



MA

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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

September 20, 2011

Ms. Lauren Carroll (c/o William Carroll)
Pacific Crest Environmental
PO Box 952
North Bend, WA 98045

Re: Opinion on Proposed Cleanup of a Property associated with a Site (Penthouse Drapery Cleaners and Manufacturers, Inc):

- Address: 1752 Rainier Ave. S., Seattle, WA
 - Facility/Site No.: 23408
 - VCP No.: NW 2278
- CSIO # 3184

Dear Ms. Carroll:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your proposed independent cleanup of a Property associated with the **Penthouse Drapery Cleaners and Manufacturers, Inc** facility (Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

Issues Presented and Opinion

1. Upon completion of the proposed cleanup, will further remedial action likely be necessary at the Property to clean up contamination associated with the Site?

YES. Ecology has determined that further remedial action will likely be necessary at the Property to clean up contamination associated with the Site.

2. Upon completion of the proposed cleanup, will further remedial action likely be necessary elsewhere at the Site?

YES. Ecology has determined that further remedial action will likely be necessary elsewhere at the Site.

This opinion is based on an analysis of whether the remedial action meets the substantive requirements of MTCA, Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA"). The analysis is provided below.



Description of the Property and the Site

This opinion applies only to the Property and the Site described below. This opinion does not apply to any other sites that may affect the Property. Any such sites, if known, are identified separately below.

1. Description of the Property.

A Remedial Investigation/Feasibility Study (RI/FS) completed for the Site has not explicitly defined the area subject to a proposed cleanup action. However, the text of the RI/FS describes areas outlined in Figures 6 and 10 as showing the "estimated areal extent...requiring remedial action." (Page 4-6, 4-7). These areas occur within the following tax parcels, which were affected by the Site. Ecology assumes these are the parcels to be addressed by your cleanup:

- 754 830 1100
- 754 830 1115
- 754 830 1120
- 754 830 1150
- 754 830 1155

Taken together, these five parcels comprise the "**Cleanup property**" or "**the Property**" for purposes of this letter. They include most of the area between Rainier Avenue, 22nd Avenue South, Grand Street, and South State Street. **Enclosure A** includes a legal description of the Property. The location of the Property within the Site is illustrated in **Enclosure B, Site Description**.

Note also that several other property-related definitions are used in this letter. One of these is the "**Penthouse property**". This property is defined as the parcel at 1752 Rainier Avenue South (754 830 1155).

A second group of parcels termed the "**Belshaw property**" in this letter adjoins the Penthouse property to the south and to the east across 22nd Avenue South, as illustrated on the Site Map in Enclosure B. Part of the Belshaw property is within the Cleanup property.

Finally, a larger area in which various investigations have taken place is defined as the "**investigation area**".

2. Description of the Site.

The Site is defined by the nature and extent of contamination associated with the following releases:

- Tetrachloroethene (PCE) in Soil
- PCE, trichloroethane (TCE), cis-1,2-dichloroethene (DCE), and 1,1,1-trichloroethane (TCA) in Ground Water.
- PCE in Air.

The "Site" is the volumetric area that has been contaminated, and is defined primarily by PCE in soil, ground water, and air. The estimated areal extent of the Site is shown on the Site Map in Enclosure B, and includes the entire Penthouse property, portions of the adjoining properties to the north, south, and east, and a likely westward extension into the Rainier Avenue South right-of-way. The Site also appears to extend southward and eastward beyond Grand Street, based on PCE, TCE, and DCE detections in wells MW-1, MW-2, and MW-20.

Note that two other releases within the Cleanup property have become, or may have become, comingled with the PCE release, and are thus considered part of the Site. The first is a TCA release which appears to have occurred on the Belshaw property portion of the Cleanup property, based on detections of this compound in ground water at MW-8, MW-19, and DPE-1. The second is a release of gasoline from one or two USTs on the Belshaw property portion of the Cleanup Property.

Enclosure B includes a detailed description and diagram of the Site, as currently known to Ecology.

3. Identification of Other Sites that may affect the Property.

Please note that a parcel of real property can be affected by multiple sites. At this time, we have no confirmed information that this Property is affected by other sites.

However, Ecology believes it possible that some of the TCE detected in ground water at the Site may be from a separate site. The highest concentration of TCE detected in ground water in the investigation area was in MW-23, located up gradient, to the north. It also is possible that the southern end of the PCE/TCE plume has become comingled with a separate plume emanating from the Belshaw property east of 22nd Avenue South.

Basis for the Opinion

This opinion is based on the information contained in the following documents:

1. September 19, 2011. *Re: Penthouse Drapery Cleaners and Manufacturers, Inc, 1752 Rainier Ave. S., Seattle, Washington.* letter from William Carroll, Pacific Crest Environmental, to Mark Adams, Washington Department of Ecology

2. August 10, 2011. *Re: Former Penthouse Drapery Site, 1752 Rainier Avenue S., Seattle, WA, Site Id. No. 23408, VCP No. NW2278.* letter from Patricia Thompson, Davis Wright Tremaine LLP, to Mark Adams, Ecology NWRO Toxics Cleanup Program.
3. May 13, 2011. *Remedial Investigation-Feasibility Study Report, Former Penthouse Drapery, 1752 Rainier Avenue South, Seattle, Washington, Site Id. No. 23408, VCP No. NW2278.* Pacific Crest Environmental
4. January 4, 2011. *Re: Opinion Pursuant to WAC 173-340-515(5) on Proposed Remedial action for the following Hazardous Waste Site: Name: Penthouse Drapery Cleaners and Manufacturers, Inc.* letter from Mark Adams, Department of Ecology, to Lauren Carroll, Pacific Crest Environmental
5. August 3, 2010. *Sampling and Analysis Plan, Former Penthouse Drapery, 1752 Rainier Avenue South, Seattle, Washington, Ecology VCP # NW2278.* Pacific Crest Environmental
6. July 30, 2010. *Data Summary Report, Former Penthouse Drapery, 1752 Rainier Avenue South, Seattle, Washington.* Pacific Crest Environmental

The reports listed above will be kept in the Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. Appointments can be made by calling the NWRO resource contact, Sally Perkins, at 425 649-7190.

This opinion is void if any of the information contained in those documents is materially false or misleading.

Analysis of the Cleanup

Ecology has concluded that, upon completion of your proposed cleanup, **further remedial action** will likely be necessary at the Property to clean up contamination associated with the Site. That conclusion is based on the following analysis:

1. Characterization of the Site.

Ecology has determined your characterization of the Site is not sufficient to establish cleanup standards for the Site and select a cleanup for the Property. The Site is described above and in **Enclosure B**.

Exploration of the investigation area began with a Phase I ESA in 1995, and was followed by additional Phase I ESAs and multiple field sampling efforts between 2002 and the most recent RI activities in 2010. During this seven year period, at least 44

borings were drilled for various purposes to depths ranging up to 71.5 feet below ground surface (bgs); hundreds of soil samples were obtained for chemical analysis; and 66 ground water samples were obtained from specific locations or depth intervals. Multiple sampling events occurred at the majority of ground water monitoring wells. Other field activities provided ancillary characterization data. Specifically, pilot testing for a dual-phase extraction (DPE) system was completed in 2003, and a DPE system was installed and operated between 2004 and 2007. There has also been recent testing for a soil vapor extraction (SVE) system.

An assessment of soil vapor intrusion was also completed in 2010. The assessment consisted of obtaining an ambient air sample and a below-floor -slab soil vapor sample at the Penthouse property for analysis of PCE and its' breakdown products.

Despite the extensive work completed at the Site to date, several issues still need to be addressed in order to establish cleanup levels and select a cleanup action:

- Information on the local sanitary and storm drain system is necessary to evaluate if these are providing, or could provide, a preferential migration pathway for ground water or soil vapor.
- Terrestrial habitat conditions in the investigation area need to be described in order to conduct a terrestrial ecological assessment. Note: landscaped yard areas can be considered contiguous undeveloped land under MTCA.
- An interpretation of stratigraphic conditions specific to the investigation area is needed to provide a basis for understanding PCE distribution in the subsurface. The grain size description in the RI/FS is not sufficient for Ecology to understand what kinds of deposits are controlling contaminant migration at this Site. Also, the description of geology in the text and the conditions shown on the cross sections need to be consistent (see Enclosure B, Geology).
- The discrepancy between ground water flow direction estimates based on elevation contouring and the actual shape of the PCE plume should be evaluated.
- The lateral extent of soil contamination needs to be better defined on parcel 754 830 1100, located immediately east of the Penthouse property. Highly contaminated soils present on the Penthouse property are within 10 feet of the parcel boundary, and there does not appear to be any bounding data available.
- The vertical extent of soil and ground water contamination has not been determined at the Property. Specifically, PCE was still detectable in soil at a depth of 61 feet at the base of SB-5, suggesting the possibility it extends deeper. Ground water is also contaminated at this depth and the potential for deeper

impact has not been explored. A search for water supply wells in the area needs to be made using Ecology's database and other standard sources.

- Information on the nature and extent of contamination associated with the former leaded gasoline UST(s?) on the Belshaw property portion of the Cleanup property has not been provided to Ecology. This information needs to be provided and developed in order to clarify whether co-mingling of contaminants from the PCE release and the gasoline release has occurred.

2. Establishment of cleanup standards for the Site.

Ecology has determined the cleanup levels and points of compliance you established for the Site do not meet the substantive requirements of MTCA.

Soil

Cleanup Levels: Cleanup levels and a point of compliance are needed for contaminants present in soil at the Site. The final cleanup levels selected need to be protective of all potential exposure pathways, and be the most stringent of the cleanup levels identified as being applicable.

The Site is located in the Rainier Valley commercial district, with an established residential neighborhood immediately to the north, and other residential buildings in the area. A soil cleanup level for unrestricted use is therefore appropriate, specifically protection of human health from direct contact (ingestion). Either MTCA Methods A or B cleanup levels could be used for this purpose.

Ground water is present beneath the Property, and soil cleanup levels protective of leaching to ground water are needed. Method A cleanup levels are also appropriate for this purpose, or Method B cleanup levels could be calculated for individual constituents.

The Site is located in an area with limited terrestrial habitat, and a terrestrial ecological evaluation (TEE) completed for the project (RI/FS, P. 4-3) concludes that soil cleanup levels protective of terrestrial species are not required based on the less-than-1.5-acre-undeveloped-land-within-500-feet-of-the-site exclusion. Ecology does not accept this conclusion, unless further proof is provided regarding conditions within 500 feet of the site. The TEE analysis also claims an exemption under the soil-will-be-covered criterion. Ecology does not accept this exemption either, until such time as a cleanup action has been approved that includes institutional controls (i.e. environmental covenant).

A vapor intrusion threat exists at the Site, as indicated by high residual concentrations of PCE and TCE in soil and ground water, and the actual detections of PCE in soil vapor.

Ecology's current guidance on soil vapor intrusion does not provide an explicit method for establishing soil cleanup levels protective of indoor air, and instead relies on empirical demonstrations of air quality or on modeling. Proof that soil cleanup levels protective of air have been met will therefore be based on one of these methods.

No other exposure pathways appear to exist at this Site or require pathway-specific soil cleanup levels. The most stringent of the cleanup levels developed to be protective of the pathways described above will apply to this Site. **Ecology therefore does not accept the proposed Method C cleanup levels tabulated on Page 4-6 of the RI/FS.**

Point of Compliance: The point of compliance for soil at this Site will be throughout the Site. However, a conditional point of compliance will be set as soils throughout the Property for determining Property cleanup.

Ground Water

Cleanup Levels: The highest beneficial use for ground water under MTCA is considered to be as a potable source, unless it can be demonstrated that the ground water is non potable. Cleanup levels protective of potable use are the default. Either Method A or B cleanup levels can be used for protection of potable water.

The RI/FS proposes that ground water at the Site be considered non potable for purposes of developing cleanup levels. Ecology does not accept this classification for the following reasons:

- The 0.5 gpm low-yield criterion has not been shown to apply to this Site. The RI/FS cites the average ground water yield as being 0.3 gpm from each DPE system wells. The wells were screened to a maximum depth of 35 feet. While this data indicates low-yield conditions at shallow depth, contaminated ground water at this Site extends to a depth of at least 70 feet, and may go deeper. No data on yield has been provided for the deeper water bearing zones.
- It has not been shown that hazardous substances are unlikely to be transported to ground water that is a future source of drinking water. To do this requires an assessment of hydrostratigraphic conditions at depth and down gradient of the Site within the Rainier Valley.

The RI/FS also indicates the ground water needs to be protective of indoor air, and uses Method C air cleanup levels as the end point. Ecology agrees that a ground water cleanup level protective of indoor is required, but does not accept Method C values (see the Air section below).

In summary, Ecology does not accept the proposed ground water cleanup levels tabulated on Page 4-6 of the RI/FS.

Point of Compliance: The point of compliance for ground water is throughout the Site from the uppermost point of saturation to the lowest depth potentially impacted. A conditional point of compliance will be set for the Property cleanup comprising ground water throughout the Property from the uppermost point of saturation to the lowest depth potentially impacted.

Air

Cleanup Levels: Air cleanup levels are necessary to protect against soil vapor intrusion into buildings ultimately constructed at the Property or into existing buildings on adjacent properties. The RI/FS proposes air cleanup levels based on an industrial exposure scenario. While this may have been appropriate in the past, it is no longer. Most of the recent development in the area has been either residential or commercial. The RI/FS cleanup analysis also calculates cleanup levels based on a Method C worker exposure scenario, not the residential site use which is the standard reasonable maximum exposure (RME) for air under MTCA. Because future uses of undeveloped areas of the Site have not been determined, and because the Site boundaries may enclose areas where people are already living (condominiums across South State Street), Ecology does not accept changing the RME from residential to industrial. **The cleanup levels proposed on Page 4-5 of the RI/FS for air are therefore not accepted.**

The RI/FS also proposes soil gas screening levels. Ecology agrees that setting soil gas screening levels that are protective of ambient air is useful. However the values listed in RI/FS table on Page 4-5 are based on incorrect air cleanup levels.

Point of Compliance: The point of compliance for air is ambient air throughout the Site. A conditional point of compliance will be set for the Property cleanup as ambient air throughout the Property.

3. Selection of cleanup for the Property.

Ecology has determined the cleanup you proposed for the Property does not meet the substantive requirements of MTCA. A cleanup action can not be selected until the characterization issues outlined in Section 1 are addressed, and appropriate cleanup levels are set, as described in Section 2. There are also other issues related to the FS analysis and prior cleanup actions that need to be resolved before selection of a Property cleanup. These are described below.

One cleanup action phase has already taken place at the Cleanup property. Between 2004 and 2007, a dual-phase extraction (DPE) system operated on the Belshaw property portion of the Cleanup property. The system included 7 extraction wells (DPE-1 through DPE-7), and was designed to remove free product, soil vapor, and gasoline-contaminated ground water associated with the former gasoline UST. A total of 919 pounds of TPH as vapor and 202 pounds of free product (LNPL) were reportedly recovered. Approximately 715,000 gallons of ground water were also pumped, treated via granular charcoal, and discharged to the sewer. It is not known whether compliance soil and ground water samples were taken to confirm conditions at the close of the remediation. This data collection effort remains to be completed.

The FS portion of the RI/FS evaluated a number of cleanup alternatives and selected an option involving electric resistive heating (ERH) and enhanced in-situ anaerobic bioremediation (AB). Ecology is generally supportive of this option, but requires the following issues be addressed:

- Alternative No. 1 does not meet the MTCA threshold requirements and therefore can not be considered as one of the alternatives.
- Alternative 2 was rejected based on not meeting the "reasonable restoration time frame" criterion. Ecology does not necessarily agree with this conclusion, particularly if the alternative were expanded to include a bioremediation or chemical oxidation injection element.
- The analysis of the alternatives needs to explain how each was ranked with regard to the MTCA criteria in Table 12 of the RI/FS. An explanation of how the criteria were weighted would also be helpful, although Ecology generally agrees with the percentages chosen.
- Ecology has various questions about the HER process as follows:
 - How will electrode placement to a depth of 50 feet remediate soil and ground water below that depth?
 - Is pilot testing necessary to establish a radius of influence for the ERH electrodes?
 - Will elevated soil temperatures extend to land surface, and if so, what impact might that have on utilities, landscaping, terrestrial species, or other aspects of the surface and near-surface? As an ancillary question, how closely and uniformly can the temperature be controlled in the treatment area?

-Are there any specific dangers to the public or the environment associated with implementation of an ERH system?

- A compliance monitoring plan will need to be prepared to monitor and confirm the effects of the cleanup action. Among other things, this plan will need to address soil sampling and analysis. Ecology does not accept the contention that soil samples collected from below the water table are not representative and not suitable for compliance monitoring. If this assertion were to be accepted, most soil sample data from western Washington would need to be discarded because of some degree of saturation present in the samples.

Limitations of the Opinion

1. Opinion does not settle liability with the state.

Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Site. This opinion **does not**:

- Change the boundaries of the Site.
- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70.105D.040(4).

2. Opinion does not constitute a determination of substantial equivalence.

To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you proposed will be substantially equivalent. Courts make that determination. *See* RCW 70.105D.080 and WAC 173-340-545.

3. Opinion is limited to proposed cleanup.

This letter does not provide an opinion on whether further remedial action will actually be necessary at the Property upon completion of your proposed cleanup. To obtain such an opinion, you must submit a report to Ecology upon completion of your cleanup and request an opinion under the VCP.

4. State is immune from liability.

The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. See RCW 70.105D.030(1)(i).

Contact Information

Thank you for choosing to clean up your Property under the Voluntary Cleanup Program (VCP). After you have addressed our concerns, you may request another review of your cleanup. Please do not hesitate to request additional services as your cleanup progresses. We look forward to working with you.

For more information about the VCP and the cleanup process, please visit our web site: www.ecy.wa.gov/programs/tcp/vcp/vcpmain.htm. If you have any questions about this opinion, please contact me at 425.649.7107.

Sincerely,



Mark Adams
NWRO Toxics Cleanup Program

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Enclosures (2): A – Legal Description of the Property
B – Description and Diagram of the Site

Enclosure A

Legal Description of the Property

Legal Description of Affected Parcels

Property Name	Current Property Owner Name	Former Property Owner Name	Property Address	City	Property Zip Code	Township	Range	Section	Quarter	Parcel ID	Legal Description
Former Penthouse Drapery Property	Todd Sullivan	Colin Tsuchikawa Belshaw Brothers, Inc./Enodis	1752 Rainier Avenue South	Seattle	98144	24	24	4	9 NW	754830-1155	SANDERS SUPL PLAT LESS ST
Belshaw - Parking lot Vacant Lot - East of Former Penthouse Drapery Property	Brunzer, LLC	Adulkarim Nagi	Rainier Ave. S. 2113 S. State Street	Seattle	98144	24	24	4	9 NW	754830-1150	SANDERS SUPL PLAT LESS ST
Belshaw - Paint Building	CENTIOLI IMPROVEMENT LLC	Belshaw Brothers, Inc./Enodis	1762 Rainier Avenue South	Seattle	98144	24	24	4	9 NW	754830-1115	SANDERS SUPL PLAT W 1/2 SANDERS SUPL PLAT 3 & 8 LESS ST & LOT 3 BLK 1 CREEDMOOR ADD SANDERS SUPL PLAT 4 & POR E OF RAINIER LESS FOR ST LOT 7
Belshaw - Weld Bldg. Parking	Brunzer, LLC	Belshaw Brothers, Inc./Enodis	Rainier Ave. S.	Seattle	98144	24	24	4	9 NW	754830-1120	

Enclosure B

Description and Diagram of the Site

Site Description

This section provides Ecology's understanding and interpretation of site conditions. It forms the basis for the conclusions and opinions expressed in the body of the letter.

Site and Property Definition: Several property or area terms are used throughout this section and the body of the letter, as mentioned earlier. The earlier description of these various definitions is repeated here:

The "Site" is the volumetric area that has been contaminated, and is defined primarily by PCE in soil, ground water, and air. TCA is also present in ground water, along with the PCE-breakdown products TCE and DCE. The estimated areal extent of the Site is shown on the attached Site Map. As illustrated, the Site includes the entire Penthouse property, portions of the adjoining properties to the north, south, and east, and a likely westward extension into the Rainier Avenue South right-of-way. The Site also appears to extend southward and eastward beyond Grand Street, based on PCE, TCE, and DCE detections in wells MW-1, MW-2, and MW-20.

Note that two other releases within the Cleanup property (see definition below) have become, or may have become, comingled with the PCE release, and are thus considered part of the Site. The first is a TCA release which appears to have occurred on the Belshaw property portion of the Cleanup property (see definition below), based on detections of this compound in ground water at MW-8, MW-19, and DPE-1. The second is a release of gasoline from one or two USTs on the Belshaw property portion of the Cleanup Property.

A Remedial Investigation/Feasibility Study (RI/FS) completed for the Site has not explicitly defined the area subject to a proposed cleanup action. However, the text of the RI/FS describes areas outlined in Figures 6 and 10 as showing the "estimated areal extent...requiring remedial action." (Page 4-6, 4-7). These areas occur within the following tax parcels, which were affected by the Site. Ecology assumes these are the parcels to be addressed by your cleanup:

- 754 830 1100
- 754 830 1115
- 754 830 1120
- 754 830 1150
- 754 830 1155

Taken together, these five parcels comprise the "Cleanup property" or "the Property" for purposes of this letter. They include most of the area between Rainier Avenue, 22nd Avenue South, Grand Street, and South State Street. **Enclosure A** includes a legal description of the Property. The location of the Property within the Site is illustrated in **Enclosure B, Site Description**.

Note also that several other property-related definitions are used. One of these is the **"Penthouse property"**. This property is defined as the parcel at 1752 Rainier Avenue South (754 830 1155).

A second group of parcels termed the **"Belshaw property"** in this letter adjoins the Penthouse property to the south and to the east across 22nd Avenue South, as illustrated on the Site Map. Part of the Belshaw property is within the Cleanup property.

Finally, a larger area in which various investigations have taken place is defined as the **"investigation area"**.

Area and Property Description: The Property is in the Rainier Valley business district, and is situated on the major thoroughfare serving the area – Rainier Avenue South. Commercial businesses line Rainier Avenue, and are scattered throughout the area. Residential properties are also present in close proximity to the Property. Directly across the street to the north are a new condominium development and a neighborhood with single-family homes. A large apartment complex and a defunct manufacturing facility are located to the east.

Property History and Current Use: The Penthouse property was developed by at least 1947 with the construction of a commercial building. A number of companies have occupied the building since then including Associated Industries Fabricators (1951 – 1970), Penthouse Drapery (1984-1990), and Seattle Collision Center (1998- present). Seattle Collision is still in operation.

The remainder of the Property immediately south of the Penthouse property (the western portion of the Belshaw Property) has also been developed for some time, although the history of development has not been provided to Ecology. A welding building and a paint building were formerly present in this area. They were part of a larger bakery and restaurant equipment manufacturing facility that occupied the Belshaw Property.

Contaminant Sources and History of Releases: Potential contaminant sources for this Site include dry cleaning fluid spills and disposal at the cleaners (the "source area"). The dry cleaning fluid consisted principally of PCE. There is no record of specific spills or leaks at the Penthouse property, nor is any information available to Ecology on the dry cleaner operation.

Physiographic Setting: The Site is situated within and near the northern end of the Rainier Valley, between the Beacon Hill upland on the west and the Mt. Baker Ridge upland on the east. The uplands rise to elevations of 200 to 400 feet above sea level; the valley floor at the Site is at about Elevation 70 feet. The axis (lowest point) of the valley follows Rainier Avenue, and slopes gently down to the southeast. The Site is close to the eastern edge of the valley, which is marked by a curving break in slope. On the north, the break in slope is right at the boundary of the Site at South State Street. On the east, it is about 150 feet east of 22nd Avenue South, and on the west, considerably further away.

Surface/Storm Water/Sanitary System: Information regarding surface water bodies and storm water runoff and transport at and near the Site has not been presented in the RI/FS. Storm water utility information is particularly important because of the potential for preferential contaminant transport.

Ecological Setting: Information regarding the ecological setting has not been presented in the RI/FS. Ecology believes that some terrestrial habitat may be present in the landscaped residential neighborhood north of the Site, but this remains to be evaluated.

Geology: Geologic conditions in the investigation area have been thoroughly explored to a depth of about 70 feet below ground surface (bgs), but no genetic interpretation has been provided. The RI/FS presents a mostly grain size description as follows -- 12 feet of fine sand, with interbedded silts and gravel, over interbedded silty fine sand and clay to the depth explored (Page 3-11). This description conflicts to some degree with the geologic cross sections (Figure 4 and 5), which show mostly silt with three or four beds of sand or silty gravelly sand.

Ground Water: Depth to saturation beneath the investigation area is about 12 to 18 feet bgs. Below this depth are several water-bearing zones which largely coincide with sandy interbeds within the silt. These are termed the Shallow Zone, Intermediate Zone, and Deep Zone. A water bearing zone is also intermittently present between the Intermediate and Deep Zones. The top of the Shallow Zone appears to be the water table (unconfined conditions), whereas the deeper water bearing zones are confined, with potentiometric heads slightly below the water table.

Both lateral and vertical flow is occurring at the Site. The vertical flow appears to be downward, based on declining heads with depth. This situation is somewhat unusual for a valley between two uplands, indicating that the deeper water-bearing zones are actively discharging to the nearest sink (likely Lake Washington).

Lateral ground water flow directions, by contrast, are as expected for the situation - generally down valley to the southeast. However, there is a disconnect between the PCE distribution in ground water, and the various potentiometric surface contour maps - Figure 7,8, and 9 in the RI/FS and Figure 5, 6, and 7 in the Data Summary Report. The PCE distribution shows transport almost directly southeast down Rainier Avenue, whereas the ground water contour maps show a more easterly or even northeasterly flow. It is possible the operation of the dual-phase extraction system between 2004 and 2007 in the eastern part of the Cleanup property resulted in a slight lowering of ground water levels, thus implying continuing flow in that direction. However, even in 2010 the water levels at MW-26 remain anomalously depressed.

Water Use: Potable water is provided to the area by the City of Seattle. However, no information has been provided on whether water supply wells also exist in the area.

Release and Extent of Contamination - Soil: PCE contamination in soil extends to depths of greater than 70 feet below land surface (the full depth has not been determined) in the source area at the Penthouse property. The affected area appears to be on the order of 100 by 100 feet in plan dimension, although it may extend further to the east and west where the boundaries of the contaminated area have not been defined. Contaminated soil also extends more than 100 feet to the southeast (the southern edge has not been defined), associated with the PCE contaminant plume in ground water (see below). Soil PCE concentrations in this down gradient area are considerably less than in the source area.

The depth of PCE penetration is a little surprising given the presence of the dense silts underlying the Site. The silts must have a greater vertical permeability than expected. This condition coupled with vertical ground water flow appears to have distributed the bulk of the PCE contamination directly below the source. The PCE in soil down gradient of the source area likely was derived from the PCE transported in ground water.

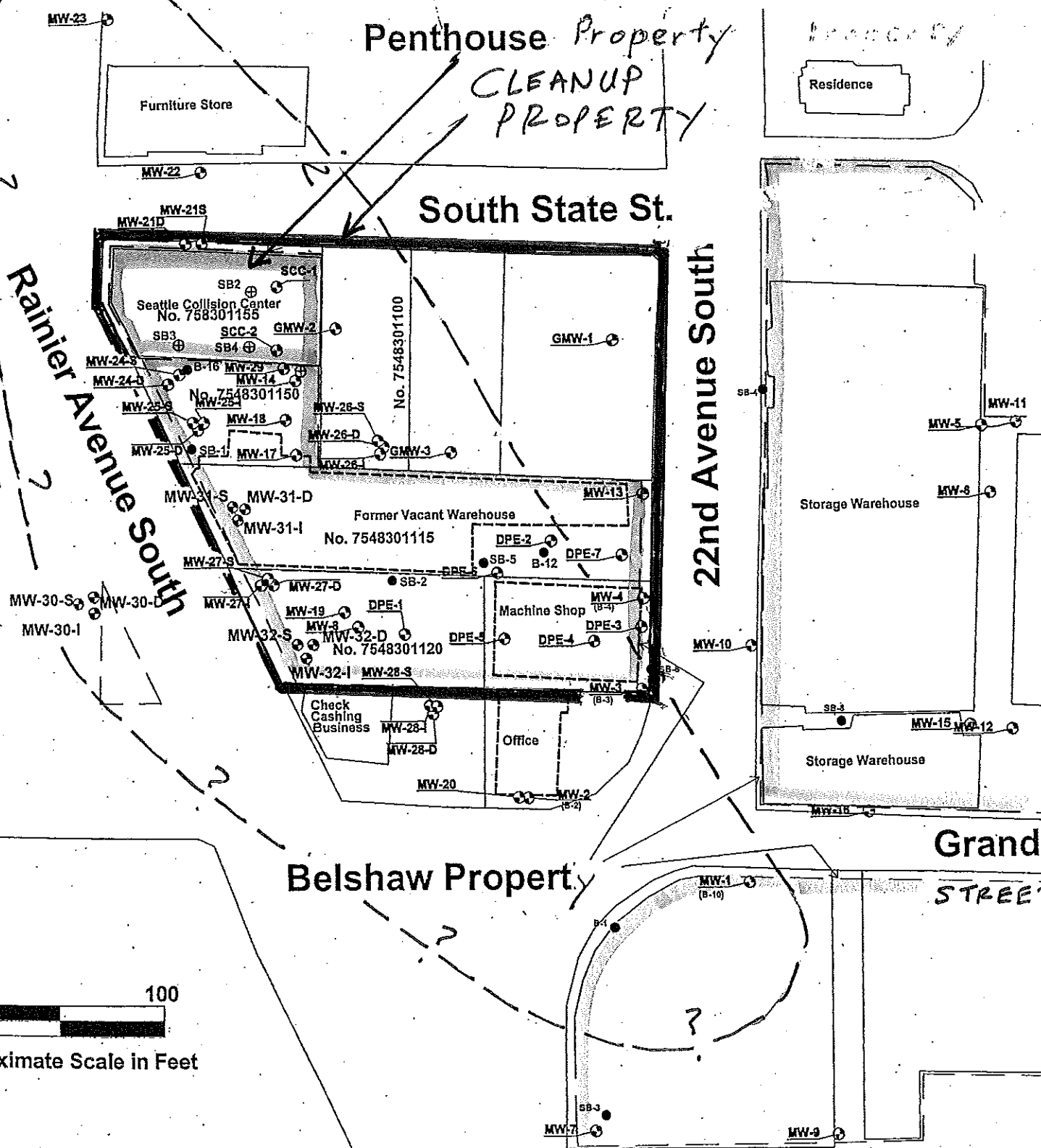
Extent of Contamination – Ground Water: Extensive ground water monitoring data show a PCE plume extending southeastward over 350 feet from the source area. The PCE contamination is present in all of the water bearing zones, and declines from near-free-product-level concentrations directly at the source to a few parts per billion at the distal edge of the plume.

TCE and DCE are also present in the plume at much lower concentrations than PCE. These are breakdown products of PCE and indicate degradation is ongoing. However, one puzzling aspect of the TCE distribution is that the highest concentrations detected to date were in the well furthest up gradient (MW-23). This result may indicate a separate up gradient release (i.e. a different site).

The compound TCA has also been detected on the Belshaw property portion of the Cleanup property at MW-8, MW-19, and DPE-1. This compound is not a breakdown product of TCE, and appears to have been released from a separate source near these wells.

The boundary of the contaminant plume within the three or four water bearing zones has been largely determined to the east and north, but not to the southeast, southwest, or west. The base of contaminant plume has also not been determined.

SITE BOUNDARY



Approximate Scale in Feet

MARK ADAMS 8/18/11
ECOLOGY

