

Fox Avenue Building L.L.C.

King County

Facility ID# 2282

The Washington State Department of Ecology (Ecology) completed the public comment period for the proposed Agreed Order (AO), draft Cleanup Action Plan (dCAP) and the Remedial Investigation/Feasibility Study (RI/FS) report for Fox Avenue Building L.L.C. site. This site is located at 6900 Fox Avenue South in Seattle, King County, Washington.

The dCAP and AO were revised to address some of the comments submitted by Seattle Boiler Works (SBW). SBW is the only party who submitted comments during the public comment period. A responsiveness summary was also composed to address SBW's comments. You now can view the revised dCAP, AO and responsiveness summary at the following locations listed below:

Washington State Department of Ecology Northwest Regional Office

3190 160th Ave SE
Bellevue, WA 98008

Call for an appointment: Sally Perkins

Phone: (425) 649-7190

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E-mail: sper461@ecy.wa.gov

Hours: Tuesday – Thursday

8:00 AM – 12:00 PM and 1:00 PM – 4:30 PM

Ecology's website: http://www.ecy.wa.gov/programs/tcp/sites/pace/pace_hp.html

For more information about this site, please contact Sunny Becker, Site Manager, Washington Department of Ecology, 3190 160th Ave. S.E., Bellevue, WA 98008, hlin461@ecy.wa.gov, (425) 649-7187.

Responsiveness Summary

Ecology received one public comment, which is from Seattle Boiler Works (SBW), during the comment period. Ecology later received responses to SBW's comments from Floyd & Snider (F&S), the consultant for Fox Avenue property owner (Fox Avenue), on April 20, 2012. Ecology also received additional responses from SBW on May 2, 2012.

Ecology makes the following summaries on the cleanup project at Fox Avenue site:

1. Restoration Time Frame: Ecology understands that SBW believes that the restoration time frame estimated in the RI/FS report does not comply with WAC 173-340-360(2)(b)(ii) due to the length of time required to achieve the applicable clean-up standards. When determining whether the cleanup action provides for a reasonable restoration time frame, Ecology considered the following factors:
 - Potential risks posed by the site to human health and the environment;
 - Practicability of achieving a shorter restoration time frame;
 - Current use of the site;
 - Potential future use of the site;
 - The availability of alternative water supplies;
 - The effectiveness and reliability of institutional controls; ability to control and monitor migration of hazardous substances; and,
 - The natural processes that reduce concentrations of hazardous substances.

WAC 173-340-360(4)(b)(i)-(ix).

Ecology, after receiving input from both SBW and Fox Avenue, determined that the cleanup action plan outlined the draft Cleanup Action Plan (dCAP) (thermal treatment in the source area and enhanced reductive dechlorination (ERD) for the down gradient groundwater plume) was the most appropriate of the cleanup alternatives from the Remedial Investigation/Feasibility Study prepared by Fox Avenue. Ecology notes that the URS tech memo submitted as part of the comments from SBW recommended an alternative for the spacing of the ERD injection points with different injection substrate, an oil based substrate. Ecology will review and evaluate data collected during the thermal treatment and ERD injection and share the data with SBW. If the data shows that improvements, including those recommended by SBW, are necessary, Ecology will require Fox Avenue to implement such improvements. Ecology will share any plans or reports, including those within the Engineering Design Report, with SBW upon request.

2. Periodic Review: Ecology does not believe a more aggressive periodic review for Fox Avenue site is necessary. MTCA requires that Ecology conduct a periodic review at the Fox Avenue Site. WAC 173-340-420. The review is required at least every five years after the initiation of a cleanup action. WAC 173-340-420(3). While the first periodic review will not be completed until five years into the cleanup, Ecology will be receiving monthly and semi-annual scheduled monitoring data consistently during the active cleanup. Fox Avenue is required to submit monitoring data on a monthly or semi-annually schedule during the active thermal treatment and ERD injection cleanup phase. Such data will allow Ecology to determine whether human

health and the environmental are being protected and whether the cleanup is effective. There are contingency plans specified in the dCAP if the thermal treatment fails and Ecology is prepared to determine whether those contingency plans will need to be implemented prior to the five year review. Ecology has included additional information about the long term groundwater monitoring in the dCAP. Ecology will conduct its routine formal five-year periodic review for Fox Avenue, as it will do for any other cleanup sites at which such reviews are required under MTCA.

3. Vapor Intrusion

Ecology had lengthy discussions with SBW on MTCA Method B air cleanup level being applicable at SBW. Ecology understands that SBW will not accept deed restrictions. Ecology agrees that Method B air cleanup level is applicable at SBW. Standard method B air cleanup levels will be met either at the end of ERD injections, or when SBW is re-zoned to be residential use, whichever comes first.

Regarding to the trigger levels for executing contingency actions, such as venting system or sealing the floor cracks, it was agreed at the previous meetings that industrial method C air cleanup levels would be used as trigger levels at both Fox Avenue and at SBW, because both properties are currently used as industrial properties. SBW submitted additional comments during the public comment period, now requests that contingency plans shall be implemented immediately at SBW, since indoor air at SBW exceeded the standard method B air cleanup levels. In response to SBW's comments, Ecology plans to use modified Method B air cleanup levels instead of method C industrial air cleanup levels as trigger levels for contingency actions at SBW. Ecology believes it is reasonable to use modified Method B cleanup level as a trigger level for contingency actions, based on WAC 173-340-705 and WAC 173-340-708. The modified Method B uses workers' 8 hr/day exposure instead of an exposure for a child living on the site at SBW. The modified Method B calculation is included as attachment. The dCAP requires the Fox Avenue to take a baseline sample before the thermal treatment. The baseline sampling event is currently scheduled to take place in September, 2012. Details of the sampling procedures and locations are discussed in the Engineering Design Report. If the sample results from the September sampling event show the solvent concentrations inside the building exceeds modified Method B, contingency actions will be executed at SBW.

The comments submitted by SBW during public comment period also requests monthly indoor air sampling to be taken during thermal treatment, and monthly or quarterly indoor air samples post thermal treatment. Ecology now has enough information to determine the frequency and locations of air sampling during thermal treatment. Ecology asks Fox Avenue to take monthly sub floor soil vapor samples inside buildings at Fox and SBW. If the concentrations go up, additional indoor air samples will be taken and corrective actions may be taken. If the concentrations remain the same or go down during the thermal treatment, at least one indoor air samples will be taken for confirmation. However, the frequency and locations of the indoor air samples for post thermal treatment period will be determined at the end of thermal treatment in a Sampling and Analysis plan to be submitted by Fox Avenue. Ecology will share the information on the sampling plan, if SBW requests.

4. Financial Assurance

The Agreed Order will include a requirement that Fox Avenue post adequate financial assurances for the long-term operation and maintenance related to the long-term monitoring and institutional controls that will remain on the site following active remediation. The Agreed Order mandates that Fox Avenue shall provide proof of financial assurances sufficient to cover all such costs in a form acceptable to Ecology. Fox Avenue will be required to adjust the financial assurance coverage for inflation and any changes in cost estimates. Ecology and Fox Avenue are currently in discussions regarding the form of financial assurances, and Fox Avenue will be required to post the financial assurance in accordance to the schedule set out in the Agreed Order. The dCAP will include preliminary cost calculation and financial information describing the basis for the amount of the financial assurance.

INDOOR AIR CLEANUP LEVELS, FOX AVENUE SITE

PCE Air Cleanup Levels from Cancer Risk

Equation 750-2 Air Cleanup Level = $\frac{(RISK \times ABW \times AT \times UCF)}{(CPF \times BR \times ABS \times ED \times EF)}$
 (ug/m³)

- RISK = Acceptable excess individual lifetime cancer risk level (unitless)
- ABW = Average body weight (kg) over the exposure duration
- AT = Averaging time (years)
- UCF = 1,000 mg/kg
- CPF = Carcinogenic potency factor as specified in WAC 173-340-708(8), PCE is 0.021 mg/kg/day
- BR = Breathing rate (m³/day)
- ABS = Inhalation absorption fraction (unitless)
- ED = Exposure duration (years)
- EF = Exposure frequency (unitless fraction of full-time exposure, see below)

Exposure Scenarios	RISK (unitless)	ABW (kg)	AT (years)	CPF (kg-day/mg)	BR (m ³ /day)	ABS (unitless)	ED (years)	EF (unitless)	Assumptions for Unitless EF Term			RESULT ug/m ³
									hours/day (unitless)	days/week (unitless)	weeks/year (unitless)	
DEFAULT MTCA Method B	1.00E-06	70	75	0.021	20	1	30	1	24	7	52	0.42
MODIFIED MTCA Method B	1.00E-06	70	75	0.021	20	1	15	0.22	8	5	49	3.7
DEFAULT MTCA Method C	1.00E-05	70	75	0.021	20	1	30	1	24	7	52	4.2
MODIFIED MTCA Method C	1.00E-05	70	75	0.021	20	1	15	0.22	8	5	49	37

Notes:
 Ecology worker exposure was modified from full time (365 days/year x 24 hours/day) to an adjusted industrial work week (8 hours/day x 5 days/week x 49 weeks/year).

TCE Air Cleanup Levels from Cancer Risk

Equation 750-2 Air Cleanup Level = $\frac{(RISK \times ABW \times AT \times UCF)}{(CPF \times BR \times ABS \times ED \times EF)}$
 (ug/m³)

- RISK = Acceptable excess individual lifetime cancer risk level (unitless)
- ABW = Average body weight (kg) over the exposure duration
- AT = Averaging time (years)
- UCF = 1,000 mg/kg
- CPF = Carcinogenic potency factor as specified in WAC 173-340-708(8), TCE is 0.089 mg/kg/day
- BR = Breathing rate (m³/day)
- ABS = Inhalation absorption fraction (unitless)
- ED = Exposure duration (years)
- EF = Exposure frequency (unitless fraction of full-time exposure, see below)

Exposure Scenarios	RISK (unitless)	ABW (kg)	AT (years)	CPF (kg-day/mg)	BR (m ³ /day)	ABS (unitless)	ED (years)	EF (unitless)	Assumptions for Unitless EF Term			RESULT ug/m ³
									hours/day (unitless)	days/week (unitless)	weeks/year (unitless)	
DEFAULT MTCA Method B	1.00E-06	70	75	0.089	20	1	30	1	24	7	52	0.10
MODIFIED MTCA Method B	1.00E-06	70	75	0.089	20	1	15	0.22	8	5	49	0.88
DEFAULT MTCA Method C	1.00E-05	70	75	0.089	20	1	30	1	24	7	52	0.98
MODIFIED MTCA Method C	1.00E-05	70	75	0.089	20	1	15	0.22	8	5	49	8.8

Notes:
 Ecology worker exposure was modified from full time (365 days/year x 24 hours/day) to an adjusted industrial work week (8 hours/day x 5 days/week x 49 weeks/year).

Becker, Sunny (ECY)

From: John Houlihan [john@houlihan-law.com]
Sent: Wednesday, May 02, 2012 1:31 PM
To: Wang, Ching-Pi (ECY); Becker, Sunny (ECY)
Cc: Craig R. Hopkins; Roy W. Elliott; paul.mccullough@urs.com
Subject: RE: response to SBW comments on the draft AO for Fox Ave

Sunny and Ching-Pi -- Thank you for providing the Floyd Snider April 20, 2012 memorandum discussing Seattle Boiler's comments on the Agreed Order and dCAP. There were a few items that merit a response.

First with respect to the restoration timeframe, Floyd Snider focuses on the just first 15 years of their remedy and down-plays the next 50 years of persistent contamination above the MTCA clean-up level. Their "15 year" focus also ignores the prior 20 years of start and stop study, failed interim remedial measures and the decades of impacts to the Seattle Boiler property. Overall, the "restoration time frame" is not reasonable as MTCA requires. Floyd Snider incredulously ponders in its response why a 65 year restoration time frame throughout the site is an issue for Seattle Boiler. Quite honestly, the simple answer is it is unacceptable because Fox Avenue's contamination -- which it knowingly adopted as its own when it bought the property -- is impacting Seattle Boiler's valuable real estate. Seattle Boiler did nothing to cause this problem yet Fox Avenue and Floyd Snider expect that Seattle Boiler should sit passively by while they craft a remedy that meets Fox Avenue's needs and pocket-book and prolongs the impacts to Seattle Boiler.

Second, Floyd Snider seeks to deflect Seattle Boiler's valid comments on the ERD system design (i.e. more and closer spaced ERD wells) and indoor air monitoring (a robust and comprehensive before, during and after testing requirement) by pushing those critical issues to the Compliance Monitoring Plan ("CMP") and Engineering Design Report ("EDR") phase. We are not confident that Seattle Boiler's comments on these important issues will be adequately addressed in the CMP and EDR. Moreover, at best there is limited comment ability for Seattle Boiler during those post-agreed order phases. Consequently, our comments should be addressed directly in the CAP so that they are a specific and binding requirement on Fox Avenue. The Agreed Order must have robust requirements for vapor mitigation to protect Seattle Boiler's workers during the long remediation. Our comment letter provided reasonable and implementable vapor intrusion mitigation requirements that should be included as specific and enforceable components of the CAP.

Third, Floyd Snider's response to the request for aggressive periodic review confuses periodic review under WAC 173-340-420 with periodic reporting to Ecology. We read the dCap. It does have references to "contingency plans." It does have reporting and status updates to Ecology. But what is does not have is the specific requirement for a more aggressive periodic review of the remedy under WAC 173-340-420 which requires Ecology and Fox Avenue to evidence and make a finding that the remedy is still protective of human health and the environment. Periodic review also provides the public -- including Seattle Boiler-- the opportunity to provide comment on the remedy review. The more frequent remedy review timeframe Seattle Boiler proposed would provide an important incentive for Fox Avenue to aggressively assess the effectiveness of the remedy and implement contingency plans in a timely fashion. The more frequent periodic review would also reduce the risk of squandering Fox Avenue's professed limited financial resources by prolonging a failing remedial approach.

Finally, with respect to Financial Assurances, the Floyd Snider memo completely misses the point. Seattle Boiler is aware that Fox Avenue has a trust agreement in place. But there is nothing in the

Agreed Order requiring Fox Avenue to have such a trust account. There is no requirement in the Agreed Order that in the event of depletion of that Trust Account alternative financial assurances must be provided. MTCA requires financial assurances for any remedy that relies on deed restrictions or institutional controls. It is irrelevant whether those deed restrictions are on Fox Avenue's property or Seattle Boiler's property. Moreover, as proposed this is a 65 year plus remedial project. The remedial timeframe is longer than our lifetimes. As such, it is imperative that Fox Avenue be required to post adequate financial assurances that the remedy will be implemented which are a specific obligation under the Agreed Order and enforceable by Ecology.

Thank you for the opportunity to provide this response.

If you have any questions, please contact me.

Thanks, John

JOHN J. HOULIHAN, JR.

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-----Original Message-----

From: Wang, Ching-Pi (ECY) [mailto:CWAN461@ECY.WA.GOV]
Sent: Friday, April 20, 2012 11:30 AM
To: John Houlihan
Cc: Becker, Sunny (ECY)
Subject: FW: response to SBW comments on the draft AO for Fox Ave

John:

Forwarding to you and your team on behalf of Sunny Becker who is on leave this week.

Ching-Pi
425.649.7134.

-----Original Message-----

From: Tom Colligan [mailto:Tom.Colligan@floydsnider.com]
Sent: Friday, April 20, 2012 8:23 AM
To: Becker, Sunny (ECY); Wang, Ching-Pi (ECY)
Cc: tgold@jzplaw.com; wjoyce@jzplaw.com; bobc@cascapecolumbia.com; Teri A. Floyd
Subject: response to SBW comments on the draft AO for Fox Ave

Memorandum

To: Sunny Becker, Ching-Pi Wang; Department of Ecology
Copies: Bob Code, Cascade Columbia Distribution Company
William Joyce, Joyce Ziker Parkinson, PLLC
Tod Gold, Joyce Ziker Parkinson, PLLC
From: Tom Colligan, Teri Floyd
Date: April 20th, 2012
Project No: Fox Ave RA
Re: **Response to Seattle Boiler Works Comments on the Draft CAP**

On behalf of the Fox Avenue Building, LLC (Fox Avenue), we would like to provide our perspective on the public comments the Department of (Ecology) received on the draft Cleanup Action Plan (dCAP) and Agreed Order for the Fox Avenue Site from Houlihan Law (Houlihan) and URS Corporation (URS) dated March 30, 2012. The comments were submitted on behalf of Seattle Boiler Works, Inc. (Seattle Boiler). Four general comments were made concerning the issues of Restoration Timeframe, Periodic Review, Vapor Intrusion, and Financial Assurance. We have carefully reviewed the comments and are providing our perspective to each below.

RESTORATION TIMEFRAME

Houlihan argues that the estimated 65-year restoration timeframe in the dCAP to achieve the final cleanup levels site-wide is too long. Our response is that the dCAP actually is built around a very aggressive schedule that within the next 10-15 years reduces site risk to levels that are protective and consistent with the Model Toxics Control Act (MTCA). In this period, final cleanup levels will be attained in all media that currently have unacceptable risk under the MTCA. These media include the seeps in the Myrtle Street Embayment, the soil under the Cascade Columbia building, and indoor air at both Seattle Boiler and Cascade Columbia. Should any of the final cleanup levels for these media not be met in the 10 to 15 year period of active remediation, appropriate contingency actions as described in the dCAP and as discussed and approved by Ecology will be implemented.

Following this 10 to 15 year period, natural attenuation will be relied upon to achieve further reductions until final cleanup levels are met in groundwater upgradient of the Myrtle Street Embayment. Although Houlihan objects to this natural attenuation for groundwater under Seattle Boiler as being too long, it is consistent with the MTCA criteria for remedy selection, as detailed in our Feasibility Study, as there will be no further exposure to contaminants or restrictions on the industrial use of the property during this period. This is because the groundwater undergoing natural attenuation during this period is non-potable, hence a longer restoration time frame that recognizes the technical challenges of full restoration of aquifers impacted by DNAPLs is acceptable under the MTCA given these circumstances. Other than groundwater as a potential source to indoor air, Houlihan does not explain why the extended

restoration time for groundwater throughout the site is an issue for Seattle Boiler. As explained herein, the remedial actions described in the dCAP are protective of indoor air exposure.

Houlihan also suggests that there are additional technologies that URS has identified that should be implemented on the downgradient plume; however, the URS memo, instead of identifying other technologies, states the following:

"Our recommendations do not require changes to the selected remediation technologies and are not intended to change the basic remediation approach."

We are encouraged that the technical consultant for Seattle Boiler agrees with the proposed remedial approach of thermal treatment and enhanced reductive dechlorination. The URS memo does offer some generic improvements as to how ERD should be implemented to be more aggressive, such as more closely spaced ERD injection points. We appreciate the suggestions made by URS on how to improve the effectiveness of ERD and will give them due consideration in our design document for ERD treatment of the downgradient plume.

URS also states that the proposed remediation levels for soil and groundwater are too high to be protective of health at Seattle Boiler and proposes lower remediation levels. We have discussed this issue at length with Ecology and URS. The URS remediation levels are based on generic theoretical calculations that ignore site specific conditions. We firmly believe that Fox Avenue's proposed remediation levels (which will achieve a 98% reduction in the average soil concentration and a 90% reduction in average groundwater concentrations of PCE) will be more than sufficient to protect worker health at Seattle Boiler, which currently does not exceed the Method C standard. If it turns out that the remediation levels are not protective, then contingency measures will need to be evaluated that will ensure protectiveness.

AGGRESSIVE PERIODIC REVIEW

Houlihan states that there is no "contingency plan" for failure of the thermal heating phase of the project and that a periodic review to assess the effectiveness of the heating phase should be done no later than 12 months after the thermal system is turned off and then on a 3-year basis until the groundwater remediation level is achieved.

This comment is not well grounded and ignores specific elements of the dCAP. The dCAP specifies contingencies for failure of the thermal remedy to achieve the remediation level. Under Section 6.1.2, such contingencies include adding electrodes to those areas that do not meet remediation levels and continuing to heat until the remediation level is achieved. If further thermal remediation is ineffective, other contingencies include ERD, chemical oxidation, or excavation of soils.

Reports on the progress of the thermal remedy will be made to Ecology on a monthly basis. Reports of the progress of the ERD remedy will be submitted to Ecology on a semi-annual basis, as was done with the ERD Interim Action. Additional schedule changes to accelerate Ecology's periodic review cycle are not necessary and are not required by the MTCA regulation.

VAPOR INTRUSION

Houlihan asserts that MTCA Method B is the correct indoor air standard to be applied at Seattle Boiler. Seattle Boiler was unwilling to accept an institutional control that would allow the use of the MTCA Method C standard even though Seattle Boiler is clearly an industrial facility under MTCA and will likely remain so for the foreseeable future. Nonetheless, Ecology decided that the Method B standard is applicable in the case where the owner insists and the dCAP incorporates this standard.

Houlihan also states that the expected timeframe to reach MTCA Method B cleanup levels will exceed 60 years and requests the dCAP be revised so that mitigation efforts be undertaken immediately if indoor air levels exceed MTCA Method B levels. However, the stated restoration timeframe (refer to Table 6.1 in the dCAP) to achieve MTCA Method B levels for indoor air at Seattle Boiler is a maximum of 15 years. If, after 15 years, the Method B cleanup level for indoor air is not achieved (after allowing for correction due to ambient conditions), then contingency actions on Seattle Boiler Works will need to be implemented. This was agreed to in a joint meeting with Ecology on October 6, 2011 and is documented in an email from Ecology to Houlihan on October 10, 2011:

"If MTCA Method C air cleanup levels are exceeded, contingency actions such as sealing of floor cracks, upgrade passive or active ventilation will be implemented at Fox Avenue property and Seattle Boiler Works (SBW). At the end of active cleanup actions thermal treatment and enhanced reductive chlorination (ERD), Method B in the air for SBW should be met. If not, similar contingency actions will be implemented".

Ecology's approach, as described above, is expressly stated in the dCAP, fully protective of current and reasonably foreseeable industrial use at Seattle Boiler, and consistent with MTCA.

Additionally, Houlihan is recommending a robust indoor air monitoring program and has provided a specific "punch-list" of monitoring actions. Houlihan requests monitoring "before, during, and after" thermal treatment. This is the plan already set forth in the dCAP. Houlihan and URS also provide details for how sampling and groundwater monitoring should be done (e.g., extensive use of membrane interface probes). We appreciate this level of detail regarding sampling locations, activities, and schedule but it is not necessary to include such details in the dCAP. Instead, as required by the Agreed Order, we will provide details and justifications for our proposed locations, activities, and schedule for monitoring indoor air and groundwater in the Compliance Monitoring Plan and the Engineering Design Report. .

Regarding the URS recommendation for membrane interface probe (MIP) investigations, we have already learned about their capabilities during our previous extensive MIP profiling of the site. Our conclusion is that MIPs provided value in identifying source areas in soil, but were not as useful in assessing groundwater conditions. We believe that sampling of the full network of monitoring and injection wells augmented by Geoprobe samples will help us best understand where to target ERD following the end of the thermal remedy.

FINANCIAL ASSURANCES

Houlihan asserts that financial assurances are mandatory and must be provided because institutional controls (i.e., deed restrictions) and long-term monitoring are elements of the remedial action. As explained below, Fox Avenue Building, LLC has a Trust Agreement already in place that is, in fact, a financial assurance mechanism. Moreover, Section 173-340-440(11) of MTCA does not state that financial assurances are always required. This section states: "It is presumed that financial assurance mechanisms will be required unless the PLP can demonstrate that sufficient financial resources are available and in place to provide for the long-term effectiveness of engineered and institutional controls adopted."

Under the dCAP, deed restrictions are only required on the Fox Avenue and Whitehead properties. It is not clear why Seattle Boiler Works, which declined to accept institutional controls, is making this comment with respect to properties it does not own. Furthermore, although long-term monitoring is part of the remedy for the site, engineered controls (e.g., a cap) are not.

As Seattle Boiler Works is aware, Fox Avenue Building, LLC has a Trust Agreement already in place to provide sufficient funding for all remediation and monitoring activities required under the CAP. The Trust Agreement was created as part of a settlement between Fox Avenue Building, LLC and its former insurance carrier. By its terms, funds in the Trust Agreement can only be used for the cleanup of the Fox Avenue Building Site in full compliance with MTCA requirements.

In April 2011, notice of the Trust Agreement was provided to Ecology. At the same time, the actual Trust Agreement itself and a summary of the settlement terms with the insurance carrier were provided to Seattle Boiler Works.

Furthermore, as provided in the Trust Agreement, one of the required co-Trustees is Dan Silver, the former Deputy Director of Ecology. Mr. Silver's responsibilities under the Trust Agreement include approval of the annual budget for remediation work and any proposed significant amendment or modification to the budget.

Seattle Boiler Works provided no comments on the Trust Agreement in April 2011. Seattle Boiler Works' current comments on the dCAP do not mention the Trust Agreement or provide an explanation of why the Trust Agreement is not sufficiently protective. Seattle Boiler Works has not demonstrated that financial assurances are necessary at the site.

In summary, Fox Avenue Building has established a sufficient and legally-binding mechanism for funding remediation and monitoring activities described in the dCAP. There is no need, and MTCA does not require, that an additional financial assurance mechanism be required under the Agreed Order to implement the dCAP.

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March 30, 2012

VIA EMAIL & U.S. MAIL

Ms. Sunny Becker
Mr. Ching-Pi Wang
Toxics Cleanup Program - NWRO
Department of Ecology
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Bellevue, WA 98008-5452

**RE: Fox Avenue Groundwater Site: Seattle Boiler Comments on Agreed
Order and Corrective Action Plan**

Dear Sunny and Ching-Pi:

On behalf of Seattle Boiler Works, Inc. ("SBW"), we are submitting the following comments on the proposed Agreed Order and Corrective Action Plan ("CAP") for the Fox Avenue Building LLC Site ("Fox Avenue Site"). As you know, SBW is located immediately down-gradient from the Fox Avenue Site and the saturated soils, groundwater and indoor air at SBW is adversely impacted by the solvent contamination flowing from the Fox Avenue Site. Over the last 9 years, we have participated in numerous meetings with Ecology and Fox Avenue regarding the investigation and interim remedial efforts at the Fox Avenue Site. While some adjustments to the Fox Avenue remedial efforts were achieved as a result of those meetings, the proposed Agreed Order and CAP still fail to address the substantial impacts and human health exposures on SBW property.

The Agreed Order acknowledges that the Fox Avenue Site has been under various forms of investigation, study and pilot testing efforts for the last 23 years. The draft CAP proposes yet another "interim" remedy that will last at least another 65 years with no certainty that clean-up levels protective of human health on the SBW property will be achieved. We respectfully submit that taking almost 100 years to remediate the Fox Avenue site is patently unreasonable and contrary to MTCA's goal of "expeditiously" remediating hazardous substances releases. We respectfully submit the following comments.

Ms. Sunny Becker
Mr. Ching-Pi Wang
March 30, 2012

RESTORATION TIMEFRAME DOES NOT COMPLY WITH MTCA

MTCA requires that all remedies achieve applicable clean-up standards in a reasonable restoration timeframe. See, WAC 173-340-360(2)(b)(ii). The proposed restoration time frame for the down gradient areas, including the SBW property and the Duwamish River exceeds 60 years. The entire Duwamish Superfund site which is substantially larger and more complex than the Fox Avenue Site is currently on track for a proposed remedy that will reach applicable clean-up levels nearly twice as fast as the Fox Avenue remedy. Investigation and remedial measures have been going on at this Site since 1989. Coupled with the proposed long term monitored natural attenuation in the CAP, achievement of clean-up standards, if at all, will have taken almost a century. Allowing a solvent plume to persist for almost a century above clean-up levels simply does not provide for a reasonable restoration time frame.

The proposed CAP advocates adoption of monitored natural attenuation for the SBW property because “currently” no technology exists to remediate a DNAPL site in a reasonable restoration timeframe. There are current technologies that can be used to more aggressively treat the down gradient ground water plume and thereby reduce the restoration timeframe. Please see the URS Technical memorandum attached hereto and incorporated herein at Exhibit A (“URS Tech Memo”) for a discussion of additional remedial technologies that should be implemented on the down-gradient plume to reduce the restoration timeframe.

We suspect, however, that the “unavailability” determination made by Fox Avenue has more to do with the cost of more aggressive remedial actions on SBW property rather than the actual “availability” of such remedial technologies. As we have stated numerous times during our meetings with Ecology, the remedy should not be limited by how much money Fox Avenue currently has available from its insurance policy settlement.

We respectfully request that Ecology require Fox Avenue to implement the additional remedial actions outlined in the URS Tech Memo.

MANDATE AN AGGRESSIVE PERIODIC REVIEW PROGRAM

As Ecology well knows, Fox Avenue’s prior remedial “fix” for the solvent contamination failed. Despite high hopes and consultant optimism, the in situ chemical oxidation with permanganate solution failed. The fundamental precept of the current CAP is that the ERH will result in a quick and substantial mass reduction of solvent in the source area.

Ms. Sunny Becker
Mr. Ching-Pi Wang
March 30, 2012

The remainder of the remedy selections and restoration time frames are built on this key assumption.

Notably absent from the CAP, however, is a robust contingency plan for the failure or sub-optimal performance of the ERH remedial phase. If the source area mass is not substantially reduced, will the ERD "polishing" remedial technology be able to address the remaining mass without further extending an already unreasonably long restoration timeframe? Is the overall remedy premised on the ERH effectiveness still viable? These are critical questions which are not adequately addressed in a substantive fashion in the CAP and AO.

WAC 173-340-420 requires Ecology to perform a Periodic Review of the Fox Avenue remedy to ensure that it is still protective of human health and the environment at least every 5 years. The Periodic Review includes evaluation of current and projected site and resources uses; the availability and practicability of more permanent remedies; and the availability of improved analytical techniques to evaluate compliance with clean-up levels. Notice and opportunity for public comment is also required. A revised clean-up plan shall be prepared where Ecology finds that substantial changes in the clean-up action are necessary to protect human health and the environment.

Given the structure of the proposed remedy, the history of prior remedy failures, and the limited financial resources available, it is imperative that a robust and frequent Periodic Review schedule be mandated to decrease the risk of remedy failure, sub-par performance and wasting of financial resources. In addition to the proposed contingency actions in the CAP, we request that Ecology specifically require in the Agreed Order a robust and frequent Periodic Review schedule under WAC 173-340-420.

The first periodic review should occur no later than 12 months after the ERH system is "switched off." At that point, sufficient data should be available to assess the effectiveness of the ERH remedial technology and evaluate whether the ERH system needs to be re-energized, re-configured or whether an entirely new remedial technology should be required. If the ERH remedy fails to meet expectations, then the remedy should be comprehensively re-evaluated at that point with appropriate public comment and review. A periodic review at this point in the process is critical to assess whether the planned remedy, remedial technologies and 60+ year time-frame are viable.

Thereafter, periodic review of the remedy should occur on a 3 year rolling basis until the ERD phase achieves the groundwater remediation level for 3 years. Upon achievement

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of the groundwater remediation level, the schedule for Periodic Review should be every 5 years.

This review schedule will allow for evaluation of the remedy and new remedial technologies that may become available to more effectively and expeditiously address the down-gradient groundwater plume.

VAPOR INTRUSION

As set forth in SBW's March 22, 2011 letter to Ecology, attached hereto and incorporated herein at Exhibit B, we believe that Ecology's determination that the indoor air at SBW property is "in compliance with MTCA" is incorrect. The correct indoor air standard that must be applied at SBW is MTCA Method B. The rationale for this conclusion is set forth in Exhibit B. In brief, WAC 173-340-706(1)(c) conditions use of Method C air clean-up levels on the property meeting the criteria for an "industrial property" found in WAC 173-340-745. For a property to be considered "industrial" under WAC 173-340-745, it **MUST** meet the following two criteria: (a) the property is "industrial" in character (e.g. zoned industrial or in an industrial use area); and (b) the remedial plan includes appropriate institutional controls to limit exposures to residual hazardous substances *and AT A MINIMUM requires placement of a covenant on the property restricting its use to industrial property uses.*

There is no institutional control limiting the use of SBW's property to industrial uses. As such, Method B is the appropriate clean-up level for indoor air. Although the CAP establishes Method B as the clean-up level for indoor air, the CAP does not provide any action be taken unless the indoor air concentrations exceed the Method C levels for industrial properties. Given that the expected timeframe to reach Method B indoor air concentrations exceeds 60 years, exposing SBW workers to indoor air concentrations above Method B levels for such a long duration is unacceptable.

The CAP should be revised to require Fox Avenue to take mitigation efforts with respect to indoor air if the concentrations exceed Method B.

The CAP also should be revised to establish a more robust and frequent sampling plan for indoor air on SBW property. As you know, only one indoor air sampling event has been undertaken on SBW property. The results of that sampling showed that the indoor air concentrations exceeded the Method B limits. The concentrations only met Method C limits when the purported "back-ground" PCE air concentration was netted against the indoor air concentration.

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We do not believe that the single sampling event is adequate to characterize the indoor air on SBW property. The Fox Avenue groundwater plume extends beneath all of the buildings on the SBW property. Indoor air sampling, however, has been conducted in only one building. In addition, the background sample collected in conjunction with the indoor air sample event could have been measuring air concentrations which were affected by emissions from the source areas on Fox Avenue. As such, the background sample may not have been representative of true background unaffected by the source area. Unfortunately, Fox Avenue has not conducted consistent periodic sampling to establish a reliable data set for the indoor air conditions at SBW.

The CAP similarly does not provide for an adequate indoor air sampling program. If Fox Avenue intends on evidencing compliance with the groundwater clean-up levels using an empirical demonstration, then it must be required to implement a robust indoor air monitoring program.

Given the potential risk to SBW employees, we request the following indoor air sampling regime and mitigation be required.

- a. Monitoring to establish adequate and statistically reliable evaluation of current "baseline" conditions before ERH. During design and construction of the ERH system, conduct indoor air monitoring of all SBW buildings and collect representative background samples on a monthly basis.
- b. Monitoring during ERH. Upon energizing the ERH system, indoor air monitoring should continue on a monthly schedule. Given that volatilization of solvents is the targeted result of ERH and the CAP acknowledges a risk of mobilization of solvents to down-gradient groundwater, monthly monitoring of indoor air is appropriate to ensure that preferential pathways or sub-optimal vapor capture is not resulting in exposure above Method B concentrations on the SBW property.
- c. Monitoring Post-ERH. Monthly monitoring should continue for 12 months following de-energizing the ERH system to assess re-bounce, effectiveness of the ERH remedial phase and the ERD polishing.
- d. Monitoring Long Term. Thereafter, the CAP should provide for quarterly monitoring.
- e. Mitigation. The current CAP provides that if Method C levels are exceeded, then a mitigation plan will be submitted for Ecology review within 60 days. Beyond the obligation to submit a mitigation plan, the CAP does not require Fox Avenue to take any affirmative steps to protect SBW employees from

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exposure. This is simply unacceptable. The CAP should be revised to require Fox Avenue to implement mitigation measures within 20 days of receipt of any indoor air sampling results in excess of Method B concentrations. The mitigation measures should include HVAC adjustments, venting and other readily available means to mitigate exposure of SBW employees and be implemented on "as soon as possible" basis not exceeding 20 days. Reporting to Ecology on a reasonable time-frame can follow but should not delay or defer action to protect SBW employees from exposure.

FINANCIAL ASSURANCES

WAC 173-340-440 mandates that financial assurances be posted for the Fox Avenue CAP. Whenever a remedial action includes the use of institutional controls, deed restrictions or long term monitoring, then the responsible party must provide adequate financial assurances that the remedy will be performed.

Here, the proposed remedy includes the use of institutional controls on the Fox Avenue and Whitehead properties as well as proposes a very long remedial time-frame. SBW has previously informed Ecology that Fox Avenue has limited financial resources available from its insurance policies to fund the work required under the Agreed Order. Moreover, the Site has a history of "start and stop" investigation and remediation punctuated by bankruptcies and ownership changes.

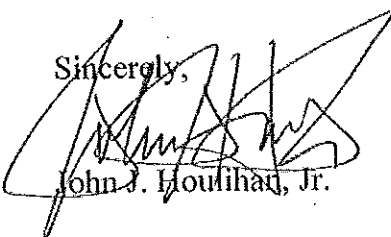
Despite MTCA's mandatory requirement for financial assurances, knowledge of limited financial resources and a long remedial time frame, the Agreed Order does not require Fox Avenue to establish financial assurance that the remedy will be performed. The absence of financial assurances in this instance fails to comply with MTCA. The Agreed Order must require Fox Avenue to provide reasonable financial assurance in accordance with MTCA.

We request that the Agreed Order require Fox Avenue to post adequate financial assurances for the proposed remedy. The financial assurance should take the form of a trust fund capitalized with the funds necessary to fully implement the proposed remedy or a non-revocable letter of credit for the projected short term and long term costs. Given that Fox Avenue is a single asset LLC, a personal guaranty from the owners of Fox Avenue may also be appropriate to secure implementation of the remedy.

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We appreciate the opportunity to submit these comments. We look forward to Ecology's consideration of these comments and revision of the Agreed Order and CAP. If you have any questions, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "John J. Houlihan, Jr.", is written over the word "Sincerely,". The signature is stylized and somewhat illegible due to its cursive nature.

John J. Houlihan, Jr.

cc: Seattle Boiler Works, via email
URS Corp., via email
William Joyce, Esq., via email
Tod Gold, Esq., via email

HOULIHAN LAW

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March 22, 2011

VIA EMAIL & U.S. MAIL

Ms. Sunny Becker
Mr. Ching-Pi Wang
Toxics Cleanup Program - NWRO
Department of Ecology
3190 - 160th Avenue SE
Bellevue, WA 98008-5452

**RE: Fox Avenue Groundwater Site: Seattle Boiler Works Vapor Intrusion
Study Results**

Dear Sunny and Ching-Pi:

I received Sunny's March 3, 2011 letter responding to our submission of URS' February 2, 2011 "Vapor Intrusion Assessment Seattle Boiler Works Property." We appreciate your continued attention to Seattle Boiler Works' ("SBW") concerns regarding the Fox Avenue remedial plan and the impacts on the SBW property. We believe, however, that Ecology's determination that the indoor air at SBW property is "in compliance with MTCA" is incorrect. We request that you reconsider your "determination" and provide the following to assist you in that effort.

Ecology's determination that the indoor air complies with MTCA was based on the classification of SBW's property as "industrial" which thereby allowed the application of Method C air clean-up concentrations. Ecology's determination that the SBW property is "industrial" for purposes of using Method C criteria – for any affected media – is incorrect. Method C cannot be used for SBW property because it fails to meet one of the two REQUIRED elements of the definition of an "industrial property" under MTCA.

Under WAC 173-340-706(1)(c), Method C can be used to set air clean-up levels for "industrial properties." This is the WAC section which Ecology referenced in its March 3, 2011 determination. This section is not however determinative of whether the SBW is an "industrial property." Rather, WAC 173-340-706(1)(c) conditions use of Method C air clean-up levels on the property meeting the criteria for an "industrial property" found in WAC 173-340-745.

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February 4, 2011

For a property to be considered “industrial” under WAC 173-340-745, it MUST meet the following two criteria: (a) the property is “industrial” in character (e.g. zoned industrial or in an industrial use area); and (b) the remedial plan includes appropriate institutional controls to limit exposures to residual hazardous substances *and AT A MINIMUM requires placement of a covenant on the property restricting its use to industrial property uses.*

Ecology is fully aware that Fox Avenue’s remedial plan cannot require SBW to place an institutional control on the SBW property restricting it to industrial uses. SBW has made it very clear that institutional controls limiting the use of its property in any way are unacceptable. As such, the SBW property cannot be classified as “industrial” to allow the use of Method C clean-up concentrations – for any media.

The requirement of an institutional control to allow the use of Method C makes sense: remedial actions may take decades to complete and during that time land use patterns may change. What was once “industrial” may change and develop over time to other uses such as commercial or office or even residential. Here, Fox Avenue is proposing a remedial time frame of over 30 years. Land use patterns will undoubtedly change during that time period and SBW is unwilling to restrict the use of its valuable property to solely industrial uses. Method C industrial clean-up concentrations are not applicable to the SBW property.

So then, what is the appropriate clean-up standard? WAC 173-340-750(1)(b) mandates that the air quality clean-up standard SHALL BE based on residential exposure UNLESS the property qualifies for Method C clean-up levels. As set forth above, Method C is unavailable for the SBW property. As such, WAC 173-340-750(1)(b) requires that residential exposures be used as the relevant criteria for setting the air clean-up levels (i.e. Method A or B for non-industrial properties). Our February 4th submission called for Method B air clean-up levels for the SBW property. SBW is not asking for anything less than what is mandated by MTCA and Ecology’s own implementing regulations. SBW’s use of Method B for a non-industrial property is also supported by WAC 173-340-745(2)(b) which requires that clean-up levels beyond the boundary of the industrial property that do not qualify for industrial soil clean-up levels (*including implementation of institutional controls and a covenant restricting use of the property to industrial property uses*), shall be established in accordance with WAC 173-340-740 which means Method A or B for a non-industrial property – not Method C industrial.

While Fox Avenue may be able to classify its property as “industrial” by imposing institutional controls and land use covenants to limit future use to industrial purposes, Fox Avenue cannot impose that institutional control on SBW’s property. After all, Fox

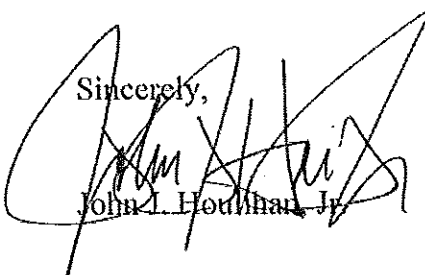
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Avenue is contaminating SBW's property. There is no justification to allow Fox Avenue a lesser remedial standard on SBW property by foisting institutional controls and land use covenants on the "innocent" property owner. WAC 173-340745(b)(2) contemplates this exact situation and requires that the applicable clean-up level be established as Method A or B for non-industrial properties.

We once again request that Fox Avenue be required to conduct a comprehensive indoor air investigation of all buildings at the SBW property and undertake interim actions to mitigate vapor intrusion. Please confirm that Ecology will require Fox Avenue to conduct the comprehensive indoor air investigation and interim vapor mitigation to meet at least Method B clean-up levels for a non-industrial property. Similarly, we expect that Ecology will require Fox Avenue's remedial plan to meet Method A or B non-industrial clean-up concentrations on the SBW property for all affected media.

We look forward to Ecology's prompt reconsideration of its March 3, 2011 "determination" and confirmation that Ecology will require Fox Avenue to meet Method A or B non-industrial clean-up concentrations for all affected media on the SBW property including without limitation indoor air. If you have any questions, please do not hesitate to contact me.

Sincerely,


John L. Houlahan, Jr.

cc: Seattle Boiler Works, via email
URS Corp., via email
William Joyce, Esq., via email
Tod Gold, Esq., via email



more protective, and we believe appropriate, remediation levels (“RELs”); (2) increased remediation efforts on the SBW property; (3) implementation of an aggressive periodic performance monitoring program that includes Membrane Interface Probe (“MIP”), targeted soil/groundwater sampling and analysis in addition to routine groundwater, soil gas, and indoor air monitoring, and (4) an adaptive and flexible management approach that allows timely improvements to the remedial process based on the latest site information.

REMEDICATION LEVELS

The proposed RELs in the dCAP for soil and groundwater are much too high to be protective of health at the SBW property and should be replaced with more protective values. We request that Ecology adopt the soil and groundwater RELs presented in Attachment 1 and require active remediation throughout applicable portions of the Site, including the SBW property, until the RELs have been achieved or until it can be demonstrated by long-term groundwater, sub slab vapor, and indoor air monitoring that the vapor intrusion pathway at the SBW has been permanently eliminated. Contrary to the dCAP, we do not believe that the vapor intrusion pathway will be eliminated at the SBW property until contaminant levels have been reduced to levels at or near the RELs identified in Attachment 1.

MORE AGGRESSIVE REMEDIATION ON SBW PROPERTY

The dCAP indicates that ERD injections will be conducted on the SBW property using a single line of 7 injection wells spaced at approximately 60 foot intervals along a transect roughly perpendicular to the VOC plume (see Figure 4.1 of dCAP). A second row of injection wells is located approximately 120 to 200 feet upgradient of the injection wells on the SBW property, northeast of Fox Avenue South Street. We believe that the remediation well network depicted on Figure 4.1 is inadequate to remediate the SBW property at a standard point of compliance. The use of a more persistent, lower soluble ERD substrate (i.e., Edible Oil Substrate (“EOS”) or similar, as suggested in the dCAP for the Fox Avenue Property) should be used at the SBW property without further delay, especially in the uppermost water bearing zone where it has been demonstrated to be more difficult to maintain strongly reducing conditions necessary for reductive dechlorination (and application of the sugar ERD substrate from prior interim actions resulted in very low pH values, in the range of 4 standard units in some cases).

As indicated in the dCAP, the use of less soluble ERD substrates requires relatively close spacings between the injection points/wells. The dCAP should be modified to include a substantial increase in the number of injection points and much closer well spacings than the 60-foot intervals currently depicted on Figure 4-1. While the actual number and spacing should be determined in the remedial design and confirmed based on performance monitoring data, we expect that the injection point spacings will be at least 10 to 15 foot intervals. Enhanced injection methods such as Atomized Liquid Injection™ with pneumatic fracturing or other enhanced injection methods should be considered in the remedial design



and during subsequent site reviews to increase the radius of injection influence in finer-grained soil where the injection radius is expected to be limited.

Elevated concentrations, above MTCA B cleanup levels, of chemicals in soil vapor and indoor air are known to be present at the SBW property. Concentrations of these CVOCs have almost certainly been present at even higher levels for at least several prior decades. Therefore, we strongly disagree with the current plan in the dCAP of waiting another 10 to 15 years for indoor air levels to decrease below applicable cleanup levels. We believe that this approach should be patently unacceptable to Ecology and corrective measures should be implemented immediately if indoor air levels exceed MTCA Method B.

We believe that it is unlikely that the existing CVOC vapors that are known to be present beneath the Pipe Shop Building on the SBW property at high concentrations (i.e., up to 5,100 micrograms per cubic meter) and additional CVOC vapors that would likely accumulate following the ERH treatment will diminish without vapor extraction. The dCAP should be revised to indicate that a temporary vapor extraction system would be installed and operated at the SBW property to address this expected need, unless it can be demonstrated by soil vapor monitoring within 5 years of beginning the ERH remedy that vapor concentrations beneath all buildings at the SBW property are below applicable MTCA Method B screening levels. Again, we are not optimistic that this will be the case based on the current plans described in the dCAP. Indoor air sampling should not be the sole basis for assessing the vapor intrusion pathway at SBW property, as the nature of the building ventilation characteristics and integrity of the floors may change over time. Dedicated vapor monitoring probes should be installed within the SBW buildings to assess sub-slab vapor concentrations over time. The soil vapor data is important information to assess if the vapor intrusion risk is diminishing over time throughout the cleanup action.

COMPLIANCE MONITORING AND ADAPTIVE APPROACH

We recommend that a Membrane Interface Probe ("MIP") investigation be incorporated into the remedial performance investigations described in the dCAP after implementation of the ERH remedy, and then periodically thereafter (every 2 to 3 years) until active remediation is complete. The MIP is not intended to replace soil sampling and chemical analysis, but rather to assist in the selection of optimal soil/groundwater sample locations. It would also be highly useful to identify specific zones to target for future "hot spot" remediation (i.e., where soil/groundwater levels exceed our proposed RELs) and to assess the effectiveness of the injections. The number of borings and soil/groundwater samples should be based on a statistical assessment of the data rather than an arbitrary limit of borings or samples. For example, we believe that 10 to 12 borings (with no MIP) to assess approximately 33,000 cubic yards of ERH treated soil may not be sufficient to adequately characterize this area to define supplemental injection locations. In any event, we believe it is prudent to perform thorough assessments before and after injections to guide future remediation efforts.



SPECIFIC COMMENTS

Our specific comments to the dCAP are provided below.

1. **P 2-5, 2nd Bullet.** This sentence states definitively that there is no associated soil contamination from the downgradient plume. This statement should be backed up with a reference to the soil analytical data used to make this determination (number of samples, locations, data tables, etc). The dCAP should acknowledge the possibility of soil impacts on the SBW property due to a fluctuating groundwater table and/or volatilization of CVOCs from groundwater to vapor phase, and subsequent adsorption to the soil.
2. **P 2-6 Last Bullet.** Measured concentrations of PCE in indoor air at the SBW property exceeded MTCA Method C cleanup levels in some cases. However, concentrations of PCE in one outdoor air sample taken upwind of the SBW Pipe Shop Building and downwind of the Fox Ave. property had detectable levels of PCE that when subtracted from the indoor air PCE levels, resulted in indoor air PCE levels slightly less than MTCA C indoor air cleanup levels. (It should be noted that the "background" PCE level in ambient air at the SBW property was more than three times higher than the average "background" ambient air PCE levels measured nearer to the upwind portion to the Fox Ave Bldg. property; see Table 2.1). MTCA defines "Area background" as the concentrations of hazardous substances that are consistently present in the environment in the vicinity of a site which are the result of human activities unrelated to releases of that site. It is URS' opinion that the one "background" PCE concentration measured on the SBW property may have been influenced by contaminants originating from the Fox Avenue property and therefore may not be representative of "Area background" levels. We suggest that the dCAP be revised to indicate this possibility. We also recommend that additional indoor air sampling be conducted at the SBW property to further assess indoor air quality in all buildings at the SBW property. The appropriate indoor air cleanup level for the SBW property is MTCA Method B. Contingency actions should be undertaken if indoor air test results indicate an exceedance of an applicable MTCA Method B cleanup level. The dCAP should be revised to indicate that contingency actions such as sealing cracks in the floors, modifying ventilation, etc. are not a substitute for a permanent cleanup (i.e., below MTCA Method B indoor air cleanup levels).
3. **P 3-1, Last Paragraph.** Numeric soil cleanup levels are not designed to be protective. See general comments.
4. **P 3-2, Third Paragraph.** A groundwater cleanup level protective of indoor air was not calculated. The proposed groundwater RLs (i.e., 250 ug/L PCE+TCE) are not protective of indoor air. Soil vapor data collected by URS beneath the SBW Pipe Shop Building were several orders of magnitude above applicable soil gas screening



more protective, and we believe appropriate, remediation levels (“RELs”); (2) increased remediation efforts on the SBW property; (3) implementation of an aggressive periodic performance monitoring program that includes Membrane Interface Probe (“MIP”), targeted soil/groundwater sampling and analysis in addition to routine groundwater, soil gas, and indoor air monitoring, and (4) an adaptive and flexible management approach that allows timely improvements to the remedial process based on the latest site information.

REMEDICATION LEVELS

The proposed RELs in the dCAP for soil and groundwater are much too high to be protective of health at the SBW property and should be replaced with more protective values. We request that Ecology adopt the soil and groundwater RELs presented in Attachment 1 and require active remediation throughout applicable portions of the Site, including the SBW property, until the RELs have been achieved or until it can be demonstrated by long-term groundwater, sub slab vapor, and indoor air monitoring that the vapor intrusion pathway at the SBW has been permanently eliminated. Contrary to the dCAP, we do not believe that the vapor intrusion pathway will be eliminated at the SBW property until contaminant levels have been reduced to levels at or near the RELs identified in Attachment 1.

MORE AGGRESSIVE REMEDIATION ON SBW PROPERTY

The dCAP indicates that ERD injections will be conducted on the SBW property using a single line of 7 injection wells spaced at approximately 60 foot intervals along a transect roughly perpendicular to the VOC plume (see Figure 4.1 of dCAP). A second row of injection wells is located approximately 120 to 200 feet upgradient of the injection wells on the SBW property, northeast of Fox Avenue South Street. We believe that the remediation well network depicted on Figure 4.1 is inadequate to remediate the SBW property at a standard point of compliance. The use of a more persistent, lower soluble ERD substrate (i.e., Edible Oil Substrate (“EOS”) or similar, as suggested in the dCAP for the Fox Avenue Property) should be used at the SBW property without further delay, especially in the uppermost water bearing zone where it has been demonstrated to be more difficult to maintain strongly reducing conditions necessary for reductive dechlorination (and application of the sugar ERD substrate from prior interim actions resulted in very low pH values, in the range of 4 standard units in some cases).

As indicated in the dCAP, the use of less soluble ERD substrates requires relatively close spacings between the injection points/wells. The dCAP should be modified to include a substantial increase in the number of injection points and much closer well spacings than the 60-foot intervals currently depicted on Figure 4-1. While the actual number and spacing should be determined in the remedial design and confirmed based on performance monitoring data, we expect that the injection point spacings will be at least 10 to 15 feet intervals. Enhanced injection methods such as Atomized Liquid Injection™ with pneumatic fracturing or other enhanced injection methods should be considered in the remedial design



levels (see Table 2.1), indicating that there is an active groundwater to vapor pathway at the SBW property.

5. **P 3-4, Cleanup Levels.** See general comments

6. **P 6-7, 2nd Paragraph.** URS recommends that additional ambient air sampling and analysis be conducted to assess Area background levels of CVOCs. The one ambient air sample collected by URS may not be representative of Area background levels at the SBW property due to contribution from the Fox Avenue property. Additional indoor air testing at the SBW property is recommended at this time to assess indoor air quality in all buildings at the SBW property to obtain baseline data prior to implementation of the cleanup action.

P 6-7, Third Paragraph, Contingency Actions. The dCAP indicates that “similar” contingency actions would be implemented for the SBW property if the MTCA Method B indoor air cleanup levels are exceeded due to releases from the Site at the end of active remediation (10 to 15 years following thermal remediation). We recommend that the time period to begin corrective actions should be reduced from 10 to 15 years to immediately. Institutional controls are not currently acceptable to SBW. Additional remediation should be required by Ecology to achieve MTCA Method B indoor air cleanup levels at the SBW property if indoor air monitoring indicates levels above MTCA Method B indoor air cleanup levels after the 5 year period.

Thank you for the opportunity and we look forward to Ecology’s responses.

Attachments:

Attachment 1 Tables

Table 1 –Cleanup Levels and Remediation Levels Protective of SBW Property

Table 2 – Detailed Groundwater Protection of Indoor Air Calculations

Table 3 – Detailed Protection of Target Groundwater Concentrations

ATTACHMENT 1

REMEDIATION LEVELS

Table 1
Cleanup Levels and Remediation Levels Seattle Boiler Works
Seattle Boiler Works

Constituent	Soil Concentrations Protective of Groundwater (mg/kg)	Groundwater Concentrations Protective of Indoor Air (µg/L)	Indoor Air CUL (µg/m ³)
	REL	REL	CUL
Tetrachlorethene	0.14	12.7	9.6
Trichloroethene	0.009	1.4	0.6
cis 1,2-Dichloroethene	--	--	--
trans 1,2-Dichloroethene	0.4	70	27
1,1-Dichloroethene	--	--	--
Vinyl Chloride	0.002	0.3	0.28

Notes:

CUL = Cleanup Level

REL = Remediation Level

-- = no value available

µg/kg = micrograms per kilogram

µg/L = micrograms per liter

µg/m³ = micrograms per cubic meter

Soil cleanup levels are protection of groundwater values based on WAC 173-340-747, where target groundwater is the CUL

Soil RELs are protection of groundwater values based on WAC 173-340-747, where target groundwater is the REL

Groundwater CULs and RELs are based on vapor intrusion from groundwater to indoor air pathway

Air CULs are MTCA Method B (using most recent IRIS toxicity values)

Table 2
Detailed Groundwater Protection of Indoor Air Calculations

Constituent	Air (µg/m ³)		Henry's Law (dimen- sionless) ^b	CF L/m ³	AF	GW Screening Levels Protective of Indoor Air ^a
	REL					REL
Tetrachlorethene ^c	9.6	ca	7.54E-01	1000	0.001	12.74
Trichloroethene ^c	0.6	ca	4.22E-01	1000	0.001	1.42
cis 1,2-Dichloroethene	N/A		1.67E-01	1000	0.001	--
trans 1,2-Dichloroethene	27	nc	3.85E-01	1000	0.001	70.1
1,1-Dichloroethene	N/A		1.07E+00	1000	0.001	--
Vinyl Chloride	0.28	ca	1.10E+00	1000	0.001	0.25

Notes:

^aGroundwater Screening Levels = (Air Concentration) / (Henry's Law x Attenuation Factor x Conversion Factor) - formula from Ecology 2009

^bHenry's Law values obtained from Ecology's CLARC database; <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>

^cThe REL values for tetrachloroethylene and trichloroethylene were calculated using the recently updated toxicity criteria recommended by EPA on the IRIS database (accessed March 37, 2012) and MTCA equations 750-1 and 750-2. For both chemicals, the noncancer REL value is more conservative than the cancer REL value calculated based on a target cancer risk of 1 x 10⁻⁵ and was selected as the REL.

AF - Attenuation Factor, Ecology's default for groundwater-to-indoor air pathway (Ecology 2009)

CF - Conversion Factor

ca - value based on cancer endpoints

nc - value based on noncancer endpoints

Table 3
Detailed Soil Protection of Target Groundwater Concentrations

MTCA Equation 747-1: $C_s = C_w \times UCF \times DF \times [K_d + (O_w + O_a \times K_d)]$ MTCA Equation 747-2: $K_d = K_{oc} \times f_{oc}$
 Hcc)/Pb)]

Cs	Soil concentration protective of groundwater	mg/kg
Cw	target concentration in water	ug/L
UCF	Conversion Factor	chemical-specific
DF	Dilution factor	0.001
Kd	Distribution Coefficient	unitless
Ow	water-filled soil porosity	20
Oa	air-filled soil porosity	unitless
Hcc	Henry's Law Constant	l/kg
Pb	soil bulk density	chemical-specific
foc	fraction organic carbon	kg/L
		1.5
		g/g
		0.001

Constituent	Target Groundwater Concentrations				
	REL	Kd	Koc ^a	Hcc ^a	Cs = REL
Tetrachlorethene	12.74	0.27	2.70E+02	7.54E-01	0.136
Trichloroethene	1.42	0.094	9.40E+01	4.22E-01	0.009
cis 1,2-Dichloroethene	--	0.0355	^{35.5}	1.67E-01	--
trans 1,2-Dichloroethene	70.11	0.038	³⁸	3.85E-01	0.381
1,1-Dichloroethene	--	0.065	65	1.07E+00	--
Vinyl Chloride	0.25	0.0186	18.6	1.10E+00	0.002

Notes:

^aKoc and Henry's Law values obtained from Ecology's CLARC database; <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>