 uj	270 uj	270 uj	270 uj	
IB-26	0	10	Deep	66 uj	66 uj	66 uj				66 uj	2700 ur	2700 ur	66 uj	66 uj	66 uj	66 uj	66 uj	**2900 j**	66 uj	66 uj	66 uj	130 uj		66 uj	66 uj	66 uj	66 uj	66 uj	
IB-51	0	10	Deep	120 uj	120 uj	120 uj				120 uj	5000 ur	5000 ur	120 uj	120 uj	120 uj	120 uj	120 uj	**3000 j**	120 uj	120 uj	120 uj	250 uj		120 uj	120 uj	120 uj	120 uj	120 uj	
MWA-8i	36	36.3	Deep	50 u	60 u	50 u				50 u	2000 ur	2000 ur	50 u	50 u	50 u	50 u	50 u	**1100**	50 u	50 u	50 u	100 u		50 u	50 u	60 u	50 u	50 u	50 u
MWA-11i	6	8	Deep	**3.6**	1.5 u	1.5 u				1.5 u	60 ur	60 ur	1.5 u	1.5 u	1.5 u	1.5 u	1.5 u	**15000 j**	1.5 u	1.5 u	1.5 u	3 u		1.5 u	1.5 u	1.5 u	1.5 u	1.5 u	1.5 u
MWA-11i	26	28	Deep	1 uj	1 uj	1 uj				1 uj	40 ur	40 ur	1 uj	1 uj	1 uj	1 uj	1 uj	**880**	1 uj	1 uj	1 uj	2 uj		1 uj	1 uj	1 uj	1 uj	1 uj	1 uj
MWA-11i	28	39	Deep	0.05 uj	0.05 uj	0.05 uj				0.05 uj	2 ur	2 ur	0.05 uj	0.05 uj	0.05 uj	0.05 uj	0.05 uj	**39**	0.05 uj	0.05 uj	0.05 uj	0.1 uj		0.05 uj	0.05 uj	0.05 uj	0.05 uj	0.05 uj	0.05 uj
AP-1	4	6	Deep	0.0066 u	0.0066 u	0.0066 u				0.0066 u	0.027 u	**0.11 j**	0.0066 u	0.0066 u	0.0066 u	0.0066 u	0.0066 u	0.0066 u	0.0066 u	0.0066 u	0.0066 u	0.033 u		0.0066 u	0.0066 u	0.0066 u	0.0066 u	0.0066 u	
AP-3	8	10	Deep	0.0076 u	0.0076 u	0.0076 u				0.0076 u	0.03 u	**0.24 j**	0.0076 u	0.0076 u	0.0076 u	0.0076 u	0.0076 u	**4 j**	0.0076 u	**0.026**	0.0076 u	0.052 u		**0.011 j**	0.0076 u	0.0076 u	0.0076 u	0.0076 u	
AP-4	8	10	Deep	0.38 uj	0.38 uj	0.38 uj				0.38 uj	1.5 ur	15 ur	0.38 uj	0.38 uj	0.38 uj	0.38 uj	0.38 uj	**4400 j**	0.38 uj	0.38 uj	0.38 uj	0.76 uj		**2.1 j**	0.38 uj	0.38 uj	0.38 uj	0.38 uj	
AP-5	0	2	Shallow	0.0056 u	0.0056 u	0.0056 u				0.0056 u	0.022 u	0.056 uj	0.0056 u	0.0056 u	0.0056 u	0.0056 u	0.0056 u	0.0057 u	0.0056 u	0.0056 u	0.0056 u	0.021 u		0.0056 u	0.0056 u	0.0056 u	0.0056 u	0.0056 u	
AP-6	7.5	8	Deep	67 u	67 u	67 u				67 u	270 ur	2700 ur	67 u	67 u	67 u	67 u	67 u	**4000**	67 u	67 u	67 u	140 u		67 u	67 u	67 u	67 u	67 u	
AP-7	7	7.5	Deep	16 u	16 u	16 u				16 u	62 ur	620 ur	16 u	16 u	16 u	16 u	16 u	**480**	16 u	16 u	16 u	31 u		16 u	16 u	16 u	16 u	16 u	
AP-7	7.5	8	Deep	64 u	64 u	64 u				64 u	260 ur	2600 ur	64 u	64 u	64 u	64 u	64 u	**1700**	64 u	64 u	64 u	130 u		64 u	64 u	64 u	64 u	64 u	
AP-8	7.5	8	Deep	68 u	68 u	68 u				68 u	270 ur	2700 ur	68 u	68 u	68 u	68 u	68 u	**2000**	68 u	68 u	68 u	140 u		68 u	68 u	68 u	68 u	68 u	
VP-1	7.5	8	Deep															**520 d**		50 u				50 u					
VP-2	7.5	8	Deep															**1.6 d**		**0.007**				**0.076**					
VP-3	7.5	8	Deep															**5600 d**		25 u				25 u					
VP-4	7.5	8	Deep															**4600 d**		25 u				25 u					
VP-6	7.5	8	Deep															**13000 d**		49 u				49 u					
VP-7	7.5	8	Deep															**0.083**		0.005 u				0.005 u					
VP-8	7.5	8	Deep															**5400 d**		50 u				50 u					
VP-9	8	-	Deep															**11000**		0.78 u			3.1 u	**5.6**					
VP-9	12	-	Deep	**0.8**			0.68 u	0.68 u	0.68 u			27 u						**570**		0.68 u			2.7 u	0.68 u					
VP-9	16	-	Deep	0.74 u			0.74 u	0.74 u	0.74 u			30 u						**420**		0.74 u			3 u	0.74 u					
VP-10	8	-	Deep	0.075 u			**3.3**	**0.22**	**8.2**			3 u						**53**		0.075 u			0.3 u	**0.87**					
VP-10	12	-	Deep	**2.1**			0.76 u	0.76 u	**1.3**			30 u						**930**		0.76 u			3 u	0.76 u					
VP-10	16	-	Deep	0.19 u			0.19 u	0.19 u	**0.6**			7.6 u						**150**		0.19 u			0.76 u	0.19 u					
VP-11	8	-	Deep	0.071 u			**15**	**1.2**	**49**			2.8 u						**9.8**		0.071 u			**0.46**	**2.7**					
VP-11	12	-	Deep	**2.3**			0.78 u	0.78 u	**1.2**			31 u						**860**		0.78 u			3.1 u	0.78 u					
VP-11	16	-	Deep	0.068 u			0.068 u	0.068 u	0.068 u			2.7 u						**11**		0.068 u			0.27 u	0.068 u					
VP-12	8	-	Deep	**18**			**1.9**	0.68 u	**11**			27 u						**7200**		0.68 u			2.7 u	**3.4**					
VP-12	12	-	Deep	0.72 u			0.72 u	0.72 u	0.72 u			29 u						**550**		0.72 u			2.9 u	0.72 u					
VP-12	16	-	Deep	0.17 u			0.17 u	0.17 u	**0.22**			6.8 u						**92**		0.17 u			0.68 u	0.17 u					
VP-13	8	-	Deep	**13**			**5.4**	**0.8**	**26**			28 u						**8700**		0.69 u			2.8 u	**7.5**					
VP-13	12	-	Deep	0.76 u			0.76 u	0.76 u	**0.89**			31 u						**500**		0.76 u			3.1 u	0.76 u					
VP-13	16	-	Deep	0.068 u			0.068 u	0.068 u	0.068 u			2.7 u						**14**		0.068 u			0.27 u	0.068 u					
VP-14	8	-	Deep	0.069 u			0.069 u	0.069 u	0.069 u			2.8 u						**0.35**		**0.13**			0.28 u	0.069 u					
VP-14	12	-	Deep	0.067 u			**0.083**	0.067 u	**0.27**			2.7 u						**0.16**		0.067 u			0.27 u	0.067 u					
VP-14	16	-	Deep	34 u			34 u	34 u	34 u			**340**						**230**		34 u			130 u	34 u					
VP-15	8	-	Deep	6.6 u			6.6 u	6.6 u	6.6 u			**210**						**13**		6.6 u			26 u	6.6 u					
VP-15	12	-	Deep	0.067 u			**0.14**	0.067 u	**0.66**			2.7 u						**110**		0.067 u			0.27 u	0.067 u					
VP-15	16	-	Deep	0.066 u			0.066 u	0.066 u	**0.12**			2.6 u						**9.6**		0.066 u			0.26 u	**0.066**					
VP-16	8	-	Deep	0.67 u			0.67 u	0.67 u	**2.5**			27 u						**1300**		0.67 u			2.7 u	0.67 u					
VP-16	12	-	Deep	0.078 u			**0.12**	0.078 u	**0.6**			3.1 u						**700**		**0.27**			0.31 u	**0.17**					
VP-16	16	-	Deep	0.067 u			0.067 u	0.067 u	**0.29**			2.7 u						**180**		0.067 u			0.27 u	0.067 u					
VP-17	8	-	Deep	0.65 u			**0.87**	0.65 u	**4.7**			26 u						**2300**		0.65 u			2.6 u	**1.4**					
VP-17	12	-	Deep	0.078 u			**0.16**	0.078 u	**0.78**			3.1 u						**580**		**0.31**			0.31 u	**0.2**					
VP-17	16	-	Deep	0.069 u			0.069 u	0.069 u	**0.071**			2.8 u						**73**		0.069 u			0.28 u	0.069 u					
VP-18	8	-	Deep	0.64 u			**1**	0.64 u	**6.2**			25 u						**3900**		0.64 u			2.5 u	**1.5**					
VP-18	12	-	Deep	0.73 u			0.73 u	0.73 u	0.73 u			29 u						**550**		0.73 u			2.9 u	0.73 u					
VP-18	16	-	Deep	0.34 u			0.34 u	0.34 u	0.34 u			14 u						**240**		0.34 u			1.4 u	0.34 u					
VP-19	8	-	Deep	6.6 u			6.6 u	6.6 u	**11**			270 u						**7900**		6.6 u			27 u	6.6 u					
VP-19	12	-	Deep	1.5 u			1.5 u	1.5 u	1.5 u			60 u						**670**		1.5 u			6 u	1.5 u					
VP-19	16	-	Deep	0.063 u			0.063 u	0.063 u	0.063 u			2.5 u						**7.3**		0.063 u			0.25 u	0.063 u					
VP-20	8	-	Deep	0.066 u			0.066 u	0.066 u	0.066 u			2.6 u						**29**		0.066 u			0.26 u	**0.096**					
VP-20	12	-	Deep	0.35 u			0.35 u	0.35 u	0.35 u			14 u						**180**		0.35 u			1.4 u	0.35 u					
VP-20	16	-	Deep	0.063 u			0.066 u	0.066 u	0.066 u			2.6 u						**50**		0.066 u			0.26 u	0.066 u					
VP-21	7.5	8	Deep	0.0078 uj	0.0078 uj	0.0078 uj	0.0078 uj	0.0078 uj	0.0078 uj	0.0078 uj	0.032 uj	0.078 uj	0.0078 uj	0.0078 uj	0.0078 uj	0.0078 uj	0.0078 uj	**0.37 j**	0.0078 uj	**0.0087 j**	0.0078 uj	0.016 uj	0.0078 uj	**0.0096 j**	0.0078 uj	0.0078 uj	0.0078 uj	0.0078 uj	
VP-21	11.5	12	Deep	0.15 u	0.15 u	0.15 u	0.15 u	0.15 u	0.15 u	0.15 u	0.58 ur	5.8 ur	0.15 u	0.15 u	0.15 u	0.15 u	0.15 u	**22**	0.15 ur	0.15 u	0.15 u	0.29 u	0.15 u	0.15 u	0.15 u	0.15 u	0.15 u	0.15 u	

Table 4-9
Volatile Organic Compounds and Semi-Volatile Organic Compounds in Soil - Potential Leaching to Groundwater
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Boring Number	Start Depth (ft)	End Depth (ft)	Soil Sample Interval	1,1,1-Trichloro-ethane (mg/kg)	1,1-Dichloro-ethane (mg/kg)	1,1-Dichloro-ethene (mg/kg)	1,2- Dichloro-benzene g/kg)	1,3- Dichloro-benzene g/kg)	1,4- Dichloro-benzene g/kg)	1,2-Dichloro-ethane (mg/kg)	2-Butanone (mg/kg)	Acetone (mg/kg)	Benzene (mg/kg)	Bromochloro-methane (mg/kg)	Bromoform (mg/kg)	Carbon disulfide (mg/kg)	Carbon tetrachloride (mg/kg)	Chlorobenzene (mg/kg)	Chloroethane (mg/kg)	Chloroform (mg/kg)	cis-1,2-Dichloro-ethene (mg/kg)	Methylene chloride (mg/kg)	Naphthalene	Tetrachloro-ethene (mg/kg)	Toluene (mg/kg)	trans-1,2-Dichloroethene (mg/kg)	Trichloroethene (mg/kg)	Vinyl chloride (mg/kg)	Total Xylenes (mg/kg)
Leaching To Groundwater Screening Levels				**220**	**940**	**74**	(m **280**	(m **1420**	(m **300**	**14200**	**280000**	**30000**	**102**	**22**	**280**	**18**	**3**	**1000**	**460**	**560**	**11800**	**1180**	**240**	**7**	**196**	**20000**	**60**	**5**	**740**
VP-21	15.5	16	Deep	0.0066 *u*	0.0066 *u*	0.0066 *u*	0.0066 *u*	0.0066 *u*	0.0066 *u*	0.0066 *u*	0.027 *uj*	0.066 *u*	0.0066 *u*	0.0066 *u*	0.0066 *u*	0.0066 *u*	0.0066 *u*	**2.6 j**	0.0066 *u*	0.0066 *u*	0.0066 *u*	0.014 *u*	0.0066 *u*	0.0066 *u*	0.0066 *u*	0.0066 *u*	0.0066 *u*	0.0066 *u*	
VP-22	7.5	8	Deep	0.0068 *u*	0.0068 *u*	0.0068 *u*	0.0068 *u*	0.0068 *u*	0.0068 *u*	0.0068 *u*	0.027 *uj*	0.068 *u*	0.0068 *u*	0.0068 *u*	0.0068 *u*	0.0068 *u*	0.0068 *u*	**0.4**	0.0068 *u*	0.0068 *u*	0.0068 *u*	0.014 *u*	0.0068 *u*	0.0068 *u*	0.0068 *u*	0.0068 *u*	0.0068 *u*	0.0068 *u*	
VP-22	11.5	12	Deep	1.5 *u*	1.5 *u*	1.5 *u*	1.5 *u*	1.5 *u*	1.5 *u*	1.5 *u*	6 *ur*	60 *ur*	1.5 *u*	1.5 *u*	1.5 *u*	1.5 *u*	1.5 *u*	**170**	1.5 *ur*	1.5 *u*	1.5 *u*	3 *u*	1.5 *u*	1.5 *u*	1.5 *u*	1.5 *u*	1.5 *u*	1.5 *u*	
VP-22	15.5	16	Deep	0.37 *u*	0.37 *u*	0.37 *u*	0.37 *u*	0.37 *u*	0.37 *u*	0.37 *u*	1.5 *ur*	15 *ur*	0.37 *u*	0.37 *u*	0.37 *u*	0.37 *u*	0.37 *u*	**40**	0.37 *ur*	0.37 *u*	0.37 *u*	0.73 *u*	0.37 *u*	0.37 *u*	0.37 *u*	0.37 *u*	0.37 *u*	0.37 *u*	
VP-23	7.5	8	Deep	6.8 *u*	6.8 *u*	6.8 *u*	6.8 *u*	6.8 *u*	6.8 *u*	6.8 *u*	28 *ur*	280 *ur*	6.8 *u*	6.8 *u*	6.8 *u*	6.8 *u*	6.8 *u*	**310**	6.8 *ur*	6.8 *u*	6.8 *u*	14 *u*	6.8 *u*	6.8 *u*	6.8 *u*	6.8 *u*	6.8 *u*	6.8 *u*	
VP-23	11.5	12	Deep	0.14 *u*	0.14 *u*	0.14 *u*	0.14 *u*	0.14 *u*	0.14 *u*	0.14 *u*	0.56 *ur*	5.6 *ur*	0.14 *u*	0.14 *u*	0.14 *u*	0.14 *u*	0.14 *u*	**12**	0.14 *ur*	0.14 *u*	0.14 *u*	0.28 *u*	0.14 *u*	0.14 *u*	0.14 *u*	0.14 *u*	0.14 *u*	0.14 *u*	
VP-23	15.5	16	Deep	7.4 *u*	7.4 *u*	7.4 *u*	7.4 *u*	7.4 *u*	7.4 *u*	7.4 *u*	30 *ur*	300 *ur*	7.4 *u*	7.4 *u*	7.4 *u*	7.4 *u*	7.4 *u*	**410**	7.4 *ur*	7.4 *u*	7.4 *u*	15 *u*	7.4 *u*	7.4 *u*	7.4 *u*	7.4 *u*	7.4 *u*	7.4 *u*	
VP-24	7.5	8	Deep	0.007 *uj*	0.007 *uj*	0.007 *uj*	0.007 *uj*	0.007 *uj*	0.007 *uj*	0.007 *uj*	0.028 *uj*	0.007 *uj*	0.007 *uj*	0.007 *uj*	0.007 *uj*	0.007 *uj*	0.007 *uj*	**0.17 j**	0.007 *uj*	0.007 *uj*	0.007 *uj*	0.014 *uj*	0.007 *uj*	0.007 *uj*	0.007 *uj*	0.007 *uj*	0.007 *uj*	0.007 *uj*	
VP-24	11.5	12	Deep	0.0074 *u*	0.0074 *u*	0.0074 *u*	0.0074 *u*	0.0074 *u*	0.0074 *u*	0.0074 *u*	0.03 *uj*	0.0074 *u*	0.0074 *u*	0.0074 *u*	0.0074 *u*	0.0074 *u*	0.0074 *u*	**0.31**	0.0074 *u*	0.0074 *u*	0.0074 *u*	0.015 *u*	0.0074 *u*	0.0074 *u*	0.0074 *u*	0.0074 *u*	0.0074 *u*	0.0074 *u*	
VP-24	15.5	16	Deep	0.0067 *u*	0.0067 *u*	0.0067 *u*	0.0067 *u*	0.0067 *u*	0.0067 *u*	0.0067 *u*	0.027 *uj*	0.0067 *u*	0.0067 *u*	0.0067 *u*	0.0067 *u*	0.0067 *u*	0.0067 *u*	**0.059**	0.0067 *u*	0.0067 *u*	0.0067 *u*	0.014 *u*	0.0067 *u*	0.0076 *u*	0.0067 *u*	0.0067 *u*	0.0067 *u*	0.0067 *u*	
CS-1	7.5	-	Deep	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	1 *u*	1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	**0.298**	0.1 *u*	0.1 *u*	0.1 *u*	1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	
CS-2	8	-	Deep	0.1 *u*	0.1 *u*	0.1 *u*	**0.713**	0.1 *u*	5.73 *u*	0.1 *u*	1 *u*	1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	**2110**	0.1 *u*	0.1 *u*	0.1 *u*	1 *u*	0.1 *u*	**2.53**	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	
CS-3	8	-	Deep	2 *u*	2 *u*	2 *u*	2 *u*	2 *u*	2 *u*	2 *u*	20 *u*	20 *u*	2 *u*	2 *u*	2 *u*	2 *u*	2 *u*	**41.9**	2 *u*	2 *u*	2 *u*	20 *u*	2 *u*	2 *u*	2 *u*	2 *u*	2 *u*	2 *u*	
CS-4	7	-	Deep	1 *u*	1 *u*	1 *u*	**1.4**	1 *u*	**9.75**	1 *u*	10 *u*	10 *u*	1 *u*	1 *u*	1 *u*	1 *u*	1 *u*	**7370**	1 *u*	1 *u*	1 *u*	1 *u*	1 *u*	**5.63**	1 *u*	1 *u*	1 *u*	1 *u*	
CS-5	8	-	Deep	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	1 *u*	1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	**0.27**	0.1 *u*	0.1 *u*	0.1 *u*	1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	
CS-6	8	-	Deep	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	5000 *u*	5000 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	**3220**	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	
CS-7	8	-	Deep	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	5000 *u*	5000 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	**3610**	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	
CS-8	7.5	-	Deep	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	2000 *u*	2000 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	**4280**	200 *u*	200 *u*	200 *u*	2000 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	
CS-9	8	-	Deep	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	2000 *u*	2000 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	**7310**	200 *u*	200 *u*	200 *u*	2000 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	
CS-10	8	-	Deep	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	5000 *u*	5000 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	**2310**	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	50 *u*	
CS-11	8	-	Deep	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	2000 *u*	2000 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	**26700**	200 *u*	200 *u*	200 *u*	2000 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	
CS-12	8	-	Deep	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	2000 *u*	2000 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	**12500**	200 *u*	200 *u*	200 *u*	2000 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	200 *u*	
CS-13	8.5	-	Deep	1000 *u*	1000 *u*	1000 *u*	1000 *u*	1000 *u*	1000 *u*	1000 *u*	10000 *u*	10000 *u*	1000 *u*	1000 *u*	1000 *u*	1000 *u*	1000 *u*	**66600**	1000 *u*	1000 *u*	1000 *u*	10000 *u*	1000 *u*	1000 *u*	1000 *u*	1000 *u*	1000 *u*	1000 *u*	
CS-14	11	-	Deep	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	1 *u*	1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	**11.3**	0.1 *u*	**0.171**	0.1 *u*	1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	
CS-15	7.5	-	Deep	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	1 *u*	1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	**1.21**	0.1 *u*	0.1 *u*	0.1 *u*	1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	0.1 *u*	
MWA-30	29.5	30	Deep	0.0056 *u*	0.0056 *u*	0.0056 *u*				0.0056 *u*	0.023 *u*	0.023 *u*	0.0056 *u*	0.0056 *u*	0.0056 *u*	0.0056 *u*	0.0056 *u*	**0.0056**	0.0056 *u*	**0.025**	0.0056 *u*	0.012 *u*		0.0056 *u*	**0.0063**	0.0056 *u*	0.0056 *u*	0.0056 *u*	

Notes:
mg/kg - milligrams per kilogram
u - Undetected at detection limit shown
r - Rejected
j - Estimated
d - Dilution
Concentration above applicable screening criteria
BOLD - Detected
ft = Feet

Table 4-10
Pesticides in Soil - Potential Leaching to Groundwater
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Sample Name	Start Depth (ft)	End Depth (ft)	Soil Sample Interval	alpha-BHC (mg/kg)	delta-BHC (mg/kg)	Lindane (mg/kg)	Chlordane (mg/kg)	Total DDD (mg/kg)	Total DDE (mg/kg)	Total DDT (mg/kg)	DDX (mg/kg)	Dieldrin (mg/kg)	Endosulfan I (mg/kg)	Endosulfan sulfate (mg/kg)	Endrin (mg/kg)	Endrin aldehyde (mg/kg)	Heptachlor epoxide (mg/kg)
Leaching To Groundwater				**0.00098**	**0.74**	**1.6**	**0.00162**	**0.00062**	**0.00044**	**0.00044**	**0.00044**	**0.000108**	**1.02**	**178**	**0.046**	**0.6**	**0.000078**
AP-2	0	4	Shallow	0.58 u	0.58 u	0.58 u	2.2 ut	2.6	4.2	220	227 a	0.58 u	0.58 u	0.58 u	70	0.58 u	0.58 u
AP-2	4	6	Deep	0.61 uj	0.61 uj	0.61 uj	6.1 uj	3.3 t	2.5 t	130 t	136 a	1.2 uj	0.61 uj	1.2 uj	1.2 uj	1.2 uj	0.61 uj
AP-3	8	10	Deep	71 uj	71 uj	71 uj	71 ujt	120 t	71 ut	2600 t	2720 a	71 uj	71 uj	71 uj	2000 uj	71 uj	71 uj
AP-4	0	2	Shallow	0.59 u	0.59 u	0.59 u	0.59 ut	40	15	2400	2460 a	0.59 u	0.59 u	0.59 u	0.59 u	0.59 u	0.59 u
AP-5	0	2	Shallow	0.57 u	0.57 u	0.57 u	0.57 ut	2.6	3.2	250	255.8 a	0.57 u	0.57 u	0.57 u	72	0.57 u	0.57 u
B-49	2	2.5	Shallow	2 u	2 u	2 u	4.1 ut	48	44	3600	3690 a	2 u	2 u	2 u	2 u	2 u	2 u
B-49	7	8	Deep	0.015 u	0.015 u	0.015 u	0.015 ut	0.015 u	0.015 u	0.135 t	0.135 a	0.015 u	0.015 u	0.015 u	0.015 u	0.015 u	0.015 u
B-50	0.5	1	Shallow	0.01 u	0.01 u	0.01 u	0.01 ut	0.01 u	0.01 u	0.02	0.02 a	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u
B-50	5	5.5	Deep	0.012 u	0.012 u	0.012 u	0.012 ut	0.012 u	0.018	0.012 u	0.018 a	0.012 u	0.012 u	0.012 u	0.012 u	0.012 u	0.012 u
B-51	0.5	1	Shallow	0.01 u	0.01 u	0.01 u	0.01 ut	0.01 u	0.197	1.8	2 a	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u
B-51	5	5.5	Deep	0.01 u	0.01 u	0.01 u	0.01 ut	0.075	0.423	2.4	2.9 a	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u
B-52	0.5	1	Shallow	0.01 u	0.01 u	0.01 u	0.01 ut	0.01 u	0.01 u	0.03	0.03 a	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u
B-52	5	5.5	Deep	0.01 u	0.01 u	0.01 u	0.01 ut	0.01 u	0.01 u	0.048	0.048 a	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u
B-53	4.5	6	Deep	12 u	12 u	12 u	12 ut	80	14	16000	16100 a	12 u	12 u	12 u	12 u	12 u	12 u
B-54	4	5	Deep	0.2 u	0.2 u	0.2 u	0.2 ut	0.7	1.3	21	22.6 a	0.2 u	0.2 u	0.2 u	0.2 u	0.2 u	0.2 u
B-55	6	7	Deep	1.6	1 u	1 u	1 ut	36	1 u	297	333 a	1 u	1 u	1 u	1 u	1 u	1 u
B-55	12	13	Deep	0.037	0.01 u	0.01 u	0.01 ut	0.289	0.021	2.8	3.11 a	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u
B-56	4	5	Deep	0.2 u	0.2 u	0.2 u	0.2 ut	4.9	3.2	454	462 a	0.2 u	0.2 u	0.2 u	0.2 u	0.2 u	0.2 u
B-56	19	20	Deep	0.01 u	0.01 u	0.01 u	0.01 ut	0.01 u	0.01 u	0.01 u	0.01 a	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u
B-57	0	1	Shallow	0.02 u	0.02 u	0.02 u	0.02 ut	0.32	29	23	52.3 a	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u
B-57	4	5	Deep	0.02 u	0.02 u	0.02 u	0.142 t	0.19	12	8.4	20.6 a	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u
B-58	1	2	Shallow	0.02 u	0.02 u	0.02 u	0.02 ut	0.02 u	0.047	0.355	0.402 a	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u
B-58	4	5	Deep	0.02 u	0.02 u	0.02 u	0.02 ut	0.132	0.1	2.1	2.33 a	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u
B-61	5	6	Deep	35 uj	0.19	0.55 j	0.7 t	620 t	38 t	7000 t	7660 a	5 u	0.16 u	250 u	250 u	250 u	0.05 u
B-61	6	7	Deep	2.1 uj	2.6 uj	2.6 uj	9.7 uj	60 t	8.2 t	920 t	988 a	2.3 uj	2.9 uj	2.5 uj	2.5 uj	2.8 uj	2.5 uj
B-61	7	8	Deep	0.034 uj	0.042 uj	0.042 uj	0.16 uj	1 t	0.19 t	33 t	34.2 a	0.036 uj	0.047 uj	0.04 uj	0.04 uj	0.045 uj	0.04 uj
B-61	11	12	Deep	0.65 uj	0.65 uj	0.65 uj	0.65 ujt	32 t	3 t	400 t	435 a	0.65 uj	0.65 uj	0.65 uj	0.65 uj	0.65 uj	0.65 uj
B-61	21	22	Deep	0.054 uj	0.054 uj	0.054 uj	0.054 ujt	1.2 t	0.18 t	21 t	22.4 a	0.054 uj	0.054 uj	0.054 uj	0.054 uj	0.054 uj	0.054 uj
B-62	4	5	Deep	0.05 uj	0.05 u	0.05 u	0.05 ut	0.0855 t	0.36 t	3.9 t	4.24 a	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u
B-65	0	2	Shallow	0.56 u	0.56 u	0.56 u	0.56 ut	22 t	17	1100	1140 a	0.56 u	0.56 u	0.56 u	0.56 u	0.56 u	0.56 u
B-65	12	14	Deep	0.66 u	0.66 u	0.66 u	0.66 ut	15 t	3.8	760	779 a	0.66 u	0.66 u	0.66 u	0.66 u	0.66 u	0.66 u
B-66	0	2	Shallow	0.58 u	0.58 u	0.58 u	0.58 ut	13 t	5	520	538 a	0.58 u	0.58 u	0.58 u	0.58 u	0.58 u	0.58 u
B-66	4	6	Deep	0.061 u	0.061 u	0.061 u	0.061 ut	2.1	0.86	84	87 a	0.061 u	0.061 u	0.061 u	0.061 u	0.061 u	0.061 u
B-66	12	14	Deep	0.07 u	0.07 u	0.07 u	0.07 ut	1.6 t	0.65	49	51.3 a	0.07 u	0.07 u	0.07 u	0.07 u	0.07 u	0.07 u
B-91	0	0.5	Shallow	0.056 u	0.056 u	0.056 u	0.056 ut	0.82 t	2.1	120	123 a	0.056 u	0.056 u	0.056 u	0.056 u	0.056 u	0.056 u
B-91	0.5	1.5	Shallow	0.054 u	0.054 u	0.054 u	0.054 ut	0.054 u	0.1 u	3.8 t	3.8 a	0.054 u	0.054 u	0.054 u	0.054 u	0.054 u	0.054 u
B-92	0	0.5	Shallow	0.057 u	0.057 u	0.057 u	0.057 ut	0.33 t	0.83	39	40.2 a	0.057 u	0.057 u	0.057 u	0.057 u	0.057 u	0.057 u
B-92	0.5	1.5	Shallow	0.0011 u	0.0011 u	0.0011 u	0.0011 ut	0.004 t	0.022	0.033 t	0.059 a	0.0011 u	0.0011 u	0.0011 u	0.0011 u	0.0011 u	0.0011 u
B-93	0	0.5	Shallow	0.011 u	0.011 u	0.011 u	0.011 ut	0.012 t	0.53	1 t	1.54 a	0.011 u	0.011 u	0.011 u	0.011 u	0.011 u	0.011 u
B-93	0.5	1.5	Shallow	0.0011 u	0.0011 u	0.0011 u	0.0011 ut	0.0037 t	0.0048 u	0.032	0.0357 a	0.0011 u	0.0011 u	0.0011 u	0.0011 u	0.0011 u	0.0011 u
B-94	0	0.5	Shallow	0.054 u	0.054 u	0.054 u	0.054 ut	8.8 t	4.4	1300	1310 a	0.054 u	0.054 u	0.054 u	0.054 u	0.054 u	0.054 u
B-94	0.5	1.5	Shallow	0.0054 u	0.0054 u	0.0054 u	0.0054 ut	0.0054 u	0.016 u	0.56 t	0.56 a	0.0054 u	0.0054 u	0.0054 u	0.0054 u	0.0054 u	0.0054 u
B-95	0	0.5	Shallow	0.054 u	0.054 u	0.054 u	0.054 ut	0.066 t	0.91	16	17 a	0.054 u	0.054 u	0.054 u	0.054 u	0.054 u	0.054 u
B-95	0.5	1.5	Shallow	0.012 u	0.012 u	0.012 u	0.012 ut	0.012 u	0.027 u	1.1	1.1 a	0.012 u	0.012 u	0.012 u	0.012 u	0.012 u	0.012 u
B-96	0	0.5	Shallow	0.059 u	0.059 u	0.059 u	0.059 ut	2.2 t	190	440	632 a	0.059 u	0.059 u	0.059 u	0.059 u	0.059 u	0.059 u
B-96	0.5	1.5	Shallow	0.06 u	0.06 u	0.06 u	0.06 ut	0.06 u	4.7	4.2	8.9 a	0.06 u	0.06 u	0.06 u	0.06 u	0.06 u	0.06 u
B-97	0	0.5	Shallow	0.001 u	0.001 u	0.001 u	0.001 ut	0.0026	0.044	0.096	0.143 a	0.001 u	0.001 u	0.001 u	0.001 u	0.001 u	0.001 u
B-97	0.5	1.5	Shallow	0.0021 u	0.0021 u	0.0021 u	0.0021 ut	0.0041 t	0.11	0.17	0.284 a	0.0021 u	0.0021 u	0.0021 u	0.0021 u	0.0021 u	0.0021 u
B-98	0	0.5	Shallow	0.011 u	0.011 u	0.011 u	0.011 ut	0.023 t	0.036 u	0.9	0.923 a	0.011 u	0.011 u	0.011 u	0.011 u	0.011 u	0.011 u
B-98	0.5	1.5	Shallow	0.022 u	0.022 u	0.022 u	0.022 ut	0.022 u	0.066 u	1.6	1.6 a	0.022 u	0.022 u	0.022 u	0.022 u	0.022 u	0.022 u
B-99	0	0.5	Shallow	0.001 u	0.001 u	0.001 u	0.001 ut	0.0032	0.055	0.094 t	0.152 a	0.001 u	0.001 u	0.001 u	0.001 u	0.001 u	0.001 u
B-99	0.5	1.5	Shallow	0.001 u	0.001 u	0.0061	0.001 ut	0.0032 t	0.0012 u	0.008 u	0.0032 a	0.001 u	0.001 u	0.001 u	0.001 u	0.001 u	0.001 u
B-100	0	0.5	Shallow	31 u	31 u	31 u	31 ut	32 t	31 u	3300 t	2970 a	31 u	31 u	31 u	31 u	31 u	31 u
B-100	0.5	1.5	Shallow	0.0052 u	0.0052 u	0.0052 u	0.0052 ut	0.22	0.098	20	20.3 a	0.0052 u	0.0052 u	0.0052 u	0.0052 u	0.0052 u	0.0052 u
B-100	8	10	Deep	20 u	20 u	20 u	20 ut	54 t	20 u	1500 t	1550 a	20 u	20 u	20 u	20 u	20 u	20 u
B-100	12	14	Deep	0.65 u	0.65 u	0.65 u	0.65 ut	19	0.7 u	390	409 a	0.65 u	0.65 u	0.65 u	0.65 u	0.65 u	0.65 u
B-101	0	0.5	Shallow	5.5 u	5.5 u	5.5 u	5.5 ut	5.5 u	5.5 u	230 t	230 a	5.5 u	5.5 u	5.5 u	5.5 u	5.5 u	5.5 u
B-101	0.5	1.5	Shallow	0.055 u	0.055 u	0.055 u	0.055 ut	0.063 t	0.055 u	5 t	5.06 a	0.055 u	0.055 u	0.055 u	0.055 u	0.055 u	0.055 u
B-101	12	14	Deep	0.0012 u	0.0012 u	0.0012 u	0.0012 ut	0.0012 u	0.0012 u	0.014 u	0.014 a	0.0012 u	0.0012 u	0.0012 u	0.0012 u	0.0012 u	0.0012 u
B-102	0	0.5	Shallow					5.5 u	5.5 u	62	62 a						
B-102	0.5	1.5	Shallow					0.055 u	0.13	0.41	0.54 a						
B-103	0	0.5	Shallow					0.0057 u	0.11	0.07 u	0.11 a						
B-103	0.5	1.5	Shallow					0.0055 u	0.0055 u	0.0055 u	0.0055 a						
B-104	0	0.5	Shallow					0.0055 u	0.12 u	0.032 t	0.032 a						
B-104	0.5	1.5	Shallow					0.0055 u	0.0084	0.031	0.0394 a						
B-104	12	14	Deep					0.01	0.018	0.093	0.121 a						
B-105	0	0.5	Shallow					26 u	32	240	272 a						
B-105	0.5	1.5	Shallow					0.56 u	0.9	10	10.9 a						
B-106	0	0.5	Shallow					2.6 u	4.5	81	85.5 a						
B-106	0.5	1.5	Shallow					0.55 u	0.55 u	3.3	3.3 a						
B-107	0	0.5	Shallow					13	5.7 u	98	111 a						
B-107	0.5	1.5	Shallow					0.087 t	0.058	0.77	0.915 a						
B-108	0	0.5	Shallow					560 u	560 u	2900	2900 a						
B-108	0.5	1.5	Shallow					590 u	590 u	5400	5400 a						
B-109	0	0.5	Shallow					57 u	57 u	710	710 a						
B-109	0.5	1.5	Shallow					60 u	60 u	300	300 a						
B-110	0.5	1.5	Shallow					58 u	58 u	240	240 a						
B-110	1.5	2.5	Shallow					0.7	0.65 u	15	15.7 a						
B-110	2.5	3.5	Deep					0.68 u	0.68 u	3.4	3.4 a						
B-110	3.5	4.5	Deep					0.066 u	0.066 u	0.59	0.59 a						
B-111	0	1	Shallow					56 u	56 u	390	390 a						
B-111	1	2	Shallow					62 u	62 u	1300	1300 a						
B-111	2	3	Shallow					59 u	59 u	870	870 a						
B-111	3	4	Deep					61 u	61 u	720	720 a						
B-111	7	8	Deep					0.67 u	0.67 u	7	7 a						
B-112	0	0.5	Shallow					11 t	5.5 u	96	107 a						
B-112	0.5	1.5	Shallow					5.6 u	5.6 u	23	23 a						
B-112	2	4	Shallow					0.064 u	0.064 u	0.5	0.5 a						
B-112	4	6	Deep					0.68 u	0.68 u	2.1	2.1 a						
B-112	6	8	Deep					0.077	0.0072 u	0.11 u	0.077 a						
B-113	0	0.5	Shallow					1.4 t	0.54 u	14	15.4 a						
B-113	0.5	1.5	Shallow					5.9 u	5.9 u	40	40 a						
B-113	2	4	Shallow					0.0071 u	0.0066 u	0.06 u	0.06 a						
B-113	4	6	Deep					0.66 ut	0.66 ut	2.5 t	2.5 a						
B-113	6	8	Deep					0.042 t	0.041 t	0.045 u	0.083 a						
B-114	0	0.5	Shallow					5.3 u	5.3 u	23	23 a						
B-114	0.5	1.5	Shallow					14	6 u	120	134 a						
B-114	2	4	Shallow					0.0067 ut	0.0067 u	0.056 u	0.056 a						
B-114	4	6	Deep					0.065 u	0.065 u	0.47 t	0.47 a						
B-114	6	8	Deep					0.0073 u	0.0073 u	0.0073 u	0.0073 a						
B-115	0	0.5	Shallow					0.019	0.029	0.2	0.248 a						
B-115	0.5	1.5	Shallow					56 u	56 u	510	510 a						
B-115	4	6	Deep					8.3 u	8.3 u	41	41 a						
B-115	6	8	Deep					89 u	89 u	500	500 a						
CS-1	0	1	Shallow	0.005 u	0.005 u	0.005 u	5 ut	0.005 u	0.005 u	0.005 u	0.005 a	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u
CS-2	0	1	Shallow	0.0062 u	0.0057 u	0.01	5 ut	0.005 u	0.005 u	0.005 u	0.005 a	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u
E-SETCON	0	1	Shallow	0.48	0.5 u	0.5 u	500 ut	0.5 u	15	1400	1420 a	0.5 u	0.5 u	0.5 u	0.77 u	0.5 u	0.5 u
IB-20	3	4	Deep	0.25 u	0.25 u	0.25 u	1200 ut	320	100	13000	13400 a	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u
IB-25	4	5	Deep	0.082 u	0.05 u	0.05 u	50 ut	0.05 u	0.05 u	0.87	0.87 a	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u
IB-25	8	9	Deep	0.25 u	0.25 u	0.25 u	1100 ut	160 u	86	3900	3990 a	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u
IB-27	5	6	Deep	0.25 u	0.25 u	0.25 u	790 ut	230	8.3	6300	6540 a	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u
IB-32	0	1	Shallow	0.25 u	0.25 u	0.25 u	250 ut	16	25	2700	2740 a	0.25 u	0.25 u	0.25 u	1.5	0.25 u	0.25 u
IB-36	0	1	Shallow	0.5 u	0.5 u	0.5 u	500 ut	1.9	2.3	340	344 a	0.5 u	0.5 u	0.5 u	0.5 u	0.5 u	0.5 u
IB-37	3	4	Deep	0.25 u	0.25 u	0.25 u	250 ut	16	2.3	1400	1420 a	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u
IB-39	4	5	Deep	0.25 u	0.25 u	0.25 u	250 ut	0.37 u	2.2	61	63.2 a	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u
IB-41	0	1	Shallow	0.25 u	0.25 u	0.25 u	250 ut	2.4	3.9	200	206 a	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u
IB-43	1	2	Shallow	0.25 u	0.25 u	0.25 u	3200 ut	96	70	5100	5270 a	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u
IB-44	4	5	Deep	0.25 u	0.25 u	0.25 u	250 ut	19	1.3	55	75.3 a	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u	0.25 u

Table 4-10
Pesticides in Soil - Potential Leaching to Groundwater
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Sample Name	Start Depth (ft)	End Depth (ft)	Soil Sample Interval	alpha-BHC mg/kg	delta-BHC (mg/kg)	Lindane (mg/kg)	Chlordane (mg/kg)	Total DDD (mg/kg)	Total DDE (mg/kg)	Total DDT (mg/kg)	DDX (mg/kg)	Dieldrin (mg/kg)	Endosulfan I (mg/kg)	Endosulfan sulfate (mg/kg)	Endrin (mg/kg)	Endrin aldehyde (mg/kg)	Heptachlor epoxide (mg/kg)
IB-46	6	7	Deep	0.25 u	0.52 u	0.25 u	1700 ut	**68**	**29**	**6500**	**6600 a**	0.25 u	0.25 u	0.25 u	0.25 u	0.4 u	0.3 u
IB-47	0	1	Shallow	0.25 u	0.25 u	0.25 u	250 ut	**1.7**	**6.9**	**330**	**339 a**	0.25 u	0.25 u	0.25 u	0.44 u	0.25 u	0.25 u
IB-6	1	2	Shallow	0.25 u	0.25 u	0.25 u	250 ut	**12**	**7.7**	**960**	**980 a**	0.25 u	0.25 u	0.25 u	0.48 u	0.25 u	0.25 u
IB-6	3	4	Deep	0.05 u	0.05 u	0.05 u	50 ut	0.05 u	0.05 u	**1.1**	**1.1 a**	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u
IB-73	0.5	1	Shallow	0.11 u	0.11 u	0.11 u	110 ut	0.11 u	0.11 u	**1.4**	**1.4 a**	0.11 u	0.11 u	0.11 u	0.29 u	0.11 u	0.11 u
IB-74	0.5	1	Shallow	0.12 u	0.12 u	0.12 u	120 ut	0.12 u	0.12 u	**1.7**	**1.7 a**	0.12 u	0.12 u	0.12 u	0.39 u	0.12 u	0.12 u
IB-79	0.5	1	Shallow	5.8 u	5.8 u	5.8 u	5800 ut	**72 t**	**19**	**4100**	**4190 a**	5.8 u	5.8 u	5.8 u	5.8 u	5.8 u	5.8 u
IB-79	1	1.5	Shallow	0.6 uj	0.6 uj	0.6 uj	6000 uj	**4.5 t**	**2.3 t**	**160 t**	**167 a**	1.2 uj	0.6 uj	1.2 uj	1.2 uj	1.2 uj	0.6 uj
IB-80	0.5	1	Shallow	5.4 u	5.4 u	5.4 u	5400 ut	5.4 u	5.4 u	**100**	**100 a**	5.4 u	5.4 u	5.4 u	13 u	5.4 u	5.4 u
IB-81	0.5	1	Shallow	0.11 u	0.11 u	0.11 u	110 ut	0.11 u	**0.13**	**1**	**1.13 a**	0.11 u	0.11 u	0.11 u	0.32 u	0.11 u	0.11 u
IB-86	8	10	Deep	0.053 u	0.016 u	0.045 u	64 ut	**2.4**	**0.5**	**16**	**18.9 a**	0.025 u	0.015 u	0.048 u	0.021 u	0.034 u	0.053 u
IB-87	2	4	Shallow	0.45 u	0.14 u	0.39 u	550 ut	**10 t**	**0.75 t**	**280 t**	**291 a**	0.21 u	0.13 u	0.41 u	0.18 u	0.3 u	0.45 u
IB-88	6	8	Deep	0.43 u	0.13 u	0.37 u	510 ut	**14 t**	**1.2 t**	**460**	**475 a**	0.2 u	0.12 u	0.39 u	0.17 u	0.28 u	0.43 u
IB-88	8	10	Deep	0.0043 u	0.0013 u	0.0037 u	5.2 ut	**0.028**	**0.0071 t**	**2.1**	**2.14 a**	0.002 u	0.0012 u	0.0039 u	0.0017 u	0.0028 u	0.0043 u
IB-89	6	8	Deep	4.8 u	1.5 u	4.1 u	5800 ut	**240 t**	**63**	**9000**	**9300 a**	2.3 u	1.4 u	4.4 u	1.9 u	3.1 u	4.8 u
IB-89	8	10	Deep	0.44 u	0.13 u	0.38 u	530 ut	**48 t**	**2.5**	**700**	**751 a**	0.21 u	0.13 u	0.4 u	0.18 u	0.29 u	0.44 u
IB-90	2	4	Shallow	0.35 u	0.11 u	0.29 u	410 ut	**13 t**	**7.4**	**340**	**360 a**	0.16 u	0.095 u	0.31 u	0.14 u	0.23 u	0.35 u
IB-91	0	2	Shallow	3.5 u	1.1 u	3 u	4200 ut	**91 t**	**51 t**	**4200 t**	**4340 a**	1.7 u	0.97 u	3.2 u	1.4 u	2.3 u	3.5 u
IB-91	2	4	Shallow	0.44 u	0.13 u	0.37 u	520 ut	**7.3 t**	**3.3**	**980**	**991 a**	0.2 u	0.12 u	0.4 u	0.17 u	0.28 u	0.44 u
IB-93	8	10	Deep	0.4 u	0.12 u	0.34 u	480 ut	**200 t**	**16**	**6900**	**7120 a**	0.19 u	0.11 u	0.36 u	0.16 u	0.26 u	0.4 u
IB-94	0	2	Shallow	0.43 u	0.13 u	0.37 u	520 ut	**4.5 t**	**4.2**	**850**	**859 a**	0.2 u	0.12 u	0.39 u	0.17 u	0.28 u	0.43 u
IB-95	0	2	Shallow	0.38 u	0.12 u	0.32 u	460 ut	**13 t**	**28 t**	**390**	**431 a**	0.18 u	0.11 u	0.35 u	0.15 u	0.25 u	0.38 u
IB-95	4	6	Deep	0.45 u	0.14 u	0.38 u	540 ut	**5.6 t**	**1.2 t**	**270**	**277 a**	0.21 u	0.13 u	0.41 u	0.18 u	0.29 u	0.45 u
IB-96	8	10	Deep	0.0048 u	0.0014 u	0.0041 u	5.7 ut	**0.0096 t**	**0.0049 t**	**0.18**	**0.195 a**	0.0022 u	0.0014 u	0.0043 u	0.0019 u	0.0031 u	0.0048 u
MWA-20	5	6.5	Deep	0.005 u	0.005 u	0.005 u	5 ut	0.005 u	0.005 u	**0.028**	**0.028 a**	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u
MWA-20	10	11.5	Deep	0.005 u	0.0057 u	0.0053 u	5 ut	**0.072 t**	**0.041 t**	**0.3 t**	**0.413 a**	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u
MWA-20	15	16.5	Deep	0.005 u	0.005 u	0.005 u	5 ut	0.005 u	0.005 u	**0.014**	**0.014 a**	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u
PS-1	0	0.5	Shallow	0.05 u	0.05 u	0.05 u	50 ut	**1.1**	**1.6**	**40**	**42.7 a**	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u	0.05 u
PS-1		1	Shallow	0.057 u	0.05 u	0.05 u	50 ut	**3**	**5.4**	**250**	**258 a**	0.05 u	0.05 u	0.05 u	0.12 u	0.05 u	0.05 u
PS-2	0	0.5	Shallow	0.11 u	0.05 u	0.05 u	150 ut	**45**	**24**	**2000**	**2070 a**	0.05 u	0.05 u	0.05 u	0.53 u	0.2 u	0.05 u
PS-2		1	Shallow	0.065 u	0.05 u	0.05 u	100 ut	**9.9**	**19**	**380**	**409 a**	0.05 u	0.05 u	0.05 u	0.7 u	0.05 u	0.09 u
S-1	0.4166667	0.6666667	Shallow	0.005 u	0.005 u	0.005 u	150 ut	**0.013**	**5.2**	**0.89**	**6.1 a**	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u
S-1	1.166667	1.416667	Shallow	0.005 u	0.005 u	0.005 u	63 ut	**0.014**	**2.7**	**1.3**	**4.01 a**	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u	0.005 u
S-2	0	0.3333333	Shallow	0.0059 u	0.0059 u	0.0059 u	5.9 ut	**0.013 t**	**0.086**	**0.33**	**0.429 a**	0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u	0.0059 u
S-3	0	0.3333333	Shallow	0.0053 u	0.0053 u	0.0053 u	5.3 ut	**0.054 t**	**0.15 t**	**1.8**	**2 a**	0.0053 u	0.0053 u	0.0053 u	0.0053 u	0.0053 u	0.0053 u
S-4	0	0.3333333	Shallow	0.0058 u	0.0058 u	0.0058 u	5.8 ut	**0.049 t**	**0.12**	**1.3**	**1.47 a**	0.0058 u	0.0058 u	0.0058 u	0.0058 u	0.0058 u	0.0058 u
S-5	0	0.3333333	Shallow	0.0065 u	0.0065 u	0.0065 u	6.5 ut	**0.16**	**0.39**	**2**	**2.55 a**	0.0065 u	0.0065 u	0.0065 u	0.0065 u	0.0065 u	0.0065 u
S-6	0	0.3333333	Shallow	0.57 u	0.57 u	0.57 u	570 ut	**5.8 t**	**4.1**	**260**	**270 a**	0.57 u	0.57 u	0.57 u	0.57 u	0.57 u	0.57 u
S-7	0	0.3333333	Shallow	5.9 u	5.9 u	5.9 u	5900 ut	**25 t**	**40**	**1600**	**1670 a**	5.9 u	5.9 u	5.9 u	5.9 u	5.9 u	5.9 u
S-8	0	0.3333333	Shallow	1.2 u	1.2 u	1.2 u	1200 ut	**21 t**	**12**	**1600**	**1630 a**	1.2 u	1.2 u	1.2 u	1.2 u	1.2 u	1.2 u
US-01	0	0.5	Shallow	0.1 u	0.1 u	0.1 u	100 ut	**0.42**	**0.89**	**6.6**	**7.91 a**	0.1 u	0.1 u	0.1 u	0.1 u	0.1 u	0.1 u
US-01	2	2.5	Shallow	12 u	12 u	12 u	12000 ut	**38**	**53**	**690**	**781 a**	12 u	12 u	12 u	12 u	12 u	12 u
US-01	2.5	4	Deep					**16 t**	**8.5 t**	**1100 t**	**1120 a**						
US-02	0	0.5	Shallow	0.01 u	0.01 u	0.01 u	10 ut	**0.113**	**0.151**	**1.9**	**2.16 a**	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u
US-02	2	2.5	Shallow	0.01 u	0.01 u	0.01 u	10 ut	0.01 u	**0.012**	**0.239**	**0.251 a**	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u	0.01 u
US-03	0	0.5	Shallow	1.1 u	1.1 u	1.1 u	1100 ut	**9**	**6.6**	**140**	**156 a**	1.1 u	1.1 u	1.1 u	1.1 u	1.1 u	1.1 u
US-03	2	2.5	Shallow	1 u	1 u	1 u	1000 ut	**1.1**	**3.2**	**25**	**29.3 a**	1 u	1 u	1 u	1 u	1 u	1 u
VP-21	6	8	Deep					**200**	83 u	**2000**	**2200 a**						
VP-21	14	16	Deep					**0.21 t**	0.067 u	**2**	**2.21 a**						
VP-22	8	10	Deep					**140**	74 u	**1200**	**1340 a**						
VP-22	14	16	Deep					**0.018**	0.0067 u	**0.15**	**0.168 a**						
VP-23	8	10	Deep					670 u	670 u	**1700**	**1700 a**						
VP-23	14	16	Deep					**9.2**	7.1 u	**55**	**64.2 a**						
VP-24	6	8	Deep					**42 t**	**13**	**100**	**155 a**						
VP-24	14	16	Deep					**1.1**	0.7 u	**9.2**	**10.3 a**						
OCTF-1	0.5	0.5	Shallow					**0.0495**	**0.0564**	**0.291**	**0.397 a**						
OCTF-1	1	1	Shallow					**0.0275**	**0.0235**	**0.0815**	**0.133 a**						
OCTF-10	0.5	0.5	Shallow					**0.0176**	**0.167**	**0.715**	**0.9 a**						
OCTF-10	1	1	Shallow					**0.0184**	**0.0956**	**1.34**	**1.45 a**						
OCTF-11	0.5	0.5	Shallow					**360**	**18200**	**13300**	**31900 a**						
OCTF-11	1	1	Shallow					3350 u	**12300**	**3290**	**15600 a**						
OCTF-12	0.5	0.5	Shallow					**0.208**	**5.28**	**5.71**	**11.2 a**						
OCTF-12	1	1	Shallow					**0.0215**	**0.664**	**0.164**	**0.85 a**						
OCTF-13	0.5	0.5	Shallow					**0.144**	**7.87**	**0.672**	**8.69 a**						
OCTF-13	1	1	Shallow					**0.248**	**14.6**	**6.74**	**21.6 a**						
OCTF-2	0.5	0.5	Shallow					**39.6**	**5.95**	**17.7**	**63.3 a**						
OCTF-2	1	1	Shallow					**4.59**	**0.48**	**1.81**	**6.88 a**						
OCTF-3	0.5	0.5	Shallow					**0.0999**	0.067 u	**0.0109**	**0.111 a**						
OCTF-3	1	1	Shallow					**0.362**	**0.132**	**0.187**	**0.681 a**						
OCTF-4	0.5	0.5	Shallow					**0.0167**	**0.0189**	**0.0575**	**0.0931 a**						
OCTF-4	1	1	Shallow					**7.91**	**1.16**	**1.1**	**10.2 a**						
OCTF-5	0.5	0.5	Shallow					**0.01**	**0.0158**	0.0067 u	**0.0258 a**						
OCTF-5	1	1	Shallow					0.0067 u	**0.0118**	0.0067 u	**0.0118 a**						
OCTF-6	0.5	0.5	Shallow					**0.0499**	**0.0429**	**0.0932**	**0.186 a**						
OCTF-6	1	1	Shallow					**0.0267**	**0.0686**	**0.0215**	**0.117 a**						
OCTF-7	0.5	0.5	Shallow					0.0067 u	**0.226**	**0.0238**	**0.25 a**						
OCTF-7	1	1	Shallow					**0.131**	**2.99**	0.67 u	**3.12 a**						
OCTF-8	0.5	0.5	Shallow					**0.0283**	**0.0454**	**0.0941**	**0.168 a**						
OCTF-8	1	1	Shallow					0.0067 u	**0.0163**	**0.0371**	**0.0534 a**						
OCTF-9	0.5	0.5	Shallow					**0.0474**	**0.0213**	**0.0367**	**0.105 a**						
OCTF-9	1	1	Shallow					**0.0774**	**0.0354**	**0.0482**	**0.161 a**						
B-125	3	5	Deep	0.00808 u	0.00808 u	0.00808 u		**0.219 a**	**0.0928 a**	**0.19 a**	**0.502 a**	0.00808 u	0.00808 u	0.00808 u	0.00808 u	0.00808 u	0.00808 u
B-125	8	10	Deep	0.00829 u	0.00829 u	0.00829 u		**0.537 a**	**0.232 a**	**0.349 a**	**1.12 a**	0.00829 u	0.00829 u	0.00829 u	0.00829 u	0.00829 u	0.00829 u
B-126	3	5	Deep	0.0195 u	0.0195 u	0.0195 u		**0.358 a**	**1.1 a**	**4 a**	**5.46 a**	0.0195 u	0.0195 u	0.0195 u	0.0195 u	0.0195 u	0.0195 u
B-126	8	10	Deep	0.000837 uj	0.000837 uj	0.000837 uj		**0.000577 ja**	**0.00505 ja**	**0.0215 ja**	**0.0271 ja**	0.000837 uj	**0.00172 j**	0.000837 uj	0.000837 uj	0.000837 uj	0.000837 uj
SS1-2	0	1	Shallow	0.0165 u	0.0165 u	0.0165 u	0.0165 ut	**0.065**	**0.11**	**1.98 j**	**2.16 ja**	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u
SS1-3	0	1	Shallow	0.066 u	0.066 u	0.066 u	0.066 ut	**6.21**	**2.7**	**138**	**147 a**	0.066 u	0.066 u	0.33 u	0.134 u	0.33 u	0.066 u
SS1-4	0	1	Shallow	0.0165 u	0.0165 u	0.0165 u	0.0165 ut	**0.925 j**	**1.24**	**11.4**	**13.5 ja**	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u
SS1-5	0	1	Shallow	0.0165 u	0.0165 u	0.0165 u	0.0165 ut	**0.113**	**0.329**	**2.79**	**3.23 a**	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u
SS2-2	0	1	Shallow	0.0165 u	0.0165 u	0.0165 u	0.0165 ut	**0.168**	**0.325**	**5.84**	**6.33 a**	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u
SS2-3	0	1	Shallow	0.0165 u	0.0165 u	0.0165 u	0.0165 ut	**0.461**	**0.667**	**11**	**12.1 a**	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u
SS2-4	0	1	Shallow	0.0165 u	0.0165 u	0.0165 u	0.0165 ut	**0.0716**	**0.161**	**1.33**	**1.56 a**	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u
SS2-5	0	1	Shallow	0.0165 u	0.0165 u	0.0165 u	0.0165 ut	**0.0497**	**0.0858**	**0.516**	**0.652 a**	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u
SS2-6	0	1	Shallow	0.0165 u	0.0165 u	0.0165 u	0.0165 ut	0.0165 u	**0.0561**	**0.396**	**0.452 a**	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u
SS2-7	0	1	Shallow	0.0165 u	0.0165 u	0.0165 u	0.0165 ut	0.0165 u	**0.0258**	**0.178**	**0.204 a**	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u	0.0165 u

Notes:
mg/kg - milligrams per kilogram
u - Undetected at detection limit shown
r - Rejected
j - Estimated
d - Dilution
Concentration above applicable screening criteria
BOLD - Detected
ft = Feet
DDT = Dichloro-diphenyl-trichloroethane
DDD = Dichloro-diphenyl-dichloroethane
DDE = Dichloro-diphenyl-chloroethane
DDX = Total of DDD, DDE, and DDT isomers

Table 4-11

Furans in Soil - Potential Leaching to Groundwater
Hot Spot Evaluation Update
Arkema, Inc. Facility
Portland, Oregon

Boring	Start Depth (ft)	End Depth (ft)	Soil Sample Interval	TEQ (pg/g)
Leaching To Groundwater				**0.012**
B-122	0	2	Shallow	**224.9 jt**
B-122	4	6	Deep	**11.5 jt**
B-122	8	10	Deep	**0.5 jt**
B-123	0	2	Shallow	**725.8 jt**
B-123	4	6	Deep	**92.5 jt**
B-123	8	10	Deep	**0.5 jt**
B-124	0	2	Shallow	**1863.9 jt**
B-124	4	6	Deep	**11.6 jt**
B-124	8	10	Deep	**1.7 jt**
B-125	3	5	Deep	**27.5 jt**
B-125	8	10	Deep	**61.4 jt**
B-126	3	5	Deep	**105.6 jt**
B-126	8	10	Deep	**3.5 jt**
B-127	10	12	Deep	**62.1 jt**
B-127	15	17	Deep	**1.7 jt**
B-128	10	12	Deep	**1.3 jt**
B-128	15	17	Deep	**0.3 jt**
B-129	0	2	Shallow	**13.2 jt**

Notes:
pg/g - picograms per kilogram
u - Undetected at detection limit shown
r - Rejected
j - Estimated
d - Dilution
Concentration above applicable screening criteria
BOLD - Detected
ft = Feet
TEQ = 2,3,7,8-Tetrachlorodibenzodioxin Toxicity Equivalent Quotient