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February 24, 2010

VIA E-MAIL and U.S. MAIL

David South
Washington State Department of Ecology
Northwest Regional Office
3190 - 160th Avenue SE
Bellevue, WA 98008-5452
Email: dsou461@ecy.wa.gov

RE: Petition to Remove Union Station Site in Seattle, Washington from the Washington Hazardous Sites List
Washington Department of Ecology ("Ecology") Site FS ID 2060

Dear Mr. South:

Pursuant to Washington Administrative Code ("WAC") 173-340-330(7) and Part XXV of the Consent Decree governing the above-captioned Union Station Site (the "Site"),[1] we submit this petition on behalf of Union Station Associates for removal of the Site from Ecology's Hazardous Sites List.[2] The Site has been listed for nearly 20 years, and is

[1] *Washington Dep't of Ecology v. Union Station Assocs.*, Case No. 97-2-18936-5SEA, Prospective Purchaser Consent Decree Re: Union Station, (King County Superior Court, entered July 29, 1997) (the "Consent Decree"). A copy of the Consent Decree, without attachments, is enclosed as Exhibit A. Attachments are available upon request.

[2] According to Ecology's most recent version of the State's Hazardous Waste Site list, Ecology assigned the Site FS ID 2060 and ranked it a "3" under the Washington Ranking Method. Ecology, Hazardous Sites List (August 20, 2009). Construction has been completed and operation and maintenance activities are underway. *Id.*

eligible for removal from the list according to the governing Consent Decree and regulations. The basis for this request is set forth below.

I. Site History

A. Location and Historical Uses

The Site consists of three parcels, spanning six city blocks and including portions of the grade level beneath elevated viaduct portions of South Jackson Street, South Airport Way, and 4th Avenue S. Figure 1-1 of Landau Associates' November 5, 2009 report entitled "Groundwater Monitoring, Union Station, Seattle, Washington" (the "November 2009 Groundwater Monitoring Report") provides a vicinity map; Figure 1-2 shows the Site.[3]

The property was originally part of the South Seattle industrial neighborhood. In 1874, the Seattle Gaslight Company constructed a coal gasification plant at the property on pilings over the mudflats of Duwamish Bay. The area surrounding the pile-supported facility was filled prior to about 1912. Around the turn of the century, Vulcan Iron Works manufactured iron, brass, and steel on the southern portion of the property. In 1911, the Union Station passenger railroad station was constructed at the property. Union Station served passengers until 1971, when Union Pacific discontinued passenger operations at the property. From 1971 until the purchase of the property by Union Station Associates in 1997, the property was essentially dormant. The southernmost terminus of the downtown Seattle transit project bus tunnel was completed at the property along 5th Avenue S. in 1990.

B. Remediation and Sampling

In 1991, the property was placed on the Washington Hazardous Sites List. Subsequently, a remedial investigation/feasibility study (RI/FS; Landau Associates and Hart Crowser 1996) was conducted.

The RI included review of the property's industrial history to confirm that the investigation included the areas likely to have contamination, evaluation of existing soil and groundwater sampling information, and analysis of new soil and groundwater samples. The RI compared chemical testing results for soil and groundwater to screening levels and identified constituents of concern that required additional evaluation. The RI identified carcinogenic polycyclic aromatic hydrocarbons ("cPAHs") from the coal gasification process, and metals from the coal gasification process and from the foundry within fill soil that was placed on the former tideflat surface during operation of the historic industries. Concentrations of cPAHs and some metals in some soil samples

[3] On November 5, 2009, Kristy Hendrickson of Landau provided you with a copy of the November 2009 Groundwater Monitoring Report. A copy is also enclosed here for ease of reference as Exhibit B.

exceeded cleanup levels. Groundwater analytical results from tests during the RI and from supplemental monitoring performed after the RI and before the Consent Decree showed that groundwater screening levels for cPAHs, petroleum hydrocarbons, benzene, and arsenic were exceeded in samples from some wells at the property. Arsenic was found in an upgradient well at concentrations exceeding those found in property wells. There were also strong indications that a source or sources of petroleum hydrocarbons existed upgradient of the property. No pesticides, polychlorinated biphenyls ("PCBs"), herbicides, or evidence of dense non-aqueous phase liquids ("DNAPL") were detected.

The RI findings were used to develop alternatives to remediate the property. The evaluations of these alternatives were included in the FS. The FS defined cleanup standards, developed and evaluated four cleanup action alternatives, and identified a preferred cleanup action alternative that would adequately protect human health and the environment. Soil cleanup levels were conservatively based on residential use conditions, although the property was zoned International District Mixed and planned property use was commercial with limited potential for direct contact. The point of compliance for soil is throughout the property. Groundwater cleanup levels were based on protection of marine surface water. The point of compliance for groundwater is the property boundary and extends from the uppermost level of the saturated zone vertically to the lowest depth that could potentially be affected by the property. The cleanup action selected by Ecology included paving, construction soil excavation, groundwater monitoring, contingent groundwater remediation, and institutional controls.

In 1997, Ecology and Union Station Associates entered into the Consent Decree. Since then, Union Station Associates has implemented the selected remedial action for the property. Paving and construction soil excavation were completed as part of property redevelopment. A restrictive covenant implementing the required institutional controls was recorded on the property deed. Groundwater monitoring began in October 1997 and is described in the November 2009 Groundwater Monitoring Report and previous groundwater monitoring reports in your possession (Landau Associates 2000, 2002, 2003a,b, and 2004).

Construction at the Site is complete. A parking garage was completed on the south parcel in 1999. Construction at the main parcel, including renovation of the Union Station building and construction of a parking garage and four new buildings, was completed in 2001. A new building at the north parcel was completed in 2002. *See* November 2009 Groundwater Monitoring Report, Part 1.0.

Based on the results of sampling events in June 2002, 2003, and 2004, Ecology approved the reduction of groundwater monitoring frequency to every five years, and issued a Certificate of Completion for the Site in 2005.[4] However, Ecology did not remove the

[4] *See* your letter to K. Hendrickson, Landau, Re: Union Station Purchaser Consent Decree No. 97-2-18936-5SEA – Certificate of Completion, January 20, 2005) (enclosed as Exhibit C).

Site from the Hazardous Sites list due to the presence of petroleum hydrocarbons in groundwater at the Site and upgradient of the Site.

In June 2009, Landau discovered that the City of Seattle Department of Transportation had paved over well B-4, which was located within the 5th Avenue right-of-way. Landau therefore installed a replacement upgradient well, B-4R, approximately 20 feet east of well B-4, in the sidewalk on the east side of 5th Avenue South. *See* November 2009 Groundwater Monitoring Report at 2-1.

After the 2009 sampling event at the Site, Landau reached the following conclusions relevant to this petition:

1. Historical and current analytical results for the Site indicate upgradient sources of gasoline-range and diesel-range petroleum hydrocarbons and related constituents that have migrated in groundwater onto the property. As a result of the City's paving over well B-4, Landau replaced that well with well B-4R and determined that the groundwater elevation in the replacement well was higher than the elevations measured at the property wells. This indicates that groundwater flow in the vicinity of the Site is to the west, and that low groundwater elevations measured at well B-4 in March 2001, after the Nisqually earthquake, were likely a result of physical changes to the well or subsurface.

2. The only exceedances of Cleanup Action Plan ("CAP") levels in 2009 were for acenapthene (in two wells); benzene (two wells); arsenic (six wells); benzo(a)anthracene (one well); and chrysene (one well). These constituents are present in at least one background well, indicating that they have migrated onto the Site from offsite. As described in the November 2009 Groundwater Monitoring Report, background-based screening levels were calculated for petroleum hydrocarbons, benzene, acenapthene, and cPAHs using data from well B-4/B-4R and for arsenic using data from B-6R. Only the UCL for benzene in MW-105 exceeds the background-based screening level, and there are no exceedances of screening levels for diesel-range or gasoline-range petroleum hydrocarbons in any property well.

3. The results set forth in the immediately preceding paragraph are consistent with the results of previous statistical evaluations. Results for groundwater samples at B-4 and B-4R have consistently demonstrated that petroleum-related constituents were migrating from off-property onto the property. Regardless, because the exceedances do not represent contamination originating on the Site, they should not be used to trigger groundwater treatment or an increase in the frequency of groundwater monitoring.

November 2009 Groundwater Monitoring Report at 6-1 to 6-2.

II. The Site is Eligible for Removal from the List Under the Terms of the Consent Decree

Section XXV, paragraph 91 of the Consent Decree addresses delisting of the Site from the Hazardous Sites List. It provides:

> Upon completion of all remedial actions specific in the Cleanup Action Plan, exception confirmational monitoring, Ecology shall issue a Certificate of Completion. . . . Unless Ecology becomes aware of circumstances at the Facility that present a previously unknown threat to human health or the environment, Ecology shall within thirty (30) days of issuance of the Certificate of Completion propose to remove the Facility form the Hazard Ranking List, pursuant to WAC 173-340-330(4).

Ecology issued a Certificate of Completion for the Site on January 20, 2005. Unless Ecology became aware of circumstances at the Site that presented a "previously unknown threat to human health or the environment," then, under the terms of the Consent Decree, by February 20, 2005, Ecology was to propose to remove the Site from the Hazard Ranking List. To our knowledge, no circumstances at the Site constituting a "previously unknown threat to human health or the environment" have arisen since the date of the Consent Decree. But on January 20, 2005, you sent Ms. Hendrickson a letter (Exhibit C) in which you explained that Ecology would not delist the Site because Ecology considered "the origin of [Total Petroleum Hydrocarbons] to be unclear [as of January 20, 2005]."

The results of sampling over the five years that have passed since your January 20, 2005 letter, along with results that pre-date that letter, confirm that the exceedances of CAP levels and the only exceedance of a background-based screening level in 2009 are due to migration from an offsite source. Further, no exceedances were detected in 2009 of screening levels for diesel-range or gasoline-range petroleum hydrocarbons in any property well.

Finally, the replacement of well B-4 by well B-4R should resolve the concern set forth in your January 20, 2005 letter, that B-4 might not be an upgradient well. Landau's testing establishes that well B-4R is upgradient; thus, concentrations measured in well B-4 accurately represent background levels.

Accordingly, under the terms of the Consent Decree, Ecology should propose to remove the Site from the Hazardous Sites List.

III. The Site is Eligible for Removal From the List Under Applicable Regulations

The Site is a "containment" site within the meaning of WAC 173-340-200 and WAC 173-340-330(7)(a)(iii). Accordingly, Ecology may now remove the Site from the list, because all of the following conditions have been met:

> 1) All construction and operation of remedial actions have been adequately completed and:
>
> 2) Only passive maintenance activities such as monitoring, inspections and periodic repairs remain; ...
>
> 3) Sufficient confirmational monitoring has been done to demonstrate that the remedy has effectively contained the hazardous substances of concern at the site;
>
> 4) All required performance monitoring has been completed;
>
> 5). . . required institutional controls are in place and have been demonstrated to be effective in protecting public health and the environment from exposure to hazardous substances and protecting the integrity of the cleanup action;
>
> 6) Written documentation is present in the department files that describes what hazardous substances have been left on site, where they are located, and the long term monitoring and maintenance obligations at the site;
>
> 7) . . . financial assurances are in place; and
>
> 8) . . . it has been demonstrated the site meets ground water cleanup levels at the designated point of compliance.

WAC 173-340-330(7).

From 1997 to date, Landau and Union Station Associates have submitted to Ecology thorough documentation of all investigations performed, all cleanup actions taken, and adequate compliance monitoring at the Site.[5] These documents demonstrate that the Site satisfies all of the foregoing conditions for removal from the Hazardous Sites List under WAC 173-340-330(7).

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[5] Additional copies of any of the Site documentation will be provided upon Ecology's request.

IV. Conclusion and Request

As set forth above, the Site is eligible for removal from the Hazardous Sites List according to the governing Consent Decree and regulations. Since Union Station Associates purchased the Site approximately 13 years ago, it has complied with the terms of the Consent Decree, remediated the Site, and demonstrated compliance with governing regulations. Accordingly, Union Station Associates requests that Ecology remove the Site from the Hazardous Sites List.

Please direct any questions regarding this petition to me. Thank you.

Sincerely,

Jessica K. Ferrell

Enclosure

cc: Kristy Hendrickson, Landau Associates Inc.
Kevin Daniels, Nitze-Stagen Co.
Brad Marten, Marten Law

Exhibit A

KING COUNTY SUPERIOR COURT

IN AND FOR THE STATE OF WASHINGTON

STATE OF WASHINGTON DEPARTMENT OF ECOLOGY Plaintiff, vs. UNION STATION ASSOCIATES, a limited liability corporation, et. al. Defendants.	No. 97-2-18936-5SEA **PROSPECTIVE PURCHASER CONSENT DECREE** **RE: UNION STATION**

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INTRODUCTION

This prospective purchaser consent decree ("Decree") is made and entered into by and between the Washington State Department of Ecology ("Ecology") and Union Station Associates, L.L.C. ("Union Station Associates") and certain of its Associated Entities. Additional Associated Entities and Qualified Successors in Interest and Assigns may become parties to this Decree as provided herein, in Sections X and XI.

1. WHEREAS, the purpose of this Decree is to 1) resolve the potential liability of Defendants for the contamination identified in Attachment G associated with the Facility, including the contamination associated with the "Property" described in Section III and Attachment A herein, as well as any such contamination from the Property that has migrated from the Property and has thereafter been deposited, stored, disposed of, or placed, or otherwise come to be located within the Facility; 2) to promote the public interest by expediting cleanup activities at the Facility; and 3) to facilitate the reuse of a currently vacant parcel of land.

2. WHEREAS, the Property currently is owned by Union Pacific Railroad Company ("Union Pacific").

3. WHEREAS, the Facility is listed on the Washington Hazardous Sites List with a site hazard ranking of 3.

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4. WHEREAS, Union Station Associates has entered into an Option Agreement with Union Pacific to purchase the Property, which totals 7.5 acres.

5. WHEREAS, final entry of this Consent Decree is a condition of the Option Agreement necessary in order for the purchase to close.

6. WHEREAS, Defendants propose to develop in phases, a mixed commercial and retail development on the Property.

7. WHEREAS, in the absence of this Decree, at the time it acquires the Property, Union Station Associates would incur potential liability at the Facility to the State of Washington and/or third parties under the Model Toxics Control Act ("MTCA"), Chapter 70.105D, RCW as an owner/operator due to releases or threatened releases of Hazardous Substances, Pollutants or Contaminants at the Facility.

8. WHEREAS, in the absence of this Decree, at the time Union Station Associates acquires the Property, certain of its members, managers, directors and officers who have the actual or potential ability to control the decisions of Union Station Associates (hereinafter referred to as "Associated Entities") could otherwise incur potential liability at the Facility to the State of Washington and/or third parties based on statutory language under MTCA and case law interpreting owner/operator liability under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA") to extend to persons

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with the actual or potential ability to control the decisions of Union Station Associates.

9. WHEREAS, the Parties agree that by including Associated Entities of Union Station Associates in the protections of this Decree, the Parties intend to resolve the potential liability that could result from their actual or potential ability to control the decisions of Union Station Associates.

10. WHEREAS, Ecology does not intend to provide a defense to Defendants to any liability for releases or threatened releases of Hazardous Substances, Pollutants or Contaminants caused or contributed to by Defendants.

11. WHEREAS, this Decree promotes the public interest by facilitating use of the Property for an important public purpose.

12. WHEREAS, Defendants have offered to further certain Ecology goals as provided in this Decree, in exchange for a covenant not to sue and protection from contribution for contamination at the Facility.

13. WHEREAS, Defendants have certified that their plans for the Property are not likely to aggravate or contribute to contamination at the Facility, interfere with remedial actions that may be needed at the Facility, or increase human health risks to persons at or in the vicinity of the Facility.

14. WHEREAS, this Decree will provide a substantial public benefit by promoting reuse of a currently vacant parcel of land, providing substantial economic, community, and transportation

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benefits to the area and yielding substantial resources for environmental remediation.

15. WHEREAS, Defendants' development of the Property is designed to lead to more expeditious and effective remediation of Hazardous Substances released at the Facility and to promote protection of public health and the environment.

16. WHEREAS, the Court is fully advised of the reasons for entry of this Decree, and good cause having been shown:

IT IS HEREBY ORDERED, ADJUDGED AND DECREED AS FOLLOWS:

I. AUTHORITY, JURISDICTION AND VENUE

17. This Court has authority to resolve the liability of the parties to this Decree.

18. This Court has jurisdiction over the subject matter and over the parties pursuant to the MTCA. Venue is proper in King County pursuant to RCW 70.105D.050(5)(b).

19. Authority for entry of this Decree is conferred by RCW 70.105D.040(4) and 70.105D.040(5), which authorize the Washington State Attorney General to agree to a settlement with a prospective purchaser of a facility if, after public notice and hearing, Ecology finds the proposed settlement would lead to a more expeditious cleanup of hazardous substances in compliance with cleanup standards adopted under RCW 70.105D.030(2)(d). RCW 70.105D.040(4) and 70.105D.040(5) require that such a settlement be entered as a consent decree issued by a court of competent jurisdiction.

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20. Ecology finds the proposed settlement would lead to a more expeditious cleanup of hazardous substances in compliance with cleanup standards adopted under RCW 70.105D.030(2)(d).

21. Ecology has listed the Facility on the Washington Hazardous Sites list. Ecology has not made a determination that Defendants are Potentially Liable Persons ("PLPs") for the Facility. Were Union Station Associates to acquire an interest in the Facility, however, some or all of the Defendants would become PLPs under RCW 70.105D.040(1)(a). This Decree is entered before Union Station Associates' acquires the Property to resolve the potential liability of it and certain of its Associated Entities at the Facility to the State of Washington and/or third parties for the contamination identified in Attachment G associated with the Facility, including the contamination associated with the Property, described in Section III and Attachment A herein, as well as any such contamination from the Property that has migrated from the Property and has thereafter been deposited, stored, disposed of, or placed, or otherwise come to be located within the Facility, and to facilitate a more comprehensive and expeditious cleanup than otherwise would occur.

22. By entering into this Decree, Defendants agree not to challenge Ecology's jurisdiction in any proceeding to enforce this Decree. Defendants consent to the issuance of this Decree and have agreed to perform the terms of the Decree, including remediation, monitoring and payment of oversight costs as

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specified in this Decree; however, only Union Station Associates and its Successors in Interest and Assigns who become Defendants as provided in Sections X and XI of this Decree will be obligated under paragraph 93 to indemnify the State of Washington.

II. DEFINITIONS

23. Whenever terms listed below are used in this Decree or in the attachments hereto, the following definitions shall apply:

(a) "Cleanup Action Plan" shall mean the Cleanup Action Plan, dated May 29, 1997, attached to this Decree as Attachment B.

(b) "Decree" shall mean this Decree and all attachments hereto. In the event of a conflict between this Decree and any attachment, this Decree shall control.

(c) "Defendant" shall mean Union Station Associates, L.L.C. and those Associated Entities who are signatories to this Decree. Additional Associated Entities may become Defendants as provided in Sections X and XI. Qualified Successors in Interest and Assigns may also become Defendants as provided in Sections X and XI.

(d) "Facility" shall mean the site or area where Hazardous Substances, Pollutants or Contaminants have been deposited, stored, disposed of, placed or otherwise come to be located as a result of the conditions on the Property discussed in one or more of the reports or studies listed in Attachment G. The Facility boundaries are beyond the Property boundaries both upgradient and downgradient, and are not currently known at this time.

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(e) "Hazardous Substance" shall have the meaning defined in the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") § 101(14), 42 U.S.C. § 9601(14) and MTCA, RCW 70.105D.020(6).

(f) "Paragraph" shall mean a portion of this Decree identified by an Arabic numeral.

(g) "Pollutants or Contaminants" shall have the meaning defined in CERCLA § 101(33), 42 U.S.C. § 9601(33).

(h) "The Property" is described in Section III and Attachment A attached hereto and incorporated by reference.

(i) "Section" shall mean a portion of this Decree identified by a Roman numeral and including one or more Paragraphs.

(j) "Successors in Interest and Assigns" shall mean any person who acquires an interest in the Property through purchase, lease, transfer, assignment, mortgage or otherwise and by virtue of compliance with Sections X and XI obtains protection under this Decree. "Successor in Interest and Assigns" specifically includes the lenders and mortgagees in interest of Union Station Associates who by virtue of compliance with Sections X and XI obtain protection under this Decree.

III. DESCRIPTION OF FACILITY CONDITIONS

24. The Property consists of approximately 7.5 acres located in the City of Seattle, in King County as set forth in Attachment A.

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25. Numerous studies of environmental conditions at the Property and the Facility have been conducted. Attachment G is a list of the studies supplied by Defendants to Ecology, on which Ecology has relied in reaching this Agreement. For the purpose of this Decree, only the documents listed in Attachment G were relied upon by Ecology. Other documents, whether contained in Ecology files, listed as references in the documents listed on Attachment G, or otherwise existing were not relied upon by Ecology for the purposes of this Decree. A brief description of the environmental conditions at the Facility follows.

26. A Seattle Gaslight Company coal gasification plant operated in the northern portion of the Property from 1874 to 1907. The Washington Natural Gas Company (now Puget Sound Energy) is the successor to the Seattle Gaslight Company. A Vulcan Iron Works foundry operated from about 1900 until about 1910 in the southern portion of the Property. Gas plant wastes consist mostly of tar, lampblack, and tarry sludges. Coal tar is a complex chemical mixture (containing more than 250 individual compounds) that is derived from the destructive distillation of coal in coke ovens and retorts. During the process, coal is heated to 450 to 900 degrees centigrade for approximately 16 hours in the absence of air. Coal vapors generated from this process are then condensed to produce water, and the coal tars can then be separated out because they sink.

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27. The major class of chemical and relative percent composition associated with gas plant wastes are approximately 85% polycyclic aromatic hydrocarbons (PAHs). The PAHs associated with coal tars have a distinctive composition dominated by naphthalenes (11 to 14%), and phenanthrene (3 to 7%). Other chemical classes include: 10% phenolics (e.g., phenols, cresols, napthals), 5% various inorganic sulfur and nitrogen compounds (e.g., acridenes, cyanide, ammonia, thiodenes, sulphite), less than 5% light aromatic hydrocarbons (benzene, toluene, ethylbenzene, and xylene [BTEX]), and trace metals (e.g., aluminum, arsenic, cadmium, chromium, copper, iron, lead, mercury, selenium, silver, sodium, and vanadium).

28. A Vulcan Iron Works plant was located between South Dearborn and South Lane Streets north of Airport Way South. The iron works was built before 1900 and expanded in 1902 to cover the entire portion of the block north of Airport Way South. Along with the residues from the iron, brass, and steel manufacturing processes, it is likely that a variety of lubricants were used on site for servicing machinery and products.

29. Union Station was constructed in 1911 by the Oregon and Washington Railway and Navigation Co. (predecessor to Union Pacific Railroad) and the Chicago Milwaukee and St. Paul Line. Union Station served passengers until 1971, when Union Pacific Railroad discontinued railroad operations at the Property. Based on the existence of a rail yard and a roundhouse located south of

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the station, it is believed that limited routine maintenance activities were conducted at the station with most of the heavy maintenance activities occurring off of the Property. Union Pacific Railroad continued to use some of the building space for offices until 1978, and in 1984 it removed the railroad tracks from the station area. The depot building is currently being used as leased space for various social functions.

30. Over 50 soil samples from the Property or immediately adjacent areas have been analyzed for a variety of metals and organic compounds.

31. The most frequently detected constituents include metals (arsenic, beryllium, chromium, copper, lead, mercury, nickel, silver, zinc) and PAHs. Concentrations of arsenic, beryllium, lead and CPAH in soil at some locations exceed MTCA method B cleanup levels. The highest concentrations of PAH compounds were detected within the fill soils at the northern end of the Facility and at the elevation of the historical tideflat surface. Metals concentrations are found at elevated levels in various portions of the Facility. The distribution of these constituents is consistent with the understanding that the PAH contamination originated from the historical coal gasification plant that existed at the north end of the Property. The origin of the metals may be either trace metals from the coal used in the gasification plant or residuals from other prior site owners and operations.

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32. The constituents (PAHs and metals) detected at the Facility are considered to be persistent in the environment. This means that they do not readily react, degrade, or otherwise diminish in concentration rapidly. Based on detection frequency and the magnitude of the exceedence, carcinogenic PAHs are the most significant constituent of concern in soil at the Facility.

33. Groundwater is present in fill material at the Facility. Based on water level elevations measured in monitoring wells from previous studies, and information from adjacent properties, shallow groundwater flow is to the northwest. Estimated groundwater flow velocity within the fill aquifer on the Property is about 0.2 to 2 feet per month. Groundwater on, and adjacent to the Property is not used for drinking. A search of Ecology's well data conducted in 1986 indicated that there are no existing drinking water wells located in the vicinity of the Property. Drinking water supplied to the City of Seattle comes from protected surface water sources on the Tolt and Cedar Rivers. Based on the location of the old shoreline and the historic topography, it is likely that a component of groundwater flow may enter the Property at its northern boundary.

34. Constituents detected in groundwater are similar to those detected in soil, including metals and PAHs. Low and high molecular weight PAH concentrations detected in some samples from some groundwater wells suggest that PAHs are sorbed on minerals in

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the formation near to the well and causing measured PAH concentrations in excess of MTCA method B cleanup levels.

IV. DESCRIPTION OF PROPOSED PROJECT

35. Defendants propose to acquire the Property for commercial and retail development. The Union Station Development Project (the "Project") will provide 1.2 million square feet of commercial and retail space at the south end of downtown Seattle.

36. Union Station will be rehabilitated, and six new buildings will be constructed. The Project will provide 1,110 parking spaces, including a parking garage located south of Airport Way. The Project will include retail uses to complement the commercial space. Below grade, transit, service, storage and parking activities will predominate. At grade, there will be public open spaces and retail. Special facilities, such as a fitness center, will also be located at street level. Above grade, floor space will be devoted primarily to commercial office space.

37. Defendants propose to carry out the existing Property Use and Development Agreement (PUDA) for this development, which is valid until the year 2008. The following summarizes the key elements of the development:

Density: Over 1,100,000 square feet above-grade in up to six new buildings.

Height: Maximum building heights may vary from 65 feet to 150 feet above street level, depending upon the

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location of the building.

Access: Pedestrian access will be available from all sides of the Property. Automobile access to parking is provided along Fourth Avenue both north and south of Airport Way. Service access is provided south of Airport Way. Public transportation is provided at-grade along Fifth and Fourth, and below-grade at the Metro International Station, located at the northeast corner of the Site. The Metro station is designed to accommodate a future light and heavy rail system being planned by the Regional Transit Authority. Access to the Waterfront Streetcar is available on Fifth Avenue on the north end of the Property.

38. The development will be designed to take advantage of the desirable location of the Property, and will minimize adverse environmental impacts. Redevelopment will facilitate public access between the Pioneer Square and International District neighborhoods, create a strong connection to the downtown retail core, improve public safety in the area, improve parking in the area and create a new transportation hub.

39. The Project is expected to create a significant number of well-paying downtown jobs and to spur development in the south end of Seattle.

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V. WORK TO BE PERFORMED

40. Upon the Effective Date of this Decree, Defendants will perform the Cleanup Action Plan described in Attachment B according to the schedule provided therein.

41. Defendants agree not to perform any remedial actions for the release of hazardous substances covered by this Decree, other than those required by this Decree, unless the parties agree to amend the Decree to cover those actions. All work conducted under this Decree shall be done in accordance with Chapter 173-340 WAC and the National Contingency Plan, 40 CFR Part 300, unless otherwise provided herein. All work conducted pursuant to this Decree shall be done pursuant to the cleanup levels specified in Tables 1 and 2 of the Cleanup Action Plan, as now written or hereinafter amended provided that cleanup levels based on practical quantitation limits may be modified pursuant to WAC 173-340-707(4) and that any errors in fact are subject to correction.

42. Defendants agree to record the restrictive covenant in Attachment C with the Office of the King County Recorder within thirty (30) days of the Effective Date of this Decree, and shall provide Ecology with proof of such recording within thirty (30) days of recording.

VI. ECOLOGY COSTS

43. Defendants agree to pay all oversight costs incurred by Ecology pursuant to this Decree, except for costs already paid pursuant to the prepayment agreement entered between Ecology and Nitze-Stagen & Company, Incorporated dated June 19, 1996. The

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oversight costs required to be paid under this Decree shall include work performed by Ecology or its contractors for, or on, the Facility under Chapter 70.105D RCW, both before and after the issuance of this Decree, for Decree preparation, negotiations, and administration. Ecology oversight costs shall be calculated pursuant to WAC 173-340-550(2) and shall include direct staff costs, an agency support cost multiplier and a program support cost multiplier for all oversight costs. Such oversight costs shall not include costs of any remedial action taken by Ecology, but Ecology reserves its right to take such action pursuant to Section XV herein.

44. Defendants agree to pay Ecology oversight costs within ninety (90) days of receiving from Ecology an itemized statement of costs that includes a summary of costs incurred, an identification of involved staff, and the amount spent by involved staff members on the project. Ecology shall, upon request, provide Defendants a general statement of work performed. Ecology shall prepare itemized statements of its oversight costs quarterly. Failure to pay Ecology's costs within ninety (90) days of receipt of the itemized statement will result in interest charges at the rate of twelve (12) percent per annum.

45. In the event Defendants dispute expenditures or the adequacy of documentation for which reimbursement is sought, the parties agree to be bound by the dispute resolution process set forth in Section XII.

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VII. DESIGNATED PROJECT COORDINATORS

46. The project coordinator for Ecology is:

David L. South
Toxics Cleanup Program
Department of Ecology
Northwest Regional Office
3190 160th Avenue S.E.
Bellevue, Washington 98008-5452
(206) 649-7200

The project coordinator for Defendants is:

Kevin Daniels
Union Station Associates, L.L.C.
2401 Utah Avenue South
Seattle, Washington 98134
(206) 467-0420

47. Each project coordinator shall be responsible for overseeing the implementation of this Decree. The Ecology project coordinator will be Ecology's designated representative at the Property. To the maximum extent possible, communications between Ecology and Defendants and all documents, including reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Decree, shall be directed through the project coordinators. The project coordinators may designate, in writing, working-level staff contacts for all or portions of the implementation of Section V of this Decree, including the Cleanup Action Plan, incorporated in this Decree as Attachment B. The project coordinators may agree to minor modifications to the work to be performed without formal

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amendments to this Decree. Minor modifications will be documented in writing by Defendants and approved by Ecology.

48. Any party may change its respective project coordinator. Written notification shall be given to the other party at least ten (10) days prior to the change.

VIII. PERFORMANCE

49. All work performed pursuant to this Decree shall be under the direction and supervision, as necessary, of a professional engineer or hydrogeologist, or equivalent. Any construction work must be under the supervision of a professional engineer. Defendants shall notify Ecology in writing as to the identity of such engineer(s) or hydrogeologist(s), or others and of any contractors and subcontractors to be used in carrying out the terms of this Decree, in advance of their involvement at the Facility.

IX. CERTIFICATIONS

50. Defendants certify that, to the best of their knowledge and belief, they have fully and accurately disclosed to Ecology the information currently in their possession that relates to the environmental conditions at the Facility, or to Defendants' right and title thereto and such information is included in Attachment G.

51. Defendants represent and certify that, to the best of their knowledge, they are not aware of any facts that would give rise to liability under RCW 70.105D.040 prior to Union Station Associates' acquisition of the Property.

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52. Defendants represent and certify their belief that their redevelopment is not likely to contribute to the existing release or threatened release of Hazardous Substances from the Facility, interfere with future remedial actions that may be needed at the Facility, or increase health risks to persons at or in the vicinity of the Facility.

53. If any certification provided by a Defendant pursuant to this Section is not true, the Covenant Not to Sue in Section XIV shall not be effective with respect to that Defendant, and Ecology reserves all rights it may have against that Defendant.

X. PARTIES BOUND; CONVEYANCE OF PROPERTY

54. The restrictions, obligations and rights set forth in this Decree shall be binding upon the parties to this Decree. Additional Associated Entities and Qualified Successors in Interest and Assigns may become parties to this Decree, at the option of Defendants, by following the amendment procedures set forth in Section XI, or such other procedure as may hereafter be legally available, by reason of an amendment to MTCA or its implementing regulations, or otherwise.

55. Defendants shall implement contractual provisions that require all Successors in Interest and Assigns who become parties to this Decree to comply with the provisions of this Decree.

56. If proposed Successors in Interest and Assigns wish to become a party to this Decree, Defendants and the proposed transferee(s) shall notify Ecology and the Attorney General's

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Office of the proposed transfer, the name of the proposed transferee(s), and the proposed transferee(s)'s intended use for the Property. The notification required by this paragraph shall occur at least sixty (60) days before the date of any transfer of interest. Such notification shall be in the form of Attachment D to this Decree. Other than the amendment procedures set forth in Section XI, there is no notification required for an additional Associated Entity to become a party to the Decree.

57. In the event Defendants assign all of their fee interest to a Successor in Interest or Assign, at Ecology's sole discretion, Ecology may elect to thereafter look first to the Successor and then to Union Station Associates, and, finally, to Associated Entities, to satisfy the requirements of this Decree, including, but not limited to, performance of the work as described in Section V, and payment of Ecology costs as described in Section VI.

58. The Covenant Not to Sue shall not be effective with respect to any additional Associated Entity or Successors In Interest or Assigns who fail to follow the procedure set forth in Section XI, or such other procedure as may hereafter be legally available, by reason of an amendment to MTCA or its implementing regulations, or otherwise. Failure of Defendants or the proposed Successors in Interest or Assign to timely comply with the notification requirements for Successors in Interest or Assigns in

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paragraph 56 does not in any way alter the rights and obligations of such party as set forth in this Decree.

XI. AMENDMENT OF CONSENT DECREE; ADDING NEW PARTIES TO DECREE

59. This Decree may only be amended by a written stipulation among the parties to this Decree that is thereafter entered and approved by order of the Court. Such amendment shall become effective upon entry by the Court, or upon a later date if such date is expressly stated in the parties' written stipulation or the Court so orders.

60. Amendments may cover any subject or be for any purpose agreed to by the parties to this Decree, including for the purpose of making additional Associated Entities or proposed Successors in Interest and Assigns new parties to the Decree. If Ecology determines that the subject of an amendment requires public input, Ecology shall provide thirty (30) days public notice prior to seeking entry of the amendment by the Court, except that Ecology agrees that an amendment to make additional Associated Entities or proposed Successors in Interest and Assigns parties to this Decree does not by itself require public notice or comment.

61. All of Defendants' rights and benefits under this Decree may be assigned or transferred, and shall run to any person who becomes a party to this Decree pursuant to the procedures set forth in Section XI of this Decree or obtains such protections through any other procedures as may hereafter be legally

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available. Such rights and benefits shall not take effect until this Decree is amended pursuant to the procedure set forth in Section XI, or such other procedure as may hereafter be legally available to additional Associated Entities or Successors in Interest and Assigns, by reason of an amendment to MTCA or its implementing regulations, or otherwise.

62. Whenever Defendants contemplate conveyance of a fee interest in the Property, the proposed Successors in Interest and Assigns may request that the Decree be amended as provided for in this paragraph. The amendment to the Decree shall be in the form of Attachment E, "Agreement of Successors in Interest and Assigns." Ecology may withhold consent to an amendment making proposed Successors in Interest and Assigns party to this Decree only if Defendants or a Successors in Interest and Assigns is in violation or will be in violation of a material term of the Decree. Provided, however, that Ecology shall not withhold consent to an amendment making proposed Successors in Interest and Assigns party to the Decree on the basis that their proposed use fails to provide a public benefit or expedite cleanup so long as the proposed use as a whole meets or is anticipated to meet those requirements.

63. Whenever Defendants desire to add additional Associated Entities to the Decree, the Decree will be amended as provided for in this paragraph. The amendment to the Decree shall be in the form of Attachment F, "Agreement of Additional Associated

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Entities." Ecology may withhold consent to an amendment adding an Associated Entity as a party to this Decree only if Defendants or their Successors in Interest and Assigns are in violation or will be in violation of a material term of the Decree.

XII. DISPUTE RESOLUTION

64. In the event a dispute arises as to an approval, disapproval, proposed modification, or other decision or action by Ecology's project coordinator pertaining to this Decree the parties shall use the dispute resolution procedure set forth below.

(1) Upon receipt of the Ecology project coordinator's written decision, Defendants have fourteen (14) days within which to notify Ecology's project coordinator of any objection to the decision.

(2) The parties' project coordinators shall then confer in an effort to resolve the dispute. If the project coordinators cannot resolve the dispute within fourteen (14) days, Ecology's project coordinator shall issue a written decision.

(3) Defendants may then request Ecology management review of the decision. This request shall be submitted in writing to the Toxics Cleanup Program Manager within seven (7) days of receipt of Ecology's project coordinator's written decision.

(4) Ecology's Toxics Cleanup Program Manager shall conduct a review of the dispute and shall issue a written decision regarding the dispute within thirty (30) days of the Defendants' request for

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review. The Toxics Cleanup Program Manager's decision shall be Ecology's final decision on the disputed matter.

65. If Ecology's final written decision is unacceptable to Defendants, Defendants have the right to submit the dispute to the Court for resolution. The parties agree that one judge should retain jurisdiction over this case and shall, as necessary, resolve any dispute arising under this Decree. For disputes that arise under the following sections of the Decree, the Court shall review the action or decision of Ecology under an arbitrary and capricious standard of review: work to be performed (Section V), Ecology costs (Section VI), designated project coordinators (Section VII), performance of the work (Section VIII), retention of records (Section XVII), property access (Section XVIII), compliance with applicable laws (Section XIX), permit requirements (Section XX), sampling data reporting and availability (Section XXI), progress reports (Section XXII), extension of schedule (Section XXIII), endangerment (Section XXIV), certification of completion and delisting (Section XXV) and public participation (Section XXIX) The standard of review for all other issues will be decided by the Court.

66. The parties may mutually agree to substitute an Alternative Dispute Resolution (ADR) process, such as mediation, for the formal dispute resolution process set forth in this section.

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67. The parties agree to use the dispute resolution process in good faith and agree to expedite, to the extent possible, the dispute resolution process whenever it is used. When either party uses the dispute resolution process in bad faith or for purposes of delay, the other party may seek sanctions.

68. The implementation of these dispute resolution procedures shall not provide a basis for delay of any activities required in this Decree, unless Ecology agrees in writing to a schedule extension or the Court so orders.

XIII. CONTRIBUTION PROTECTION

69. With regard to claims for contribution against Defendants for Matters Addressed in this Consent Decree, the parties hereto agree that Defendants are entitled to contribution protection from any actions or claims pursuant to MTCA, RCW 70.105D.080, CERCLA § 107 or 113, or any other federal or state claim seeking, under other theories, substantially similar relief, to the extent allowed by MTCA, RCW 70.105D.040 and CERCLA § 113(f)(2). The contribution protection conferred in this section shall not be frustrated by the use of non-CERCLA or non-MTCA theories to seek relief in the nature of contribution or indemnification.

70. For the purpose of this section, "Matters Addressed" shall include:

(i) all past and future investigation and remedial measures taken at the Facility, including those taken on or off of the Property, provided such measures pertain to Hazardous

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Substances, Pollutants or Contaminants specified in one or more of the reports or studies listed in Attachment G, whether performed by Defendants, Ecology or any other persons, including other PLPs, whether performed voluntarily, under the Independent Remedial Action Program (IRAP), under any consent decree or order, under an enforcement order, or otherwise, and whether performed before or after the Effective Date of this Decree.

XIV. COVENANT NOT TO SUE; REOPENERS

71. In consideration of Defendants' compliance with the terms and conditions of this Decree, Ecology agrees that compliance with this Decree shall stand in lieu of any and all administrative, legal, and equitable remedies and enforcement actions ("Actions") available to the State against Defendants or Successors in Interest and Assigns, for releases or threatened releases of Hazardous Substances, Pollutants or Contaminants at the Facility including releases or threatened releases on or off of the Property, provided such Actions pertain to Hazardous Substances, Pollutants or Contaminants specified in one or more of the reports or studies listed in Attachment G.

72. Reopeners: In the following circumstances Ecology may exercise its full legal authority to address releases of Hazardous Substances, Pollutants, or Contaminants at the Facility, notwithstanding the Covenant Not to Sue set forth above:

(1) In the event a Defendant fails to comply with the terms and conditions of this Decree, including all attachments, and, after written notice of noncompliance, such failure is not cured

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by such defendant within sixty (60) days of receipt of notice of noncompliance;

(2) In the event factors not known at the time of entry of this Agreement, and not disclosed to Ecology in Attachment G are discovered and such factors present a previously unknown threat to human health or the environment and are not addressed by the Cleanup Action Plan. If such factors are discovered, Ecology shall give written notice to Defendants. Defendants will have sixty (60) days from receipt of notice to propose a cure to the condition giving rise to the threat. If such cure is acceptable to Ecology, Defendants and Ecology will negotiate an appropriate time table for implementation. If such cure is not acceptable to Ecology, the parties shall follow the dispute resolution procedures in Section XIII.

73. Applicability: The Covenant Not to Sue set forth above shall have no applicability whatsoever to:

(1) Criminal liability;

(2) Liability for any releases or threatened releases of Hazardous Substances, Pollutants or Contaminants caused or contributed to by a Defendant;

(3) Liability for actions by a Defendant that would be sufficient to create liability under RCW 70.105D.040(1)(c)-(e) as a generator, transporter or seller of Hazardous Substances;

(4) Liability of a Defendant who owned or operated the Property prior to May, 1994.

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(5) Liability for damages for injury to, destruction of, or loss of natural resources.

(6) Liability for any property owned or leased by a Defendant other than the Property.

74. Ecology retains all of its legal and equitable rights against all persons, except as otherwise provided in this Decree. The legal and equitable rights retained by Ecology include, but are not limited to, the right to compel any person, other than Defendants, to take remedial actions for the release of hazardous substances at the Property, and to seek reimbursement against such persons for costs incurred by Ecology as a result of such contamination.

XV. RESERVATION OF RIGHTS

75. Defendants reserve all rights and defenses which they may have and which are not otherwise addressed in this Decree, including the right to seek contribution or cost recovery for funds expended pursuant to this Decree, subject to the limitations in Section XXVIII. The execution of the "Agreement of Successors in Interest and Assigns" attached hereto as Attachment E or the "Agreement of Additional Associated Entities" attached hereto as Attachment F or an amendment to this Decree by the Defendants is not an admission of liability on their part.

76. Except as provided herein for the parties, this Decree does not grant any rights or affect any liabilities of any person, firm or corporation or subdivision or division of state, federal, or local government.

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XVI. DISCLAIMER

77. This Decree does not constitute a representation by Ecology that the Property is fit for any particular purpose.

XVII. RETENTION OF RECORDS

78. Defendants shall preserve, during the pendency of this Decree and for ten (10) years from the date this Decree is no longer in effect as provided in Section XXX, all records, reports, documents, and underlying data in its possession relevant to the implementation of this Decree and shall insert in contracts with project contractors and subcontractors a similar record retention requirement. Defendants shall retain all monitoring data so long as monitoring is ongoing as provided in the Cleanup Action Plan. In the event the Cleanup Action Plan is modified to terminate monitoring, Defendants shall retain all monitoring data until ten (10) years after monitoring is completed. Upon request of Ecology, Defendants shall make all non-archived records available to Ecology and allow access for review. All archived records shall be made available to Ecology within a reasonable period of time.

XVIII. PROPERTY ACCESS

79. Defendants grant to Ecology, its employees, agents, contractors and authorized representatives, an irrevocable right to enter upon the Property, with reasonable notice and at any reasonable time for purposes of allowing Ecology to monitor or enforce compliance with this Decree. Defendants recognize and acknowledge that Ecology's entry onto the Property for such

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purposes may interfere with their full use of the Property. Defendants agree that they will not object to any interruption or interference with their use of the Property caused by Ecology's entry onto the Property for such purposes. The right of entry granted in this Section is in addition to any right Ecology may have to enter onto the Property pursuant to specific statutory or regulatory authority. Consistent with Ecology's responsibilities under state and federal law, Ecology, and any persons acting for it, shall use reasonable efforts to minimize any interference and use reasonable effort not to interfere with the operations of Defendants by any such entry. In the event Ecology enters the Property for reasons other than emergency response, Ecology agrees that it shall provide reasonable notice to Defendants of any planned entry, as well as schedules and locations of activity on the Property. Ecology further agrees to accommodate reasonable requests that it modify its scheduled entry or activities at the Property. Notwithstanding any provision of the Decree, Ecology retains all of its access authorities and access rights, including enforcement authorities related thereto, under MTCA and any other applicable state statute or regulations.

XIX. COMPLIANCE WITH APPLICABLE LAWS

80. All actions carried out by Defendants pursuant to this Decree shall be done in accordance with all applicable federal, state, and local requirements, including requirements to obtain necessary permits.

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XX. PERMIT REQUIREMENTS

81. In the event Ecology determines or Defendants become aware that additional permits beyond those already obtained prior to entry of this Decree would, but for the provisions of RCW 70.105D.090(1), be required to carry out the Cleanup Action Plan, Defendants will be required to consult with the appropriate state or local jurisdictions concerning the substantive requirements those agencies believe are applicable to the remedial actions, prior to conducting the remedial actions. Ecology shall then determine whether additional substantive requirements are applicable to the remedial action, and if so, how Defendants must meet those requirements. Substantive requirements will be incorporated into an amendment to this Decree.

XXI. SAMPLING, DATA REPORTING, AND AVAILABILITY

82. With respect to the implementation of this Decree, Defendants shall make the results of all sampling, laboratory reports, and/or test results generated by it, or on its behalf, available to Ecology in hard copy and on electronic disk. Data submitted on disk shall be in a format acceptable to Ecology for importation for use as a relational database into databases and/or spreadsheet software commonly available.

83. If requested by Ecology, Defendants shall allow split or duplicate samples to be taken by Ecology and/or its authorized representatives of any samples collected by Defendants pursuant to the implementation of this Decree. Defendants shall notify

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Ecology seven (7) days in advance of any sample collection or work activity at the Property. Ecology shall, upon request, allow split or duplicate samples to be taken by Defendants or their authorized representatives of any samples collected by Ecology pursuant to the implementation of this Decree provided it does not interfere with the Department's sampling. Ecology shall endeavor to notify Defendants prior to any sample collection activity.

XXII. PROGRESS REPORTS

84. Defendants shall submit to Ecology written monthly progress reports beginning thirty (30) days prior to initiation of the Cleanup Action Plan and continuing until completion. After that time, progress reports shall be submitted quarterly, or at other intervals as approved by Ecology. The progress reports shall describe the actions taken during the reporting period to implement the requirements of this Decree. The progress report shall include the following:

(1) A list of on-site activities that have taken place during the reporting period;

(2) Detailed description of any deviations from required tasks not otherwise documented in project plans or amendment requests;

(3) Description of all deviations from the schedule during the current reporting period and any planned deviations in the upcoming reporting period;

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(4) For any deviations in schedule, a plan for recovering lost time and maintaining compliance with the schedule;

(5) All raw data (including laboratory analysis) received by Defendants during the past reporting period and an identification of the source of the sample. Raw data shall be submitted in hard copy and, on electronic disk. Data submitted on disk shall be in a format acceptable to Ecology for importation for use as a relational database into databases and/or spreadsheet software commonly available;

(6) A list of deliverables for the upcoming reporting period if different from the schedule;

(7) the status of deed recordation.

85. All progress reports shall be submitted by the tenth day of the month in which they are due after the effective date of this Decree.

XXIII. EXTENSION OF SCHEDULE

86. An extension of schedule shall be granted only when a request for an extension is submitted in a timely fashion, generally at least thirty (30) days prior to expiration of the deadline for which the extension is requested, and good cause exists for granting the extension. All extensions shall be requested in writing. The request shall specify the reason(s) the extension is needed.

87. An extension shall be granted only for such period of time as Ecology determines is reasonable under the circumstances.

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A requested extension shall not be effective until approved by Ecology or the Court. Ecology shall act upon any written request for extension in a timely fashion. It shall not be necessary to formally amend this Decree pursuant to Section XI when a schedule extension is granted.

88. The burden shall fall on Defendants to demonstrate to the satisfaction of Ecology that the request for such an extension has been submitted in a timely fashion and that good cause exists for granting the extension. Good cause includes, but is not limited to, the following:

(1) Circumstances beyond the reasonable control and despite the due diligence of Defendants including delays caused by unrelated third parties or Ecology, such as (but not limited to) delays by Ecology in reviewing, approving, or modifying documents submitted by Defendants; or

(2) Acts of God, including fire, flood, blizzard, extreme temperatures, storm, or other unavoidable casualty; or

(3) Endangerment as described in Section XXIV.

Ecology may extend the schedule for a period not to exceed ninety (90) days, except where an extension is needed as a result of:

(1) Delays in the issuance of a necessary permit which was applied for in a timely manner; or

(2) Other circumstances deemed exceptional or extraordinary by Ecology.

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However, neither increased costs of performance of the terms of the Decree nor changed economic circumstances shall be considered circumstances beyond the reasonable control of Defendants.

Ecology shall give Defendants written notification in a timely fashion of any extensions granted pursuant to this Decree.

XXIV. ENDANGERMENT

89. If, during construction of the Property, Ecology determines that there is an actual or imminent danger to human health or to the environment, Ecology may order Defendants to stop further implementation of this Decree for such period of time as needed to abate the danger or may petition the Court for an order as appropriate. During any stoppage of work under this section, the obligations of Defendants shall be suspended and the time periods for performance of that work, as well as the time period for any other work dependent upon the work which is stopped, shall be extended, pursuant to Section XXIII of this Decree, for such period of time as Ecology determines is reasonable under the circumstances.

90. In the event Defendants determine that activities undertaken in furtherance of this Decree or any other circumstances or activities are creating an imminent danger to human health or to the environment, Defendants may stop implementation of this Decree for such period of time necessary for Ecology to evaluate the situation and determine whether Defendants should proceed with implementation of the Decree or

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whether the work stoppage should be continued until the danger is abated. Defendants shall notify Ecology's project coordinator as soon as possible, but no later than twenty-four (24) hours after stoppage of work, and thereafter provide Ecology with documentation of the basis for the work stoppage. If Ecology disagrees with Defendants' determination, Ecology may order Defendants to resume implementation of this Decree. If Ecology concurs with the work stoppage, Defendants' obligations shall be suspended and the time period for performance of that work, as well as the time period for any other work dependent on the work which was stopped, shall be extended, pursuant to Section XXIII of this Decree, for such period of time as Ecology determines is reasonable under the circumstances. Any disagreements pursuant to this Section shall be resolved through the dispute resolution procedures in Section XII.

XXV. CERTIFICATION OF COMPLETION AND DELISTING

91. Upon completion of all remedial actions specified in the Cleanup Action Plan, except confirmational monitoring, Ecology shall issue a Certificate of Completion. Completion of all remedial actions except confirmational monitoring is defined in Section 6.0 of Attachment B. Unless Ecology becomes aware of circumstances at the Facility that present a previously unknown threat to human health or the environment, Ecology shall within thirty (30) days of issuance of the Certificate of Completion propose to remove the Facility from the Hazard Ranking List, pursuant to WAC 173-340-330(4).

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XXVI. INDEMNIFICATION AND HOLD HARMLESS

92. To the extent allowed by law, Union Station Associates and its Successors in Interest and Assigns who become Defendants as set forth in Sections X and XI of this Decree (hereinafter collectively the "Indemnitors") agree to defend, hold harmless and indemnify the State of Washington, its employees, and agents from any and all claims or causes of action for death or injuries to persons or for loss or damage to property arising from or on account of acts or omissions of Defendants, their officers, employees, agents, or contractors in entering into and implementing this Decree. If barred from assuming the State's defense of any claim brought under this Section, Indemnitors nevertheless shall have the opportunity to participate and/or cooperate in Ecology's defense to the maximum extent allowable by law. However, Indemnitors shall not indemnify the State of Washington nor save nor hold its employees and agents harmless from any claims or causes of action arising out of the negligent acts or omissions of the State of Washington, or the employees or agents of the State, in implementing the activities pursuant to this Decree. In any claims against the State by any employee of the Indemnitors, the indemnification obligation shall not be limited in any way by the limitation on the amount or type of damages, compensation or benefits payable by or for the Indemnitors under workmen's compensation acts, disability benefit acts, or other employee benefits acts.

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XXVII. INSURANCE

93. A Commercial General Liability insurance policy meeting the requirements set forth in paragraph 94 shall be obtained by the Defendants for the Union Station Property in the amount of one million dollars per occurrence/two million dollars aggregate for a period beginning on the Effective Date of this Decree and ending three years following the completion of foundation loading. The State of Washington shall be listed as an additional insured on such policy. In the event that groundwater treatment is required as set forth in the Cleanup Action Plan, Attachment B, Defendants will obtain the same coverage for a period beginning with the construction of the groundwater treatment system and ending two years following initiation of operation of the groundwater treatment system.

94. The following requirements apply to the coverage required by paragraph 93:

a) The coverage shall contain no special limitations on the scope of protection afforded to the State of Washington.

b) For any claims related to this Decree, Defendant's insurance coverage shall be primary insurance as respects the State of Washington.

c) During the periods mentioned in paragraph 93, the policy shall state that coverage shall not be suspended, voided, canceled, reduced in coverage or in limits except after thirty (30) days prior written notice, by certified mail, return receipt requested, has been given to the State of Washington.

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XXVIII. CLAIMS AGAINST THE STATE

95. Defendants hereby agree that they will not seek to recover any costs accrued in implementing the remedial action required by this Decree from the State of Washington or any of its agencies; and further, that the Defendants will make no claim against the State Toxics Control Account or any Local Toxics Control Account for any costs incurred in implementing this Decree. Except as provided above, however, Defendants expressly reserve their right to seek to recover any costs incurred in implementing this Decree from any other potentially liable person.

XXIX. PUBLIC PARTICIPATION

96. Public participation shall be accomplished by implementing a Union Station Public Participation Plan, attached as Exhibit I. Ecology shall maintain the responsibility for public participation in accordance with WAC 173-340-600(8)(g). Defendants shall help coordinate and implement public participation for the Property as required by Ecology.

XXX. DURATION OF DECREE AND RETENTION OF JURISDICTION

97. This Decree shall remain in effect and this Court shall retain jurisdiction over both the subject matter of this Decree and the parties for the duration of the performance of the terms and provision of this Decree for the purpose of enabling any of the parties to apply to the Court, as provided in the dispute resolution process set forth in Section XII, and the amendment

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process set forth in Section XI, at any time for such further order, direction, and relief as may be necessary or appropriate to ensure that obligations of the parties have been satisfied. The Decree shall remain in effect until the parties agree otherwise.

XXXI. PUBLIC NOTICE AND WITHDRAWAL OF CONSENT

98. This Decree has been the subject of public notice and comment as required by RCW 70.105D.040(4)(a). As a result of this process, Ecology has found that this Decree will lead to a more expeditious cleanup of hazardous substances at the Property, in compliance with applicable cleanup standards, and is in the public interest.

99. If the Court withdraws its consent, this Decree shall be null and void at the option of any party, and the accompanying Complaint shall be dismissed without costs and without prejudice. In such an event, no party shall be bound by the requirements of this Decree.

XXXII. SEVERABILITY

100. If any Section, subsection, sentence or clause of this Agreement is found to be illegal, invalid or unenforceable, such illegality, invalidity or unenforceability will not affect the legality, validity or enforceability of the Agreement as a whole or of any other Section, subsection, sentence or clause.

XXXIII. EFFECTIVE DATE

101. The effective date of this Decree is the Closing date, as defined in the Purchase and Sale Agreement between Union

Pacific and Union Station Associates, dated 4-1-97, and attached as Exhibit H. So ordered this 29 day of July, 1997.

JUL 29 1997
CARLOS V. VELATEGUI
COURT COMMISSIONER

Judge
King County Superior Court

The undersigned parties enter into this Prospective Purchaser Consent Decree on the date specified below.

UNION STATION ASSOCIATES, L.L.C.

By: _____

Date: 7/10/97

ASSOCIATED ENTITIES

By: _____

Date: 7/10/97

By: _____

Date: 7/10/97

By: _____

Date: _____

DEPARTMENT OF ECOLOGY

By: Mary E. Burg

Date: 28 July 1997

ATTORNEY GENERAL'S OFFICE

By: _____

Date: July 28, 1997

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Ecology Division
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80000 SERIES
30% P.C.W.

EXHIBIT B

Exhibit B

Groundwater Monitoring
Union Station
Seattle, Washington

November 5, 2009

Prepared for

Union Station Associates
2401 Utah Avenue South, Suite 305
Seattle, WA 98134

LANDAU ASSOCIATES
130 2nd Avenue South
Edmonds, WA 98020
(425) 778-0907

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1.0 INTRODUCTION

This report describes the groundwater monitoring that was performed at the Union Station property in August 2009. The groundwater monitoring was performed in accordance with Prospective Purchaser Consent Decree 97-2-18936-5SEA between the Washington State Department of Ecology (Ecology) and Union Station Associates and with the associated cleanup action plan (CAP; Landau Associates 1997). Groundwater monitoring completed prior to August 2009 is described in five previous annual reports (Landau Associates 2000, 2002, 2003a,b, and 2004). In addition to describing the groundwater monitoring performed in August 2009, this report includes an evaluation of the groundwater analytical results and groundwater flow directions.

1.1 PROPERTY DESCRIPTION

The Union Station property consists of three parcels located in Seattle, Washington. Figure 1-1 provides a vicinity map; Figure 1-2 shows the Union Station property. The property spans six city blocks and includes portions of the grade level beneath elevated viaduct portions of South Jackson Street, South Airport Way, and 4th Avenue S.

The property was originally part of the South Seattle industrial neighborhood. In 1874, the Seattle Gaslight Company constructed a coal gasification plant at the property on pilings over the mudflats of Duwamish Bay. The area surrounding the pile-supported facility was filled prior to about 1912. Around the turn of the century, Vulcan Iron Works manufactured iron, brass, and steel on the southern portion of the property. In 1911, the Union Station passenger railroad station was constructed at the property. Union Station served passengers until 1971, when Union Pacific discontinued passenger operations at the property. From 1971 until the purchase of the property by Union Station Associates in 1997, the property was essentially dormant. The southernmost terminus of the downtown Seattle transit project bus tunnel was completed at the property along 5th Avenue S. in 1990.

In 1991, the property was placed on the Washington Hazardous Sites List. Subsequently, a remedial investigation/feasibility study (RI/FS; Landau Associates and Hart Crowser 1996) was conducted.

The RI included review of the property's industrial history to confirm that the investigation included the areas likely to have contamination, evaluation of existing soil and groundwater sampling information, and analysis of new soil and groundwater samples. The RI compared chemical testing results for soil and groundwater to screening levels and identified constituents of concern that required additional evaluation. The RI identified carcinogenic polycyclic aromatic hydrocarbons (cPAHs) from the coal gasification process, and metals from the coal gasification process and from the foundry within

fill soil that was placed on the former tideflat surface during operation of the historic industries. Concentrations of cPAHs and some metals in some soil samples exceeded cleanup levels. Groundwater analytical results from tests during the RI and from supplemental monitoring performed after the RI and before the Consent Decree showed that groundwater screening levels for cPAHs, petroleum hydrocarbons, benzene, and arsenic were exceeded in samples from some wells at the property. Arsenic was found in an upgradient well at concentrations exceeding those found in property wells. There were also strong indications that a source or sources of petroleum hydrocarbons existed upgradient of the property. No pesticides, polychlorinated biphenyls (PCBs), herbicides, or evidence of dense non-aqueous phase liquids (DNAPL) were detected.

The RI findings were used to develop alternatives to remediate the property. The evaluations of these alternatives were included in the FS. The FS defined cleanup standards, developed and evaluated four cleanup action alternatives, and identified a preferred cleanup action alternative that would adequately protect human health and the environment. Soil cleanup levels were conservatively based on residential use conditions, although the property was zoned International District Mixed and planned property use was commercial with limited potential for direct contact. The point of compliance for soil is throughout the property. Groundwater cleanup levels were based on protection of marine surface water. The point of compliance for groundwater is the property boundary and extends from the uppermost level of the saturated zone vertically to the lowest depth that could potentially be affected by the property. The point of compliance established for groundwater at the property is shown on Figure 1-2. The cleanup action selected by Ecology includes paving, construction soil excavation, groundwater monitoring, contingent groundwater remediation, and institutional controls.

In 1997, Ecology and Union Station Associates entered into a Prospective Purchaser Consent Decree for the property. Since that time, Union Station Associates has implemented the selected remedial action for the property. Paving and construction soil excavation were completed as part of property redevelopment. A restrictive covenant implementing the required institutional controls was recorded on the property deed. Groundwater monitoring began in October 1997 and is described in the remainder of this document and in previous groundwater monitoring reports (Landau Associates 2000, 2002, 2003a,b, and 2004).

Construction at the property is complete. A parking garage was completed on the south parcel in 1999. Construction at the main parcel, including renovation of the Union Station building and construction of a parking garage and four new buildings, was completed in 2001. A new building at the north parcel was completed in 2002.

1.2 CONSENT DECREE REQUIREMENTS FOR GROUNDWATER MONITORING

Groundwater monitoring requirements for the property are described in the CAP and are summarized in Table 3 of the CAP, identified as Table 1-1 in this report. Monitoring wells originally included in the monitoring program were HC-101, HC-102, HC-103, MW-104, MW-105, MW-106, MW-107, and upgradient background wells B-4 and B-6. As described in a previous report (Landau Associates 2000), between 1997 and 1999 wells HC-101, HC-102, MW-106, MW-107, MW-108, and B-6 were abandoned and replaced with monitoring wells in similar locations. In 2000, Ecology approved suspension of water quality monitoring in well HC-103 (Ecology 2000). Just prior to the August 2009 monitoring event, it was discovered that background well B-4 had been paved over during City of Seattle street repairs and was no longer accessible. As a result, a replacement well was installed approximately 20 ft east of well B-4. Installation of this replacement well, identified as well B-4R, is discussed further in Section 3.0. Monitoring wells currently included in the groundwater quality and groundwater level monitoring program are as follows: property wells MW-101R, MW-102R, MW-104, MW-105, MW-107R, MW-108R, and upgradient background wells B-4R and B-6R. HC-103 is monitored only for groundwater level.

Quarterly groundwater monitoring is required for 8 quarters beginning within 3 months of the effective date of the Consent Decree. The CAP also requires that quarterly sampling be performed for 8 quarters beginning the first quarter after all foundations are completed. The CAP establishes that groundwater monitoring frequency be reduced to annual if the upper 95 percent confidence limit on the mean (UCL) for results from compliance monitoring wells is less than or equal to cleanup levels. Annual monitoring is then required until 3 years after foundation loading (building construction) is complete. Groundwater monitoring frequency is then reduced to every 5 years if the UCL for results from compliance monitoring wells is less than or equal to cleanup levels. The CAP also specifies procedures to be implemented if any sample exceeds cleanup levels during monitoring.

A report documenting groundwater monitoring for 8 quarters after foundation loading was complete was submitted to Ecology in August 2000 (Landau Associates 2000). After review of the report, Ecology required an additional year of quarterly monitoring (Ecology 2000). In March 2002, the results for the additional year of groundwater monitoring were submitted in a report to Ecology with recommendations to reduce groundwater monitoring frequency to annual (Landau Associates 2002). In November 2002, Ecology approved reducing groundwater monitoring frequency to annual (Ecology 2002). Annual groundwater monitoring was conducted in 2002, 2003, and 2004. Construction at the main parcel was completed in 2001. Construction at the south parcel was completed in 1999. Therefore, 3 years of groundwater monitoring after foundation loading was complete after the June 2004

monitoring event. Based on the results of the June 2002, 2003, and 2004 sampling events, Ecology approved reducing the groundwater monitoring frequency to every 5 years (Ecology 2005a). Ecology also issued a Certificate of Completion for the property in 2005 (Ecology 2005a), but did not remove the property from the Hazard Ranking List due to the presence of petroleum hydrocarbons in groundwater at the property and upgradient of the property.

This report presents results for the 2009 groundwater monitoring event showing that the compliance well results for contaminants originating on the property comply with cleanup levels. Groundwater data from the past eight sampling events is used for the statistical evaluation.

2.0 B-4 MONITORING WELL REPLACEMENT

In June 2009, prior to initiating the 2009 groundwater monitoring event, it was discovered that upgradient well B-4, which was located within the 5th Avenue right-of-way, had been paved over by the City of Seattle (City) Department of Transportation as a result of City street repairs that occurred sometime between the 2004 and 2009 groundwater monitoring events. Because the well was no longer accessible, a replacement well was installed approximately 20 ft east of well B-4, in the sidewalk on the east side of 5th Avenue South. The new well is identified as B-4R and the location of the well is shown on Figure 1-2. Drilling and construction of the monitoring well was conducted by a State of Washington licensed well driller in accordance with the Minimum Standards for Construction and Maintenance of Wells (Ecology; WAC 173-160). The well was constructed of 2-inch diameter, flush-threaded Schedule 40 PVC casing with PVC machine 010-inch slotted screen. Groundwater was encountered at 35 ft below ground surface (BGS) at the time of drilling. The depth interval for the well screen is 31 to 41 ft BGS to allow for groundwater level fluctuation and to intersect the water table.

Following placement of the well screen and casing in the borehole, a filter pack was installed around the well screen. The filter pack extends from the bottom of the end cap to 2 ft above the screen. Filter material consists of commercially prepared, presized, prewashed No. 2-12 Monterey silica sand.

A bentonite chip seal was placed above the sand pack to about 3 ft BGS. The surface of the well was completed with a concrete seal and surface pad extending from the top of the bentonite seal to slightly above the ground surface. A locking steel flush-mount monument was cemented in place from the surface to a depth of about 1.5 ft BGS. The well construction detail is presented with the boring log in Appendix A of this report.

The monitoring well was developed after the bentonite chip seal had been allowed to hydrate in the well annulus for 24 hours. Development was accomplished by surging and over pumping the well using a stainless-steel bailer. Development continued until ten casing volumes of water were removed and turbidity of the discharged water was visibly low.

3.0 GROUNDWATER MONITORING

The groundwater monitoring program consists of both water level and water quality monitoring. The Union Station groundwater monitoring network for water quality currently is comprised of eight monitoring wells: upgradient wells B-4R and B-6R, and property wells MW-101R, MW-102R, MW-104, MW-105, MW-107R, and MW-108R. The monitoring network for groundwater levels includes the eight wells monitored for water quality plus one additional monitoring well, HC-103, monitored only for groundwater level. The location of the monitoring wells is shown on Figure 1-2. Monitoring was conducted in August 2009. Procedures used for groundwater monitoring, which include water level monitoring, groundwater sampling, and laboratory analysis, were consistent with those described in the CAP, or as subsequently modified with Ecology approval. Prior to the September 2001 monitoring event, modifications to some of the procedures described in the CAP were approved by Ecology. These modifications included changes to the cyanide analysis method; addition of analysis for weak acid dissociable cyanide to the list of analytes; changes to the method of laboratory sample handling for cPAH and semivolatile organic compound (SVOC) samples; and the use of monitoring well HC-103 only for groundwater level measurements (Landau Associates 2000 and 2002). Since 2004, Ecology acknowledged the completion of all remedial actions specified in the CAP, except confirmational monitoring, and approved a reduction in groundwater monitoring frequency to every 5 years (Ecology 2005a) and reduction in the required constituents for analysis (Ecology 2005b).

3.1 GROUNDWATER LEVEL MONITORING

At each well location, the groundwater level was measured from a surveyed reference point located at the top of the PVC well casing, to the top of the groundwater using a hand-heldwater level indicator. These measurements were recorded to the nearest 0.01 ft. Table 3-1 provides a summary of well installation dates, well coordinates, and well elevation information, including top and bottom of screen.

3.2 GROUNDWATER SAMPLING, ANALYSIS PROCEDURES, AND MODIFICATIONS

Groundwater sampling procedures were consistent with those described in the CAP. Prior to sample collection, each well was slowly purged using a peristaltic pump with dedicated tubing or a disposable bailer. Because most of the wells are low-yield and produce groundwater with moderate to high turbidity, each well was purged at a rate of less than 1 liter per minute to help minimize turbidity.

Field parameters such as pH, temperature, and conductivity were measured and recorded about every 5 minutes during purging. Purging continued until at least 3 well volumes had been removed or, at well MW-102R, until the well was purged dry.

Sampling was started when sufficient volume became available in the well. Four replicates of field parameters were collected during sampling, if possible; however, due to low-yield conditions at some locations, sufficient volume for all replicates could not be obtained and priority was given to filling sample bottles. For these locations, field parameters obtained at the end of purging were used for sample quality control purposes. In order to minimize turbidity during sampling, a target flow rate of less than 0.2 liter per minute was used during sample collection. All purging and sampling information was recorded on a Groundwater Sample Collection Form as specified in the CAP.

Field instruments were calibrated and maintained in accordance with the manufacturer's instructions and the quality assurance/quality control (QA/QC) requirements identified in the CAP. Purge water was stored onsite in 55-gallon drums pending offsite disposal.

August 2009 groundwater samples were analyzed at Analytical Resources, Inc. (ARI) in Tukwila, Washington for gasoline-range, diesel-range, and motor oil-range petroleum hydrocarbons; PAHs; benzene, toluene, ethylbenzene, and xylenes (BTEX); dissolved arsenic; total dissolved solids (TDS); and total suspended solids (TSS). If a cPAH was not detected, an additional cPAH analysis using selected ion monitoring (SIM) and a large volume injector was used to obtain lower reporting limits for this constituent. Analytical results are discussed in Sections 4.2 and 5.3.

4.0 GROUNDWATER MONITORING RESULTS

As described in Section 3.0, the Union Station groundwater level monitoring network consists of nine monitoring wells that are screened within the shallow fill at or near the property. Eight of the monitoring wells are also used for groundwater quality monitoring. The following sections describe the results of the water quality and groundwater level monitoring conducted in August and September 2009, respectively.

4.1 GROUNDWATER ELEVATIONS

Groundwater elevations measured at each well during the 2009 annual groundwater monitoring event are listed in Table 4-1. Groundwater elevation contours for the monitoring event (shown on Figure 4-1) indicate the groundwater flow is generally toward the west, consistent with the regional groundwater flow toward Elliott Bay to the west (Landau Associates and Hart Crowser 1996). These groundwater contours are similar to the groundwater contour configurations observed prior to March 2001. Figures showing groundwater contours prior to March 2001 are presented in Appendix B. As discussed in previous reports (Landau Associates 2002, 2003a,b, and 2004), the decrease in groundwater elevations at well B-4 starting in March 2001, after the Nisqually earthquake of February 28, 2001, suggested a potential change in groundwater flow direction at that location. Prior to March 2001, the average measured groundwater elevation at well B-4 was 0.54 ft. From March 2001 through June 2004, the average measured groundwater elevation at well B-4 was -2.20 ft, which is lower than the average measured groundwater elevations at the property wells. Although inspections of well B-4 showed no indications of settlement or disturbance to the well, physical changes to the well due the Nisqually earthquake were considered as a possible explanation for the decrease in groundwater elevation at well B-4. The groundwater elevation at replacement well B-4R during this monitoring event was 0.85 ft, which is similar to the groundwater elevations measured at well B-4 prior to March 2001. The higher groundwater elevation at the replacement well suggests that the groundwater flow direction in the vicinity of the Union Station property may have always been to the west and that the decrease in groundwater elevation observed in well B-4 from 2002 to 2004 was likely due to physical changes to the well and/or subsurface in the immediate vicinity of the well. Fluctuations in groundwater elevation since 1997 at each well are graphically presented on Figure 4-2.

4.2 CHEMICAL ANALYSIS RESULTS

ARI conducted the analyses of the groundwater samples for the constituents identified in Section 3.2. Following receipt of the analytical results, the data was validated as described in

Appendix A of the CAP. The results of the data validation performed by Landau Associates and a summary of the data qualifiers are presented in Appendix C.

The analytical results for the property wells and background well B-6R are similar to previous results. Analytical results for petroleum hydrocarbons and related constituents in samples from background well B-4R are lower than previous results. A summary of the analytical results (with data qualifiers added as appropriate) for the August 2009 monitoring event and the seven previous monitoring events at each well is provided in Table 4-2. The associated laboratory data reports are maintained at Landau Associates' office in Edmonds, Washington. The analytical methods, cleanup levels, screening levels, and practical quantitation limits (PQLs) are also shown in Table 4-2.

PQLs for most constituents are listed in the CAP. For those constituents without a PQL in the CAP, a PQL was determined. For diesel-range, motor oil-range, and gasoline-range petroleum hydrocarbons, the PQL was calculated from ARI's method reporting limit. For other constituents, the PQL was based on the method reporting limit and PQLs listed in the CAP for similar compounds. An evaluation of compliance with cleanup or screening levels is provided in Section 5.3.

Graphs showing concentrations over time at all wells were constructed for five constituents: diesel-range and gasoline-range petroleum hydrocarbons, benzene, acenaphthene, and arsenic. These constituents were selected because they consistently have had detections above the PQL in at least several wells and, therefore, can be used for comparisons of concentrations between wells over time. Concentration graphs for these five constituents are shown on Figures 4-3 through 4-7.

In general, the concentrations of the five constituents measured at the property wells in 2009 are similar to concentrations measured previously at the property wells. Only a few changes in measured concentrations were observed for the 2009 monitoring event, as described below.

- Concentrations of diesel-range petroleum hydrocarbons in property wells were lower compared to concentrations measured at property wells during recent monitoring events. The highest concentrations of diesel-range petroleum hydrocarbons detected in the property wells have historically occurred at monitoring well MW-101R; however, these concentrations have steadily decreased from 4,200 micrograms per liter (μg/L) in 2002 to 1,500 μg/L in 2009. For the first time, diesel-range petroleum hydrocarbons were not detected at monitoring wells MW-104 and MW-105, and they continued to be below the reporting limit at MW-108R. Diesel-range petroleum hydrocarbons were also not detected for the first time since 2000 at monitoring well MW-102.
- Concentrations of gasoline-range petroleum hydrocarbons in property wells were higher compared to concentrations measured during previous monitoring events. Gasoline-range petroleum hydrocarbons were detected for the first time since March 2002 at well MW-104, although the concentration is within the concentrations measured historically at this well. The concentration of gasoline-range petroleum hydrocarbon at monitoring well MW-105 is the highest concentration measured at this well during the past eight monitoring events, although it also is within the range measured historically at this well.

- The concentration of benzene, a typical gasoline component, also increased at monitoring well MW-105 during this monitoring event, to a value within its previous range, but decreased at well MW-101R to a value slightly less than its previous range. The benzene concentration measured at well MW-101R during this monitoring event is the lowest concentration measured at this well during the past eight monitoring events.
- The concentration of arsenic at property well MW-105 is the lowest concentration measured at well MW-105 during the past eight monitoring events. The concentration of arsenic at property well MW-104 is the highest concentration measured at well MW-104 during the past eight monitoring events.
- At well MW-105, concentrations of cPAHs increased somewhat compared to the previous range of concentrations measured at this well, although the 2009 concentrations were less than those measured in the past at background well B-4. The increase is evaluated further in Section 5.0
- At the upgradient well B-4R, concentrations of four of the five constituents were lower than the concentrations measured during previous events or not detected. Only the dissolved arsenic concentration was greater than the concentrations previously measured at well B-4.
- At upgradient well B-6R, concentrations of the five constituents were similar to previous concentrations detected at this well.

5.0 EVALUATION OF RESULTS

Following completion of the last eight groundwater monitoring events at the property (performed from June 2001 through August 2009), a statistical evaluation was performed to determine compliance with the cleanup levels at each well and, if appropriate, background-based screening levels. Procedures to be used to evaluate exceedances of cleanup levels are described in the CAP. The CAP specifies that basic statistical parameters such as mean and median be developed and that the UCL be calculated for compliance well data to evaluate exceedances of cleanup levels. In accordance with the CAP, the methodology used for demonstrating statistical compliance followed statistical methods from the Ecology Toxics Cleanup Program guidance document, *Statistical Guidance for Ecology Site Managers* (Ecology 1992), the *Supplement to Statistical Guidance for Ecology Site Managers* (Ecology 1993), and MTCAStat97 compliance module. In general, compliance was determined by calculating the UCL for each detected compound at each property well and comparing it to the cleanup level listed in the CAP. For arsenic, cPAHs, and some petroleum hydrocarbon-related constituents, screening levels were calculated based on concentrations found in one of the background wells.

5.1 CALCULATION OF SCREENING LEVELS BASED ON BACKGROUND FOR SOME CONSTITUENTS

This section discusses the development of background-based screening levels for arsenic, petroleum hydrocarbons, petroleum hydrocarbon related compounds (benzene and acenapthene), and cPAHs.

5.1.1 ARSENIC

Arsenic is present in several wells, including background wells B-4R and B-6R, at levels above the cleanup level listed in the CAP. For the past eight sampling events, the highest concentrations have been found in background well B-6R. Therefore, a background-based groundwater screening level was calculated for arsenic using analytical results for background well B-6R. The background-based screening level was calculated in accordance with WAC 173-340-700(4)(d); the Ecology Toxics Cleanup Program guidance document, *Statistical Guidance for Ecology Site Managers* (Ecology 1992) using MTCA Stat97 Background Module; and the concentrations found in background well B-6R from October 1997 to August 2009. The printed report for the background calculations showing the screening level based on the 90th percentile value as well as the data upon which it is based is provided in Appendix D. The background-based screening level was used for comparison with data from all property monitoring wells because it is considered to represent conditions that could be present upgradient of the property.

5.1.2 PETROLEUM HYDROCARBONS AND RELATED CONSTITUENTS

No cleanup levels are included in the CAP for diesel-range, gasoline-range, or motor oil-range petroleum hydrocarbons. As was done in previous evaluations, the process described in Section 5.1.1 above for calculating a screening level based on the 90th percentile value for arsenic was also used for diesel-range and gasoline-range petroleum hydrocarbons, benzene, and acenaphthene.

Previous evaluations of monitoring data have indicated that the source or sources of petroleum hydrocarbons and related constituents was upgradient of the Union Station property (Landau Associates 2000, 2002, 2003a,b, and 2004). As shown on Figures 4-3, 4-4, 4-5, 4-6, and 4-7, and in Table 4-2, concentrations of petroleum-related constituents, except benzene, in monitoring well B-4 have typically exceeded or been similar to concentrations found in property wells. This indicated that groundwater to the west and downgradient of well B-4 had lower concentrations of these constituents than areas east and upgradient of the property. However, concentrations of petroleum and related constituents measured in the groundwater sample collected at replacement well B-4R during the 2009 monitoring event are below the concentrations found previously at well B-4 and the concentrations found in some property wells. This suggests that the offsite source of the petroleum hydrocarbons may no longer be present or the groundwater plume containing these constituents may no longer be present in the immediate vicinity of well B-4/B-4R.

90th percentile values for diesel-range and gasoline-range petroleum hydrocarbons, benzene, and acenaphthene were calculated using two data sets from monitoring well B-4/B-4R: one with all data from October 1997 to August 2009 and one with data from October 1997 to December 2000 and August 2009, which are the periods when the groundwater elevation at monitoring well B-4/B-4R was greater than those measured at nearby property wells. The calculated 90th percentile value is slightly higher for gasoline-range petroleum hydrocarbons, benzene, and acenaphthene using only the data through December 2000 and the August 2009 data, and slightly lower for diesel-range petroleum hydrocarbons using this limited data set, as shown in Table 5-1. For this report, screening levels for these four constituents will be based on the 90th percentile values using concentrations in monitoring well B-4/B-4R from October 1997 through December 2000 and August 2009, when well B-4/B-4R was clearly upgradient of the property. These screening levels, in addition to the cleanup levels specified in the CAP, if any, were used for evaluation of data from property wells. Motor oil-range petroleum hydrocarbons were not detected in property wells; therefore, a background-based screening level was not calculated.

For other petroleum-related constituents that also appear to be migrating onto the property from off of the property, background-based screening levels were not calculated because concentrations in property wells do not exceed the cleanup levels designated in the CAP. The printed reports for background calculations showing the screening level based on the 90th percentile value for diesel-range

and gasoline-range petroleum hydrocarbons, acenapthene, and benzene using both data sets are provided in Appendix D.

5.1.3 cPAHs

In general, the process described in Sections 5.1.1 and 5.1.2 above for calculating a background-based screening level based on the 90th percentile value for arsenic, petroleum hydrocarbons, and related compounds was also used for benzo(a)anthracene and chrysene. The highest concentrations of benzo(a)anthracene and chrysene have been found in background well B-4. Therefore, a background-based groundwater screening level was calculated using two data sets from background well B-4/B-4R for each constituent: one data set included all data from October 1997 through August 2009, and another data set included all data from October 1997 through December 2000 and August 2009. For each data set, the 90th percentile values were greater than four times the 50th percentile values; therefore, the values for four times the 50th percentile were used as screening levels. The screening levels were lower using only the data through December 2000 and the August 2009 data. For this report, screening levels for these two constituents will be based on four times the 50th percentile values using concentrations in monitoring well B-4/B-4R from October 1997 through December 2000 and August 2009, when well B-4/B-4R was clearly upgradient of the property. The printed reports for the background calculations showing the screening levels based on four times the 50th percentile value, as well as the data upon which it is based, are provided in Appendix D. The background-based screening level was used for comparison with data from all property monitoring wells because it is considered to represent conditions that could be present upgradient of the property.

5.2 STATISTICAL METHODOLOGY FOR CALCULATION OF UCL

In accordance with Ecology's guidance documents, the procedure for calculating the UCL was determined based on the percent of nondetect values and detected values less than the PQL (i.e., censored data) within a data set, as follows:

- **Case 1:** If the data set contained up to 15 percent censored data, the UCL was calculated. Prior to performing the calculation, the nondetect values were replaced by a value of half the detection limit and the detected values less than the PQL were replaced by a value of the detection limit. The distribution of the sample data was then determined (i.e., normal or lognormal distribution) and the appropriate UCL calculation was made. Ecology's software package (MTCAStat, Version 3.0) was used to determine the distribution of each data set and to calculate the UCL.
- **Case 2:** If the data set contained between 15 percent and 50 percent censored data, the UCL was calculated directly using MTCAStat, Version 3.0. Censored data was addressed by Cohen's method directly in MTCAStat.

- **Case 3:** If the data set contained more than 50 percent, but less than 100 percent censored data, the UCL was set equal to the maximum concentration in the data set.

No guidance is available for performing statistical evaluations on data sets that contain 100 percent censored data. For this evaluation, if a compound was not detected in any of the wells during the eight groundwater monitoring events, then no further evaluation was performed for that compound and the compound was omitted from Table 5-2. If a compound was detected at least once during the eight groundwater monitoring events in at least one of the property wells, the constituent was included in the statistical summary provided in Table 5-2. For those wells where the constituent was not detected, the following procedure was performed:

- **Case 0:** If the data set contained 100 percent censored data, no UCL was calculated and the well was determined to be in compliance.

Table 5-2 lists the statistical procedure (coded by case number) applied to each well data set. Also included in Table5-2 are the percentages of censored and uncensored data for each well.

The data set used in each statistical evaluation consisted of eight data points (i.e., the eight groundwater sampling events from June 2001 to August 2009).

5.3 COMPLIANCE EVALUATION

In accordance with the CAP, a comparison of the UCL to the cleanup level for each constituent detected at each well was performed. If the calculated UCL for a property well was less than or equal to the cleanup level, then it was determined that the well was in compliance for that constituent. In some cases, no UCL was calculated because the analyte was not detected or all of the detected values were less than the PQL, as described below. A summary of cleanup and screening levels, the calculated UCLs, and other statistical parameters required by the CAP for each well is provided in Table 5-2. For some petroleum-related constituents and arsenic, the UCL was also compared to a screening level based on concentrations in background well B-4/B-4R or B-6R. The results of the evaluation were similar to those of previous evaluations. The results of the evaluation for each onsite well are discussed below and summarized in Table 5-3.

5.3.1 MONITORING WELL MW-101R

At monitoring well MW-101R, UCLs were calculated for diesel-range petroleum hydrocarbons, gasoline-range petroleum hydrocarbons, arsenic, a few non-carcinogenic PAHs, and BTEX. No UCL was calculated for the other constituents because all of the data for these constituents were censored (below the PQL). Only the UCLs for benzene, acenaphthene, and arsenic exceed the cleanup levels included in the CAP. The UCLs for these constituents, however, were less than the background-based

screening levels. There is no cleanup level for gasoline-range or diesel-range petroleum hydrocarbons in the CAP; therefore, the UCLs for these constituents were compared to the background-based screening levels. Neither background-based screening level was exceeded.

5.3.2 MONITORING WELL MW-102R

At monitoring well MW-102R, UCLs were calculated for arsenic, acenaphthene, diesel-range petroleum hydrocarbons, and naphthalene. No UCL was calculated for the other constituents because all of the data for these constituents were censored. The UCL for arsenic exceeded the cleanup level included in the CAP, but was less than the background-based screening level. All other UCLs were less than the respective cleanup levels in the CAP. There is no cleanup level for diesel-range petroleum hydrocarbons in the CAP. The UCL for diesel-range petroleum hydrocarbons was compared to background-based screening levels. The background-based screening level was not exceeded.

5.3.3 MONITORING WELL MW-104

For monitoring well MW-104, UCLs were calculated for diesel-range petroleum hydrocarbons, acenaphthene, fluorene, phenanthrene, and arsenic. No UCL was calculated for the other constituents because all of the data for these constituents were censored. The UCL for arsenic exceeded the cleanup level included in the CAP, but was less than the background-based screening level. None of the other UCLs exceeded the cleanup levels included in the CAP, or, for diesel-range petroleum hydrocarbons, the background-based screening level.

5.3.4 MONITORING WELL MW-105

For monitoring well MW-105, UCLs were calculated for diesel-range petroleum hydrocarbons, gasoline-range petroleum hydrocarbons, arsenic, several non-carcinogenic PAHs, and BTEX. No UCL was calculated for the other constituents because all of the data for these constituents were censored. The UCL for benzene exceeded the cleanup level included in the CAP and the background-based screening level. The UCLs for arsenic, benzo(a)anthracene, and chrysene exceeded the cleanup levels included in the CAP, but were less than the background-based screening levels. All other UCLs were less than the respective cleanup levels or, for diesel-range and gasoline-range petroleum hydrocarbons, the background-based screening level.

5.3.5 MONITORING WELL MW-107R

For monitoring well MW-107R, UCLs were calculated for diesel-range and gasoline-range petroleum hydrocarbons, arsenic, some SVOCs, and BTEX. No UCL was calculated for the other

constituents because all of the data for these constituents were censored. The UCL for arsenic exceeded the cleanup level included in the CAP, but was less than the background-based screening level. No other UCLs exceeded the respective cleanup levels in the CAP or, for diesel-range and gasoline-range petroleum hydrocarbons, the background-based screening level.

5.3.6 MONITORING WELL MW-108R

For monitoring well MW-108R, UCLs were calculated for naphthalene and arsenic. No UCLs were calculated for the other constituents because all the data for these constituents were censored. Only the UCL for arsenic exceeded the cleanup level included in the CAP, but was less than the background-based screening level.

5.4 SUMMARY OF EVALUATION RESULTS

Acenapthene, arsenic, benzene, and two cPAHs, [benzo(a)anthracene and chrysene] were identified in the previous section as exceeding cleanup levels included in the CAP in one or more wells. Each of these constituents has also been found in one of the background wells at concentrations exceeding the cleanup level in the CAP during the past eight monitoring events; therefore, a background-based screening level was calculated for each. A background-based screening level was also calculated for diesel-range and gasoline-range petroleum hydrocarbons. Only the background-based screening level for benzene was exceeded. The UCL for benzene in well MW-105 has typically been slightly greater than the background-based screening level. Each of the constituents exceeding cleanup or background-based screening levels is discussed below and summarized in Table 5-3.

5.4.1 ACENAPHTHENE

Acenaphthene is a typical constituent of diesel as well as coal tar. Acenaphthene was detected at concentrations above the PQL at all property wells, except MW-108R. Acenaphthene has been consistently detected at concentrations above the PQL in samples collected from background well B-4, although the concentrations decreased for each monitoring event beginning in December 2001. During the most recent monitoring event, acenapthene was detected at replacement well B-4R, but at a concentration below the PQL. As described in Section 5.1.2, the background-based screening level is 441 µg/L. Only the UCL calculated for acenaphthene at well MW-101 (350 µg/L) exceeds the CAP cleanup level (225 µg/L). None of the calculated UCLs exceeded the background-based screening level. The historical presence of acenaphthene in monitoring well B-4 at high concentrations relative to concentrations detected on the property indicates that there was an off-property source or sources of acenaphthene. The decrease of acenapthene at well B-4/B-4R suggests that the offsite source is no longer

present, or the groundwater plume from the offsite source is no longer in the immediate vicinity of well B-4/B-4R. If the source is no longer present or the plume has moved beyond well B-4/B-4R, the concentrations of acenapthene at the property wells should also decrease over time. Acenapthene has shown a steady decrease at well MW-101R over since 2001. Based on the concentrations measured at well B-4/B-4R, the UCL exceedance of the CAP cleanup level in well MW-101 does not represent contamination originating from the property and, therefore, should not trigger implementation of groundwater treatment or an increase in the frequency of groundwater monitoring.

5.4.2 BENZENE

Benzene is a constituent of gasoline and is typically found in groundwater contaminated from relatively recent spills of gasoline. It can also be associated with coal gasification plants; however, groundwater testing prior to and during the RI did not indicate that benzene was present at the property from the coal gasification plant formerly located on the property. In addition, gasoline and other gasoline-related constituents, such as ethylbenzene, toluene, xylenes, and substituted benzenes, are also detected in property monitoring wells, making it likely that the source of the benzene is gasoline. Benzene, along with other petroleum-related constituents, is apparently migrating in groundwater to the property from off-property. Benzene has been detected consistently in the past in samples from monitoring well B-4, but was not detected in well B-4R during the August 2009 monitoring event. Although the background-based screening level used for comparison (251 µg/L) was calculated based on the data from monitoring well B-4 and B-4R, it is likely that the data from these wells do not reflect the maximum concentration in groundwater migrating onto the property. Furthermore, the lack of benzene at replacement well B-4R suggests that the offsite source is no longer present, or the groundwater plume from the offsite source is no longer in the immediate vicinity of well B-4/B-4R. The UCLs for wells MW-101R and MW-105 exceed the CAP cleanup level. The UCL for well MW-105 also exceeds the background-based screening level. These exceedances do not represent contamination originating from the property and, therefore, should not trigger implementation of groundwater treatment or an increase in the frequency of groundwater monitoring.

5.4.3 ARSENIC

Arsenic is a naturally occurring metal in soil and groundwater. Ecology determined that the 90th percentile value for background arsenic concentration in soil in the Puget Sound region is 7 milligrams per kilogram (mg/kg; Ecology 1994). Arsenic has been detected in groundwater at concentrations at or above the PQL in all property wells other than well MW-104, in at least five of the past eight monitoring events. Arsenic was detected in well MW-104 at a concentration exceeding the CAP cleanup level for the

first time during the August 2009 monitoring event. Because the CAP cleanup level is equal to the PQL, the detections resulted in the UCLs exceeding the CAP cleanup level for all of the property wells. Based on the concentrations measured in well B-6R, the background-based screening level is 36 µg/L. There are no exceedances of the background-based screening level. The presence of arsenic in a background well at concentrations greater than those found in property wells indicates that arsenic is present upgradient of the property. The exceedances of the CAP cleanup level do not represent contamination originating from the property and, therefore, should not trigger implementation of groundwater treatment or an increase in the frequency of groundwater monitoring.

5.4.4 cPAHs

cPAHs are constituents often found in motor oil-range petroleum hydrocarbons and asphalt-based products, as well as coal tar. Two cPAHs, benzo(a)anthracene and chrysene, were detected at concentrations above the PQL at well MW-105. These cPAHs and other cPAHs have typically been detected in samples from background well B-4, although the concentrations measured this monitoring event were below the PQL. Because the CAP cleanup level is equal to the PQL, the detections at well MW-105 resulted in the UCLs exceeding the CAP cleanup level at well MW-105. Based on the concentrations measured in well B-4/B-4R, the background-based screening levels for benzo(a)anthracene and chrysene are 6.6 µg/L and 5.7 µg/L, respectively. There are no exceedances of the background-based screening levels at the property wells. Based on the historical data at well B-4, the UCL exceedances of the CAP cleanup levels in well MW-105 do not represent contamination originating from the property and, therefore, should not trigger implementation of groundwater treatment or an increase in the frequency of groundwater monitoring.

6.0 CONCLUSIONS

Evaluation of historical and current analytical results for the property indicates that there are upgradient sources of gasoline-range and diesel-range petroleum hydrocarbons and related constituents that have migrated in groundwater onto the property. For this reason, groundwater concentrations at well B-4 have historically been used to evaluate compliance for gasoline-range and diesel-range petroleum hydrocarbons, acenaphthene, and benzene in property wells. Sometime since the previous groundwater monitoring event in June 2004, well B-4 was paved over and is no longer accessible. This well was replaced by well B-4R, located approximately 20 ft east of well B-4. The groundwater elevation measured at the replacement well was higher than the elevations measured at the property wells. This indicates that the groundwater flow in the vicinity of the property is to the west and that low groundwater elevations measured at well B-4 beginning in March 2001, after the Nisqually earthquake, were likely a result of physical changes to the well and/or subsurface.

Background-based screening levels were calculated for petroleum hydrocarbons, benzene, acenapthene, and cPAHs using data from well B-4/B-4R and for arsenic using data from B-6R. Data from the entire monitoring period, October 1997 through August 2009, were used to calculate screening levels for each constituent. For petroleum hydrocarbons, benzene, acenapthene, and cPAH data from the period when well B-4/B-4R was clearly upgradient of property wells, October 1997 through December 2000 and August 2009 were also used to calculate screening levels. Calculated values from both data sets were similar. The values from October 1997 through December 2000 and August 2009 were used as background-based screening levels for petroleum hydrocarbons, benzene, acenapthene, and cPAHs and used in compliance evaluations.

For each well, UCLs were calculated for detected constituents and compared to cleanup levels identified in the CAP. The only exceedances of CAP cleanup levels are for acenapthene (wells MW-101R and MW-104); benzene (MW-101R and MW-105); arsenic (MW-101R, MW-102R, MW-104, MW-105, MW-107R, MW-108R); benzo(a)anthracene (MW-105); and chrysene (MW-105). These constituents are also present in at least one of the background wells, indicating they have migrated onto the property from offsite. Only the UCL for benzene in MW-105 exceeds the background-based screening level. There are no exceedances of screening levels for diesel-range or gasoline-range petroleum hydrocarbons in any property well. These results are consistent with the results of previous statistical evaluations. Historical results for groundwater samples at B-4 have consistently demonstrated that petroleum-related constituents were migrating from off-property onto the property (Landau Associates 2000, 2002, 2003a,b, and 2004). Concentrations of petroleum-related constituents in 2009 samples from well B-4R are lower than historical concentrations at B-4, indicating that the offsite source

may no be longer present, or the groundwater plume from an offsite source may no longer be in the immediate vicinity of well B-4/B-4R. In any case, because these exceedances do not represent contamination originating on the property, they should not be used to trigger groundwater treatment or an increase in the frequency of groundwater monitoring.

Arsenic was detected in all property wells and in both background wells. The concentrations reported for the background wells were significantly higher than the concentrations reported for the property wells, indicating that arsenic is migrating in groundwater onto the property. A background-based screening level was calculated using the well B-6R data and was used to evaluate compliance. There were no exceedances of the background-based screening level. These arsenic exceedances do not represent contamination originating on the property; therefore, they should not be used to trigger groundwater treatment or an increase in the frequency of groundwater monitoring.

UCLs for two cPAHs [benzo(a)anthracene and chrysene], exceed the CAP cleanup levels at well MW-105, but do not exceed the background-based screening levels. Because the cPAHs exceedances do not represent contamination originating on the property, they should not be used to trigger groundwater treatment or an increase in the frequency of groundwater monitoring.

7.0 RECOMMENDATIONS

Based on the information presented in this report, we recommend that the groundwater monitoring frequency remain at every 5 years and that the list of constituents remain the same for the next groundwater monitoring event.

8.0 USE OF THIS REPORT

This report has been prepared for the exclusive use of Union Station Associates, and applicable regulatory agencies, for specific application to the Union Station property groundwater monitoring program. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau Associates. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

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

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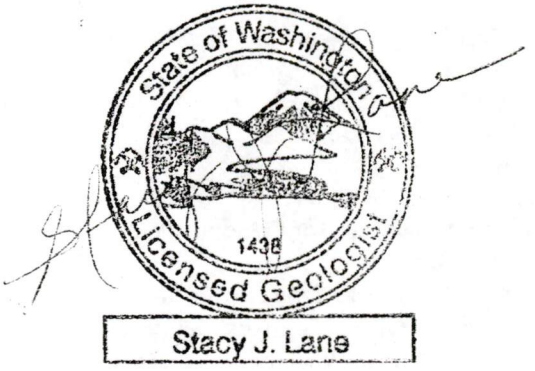

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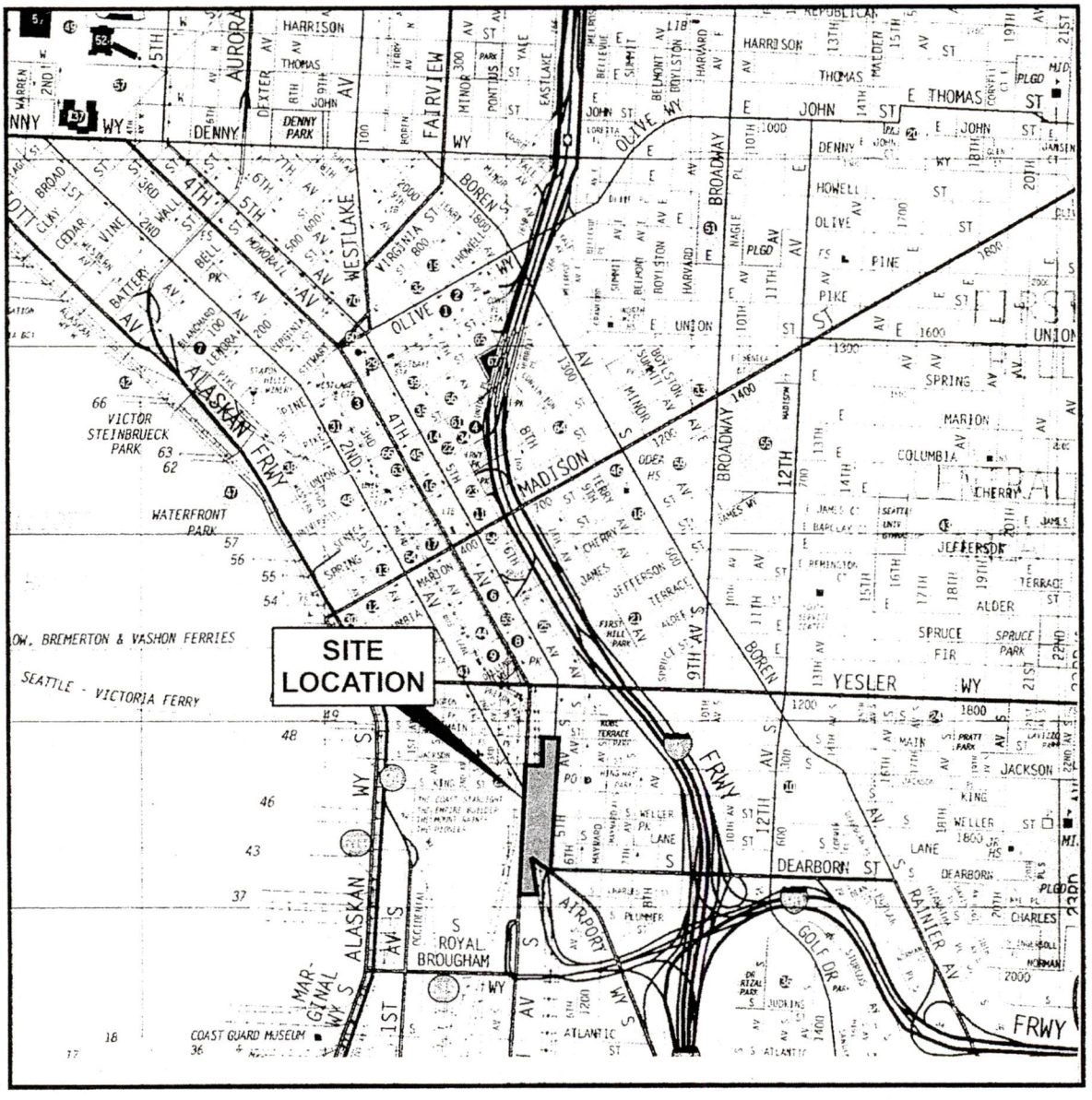

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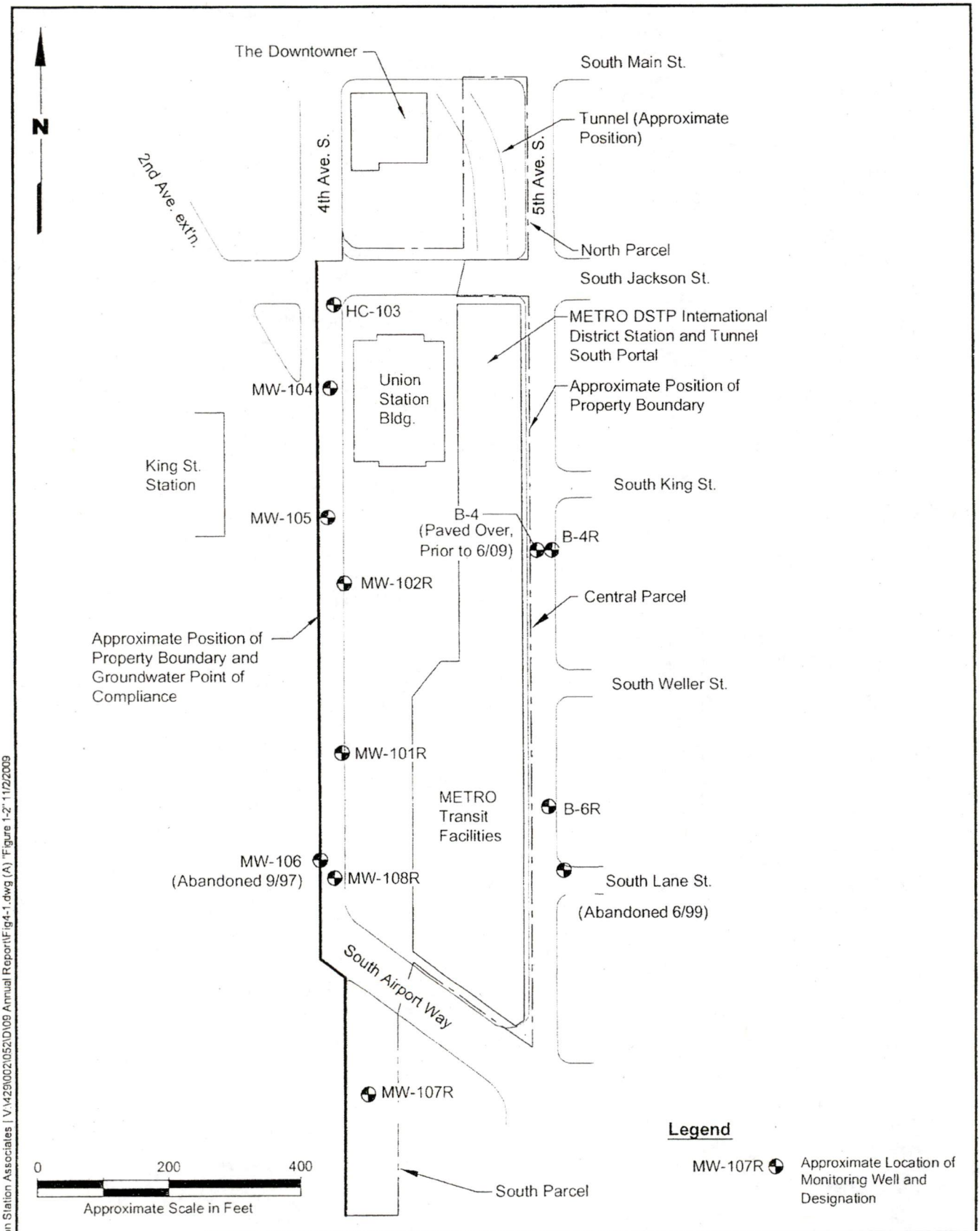
Union Station Seattle, Washington	**Vicinity Map**	Figure 1-1



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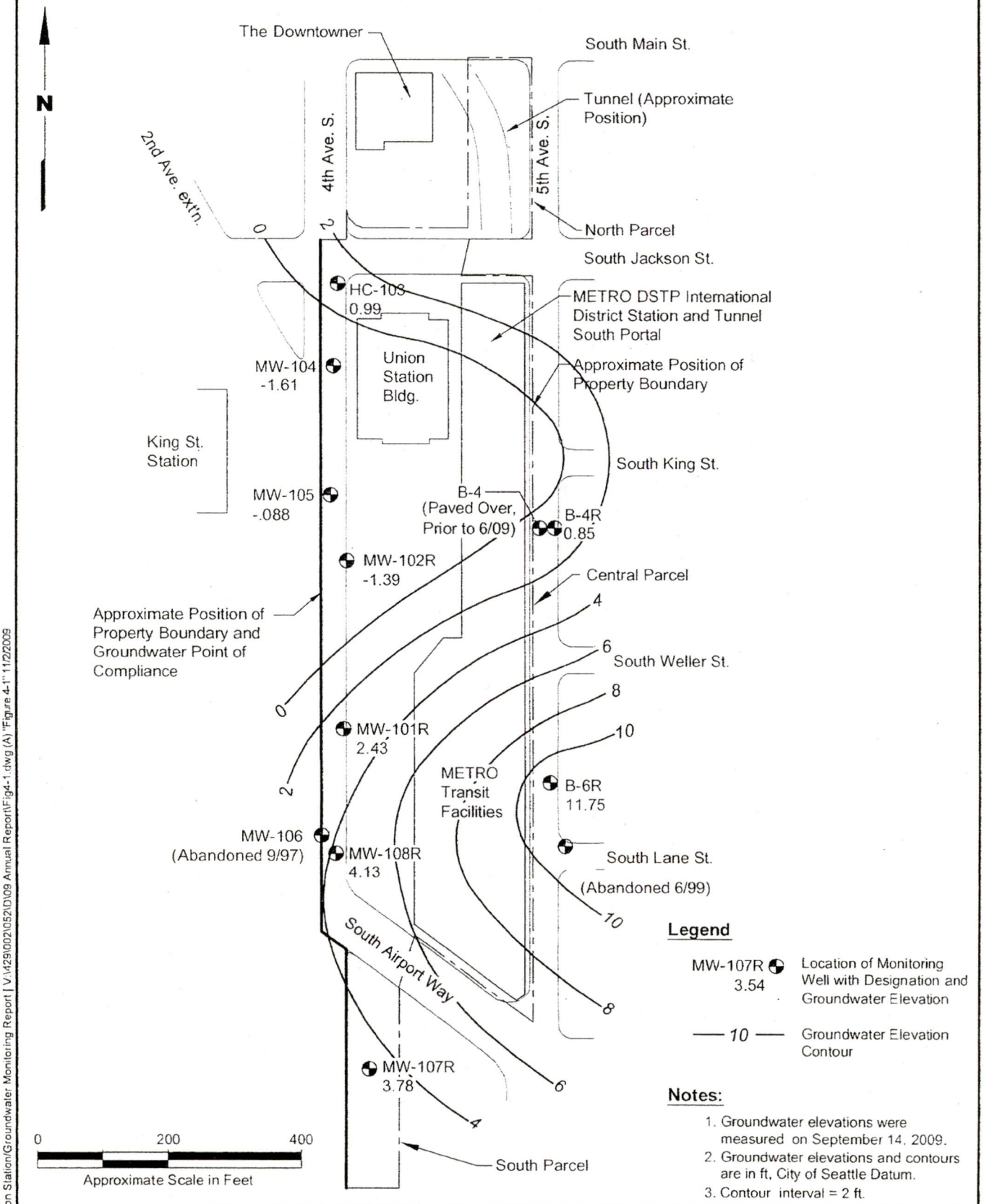
Union Station Seattle, Washington	**Union Station Groundwater Monitoring Well Locations**	Figure **1-2**



Union Station/Groundwater Monitoring Report | V:\429\002\052\D\09 Annual Report\Fig4-1.dwg (A) "Figure 4-1" 11/2/2009

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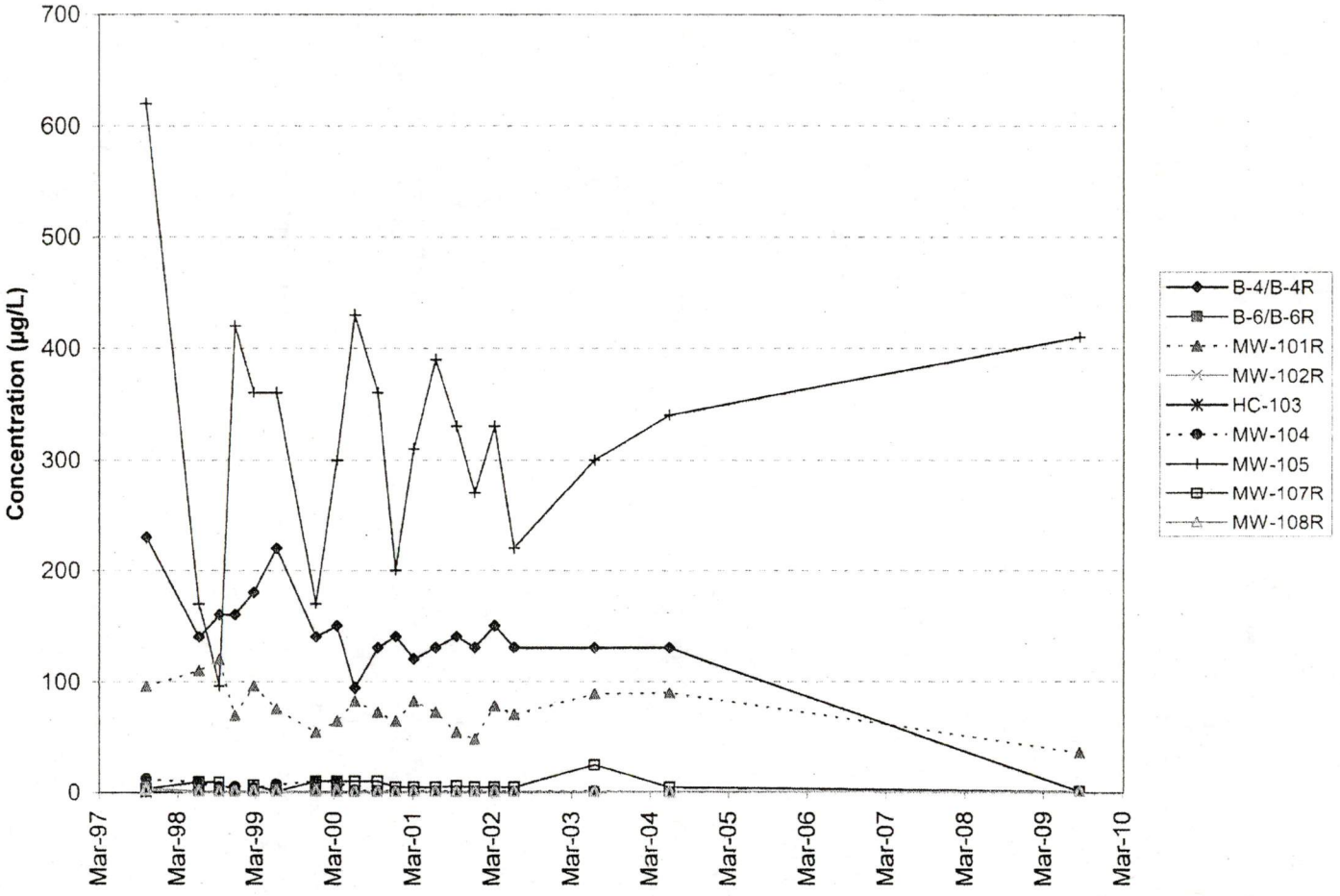
Union Station
Seattle, Washington

Groundwater Elevation Contours: September 2009

Figure
4-1

Benzene Concentrations



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Union Station Seattle, Washington	**Benzene Concentrations vs. Time**	Figure 4-5

TABLE 1-1
CONSENT DECREE GROUNDWATER MONITORING AND REMEDIATION

Groundwater Treatment

Minimize present worth of capital and O&M costs to determine the size and estimated operating time of the system.

Performance monitoring.

Quarterly monitoring during groundwater treatment.

Plot data and do statistical evaluation as directed by Ecology to determine when to terminate treatment or when cleanup standards are met.

Post-Treatment Monitoring

Quarterly monitoring for 8 quarters.

If UCL exceeds cleanup levels and trend analysis does not indicate decreasing trend, return to groundwater treatment.

If UCL exceeds cleanup levels and trend analysis indicates decreasing trend, continue monitoring quarterly. If UCL calculated using the last 8 quarters of data exceeds cleanup levels after 12 quarters of data have been collected, return to groundwater treatment.

If UCL is less than or equal to cleanup levels, commence annual monitoring for 3 years.

Annual monitoring for 3 years.

If any sample exceeds cleanup levels, collect another sample 1 quarter later.

If the second sample is less than cleanup levels return to annual monitoring.

If the second sample exceeds cleanup levels commence quarterly monitoring for 1 year and use triggers in quarterly monitoring above.

If no exceedance of cleanup levels has occurred after 3 years, commence monitoring every 5 years.

Monitoring every 5 years.

If any sample exceeds cleanup levels, collect another sample 1 quarter later.

If the second sample is less than cleanup levels return to monitoring every 5 years.

If the second sample exceeds cleanup levels commence quarterly monitoring (see above).

If UCL is less than or equal to cleanup levels, continue monitoring every 5 years so long as residual hazardous substance concentrations contained onsite exceed site cleanup levels [see WAC 173-340-360 (8)(b)].

Notes:

1. This table was prepared for and originally presented in the CAP.
2. As described in Appendix A of the CAP, alternate statistical methods may be used upon approval by Ecology.

TABLE 3-1
MONITORING WELL SUMMARY
UNION STATION

Well	Installation Date	Abandonment Date	Northing	Easting	Ground Surface Elevation (a)	Reference Elevation (b)	Top of Screen Elevation	Bottom of Screen Elevation	Top of Native Soil Elevation	Notes
HC-101	4-96	3-98	1583.27	1695.87	8.80	9.09	3.8	-6.2	NA	Well was damaged during construction activities and abandoned
MW-101R	3-98	N/A	1583.24	1695.87	9.77	9.06	2.8	-7.2	NA	Replacement well for HC-101; Boring could not be advanced beyond 16 ft BGS.
HC-102	4-96	3-98	1837.46	1700.69	9.30	8.64	4.3	-5.7	NA	Well was damaged during construction activities and abandoned
MW-102R	3-98	N/A	1837.26	1700.58	9.97	8.60	-3.7	-13.7	-14.7	Replacement well for HC-102.
HC-103	4-96	N/A	2253.49	1687.23	10.30	8.99	5.5	-4.5	NA	
MW-104	11-96	N/A	2129.50	1680.99	10.65	9.59	-0.1	-10.1	-12.6	
MW-105	11-96	N/A	1935.82	1676.45	10.07	8.92	-4.5	-14.0	-15.5	
MW-106	11-96	9-97	1422.63	1662.65	9.50	9.07	-1.0	-11.0	-13.5	Well was abandoned to accommodate construction.
MW-107	11-96	10-98	1048.59	1728.86	13.30	12.59	-1.7	-11.7	-12.7	Well was abandoned to accommodate construction.
MW-107R	2-99	N/A	1067.59	1734.64	12.99	12.43	-1.5	-7.0	-10.0	Replacement well for MW-107
MW-108	9-97	4-98	NA	NA	NA	NA	NA	NA	NA	Replacement well for MW-106; well was later damaged during construction activities and abandoned.
MW108R	4-98	N/A	1395.75	1684.25	9.56	8.78	-3.4	-13.4	-14.4	Replacement well for MW-108.
B-4	12-85	Paved over between 6/04 and 8/09	1886.32	1994.74	36.80	36.36	-4.6	-9.6	-12.1	Well was paved over by Seattle DOT
B-4R	08-09	N/A	221730.54 (c)	1271778.6 (c)	36.74	36.35	5.74	-4.26	NA	Replacement well for B-4
B-6	12-85	6-99	1406.35	2033.29	34.30	34.08	-0.9	-5.7	NA	Well was abandoned to accommodate construction.
B-6R	11-99	N/A	1501.99	2010.27	34.38	34.38	10.4	-9.6	-17.1	Replacement well for B-6.

NA = Not available
N/A = Not applicable.

(a) Ground surface elevation at time of well installation.
(b) Reference elevation is used for measuring groundwater levels and represents most current survey information.
(c) Elevations are in NAVD 88 Datum

Note: All elevations are in feet, City of Seattle Datum.

TABLE 4-1
GROUNDWATER ELEVATION SUMMARY
SEPTEMBER 2009
UNION STATION

Well	Measuring Point Elevation	Measured Depth to Groundwater	Groundwater Elevation
B-4R	36.35	35.50	0.85
B-6R	34.38	22.63	11.75
MW-101R	9.06	6.63	2.43
MW-102R	8.60	9.99	-1.39
HC-103	8.99	8.00	0.99
MW-104	9.59	11.20	-1.61
MW-105	8.92	9.80	-0.88
MW-107R	12.43	8.65	3.78
MW-108R	8.78	4.65	4.13

Note: All elevations are in feet, City of Seattle Datum.

TABLE 4-2
SUMMARY OF GROUNDWATER ANALYTICAL DATA
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (µg/L)	Background-based Screening Level (a) (µg/L)	Practical Quantitation Limits (µg/L)	B-4 DH51I 6/22/2001	B-4 DQ61G 9/26/2001	B-4 DY69A 12/19/2001	B-4 EE79H 3/20/2002	B-4 EM41H 6/19/2002	B-4 FP47G/P 06/25/03	B-4 GS18I 06/09/04	B-4R PL85B 08/25/09
TPH (µg/L)												
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400(e)	400 (b)	6400 J	8000 J	2600	6100	3800	15000	5100	250 U
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (b)	1200	2900 J	570	2500 U	620	6800	2000	500 U
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500(e)	600 (b)	5200	6500	6000 J	5700	5400	3300	1800	280
cPAH (µg/L)												
Benzo(a)anthracene	8270 (c)	1.0	6.6	1.0	1.0	8.3	1.7	1.4	0.41	2.1	2.0	0.37
Chrysene	8270 (c)	1.0	5.7	1.0	0.83	7.4	1.5	1.3 J	0.36	2.0	1.7	0.45
Benzo(b)fluoranthene	8270 (c)	1.0		1.0	0.22	4.3	0.61	0.46	0.10 U	0.77	1.1	0.17
Benzo(k)fluoranthene	8270 (c)	1.0		1.0	0.33	5.6	1.2	1.0	0.10 U	0.86	1.1	0.26
Benzo(a)pyrene	8270 (c)	1.0		1.0	0.34	7.2	1.3	1.0	0.12	1.1	1.2	0.36
Indeno(1,2,3-cd)pyrene	8270 (c)	1.0		1.0	0.15	3.6	0.57	0.53	0.10 U	0.55	0.44	0.17
Dibenzo(a,h)anthracene	8270 (c)	1.0		1.0	0.10 U	0.98	0.20 U	0.20 M	0.10 U	0.16	0.28	0.10 U
ncPAH (µg/L)												
Naphthalene	8270 (c)	9880		10	3200	2600 J	2700 J	2400 J	1200	710 J	0.41	4.6
2-Methylnaphthalene	8270 (c)			10	510	450	480	510	260	160	0.46	1.0 U
Acenaphthylene	8270 (c)			10	2.0	6.5	3.2	3.0	1.0	1.6	2.9	1.0 U
Acenaphthene	8270 (c)	225	440(e)	10	350	350	330 J	320	270	120	69	6.6
Fluorene	8270 (c)	2422		10	69	120	88	96	78	45	18	1.0 U
Phenanthrene	8270 (c)			10	79	130	110	110	69	46	7.8	1.7
Anthracene	8270 (c)	25900		10	13	22	16	15	10	9.1	4.6	1.0 U
Fluoranthene	8270 (c)	27.1		10	9.3	23	14	11	9.1	8.3	9.0	1.0 U
Pyrene	8270 (c)	777		10	9.8	32	14	11	9.1	12	12	1.0 U
Benzo(g,h,i)perylene	8270 (c)			10	1.0 U	3.6	1.0 U	1.0 U	1.0 U	0.53	0.45	1.0 U
BTEX (µg/L)												
Benzene	8260/8021	71	250 (e)	5	130	140	130	150	130	130	130	1.0 U
Toluene	8260/8021	485		5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	1.0 U
Ethylbenzene	8260/8021	276		5	220	230	190	230	180	160	110	1.0 U
m,p-Xylene	8260/8021			5 (d)	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	1.0 U
o-Xylene	8260/8021				5.4	6.0	5.0 U	5.6	5.0 U	5.0 U	5.0 U	1.0 U
DISSOLVED METALS (µg/L)												
Arsenic	200.8	4	37(e)	4	3	3	3 J	3	3.2	7	4	13
CONVENTIONALS												
Total Dissolved Solids (µg/L)	160.1				810,000 J	780,000 J	770,000	740,000	790,000	790,000	751,000	538,000
Total Suspended Solids (µg/L)	160.2				1,000,000 J	400,000	1,400,000 J	920,000	680,000	270,000	938,000	8,300,000
pH	Field				NM	NM	NM	NM	NM	NM	NM	7.36
Specific Conductance (µmhos)	Field				NM	NM	NM	NM	NM	NM	NM	1398
Temperature (°C)	Field				NM	NM	NM	NM	NM	NM	NM	15.01

TABLE 4-2
SUMMARY OF GROUNDWATER ANALYTICAL DATA
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (µg/L)	Background-based Screening Level (a) (µg/L)	Practical Quantitation Limits (µg/L)	B-6R DH51D 6/22/2001	B-6R DQ61H 9/26/2001	B-6R DY69B 12/19/2001	B-6R EE79I 3/20/2002	MW-109R Dup of B-6R EE79G 3/20/2002	B-6R EM41I 6/19/2002	B-6R FP47H/Q 06/25/03	B-6R GS18J 06/09/04	B6R PL85A 08/25/09
TPH (µg/L)													
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400(e)	400 (b)	250 U	250 U	250 U	250 U	250 U	250	250 U	250 U	250 U
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (b)	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500(e)	600 (b)	250 U	250 U	250 UJ	250 U	250 U	250 U	250 U	250 U	250 U
cPAH (µg/L)													
Benzo(a)anthracene	8270 (c)	1.0	6.6	1.0	0.10 U	0.26	0.10 U	0.10 U	0.10 U	0.10 U	0.020	0.035	0.19
Chrysene	8270 (c)	1.0	5.7	1.0	0.10 U	0.23	0.10 U	0.10 U	0.10 U	0.10 U	0.020	0.030	0.21
Benzo(b)fluoranthene	8270 (c)	1.0		1.0	0.10 U	0.15	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.016	0.15
Benzo(k)fluoranthene	8270 (c)	1.0		1.0	0.10 U	0.16	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.016	0.11
Benzo(a)pyrene	8270 (c)	1.0		1.0	0.10 U	0.21	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.023	0.19
Indeno(1,2,3-cd)pyrene	8270 (c)	1.0		1.0	0.10 U	0.11	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.016	0.11
Dibenzo(a,h)anthracene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.10 U
ncPAH (µg/L)													
Naphthalene	8270 (c)	9880		10	1.0 U	7.1 J	4.9 J	4.0 J	2.9 J	1.0 U	0.14	0.13 U	2.6
2-Methylnaphthalene	8270 (c)			10	1.0 U	1.4	1.0 U	1.0 U	1.0 U	1.0 U	0.090	0.030 U	1.0 U
Acenaphthylene	8270 (c)			10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.010 U	0.010 J	1.0 U
Acenaphthene	8270 (c)	225	440(e)	10	1.0 UJ	1.1	1.0 U	1.0 U	1.0 U	1.0 U	0.050	0.14 U	1.0 U
Fluorene	8270 (c)	2422		10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.020	0.053	1.0 U
Phenanthrene	8270 (c)			10	1.0 U	1.3	1.0 U	1.0 U	1.0 U	1.0 U	0.080	0.16	1.0 U
Anthracene	8270 (c)	25900		10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.040	0.065	1.0 U
Fluoranthene	8270 (c)	27.1		10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.060	0.081	1.0 U
Pyrene	8270 (c)	777		10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.080	0.11	1.0 U
Benzo(g,h,i)perylene	8270 (c)			10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.010 U	0.019	1.0 U
BTEX (µg/L)													
Benzene	8260/8021	71	250 (e)	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.2 U	1.0 U
Toluene	8260/8021	485		5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.2 U	1.0 U
Ethylbenzene	8260/8021	276		5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.2 U	1.0 U
m,p-Xylene	8260/8021			5 (d)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.4 U	1.0 U
o-Xylene	8260/8021			5 (d)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.2	1.0 U
DISSOLVED METALS (µg/L)													
Arsenic	200.8	4	37(e)	4	33	31	22 J	27 J	38 J	25	24	30	31
CONVENTIONALS													
Total Dissolved Solids (µg/L)	160.1				1,200,000 J	1,100,000 J	780,000	780,000 J	1,100,000 J	890,000	790,000	923,000	891,000
Total Suspended Solids (µg/L)	160.2				370,000 J	500,000	1,400,000 J	360,000 J	790,000 J	1,100,000	430,000	940,000	1,040,000
pH	Field				6.66	6.75	NM	6.65	6.90	6.95	7.06	6.89	7.39
Specific Conductance (µmhos)	Field				1698	2370	NM	1340	1733	1348	1708	1570	2392
Temperature (°C)	Field				16.8	16.1	NM	15.0	14.1	16.1	16.8	16.6	15.54

TABLE 4-2
SUMMARY OF GROUNDWATER ANALYTICAL DATA
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (µg/L)	Background-based Screening Level (n) (µg/L)	Practical Quantitation Limits (µg/L)	MW-101R DH51F 6/22/2001	MW-109 Dup of MW-101R DH51E 6/22/2001	MW-101R DQ61A 9/26/2001	MW-101R DY69C 12/19/2001	MW-101R EE79A 3/20/2002	MW-101R EM41A 6/19/2002	MW-109 Dup of MW-101R EM41B 6/19/2002	MW-101R FP47A/J 06/25/03	MW-109 Dup of MW-101R FP47F/O 06/25/03
TPH (µg/L)													
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400(e)	400 (b)	2900	2900	3400	2400	3300	4200	3800	3800	3900
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (b)	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500(e)	600 (b)	6100	7400	5300	6300 J	6300	5400	5400	4800	4800
cPAH (µg/L)													
Benzo(a)anthracene	8270 (c)	1.0	6.6	1.0	0.27	0.29	0.37	0.16	0.25	0.17	0.17	0.20	0.20
Chrysene	8270 (c)	1.0	5.7	1.0	0.18	0.20	0.27	0.15	0.14 J	0.14	0.13	0.15	0.13
Benzo(b)fluoranthene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.030	0.020
Benzo(k)fluoranthene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.030	0.040
Benzo(a)pyrene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.040	0.040
Indeno(1,2,3-cd)pyrene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U
Dibenzo(a,h)anthracene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U
ncPAH (µg/L)													
Naphthalene	8270 (c)	9880		10	3100	3200	4900 J	2000 J	3400 J	3200	3400	2900 J	2000 J
2-Methylnaphthalene	8270 (c)			10	600	570	700	350	570	530	530	490 J	600 J
Acenaphthylene	8270 (c)			10	1.5	1.3	2.4	1.0 J	1.5	2.4	2.1	0.58 J	0.53 J
Acenaphthene	8270 (c)	225	440(e)	10	330 J	330 J	350	240 J	330	310	310	260	280
Fluorene	8270 (c)	2422		10	78	64	70	72	75	83	88	79	90
Phenanthrene	8270 (c)			10	74	63	73	97	77	92	99	63	68
Anthracene	8270 (c)	25900		10	7.1	6.8	6.0	6.9	7.4	6.5	6.4	7.2	8.2
Fluoranthene	8270 (c)	27.1		10	6.1	5.8	5.4	5.4	4.7	5.4	5.2	5.4	5.3
Pyrene	8270 (c)	777		10	6.0	5.5	5.2	5.1	4.2	5.0	5.2	6.1	6.1
Benzo(g,h,i)perylene	8270 (c)			10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.010 U	0.010 U
BTEX (µg/L)													
Benzene	8260/8021	71	250 (e)	5	72	64	54	48 J	78	70	69	89	96
Toluene	8260/8021	485		5	14	18	8.4	5.0 UJ	7.6	5.7	5.5	5.0 U	4.1
Ethylbenzene	8260/8021	276		5	250 J	130 J	170	130 J	260	250	240	300	260
m,p-Xylene	8260/8021			5 (d)	83 J	110 J	60	46 J	92	46	43	45	48
o-Xylene	8260/8021			5 (d)	39 J	52 J	27	18 J	37	23	22	17	19
DISSOLVED METALS (µg/L)													
Arsenic	200.8	4	37(e)	4	12	12	14	10 J	11	10	11	11	11
CONVENTIONALS													
Total Dissolved Solids (µg/L)	160.1				1000000 J	1100000 J	1000000 J	1100000	970000	1000000	1000000	960,000	950,000
Total Suspended Solids (µg/L)	160.2				76000 J	98000 J	79000	65000 J	71000	72000	72000	79,000	78,000
pH	Field				6.83	6.81	7.25	NM	6.70	6.92	6.98	6.96	6.96
Specific Conductance (µmhos)	Field				2535	2908	2310	NM	2540	1860	2418	1,510	1,510
Temperature (°C)	Field				14.8	14.9	16.4	NM	14.2	12.8	13.6	14.8	14.8

TABLE 4-2
SUMMARY OF GROUNDWATER ANALYTICAL DATA
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (µg/L)	Background-based Screening Level (a) (µg/L)	Practical Quantitation Limits (µg/L)	MW-101R GS18F 06/09/04	MW-109 Dup of MW-101R GS18G 06/09/04	MW-101R PL72A 08/24/09	MW-109R Dup of MW-101R PL72E 08/24/09
TPH (µg/L)								
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400(e)	400 (b)	2700	2600	1600	1500
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (b)	500 U	500 U	500 U	500 U
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500(e)	600 (b)	4100	4100	6000	6000
cPAH (µg/L)								
Benzo(a)anthracene	8270 (c)	1.0	6.6	1.0	0.23	0.25	0.28 J	0.43 J
Chrysene	8270 (c)	1.0	5.7	1.0	0.16	0.17	0.20 J	0.33 J
Benzo(b)fluoranthene	8270 (c)	1.0		1.0	0.048 J	0.048 J	0.10 U	0.10 U
Benzo(k)fluoranthene	8270 (c)	1.0		1.0	0.048 J	0.071	0.10 U	0.10
Benzo(a)pyrene	8270 (c)	1.0		1.0	0.052	0.060	0.10 U	0.14
Indeno(1,2,3-cd)pyrene	8270 (c)	1.0		1.0	0.050 U	0.050 U	0.10 U	0.10 U
Dibenzo(a,h)anthracene	8270 (c)	1.0		1.0	0.050 U	0.050 U	0.10 U	0.10 U
ncPAH (µg/L)								
Naphthalene	8270 (c)	9880		10	1800	1800	1500	1400
2-Methylnaphthalene	8270 (c)			10	280	290	440	400
Acenaphthylene	8270 (c)			10	2.0	2.3	1.0 U	1.0 U
Acenaphthene	8270 (c)	225	440(e)	10	250	260	240	220
Fluorene	8270 (c)	2422		10	72	79	85	76
Phenanthrene	8270 (c)			10	66	75	93	86
Anthracene	8270 (c)	25900		10	6.5	7.6	7.6	7.1
Fluoranthene	8270 (c)	27.1		10	5.0	5.6	6.8	6.0
Pyrene	8270 (c)	777		10	4.6	5.3	6.2	5.3
Benzo(g,h,i)perylene	8270 (c)			10	0.050 U	0.050 U	1.0 U	1.0 U
BTEX (µg/L)								
Benzene	8260/8021	71	250 (e)	5	90	92	36	36
Toluene	8260/8021	485		5	5.5	6.0	2.2	2.3
Ethylbenzene	8260/8021	276		5	210	230	150	150
m,p-Xylene	8260/8021			5 (d)	38	43	25	25
o-Xylene	8260/8021			5 (d)	17	19	18 J	1.0 UJ
DISSOLVED METALS (µg/L)								
Arsenic	200.8	4	37(e)	4	12	12	9.1	9.5
CONVENTIONALS								
Total Dissolved Solids (µg/L)	160.1				1,250,000	1,390,000	1,130,000	1,080,000
Total Suspended Solids (µg/L)	160.2				284,000 J	90,100 J	60,400	59,300
pH	Field				6.67	6.67	6.88	6.88
Specific Conductance (µmhos)	Field				2,012	2,012	2,899	2,899
Temperature (°C)	Field				15.3	15.3	15.0	15.0

TABLE 4-2
SUMMARY OF GROUNDWATER ANALYTICAL DATA
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (µg/L)	Background-based Screening Level (a) (µg/L)	Practical Quantitation Limits (µg/L)	MW102R DH51B 6/22/2001	MW-102R DQ61B 9/26/2001	MW-109 Dup of MW102R DQ61I 9/26/2001	MW-102R DY69D 12/19/2001	MW-102R EE79B 3/20/2002	MW-102R EM41C 6/19/2002	MW-102R FP47B/K 06/25/03	MW-102R GS18E 06/09/04	MW-102R PL72B 08/24/09
TPH (µg/L)													
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400(e)	400 (b)	320	340	320	370	300	400	400	250 U	250 U
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (b)	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500(e)	600 (b)	250 U	250 U	250 U,J	250 U,J	250 U	250 U	250 U	250 U	250 U
cPAH (µg/L)													
Benzo(a)anthracene	8270 (c)	1.0	6.6	1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.030 J	0.12	0.10 U
Chrysene	8270 (c)	1.0	5.7	1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.020 J	0.098	0.10 U
Benzo(b)fluoranthene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U,J	0.064	0.10 U
Benzo(k)fluoranthene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U,J	0.068	0.10 U
Benzo(a)pyrene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U,J	0.064	0.10 U
Indeno(1,2,3-cd)pyrene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U,J	0.069	0.10 U
Dibenzo(a,h)anthracene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U,J	0.074	0.10 U
ncPAH (µg/L)													
Naphthalene	8270 (c)	9880		10	1.0 U	8.4 J	1.0 J	12 J	22 J	1.5	0.060 U,J	0.24 U	3.1
2-Methylnaphthalene	8270 (c)			10	1.0 U	1.8	1.0 U	2.1	2.6	1.0 U	0.12 J	0.67	1.0 U
Acenaphthylene	8270 (c)			10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.16 J	0.28	1.0 U
Acenaphthene	8270 (c)	225	440(e)	10	12 J	11	12	15 J	17	13	11	13	11
Fluorene	8270 (c)	2422		10	3.2	2.9	3.0	3.4	3.7	2.6	2.9	3.2	2.8
Phenanthrene	8270 (c)			10	4.3	4.3	4.3	3.3	3.8	1.0 U	2.7	3.8	3.5
Anthracene	8270 (c)	25900		10	1.0 U	1.0 U	1.1	1.0 U	1.1	1.0 U	0.84 J	0.98	1.0 U
Fluoranthene	8270 (c)	27.1		10	1.0 U	1.0	1.1	1.0 U	1.0 U	1.0 U	0.48 J	1.0	1.0 U
Pyrene	8270 (c)	777		10	1.0 U	1.0 U	1.0	1.0 U	1.0 U	1.0 U	0.40 J	0.85	1.0 U
Benzo(g,h,i)perylene	8270 (c)			10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.010 U,J	0.059	1.0 U
BTEX (µg/L)													
Benzene	8260/8021	71	250 (e)	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.2 U	1.0 U
Toluene	8260/8021	485		5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.2 U	1.0 U
Ethylbenzene	8260/8021	276		5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.2 U	1.0 U
m,p-Xylene	8260/8021			5 (d)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.4 U	1.0 U
o-Xylene	8260/8021			5 (d)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.2 U	1.0 U
DISSOLVED METALS (µg/L)													
Arsenic	200.8	4	37(e)	4	7	11	11	3 J	5	4	2 U	6	6.8
CONVENTIONALS													
Total Dissolved Solids (µg/L)	160.1				2,100,000 J	2,100,000 J	2,000,000 J	1,900,000	1,800,000	1,900,000	1,500,000	1,590,000	1,700,000
Total Suspended Solids (µg/L)	160.2				67,000 J	72,000	83,000	61,000 J	51,000	41,000	51,000	40,600	45,500
pH	Field				6.60	6.53	6.53	6.47	6.64	6.70	6.80	6.65	6.43
Specific Conductance (µmhos)	Field				3,875	3,750	3,750	3,740	3,090	3,753	2,710	2,415	3,262
Temperature (°C)	Field				16.0	16.2	16.1	15.1	14.2	15.0	15.6	15.9	16.18

TABLE 4-2
SUMMARY OF GROUNDWATER ANALYTICAL DATA
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (µg/L)	Background-based Screening Level (a) (µg/L)	Practical Quantitation Limits (µg/L)	MW-104 DH51C 6/22/2001	MW-104 DQ61C 9/26/2001	MW-104 DY69E 12/19/2001	MW-104 EE79C 3/20/2002	MW-104 EM41D 6/19/2002	MW-104 FP47C/L 06/25/03	MW-104 GS18B 06/09/04	MW-104 PL72D 08/24/09
TPH (µg/L)												
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400(e)	400 (b)	380	390	470	480	360	460	260	250 U
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (b)	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500(e)	600 (b)	310	260	260 J	290	250 U	250 U	250 U	340
cPAH (µg/L)												
Benzo(a)anthracene	8270 (c)	1.0	6.6	1.0	0.13	0.10 U	0.10 U	0.10 U	0.10 U	0.090	0.070	0.14
Chrysene	8270 (c)	1.0	5.7	1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.060	0.047	0.13
Benzo(b)fluoranthene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.10 U
Benzo(k)fluoranthene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.10 U
Benzo(a)pyrene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.10 U
Indeno(1,2,3-cd)pyrene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.10 U
Dibenzo(a,h)anthracene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.10 U
ncPAH (µg/L)												
Naphthalene	8270 (c)	9880		10	1.0 U	1.0 U,I	1.0 U	1.0 U,I	1.0 U	0.40	0.75 U	4.5
2-Methylnaphthalene	8270 (c)			10	1.0 U	4.9	1.0 U	2.0	1.0 U	9.3	1.5	7.8
Acenaphthylene	8270 (c)			10	1.0 U	1.4	1.0 U	1.0 U	2.3	0.47	0.70	1.0 U
Acenaphthene	8270 (c)	225	440(e)	10	43 J	46	64 J	50	50	48	45	55
Fluorene	8270 (c)	2422		10	11	10	11	10	6.8	8.5	4.0	15
Phenanthrene	8270 (c)			10	1.0 U	1.6	1.0 U	1.2	1.0 U	0.010 U	0.36	15
Anthracene	8270 (c)	25900		10	1.3	1.0	1.1	1.2	1.0 U	0.77	0.010 U	1.7
Fluoranthene	8270 (c)	27.1		10	1.5	1.5	1.7	1.4	1.4	1.4	1.4	1.8
Pyrene	8270 (c)	777		10	1.1	1.1	1.4	1.0	1.1	1.3	1.1	1.3
Benzo(g,h,i)perylene	8270 (c)			10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.010 U	0.010 U	1.0 U
BTEX (µg/L)												
Benzene	8260/8021	71	250 (e)	5	1.7	1.0	1.6	2.1	1.1	1.5	0.7	1.0
Toluene	8260/8021	485		5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.2 U	1.0 U
Ethylbenzene	8260/8021	276		5	1.5	1.0 U	1.0 U	1.4	1.0 U	1.1	0.6	1.0 U
m,p-Xylene	8260/8021			5 (d)	2.2	1.8	1.9	2.7	1.9	1.6	1.5	1.0 U
o-Xylene	8260/8021			5 (d)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.2 U	1.0 U
DISSOLVED METALS (µg/L)												
Arsenic	200.8	4	37(e)	4	1	1	1 J	1	1.0	1	2	7.0
CONVENTIONALS												
Total Dissolved Solids (µg/L)	160.1				550000 J	530000 J	550000	530000	530000	510000	500000	502000
Total Suspended Solids (µg/L)	160.2				19000 J	5100	11000 J	19000	4900	6200	7900	14800
pH	Field				6.74	7.26	6.82	7.27	7.32	7.26	6.86	7.88
Specific Conductance (µmhos)	Field				955	1020	1270	920	1088	641	930	1314
Temperature (°C)	Field				14.7	16.5	13.2	11.4	14.6	15.4	15.2	16.60

TABLE 4-2
SUMMARY OF GROUNDWATER ANALYTICAL DATA
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (µg/L)	Background-based Screening Level (a) (µg/L)	Practical Quantitation Limits (µg/L)	MW-105 DH51G 6/22/2001	MW-105 DQ61D 9/26/2001	MW-105 DY69F 12/19/2001	MW-105 EE79D 3/20/2002	MW-105 EM41E 6/19/2002	MW-105 FP47D/M 06/25/03	MW-105 GS18D 06/09/04	MW-105 PL85D 08/25/09
TPH (µg/L)												
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400(e)	400 (b)	1200	1600	1400	1600	1500	1400	760	250 U
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (b)	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500(e)	600 (b)	2400 J	2300 J	2100 J	2000	1600 J	1500	1100	3000
cPAH (µg/L)												
Benzo(a)anthracene	8270 (c)	1.0	6.6	1.0	0.52	0.41	0.77 J	0.85	0.24	0.24	0.46	1.2
Chrysene	8270 (c)	1.0	5.7	1.0	0.35	0.27	0.56 J	0.66 J	0.16	0.15	0.28	1.1
Benzo(b)fluoranthene	8270 (c)	1.0		1.0	0.12	0.10 U	0.20 J	0.17	0.10 U	0.030	0.10	0.55
Benzo(k)fluoranthene	8270 (c)	1.0		1.0	0.13	0.10 U	0.32 J	0.36	0.10 U	0.040	0.12	0.74
Benzo(a)pyrene	8270 (c)	1.0		1.0	0.15	0.10 U	0.40 J	0.41	0.10 U	0.040	0.14	1.0
Indeno(1,2,3-cd)pyrene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.19 J	0.15	0.10 U	0.010 U	0.068	0.48
Dibenzo(a,h)anthracene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 UJ	0.10 U	0.10 U	0.010 U	0.053	0.17
ncPAH (µg/L)												
Naphthalene	8270 (c)	9880		10	770	610 J	860 J	940 J	410	480 J	540	240
2-Methylnaphthalene	8270 (c)			10	110	89	74	96	76	71	62	29
Acenaphthylene	8270 (c)			10	1.2	1.7	1.2	1.0 U	1.1	0.29 J	0.98	1.0 U
Acenaphthene	8270 (c)	225	440(e)	10	70	67	80 J	79	75	54	48	50
Fluorene	8270 (c)	2422		10	32	29	35	30	32	24	20	19
Phenanthrene	8270 (c)			10	59	60	73	65	57	40	34	30
Anthracene	8270 (c)	25900		10	7.0	6.4	9.6	8.1	5.8	5.6	4.8	4.3
Fluoranthene	8270 (c)	27.1		10	9.5	8.1	11	11	7.4	5.9	6.5	6.0
Pyrene	8270 (c)	777		10	8.1	6.6	9.8	8.2	6.8	6.1	5.7	4.8
Benzo(g,h,i)perylene	8270 (c)			10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.010 U	0.062	1.0 U
BTEX (µg/L)												
Benzene	8260/8021	71	250 (e)	5	390	330	270 J	330	220	310	340	410
Toluene	8260/8021	485		5	23	33	18 J	29	22	32	41	92
Ethylbenzene	8260/8021	276		5	82	69	56 J	68	50	52	49	66
m,p-Xylene	8260/8021			5 (d)	60	56	38 J	47	36	37	39	66
o-Xylene	8260/8021			5 (d)	42	37	29 J	29	21	19	15	24
DISSOLVED METALS (µg/L)												
Arsenic	200.8	4	37(e)	4	14	14	18 J	19	12	12	17	14
CONVENTIONALS												
Total Dissolved Solids (µg/L)	160.1				3200000 J	3400000 J	2700000	2700000	3300000	2400000	3510000	3100000
Total Suspended Solids (µg/L)	160.2				85000 J	100000	110000 J	97000	88000	98000	44900	91100
pH	Field				7.01	6.72	6.73	6.87	6.94	7.08	7	NM
Specific Conductance (µmhos)	Field				7525	6230	5850	5460	6830	6610	5262	NM
Temperature (°C)	Field				17.6	18.9	16.6	15.8	17.0	17.3	17.2	NM

TABLE 4-2
SUMMARY OF GROUNDWATER ANALYTICAL DATA
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (µg/L)	Background-based Screening Level (a) (µg/L)	Practical Quantitation Limits (µg/L)	MW-107R DH51H 6/22/2001	MW-107R DQ61E 9/26/2001	MW-107R DY69G 12/19/2001	MW-107R EE79E 3/20/2002	MW-107R EM41F 6/19/2002	MW-107R FP47E/N 06/25/03	MW-107R GS18C 06/09/04	MW-107R PL85C 08/25/09
TPH (µg/L)												
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400(e)	400 (b)	890	1900	630	1200	1000	1400	680	290
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (b)	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500(e)	600 (b)	1500	3900	780 J	1200	1700	2500	880	1300
cPAH (µg/L)												
Benzo(a)anthracene	8270 (c)	1.0	6.6	1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.053	0.10 U
Chrysene	8270 (c)	1.0	5.7	1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.051	0.10 U
Benzo(b)fluoranthene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.050 U	0.10 U
Benzo(k)fluoranthene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.050 U	0.10 U
Benzo(a)pyrene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.050 U	0.10 U
Indeno(1,2,3-cd)pyrene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.050 U	0.10 U
Dibenzo(a,h)anthracene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.050 U	0.10 U
ncPAH (µg/L)												
Naphthalene	8270 (c)	9880		10	1300	1400 J	990 J	2200 J	1000	1400 J	1200	480
2-Methylnaphthalene	8270 (c)			10	130	150	66	150	77	220	140	100
Acenaphthylene	8270 (c)			10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.30 J	0.47	1.0 U
Acenaphthene	8270 (c)	225	440(e)	10	47	56	38 J	63	43	76	58	44
Fluorene	8270 (c)	2422		10	14	15	10	17	13	27	19	12
Phenanthrene	8270 (c)			10	9.8	12	7.6	14	8.8	18	14	8.7
Anthracene	8270 (c)	25900		10	1.0 U	1.0	1.0 U	1.0	1.0 U	1.4	1.0	1.0 U
Fluoranthene	8270 (c)	27.1		10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.49	0.47	1.0 U
Pyrene	8270 (c)	777		10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.44	0.49	1.0 U
Benzo(g,h,i)perylene	8270 (c)			10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.010 U	0.050 U	1.0 U
BTEX (µg/L)												
Benzene	8260/8021	71	250 (e)	5	5.0 U	5.7	5.0 UJ	5.0 U	5.0 U	5.0 U	5.0 U	1.0 U
Toluene	8260/8021	485		5	7.3	22	5.0 UJ	5.0 U	5.0 U	9.0	5.0 U	1.0 U
Ethylbenzene	8260/8021	276		5	47	110	21 J	33	32	72	24	15
m,p-Xylene	8260/8021			5 (d)	32	89	15 J	23	23	45	15	7.8
o-Xylene	8260/8021			5 (d)	20	66	11 J	15	13	30	11	5.9
DISSOLVED METALS (µg/L)												
Arsenic	200.8	4	37(e)	4	8	8	7 J	7	5	3	8	4.4
CONVENTIONALS												
Total Dissolved Solids (µg/L)	160.1				1,900,000 J	1,300,000 J	1,700,000	1,500,000	1,800,000	1,500,000	1,550,000	1,250,000
Total Suspended Solids (µg/L)	160.2				65,000 J	63,000	53,000 J	46,000	48,000	53,000	45,800	38,400
pH	Field				6.84	7.31	6.79	6.85	6.90	6.94	6.85	7.36
Specific Conductance (µmhos)	Field				3,550	2,900	3,710	2,780	3,303	2,630	2,792	3,107
Temperature (°C)	Field				13.6	14.6	12.4	11.9	13.0	14.0	14.0	13.09

TABLE 4-2
SUMMARY OF GROUNDWATER ANALYTICAL DATA
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (µg/L)	Background-based Screening Level (a) (µg/L)	Practical Quantitation Limits (µg/L)	MW-108R DH51A 8/22/2001	MW-108R DQ61F 9/26/2001	MW-108R DY69H 12/19/2001	MW-109R Dup of MW108R DY69I 12/19/2001	MW-108R EE79F 3/20/2002	MW-108R EM41G 6/19/2002	MW-108R FP47I/R 06/25/03	MW-108R GS18H 06/09/04	MW-108R PL72C 08/24/09
TPH (µg/L)													
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400(e)	400 (b)	250 U	250 U	250 U	250 U	250 U	330	250 U	250 U	250 U
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (b)	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500(e)	600 (b)	250 UJ	250 J	250 UJ	250 UJ	250 U	250 UJ	250 U	250 U	250 U
cPAH (µg/L)													
Benzo(a)anthracene	8270 (c)	1.0	6.6	1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.030	0.10	0.10 U
Chrysene	8270 (c)	1.0	5.7	1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.020	0.099	0.10 U
Benzo(b)fluoranthene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.055	0.10 U
Benzo(k)fluoranthene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.074	0.10 U
Benzo(a)pyrene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.066	0.10 U
Indeno(1,2,3-cd)pyrene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.070	0.10 U
Dibenzo(a,h)anthracene	8270 (c)	1.0		1.0	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.070	0.10 U
ncPAH (µg/L)													
Naphthalene	8270 (c)	9880		10	30	22 J	31 J	20 J	27 J	49	33 J	11	12
2-Methylnaphthalene	8270 (c)			10	5.4	3.9	4.7	3.7	5.0	7.9	6.2	2.8	1.6
Acenaphthylene	8270 (c)			10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.040	0.050 U	1.0 U
Acenaphthene	8270 (c)	225	440(e)	10	3.8 J	2.6	3.0 J	2.3 J	3.0	4.6	3.3	2.1	2.1
Fluorene	8270 (c)	2422		10	1.1	1.0	1.1	1.0 U	1.0	1.4	1.1	1.0	1.0 U
Phenanthrene	8270 (c)			10	1.7	1.8	2.0	1.7	1.6	1.7	1.5	1.9	1.0
Anthracene	8270 (c)	25900		10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.22	0.29	1.0 U
Fluoranthene	8270 (c)	27.1		10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.16	0.28	1.0 U
Pyrene	8270 (c)	777		10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.21	0.30	1.0 U
Benzo(g,h,i)perylene	8270 (c)			10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.010 U	0.058	1.0 U
BTEX (µg/L)													
Benzene	8260/8021	71	250 (e)	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	8260/8021	485		5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	8260/8021	276		5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.5	1.0 U	1.0 U
m,p-Xylene	8260/8021			5 (d)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
o-Xylene	8260/8021			5 (d)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
DISSOLVED METALS (µg/L)													
Arsenic	200.8	4	37(e)	4	6	4	9 J	14 J	6	5	2 U	.5 U	2 U
CONVENTIONALS													
Total Dissolved Solids (µg/L)	160.1				11,000,000 J	11,000,000 J	9,900,000	9,800,000	10,000,000	10,000,000	11,000,000	8,970,000	9,040,000
Total Suspended Solids (µg/L)	160.2				130,000 J	99,000	130,000 J	94,000 J	87,000	84,000	86,000	79,100	60,100
pH	Field				6.72	7.39	6.76	6.77	6.72	6.73	6.71	6.76	6.45
Specific Conductance (µmhos)	Field				18,925	18,800	19,300	19,300	1,800	2,548	21,100	11,900	16,760
Temperature (°C)	Field				15.0	16.2	13.6	13.4	13.1	14.4	15.2	15.4	15.51

TABLE 4-2
SUMMARY OF GROUNDWATER ANALYTICAL DATA
06/01 TO 08/09
UNION STATION

cPAH =Carcinogenic polycyclic aromatic hydrocarbons

NA = Not analyzed for this constituent

NM = Not measured due to insufficient volume.

U = Indicates the compound was undetected at the listed concentration

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ = The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

M = Indicates an estimated value of analyte detected and confirmed by analyst with low spectral match parameters.

Note: All metals samples were field filtered

(a) Screening level is based on the 90th percentile of the background data obtained from well B4 or B6/B6R. The 90th percentile was calculated using MTCA stat Background Module V2.0.

(b) PQL calculated from method detection limit.

(c) Analytical results reported from analyses using EPA Method 8270 or EPA Method 8270-SIM

(d) PQL identified for total xylenes in CAP

TABLE 5-1
90TH PERCENTILE VALUES FOR
PETROLEUM-RELATED CONSTITUENTS IN MONITORING WELL B-4/B-4R

Constituent	Based on Data from Oct. 1997 to August 2009	Based on Data from Oct. 1997 to Dec. 2000 and August 2009
Diesel-Range Petroleum Hydrocarbons	8000	6400
Gasoline-Range Petroleum Hydrocarbons	7300	7500
Benzene	230	250
Acenaphthene	430	440
Benzo(a)anthracene	2.8	6.6
Chrysene	2.9	5.7

TABLE 5-2
STATISTICAL SUMMARY OF GROUNDWATER DATA - BACKGROUND WELL B4/B4R
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (a) (µg/L)	Background-based Screening Level (µg/L)	Practical Quantitation Limits (b) (µg/L)	Number of Samples (c)	Number of Detects (>= PQL)	Number of Censored Data (d)	Percent Censored Data	Statistical Case No. (e)	UCL (f)	Minimum Uncensored Data	Maximum Uncensored Data	Mean of Uncensored Data (f)	Std. Dev. of Uncensored Data (f)	Median of Uncensored Data (f)
TPH (µg/L)															
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400 (g)	400 (h)	8	7	1	13	---	---	2600	15000	6714	4058	6100
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (h)	8	4	4	50	---	---	1200	6800	3225	2482	2450
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500 (g)	600 (h)	8	7	1	13	---	---	1800	6500	4843	1678	5400
cPAH (µg/L)															
Benzo(a)anthracene	8270-SIM	1.0	6.6	1.0	8	6	2	25	---	---	1.0	8.3	2.8	2.7	1.9
Chrysene	8270-SIM	1.0	5.7	1.0	8	5	3	38	---	---	1.3	7.4	2.8	2.6	1.7
Benzo(b)fluoranthene	8270-SIM	1.0		1.0	8	2	6	75	---	---	1.1	4.3	2.7	2.3	2.7
Benzo(k)fluoranthene	8270-SIM	1.0		1.0	8	4	4	50	---	---	1.0	5.6	2.2	2.3	1.2
Benzo(a)pyrene	8270-SIM	1.0		1.0	8	5	3	38	---	---	1.0	7.2	2.4	2.7	1.2
Indeno(1,2,3-cd)pyrene	8270-SIM	1.0		1.0	8	1	7	88	---	---	3.6	3.6	--	--	--
Dibenzo(a,h)anthracene	8270-SIM	1.0		1.0	8	0	8	100	---	---	--	--	--	--	--
ncPAH (µg/L)															
Naphthalene	8270	9880		10	8	6	2	25	---	---	710	3200	2135	964	2500
2-Methylnaphthalene	8270			10	8	6	2	25	---	---	160	510	395	148	465
Acenaphthylene	8270			10	8	1	7	88	---	---	10	10	--	--	--
Acenaphthene	8270	225	440 (g)	10	8	7	1	13	---	---	69	350	226	141	295
Fluorene	8270	2422		10	8	7	1	13	---	---	18	120	64	40	74
Phenanthrene	8270			10	8	6	2	25	---	---	46	130	91	31	95
Anthracene	8270	25900		10	8	5	3	38	---	---	10	22	15	4	15
Fluoranthene	8270	27		10	8	3	5	63	---	---	11	23	16	6	14
Pyrene	8270	777		10	8	5	3	38	---	---	11	32	16	9	12
Benzo(g,h,i)perylene	8270			10	8	0	8	100	---	---	--	--	--	--	--
BTEX (µg/L)															
Benzene	8260	71	250 (g)	5	8	7	1	13	---	---	130	150	118	48	130
Toluene	8260	485		5	8	0	8	100	---	---	--	--	--	--	--
Ethylbenzene	8260	276		5	8	7	1	13	---	---	110	230	166	78	190
m,p-Xylene	8260			5 (n)	8	0	8	100	---	---	--	--	--	--	--
o-Xylene	8260			5 (n)	8	3	5	63	---	---	5.4	6	5.7	0.3	5.6
DISSOLVED METALS (µg/L)															
Arsenic	200.8	4	37 (g)	4	8	3	5	63	---	---	4.0	13.4	8.1	4.8	7.0

TABLE 5-2
STATISTICAL SUMMARY OF GROUNDWATER DATA - BACKGROUND WELL B6R
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (a) (µg/L)	Background-based Screening Level (µg/L)	Practical Quantitation Limits (b) (µg/L)	Number of Samples (c)	Number of Detects (>= PQL)	Number of Censored Data (d)	Percent Censored Data	Statistical Case No. (e)	UCL (f)	Minimum Uncensored Data	Maximum Uncensored Data	Mean of Uncensored Data (f)	Std. Dev. of Uncensored Data (f)	Median of Uncensored Data (f)
TPH (µg/L)															
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400 (g)	400 (h)	8	0	8	100	---	---	--	--	--	--	--
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (h)	8	0	8	100	---	---	--	--	--	--	--
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500 (g)	600 (h)	8	0	8	100	---	---	--	--	--	--	--
cPAH (µg/L)															
Benzo(a)anthracene	8270-SIM	1.0	6.6	1.0	8	0	8	100	---	---	--	--	--	--	--
Chrysene	8270-SIM	1.0	5.7	1.0	8	0	8	100	---	---	--	--	--	--	--
Benzo(b)fluoranthene	8270-SIM	1.0		1.0	8	0	8	100	---	---	--	--	--	--	--
Benzo(k)fluoranthene	8270-SIM	1.0		1.0	8	0	8	100	---	---	--	--	--	--	--
Benzo(a)pyrene	8270-SIM	1.0		1.0	8	0	8	100	---	---	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	8270-SIM	1.0		1.0	8	0	8	100	---	---	--	--	--	--	--
Dibenzo(a,h)anthracene	8270-SIM	1.0		1.0	8	0	8	100	---	---	--	--	--	--	--
ncPAH (µg/L)															
Naphthalene	8270	9880		10	8	0	8	100	---	---	--	--	--	--	--
2-Methylnaphthalene	8270			10	8	0	8	100	---	---	--	--	--	--	--
Acenaphthylene	8270			10	8	0	8	100	---	---	--	--	--	--	--
Acenaphthene	8270	225	440 (g)	10	8	0	8	100	---	---	--	--	--	--	--
Fluorene	8270	2422		10	8	0	8	100	---	---	--	--	--	--	--
Phenanthrene	8270			10	8	0	8	100	---	---	--	--	--	--	--
Anthracene	8270	25900		10	8	0	8	100	---	---	--	--	--	--	--
Fluoranthene	8270	27		10.0	8	0	8	100	---	---	--	--	--	--	--
Pyrene	8270	777		10	8	0	8	100	---	---	--	--	--	--	--
Benzo(g,h,i)perylene	8270			10	8	0	8	100	---	---	---	---	---	---	---
BTEX (µg/L)															
Benzene	8260	71	250 (g)	5	8	0	8	100	---	---	--	--	--	--	--
Toluene	8260	485		5	8	0	8	100	---	---	--	--	--	--	--
Ethylbenzene	8260	276		5	8	0	8	100	---	---	--	--	--	--	--
m,p-Xylene	8260			5 (n)	8	0	8	100	---	---	--	--	--	--	--
o-Xylene	8260			5 (n)	8	0	8	100	---	---	--	--	--	--	--
DISSOLVED METALS (µg/L)															
Arsenic	200.8	4	37 (g)	4	8	8	0	0	---	---	22	33	28	4	29

TABLE 5-2
STATISTICAL SUMMARY OF GROUNDWATER DATA - WELL MW101R
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (a) (µg/L)	Background-based Screening Level (µg/L)	Practical Quantitation Limits (b) (µg/L)	Number of Samples (c)	Number of Detects (>= PQL)	Number of Censored Data (d)	Percent Censored Data	Statistical Case No. (e)	UCL (f)	Minimum Uncensored Data	Maximum Uncensored Data	Mean of Uncensored Data (f)	Std. Dev. of Uncensored Data (f)	Median of Uncensored Data (f)
TPH (µg/L)															
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400 (g)	400 (h)	8	8	0	0	1	3684 (l)	1600	4200	3038	823	3100
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (h)	8	0	8	100	0	NC	--	--	--	--	--
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500 (g)	600 (h)	8	8	0	0	1	6067 (l)	4100	6300	5538	791	5700
cPAH (µg/L)															
Benzo(a)anthracene	8270-SIM	1.0	6.6	1.0	8	0	8	100	0	NC	--	--	--	--	--
Chrysene	8270-SIM	1.0	5.7	1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(b)fluoranthene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(k)fluoranthene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(a)pyrene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Dibenzo(a,h)anthracene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
ncPAH (µg/L)															
Naphthalene	8270	9880		10	8	8	0	0	1	3970 (l)	1500	4900	2850	1092	3000
2-Methylnaphthalene	8270			10	8	8	0	0	1	630 (l)	280	700	495	136	510
Acenaphthylene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
Acenaphthene	8270	225	440 (g)	10	8	8	0	0	1	350 (j)	240	350	289	46	285
Fluorene	8270	2422		10	8	8	0	0	1	81 (l)	70	85	77	5	77
Phenanthrene	8270			10	8	8	0	0	1	89 (l)	63	97	79	13	76
Anthracene	8270	25900		10	8	0	8	100	0	NC	--	--	--	--	--
Fluoranthene	8270	27		10	8	0	8	100	0	NC	--	--	--	--	--
Pyrene	8270	777		10	8	0	8	100	0	NC	--	--	--	--	--
Benzo(g,h,i)perylene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
BTEX (µg/L)															
Benzene	8260	71	250 (g)	5	8	8	0	0	1	87 (l)	36	90	67	19	71
Toluene	8260	485		5	8	5	3	38	2	11 (i)	6	14	8	3	8
Ethylbenzene	8260	276		5	8	8	0	0	1	273 (l)	130	300	215	60	230
m,p-Xylene	8260			5 (n)	8	8	0	0	1	78 (l)	25	92	54	23	46
o-Xylene	8260			5 (n)	8	8	0	0	1	39 (j)	17	39	25	9	21
DISSOLVED METALS (µg/L)															
Arsenic	200.8	4	37 (g)	4	8	8	0	0	1	12 (l)	9.1	14	11	2	11

TABLE 5-2
STATISTICAL SUMMARY OF GROUNDWATER DATA - WELL MW102R
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (a) (µg/L)	Background-based Screening Level (µg/L)	Practical Quantitation Limits (b) (µg/L)	Number of Samples (c)	Number of Detects (>= PQL)	Number of Censored Data (d)	Percent Censored Data	Statistical Case No. (e)	UCL (f)	Minimum Uncensored Data	Maximum Uncensored Data	Mean of Uncensored Data (f)	Std. Dev. of Uncensored Data (f)	Median of Uncensored Data (f)
TPH (µg/L)															
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400 (g)	400 (h)	8	2	6	75	3	400 (m)	400	400	400	0	400
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (h)	8	0	8	100	0	NC	--	--	--	--	--
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500 (g)	600 (h)	8	0	8	100	0	NC	--	--	--	--	--
cPAH (µg/L)															
Benzo(a)anthracene	8270-SIM	1.0	6.6	1.0	8	0	8	100	0	NC	--	--	--	--	--
Chrysene	8270-SIM	1.0	5.7	1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(b)fluoranthene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(k)fluoranthene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(a)pyrene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Dibenzo(a,h)anthracene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
ncPAH (µg/L)															
Naphthalene	8270	9880		10	8	2	6	75	3	22 (m)	12	22	17	7	17
2-Methylnaphthalene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
Acenaphthylene	8270				8	0	8	100	0	NC	--	--	--	--	--
Acenaphthene	8270	225	440 (g)		8	8	0	0	1	17 (j)	11	17	13	2	13
Fluorene	8270	2422		10	8	0	8	100	0	NC	--	--	--	--	--
Phenanthrene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
Anthracene	8270	25900		10	8	0	8	100	0	NC	--	--	--	--	--
Fluoranthene	8270	27		10	8	0	8	100	0	NC	--	--	--	--	--
Pyrene	8270	777		10	8	0	8	100	0	NC	--	--	--	--	--
Benzo(g,h,i)perylene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
BTEX (µg/L)															
Benzene	8260	71	250 (g)	5	8	0	8	100	0	NC	--	--	--	--	--
Toluene	8260	485		5	8	0	8	100	0	NC	--	--	--	--	--
Ethylbenzene	8260	276		5	8	0	8	100	0	NC	--	--	--	--	--
m,p-Xylene	8260			5 (n)	8	0	8	100	0	NC	--	--	--	--	--
o-Xylene	8260			5 (n)	8	0	8	100	0	NC	--	--	--	--	--
DISSOLVED METALS (µg/L)															
Arsenic	200.8	4	37 (g)	4	8	6	2	25	2	9 (i)	4	11	7	2	6

TABLE 5-2
STATISTICAL SUMMARY OF GROUNDWATER DATA - WELL MW104
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (a) (µg/L)	Background-based Screening Level (µg/L)	Practical Quantitation Limits (b) (µg/L)	Number of Samples (c)	Number of Detects (>= PQL)	Number of Censored Data (d)	Percent Censored Data	Statistical Case No. (e)	UCL (f)	Minimum Uncensored Data	Maximum Uncensored Data	Mean of Uncensored Data (f)	Std. Dev. of Uncensored Data (f)	Median of Uncensored Data (f)
TPH (µg/L)															
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400 (g)	400 (h)	8	3	5	63	3	480 (m)	460	480	470	10	470
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (h)	8	0	8	100	0	NC	--	--	--	--	--
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500 (g)	600 (h)	8	0	8	100	0	NC	--	--	--	--	--
cPAH (µg/L)															
Benzo(a)anthracene	8270-SIM	1.0	6.6	1.0	8	0	8	100	0	NC	--	--	--	--	--
Chrysene	8270-SIM	1.0	5.7	1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(b)fluoranthene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(k)fluoranthene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(a)pyrene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Dibenzo(a,h)anthracene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
ncPAH (µg/L)															
Naphthalene	8270	9880		10	8	0	8	100	0	NC	--	--	--	--	--
2-Methylnaphthalene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
Acenaphthylene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
Acenaphthene	8270	225	440 (g)	10	8	8	0	0	1	55 (l)	43	64	50	7	49
Fluorene	8270	2422		10	8	5	3	37.5	2	15 (j)	10	15	11	2	11
Phenanthrene	8270			10	8	1	7	88	3	15 (m)	15	15	15	0	15
Anthracene	8270	25900		10	8	0	8	100	0	NC	--	--	--	--	--
Fluoranthene	8270	27		10	8	0	8	100	0	NC	--	--	--	--	--
Pyrene	8270	777		10	8	0	8	100	0	NC	--	--	--	--	--
Benzo(g,h,i)perylene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
BTEX (µg/L)															
Benzene	8260	71	250 (g)	5	8	0	8	100	0	NC	--	--	--	--	--
Toluene	8260	485		5	8	0	8	100	0	NC	--	--	--	--	--
Ethylbenzene	8260	276		5	8	0	8	100	0	NC	--	--	--	--	--
m,p-Xylene	8260			5 (n)	8	0	8	100	0	NC	--	--	--	--	--
o-Xylene	8260			5 (n)	8	0	8	100	0	NC	--	--	--	--	--
DISSOLVED METALS (µg/L)															
Arsenic	200.8	4	37 (g)	4	8	1	7	88	3	7 (m)	7	7	--	--	--

TABLE 5-2
STATISTICAL SUMMARY OF GROUNDWATER DATA - WELL MW105
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (a) (µg/L)	Background-based Screening Level (µg/L)	Practical Quantitation Limits (b) (µg/L)	Number of Samples (c)	Number of Detects (>= PQL)	Number of Censored Data (d)	Percent Censored Data	Statistical Case No. (e)	UCL (f)	Minimum Uncensored Data	Maximum Uncensored Data	Mean of Uncensored Data (f)	Std. Dev. of Uncensored Data (f)	Median of Uncensored Data (f)
TPH (µg/L)															
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400 (g)	400 (h)	8	7	1	13	1	1600 (j)	760	1600	1351	295	1400
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (h)	8	0	8	100	0	NC	--	--	--	--	--
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500 (g)	600 (h)	8	8	0	0	1	2583 (l)	1100	3000	2000	595	2050
cPAH (µg/L)															
Benzo(a)anthracene	8270-SIM	1.0	6.6	1.0	8	1	7	88	3	1.2 (m)	1.2	1.2	--	--	--
Chrysene	8270-SIM	1.0	5.7	1.0	8	1	7	88	3	1.1 (m)	1.1	1.1	--	--	--
Benzo(b)fluoranthene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(k)fluoranthene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(a)pyrene	8270-SIM	1.0		1.0	8	1	7	88	3	1.0 (m)	1.0	1.0	--	--	--
Indeno(1,2,3-cd)pyrene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Dibenzo(a,h)anthracene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
ncPAH (µg/L)															
Naphthalene	8270	9880		10	8	8	0	0	1	909 (l)	240	940	606	238	575
2-Methylnaphthalene	8270			10	8	8	0	0	1	92 (l)	29	110	76	24	75
Acenaphthylene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
Acenaphthene	8270	225	440 (g)	10	8	8	0		1	76 (l)	48	80	65	13	69
Fluorene	8270	2422		10	8	8	0	0	1	33 (j)	19	35	28	6	30
Phenanthrene	8270			10	8	8	0	0	1	68 (l)	30	73	52	16	58
Anthracene	8270	25900		10	8	0	8	100	0	NC	--	--	--	--	--
Fluoranthene	8270	27		10.0	8	2	6	75	3	11 (m)	11	11	11	0	11
Pyrene	8270	777		10	8	0	8	100	0	NC	--	--	--	--	--
Benzo(g,h,i)perylene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
BTEX (µg/L)															
Benzene	8260	71	250 (g)	5	8	8	0	0	1	377 (l)	220	410	325	61	330
Toluene	8260	485		5	8	8	0	0	1	92 (j)	18	92	36	24	31
Ethylbenzene	8260	276		5	8	8	0	0	1	71 (l)	49	82	62	12	61
m,p-Xylene	8260			5 (n)	8	8	0		1	66 (j)	36	66	47	12	43
o-Xylene	8260			5 (n)	8	8	0	0	1	36 (l)	15	42	27	9	27
DISSOLVED METALS (µg/L)															
Arsenic	200.8	4	37 (g)	4	8	7	1	13	1	19 (j)	12	19	15	3	14

TABLE 5-2
STATISTICAL SUMMARY OF GROUNDWATER DATA - WELL MW107R
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (a) (µg/L)	Background-based Screening Level (µg/L)	Practical Quantitation Limits (b) (µg/L)	Number of Samples (c)	Number of Detects (>= PQL)	Number of Censored Data (d)	Percent Censored Data	Statistical Case No. (e)	UCL (f)	Minimum Uncensored Data	Maximum Uncensored Data	Mean of Uncensored Data (f)	Std Dev of Uncensored Data (f)	Median of Uncensored Data (f)
TPH (µg/L)															
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400 (g)	400 (h)	8	7	1	13	1	1903 (l)	630	1900	1100	446	1000
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (h)	8	0	8	100	0	NC	--	--	--	--	--
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500 (g)	600 (h)	8	8	0	0	1	2812 (l)	780	3900	1720	1031	1400
cPAH (µg/L)															
Benzo(a)anthracene	8270-SIM	1.0	5.6	1.0	8	0	8	100	0	NC	--	--	--	--	--
Chrysene	8270-SIM	1.0	5.7	1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(b)fluoranthene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(k)fluoranthene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(a)pyrene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Dibenzo(a,h)anthracene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
ncPAH (µg/L)															
Naphthalene	8270	9880		10	8	8	0	0	1	2200 (j)	480	2200	1246	489	1250
2-Methylnaphthalene	8270			10	8	8	0	0	1	181 (l)	66	220	129	49	135
Acenaphthylene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
Acenaphthene	8270	225	440 (g)	10	8	8	0	0	1	63 (l)	38	76	53	13	52
Fluorene	8270	2422		10	8	8	0	0	1	20 (l)	10	27	16	5	15
Phenanthrene	8270			10	8	4	4	50	2	15 (i)	12	18	15	3	14
Anthracene	8270	25900		10	8	0	8	100	0	NC	--	--	--	--	--
Fluoranthene	8270	27		10	8	0	8	100	0	NC	--	--	--	--	--
Pyrene	8270	777		10	8	0	8	100	0	NC	--	--	--	--	--
Benzo(g,h,i)perylene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
BTEX (µg/L)															
Benzene	8260	71	250 (g)	5	8	1	7	88	3	5.7 (m)	5.7	5.7	--	--	--
Toluene	8260	485		5	8	3	5	63	3	22 (m)	7.3	22	13	8	9
Ethylbenzene	8260	276		5	8	8	0	0	1	87 (l)	15	110	44	32	33
m,p-Xylene	8260			5 (n)	8	8	0	0	1	71 (l)	7.8	89	31	26	23
o-Xylene	8260			5 (n)	8	8	0	0	1	47 (l)	5.9	66	21	19	14
DISSOLVED METALS (µg/L)															
Arsenic	200.8	4	37 (g)	4	8	7	1	13	1	8 (j)	4	8	7	1	7

TABLE 5-2
STATISTICAL SUMMARY OF GROUNDWATER DATA - WELL MW108R
06/01 TO 08/09
UNION STATION

Analyte	Method	CAP Cleanup Level (a) (µg/L)	Background-based Screening Level (µg/L)	Practical Quantitation Limits (b) (µg/L)	Number of Samples (c)	Number of Detects (>= PQL)	Number of Censored Data (d)	Percent Censored Data	Statistical Case No. (e)	UCL (f)	Minimum Uncensored Data	Maximum Uncensored Data	Mean of Uncensored Data (f)	Std. Dev. of Uncensored Data (f)	Median of Uncensored Data (f)
TPH (µg/L)															
Diesel-Range Petroleum Hydrocarbons	WTPH-Dx		6,400 (g)	400 (h)	8	0	8	100	0	NC	--	--	--	--	--
Motor Oil-Range Petroleum Hydrocarbons	WTPH-Dx			1100 (h)	8	0	8	100	0	NC	--	--	--	--	--
Gasoline-Range Petroleum Hydrocarbons	WTPH-G		7,500 (g)	600 (h)	8	0	8	100	0	NC	--	--	--	--	--
cPAH (µg/L)															
Benzo(a)anthracene	8270-SIM	1.0	6.6	1.0	8	0	8	100	0	NC	--	--	--	--	--
Chrysene	8270-SIM	1.0	5.7	1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(b)fluoranthene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(k)fluoranthene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Benzo(a)pyrene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Indano(1,2,3-cd)pyrene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
Dibenzo(a,h)anthracene	8270-SIM	1.0		1.0	8	0	8	100	0	NC	--	--	--	--	--
ncPAH (µg/L)															
Naphthalene	8270	9880		10	8	8	0	0	1	44 (l)	11	49	27	12	29
2-Methylnaphthalene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
Acenaphthylene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
Acenaphthene	8270	225	440 (g)	10	8	0	8	100	0	NC	--	--	--	--	--
Fluorene	8270	2422		10	8	0	8	100	0	NC	--	--	--	--	--
Phenanthrene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
Anthracene	8270	25900		10	8	0	8	100	0	NC	--	--	--	--	--
Fluoranthene	8270	27		10	8	0	8	100	0	NC	--	--	--	--	--
Pyrene	8270	777		10	8	0	8	100	0	NC	--	--	--	--	--
Benzo(g,h,i)perylene	8270			10	8	0	8	100	0	NC	--	--	--	--	--
BTEX (µg/L)															
Benzene	8260	71	250 (g)	5	8	0	8	100	0	NC	--	--	--	--	--
Toluene	8260	485		5	8	0	8	100	0	NC	--	--	--	--	--
Ethylbenzene	8260	275		5	8	0	8	100	0	NC	--	--	--	--	--
m,p-Xylene	8260			5 (n)	8	0	8	100	0	NC	--	--	--	--	--
o-Xylene	8260			5 (n)	8	0	8	100	0	NC	--	--	--	--	--
DISSOLVED METALS (µg/L)															
Arsenic	200.8	4	37 (g)	4	8	5	3	38	2	7 (i)	4	9	6	2	6

TABLE 5-2
STATISTICAL SUMMARY OF GROUNDWATER DATA - FOOTNOTES
UNION STATION

-- = Not Applicable.

UCL = Upper confidence limit.

NC = Not calculated.

= UCL exceeds the cleanup level.

(a) Cleanup levels are from Table 1 of the Cleanup Action Plan, unless otherwise indicated.

(b) Practical quanitation limits are from Table 1 of the Cleanup Action Plan, unless otherwise indicated.

(c) The number of samples is equal to the number of samples analyzed.

(d) Censored data consists of nondetected results and detected values less than the PQL.

(e) Statistical Case Nos:

0 = Data set consists of 100% censored data

1 = Data set consists of not more than 15 % censored data.

2 = Data set consists of more than 15 % censored data but less than or equal to 50% censored data.

3 = Data set consists of more than 50 % censored data but less than 100 % censored data.

(f) No UCL, mean, standard deviation, or median were calculated for data sets with 100% censored data. Also, no UCL was calculated for background wells B-4 and B-6/B-6R.

(g) Screening level is based on the 90th percentile of the background data obtained from well B4 or B6/B6R. The 90th percentile was calculated using MTCAstat 97 Background Module.

(h) Practical quantitation limit is equal to approximately 10 times the laboratory method detection limit.

(i) Upper confidence limit calculated using MTCAStat 97 Site Module.

(j) The data set was determined to be neither lognormally nor normally distributed by MTCAstat; therefore, in accordance with the Supplement to Statistical Guidance for Ecology Site Managers (Ecology 1993), the upper confidence level was set equal to the maximum concentration in the data set.

(k) Practical quantitation limit based on method reporting limit and PQLs of similar compounds

(l) The data set consists of less than or equal to 15 % censored data (Case No. 1); therefore, in accordance with the Supplement to Statstical Guidance for Ecology Site Managers (Ecology 1993), all nondetected values were replaced with 1/2 the detection limit and all detected values less than the PQL were replaced with the detection limit. Statistics were then performed on the adjusted data.

(m) Greater than 50% of the data are censored; therefore, in accordance with the Supplement to Statistical Guidance for Ecology Site Managers (Ecology 1993), the upper 95% confidence limit was set equal to the maximum concentration in the data set.

(n) Practical quantitation limit identified for total xylenes in Cleanup Action Plan.

TABLE 5-3
SUMMARY OF CLEANUP AND SCREENING LEVEL EXCEEDANCES
(Concentrations in µg/L)

Constituent	Location	CAP CUL	Background-based Screening Levels	6/2001 - 8/2009 UCL	3/2001 - 6/2004 UCL	12/2000 - 6/2003 UCL	9/2000 - 6/2002 UCL	9/1999 - 6/2001 UCL	6/1998 - 6/2000 UCL	Comments
Acenaphthene										Apparent off-property sources
	MW-101R	225	440	350	350	350	350	340	276	
Benzene										Apparent off-property sources
	Well MW-101R	71	250	87	87	82	77	78	104	
	Well MW-105	71	250	337	346	350	361	376	373	
Arsenic										Apparent off-property sources
	MW-101R	4	37	12	12	13	13	14	14	
	MW-102R	4	37	9	8	9	9	9	7	
	MW-104	4	37	7						
	MW-105	4	37	19	17	19	19	18	21	
	MW-107R	4	37	8	8	8	8	8	10	
	MW-108R	4	37	7	9	15	15	12	8	
Benzo(a)anthracene										Apparent off-property sources
	MW-105	1.0	6.6	1.2	--	--	--	--	--	
Chrysene										Apparent off-property sources
	MW-105	1.0	5.7	1.1	--	--	--	--	--	

CAP CUL = Cleanup level listed in the Cleanup Action Plan.
UCL = Upper Confidence Limit.
-- = Indicates a UCL was not calculated because all concentrations were below the PQL during the respective period.

APPENDIX A

Well Construction Detail and Boring Log

Soil Classification System

MAJOR DIVISIONS			GRAPHIC SYMBOL	USCS LETTER SYMBOL[1]	TYPICAL DESCRIPTIONS[2][3]
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
				GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
				GC	Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
				SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
				CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			MH	Inorganic silt; micaceous or diatomaceous fine sand
				CH	Inorganic clay of high plasticity; fat clay
				OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL			PT	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

Notes:
1. USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
2. Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
3. Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent:	> 50% - "GRAVEL," "SAND," "SILT," "CLAY," etc.
Secondary Constituents:	> 30% and ≤ 50% - "very gravelly," "very sandy," "very silty," etc.
	> 15% and ≤ 30% - "gravelly," "sandy," "silty," etc.
Additional Constituents:	> 5% and ≤ 15% - "with gravel," "with sand," "with silt," etc.
	≤ 5% - "with trace gravel," "with trace sand," "with trace silt," etc., or not noted.

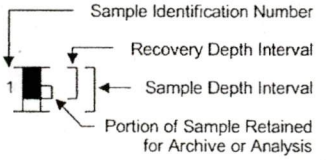
4. Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key

SAMPLER TYPE

Code	Description
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon
c	Shelby Tube
d	Grab Sample
e	Single-Tube Core Barrel
f	Double-Tube Core Barrel
g	2.50-inch O.D., 2.00-inch I.D. WSDOT
h	3.00-inch O.D., 2.375-inch I.D. Mod. California
i	Other - See text if applicable
1	300-lb Hammer, 30-inch Drop
2	140-lb Hammer, 30-inch Drop
3	Pushed
4	Vibrocore (Rotosonic/Geoprobe)
5	Other - See text if applicable

SAMPLE NUMBER & INTERVAL



Field and Lab Test Data

Code	Description
PP = 1.0	Pocket Penetrometer, tsf
TV = 0.5	Torvane, tsf
PID = 100	Photoionization Detector VOC screening, ppm
W = 10	Moisture Content, %
D = 120	Dry Density, pcf
-200 = 60	Material smaller than No. 200 sieve, %
GS	Grain Size - See separate figure for data
AL	Atterberg Limits - See separate figure for data
GT	Other Geotechnical Testing
CA	Chemical Analysis

Groundwater

▽ Approximate water level at time of drilling (ATD)

▼ Approximate water level at time other than ATD

. 11/2/09 N:\PROJECTS\0429006.010.GPJ SOIL CLASS SHEET

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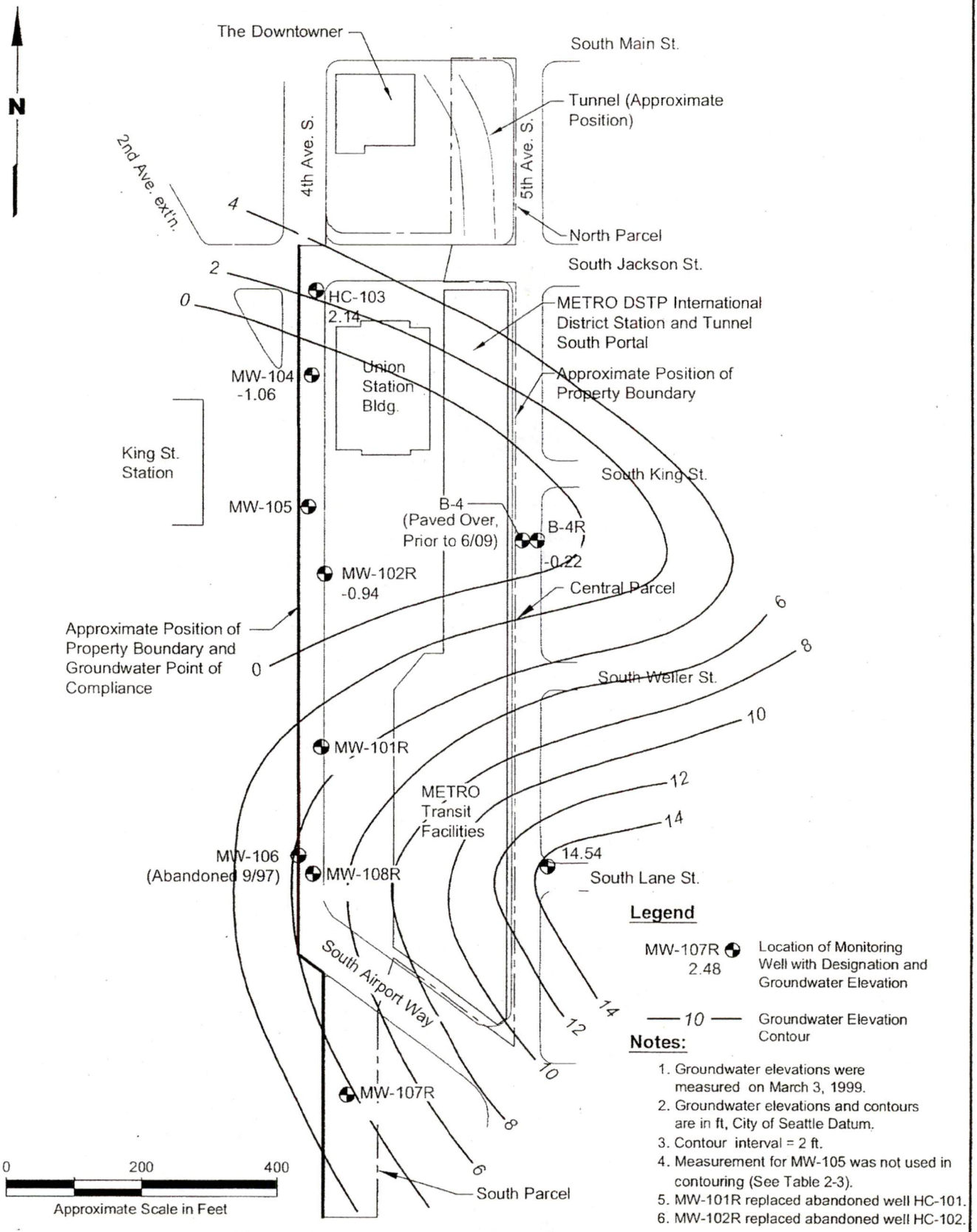
Union Station Seattle, WA	Soil Classification System and Key	Figure A-1



Union Station/Groundwater Monitoring Report | V:\429\0021052\D109 Annual Report\Fig4-1.dwg (A) "Figure B-4" 11/2/2009

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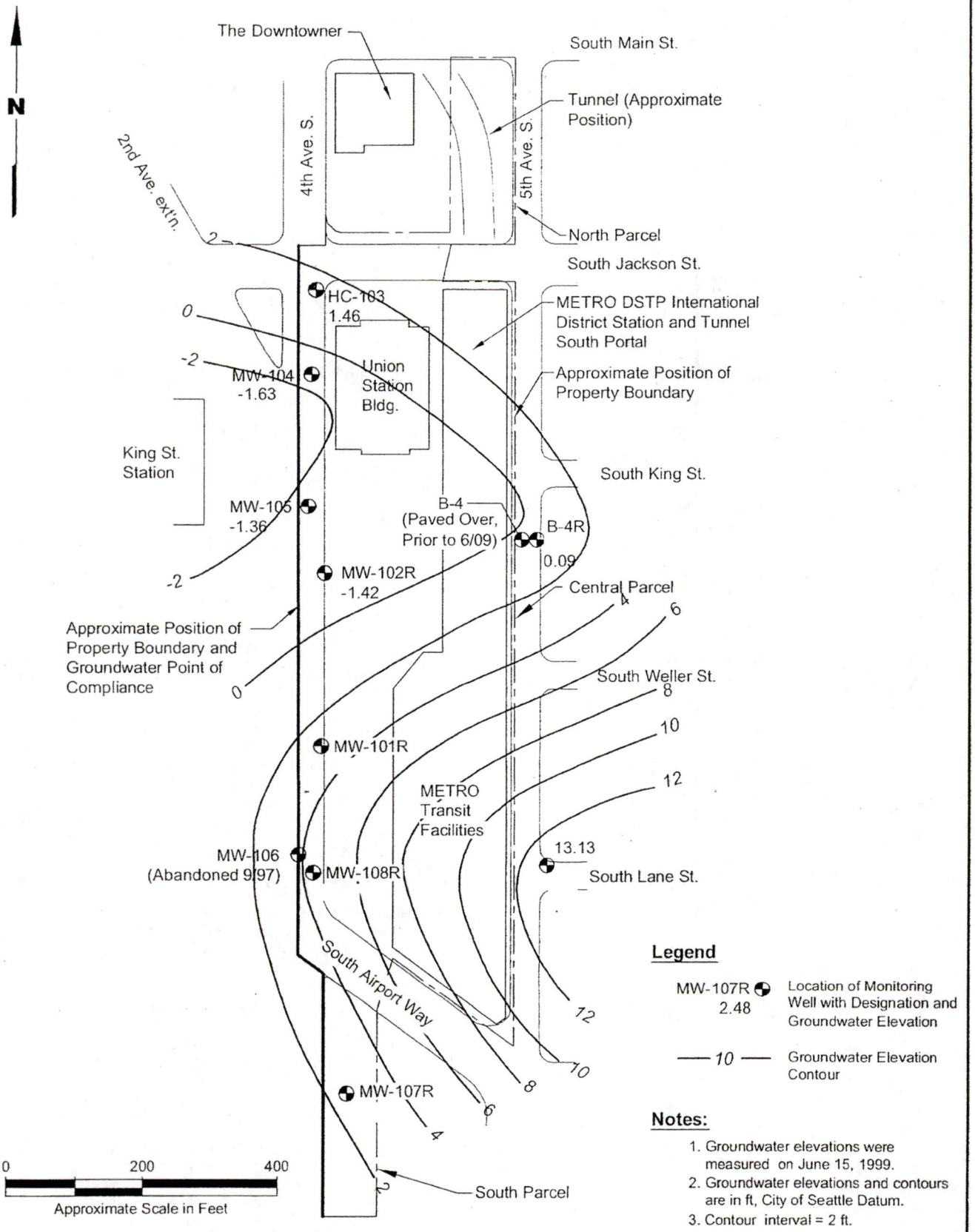
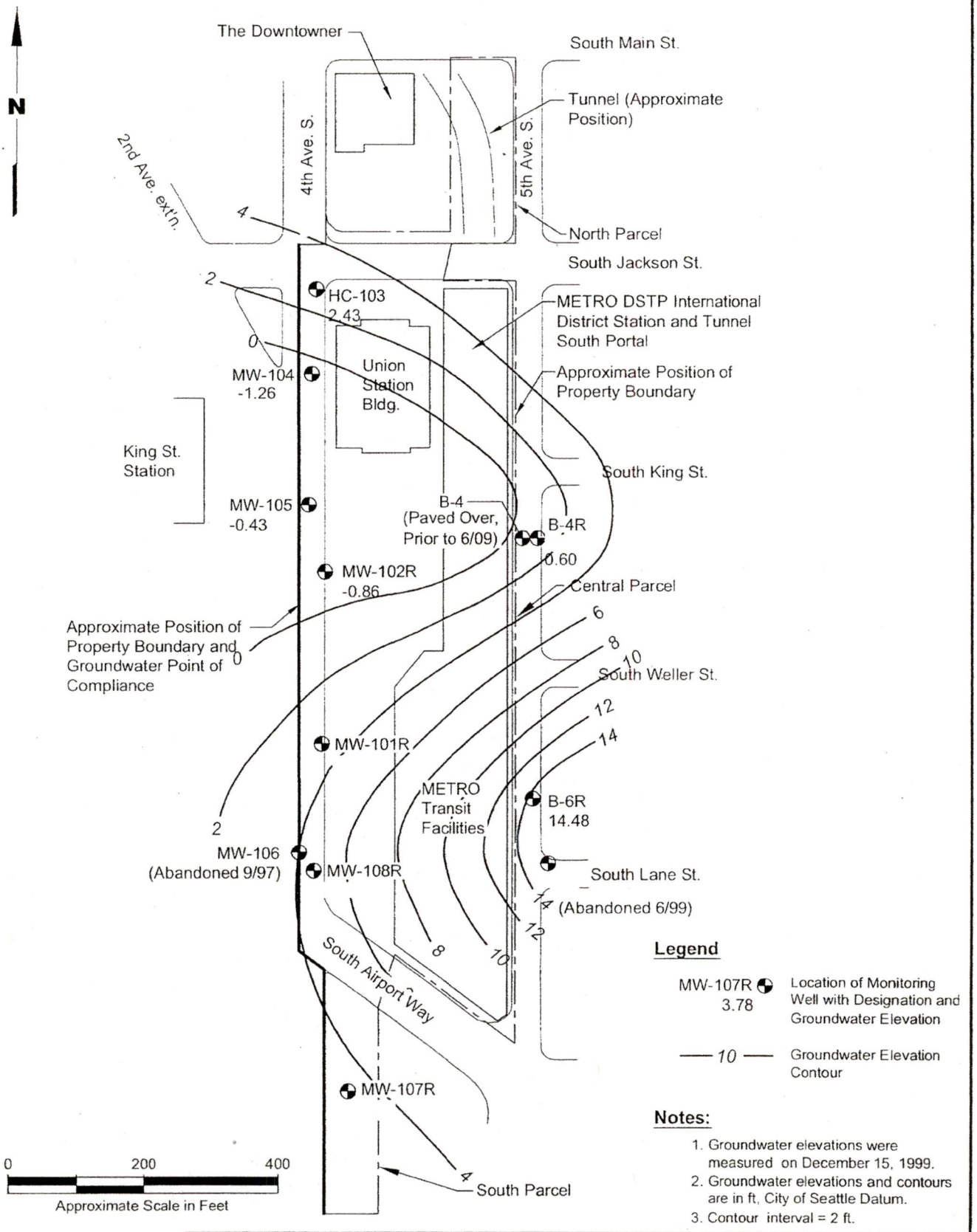
Union Station Seattle, WA	**Groundwater Elevation Contours: March 1999**	Figure **B-4**



Union Station/Groundwater Monitoring Report | V:\429\002\052\D\09 Annual Report\Fig4-1.dwg (A) "Figure B-5" 11/2/2009

LANDAU ASSOCIATES

Union Station Seattle, WA	**Groundwater Elevation Contours: June 1999**	Figure **B-5**



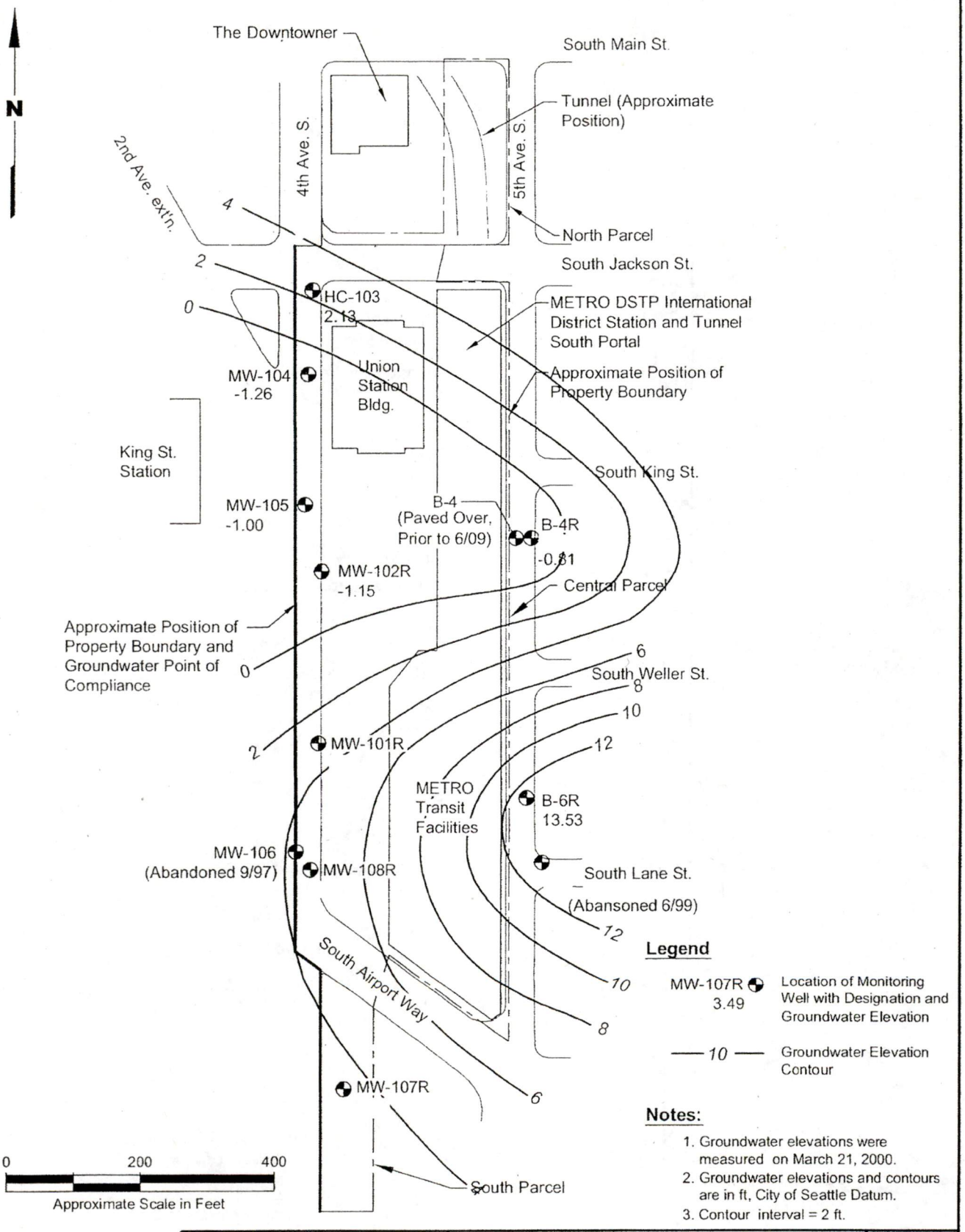
Union Station/Groundwater Monitoring Report | V:\429\002\052\D\09 Annual Report\Fig4-1.dwg (A) "Figure B-6" 11/2/2009

LANDAU ASSOCIATES

Union Station
Seattle, WA

Groundwater Elevation Contours: December 1999

Figure
B-6



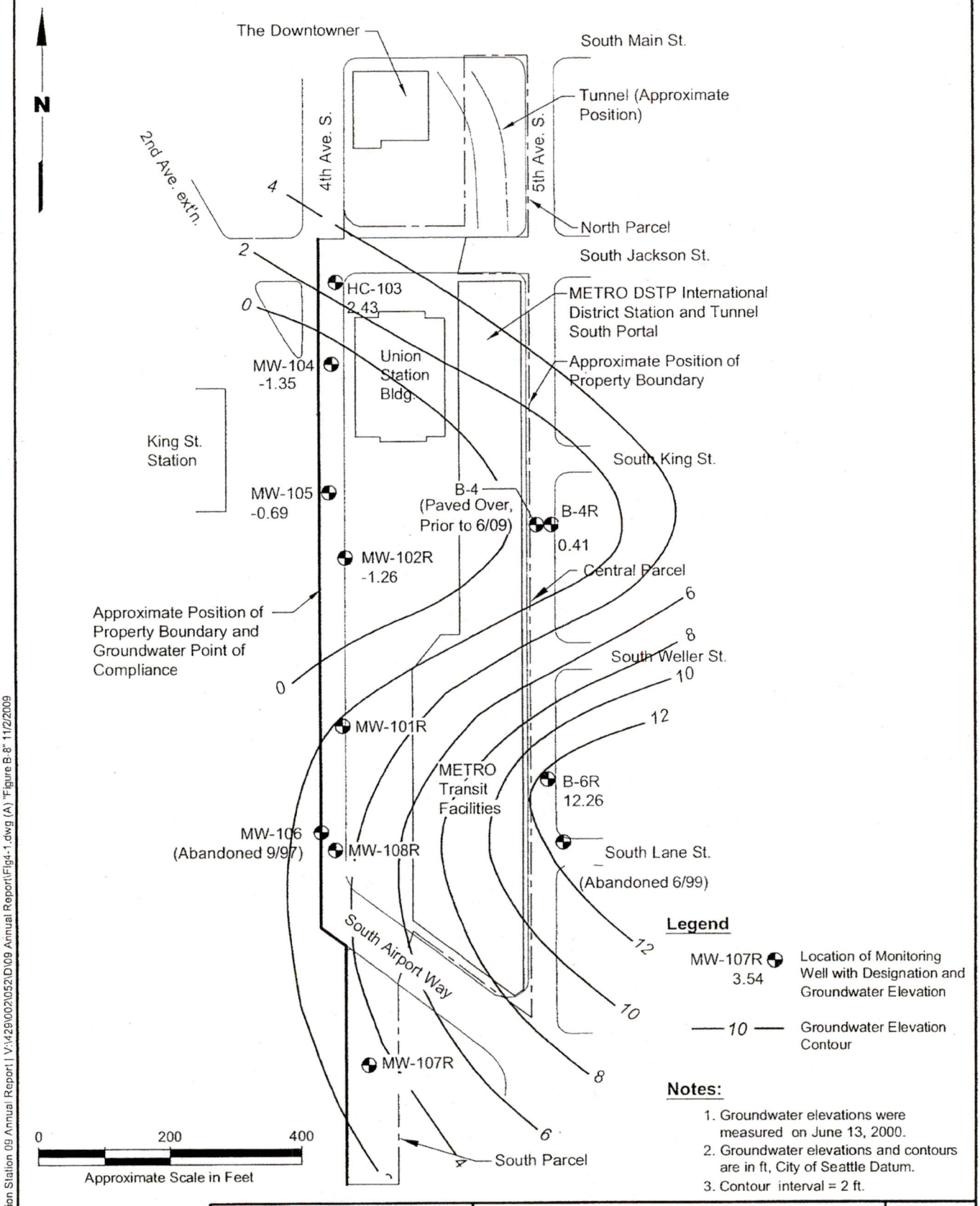
Union Station/Groundwater Monitoring Report | V:\429\0021052\D\09 Annual Report\Fig4-1.dwg (A) "Figure B-7" 11/2/2009

LANDAU ASSOCIATES

Union Station
Seattle, WA

Groundwater Elevation Contours: March 2000

Figure
B-7



Union Station 09 Annual Report | V:\429\002\052\D\09 Annual Report\Fig4-1.dwg (A) "Figure B-8" 11/2/2009

LANDAU ASSOCIATES

Seattle, WA

Groundwater Elevation Contours: June 2000

Figure **B-8**

APPENDIX C

Data Validation Technical Memorandum

TECHNICAL MEMORANDUM

LANDAU ASSOCIATES
ENVIRONMENTAL | GEOTECHNICAL | NATURAL RESOURCES

TO: Kristy Hendrickson, Project Manager

FROM: Terry McGourty and Stacy Lane

DATE: October 29, 2009

RE: UNION STATION
ANNUAL 2009 GROUNDWATER SAMPLING
LABORATORY DATA QUALITY EVALUATION

This memorandum provides the results of a data quality evaluation for nine groundwater samples including one blind field duplicate groundwater sample and two trip blanks collected during the quarterly groundwater sampling event at the Union Station property on August 24-25, 2009. A data quality evaluation was performed for the following analyses:

- Polycyclic aromatic hydrocarbons (PAHs; EPA Method 8270D)
- Polycyclic aromatic hydrocarbons [PAHs; EPA Method 8270D with selected ion monitoring (SIM)]
- Total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene, and xylenes (BTEX) [Washington State Department of Ecology (Ecology) Methods NWTPH-G and NWTPH-Dx; EPA Method SW8021Mod]
- Dissolved metals (EPA Method 200.8/7470A)
- Total dissolved solids and total suspended solids (EPA Methods 160.1 and 160.2, respectively).

All of the above analyses were performed by Analytical Resources, Inc. (ARI) laboratory located in Tukwila, Washington. This data quality evaluation covers ARI data packages PL72 and PL85.

The data quality evaluation was performed in accordance with Appendix A of the *Union Station Property Cleanup Action Plan* (CAP; Landau Associates 1997), and with applicable portions of the EPA *Contract Laboratory Program National Functional Guidelines for Organic Data Review* (EPA 1999) and *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA 2004).

The evaluation considered the following elements:

- Chain-of-custody records
- Holding times
- Blank results (laboratory and field)
- Surrogate recoveries
- Laboratory matrix spikes and matrix spike duplicates (MS/MSD)
- Laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) results
- Duplicate analyses (field and laboratory)
- Reporting limits
- Completeness.

Data validation qualifiers are added to sample results based on the evaluation of data quality. The absence of a data qualifier indicates that the datum is acceptable without qualification. The data qualifiers added to this data set are summarized in Table 1.

CHAIN-OF-CUSTODY RECORD

A signed chain-of-custody record was attached to each data package. The laboratory received all samples in good condition and all analyses were performed as requested.

HOLDING TIMES

For all analyses and all samples, the time between sample collection, extraction (if applicable), and analysis was determined to be within EPA- and project-specified holding times. No qualification of the data was necessary.

METHOD BLANKS

At least one method blank was analyzed with each batch of samples. No contamination was detected in the method blanks. No qualification of the data is necessary.

SURROGATE SPIKE RECOVERIES

Appropriate compounds were used as surrogate spikes for each analysis. Recovery values for the surrogate spikes were within the current laboratory-specified control limits. No qualification of the data is necessary.

FIELD TRIP BLANKS

One trip blank was submitted to the laboratory for both the NWTPH-G and BTEX analyses for both data packages. No contamination was detected in the trip blanks. No qualification of the data was necessary.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A laboratory duplicate and a matrix spike sample were analyzed with the dissolved arsenic in data package PL72. A laboratory duplicate sample was analyzed with the conventional parameters in data packages PL72 and PL85. A MS/MSD pair was analyzed with the PAHs in data packages PL72. The recovery values for each required spiking compound and the relative percent differences (RPDs) between the laboratory duplicate results were within the laboratory-specified control limits for all project samples with the following exceptions.

- RPDs between the MS and MSD results for four PAHs were greater than the control limit. The MS and MSD recoveries for these PAHs were within laboratory control limits; therefore, no qualification of the data was deemed necessary.

LABORATORY CONTROL SAMPLE (BLANK SPIKE) RESULTS

At least one laboratory control sample and/or laboratory control sample duplicate (LCS/LSCD) was analyzed with each batch of samples. Recoveries and relative percent differences (RPDs) for the laboratory control samples and associated duplicates were within the current laboratory control limits. No qualification of the data was necessary.

FIELD DUPLICATE RESULTS

One blind field duplicate sample pair (MW-101R/MW-109R) was collected, meeting the requirement specified in Appendix A of the Cleanup Action Plan of one duplicate per 20 samples, but no less than one field duplicate per sampling round. RPDs between the blind field duplicate sample results were within the project-specified control limit of 20 percent, with the following exception:

- PAHs. The RPD between blind field duplicate sample results for benzo(a)anthracene and chrysene exceeded the project-specified control limits. The benzo(a)anthracene and chrysene results for both samples were qualified as estimates (J), as indicated in Table 1.

- BTEX. The RPD between duplicate sample results for o-xylene exceeded the project-specified control limits. The o-xylene results for both samples were qualified as estimates (J, UJ), as indicated in Table 1.

REPORTING LIMITS

Method and/or project-specified reporting limits were met. No qualification of data was necessary.

OVERALL DATA QUALITY AND COMPLETENESS

Data precision was evaluated through laboratory, field, and matrix spike duplicates. Data accuracy was evaluated through laboratory control samples, surrogate spikes, and matrix spikes. Based on this data quality evaluation, all of the data were determined to be acceptable as qualified, and no data were rejected. The completeness for this set of data is 100 percent, which exceeds the project goal of 90 percent.

REFERENCES

EPA. 1999. *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*. U.S. Environmental Protection Agency. October.

EPA. 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. U.S. Environmental Protection Agency - Final. October.

Landau Associates. 1997. *Cleanup Action Plan, Union Station Property, Seattle, Washington.*

TABLE 1
DATA QUALIFIER SUMMARY
UNION STATION 2009 ANNUAL SAMPLING
ARI DATA PACKAGE PL72

Analysis	Analyte	Sample Number	Concentration	Data Qualifier	Reason for Qualification
cPAHs	Benzo(a)anthracene	MW-101R	0.28	J	High Field Duplicate RPD
	Benzo(a)anthracene	MW-109R	0.43	J	High Field Duplicate RPD
	Chrysene	MW-101R	0.20	J	High Field Duplicate RPD
	Chrysene	MW-109R	0.33	J	High Field Duplicate RPD
VOCs	o-Xylene	MW-101R	18	J	High Field Duplicate RPD
VOCs	o-Xylene	MW-109R	1.0U	UJ	High Field Duplicate RPD

APPENDIX B

Screening Levels Based on Background

6.6
180
240
280
300
350
350
370
390
400
420
450

UNION STATION

B-4, Acenaphthene

Screening Levels Based on Background 10/97 -12/00 + 08/09

MTCA*Stat* 3.0

Number of samples	12	Uncensored values	
Uncensored	12	Mean	311.38
Censored	0	Lognormal mean	464.01
TOTAL	12	Std. devn.	123.52
		Median	350
		Min.	6.6
		Max.	450

Lognormal distribution?	Normal distribution?
r-squared is: 0.50	r-squared is: 0.87

Recommendations:

Use nonparametric method.

Distribution selection	Enter percentile	Value corresponding to that percentile is:
3	90	441.00
1 = Lognormal	50th	350.00
2 = Normal	4 X 50th	1400.00
3 = Nonparametric method	Coefficient of Variation = N/A	

0.5 UNION STATION
94 B-4, Benzene
130 Screening Levels Based on Background 10/97 -12/00 + 08/09

140 MTCA*Stat* 3.0

140 Number of samples	12	Uncensored values	
140 Uncensored	12	Mean	148.71
150 Censored	0	Lognormal mean	397.48
160 TOTAL	12	Std. devn.	64.50
160		Median	145
180		Min.	0.5
230		Max.	260

260

Lognormal distribution?	Normal distribution?
r-squared is: 0.44	r-squared is: 0.89

Recommendations:

Use nonparametric method.

Distribution selection	Enter percentile	Value corresponding to that percentile is:
3	90	251.00
1 = Lognormal	50th	145.00
2 = Normal	4 X 50th	580.00
3 = Nonparametric method	Coefficient of Variation = N/A	

0.27
0.37
0.39
0.44
0.53
0.91
1.1
4
5.8
6
9.8
32

UNION STATION

B-4, Benzo(a)anthracene

Screening Levels Based on Background 10/97 -12/00 + 08/09

MTCA*Stat* 3.0

Number of samples	12	Uncensored values	
Uncensored	12	Mean	5.13
Censored	0	Lognormal mean	5.65
TOTAL	12	Std. devn.	9.01
		Median	1.005
		Min.	0.27
		Max.	32

Lognormal distribution?	Normal distribution?
r-squared is: 0.91	r-squared is: 0.57

Recommendations:

Use lognormal distribution.

Distribution selection	Enter percentile	Value corresponding to that percentile is:
1	90	15.19
1 = Lognormal	50th	1.65
2 = Normal	4 X 50th	6.59
3 = Nonparametric method	Coefficient of Variation = 4.38	

0.24
0.34
0.37
0.43
0.45
0.68
0.76
3.3
4.5
5.4
9
30

UNION STATION

B-4, Chrysene

Screening Levels Based on Background 10/97 -12/00 + 08/09

MTCA*Stat* 3.0

Number of samples	12	Uncensored values	
Uncensored	12	Mean	4.62
Censored	0	Lognormal mean	4.89
TOTAL	12	Std. devn.	8.46
		Median	0.72
		Min.	0.24
		Max.	30

Lognormal distribution?	Normal distribution?
r-squared is: 0.90	r-squared is: 0.55

Recommendations:

Use lognormal distribution.

Distribution selection	Enter percentile	Value corresponding to that percentile is:
1	90	13.35
1 = Lognormal	50th	1.42
2 = Normal	4 X 50th	5.67
3 = Nonparametric method	Coefficient of Variation = 4.52	

125
2300
2400
2900
3500
3600
3800
3800
4500
4700
5900
7700

UNION STATION

B-4, Diesel-Range Hydrocarbons

Screening Levls Based on Background 10/97 - 12/00 + 8/09

MTCA*Stat* 3.0

Number of samples	12	Uncensored values	
Uncensored	12	Mean	3768.75
Censored	0	Lognormal mean	5018.86
TOTAL	12	Std. devn.	1896.50
		Median	3700
		Min.	125
		Max.	7700

Lognormal distribution?	Normal distribution?
r-squared is: 0.62	r-squared is: 0.94

Recommendations:

Use normal distribution.

Distribution selection	Enter percentile	Value corresponding to that percentile is:
2	90	6411.15
1 = Lognormal	50th	3768.75
2 = Normal	4 X 50th	15075.00
3 = Nonparametric method	Coefficient of Variation = 0.55	

280 UNION STATION
2400 B-4, Gasoline-Range Hydrocarbons
3100 Screening Level Based on Background 10/97 - 12/00 + 08/09

3200		MTCA*Stat* 3.0		
3800	Number of samples	12	Uncensored values	
4100	Uncensored	12	Mean	4440.00
4500	Censored	0	Lognormal mean	5271.97
4800	TOTAL	12	Std. devn.	2213.91
5900			Median	4300
6000			Min.	280
6200			Max.	9000

9000

Lognormal distribution?	Normal distribution?
r-squared is: 0.70	r-squared is: 0.96

Recommendations:

Use normal distribution.

Distribution selection	Enter percentile	Value corresponding to that percentile is:
2	90	7499.09
1 = Lognormal	50th	4440.00
2 = Normal	4 X 50th	17760.00
3 = Nonparametric method	Coefficient of Variation = 0.54	

UNION STATION

B-6R Arsenic

Screening Level Based on Background 10/97-08/09

MTCA*Stat* 3.0

Number of samples		Uncensored values	
Uncensored	20	Mean	21.29
Censored	0	Lognormal mean	21.64
TOTAL	20	Std. devn.	8.45
		Median	21.5
		Min.	6
		Max.	35

Lognormal distribution?	Normal distribution?
r-squared is: 0.92	r-squared is: 0.96

Recommendations:

Use lognormal distribution.

Distribution selection	Enter percentile	Value corresponding to that percentile is:
1	90	36.92
1 = Lognormal	50th	19.45
2 = Normal	4 X 50th	77.80
3 = Nonparametric method	Coefficient of Variation = 0.53	

Exhibit C

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

January 20, 2005

Ms. Kristy J. Hendrickson
Landau Associates
130 2nd Avenue
Edmonds, WA 98020

Dear Kristy:

RE: Union Station Purchaser Consent Decree No. 97-2-18936-5SEA – Certification of Completion

SUMMARY

- **This letter constitutes Ecology Certification of Completion that all remedial actions specified in the Cleanup Action Plan, except confirmational monitoring, are complete.**
- **Ecology approves reduction in groundwater monitoring frequency to every five years.**
- **Ecology denies reduction in the list of constituents to be analyzed in groundwater monitoring rounds.**
- **Ecology cannot delist the site as hazardous substances exist on site which are likely to exceed cleanup standards.**

Thank you for your letter of October 29, 2004 and the accompanying report, *Groundwater Monitoring, Union Station, Seattle, WA*, dated October 28, 2004. In that letter you requested a Certificate of Completion and that the site be removed from the Hazard Ranking List. You also requested a reduction in the monitoring frequency to every five years and a reduction in the constituents monitored to carcinogenic polycyclic aromatic hydrocarbons.

The Consent Decree states in Section XXV,

> Upon completion of all remedial actions specified in the Cleanup Action Plan, except confirmational monitoring, Ecology shall issue a Certificate of Completion. Completion of all remedial actions except confirmational monitoring is defined in Section 6.0 of Attachment B. Unless Ecology becomes aware of circumstances at the Facility that present a previously unknown threat to human health or the environment, Ecology shall within thirty (30) days if issuance of the Certificate of Completion propose to remove the Facility from the Hazard Ranking List, pursuant to WAC 173-340-330(4).

Ecology agrees that all remedial actions specified in the Cleanup Action Plan, except confirmational monitoring, are complete. This letter constitutes Ecology's Certification of Completion pursuant to the Consent Decree.

Ecology remains concerned regarding concentrations of Total Petroleum Hydrocarbons (TPH) being detected at the site and regarding the change in groundwater conditions subsequent to the February 2001 Nisqually earthquake. The earthquake apparently changed groundwater flow directions, resulting in monitoring well B-4 now being a downgradient rather than an upgradient well. B-4 continues to have elevated TPH concentrations, as well as elevated cPAH concentrations. Wells MW-105, MW-101R, and MW-107R also have elevated TPH concentrations which are not readily explained by the concentrations measured in the sole remaining background well, B-6R.

Table 1 of the Cleanup Action Plan[1] clearly states that if TPH is detected, the data will be reviewed to evaluate whether groundwater is adequately protected pursuant to WAC 173-340-720(3)(c):

> Method B cleanup levels to protect beneficial uses of ground water other than drinking water shall be established by the department on a case-by-case basis.

The 2004 monitoring report presents information regarding "background" concentrations of TPH based upon concentrations measured in B-4. However, Ecology cannot consider B-4 to be a representative upgradient well. In addition, whole effluent toxicity testing at other sites indicates a TPH concentration protective of beneficial uses of groundwater to protect aquatic life is generally less than 1000 µg/L. This is less than TPH concentrations measured in many of the site monitoring wells. Hence, Ecology does not believe that it has been demonstrated that cleanup levels have been met at the point of compliance for groundwater. As a result of the changed groundwater conditions since February 2001, it is not even clear that the point of compliance established in the 1997 consent decree is still appropriate.

Ecology considers the origin of the TPH to be unclear at present. Since it is present, Ecology will not delist the site at this time. This is necessary to maintain a record of the presence of this contamination until such time as Ecology has the resources to address it. Ecology is concerned that those involved with the site in the future can readily assess groundwater conditions beneath the site. Ecology believes continued monitoring is the appropriate response at this time.

With regard to continued monitoring, your letter of October 29, 2004 requests groundwater monitoring frequency be reduced to every 5 years and the list of constituents for analysis be reduced. Ecology approves the request to reduce of groundwater monitoring frequency to every 5 years. Ecology denies the request to reduce the list of constituents for analysis.

Sincerely,

David L. South

David L. South
Senior Engineer
Toxics Cleanup Program

---

[1] Exhibit B of the Consent Decree.

Hickey, Joe (ECY)

From: South, David (ECY)
Sent: Monday, March 15, 2010 5:49 PM
To: Hickey, Joe (ECY)
Subject: FW: Union Station Delisting

From: South, David (ECY)
Sent: Mon 3/15/2010 2:36 PM
To: Jessica Ferrell
Cc: Kristy Hendrickson; Kevin Daniels; Brad Marten
Subject: Union Station Delisting

Thank you for your letter of February 24, 2010. Although Ecology is always eager to remove sites from the hazardous sites list, we cannot delist the Union Station site at this time. The site does not meet the requirement that ground water cleanup levels be met at the designated point of compliance. Benzene in particular is not in compliance at the point of compliance, exceeding both its cleanup level and its background screening level. This is documented in your letter of February 24th on page 4, Item 2.

There may also be some confusion about the difference between cleanup levels and background screening levels. Background screening levels are used to assess whether contamination is coming onto the site and to assess whether additional actions are warranted. Cleanup levels are used to assess whether contaminant concentrations in groundwater leaving the site are protective of human health and the environment.

TPH concentrations in groundwater also exceed MTCA cleanup levels. The Cleanup Action Plan specifies that, "If TPH is detected, the data will be reviewed to evaluate whether groundwater is adequately protected pursuant to WAC 173-340-720(3)(c)". See Cleanup Action Plan Table 1, footnote **) This cite, from the version of the regulation current at the time of entry of the Consent Decree, requires ground water cleanup levels protect beneficial uses of groundwater other than drinking water. In the case of Union Station, ground water cleanup levels must protect marine surface water. At the time of entry of the Consent Decree, TPH cleanup levels to protect marine surface water were not available.

The current regulation does include TPH cleanup levels to protect surface water. WAC 173-340-730(3)(b)(C) states that for petroleum mixtures the cleanup levels in Table 720-1 may be used. These are the Method A ground water cleanup levels. (One can also use equations 730-1, but this gives concentrations quite a bit lower than the Method A table). Hence, TPH concentrations at the ground water point of compliance exceed cleanup levels.

The TPH concentrations protective of surface water is information that was developed after the Consent Decree was entered. Hence, the degree to which TPH concentrations leaving the site

threaten marine surface water is a circumstance at the Facility that represents a threat to human health and the environment that was previously unknown to Ecology.

On a more practical level, one of the key reasons the Union Station site needs to remain on the Hazardous Sites List is that ground water contamination is leaving the site and migrating to downgradient sites. Property transactions in the area often involve reviewing the Hazardous Sites List. It would not be appropriate to remove this site from the list, as then people would not be aware of it.

Please let me know if you have any questions.

David L. South

Senior Engineer

Toxics Cleanup Program

Washington State Department of Ecology

Northwest Regional Office

3190 160th Avenue SE

Bellevue, WA 98008-5452

425-649-7200

dsou461@ecy.wa.gov

Union Station/SIT 1.2

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

January 20, 2005

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David L. South

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Senior Engineer
Toxics Cleanup Program

---

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