



May 17, 2013

Mr. John Drake
Washington Industries, Inc.
17742 Talbot Road
Edmonds, Washington 98026

Mr. James Murphy
Lybeck Murphy LLP
Fifth Floor Chase Bank Building
7900 Southeast 28th Street
Mercer Island, Washington 98040

Re: Vapor Intrusion Assessment
Washington Industries, Inc. and Perine Properties
825 South Dakota Street and 812/820 South Adams Street
Seattle, Washington

RECEIVED

Handwritten signature

JUL 24 2013

DEPT. OF ECOLOGY

EPI Project Number: 64001.0

Dear Mr. Drake and Mr. Murphy:

Environmental Partners, Inc. (EPI) is pleased to submit this Vapor Intrusion (VI) Assessment Report for the Washington Industries, Inc. Property located at 825 South Dakota Street (WII Property) and the adjacent Perine Property located at 812 and 820 South Adams Street in Seattle, Washington (Perine Property; referred to collectively as "subject properties"). The location of the subject properties is indicated on Figure 1.

This report has been provided at the request of Washington Industries, Inc. (WII) in support of the ongoing assessment of potential current and or future environmental risks associated with VI at the subject properties. The work documented herein also serves to meet WII's ongoing efforts to comply with the requirement of the Model Toxics Control Act (70.105D RCW) and its implementing regulations (WAC 173-340; collectively "MTCA") and the requirements therein for remedial investigation (WAC 173-340-350).

BACKGROUND

The WII Property contains one approximately 11,625 square-foot, combination brick and concrete block commercial/industrial building. The building is divided into two primary lease spaces, as indicated on Figure 2: the Former AV-Pro lease space and the Former Northwest Plating (NWP) lease space. The

Former AV-Pro lease space includes roughly the western third of the building. AV-Pro is also a current tenant on the Perine Property. The Former NWP lease space includes approximately the eastern two thirds of the building. Neither of these lease spaces is currently occupied.

The Perine Property contains two separate buildings that share a wall. The western third of the Perine Property contains an approximately 11,275 square-foot metal building that is currently leased to AV-Pro. The eastern two thirds of the Perine Property contains an approximately 24,600 square-foot concrete block building that is occupied by the Perine Danforth Company. Both buildings are adjacent to the south of the building on the WII Property. The building occupied by the Perine Danforth Company appears to share the south wall of the Former NWP lease space. The layout of the buildings at the subject properties is provided on Figure 2.

Historical activities on the WII Property include metal plating, electroplating, and polishing. Historical activities on the Perine Property include use as a winery, a beverage distributor, a warehouse, a machine shop, and an emergency response refurbishing operation. The Perine Danforth Company currently uses its lease space for the storage and retail sales of screws, bolts, and other fasteners. Additional smaller lease spaces, as indicated on Figure 2, include workspaces and offices. AV-Pro provides rental audio and video equipment for events and productions.

Prior environmental assessment of the WII Property indicated the presence of elevated concentrations of volatile organic compounds (VOCs), chromium, and cyanide in soil and ground water beneath that property. The primary VOCs present at elevated concentrations are tetrachloroethene (PCE) and trichloroethene (TCE) and their environmental degradation products. These compounds are likely associated with historical degreasing in support of metals plating and finishing conducted by NWP. Chromium and cyanide are similarly associated with metals plating operations. Historical data indicate the presence of these compounds in soil and ground water at concentrations exceeding current MTCA cleanup levels (CULs). The historical data also indicate that impacts to ground water originating on the WII Property extend off-property to the north and west, and may be following preferential pathways such as sewer line backfill. Historical investigations have also generally evaluated the potential for off-property VI concerns.

Some previous work focused on source control has been performed at the Former NWP lease space. However, current soil and ground water conditions at the WII Property are not full understood or characterized. An inspection of the WII Property on October 19, 2012 identified areas of prior source control actions (i.e., targeted excavation) within the building. This inspection also found that the eastern portion of the building is not weather-tight, with large-diameter penetrations in the roof. The Former AV-Pro portion of the building was weather-tight and fully locked and enclosed.

A recent assessment of the Perine Property conducted by SoundEarth Strategies (SES) included collection and analysis of soil and ground water samples on the northern portion of the Perine Property immediately adjacent to the WII Property. This assessment identified PCE and TCE in soil and ground water at concentrations exceeding potentially applicable MTCA CULs and at concentrations exceeding the screening level for TCE in ground water as presented in the *Guidance for Evaluating Soil Vapor Intrusion in Washington State; Investigation and Remedial Action*, October 2009 (Draft VI Guidance). It should be noted that the screening levels for PCE and TCE contained in the Draft VI Guidance do not

incorporate the most current guidance regarding compound-specific risks. This is discussed in further detail below.

Based upon those findings, two additional rounds of VI assessment were performed by SES at the Perine Property. Those VI assessments included the collection of five indoor air samples and an exterior background air sample, and performance of a passive soil gas survey. The VI assessments were summarized in the following documents:

- *Air Quality Evaluation*, Perine Property, dated July 28, 2011 by SES; and
- *Results from Indoor Ambient Air and Soil Gas Sampling*, Perine Property (Technical Memorandum), dated January 13, 2012 by SES.

The VI assessments detected TCE in indoor air at concentrations ranging from 0.42 micrograms/cubic meter ($\mu\text{g}/\text{m}^3$) to 1.7 $\mu\text{g}/\text{m}^3$. Several of the detected concentrations of TCE were greater than the current MTCA Method B Indoor Air CUL of 0.37 $\mu\text{g}/\text{m}^3$. The PCE concentrations detected in these samples did not exceed the current MTCA Method B Indoor Air CUL of 9.6 $\mu\text{g}/\text{m}^3$. As discussed below in additional detail, the MTCA Method B Indoor Air CULs are based on a residential exposure scenario that does not exist at either the WII Property or the Perine Property, and which is unlikely to exist in the foreseeable future.

To EPI's knowledge, there has also been no evaluation conducted to assess whether or not any of the current on-property activities at the Perine Property may potentially be contributing to the detected concentrations of TCE in indoor air.

Ground water quality beneath the Perine Property was also assessed and those data were presented in *Groundwater Quality Evaluation, Perine Property*, dated July 28, 2011 by SES. That evaluation indicated the presence of TCE in ground water at a single location in the north central portion of the Perine Property at a concentration exceeding the Ground Water Screening Level presented in the Draft VI Guidance. PCE was not identified on the Perine Property at a concentration exceeding either the Ground Water Screening Level or the MTCA Method A Ground Water CUL.

Subsequent to the VI assessment and ground water quality evaluation, Perine also conducted pilot testing to assess the viability of addressing potential VI into the Perine Property through vacuum capture beneath the floor slab. That work is summarized in a document titled *Memorandum, Pilot Testing for Sub-Slab Depressurization System Design*, dated October 15, 2012 by SES.

A previous assessment of indoor air quality was conducted in the interior of the Former AV-Pro lease space on the WII Property. Three indoor air samples were collected in January 2004 and a fourth sample was collected in October 2007. Those results are presented in a memorandum titled *Historical Site Cleanup Summary, Northwest Plating Site*, dated October 3, 2012 by Hart Crowser. The indoor air samples contained concentrations of TCE, 1,1-dichloroethene (1,1-DCE), and vinyl chloride at concentrations exceeding MTCA Method B Indoor Air CULs. Again, the MTCA Method B Indoor Air CULs incorporate a residential exposure scenario that is not appropriate for the WII Property.

OBJECTIVES

The objectives of the VI assessment described herein were to quantitatively evaluate the concentrations of VOCs in sub-slab vapors at the subject properties, and to evaluate the presence of pressure gradients across the floor slabs and between the various spaces at both properties. Fulfilling those objectives provided data that were used to assess the potential for an unacceptable risk to human health from VI at the subject properties.

METHODOLOGY

The following sections provide a detailed description of the methods used to evaluate the sub-slab VOC concentrations and the cross-slab pressure differentials.

Sub-slab Vapor Sampling

On March 18, 2013, EPI installed four sub-slab vapor-sampling ports at the WII Property. Ports WISS-1 and WISS-2 were installed in the Former NWP lease space and ports WISS-3 and WISS-4 were installed in the Former AV-Pro lease space. The ports were installed by drilling a 1-inch diameter hole approximately 1.5 inches into the floor slab using a rotohammer. Subsequently, a 3/8-inch diameter hole was drilled through the remainder of the slab in the center of the 1-inch hole. After the holes were carefully cleared of concrete dust, 1/4-inch outside diameter Teflon tubing was installed through the slab with an open end slightly beneath the slab. The annular space between the tubing and the side of the 1-inch hole was sealed with approximately 1/2 inch of moist clay, and finished with quick-setting concrete to the upper surface of the floor.

On March 19, 2013, EPI conducted sub-slab vapor sampling at the four ports at the WII Property and at three sampling ports previously installed at the Perine Property by SES. Two of the sampling ports were in the Perine Danforth Company building (VS-1 and VS-2) and one was in the workspace located to the north of the current AV-Pro lease space (VS-3). The locations of all of the sub-slab sampling ports are displayed on Figure 2. The tubing at each sampling port was purged with a hand vacuum pump prior to sampling. A pre-evacuated 6-liter summa canister equipped with a flow-restricting orifice valve and vacuum gauge, all supplied by ALS Global, was attached to the tubing using stainless steel Swagelok fittings. The orifice valves of the summa canisters were set to collect a 6-liter sample in approximately 8 hours. After setup, the valve on each canister was opened and the sampling start time and initial canister vacuum were recorded. After sampling was started, a containment cell was placed over the canister and sampling port. A paper towel saturated with isopropyl alcohol was also placed beneath the containment cell to identify leaks in the sampling train. After approximately 6 hours, the containment cells and isopropyl alcohol source were removed. The remaining vacuum in the summa canisters was monitored periodically until it there was approximately 5.0 inches of mercury vacuum remaining, and the valve was closed and sampling stopped. Once sampling was completed, each canister was disconnected from the sampling port, the orifice valve was removed, and a plug was placed in the canister connection fitting. Each sampling port was also sealed. The canisters were shipped via overnight freight to Columbia Analytical Services in Simi Valley, California, under standard chain-of-custody protocols, for analysis for VOCs using EPA Method TO-15 on a standard turnaround time. The laboratory analytical reports are included as Attachment A.

Differential Pressure Gradient Evaluation

Following the sub-slab vapor sampling, EPI conducted an evaluation of cross-slab differential pressure at the subject properties. On March 20, 2013 EPI set up three Omniguard 4, data logging, differential pressure manometers at the subject properties. Two manometers were set up at on the WII Property at sampling ports WISS-1 in the former NWP space, and WISS-4 in the Former AV-Pro lease space. One manometer was also set up in the Perine Danforth Company building at location VS-1. Each logger was co-located with a Solinst Barologger barometric pressure data logger to measure the pressure within each space, and a fourth barologger was deployed outside of the building to measure changes in ambient barometric pressure. Both the manometers and barologgers measured to a resolution of 0.001 inches of water column (in. WC). Pressure data were recorded for 48 hours, after which the manometers were disconnected from the sub-slab sampling ports, and the manometers and barologgers were removed from the subject properties. All sub-slab sampling ports were sealed with an appropriate fitting. The pressure data were uploaded from the manometers and barologgers for subsequent analysis.

RESULTS

Sub-slab Vapor Sampling

The results of the laboratory analysis of the sub-slab vapor samples are provided in Table 1. The concentrations of PCE and TCE are summarized on Figure 2. The following VOCs were detected in all sub-slab vapor samples: PCE, TCE, cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), 1,1-DCE, 1,1,1-trichloroethane (1,1,1-TCA), and 1,1,2-trichloroethane (1,1,2-TCA).

Due to the elevated concentrations of PCE, TCE, and cis-1,2-DCE in several of the samples, it was necessary to dilute those samples in the normal course of laboratory analysis in order to properly quantitate the concentrations of other compounds. As a result, many of the laboratory practical quantitation limits (PQLs) are elevated.

The highest observed VOC concentrations were in the Former NWP lease space and in the northernmost portion of the Perine Danforth Company lease space. PCE, TCE, and cis-1,2-DCE were the most commonly detected compounds.

As noted above, isopropyl alcohol was used as a tracer gas to assess potential leakage within the vacuum sample train. Isopropyl alcohol was detected in sub-slab vapor samples indicating that there were minor vacuum leaks in the sampling train, either around the sampling ports in the floors, or via the fittings between the tubing, valves, and/or canisters. These vacuum leaks are not uncommon, but do suggest that the observed concentration in sub-slab vapor may slightly underrepresent actual sub-slab VOC concentrations.

Comparison of the maximum TCE concentration in sub-slab vapor on the WII Property (i.e., 1,200,000 $\mu\text{g}/\text{m}^3$) with maximum TCE concentrations in indoor air (i.e., 360 $\mu\text{g}/\text{m}^3$, January 2004) suggests a site-specific vapor attenuation factor of about 0.0003. Comparison of maximum sub-slab vapor TCE concentrations on the Perine Property (i.e., 150,000 $\mu\text{g}/\text{m}^3$) with maximum TCE concentration in indoor

air (i.e., $1.7 \mu\text{g}/\text{m}^3$) suggests a site-specific vapor attenuation factor of about 0.00001. Both of these attenuation factors are significantly less than the default value of 0.1 provided by the Washington State Department of Ecology (Ecology) in the Draft VI Guidance.

Differential Pressure

Cross-slab Differential Pressure

Cross-slab differential pressure was measured and recorded on the WII Property at locations WISS-1 in the former NWP space and WISS-4 in the former AV-Pro lease space, and at the Perine Property at location VS-1 (Figure 2). The measurement port of each manometer was connected to the sub-slab sampling port at each location. The manometers function by measuring pressure relative to an open "reference" port. Thus, positive differential pressure indicates that pressure is higher beneath the slab and that an upward cross-slab pressure gradient exists. Likewise, a negative differential pressure indicates a downward pressure cross-slab gradient. The Omniguard 4 differential pressure manometers were set to record the highest and lowest differential pressure measurements over consecutive 5-minute time intervals over the 48-hour recording period. EPI averaged the high and low measurements from each interval to evaluate if the cross-slab pressure gradient was predominately positive or negative during each period.

In general, the cross-slab differential pressure gradients appeared to respond relatively quickly to changes in barometric pressure, and likely to the function of the HVAC system and other activities at the Perine Property. Over the recording period, barometric pressure generally increased. Cross-slab differential pressure gradients appeared to be impacted primarily by the rate of change of barometric pressure during the test. During approximately the first quarter of the test period, barometric pressure was strongly increasing and cross-slab differential pressures were more variable during this period. Barometric pressure declined slightly for several hours during one portion of the test. The increase in barometric pressure following this decline also seemed to prompt an increased response in differential pressure at locations WISS-1 and VS-1. Graphs of the high, low, and average differential pressure, and the ambient barometric pressure are provided with this report in Attachment B. Summary descriptions of cross-slab differential pressure behavior are provided in the following bullets:

- The average cross-slab differential pressure at location WISS-1 in the Former NWP lease space at the WII Property was generally positive over the course of the test, indicating an upward pressure gradient. The average differential pressure over the course of the test was 0.0005 in. WC. A graph of the time-series differential pressure data is provided on Chart 1. The Former NWP lease space is not weather tight and has no operational HVAC system.
- The average cross-slab differential pressure at location WISS-4 in the Former AV-Pro lease space at the WII Property was slightly negative over the course of the test, indicating a downward pressure gradient. The average differential pressure over the course of the test was -0.0002 in. WC. A graph of the time-series differential pressure data is provided on Chart 2. The Former Av-Pro lease space is unoccupied and is typically sealed with closed doors and windows. Temperature is maintained at a minimum necessary temperature.

- The average cross-slab differential pressure at location VS-1 on the Perine Property was generally negative over the course of the test, indicating a downward pressure gradient. The average differential pressure over the course of the test was -0.0003 in. WC. The second half of the recording period, however, indicates a slight upward pressure gradient. A graph of the time-series differential pressure data is provided on Chart 3.

Inter-Building Pressure Gradients

Barologgers were co-located with each manometer, and one barologger was deployed outside of the buildings to measure ambient barometric pressure. Generally, the response of each barologger followed the ambient barometric pressure very closely. During the majority of the test period, the pressure within the Perine Danforth Company building was greater than the ambient barometric pressure and pressure within the spaces on the WII Property. On the WII Property, indoor pressure was slightly less than ambient pressure in both spaces, and pressure in the Former AV-Pro lease space was greater than pressure in the Former NWP lease space. A graph of the barometric pressure data is provided as Chart 4.

SITE-SPECIFIC SCREENING LEVELS AND ASSESSMENT OF POTENTIAL EXPOSURE

The Draft VI Guidance contains a methodology for preparing soil gas screening levels relative to indoor air CULs. The soil gas screening levels are levels above which the Draft VI Guidance assumes there is the potential for and exceedence of a MTCA Method B Indoor Air CUL from VI. As noted above, those MTCA Method B Indoor Air CULs incorporate a residential exposure scenario and either a long-term excess cancer risk of 1 in 1,000,000 or a long-term non-carcinogenic health effect (Hazard Quotient or HQ) greater than 1. The screening levels are 10 times the allowable indoor air CULs, based on the assumption that soil gas concentrations beneath the floor slab are attenuated by a factor of 0.1 relative to the interior of an occupied space. Exceeding a screening level typically triggers the need for either further assessment of actual indoor air exposures or pre-emptive action to mitigate VI.

Appendix 9, Table B-1 of the Draft VI Guidance illustrates the approach taken in developing screening levels. Table B-1 is developed using the MTCA Method B Indoor Air CULs for a residential exposure and various attenuation factors for shallow soil, deep soil, and ground water. A similar approach can be used based on the reasonable maximum exposure (RME) for the subject properties, which does not include a residential exposure scenario or a juvenile exposure scenario. The RME for the subject properties is a commercial worker exposure. As in the Draft VI Guidance, site-specific soil gas screening levels are calculated by assuming an attenuation factor of 0.1 between the shallow soil gas immediately beneath the floor slab and the RME indoor air exposure.

The RME for the subject properties is a commercial worker exposure scenario that assumes workers are adults with an average body weight of 70 kilograms and a breathing rate of 20 cubic meters/day. The RME incorporates an exposure frequency of 8 hours/day, 5 days/week, 50 weeks/year, and an exposure duration of 30 years. Such an RME would also incorporate an allowable excess cancer risk of 1×10^{-6} (i.e., 1 in 1,000,000) and an allowable non-carcinogenic HQ of 1. Using this RME with Equations 750-1 and 750-2 results in the development of remediation levels (RELs) for indoor air.

Those remediation levels would be protective of the long-term health of commercial workers on the subject properties.

Applying the 0.1 concentration attenuation factor to the RME for indoor air, results in an RME-specific soil gas screening level. As in the Draft VI Guidance, shallow soil gas concentrations greater than screening levels developed in this manner would result in the need for either additional assessment or mitigating actions for protection of indoor air quality for persons fitting the RME.

It should be noted that an REL is not a CUL. RELs are, by definition, higher than CULs. An REL is a concentration that triggers the requirement for a mitigating action to address potential health effects resulting from chronic (i.e., long-term) exposures. Concentrations between the CUL and the RELs are most appropriately addressed through the use of institutional controls or environmental covenants on a property. Since neither the WII Property nor the Perine Property have current or likely future ground floor residential uses, such an RME is appropriate for assessing current and likely future risks and exposures at those properties.

Both PCE and TCE have non-carcinogenic and carcinogenic health effects. Indoor air CULs based on non-carcinogenic effects are calculated using Equation 750-1 of the MTCA Regulation (WAC 173-340-750) and the current inhalation reference dose (RFDi). Indoor air CULs based on allowable excess cancer risk are calculated using Equation 750-2 and the current inhalation cancer potency factor (CPF_i). Both the RFD_i and CPF_i are subject to periodic updating and revision and for PCE and TCE were most recently revised in September of 2012. The current Ecology Cleanup Levels and Risk Calculations (CLARC) guidance for these compounds is presented as Attachment C.

Table 2 below presents the calculated indoor air REL and shallow soil gas screening levels for the non-carcinogenic health effects of PCE and TCE. Table 3 presents a similar calculation for indoor air REL and shallow soil gas screening levels for the carcinogenic health effects of PCE and TCE. Both calculations incorporate the RME presented above.

Table 2
Indoor Air CULs, RELs, and SLs
Non-Carcinogenic Risk^a

Compound	MTCA Method B Residential			MTCA Method B Commercial RME					
	RFDi (mg/kg-day) ⁻¹	Indoor Air CUL (µg/m ³)	Soil Gas SL (µg/m ³)	RFDi	EF	HQ	ED (years)	Indoor Air REL (µg/m ³)	Soil Gas SL (µg/m ³)
PCE	0.0114	18	180	0.0114	0.228	1	6	175	1,750
TCE	0.00057	0.9	9	0.00057	0.228	1	6	8.8	88

Note:

a Based on Equation 750-1, WAC 173-340-750. Refer to notes in Table 3 for abbreviation definitions.

Table 3
Indoor Air CULs, RELs, and SLs
Carcinogenic Risk^a

Compound	MTCA Method B Residential			MTCA Method B Commercial RME					
	CPF _i (mg/kg-day) ⁻¹	Indoor Air CUL (µg/m ³)	Soil Gas SL (µg/m ³)	CPF _i	EF	Risk	ED (years)	Indoor Air REL (µg/m ³)	Soil Gas SL (µg/m ³)
PCE	0.00091	9.6	96	0.00091	0.228	1x10 ⁻⁶	30	42.2	422
TCE	0.02365	0.37	3.7	0.01435 ^b	0.228	1x10 ⁻⁶	30	2.7	27

Notes:

- a Based on Equation 750-2, WAC 173-340-750.
- b CLARC Guidance, September 2012, Background Information. Adjustment for no Early Life Exposures (ELE) based on commercial worker exposure. Also see Table 2 and Table 8, footnote B of CLARC Guidance
- SL Screening Level
- EF Exposure Frequency (commercial RME, 8 hours/day, 50 weeks/year)
- ED Exposure Duration (default value)

This evaluation indicates that a concentration of PCE in soil gas of greater than 422 µg/m³ and a TCE concentration in soil gas of greater than 27 µg/m³ triggers the need for some form of mitigating action to address potential long-term health effects that may result from vapor intrusion of soil gas. The maximum PCE concentration detected in soil gas was 6,200 µg/m³ and the maximum TCE concentration was 1,200,000 µg/m³; both were detected beneath the WII Property. Prior indoor air sampling conducted by others on the WII Property measured maximum PCE in indoor air at concentrations ranging from 4.8 µg/m³ to 9.6 µg/m³ and TCE at concentrations ranging from 100 µg/m³ to 360 µg/m³. Based on these data, TCE is present in indoor air inside the WII Building at concentrations greater than the indoor air RELs developed above. The WII Property is currently unoccupied but, based on this evaluation, would require some form of VI mitigation system (VIMS) prior to future long-term occupancy.

The maximum PCE and TCE concentrations in soil gas beneath the Perine Property were 2,200 µg/m³ and 150,000 µg/m³, respectively. Both the PCE and TCE concentration in soil gas exceeded the RME-based soil gas screening level presented above. This indicates that some form of VIMS may be appropriate beneath a portion of the building on the Perine Property. Prior indoor air sampling on the Perine Property detected maximum concentrations of PCE in indoor air of 1.3 µg/m³ and TCE of 1.7 µg/m³, neither of which exceeds the indoor air REL developed above. The exceedance of the RME-based soil gas screening levels for PCE and TCE suggests the need for a VIMS on the Perine Property to address potential long-term health effects. However, the prior indoor air sampling conducted by SES empirically demonstrates that the need for such a system is not imminent and that the time necessary to evaluate and design such a system does not pose unacceptable risks to the occupants of the building.

Acute health effects result from short-term exposures to very high concentrations of individual compounds. Short-term exposure limits are provided by the U.S. Department of Health and Human

Services through the National Institute of Occupational Safety and Health (NIOSH) in cooperation with the Centers for Disease Control. The lowest short-term time-weighted average (TWA) exposure limit for PCE is 100 parts per million (ppm), which equates to $678,000 \mu\text{g}/\text{m}^3$. That value is four orders of magnitude higher than the MTCA Method B Indoor Air CUL. TCE also has a TWA exposure limit of 100 ppm, which equates to $537,000 \mu\text{g}/\text{m}^3$, or five orders of magnitude higher than the MTCA Method B Indoor Air CUL. These values are also many orders of magnitude higher than the highest PCE or TCE concentrations detected in indoor air during prior sampling. Therefore, the potential for acute health effects to on-site workers or visitors does not require further evaluation.

CONCLUSIONS

The following bullets present the conclusions that are supported by the findings of this VI Assessment:

- Concentrations of PCE and TCE in soil gas beneath the subject properties exceed a site-specific soil gas screening level based on a commercial worker RME. This finding indicates that, under the current Draft VI Guidance, some form of VIMS is appropriate for both properties.
- Historical indoor air sampling at the WII Property indicates that TCE in indoor air on that property exceeds the allowable RME-based REL. This finding indicates that a VIMS would be required prior to future occupancy of either the Former NWP lease space or the Former AV-Pro lease space.
- Indoor air sampling performed by others at the Perine Property did not indicate the presence of PCE or TCE in indoor air at concentrations exceeding the RME-based REL. This finding indicates that VI of VOCs into the Perine Danforth Company building is likely occurring; however, based on sampling data, VI is not occurring to a degree that commonly exceeds the RME-based REL. It is also acknowledged that based on atmospheric conditions, the degree of VI may vary with time and could be strongly affected by falling atmospheric conditions. Nonetheless, chronic risks are based on consistent and ongoing exposures above a certain concentration for a long period of time (e.g., 30 years.) Therefore, while it is appropriate to address VI risks at the Perine Property, those risks are not imminent based on the RME presented herein.

EPI has discussed these findings with Counsel for WII. Based upon those discussions, EPI was directed to design a VIMS for the Perine Property and to develop a brief Work Plan for the installation of that system. The system design will use, to the extent possible, the pilot testing data previously collected by SES on behalf of the Perine Danforth Company.

Based on our current understanding of this project, the most appropriate method for mitigating VI risks on the WII Property is to allow the Former AV-Pro lease space and Former NWP lease space to remain vacant and to complete a remedial investigation (RI) and feasibility study (FS) of that property. The RI/FS process will assist in determining the appropriate remedial and mitigating actions for the WII Property.

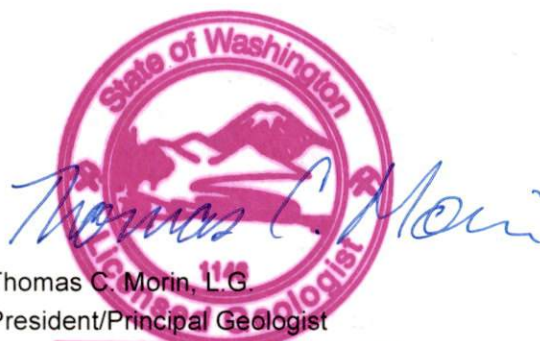
DISCLAIMER

To the extent that preparation of this VI Assessment has required the application of best professional judgment and the employment of scientific principles, certain results of this work were based on subjective interpretation. We make no warranties, express or implied, including and without limitation warranties as to merchantability or fitness for a particular purpose. The information provided herein is not to be construed as legal advice.

This VI Assessment Report was prepared solely for WII and their Counsel, and the contents herein may not be used or relied upon by any other person without the express written consent and authorization of EPI.

EPI appreciates the opportunity to be of assistance on this project. If you have any questions or comments, please do not hesitate to contact us at (425) 395-0010.

Sincerely,



Thomas C. Morin, L.G.
President/Principal Geologist

Thomas C. Morin



Monty Busbee
Senior Hydrologist

ENCLOSURES

Tables

Table 1	Sub-Slab Vapor Analytical Results
Table 2	Indoor Air CULs, RELs, and SLs - Non-carcinogenic Risk (embedded)
Table 3	Indoor Air CULs, RELs, and SLs - Carcinogenic Risk (embedded)

Figures

Figure 1	General Vicinity Map
Figure 2	Sub-Slab Vapor Sampling Locations

Attachments

Attachment A	Laboratory Analytical Reports
Attachment B	Pressure Graphs
Attachment C	CLARC Guidance: TCE and PCE, September 2012

Tables

Table 1
Sub-Slab Vapor Analytical Results (in $\mu\text{g}/\text{m}^3$)
Vapor Intrusion Assessment
Washington Industries, Inc. Property and Perine Property
825 South Dakota Street and 812 and 820 South Adams Street, Seattle, Washington

Sample Identification	Date Collected	Measured Volatile Organic Compounds ^a						
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	1,1,1-TCA	1,1,2-TCA
WII Property ^b —Former Northwest Plating Lease Space								
WISS-1	3/19/13	670	72,000	260	<72	<72	170	<72
WISS-2	3/19/13	6,200	1,200,000	13,000	<1,900	1,900	<1,900	<1,900
WII Property—Former AV-Pro Lease Space								
WISS-3	3/19/13	<680	10,000	1,200	<680	<680	<680	<680
WISS-4	3/19/13	2,800	59,000	6,000	460	<73	<73	320
Perine Property								
VS-1	3/19/13	2,200	150,000	3,100	<160	<160	180	<160
VS-2	3/19/13	400	53,000	410	<60	<60	85	<60
VS-3	3/19/13	<470	970	<470	<470	<470	<470	<470

Notes:

All results in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).

Bold results indicate that analyte is detected at a concentration greater than the laboratory practical quantitation limit.

< Indicates that the analyte is not detected at a concentration greater than the laboratory practical quantitation limit.

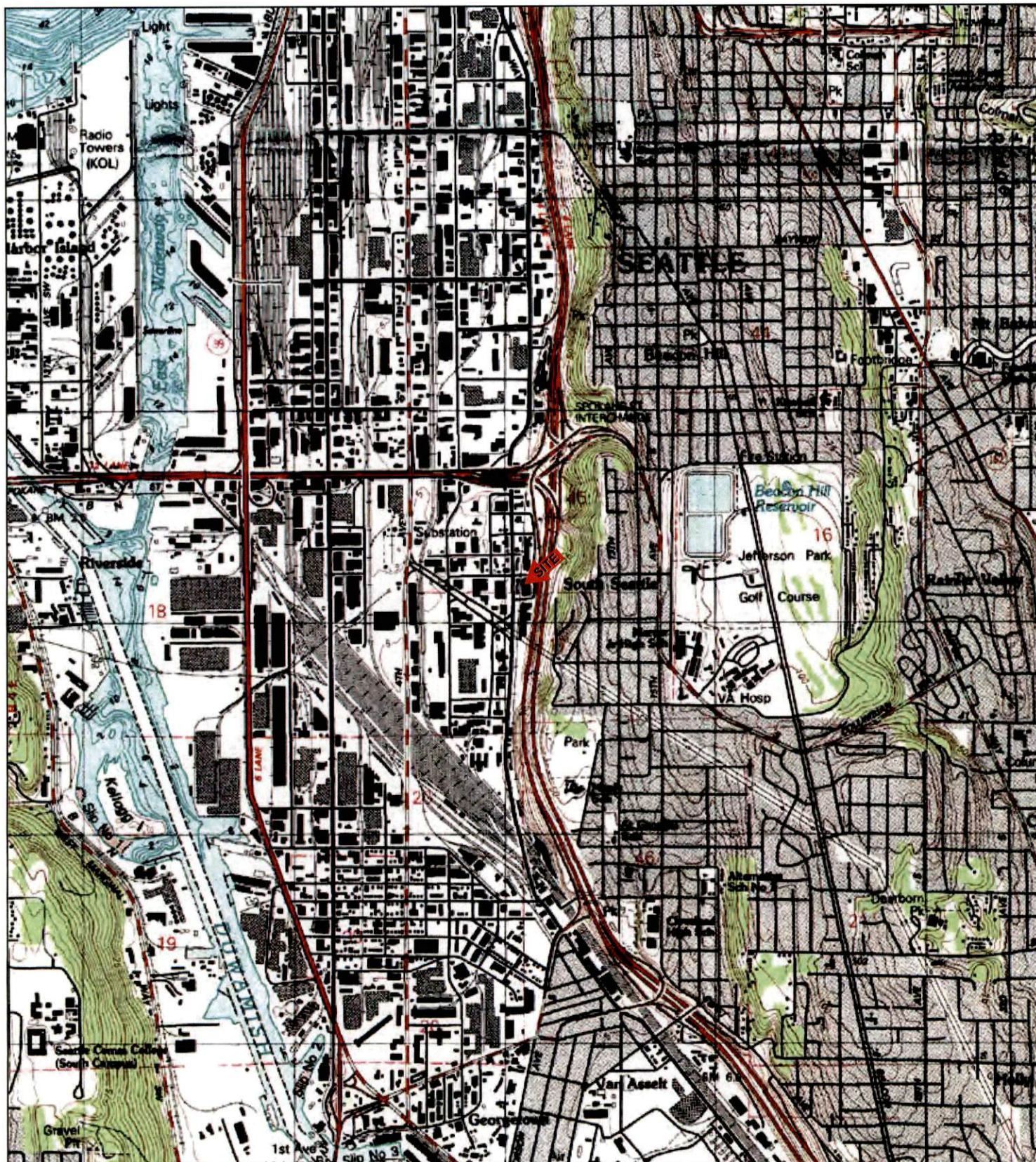
a Volatile organic compound analysis in accordance with EPA Method TO-15 from the *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air*, Second Edition (EPA/625/R-96/010b), January 1999.

b Washington Industries, Inc. Property

Compounds:

PCE	Tetrachloroethene
TCE	Trichloroethene
cis-1,2-DCE	cis-1,2-Dichloroethene
trans-1,2-DCE	trans-1,2-Dichloroethene
1,1-DCE	1,1-Dichloroethene
1,1,1-TCA	1,1,1-Trichloroethane
1,1,2-TCA	1,1,2-Trichloroethane

Figures



KEY:

SOURCE: USGS 7.5 MINUTE QUADRANGLE
(TOPOGRAPHIC)

SEATTLE SOUTH, WA
1983



SCALE = 1:25,000



**ENVIRONMENTAL
PARTNERS INC**

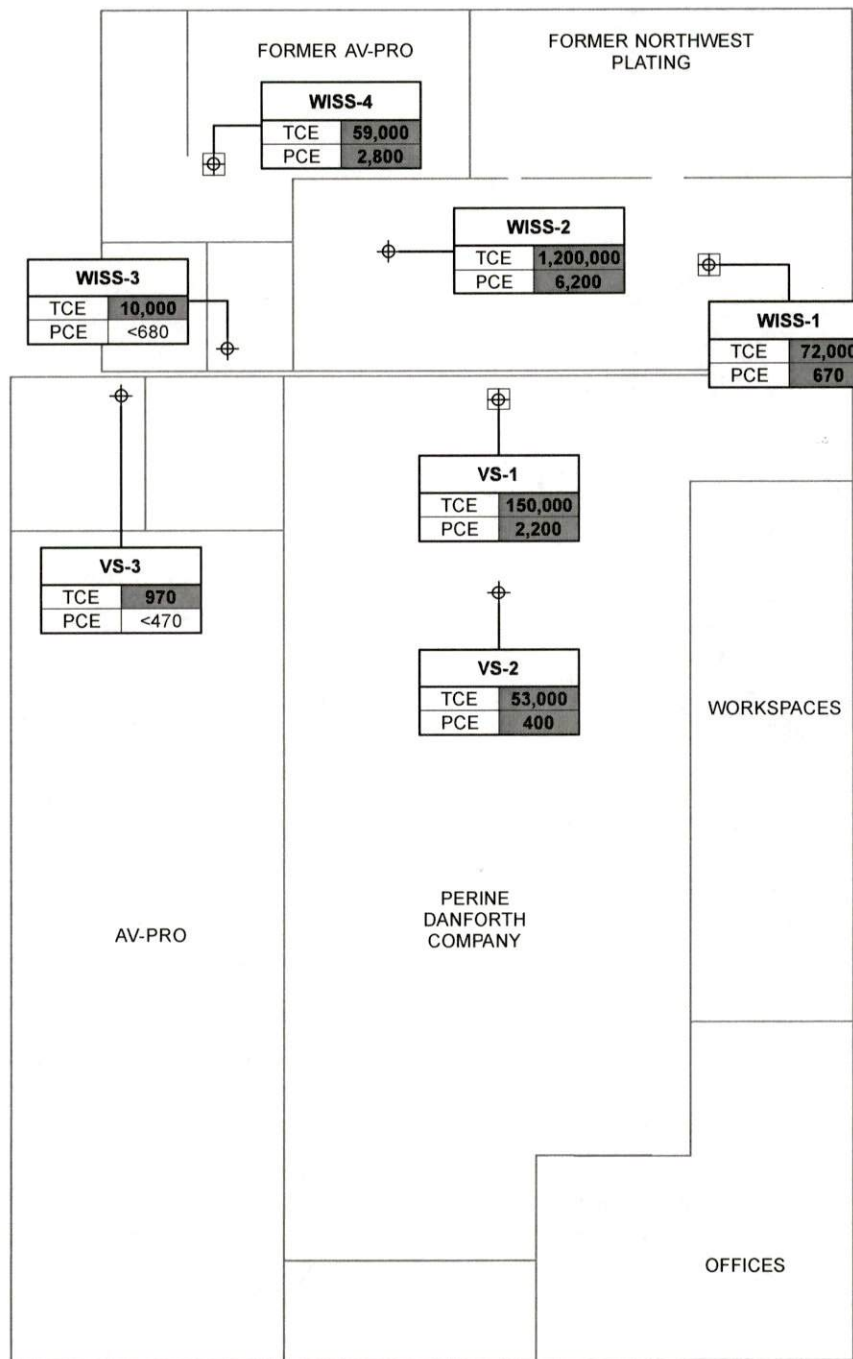
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 1

GENERAL VICINITY MAP

PROJECT	64001.0		
PREPARED FOR	WASHINGTON INDUSTRIES, INC.		
LOCATION	825 SOUTH DAKOTA STREET AND 812 AND 820 SOUTH ADAMS STREET SEATTLE, WASHINGTON		
SHEET 1 OF 1	DRAWN BY ALW	REVIEWED BY MB	DATE 5/15/13

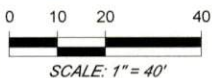
SOUTH DAKOTA STREET



NOTES:
TCE = TRICHLOROETHENE
PCE = TETRACHLOROETHENE
ALL CONCENTRATIONS IN $\mu\text{g}/\text{m}^3$
BOLD INDICATES CONCENTRATION EXCEEDS THE APPLICABLE SOIL GAS SCREENING LEVEL.

KEY:

- SUB-SLAB SAMPLING PORT
- SUB-SLAB VAPOR AND PRESSURE MONITORING LOCATIONS



ept ENVIRONMENTAL PARTNERS INC

295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 2

SUB-SLAB VAPOR SAMPLING LOCATIONS

PROJECT	64001.0		
PREPARED FOR	WASHINGTON INDUSTRIES, INC.		
LOCATION	825 SOUTH DAKOTA STREET AND 812 AND 820 SOUTH ADAMS STREET SEATTLE, WASHINGTON		
SHEET 1 OF 1	DRAWN BY ALW	REVIEWED BY MB	DATE 5/15/13

Attachment A
Laboratory Analytical Reports

LABORATORY REPORT

April 3, 2013

Monty Busbee
Environmental Partners, Inc.
295 NE Gilman Blvd., Suite 201
Issaquah, WA 98027

RE: Washington Industries / 64001

Dear Monty:

Enclosed are the results of the samples submitted to our laboratory on March 21, 2013. For your reference, these analyses have been assigned our service request number P1301150.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | EnvironmentalBy Kate Aguilera at 3:37 pm, Apr 03, 2013

Kate Aguilera
Project Manager

Client: Environmental Partners, Inc.
Project: Washington Industries / 64001

Service Request No: P1301150

CASE NARRATIVE

The samples were received intact under chain of custody on March 21, 2013 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Volatile Organic Compound Analysis

The samples were analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. Any analytes flagged with an X are not included on the laboratory's NELAP or DoD-ELAP scope of accreditation.

The Summa canisters were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of Columbia Analytical Services, Inc. dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

Columbia Analytical Services, Inc. dba ALS Environmental – Simi Valley

Certifications, Accreditations, and Registrations

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjilabs.com/search-accredited-labs	L11-203
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2012039
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	494864
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	CA200007
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-12-3
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA01527201 2-2
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.caslab.com, www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

DETAIL SUMMARY REPORT

Client: Environmental Partners, Inc.
Project ID: Washington Industries / 64001

Service Request: P1301150

Date Received: 3/21/2013
Time Received: 09:35

TO-15 - VOC Cans

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	
S-2	P1301150-001	Air	3/19/2013	16:18	SC01577	-2.32	3.69	X
VS-1	P1301150-002	Air	3/19/2013	16:22	SC00771	-2.82	3.73	X
VS-3	P1301150-003	Air	3/19/2013	16:34	SC01537	-1.79	3.65	X
WISS-1	P1301150-004	Air	3/19/2013	17:43	SC00391	-2.02	3.55	X
WISS-2	P1301150-005	Air	3/19/2013	17:39	SC01718	-2.36	3.61	X
WISS-3	P1301150-006	Air	3/19/2013	17:33	SC00944	-1.29	3.52	X
WISS-4	P1301150-007	Air	3/19/2013	18:05	SC00764	-2.06	3.65	X

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Air - Chain of Custody Record & Analytical Service Request

Requested Turnaround Time in Business Days (Surcharges) please circle: 1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

Company Name & Address (Reporting Information) Environmental Partners, Inc. 295 NE Gilman Blvd. St. 201 Issaquah, WA 98027						Project Name Washington Industries				CAS Contact:		Comments e.g. Actual Preservative or specific instructions
Project Manager Marty Busbee						Project Number 64001				Analysis Method		
Phone 425-988-4040		Fax 425-395-0011				P.O. # / Billing Information 64001				Toilet Level (VOCs)		
Email Address for Result Reporting monty6@epi-wa.com						Sampler (Print & Sign) Marty Busbee [Signature]						
Client Sample ID		Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume			
VS-2		①-253	3/19/13	1618	SC01577		-28	-5		X		
VS-1		②-298	3/19/13	1622	SC00771		-28	-5.5		X		
VS-3		③-201		1634	SC01537		-30	-5		X		
WISS-1		④-227		1743	SC00391		-27.5	-5		X		
WISS-2		⑤-261		1739	SC01718		-27	-4		X		
WISS-3		⑥-157		1733	SC00944		-29	-5		X		
WISS-4		⑦-224	✓	1805	SC00764		-28	-5		X		
Report Tier Levels - please select												
Tier I - Results (Default if not specified) ☒ Tier III (Results + QC & Calibration Summaries) _____ EDD required Yes / ☒ No												
Tier II (Results + QC Summaries) _____ Tier IV (Data Validation Package) 10% Surcharge _____ Type: _____												
Relinquished by: (Signature) [Signature]				Date: 3/20/13	Time: 1330	Received by: (Signature) [Signature]				Date: 3/21/13	Time: 0945	
Relinquished by: (Signature)				Date:	Time:	Received by: (Signature)				Date:	Time:	
Cooler / Blank Temperature _____ °C												

Sample Acceptance Check Form

Client: Environmental Partners, Inc. Work order: P1301150
Project: Washington Industries / 64001
Sample(s) received on: 3/21/13 Date opened: 3/21/13 by: MZAMORA

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

	Yes	No	N/A
1 Were sample containers properly marked with client sample ID?	☒	☐	☐
2 Container(s) supplied by ALS ?	☒	☐	☐
3 Did sample containers arrive in good condition?	☒	☐	☐
4 Were chain-of-custody papers used and filled out?	☒	☐	☐
5 Did sample container labels and/or tags agree with custody papers?	☒	☐	☐
6 Was sample volume received adequate for analysis?	☒	☐	☐
7 Are samples within specified holding times?	☒	☐	☐
8 Was proper temperature (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9 Was a trip blank received?	☐	☒	☐
10 Were custody seals on outside of cooler/Box?	☐	☒	☐
Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
Were signature and date included?	☐	☐	☒
Were seals intact?	☐	☐	☒
Were custody seals on outside of sample container?	☐	☒	☐
Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
Were signature and date included?	☐	☐	☒
Were seals intact?	☐	☐	☒
11 Do containers have appropriate preservation , according to method/SOP or Client specified information?	☐	☐	☒
Is there a client indication that the submitted samples are pH preserved?	☐	☐	☒
Were VOA vials checked for presence/absence of air bubbles?	☐	☐	☒
Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?	☐	☐	☒
12 Tubes: Are the tubes capped and intact?	☐	☐	☒
Do they contain moisture?	☐	☐	☒
13 Badges: Are the badges properly capped and intact?	☐	☐	☒
Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1301150-001.01	6.0 L Source Can					
P1301150-002.01	6.0 L Source Can					
P1301150-003.01	6.0 L Source Can					
P1301150-004.01	6.0 L Source Can					
P1301150-005.01	6.0 L Source Can					
P1301150-006.01	6.0 L Source Can					
P1301150-007.01	6.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

RESULTS OF ANALYSIS

Page 1 of 3

Client: **Environmental Partners, Inc.**
Client Sample ID: **VS-2**
Client Project ID: **Washington Industries / 64001**

CAS Project ID: P1301150
CAS Sample ID: P1301150-001

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01577

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 3/29/13
Volume(s) Analyzed: 0.0025 Liter(s)

Initial Pressure (psig): -2.32 Final Pressure (psig): 3.69

Canister Dilution Factor: 1.49

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	30,000	300	18,000	170	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	300	ND	60	
74-87-3	Chloromethane	ND	120	ND	58	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	300	ND	43	
75-01-4	Vinyl Chloride	ND	60	ND	23	
106-99-0	1,3-Butadiene	ND	120	ND	54	
74-83-9	Bromomethane	ND	60	ND	15	
75-00-3	Chloroethane	ND	60	ND	23	
64-17-5	Ethanol	ND	3,000	ND	1,600	
75-05-8	Acetonitrile	ND	300	ND	180	
107-02-8	Acrolein	ND	1,200	ND	520	
67-64-1	Acetone	ND	3,000	ND	1,300	
75-69-4	Trichlorofluoromethane	ND	60	ND	11	
67-63-0	2-Propanol (Isopropyl Alcohol)	77,000	3,000	31,000	1,200	
107-13-1	Acrylonitrile	ND	300	ND	140	
75-35-4	1,1-Dichloroethene	ND	60	ND	15	
75-09-2	Methylene Chloride	ND	300	ND	86	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	60	ND	19	
76-13-1	Trichlorotrifluoroethane	ND	60	ND	7.8	
75-15-0	Carbon Disulfide	ND	3,000	ND	960	
156-60-5	trans-1,2-Dichloroethene	ND	60	ND	15	
75-34-3	1,1-Dichloroethane	ND	60	ND	15	
1634-04-4	Methyl tert-Butyl Ether	ND	60	ND	17	
108-05-4	Vinyl Acetate	ND	3,000	ND	850	
78-93-3	2-Butanone (MEK)	ND	3,000	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 2 of 3

Client: Environmental Partners, Inc.
Client Sample ID: VS-2
Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150
CAS Sample ID: P1301150-001

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01577

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 3/29/13
Volume(s) Analyzed: 0.0025 Liter(s)

Initial Pressure (psig): -2.32 **Final Pressure (psig):** 3.69

Canister Dilution Factor: 1.49

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifie
156-59-2	cis-1,2-Dichloroethene	410	60	100	15	
141-78-6	Ethyl Acetate	ND	600	ND	170	
110-54-3	n-Hexane	ND	300	ND	85	
67-66-3	Chloroform	ND	60	ND	12	
109-99-9	Tetrahydrofuran (THF)	ND	300	ND	100	
107-06-2	1,2-Dichloroethane	ND	60	ND	15	
71-55-6	1,1,1-Trichloroethane	85	60	16	11	
71-43-2	Benzene	ND	60	ND	19	
56-23-5	Carbon Tetrachloride	ND	60	ND	9.5	
110-82-7	Cyclohexane	ND	600	ND	170	
78-87-5	1,2-Dichloropropane	ND	60	ND	13	
75-27-4	Bromodichloromethane	ND	60	ND	8.9	
79-01-6	Trichloroethene	53,000	60	9,900	11	
123-91-1	1,4-Dioxane	ND	300	ND	83	
80-62-6	Methyl Methacrylate	ND	600	ND	150	
142-82-5	n-Heptane	ND	300	ND	73	
10061-01-5	cis-1,3-Dichloropropene	ND	300	ND	66	
108-10-1	4-Methyl-2-pentanone	ND	300	ND	73	
10061-02-6	trans-1,3-Dichloropropene	ND	300	ND	66	
79-00-5	1,1,2-Trichloroethane	ND	60	ND	11	
108-88-3	Toluene	ND	300	ND	79	
591-78-6	2-Hexanone	ND	300	ND	73	
124-48-1	Dibromochloromethane	ND	60	ND	7.0	
106-93-4	1,2-Dibromoethane	ND	60	ND	7.8	
123-86-4	n-Butyl Acetate	ND	300	ND	63	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Table 5: MTCA Standard Method B and C Surface Water Cleanup Levels for Trichloroethylene (TCE) [see WAC 173-340-730(3) & (4)]				
Toxicity Values from Table 2	MTCA Method B (µg /L)		MTCA Method C (µg /L)	
	Eqn 730-1 Non-Cancer (@ HQ=1)	Eqn 730-2 Cancer (@Risk = 10 ⁻⁶)	Eqn 730-1 (mod) Non-Cancer (@ HQ=1) (c)	Eqn 730-2 (mod) Cancer (@Risk = 10 ⁻⁵)
Old CPF ₀ :0.089 per mg/kg-day	-----	6.7	-----	170
Using 3 CPF ₀ 's with no ELE Adjustment	-----	1.3E+01 (a)	-----	3.2E+02 (b)
Old RfD ₀ : 0.0003 mg/kg-day	71	-----	180	-----
New RfD ₀ : 0.0005 mg/kg-day	1.2E+02	-----	3.0E+02	-----
Applicable State & Federal Law: Ambient water quality criteria (AWQC)				
U.S. EPA's AWQC	Drinking Water + organism consumption = 2.5 µg/L			
	Consumption of organism only = 30.0 µg/L			
U.S. EPA's AWQC web location: http://water.epa.gov/scitech/swguidance/standards/current/index.cfm				
New MTCA Surface Water Cleanup levels (d)				
	MTCA Method B		MTCA Method C	
	2.5 µg/L or 30 µg/L		2.5 µg/L or 30 µg/L	
(a) Method B (cancer) surface water CUL calculated using Equation 730-2, a BCF = 11 L/kg, and a CPFo of 4.64E-02 mg/kg-day (sum of 3 CPFo's with no ELE adjustment).				
(b) Method C (cancer) surface water CUL calculated using Equation 730-2, cancer risk of 10 ⁻⁵ , BCF = 11 L/kg, FDF = 0.2, per WAC 173-340-730(4), and a CPFo of 4.64E-02 mg/kg-day (sum of 3 CPFo's with no ELE adjustment).				
(c) Method C (non-cancer) surface water CULs calculated using Equation 730-1, a BCF = 11 L/kg, and FDF = 0.2, per WAC 173-340-730(4).				
(d) MTCA requires CULs to comply with ARARs, which in this case are the federal and state water quality criteria. This includes consideration of both the survivability of the organisms and risk to humans eating fish and shellfish. It also includes consideration of whether or not the surface water has drinking water as a designated beneficial use under state law.				
The most stringent ARARs for TCE are the Federal Ambient Water Quality Criteria (AWQC), and thus these criteria govern the cleanup levels in this case. If drinking the surface water is identified as a beneficial use under WAC 173-340-201A, then use 2.5 ug/L as the cleanup level. Otherwise, use 30 ug/L.				
NOTE: These are not necessarily final cleanup levels. These values may need to be adjusted for additive risk, PQLs and natural background per WAC 173-340-730(5). (They are already adjusted for ARARs.)				

Table 6: MTCA Standard Method B and C Soil Cleanup Levels for Trichloroethylene (TCE) Protective of the Soil Ingestion Pathway
[see WAC 173-340-740 (3)(b)(iii)(B) & 173-340-745(5)(b)(iii)(B)]

Toxicity Values from Table 2	MTCA Method B (mg/kg)		MTCA Method C (mg/kg)	
	Eqn 740-1 Non-Cancer (@ HQ=1)	Eqn 740-2 Cancer (@Risk = 10 ⁻⁶)	Eqn 745-1 Non-Cancer (@ HQ=1)	Eqn 745-2 Cancer (@Risk = 10 ⁻⁵)
Using old CPF ₀ of 0.089 per mg/kg-day	-----	11	-----	1,480
Using 3 new CPF ₀ 's	-----	1.2E+01 (a)	-----	2.8E+03 (b)
Using old RfD ₀ of 0.0003 mg/kg-day	24	-----	1,050	-----
Using new RfD ₀ of 0.0005 mg/kg-day	4.0E+01	-----	1.8E+03	-----
New TCE Soil Cleanup Levels for the Soil Ingestion Pathway (c)				
	MTCA Method B		MTCA Method C	
	11 mg/kg		1,800 mg/kg	
(a) Method B (cancer) soil CUL = 1/[1/CUL for Kidney) + (1/CUL for Lymphoma) + (1/CUL for Liver)]				
Where:				
Kidney CUL = (RISK x AT x UCF) / (CPF ₀ x ELE Adjustment Factor x AB1 x EF) ⁹ [CUL = 20.1 mg/kg]				
Lymphoma CUL calculated using Equation 740-2, and CPF ₀ = 0.0216 (mg/kg-day) ⁻¹ [CUL = 46.3 mg/kg]				
Liver CUL calculated using Equation 740-2, and CPF ₀ = 0.0155 (mg/kg-day) ⁻¹ [CUL = 64.5 mg/kg]				
(b) Method C (cancer) soil CUL calculated using equation 745-2, and a CPF ₀ = 4.64E-02 mg/kg-day. (sum of 3 CPF ₀ 's with no ELE adjustment)				
(c) NOTE: These are not necessarily final cleanup levels. These values may need to be adjusted for additive risk, PQLs and natural background per WAC 173-340-740(5) and 745(6). (There are no known ARARs, so there is no adjustment for ARARs.)				
Also, this is just the soil ingestion exposure pathway. Other pathways such as leaching (see Table 7) and vapors may need to be considered when determining a final cleanup level.				

⁹ See WAC 173-340-740(3) for definitions of terms in this equation. Because the age-adjusted cancer potency factor already takes into account body weight, soil ingestion rate and exposure duration, these factors are left out of this equation when calculating this cleanup level.

RESULTS OF ANALYSIS

Page 3 of 3

Client: **Environmental Partners, Inc.**
Client Sample ID: **VS-2**
Client Project ID: **Washington Industries / 64001**

CAS Project ID: P1301150
CAS Sample ID: P1301150-001

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01577

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 3/29/13
Volume(s) Analyzed: 0.0025 Liter(s)

Initial Pressure (psig): -2.32 Final Pressure (psig): 3.69

Canister Dilution Factor: 1.49

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	300	ND	64	
127-18-4	Tetrachloroethene	400	60	59	8.8	
108-90-7	Chlorobenzene	ND	60	ND	13	
100-41-4	Ethylbenzene	ND	300	ND	69	
179601-23-1	m,p-Xylenes	ND	300	ND	69	
75-25-2	Bromoform	ND	300	ND	29	
100-42-5	Styrene	ND	300	ND	70	
95-47-6	o-Xylene	ND	300	ND	69	
111-84-2	n-Nonane	ND	300	ND	57	
79-34-5	1,1,2,2-Tetrachloroethane	ND	60	ND	8.7	
98-82-8	Cumene	ND	300	ND	61	
80-56-8	alpha-Pinene	ND	300	ND	54	
103-65-1	n-Propylbenzene	ND	300	ND	61	
622-96-8	4-Ethyltoluene	ND	300	ND	61	
108-67-8	1,3,5-Trimethylbenzene	ND	300	ND	61	
95-63-6	1,2,4-Trimethylbenzene	ND	300	ND	61	
100-44-7	Benzyl Chloride	ND	300	ND	58	
541-73-1	1,3-Dichlorobenzene	ND	60	ND	9.9	
106-46-7	1,4-Dichlorobenzene	ND	60	ND	9.9	
95-50-1	1,2-Dichlorobenzene	ND	60	ND	9.9	
5989-27-5	d-Limonene	ND	300	ND	54	
96-12-8	1,2-Dibromo-3-chloropropane	ND	300	ND	31	
120-82-1	1,2,4-Trichlorobenzene	ND	300	ND	40	
91-20-3	Naphthalene	ND	300	ND	57	
87-68-3	Hexachlorobutadiene	ND	300	ND	28	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 1 of 3

Client: Environmental Partners, Inc.
Client Sample ID: VS-1
Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150
CAS Sample ID: P1301150-002

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00771

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 3/29/13
Volume(s) Analyzed: 0.0010 Liter(s)

Initial Pressure (psig): -2.82 **Final Pressure (psig):** 3.73

Canister Dilution Factor: 1.55

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifie
115-07-1	Propene	85,000	780	49,000	450	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	780	ND	160	
74-87-3	Chloromethane	ND	310	ND	150	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	780	ND	110	
75-01-4	Vinyl Chloride	ND	160	ND	61	
106-99-0	1,3-Butadiene	ND	310	ND	140	
74-83-9	Bromomethane	ND	160	ND	40	
75-00-3	Chloroethane	ND	160	ND	59	
64-17-5	Ethanol	ND	7,800	ND	4,100	
75-05-8	Acetonitrile	ND	780	ND	460	
107-02-8	Acrolein	ND	3,100	ND	1,400	
67-64-1	Acetone	ND	7,800	ND	3,300	
75-69-4	Trichlorofluoromethane	ND	160	ND	28	
67-63-0	2-Propanol (Isopropyl Alcohol)	220,000	7,800	89,000	3,200	
107-13-1	Acrylonitrile	ND	780	ND	360	
75-35-4	1,1-Dichloroethene	ND	160	ND	39	
75-09-2	Methylene Chloride	ND	780	ND	220	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	160	ND	50	
76-13-1	Trichlorotrifluoroethane	ND	160	ND	20	
75-15-0	Carbon Disulfide	ND	7,800	ND	2,500	
156-60-5	trans-1,2-Dichloroethene	ND	160	ND	39	
75-34-3	1,1-Dichloroethane	ND	160	ND	38	
1634-04-4	Methyl tert-Butyl Ether	ND	160	ND	43	
108-05-4	Vinyl Acetate	ND	7,800	ND	2,200	
78-93-3	2-Butanone (MEK)	ND	7,800	ND	2,600	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 2 of 3

Client: Environmental Partners, Inc.
Client Sample ID: VS-1
Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150
CAS Sample ID: P1301150-002

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00771

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 3/29/13
Volume(s) Analyzed: 0.0010 Liter(s)

Initial Pressure (psig): -2.82 Final Pressure (psig): 3.73

Canister Dilution Factor: 1.55

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	3,100	160	790	39	
141-78-6	Ethyl Acetate	ND	1,600	ND	430	
110-54-3	n-Hexane	ND	780	ND	220	
67-66-3	Chloroform	ND	160	ND	32	
109-99-9	Tetrahydrofuran (THF)	ND	780	ND	260	
107-06-2	1,2-Dichloroethane	ND	160	ND	38	
71-55-6	1,1,1-Trichloroethane	180	160	33	28	
71-43-2	Benzene	ND	160	ND	49	
56-23-5	Carbon Tetrachloride	ND	160	ND	25	
110-82-7	Cyclohexane	ND	1,600	ND	450	
78-87-5	1,2-Dichloropropane	ND	160	ND	34	
75-27-4	Bromodichloromethane	ND	160	ND	23	
79-01-6	Trichloroethene	150,000	160	28,000	29	
123-91-1	1,4-Dioxane	ND	780	ND	220	
80-62-6	Methyl Methacrylate	ND	1,600	ND	380	
142-82-5	n-Heptane	ND	780	ND	190	
10061-01-5	cis-1,3-Dichloropropene	ND	780	ND	170	
108-10-1	4-Methyl-2-pentanone	ND	780	ND	190	
10061-02-6	trans-1,3-Dichloropropene	ND	780	ND	170	
79-00-5	1,1,2-Trichloroethane	ND	160	ND	28	
108-88-3	Toluene	ND	780	ND	210	
591-78-6	2-Hexanone	ND	780	ND	190	
124-48-1	Dibromochloromethane	ND	160	ND	18	
106-93-4	1,2-Dibromoethane	ND	160	ND	20	
123-86-4	n-Butyl Acetate	ND	780	ND	160	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 3 of 3

Client: Environmental Partners, Inc.
Client Sample ID: VS-1
Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150
CAS Sample ID: P1301150-002

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00771

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 3/29/13
Volume(s) Analyzed: 0.0010 Liter(s)

Initial Pressure (psig): -2.82 **Final Pressure (psig):** 3.73

Canister Dilution Factor: 1.55

CAS #	Compound	Result μg/m ³	MRL μg/m ³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	780	ND	170	
127-18-4	Tetrachloroethene	2,200	160	320	23	
108-90-7	Chlorobenzene	ND	160	ND	34	
100-41-4	Ethylbenzene	ND	780	ND	180	
179601-23-1	m,p-Xylenes	ND	780	ND	180	
75-25-2	Bromoform	ND	780	ND	75	
100-42-5	Styrene	ND	780	ND	180	
95-47-6	o-Xylene	ND	780	ND	180	
111-84-2	n-Nonane	ND	780	ND	150	
79-34-5	1,1,2,2-Tetrachloroethane	ND	160	ND	23	
98-82-8	Cumene	ND	780	ND	160	
80-56-8	alpha-Pinene	ND	780	ND	140	
103-65-1	n-Propylbenzene	ND	780	ND	160	
622-96-8	4-Ethyltoluene	ND	780	ND	160	
108-67-8	1,3,5-Trimethylbenzene	ND	780	ND	160	
95-63-6	1,2,4-Trimethylbenzene	ND	780	ND	160	
100-44-7	Benzyl Chloride	ND	780	ND	150	
541-73-1	1,3-Dichlorobenzene	ND	160	ND	26	
106-46-7	1,4-Dichlorobenzene	ND	160	ND	26	
95-50-1	1,2-Dichlorobenzene	ND	160	ND	26	
5989-27-5	d-Limonene	ND	780	ND	140	
96-12-8	1,2-Dibromo-3-chloropropane	ND	780	ND	80	
120-82-1	1,2,4-Trichlorobenzene	ND	780	ND	100	
91-20-3	Naphthalene	ND	780	ND	150	
87-68-3	Hexachlorobutadiene	ND	780	ND	73	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 1 of 3

Client: **Environmental Partners, Inc.**
Client Sample ID: **VS-3**
Client Project ID: **Washington Industries / 64001**

CAS Project ID: P1301150
CAS Sample ID: P1301150-003

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01537

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 3/29/13 & 4/1/13
Volume(s) Analyzed: 0.00030 Liter(s)
0.00010 Liter(s)

Initial Pressure (psig): -1.79 Final Pressure (psig): 3.65

Canister Dilution Factor: 1.42

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	310,000	2,400	180,000	1,400	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	2,400	ND	480	
74-87-3	Chloromethane	ND	950	ND	460	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	2,400	ND	340	
75-01-4	Vinyl Chloride	ND	470	ND	190	
106-99-0	1,3-Butadiene	ND	950	ND	430	
74-83-9	Bromomethane	ND	470	ND	120	
75-00-3	Chloroethane	ND	470	ND	180	
64-17-5	Ethanol	ND	24,000	ND	13,000	
75-05-8	Acetonitrile	ND	2,400	ND	1,400	
107-02-8	Acrolein	ND	9,500	ND	4,100	
67-64-1	Acetone	ND	24,000	ND	10,000	
75-69-4	Trichlorofluoromethane	ND	470	ND	84	
67-63-0	2-Propanol (Isopropyl Alcohol)	860,000	71,000	350,000	29,000	D
107-13-1	Acrylonitrile	ND	2,400	ND	1,100	
75-35-4	1,1-Dichloroethene	ND	470	ND	120	
75-09-2	Methylene Chloride	ND	2,400	ND	680	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	470	ND	150	
76-13-1	Trichlorotrifluoroethane	ND	470	ND	62	
75-15-0	Carbon Disulfide	ND	24,000	ND	7,600	
156-60-5	trans-1,2-Dichloroethene	ND	470	ND	120	
75-34-3	1,1-Dichloroethane	ND	470	ND	120	
1634-04-4	Methyl tert-Butyl Ether	ND	470	ND	130	
108-05-4	Vinyl Acetate	ND	24,000	ND	6,700	
78-93-3	2-Butanone (MEK)	ND	24,000	ND	8,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

D = The reported result is from a dilution.

RESULTS OF ANALYSIS

Page 2 of 3

Client: Environmental Partners, Inc.

Client Sample ID: VS-3

Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150

CAS Sample ID: P1301150-003

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Analyst: Elsa Moctezuma

Sample Type: 6.0 L Summa Canister

Test Notes:
Container ID: SC01537

Date Collected: 3/19/13

Date Received: 3/21/13

Date Analyzed: 3/29/13 & 4/1/13

Volume(s) Analyzed: 0.00030 Liter(s)

0.00010 Liter(s)

Initial Pressure (psig): -1.79 Final Pressure (psig): 3.65

Canister Dilution Factor: 1.42

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifie
156-59-2	cis-1,2-Dichloroethene	ND	470	ND	120	
141-78-6	Ethyl Acetate	ND	4,700	ND	1,300	
110-54-3	n-Hexane	ND	2,400	ND	670	
67-66-3	Chloroform	ND	470	ND	97	
109-99-9	Tetrahydrofuran (THF)	ND	2,400	ND	800	
107-06-2	1,2-Dichloroethane	ND	470	ND	120	
71-55-6	1,1,1-Trichloroethane	ND	470	ND	87	
71-43-2	Benzene	ND	470	ND	150	
56-23-5	Carbon Tetrachloride	ND	470	ND	75	
110-82-7	Cyclohexane	ND	4,700	ND	1,400	
78-87-5	1,2-Dichloropropane	ND	470	ND	100	
75-27-4	Bromodichloromethane	ND	470	ND	71	
79-01-6	Trichloroethene	970	470	180	88	
123-91-1	1,4-Dioxane	ND	2,400	ND	660	
80-62-6	Methyl Methacrylate	ND	4,700	ND	1,200	
142-82-5	n-Heptane	ND	2,400	ND	580	
10061-01-5	cis-1,3-Dichloropropene	ND	2,400	ND	520	
108-10-1	4-Methyl-2-pentanone	ND	2,400	ND	580	
10061-02-6	trans-1,3-Dichloropropene	ND	2,400	ND	520	
79-00-5	1,1,2-Trichloroethane	ND	470	ND	87	
108-88-3	Toluene	ND	2,400	ND	630	
591-78-6	2-Hexanone	ND	2,400	ND	580	
124-48-1	Dibromochloromethane	ND	470	ND	56	
106-93-4	1,2-Dibromoethane	ND	470	ND	62	
123-86-4	n-Butyl Acetate	ND	2,400	ND	500	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 3 of 3

Client: **Environmental Partners, Inc.**
Client Sample ID: **VS-3**
Client Project ID: **Washington Industries / 64001**

CAS Project ID: P1301150
CAS Sample ID: P1301150-003

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01537

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 3/29/13 & 4/1/13
Volume(s) Analyzed: 0.00030 Liter(s)
0.00010 Liter(s)

Initial Pressure (psig): -1.79 Final Pressure (psig): 3.65

Canister Dilution Factor: 1.42

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	2,400	ND	510	
127-18-4	Tetrachloroethene	ND	470	ND	70	
108-90-7	Chlorobenzene	ND	470	ND	100	
100-41-4	Ethylbenzene	ND	2,400	ND	550	
179601-23-1	m,p-Xylenes	ND	2,400	ND	550	
75-25-2	Bromoform	ND	2,400	ND	230	
100-42-5	Styrene	ND	2,400	ND	560	
95-47-6	o-Xylene	ND	2,400	ND	550	
111-84-2	n-Nonane	ND	2,400	ND	450	
79-34-5	1,1,2,2-Tetrachloroethane	ND	470	ND	69	
98-82-8	Cumene	ND	2,400	ND	480	
80-56-8	alpha-Pinene	ND	2,400	ND	420	
103-65-1	n-Propylbenzene	ND	2,400	ND	480	
622-96-8	4-Ethyltoluene	ND	2,400	ND	480	
108-67-8	1,3,5-Trimethylbenzene	ND	2,400	ND	480	
95-63-6	1,2,4-Trimethylbenzene	ND	2,400	ND	480	
100-44-7	Benzyl Chloride	ND	2,400	ND	460	
541-73-1	1,3-Dichlorobenzene	ND	470	ND	79	
106-46-7	1,4-Dichlorobenzene	ND	470	ND	79	
95-50-1	1,2-Dichlorobenzene	ND	470	ND	79	
5989-27-5	d-Limonene	ND	2,400	ND	420	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2,400	ND	240	
120-82-1	1,2,4-Trichlorobenzene	ND	2,400	ND	320	
91-20-3	Naphthalene	ND	2,400	ND	450	
87-68-3	Hexachlorobutadiene	ND	2,400	ND	220	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 1 of 3

Client: Environmental Partners, Inc.

Client Sample ID: WISS-1

Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150

CAS Sample ID: P1301150-004

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Analyst: Elsa Moctezuma

Sample Type: 6.0 L Summa Canister

Test Notes:
Container ID: SC00391

Date Collected: 3/19/13

Date Received: 3/21/13

Date Analyzed: 3/29/13

Volume(s) Analyzed: 0.0020 Liter(s)

Initial Pressure (psig): -2.02 Final Pressure (psig): 3.55

Canister Dilution Factor: 1.44

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifie
115-07-1	Propene	9,400	360	5,500	210	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	360	ND	73	
74-87-3	Chloromethane	ND	140	ND	70	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	360	ND	52	
75-01-4	Vinyl Chloride	ND	72	ND	28	
106-99-0	1,3-Butadiene	ND	140	ND	65	
74-83-9	Bromomethane	ND	72	ND	19	
75-00-3	Chloroethane	ND	72	ND	27	
64-17-5	Ethanol	ND	3,600	ND	1,900	
75-05-8	Acetonitrile	ND	360	ND	210	
107-02-8	Acrolein	ND	1,400	ND	630	
67-64-1	Acetone	ND	3,600	ND	1,500	
75-69-4	Trichlorofluoromethane	ND	72	ND	13	
67-63-0	2-Propanol (Isopropyl Alcohol)	30,000	3,600	12,000	1,500	
107-13-1	Acrylonitrile	ND	360	ND	170	
75-35-4	1,1-Dichloroethene	ND	72	ND	18	
75-09-2	Methylene Chloride	ND	360	ND	100	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	72	ND	23	
76-13-1	Trichlorotrifluoroethane	ND	72	ND	9.4	
75-15-0	Carbon Disulfide	ND	3,600	ND	1,200	
156-60-5	trans-1,2-Dichloroethene	ND	72	ND	18	
75-34-3	1,1-Dichloroethane	ND	72	ND	18	
1634-04-4	Methyl tert-Butyl Ether	ND	72	ND	20	
108-05-4	Vinyl Acetate	ND	3,600	ND	1,000	
78-93-3	2-Butanone (MEK)	ND	3,600	ND	1,200	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 2 of 3

Client: **Environmental Partners, Inc.**
Client Sample ID: **WISS-1**
Client Project ID: **Washington Industries / 64001**

CAS Project ID: P1301150
CAS Sample ID: P1301150-004

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00391

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 3/29/13
Volume(s) Analyzed: 0.0020 Liter(s)

Initial Pressure (psig): -2.02 Final Pressure (psig): 3.55

Canister Dilution Factor: 1.44

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	260	72	66	18	
141-78-6	Ethyl Acetate	ND	720	ND	200	
110-54-3	n-Hexane	ND	360	ND	100	
67-66-3	Chloroform	ND	72	ND	15	
109-99-9	Tetrahydrofuran (THF)	ND	360	ND	120	
107-06-2	1,2-Dichloroethane	ND	72	ND	18	
71-55-6	1,1,1-Trichloroethane	170	72	30	13	
71-43-2	Benzene	ND	72	ND	23	
56-23-5	Carbon Tetrachloride	ND	72	ND	11	
110-82-7	Cyclohexane	ND	720	ND	210	
78-87-5	1,2-Dichloropropane	ND	72	ND	16	
75-27-4	Bromodichloromethane	ND	72	ND	11	
79-01-6	Trichloroethene	72,000	72	13,000	13	
123-91-1	1,4-Dioxane	ND	360	ND	100	
80-62-6	Methyl Methacrylate	ND	720	ND	180	
142-82-5	n-Heptane	ND	360	ND	88	
10061-01-5	cis-1,3-Dichloropropene	ND	360	ND	79	
108-10-1	4-Methyl-2-pentanone	ND	360	ND	88	
10061-02-6	trans-1,3-Dichloropropene	ND	360	ND	79	
79-00-5	1,1,2-Trichloroethane	ND	72	ND	13	
108-88-3	Toluene	ND	360	ND	96	
591-78-6	2-Hexanone	ND	360	ND	88	
124-48-1	Dibromochloromethane	ND	72	ND	8.5	
106-93-4	1,2-Dibromoethane	ND	72	ND	9.4	
123-86-4	n-Butyl Acetate	ND	360	ND	76	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

*MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 3 of 3

Client: Environmental Partners, Inc.
Client Sample ID: WISS-1
Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150
CAS Sample ID: P1301150-004

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00391

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 3/29/13
Volume(s) Analyzed: 0.0020 Liter(s)

Initial Pressure (psig): -2.02 **Final Pressure (psig):** 3.55

Canister Dilution Factor: 1.44

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifie
111-65-9	n-Octane	ND	360	ND	77	
127-18-4	Tetrachloroethene	670	72	99	11	
108-90-7	Chlorobenzene	ND	72	ND	16	
100-41-4	Ethylbenzene	ND	360	ND	83	
179601-23-1	m,p-Xylenes	ND	360	ND	83	
75-25-2	Bromoform	ND	360	ND	35	
100-42-5	Styrene	ND	360	ND	85	
95-47-6	o-Xylene	ND	360	ND	83	
111-84-2	n-Nonane	ND	360	ND	69	
79-34-5	1,1,2,2-Tetrachloroethane	ND	72	ND	10	
98-82-8	Cumene	ND	360	ND	73	
80-56-8	alpha-Pinene	ND	360	ND	65	
103-65-1	n-Propylbenzene	ND	360	ND	73	
622-96-8	4-Ethyltoluene	ND	360	ND	73	
108-67-8	1,3,5-Trimethylbenzene	ND	360	ND	73	
95-63-6	1,2,4-Trimethylbenzene	ND	360	ND	73	
100-44-7	Benzyl Chloride	ND	360	ND	70	
541-73-1	1,3-Dichlorobenzene	ND	72	ND	12	
106-46-7	1,4-Dichlorobenzene	ND	72	ND	12	
95-50-1	1,2-Dichlorobenzene	ND	72	ND	12	
5989-27-5	d-Limonene	ND	360	ND	65	
96-12-8	1,2-Dibromo-3-chloropropane	ND	360	ND	37	
120-82-1	1,2,4-Trichlorobenzene	ND	360	ND	49	
91-20-3	Naphthalene	ND	360	ND	69	
87-68-3	Hexachlorobutadiene	ND	360	ND	34	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 1 of 3

Client: **Environmental Partners, Inc.**
Client Sample ID: **WISS-2**
Client Project ID: **Washington Industries / 64001**

CAS Project ID: P1301150
CAS Sample ID: P1301150-005

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01718

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 4/1/13
Volume(s) Analyzed: 0.000080 Liter(s)

Initial Pressure (psig): -2.36 Final Pressure (psig): 3.61

Canister Dilution Factor: 1.48

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	9,300	ND	5,400	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	9,300	ND	1,900	
74-87-3	Chloromethane	ND	3,700	ND	1,800	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	9,300	ND	1,300	
75-01-4	Vinyl Chloride	ND	1,900	ND	720	
106-99-0	1,3-Butadiene	ND	3,700	ND	1,700	
74-83-9	Bromomethane	ND	1,900	ND	480	
75-00-3	Chloroethane	ND	1,900	ND	700	
64-17-5	Ethanol	ND	93,000	ND	49,000	
75-05-8	Acetonitrile	ND	9,300	ND	5,500	
107-02-8	Acrolein	ND	37,000	ND	16,000	
67-64-1	Acetone	ND	93,000	ND	39,000	
75-69-4	Trichlorofluoromethane	ND	1,900	ND	330	
67-63-0	2-Propanol (Isopropyl Alcohol)	99,000	93,000	40,000	38,000	
107-13-1	Acrylonitrile	ND	9,300	ND	4,300	
75-35-4	1,1-Dichloroethene	1,900	1,900	470	470	
75-09-2	Methylene Chloride	ND	9,300	ND	2,700	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	1,900	ND	590	
76-13-1	Trichlorotrifluoroethane	ND	1,900	ND	240	
75-15-0	Carbon Disulfide	ND	93,000	ND	30,000	
156-60-5	trans-1,2-Dichloroethene	ND	1,900	ND	470	
75-34-3	1,1-Dichloroethane	ND	1,900	ND	460	
1634-04-4	Methyl tert-Butyl Ether	ND	1,900	ND	510	
108-05-4	Vinyl Acetate	ND	93,000	ND	26,000	
78-93-3	2-Butanone (MEK)	ND	93,000	ND	31,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 2 of 3

Client: Environmental Partners, Inc.
Client Sample ID: WISS-2
Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150
CAS Sample ID: P1301150-005

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01718

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 4/1/13
Volume(s) Analyzed: 0.000080 Liter(s)

Initial Pressure (psig): -2.36 **Final Pressure (psig):** 3.61

Canister Dilution Factor: 1.48

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualification
156-59-2	cis-1,2-Dichloroethene	130,000	1,900	33,000	470	
141-78-6	Ethyl Acetate	ND	19,000	ND	5,100	
110-54-3	n-Hexane	ND	9,300	ND	2,600	
67-66-3	Chloroform	ND	1,900	ND	380	
109-99-9	Tetrahydrofuran (THF)	ND	9,300	ND	3,100	
107-06-2	1,2-Dichloroethane	ND	1,900	ND	460	
71-55-6	1,1,1-Trichloroethane	ND	1,900	ND	340	
71-43-2	Benzene	ND	1,900	ND	580	
56-23-5	Carbon Tetrachloride	ND	1,900	ND	290	
110-82-7	Cyclohexane	ND	19,000	ND	5,400	
78-87-5	1,2-Dichloropropane	ND	1,900	ND	400	
75-27-4	Bromodichloromethane	ND	1,900	ND	280	
79-01-6	Trichloroethene	1,200,000	1,900	220,000	340	
123-91-1	1,4-Dioxane	ND	9,300	ND	2,600	
80-62-6	Methyl Methacrylate	ND	19,000	ND	4,500	
142-82-5	n-Heptane	ND	9,300	ND	2,300	
10061-01-5	cis-1,3-Dichloropropene	ND	9,300	ND	2,000	
108-10-1	4-Methyl-2-pentanone	ND	9,300	ND	2,300	
10061-02-6	trans-1,3-Dichloropropene	ND	9,300	ND	2,000	
79-00-5	1,1,2-Trichloroethane	ND	1,900	ND	340	
108-88-3	Toluene	ND	9,300	ND	2,500	
591-78-6	2-Hexanone	ND	9,300	ND	2,300	
124-48-1	Dibromochloromethane	ND	1,900	ND	220	
106-93-4	1,2-Dibromoethane	ND	1,900	ND	240	
123-86-4	n-Butyl Acetate	ND	9,300	ND	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 3 of 3

Client: Environmental Partners, Inc.
Client Sample ID: WISS-2
Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150
CAS Sample ID: P1301150-005

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01718

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 4/1/13
Volume(s) Analyzed: 0.000080 Liter(s)

Initial Pressure (psig): -2.36 **Final Pressure (psig):** 3.61

Canister Dilution Factor: 1.48

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	9,300	ND	2,000	
127-18-4	Tetrachloroethene	6,200	1,900	910	270	
108-90-7	Chlorobenzene	ND	1,900	ND	400	
100-41-4	Ethylbenzene	ND	9,300	ND	2,100	
179601-23-1	m,p-Xylenes	ND	9,300	ND	2,100	
75-25-2	Bromoform	ND	9,300	ND	890	
100-42-5	Styrene	ND	9,300	ND	2,200	
95-47-6	o-Xylene	ND	9,300	ND	2,100	
111-84-2	n-Nonane	ND	9,300	ND	1,800	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1,900	ND	270	
98-82-8	Cumene	ND	9,300	ND	1,900	
80-56-8	alpha-Pinene	ND	9,300	ND	1,700	
103-65-1	n-Propylbenzene	ND	9,300	ND	1,900	
622-96-8	4-Ethyltoluene	ND	9,300	ND	1,900	
108-67-8	1,3,5-Trimethylbenzene	ND	9,300	ND	1,900	
95-63-6	1,2,4-Trimethylbenzene	ND	9,300	ND	1,900	
100-44-7	Benzyl Chloride	ND	9,300	ND	1,800	
541-73-1	1,3-Dichlorobenzene	ND	1,900	ND	310	
106-46-7	1,4-Dichlorobenzene	ND	1,900	ND	310	
95-50-1	1,2-Dichlorobenzene	ND	1,900	ND	310	
5989-27-5	d-Limonene	ND	9,300	ND	1,700	
96-12-8	1,2-Dibromo-3-chloropropane	ND	9,300	ND	960	
120-82-1	1,2,4-Trichlorobenzene	ND	9,300	ND	1,200	
91-20-3	Naphthalene	ND	9,300	ND	1,800	
87-68-3	Hexachlorobutadiene	ND	9,300	ND	870	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 1 of 3

Client: Environmental Partners, Inc.
Client Sample ID: WISS-3
Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150
CAS Sample ID: P1301150-006

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00944

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 4/1/13
Volume(s) Analyzed: 0.00020 Liter(s)

Initial Pressure (psig): -1.29 **Final Pressure (psig):** 3.52

Canister Dilution Factor: 1.36

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualification
115-07-1	Propene	210,000	3,400	120,000	2,000	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	3,400	ND	690	
74-87-3	Chloromethane	ND	1,400	ND	660	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	3,400	ND	490	
75-01-4	Vinyl Chloride	ND	680	ND	270	
106-99-0	1,3-Butadiene	ND	1,400	ND	620	
74-83-9	Bromomethane	ND	680	ND	180	
75-00-3	Chloroethane	ND	680	ND	260	
64-17-5	Ethanol	ND	34,000	ND	18,000	
75-05-8	Acetonitrile	ND	3,400	ND	2,000	
107-02-8	Acrolein	ND	14,000	ND	5,900	
67-64-1	Acetone	ND	34,000	ND	14,000	
75-69-4	Trichlorofluoromethane	ND	680	ND	120	
67-63-0	2-Propanol (Isopropyl Alcohol)	740,000	34,000	300,000	14,000	
107-13-1	Acrylonitrile	ND	3,400	ND	1,600	
75-35-4	1,1-Dichloroethene	ND	680	ND	170	
75-09-2	Methylene Chloride	ND	3,400	ND	980	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	680	ND	220	
76-13-1	Trichlorotrifluoroethane	ND	680	ND	89	
75-15-0	Carbon Disulfide	ND	34,000	ND	11,000	
156-60-5	trans-1,2-Dichloroethene	ND	680	ND	170	
75-34-3	1,1-Dichloroethane	ND	680	ND	170	
1634-04-4	Methyl tert-Butyl Ether	ND	680	ND	190	
108-05-4	Vinyl Acetate	ND	34,000	ND	9,700	
78-93-3	2-Butanone (MEK)	ND	34,000	ND	12,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 2 of 3

Client: **Environmental Partners, Inc.**
Client Sample ID: **WISS-3**
Client Project ID: **Washington Industries / 64001**

CAS Project ID: P1301150
CAS Sample ID: P1301150-006

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00944

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 4/1/13
Volume(s) Analyzed: 0.00020 Liter(s)

Initial Pressure (psig): -1.29 Final Pressure (psig): 3.52

Canister Dilution Factor: 1.36

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	1,200	680	310	170	
141-78-6	Ethyl Acetate	ND	6,800	ND	1,900	
110-54-3	n-Hexane	ND	3,400	ND	970	
67-66-3	Chloroform	ND	680	ND	140	
109-99-9	Tetrahydrofuran (THF)	ND	3,400	ND	1,200	
107-06-2	1,2-Dichloroethane	ND	680	ND	170	
71-55-6	1,1,1-Trichloroethane	ND	680	ND	120	
71-43-2	Benzene	ND	680	ND	210	
56-23-5	Carbon Tetrachloride	ND	680	ND	110	
110-82-7	Cyclohexane	ND	6,800	ND	2,000	
78-87-5	1,2-Dichloropropane	ND	680	ND	150	
75-27-4	Bromodichloromethane	ND	680	ND	100	
79-01-6	Trichloroethene	10,000	680	1,900	130	
123-91-1	1,4-Dioxane	ND	3,400	ND	940	
80-62-6	Methyl Methacrylate	ND	6,800	ND	1,700	
142-82-5	n-Heptane	ND	3,400	ND	830	
10061-01-5	cis-1,3-Dichloropropene	ND	3,400	ND	750	
108-10-1	4-Methyl-2-pentanone	ND	3,400	ND	830	
10061-02-6	trans-1,3-Dichloropropene	ND	3,400	ND	750	
79-00-5	1,1,2-Trichloroethane	ND	680	ND	120	
108-88-3	Toluene	ND	3,400	ND	900	
591-78-6	2-Hexanone	ND	3,400	ND	830	
124-48-1	Dibromochloromethane	ND	680	ND	80	
106-93-4	1,2-Dibromoethane	ND	680	ND	89	
123-86-4	n-Butyl Acetate	ND	3,400	ND	720	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 3 of 3

Client: Environmental Partners, Inc.
Client Sample ID: WISS-3
Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150
CAS Sample ID: P1301150-006

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00944

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 4/1/13
Volume(s) Analyzed: 0.00020 Liter(s)

Initial Pressure (psig): -1.29 **Final Pressure (psig):** 3.52

Canister Dilution Factor: 1.36

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifie
111-65-9	n-Octane	ND	3,400	ND	730	
127-18-4	Tetrachloroethene	ND	680	ND	100	
108-90-7	Chlorobenzene	ND	680	ND	150	
100-41-4	Ethylbenzene	ND	3,400	ND	780	
179601-23-1	m,p-Xylenes	ND	3,400	ND	780	
75-25-2	Bromoform	ND	3,400	ND	330	
100-42-5	Styrene	ND	3,400	ND	800	
95-47-6	o-Xylene	ND	3,400	ND	780	
111-84-2	n-Nonane	ND	3,400	ND	650	
79-34-5	1,1,2,2-Tetrachloroethane	ND	680	ND	99	
98-82-8	Cumene	ND	3,400	ND	690	
80-56-8	alpha-Pinene	ND	3,400	ND	610	
103-65-1	n-Propylbenzene	ND	3,400	ND	690	
622-96-8	4-Ethyltoluene	ND	3,400	ND	690	
108-67-8	1,3,5-Trimethylbenzene	ND	3,400	ND	690	
95-63-6	1,2,4-Trimethylbenzene	ND	3,400	ND	690	
100-44-7	Benzyl Chloride	ND	3,400	ND	660	
541-73-1	1,3-Dichlorobenzene	ND	680	ND	110	
106-46-7	1,4-Dichlorobenzene	ND	680	ND	110	
95-50-1	1,2-Dichlorobenzene	ND	680	ND	110	
5989-27-5	d-Limonene	ND	3,400	ND	610	
96-12-8	1,2-Dibromo-3-chloropropane	ND	3,400	ND	350	
120-82-1	1,2,4-Trichlorobenzene	ND	3,400	ND	460	
91-20-3	Naphthalene	ND	3,400	ND	650	
87-68-3	Hexachlorobutadiene	ND	3,400	ND	320	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 1 of 3

Client: **Environmental Partners, Inc.**
Client Sample ID: **WISS-4**
Client Project ID: **Washington Industries / 64001**

CAS Project ID: P1301150
CAS Sample ID: P1301150-007

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00764

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 4/1/13
Volume(s) Analyzed: 0.0020 Liter(s)

Initial Pressure (psig): -2.06 Final Pressure (psig): 3.65

Canister Dilution Factor: 1.45

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	2,600	360	1,500	210	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	360	ND	73	
74-87-3	Chloromethane	ND	150	ND	70	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	360	ND	52	
75-01-4	Vinyl Chloride	ND	73	ND	28	
106-99-0	1,3-Butadiene	ND	150	ND	66	
74-83-9	Bromomethane	ND	73	ND	19	
75-00-3	Chloroethane	ND	73	ND	27	
64-17-5	Ethanol	ND	3,600	ND	1,900	
75-05-8	Acetonitrile	ND	360	ND	220	
107-02-8	Acrolein	ND	1,500	ND	630	
67-64-1	Acetone	ND	3,600	ND	1,500	
75-69-4	Trichlorofluoromethane	ND	73	ND	13	
67-63-0	2-Propanol (Isopropyl Alcohol)	9,200	3,600	3,800	1,500	
107-13-1	Acrylonitrile	ND	360	ND	170	
75-35-4	1,1-Dichloroethene	ND	73	ND	18	
75-09-2	Methylene Chloride	ND	360	ND	100	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	73	ND	23	
76-13-1	Trichlorotrifluoroethane	ND	73	ND	9.5	
75-15-0	Carbon Disulfide	ND	3,600	ND	1,200	
156-60-5	trans-1,2-Dichloroethene	460	73	120	18	
75-34-3	1,1-Dichloroethane	ND	73	ND	18	
1634-04-4	Methyl tert-Butyl Ether	ND	73	ND	20	
108-05-4	Vinyl Acetate	ND	3,600	ND	1,000	
78-93-3	2-Butanone (MEK)	ND	3,600	ND	1,200	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 2 of 3

Client: Environmental Partners, Inc.

Client Sample ID: WISS-4

Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150

CAS Sample ID: P1301150-007

Test Code: EPA TO-15

Date Collected: 3/19/13

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Date Received: 3/21/13

Analyst: Elsa Moctezuma

Date Analyzed: 4/1/13

Sample Type: 6.0 L Summa Canister

Volume(s) Analyzed: 0.0020 Liter(s)

Test Notes:
Container ID: SC00764

Initial Pressure (psig): -2.06 Final Pressure (psig): 3.65

Canister Dilution Factor: 1.45

CAS #	Compound	Result μg/m ³	MRL μg/m ³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	6,000	73	1,500	18	
141-78-6	Ethyl Acetate	ND	730	ND	200	
110-54-3	n-Hexane	ND	360	ND	100	
67-66-3	Chloroform	ND	73	ND	15	
109-99-9	Tetrahydrofuran (THF)	ND	360	ND	120	
107-06-2	1,2-Dichloroethane	ND	73	ND	18	
71-55-6	1,1,1-Trichloroethane	ND	73	ND	13	
71-43-2	Benzene	ND	73	ND	23	
56-23-5	Carbon Tetrachloride	ND	73	ND	12	
110-82-7	Cyclohexane	ND	730	ND	210	
78-87-5	1,2-Dichloropropane	ND	73	ND	16	
75-27-4	Bromodichloromethane	ND	73	ND	11	
79-01-6	Trichloroethene	59,000	73	11,000	13	
123-91-1	1,4-Dioxane	ND	360	ND	100	
80-62-6	Methyl Methacrylate	ND	730	ND	180	
142-82-5	n-Heptane	ND	360	ND	88	
10061-01-5	cis-1,3-Dichloropropene	ND	360	ND	80	
108-10-1	4-Methyl-2-pentanone	ND	360	ND	88	
10061-02-6	trans-1,3-Dichloropropene	ND	360	ND	80	
79-00-5	1,1,2-Trichloroethane	320	73	58	13	
108-88-3	Toluene	ND	360	ND	96	
591-78-6	2-Hexanone	ND	360	ND	89	
124-48-1	Dibromochloromethane	ND	73	ND	8.5	
106-93-4	1,2-Dibromoethane	ND	73	ND	9.4	
123-86-4	n-Butyl Acetate	ND	360	ND	76	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 3 of 3

Client: **Environmental Partners, Inc.**
Client Sample ID: **WISS-4**
Client Project ID: **Washington Industries / 64001**

CAS Project ID: P1301150
CAS Sample ID: P1301150-007

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00764

Date Collected: 3/19/13
Date Received: 3/21/13
Date Analyzed: 4/1/13
Volume(s) Analyzed: 0.0020 Liter(s)

Initial Pressure (psig): -2.06 Final Pressure (psig): 3.65

Canister Dilution Factor: 1.45

CAS #	Compound	Result μg/m ³	MRL μg/m ³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	360	ND	78	
127-18-4	Tetrachloroethene	2,800	73	410	11	
108-90-7	Chlorobenzene	ND	73	ND	16	
100-41-4	Ethylbenzene	ND	360	ND	83	
179601-23-1	m,p-Xylenes	ND	360	ND	83	
75-25-2	Bromoform	ND	360	ND	35	
100-42-5	Styrene	ND	360	ND	85	
95-47-6	o-Xylene	ND	360	ND	83	
111-84-2	n-Nonane	ND	360	ND	69	
79-34-5	1,1,2,2-Tetrachloroethane	ND	73	ND	11	
98-82-8	Cumene	ND	360	ND	74	
80-56-8	alpha-Pinene	ND	360	ND	65	
103-65-1	n-Propylbenzene	ND	360	ND	74	
622-96-8	4-Ethyltoluene	ND	360	ND	74	
108-67-8	1,3,5-Trimethylbenzene	ND	360	ND	74	
95-63-6	1,2,4-Trimethylbenzene	ND	360	ND	74	
100-44-7	Benzyl Chloride	ND	360	ND	70	
541-73-1	1,3-Dichlorobenzene	ND	73	ND	12	
106-46-7	1,4-Dichlorobenzene	ND	73	ND	12	
95-50-1	1,2-Dichlorobenzene	ND	73	ND	12	
5989-27-5	d-Limonene	ND	360	ND	65	
96-12-8	1,2-Dibromo-3-chloropropane	ND	360	ND	38	
120-82-1	1,2,4-Trichlorobenzene	ND	360	ND	49	
91-20-3	Naphthalene	ND	360	ND	69	
87-68-3	Hexachlorobutadiene	ND	360	ND	34	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 1 of 3

Client: Environmental Partners, Inc.

Client Sample ID: Method Blank

Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150

CAS Sample ID: P130329-MB

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Analyst: Elsa Moctezuma

Sample Type: 6.0 L Summa Canister

Test Notes:
Date Collected: NA

Date Received: NA

Date Analyzed: 3/29/13

Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifie
115-07-1	Propene	ND	0.50	ND	0.29	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.50	ND	0.10	
74-87-3	Chloromethane	ND	0.20	ND	0.097	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.50	ND	0.072	
75-01-4	Vinyl Chloride	ND	0.10	ND	0.039	
106-99-0	1,3-Butadiene	ND	0.20	ND	0.090	
74-83-9	Bromomethane	ND	0.10	ND	0.026	
75-00-3	Chloroethane	ND	0.10	ND	0.038	
64-17-5	Ethanol	ND	5.0	ND	2.7	
75-05-8	Acetonitrile	ND	0.50	ND	0.30	
107-02-8	Acrolein	ND	2.0	ND	0.87	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	0.10	ND	0.018	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	5.0	ND	2.0	
107-13-1	Acrylonitrile	ND	0.50	ND	0.23	
75-35-4	1,1-Dichloroethene	ND	0.10	ND	0.025	
75-09-2	Methylene Chloride	ND	0.50	ND	0.14	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.10	ND	0.032	
76-13-1	Trichlorotrifluoroethane	ND	0.10	ND	0.013	
75-15-0	Carbon Disulfide	ND	5.0	ND	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	0.10	ND	0.025	
75-34-3	1,1-Dichloroethane	ND	0.10	ND	0.025	
1634-04-4	Methyl tert-Butyl Ether	ND	0.10	ND	0.028	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	ND	5.0	ND	1.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 2 of 3

Client: Environmental Partners, Inc.

Client Sample ID: Method Blank

Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150

CAS Sample ID: P130329-MB

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Analyst: Elsa Moctezuma

Sample Type: 6.0 L Summa Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 3/29/13

Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.10	ND	0.025	
141-78-6	Ethyl Acetate	ND	1.0	ND	0.28	
110-54-3	n-Hexane	ND	0.50	ND	0.14	
67-66-3	Chloroform	ND	0.10	ND	0.020	
109-99-9	Tetrahydrofuran (THF)	ND	0.50	ND	0.17	
107-06-2	1,2-Dichloroethane	ND	0.10	ND	0.025	
71-55-6	1,1,1-Trichloroethane	ND	0.10	ND	0.018	
71-43-2	Benzene	ND	0.10	ND	0.031	
56-23-5	Carbon Tetrachloride	ND	0.10	ND	0.016	
110-82-7	Cyclohexane	ND	1.0	ND	0.29	
78-87-5	1,2-Dichloropropane	ND	0.10	ND	0.022	
75-27-4	Bromodichloromethane	ND	0.10	ND	0.015	
79-01-6	Trichloroethene	ND	0.10	ND	0.019	
123-91-1	1,4-Dioxane	ND	0.50	ND	0.14	
80-62-6	Methyl Methacrylate	ND	1.0	ND	0.24	
142-82-5	n-Heptane	ND	0.50	ND	0.12	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ND	0.11	
108-10-1	4-Methyl-2-pentanone	ND	0.50	ND	0.12	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ND	0.11	
79-00-5	1,1,2-Trichloroethane	ND	0.10	ND	0.018	
108-88-3	Toluene	ND	0.50	ND	0.13	
591-78-6	2-Hexanone	ND	0.50	ND	0.12	
124-48-1	Dibromochloromethane	ND	0.10	ND	0.012	
106-93-4	1,2-Dibromoethane	ND	0.10	ND	0.013	
123-86-4	n-Butyl Acetate	ND	0.50	ND	0.11	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 3 of 3

Client: Environmental Partners, Inc.
Client Sample ID: Method Blank
Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150
CAS Sample ID: P130329-MB

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 3/29/13
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifie
111-65-9	n-Octane	ND	0.50	ND	0.11	
127-18-4	Tetrachloroethene	ND	0.10	ND	0.015	
108-90-7	Chlorobenzene	ND	0.10	ND	0.022	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	0.50	ND	0.12	
75-25-2	Bromoform	ND	0.50	ND	0.048	
100-42-5	Styrene	ND	0.50	ND	0.12	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
111-84-2	n-Nonane	ND	0.50	ND	0.095	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.10	ND	0.015	
98-82-8	Cumene	ND	0.50	ND	0.10	
80-56-8	alpha-Pinene	ND	0.50	ND	0.090	
103-65-1	n-Propylbenzene	ND	0.50	ND	0.10	
622-96-8	4-Ethyltoluene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	
100-44-7	Benzyl Chloride	ND	0.50	ND	0.097	
541-73-1	1,3-Dichlorobenzene	ND	0.10	ND	0.017	
106-46-7	1,4-Dichlorobenzene	ND	0.10	ND	0.017	
95-50-1	1,2-Dichlorobenzene	ND	0.10	ND	0.017	
5989-27-5	d-Limonene	ND	0.50	ND	0.090	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.50	ND	0.052	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	ND	0.067	
91-20-3	Naphthalene	ND	0.50	ND	0.095	
87-68-3	Hexachlorobutadiene	ND	0.50	ND	0.047	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 1 of 3

Client: Environmental Partners, Inc.

Client Sample ID: Method Blank

Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150

CAS Sample ID: P130401-MB

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Analyst: Elsa Moctezuma

Sample Type: 6.0 L Summa Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 4/1/13

Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	0.50	ND	0.29	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.50	ND	0.10	
74-87-3	Chloromethane	ND	0.20	ND	0.097	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.50	ND	0.072	
75-01-4	Vinyl Chloride	ND	0.10	ND	0.039	
106-99-0	1,3-Butadiene	ND	0.20	ND	0.090	
74-83-9	Bromomethane	ND	0.10	ND	0.026	
75-00-3	Chloroethane	ND	0.10	ND	0.038	
64-17-5	Ethanol	ND	5.0	ND	2.7	
75-05-8	Acetonitrile	ND	0.50	ND	0.30	
107-02-8	Acrolein	ND	2.0	ND	0.87	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	0.10	ND	0.018	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	5.0	ND	2.0	
107-13-1	Acrylonitrile	ND	0.50	ND	0.23	
75-35-4	1,1-Dichloroethene	ND	0.10	ND	0.025	
75-09-2	Methylene Chloride	ND	0.50	ND	0.14	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.10	ND	0.032	
76-13-1	Trichlorotrifluoroethane	ND	0.10	ND	0.013	
75-15-0	Carbon Disulfide	ND	5.0	ND	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	0.10	ND	0.025	
75-34-3	1,1-Dichloroethane	ND	0.10	ND	0.025	
1634-04-4	Methyl tert-Butyl Ether	ND	0.10	ND	0.028	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	ND	5.0	ND	1.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 2 of 3

Client: Environmental Partners, Inc.

Client Sample ID: Method Blank

Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150

CAS Sample ID: P130401-MB

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Analyst: Elsa Moctezuma

Sample Type: 6.0 L Summa Canister

Test Notes:
Date Collected: NA

Date Received: NA

Date Analyzed: 4/1/13

Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifie
156-59-2	cis-1,2-Dichloroethene	ND	0.10	ND	0.025	
141-78-6	Ethyl Acetate	ND	1.0	ND	0.28	
110-54-3	n-Hexane	ND	0.50	ND	0.14	
67-66-3	Chloroform	ND	0.10	ND	0.020	
109-99-9	Tetrahydrofuran (THF)	ND	0.50	ND	0.17	
107-06-2	1,2-Dichloroethane	ND	0.10	ND	0.025	
71-55-6	1,1,1-Trichloroethane	ND	0.10	ND	0.018	
71-43-2	Benzene	ND	0.10	ND	0.031	
56-23-5	Carbon Tetrachloride	ND	0.10	ND	0.016	
110-82-7	Cyclohexane	ND	1.0	ND	0.29	
78-87-5	1,2-Dichloropropane	ND	0.10	ND	0.022	
75-27-4	Bromodichloromethane	ND	0.10	ND	0.015	
79-01-6	Trichloroethene	ND	0.10	ND	0.019	
123-91-1	1,4-Dioxane	ND	0.50	ND	0.14	
80-62-6	Methyl Methacrylate	ND	1.0	ND	0.24	
142-82-5	n-Heptane	ND	0.50	ND	0.12	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ND	0.11	
108-10-1	4-Methyl-2-pentanone	ND	0.50	ND	0.12	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ND	0.11	
79-00-5	1,1,2-Trichloroethane	ND	0.10	ND	0.018	
108-88-3	Toluene	ND	0.50	ND	0.13	
591-78-6	2-Hexanone	ND	0.50	ND	0.12	
124-48-1	Dibromochloromethane	ND	0.10	ND	0.012	
106-93-4	1,2-Dibromoethane	ND	0.10	ND	0.013	
123-86-4	n-Butyl Acetate	ND	0.50	ND	0.11	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Page 3 of 3

Client: **Environmental Partners, Inc.**
Client Sample ID: **Method Blank**
Client Project ID: **Washington Industries / 64001**

CAS Project ID: P1301150
CAS Sample ID: P130401-MB

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 4/1/13
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.50	ND	0.11	
127-18-4	Tetrachloroethene	ND	0.10	ND	0.015	
108-90-7	Chlorobenzene	ND	0.10	ND	0.022	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	0.50	ND	0.12	
75-25-2	Bromoform	ND	0.50	ND	0.048	
100-42-5	Styrene	ND	0.50	ND	0.12	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
111-84-2	n-Nonane	ND	0.50	ND	0.095	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.10	ND	0.015	
98-82-8	Cumene	ND	0.50	ND	0.10	
80-56-8	alpha-Pinene	ND	0.50	ND	0.090	
103-65-1	n-Propylbenzene	ND	0.50	ND	0.10	
622-96-8	4-Ethyltoluene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	
100-44-7	Benzyl Chloride	ND	0.50	ND	0.097	
541-73-1	1,3-Dichlorobenzene	ND	0.10	ND	0.017	
106-46-7	1,4-Dichlorobenzene	ND	0.10	ND	0.017	
95-50-1	1,2-Dichlorobenzene	ND	0.10	ND	0.017	
5989-27-5	d-Limonene	ND	0.50	ND	0.090	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.50	ND	0.052	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	ND	0.067	
91-20-3	Naphthalene	ND	0.50	ND	0.095	
87-68-3	Hexachlorobutadiene	ND	0.50	ND	0.047	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

ARL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

SURROGATE SPIKE RECOVERY RESULTS

Page 1 of 1

Client: Environmental Partners, Inc.
Client Project ID: Washington Industries / 64001

CAS Project ID: P1301150

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Elsa Moctezuma
Sample Type: 6.0 L Summa Canister(s)
Test Notes:

Date(s) Collected: 3/19/13
Date(s) Received: 3/21/13
Date(s) Analyzed: 3/29 - 4/1/13

Client Sample ID	CAS Sample ID	1,2-Dichloroethane-d4	Toluene-d8	Bromofluorobenzene	Acceptance Limits	Data Qualifier
		Percent Recovered	Percent Recovered	Percent Recovered		
Method Blank	P130329-MB	109	97	94	70-130	
Method Blank	P130401-MB	113	96	95	70-130	
VS-2	P1301150-001	112	97	95	70-130	
VS-1	P1301150-002	112	97	95	70-130	
VS-3	P1301150-003	111	97	95	70-130	
WISS-1	P1301150-004	114	98	94	70-130	
WISS-2	P1301150-005	114	97	93	70-130	
WISS-3	P1301150-006	115	96	93	70-130	
WISS-4	P1301150-007	114	96	95	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.

Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

Attachment B
Pressure Graphs

Chart 1

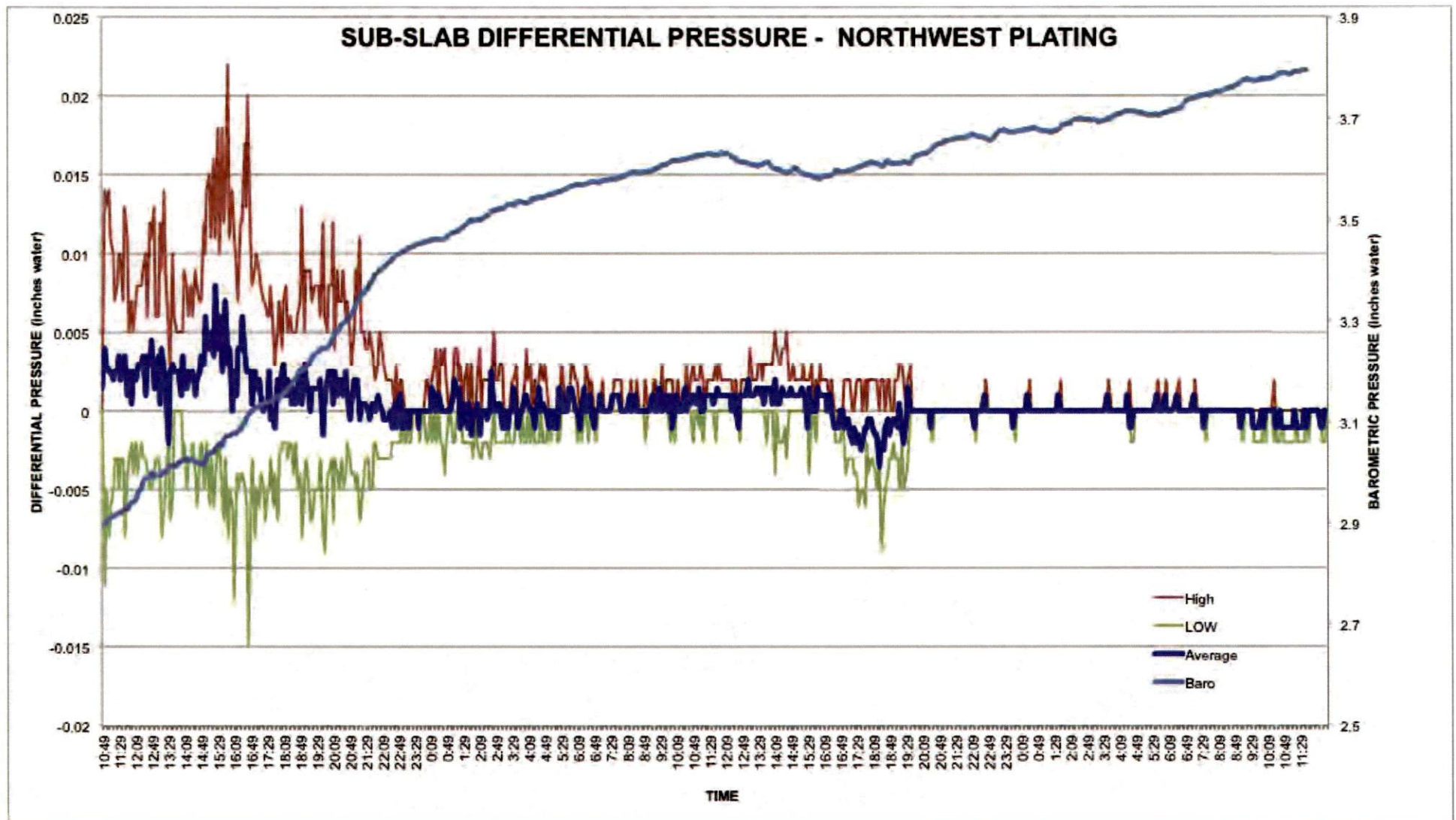


Chart 2

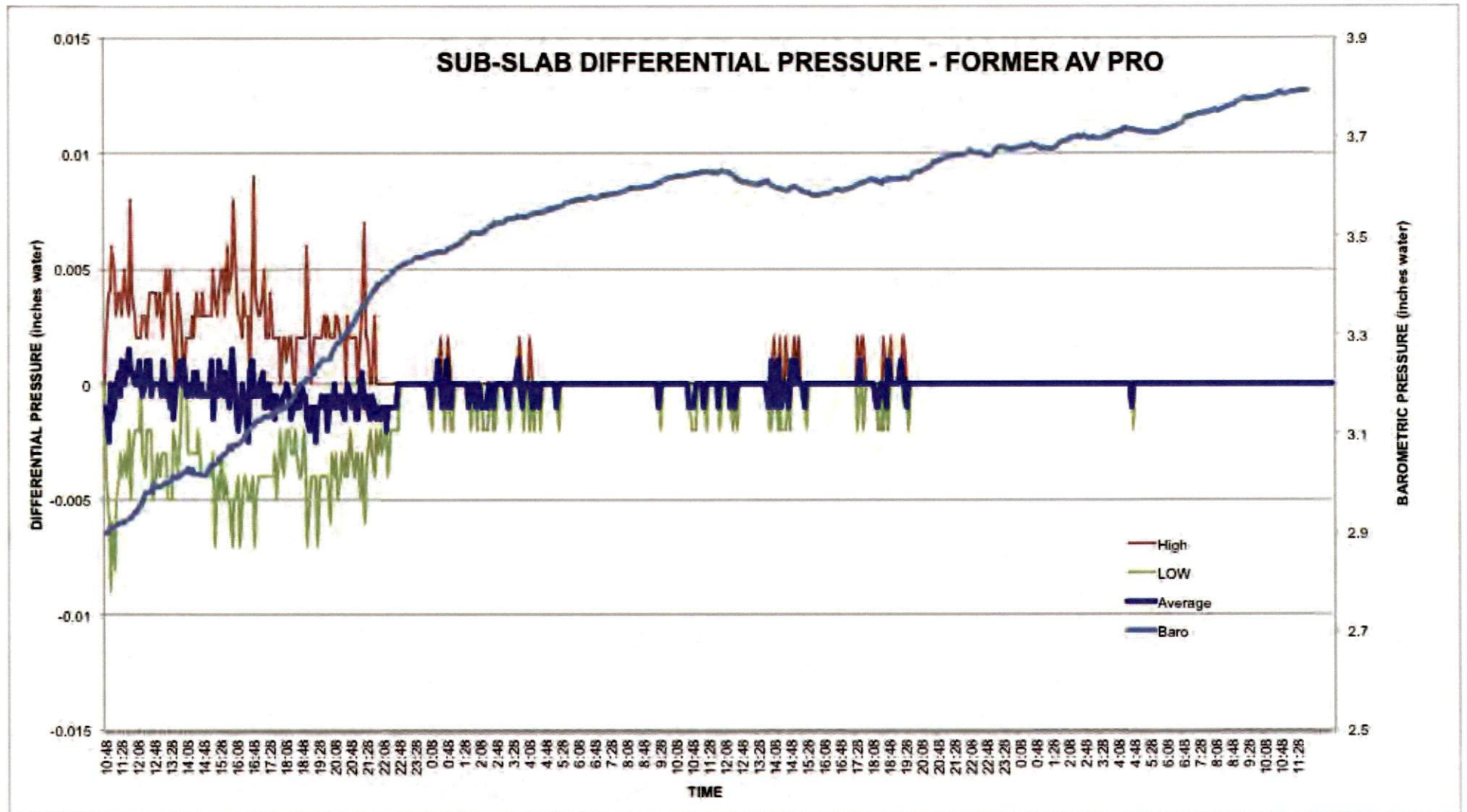


Chart 3

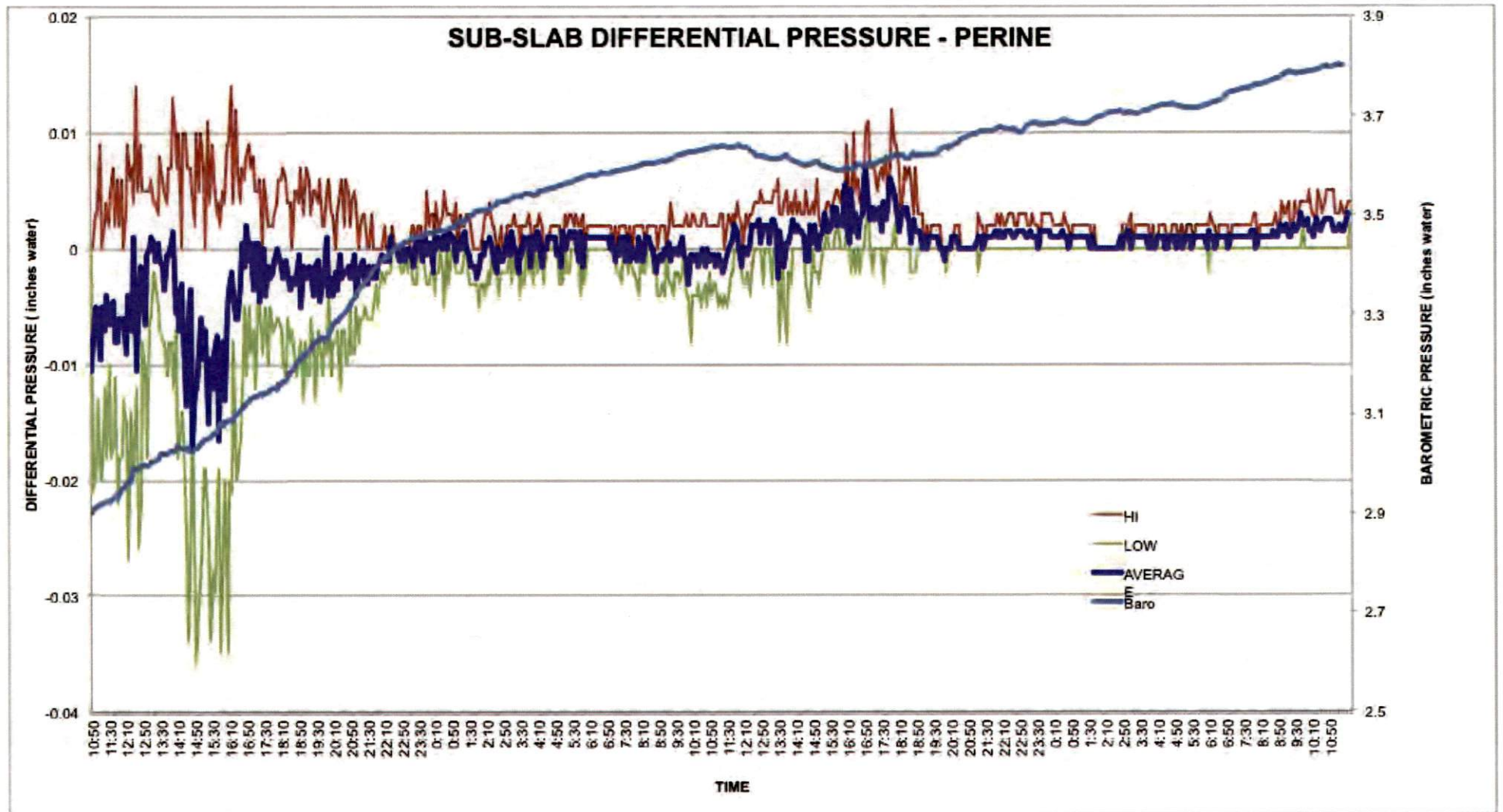
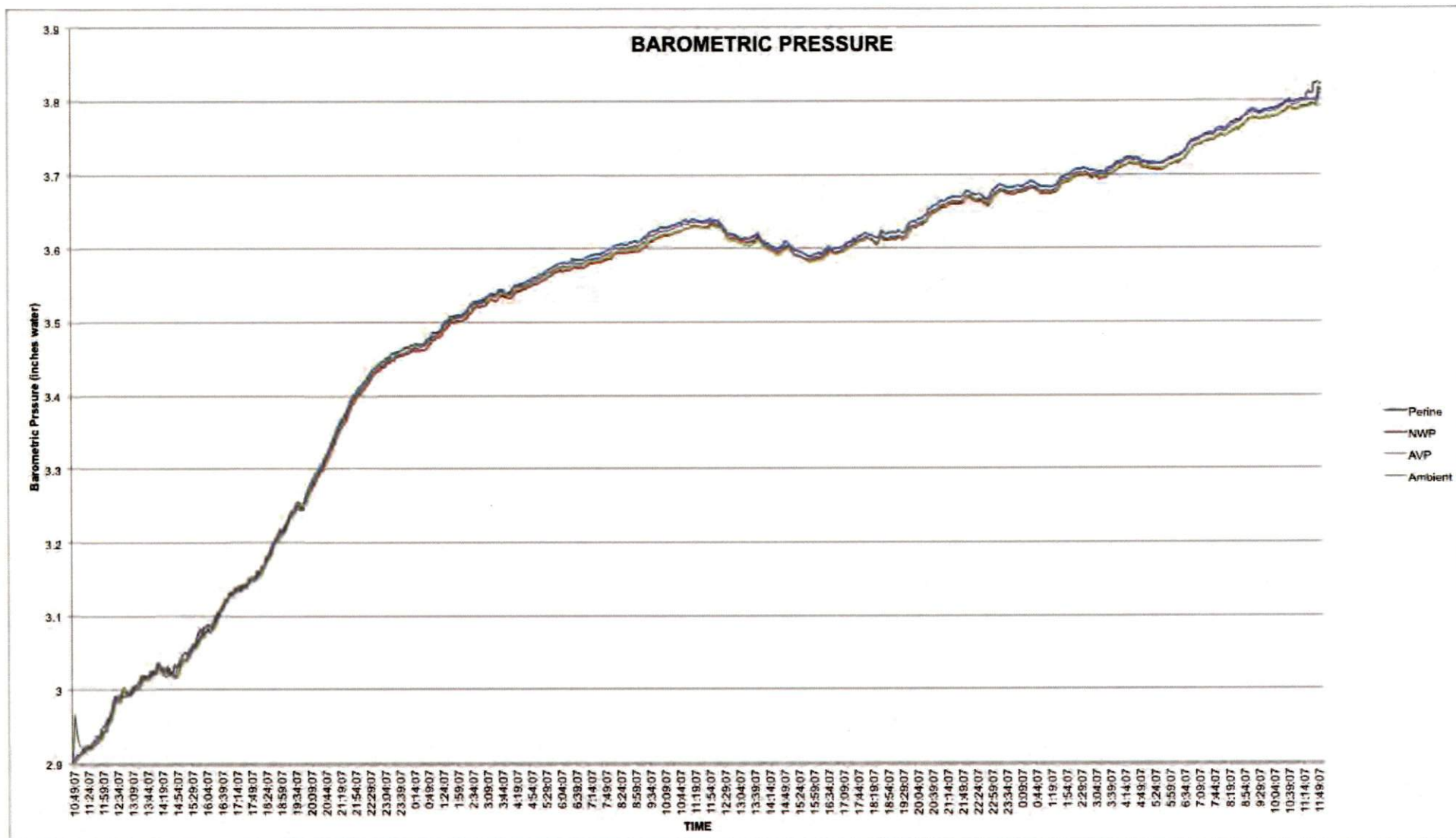


Chart 4



Attachment C
CLARC Guidance: TCE and PCE, September 2012

Trichloroethylene Toxicity Information and MTCA Cleanup Levels (TCE), CAS # 79-01-6

Background Information

The United States Environmental Protection Agency (EPA) recently published updated toxicity information for trichloroethylene (TCE). The new information was published in EPA's Integrated Risk Information System (IRIS) on-line database on September 28, 2011.

The Washington State Department of Ecology (Ecology) Cleanup Levels and Risk Calculation (CLARC) on-line database contains toxicity information and presents pre-calculated Method B and C formula values used to establish cleanup standards.

Ecology is updating CLARC's pre-calculated formula values to reflect the new EPA IRIS toxicity values for TCE by (1) updating Method B and C values for soil, groundwater, surface water, air, and the leaching pathway and (2) updating the narrative guidance for TCE to reflect the recent changes in IRIS.

TCE is a known human carcinogen. The new IRIS toxicity values include oral cancer potency factors (CPFo's) and inhalation unit risks for three kinds of cancer: kidney tumors, non-Hodgkin lymphoma, and liver cancer. One of these, cancer of the kidney, operates through a mutagenic mode of action and poses an increased risk to children. The calculations presented in this guidance acknowledge early life susceptibility for kidney cancer only and apply age-dependant adjustment factors (ADAFs) when calculating the associated Method B formula cleanup values for this cancer potency factor.

Making this adjustment under MTCA is complicated by the MTCA equations being a simplified version of the EPA risk equations. To overcome this difference, the formula-based cleanup level values for the three types of cancer are calculated separately and then the harmonic mean of these three values is determined to derive the final formula-based cleanup level. This approach is consistent with EPA regulatory guidance and information in IRIS.

No adjustment for early life exposure is made under Method C since these cleanup levels are based on an adult exposure scenario. Instead, the cancer potency factors for the three types of cancer are summed and the summed value used in the calculations.

TCE is also known to cause a wide range of non-cancer adverse health effects. EPA has published for the first time in IRIS an oral reference dose (RfDo) and inhalation reference dose (RfDi) for TCE. This information has also been used to calculate formula-based cleanup level values for non cancer risk using the MTCA equations.

Under MTCA, the more stringent of the cancer and non-cancer driven cleanup value becomes the cleanup level. For TCE, this is typically (but not always) the value based on protection from cancer.

Note that according to the Model Toxics Control Act (MTCA) cleanup regulation, in addition to these formula-based values, a variety of narrative standards must also be met, so the formula-based values may or may not be the final cleanup level. For example, actual cleanup standards established for a site must also comply with applicable state and federal laws, which have not changed.

Please note that the MTCA Method A cleanup levels for TCE have not changed. If a site qualifies for the use of Method A and Method A is being used to determine TCE cleanup levels, the Method A values in Tables 720-1, 740-1 and 745-1 can still be used.

Cancer Risk

Updated toxicity information provided by EPA for TCE includes three CPFo's and inhalation unit risks for TCE based on three cancer end points (Tables 1 and 2). All three CPFo's are used to calculate a single MTCA cancer risk-based cleanup level. The three TCE cancer end points are:

- TCE Cancer Potency Factor based on kidney cancer. EPA has determined that TCE is carcinogenic by a mutagenic mode of action for the induction of kidney tumors. Based on EPA guidance, individuals exposed to carcinogens with a mutagenic mode of action are assumed to have increased early-life susceptibility and require application of ADAFs. To calculate MTCA cancer risk-based cleanup levels for soils, groundwater, and air, ADAFs have been applied to the CPFo or inhalation unit risk based on cancer effects to the kidney. ADAFs have **not** been applied to MTCA cancer risk-based cleanup levels for surface water because the MTCA surface water cancer cleanup equation is based on adult fish consumption. In addition, fish consumption rates are highly variable across different regions, populations, and age groups and Ecology believes insufficient information is currently available to make an adjustment based on the amount of fish consumed at by different age groups. This may change as additional fish consumption information become available.
- TCE Cancer Potency Factor based on non-Hodgkin lymphoma (NHL). EPA has determined that there is insufficient information to characterize the mode of action for TCE induced NHL and, therefore, no ADAFs are applied for this cancer endpoint.
- TCE Cancer Potency Factor based on liver cancer. EPA has determined that there is insufficient information to characterize the mode of action for TCE induced liver cancer and, therefore, no ADAFs are applied for this cancer endpoint.

Non Cancer Health Effects

In addition to cancer, exposure to TCE causes a wide range of non-cancer adverse health effects. For example, IRIS notes:

“Adverse noncancer effects associated with oral TCE exposure include decreased body weight, liver and kidney effects, and neurological, immunological, reproductive, and developmental effects.”

IRIS further notes the following regarding the development of reference doses (RfDs):

“The most sensitive observed adverse effects, which were used as the primary basis for the RfD, were those affecting the immune system and the developing fetus, and were all based on oral studies.”

More on Early-Life Exposure Age Dependent Adjustments

Cancer is one of many adverse health effects that may occur in children resulting from exposures to environmental contaminants. In March 2005, the EPA addressed the potential for increased susceptibility to cancer caused by exposures to environmental chemicals during an early lifestage in “Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens.”¹ This regulatory guidance is a companion document to the revised “Guidelines for Carcinogen Risk Assessment” originally published by the EPA in 1986 and revised in 2005.² Using different methodologies to evaluate cancer potency, the EPA and the California Environmental Protection Agency (Cal-EPA) have independently concluded that risks of cancer from exposures to carcinogens occurring from conception through puberty (i.e., <16 years old) can be different than those cancer risks from exposures occurring in adulthood.

EPA and Cal-EPA have assessed and developed age groupings to help evaluate childhood exposures to environmental contaminants. Both agencies apply age related factors to adjust the cancer potencies to consider early life susceptibility for infants and children. Although the age groupings between the agencies vary slightly, the adjustment factors are the same. For EPA, the age adjustment factors are termed: Age Dependent Adjustment Factors (ADAFs)³; for Cal-EPA the age adjustment factors are termed Age Sensitivity Factors (ASFs).⁴ These adjustment factors have been used to calculate cleanup levels under this guidance.

TCE Toxicity Values for Establishing Cleanup Levels Under MTCA

Tables 1 and 2 below provide the new toxicity values for TCE published in IRIS. These toxicity values are used to establish risk-based cleanup levels under MTCA.

MTCA Cleanup Levels for TCE

Tables 4 through 8 below provide MTCA Method B and C cleanup levels protective of various exposure pathways for TCE.

¹ Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens. U.S. Environmental Protection Agency, Risk Assessment Forum, March 2005. EPA/630/R-03/003F. (Available at http://www.epa.gov/ttn/atw/childrens_supplement_final.pdf)

² Guidelines for Carcinogen Risk Assessment. U.S. Environmental Protection Agency, Risk Assessment Forum, 2005. EPA/630/P-03/001F.

³ Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens. U.S. Environmental Protection Agency, Risk Assessment Forum, March 2005. EPA/630/R-03/003F.

⁴ Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II, Technical Support Document for Cancer Potency Factors, June 2008, Public Review Draft, California Environmental Protection Agency, Office of Environmental Health Hazard Assessment.

Table 1: New Trichloroethylene (TCE) Oral Cancer Potency (Slope) Factors ⁵ (Used for calculating, soil, groundwater and surface water cleanup levels)		
Toxicity Value Based on Kidney Cancer With A Mutagenic Mode of Action & Potential for Early Life Exposure (ELE)	Toxicity Value Based on Non-Hodgkin Lymphoma (NHL)	Toxicity Value Based on Liver Cancer
9.33E-03 (mg/kg-day) ⁻¹	2.16E-02 (mg/kg-day) ⁻¹	1.55E-02 (mg/kg-day) ⁻¹
ELE Adjustment Factor For groundwater = 3.26 liter-yr/kg-day (a) For soil = 400 mg-year/kg-day (b)	No adjustment needed	No adjustment needed

IRIS also provides the sum of the three individual cancer types, resulting in **total oral cancer Cancer Potency Factor of 4.64E-02 per mg/kg-day**. This cancer potency factor is used for calculation of Method B surface water cleanup levels and all Method C cleanup levels.

(a) The early life exposure (ELE) adjustment factor for drinking water was determined using the following equation:

$$\text{ELE Adj. Factor} = \frac{(\text{ADAF} \cdot \text{ED} \cdot \text{DWIR})_{(<2 \text{ yrs})}}{\text{BW}} + \frac{(\text{ADAF} \cdot \text{ED} \cdot \text{DWIR})_{(2 \text{ to } <6 \text{ yrs})}}{\text{BW}} + \frac{(\text{ADAF} \cdot \text{ED} \cdot \text{DWIR})_{(6 \text{ to } <16 \text{ yrs})}}{\text{BW}} + \frac{(\text{ADAF} \cdot \text{ED} \cdot \text{DWIR})_{(16 \text{ to } 30 \text{ yrs})}}{\text{BW}}$$

(b) The early life exposure (ELE) adjustment factor for soil ingestion was determined using the following equation⁶

$$\text{ELE Adj. Factor} = \frac{(\text{ADAF} \cdot \text{ED} \cdot \text{SIR})_{(<2 \text{ yrs})}}{\text{BW}} + \frac{(\text{ADAF} \cdot \text{ED} \cdot \text{SIR})_{(2 \text{ to } <6 \text{ yrs})}}{\text{BW}}$$

Where the assumptions used for the various age ranges in these equations were as follows:

Early-Life Exposure Age Adjustment Assumptions					
Parameter		<2 yrs	2 to <6 yrs	6 to <16 yrs	16 to 30 yrs
ADAFs	Age Dependent Adjustment Factor (unitless)	10	3	3	1
ED	Exposure Duration (years)	2	4	10	14
DWIR	Drinking Water Ingestion Rate (liters/day)	1	1	2	2
SIR	Soil Ingestion Rate (mg/day)	200	200	50	50
BW	Body Weight (kg)	16	16	70	70

Source of information: U.S. EPA’s Integrated Risk Information System (IRIS)
<http://www.epa.gov/iris/subst/0199.htm>

⁵ MTCA uses the term "Cancer Potency Factor", abbreviated here as CPF; EPA uses the term (cancer) "Slope Factor" in the Integrated Risk Information System (IRIS). The units are (mg/kg-day)⁻¹ or risk per mg/kg-day.

⁶ Adjusted for only 6 years since MTCA uses a 6 year exposure scenario for soil ingestion of carcinogens.

Table 2: New Trichloroethylene (TCE) Inhalation Unit Risk Factors (URF) and Inhalation Cancer Potency (Slope) Factors (CPF_i)⁷ (Used for calculating air cleanup levels)

Toxicity Value Based on Kidney Cancer With A Mutagenic Mode of Action & Potential for Early Life Exposure (ELE)	Toxicity Value Based on Non-Hodgkin Lymphoma (NHL)	Toxicity Value Based on Liver Cancer
URF = $10^{-6} (\mu\text{g}/\text{m}^3)^{-1}$	URF = $2\text{E-}06 (\mu\text{g}/\text{m}^3)^{-1}$	URF = $10^{-6} (\mu\text{g}/\text{m}^3)^{-1}$
Converted to CPF_i (a) = 3.5E-03 (mg/kg-day)⁻¹	Converted to CPF_i (a) = 7.0E-03 (mg/kg-day)⁻¹	Converted to CPF_i (a) = 3.5E-03 (mg/kg-day)⁻¹
ELE Adjustment Factor (b) 32.6 ug-year/kg-day	No adjustment needed	No adjustment needed

IRIS also provides the sum of the three individual cancer types, resulting in **total inhalation unit risk factor of 4.1E-06 (ug/m³)⁻¹ or CPF_i of 1.44E-02 (mg/kg-day)⁻¹**. This cancer potency factor is used for calculation of Method C air cleanup levels.

(a) The following equation was used to convert the EPA cancer unit risk factor (URF) to an inhalation cancer potency (slope) factor: $\text{CPF}_i (\text{kg-day}/\text{mg}) = (\text{URF} [\text{m}^3/\mu\text{g}] \times 70 \text{ kg}) \div (20 \text{ m}^3/\text{day} \times 10^{-3} \text{ mg}/\mu\text{g})$

(b) The early life exposure (ELE) adjustment factor was determined using the following equation:

$$\text{ELE Adj. Factor} = \frac{(\text{ADAF} \cdot \text{ED} \cdot \text{BR})_{(<2 \text{ yrs})}}{\text{BW}} + \frac{(\text{ADAF} \cdot \text{ED} \cdot \text{BR})_{(2 \text{ to } <6 \text{ yrs})}}{\text{BW}} + \frac{(\text{ADAF} \cdot \text{ED} \cdot \text{BR})_{(6 \text{ to } <16 \text{ yrs})}}{\text{BW}} + \frac{(\text{ADAF} \cdot \text{ED} \cdot \text{BR})_{(16 \text{ to } 30 \text{ yrs})}}{\text{BW}}$$

Where the assumptions used for the various age ranges were as follows:

Early-Life Exposure Age Adjustment Assumptions					
Parameter		<2 yrs	2 to <6 yrs	6 to <16 yrs	16 to 30 yrs
ADAFs	Age Dependent Adjustment Factor (unitless)	10	3	3	1
ED	Exposure Duration (years)	2	4	10	14
BR	Breathing Rate (cubic meters/day)	10	10	20	20
BW	Body Weight (kg)	16	16	70	70

Source of information: U.S. EPA's Integrated Risk Information System (IRIS)
<http://www.epa.gov/iris/subst/0199.htm>

Table 3: New Trichloroethylene (TCE) Toxicity Values - Non-Cancer Toxicity Values

Oral Reference Dose (RfDo)	Inhalation Reference Dose (RfDi)
5.0E-04 mg/kg-day	5.7E-04 mg/kg-day (or 2.0E-03 mg/m³)

The following equation was used to convert the EPA inhalation reference concentration (RfC) to an inhalation reference dose (RfDi):

$$\text{RfDi} = (\text{RfC} [\text{mg}/\text{m}^3] \div 70 \text{ kg}) \times 20 \text{ m}^3/\text{day}$$

Source of information: U.S. EPA's Integrated Risk Information System (IRIS)
<http://www.epa.gov/iris/subst/0199.htm>

⁷ EPA uses the term "Unit Risk Factor" in risk calculations for the air exposure pathway. The MTCA rule uses the term "Cancer Potency Factor". Until the MTCA rule is updated to incorporate this new EPA approach, the URF needs to be converted to a cancer potency factor so the current MTCA equations can be used to calculate cleanup levels.

Table 4: MTCA Standard Method B and C Groundwater Cleanup Levels for Trichloroethylene (TCE) for Drinking Water (potable groundwater)
[see WAC 173-340-720(4) & (5)] **(a)**

Toxicity Values from Table 2	MTCA Method B (µg /L)		MTCA Method C (µg /L)	
	Eqn 720-1 Non-Cancer (@ HQ=1)	Eqn 720-2 Cancer (@Risk = 10 ⁻⁶)	Eqn 720-1 (mod) Non-Cancer (@ HQ=1) (c)	Eqn 720-2 Cancer (@Risk = 10 ⁻⁵)
Using old CPF ₀ of 0.089 per mg/kg-day	-----	0.5	-----	5.0
Using 3 new CPF ₀ 's	-----	5.4E-01 (b)	-----	9.4E+00 (d)
Using old RfD ₀ of 0.0003 mg/kg-day	2.4	-----	5.3	-----
Using new RfD ₀ of 0.0005 mg/kg-day	4.0E+00	-----	8.8E+00	-----
Applicable State and Federal Law: State & Federal MCL = 5.0 µg/L; Federal drinking water standards located at: http://water.epa.gov/action/advisories/drinking/drinking_index.cfm				
New TCE Potable Groundwater Cleanup Levels (e)				
	MTCA Method B		MTCA Method C	
	4 µg/L		5 µg/L	
(a) All cleanup levels calculated using an inhalation correction factor (INH) = 2.				
(b) Method B (cancer) groundwater CUL = 1/[1/CUL for Kidney) + (1/CUL for Lymphoma) + (1/CUL for Liver)] Where: Kidney CUL = (RISK x AT x UCF) / (CPF ₀ x ELE Adjustment Factor x INH x DWF) ⁸ [CUL = 1.23 µg/L] Lymphoma CUL calculated using Equation 720-2 and CPF ₀ of 0.0216 (mg/kg-day) ⁻¹ [CUL = 1.64 µg/L] Liver CUL calculated using Equation 720-2 and CPF ₀ of 0.0155 (mg/kg-day) ⁻¹ [CUL = 2.28 µg/L]				
(c) Method C (non-cancer) groundwater CUL calculated using equation 720-1 modified for an adult exposure scenario by changing the body weight to 70 kg and the drinking water intake rate to 2 liters/day per WAC 173-340-720(5).				
(d) Method C (cancer) groundwater CUL calculated using Equation 720-2, a cancer risk of 10 ⁻⁵ and a CPF ₀ = 4.64E-02 mg/kg-day (sum of 3 CPF ₀ 's with no ELE adjustment).				
(e) Normally, under MTCA, Ecology would use the MCL of 5 µg/L for TCE as the Method B cleanup level. However, in this case, the new toxicity information indicates the MCL exceeds a hazard quotient of 1. Therefore, under WAC 173-340-720 (7)(b), the MCL must be adjusted downward to 4 ug/L, so that the Method B cleanup level will not exceed a hazard quotient of 1. Thus, 4 ug/L is used as the Method B groundwater cleanup level. Because the MCL does not exceed either a hazard quotient of 1 or a cancer risk of 1x10-5, the MCL can be used as the Method C cleanup level. NOTE: These are not necessarily final cleanup levels. These values may need to be adjusted for additive risk, PQLs and natural background per WAC 173-340-720(7). (They are already adjusted for ARARs.) Also, if contaminants in the groundwater are likely to discharge to a surface water, surface water CULs may need to be considered when determining a final CUL (see Table 5).				

⁸ See WAC 173-340-720(4) for definitions of terms in this equation. Because the age-adjusted cancer potency factor already takes into account body weight, drinking water ingestion rate and exposure duration, these factors are left out of this equation when calculating this cleanup level.

Table 7: MTCA Soil Cleanup Levels for Trichloroethylene (TCE) Protective of Potable Groundwater through the Soil Leaching Pathway (see WAC 173-340-747(4))				
Target Groundwater Cleanup Level	Based on Protection of Potable Groundwater		Based on Protection of Surface Water	
	Method B Drinking H ₂ O (see Table 4)	Method C Drinking H ₂ O (See Table 4)	Drinking H ₂ O and Fish Consumption (see Table 5)	Fish Consumption Only (see Table 5)
	4.0 µg/L	5.0 µg/L	2.5 µg/L	30 µg/L
New TCE Soil Cleanup Level for Leaching Pathway (a)	0.03 mg/kg	0.03 mg/kg	0.02 mg/kg	0.2 mg/kg
(a) Calculated using Equation 747-1 (3-phase model), default assumptions and the following TCE specific properties: K_{oc} = 94 L/kg; Henry's Law Constant (H_{cc}) = 0.422 (unitless) These values are the same for unrestricted and industrial uses as the surface land use (zoning) does not affect the leachability of a chemical. NOTE: These are not necessarily final cleanup levels. These values may need to be adjusted for additive risk, PQLs and natural background per WAC 173-340-740(5) and 745(6). (There are no known ARARs, so there is no adjustment needed for ARARs.)				

Table 8: MTCA Standard Method B and C Air Cleanup Levels for Trichloroethylene (TCE) [WAC 173-340-750(3)and (4)]				
Toxicity Values from Table 2	MTCA Method B (µg/m³)		MTCA Method C (µg/m³)	
	Eqn 750-1 Non-Cancer (@ HQ = 1)	Eqn 750-2 Cancer (@ Risk = 10 ⁻⁶)	Eqn 750-1 (mod) Non-Cancer (c) (@ HQ = 1)	Eqn 750-2 Cancer (@ Risk = 10 ⁻⁵)
Using old CPF ₀ of 0.089 per mg/kg-day	-----	0.10	-----	1.0
Using new CPF _i 's	-----	3.7E-01 (a)	-----	6.3E+00 (b)
Using old RfD _i of 0.01 mg/kg-day	16	-----	35	-----
Using new RfD _i of 5.7E-04 mg/kg-day	9.0E-01	-----	2.0E+00	-----
New TCE Air Cleanup Levels (d)				
	MTCA Method B		MTCA Method C	
	0.37 µg/m³		2.0 µg/m³	
(a) Method B (cancer) Air CUL = 1/[(1/CUL for Kidney)+(1/CUL for Lymphoma)+(1/CUL for Liver)]				
Where:				
Kidney CUL = (RISK x AT x UCF) / (CPF _i x ELE Adjustment Factor x ABS x EF) ¹⁰ [CUL = 0.658 µg/m³]				
Lymphoma CUL calculated using Equation 750-2 and CPF _i = 7.00E-3 (mg/kg-day) ⁻¹ [CUL = 1.25 µg/m³]				
Liver CUL calculated using Equation 750-2 and CPF _i = 3.5E-3(mg/kg-day) ⁻¹ [CUL = 2.50 µg/m³]				
(b) Method C (cancer) air CUL calculated using equation 750-2, a cancer risk of 10-5, and a CPF _i = 1.435E-02 (mg/kg-day) ⁻¹ . (sum of 3 CPF _i 's with no ELE adjustment)				
(c) Method C (non-cancer) air CUL calculated using equation 750-1 modified for an adult exposure scenario by changing the body weight to 70 kg and the breathing rate to 20 m³/day per WAC 173-340-750(4).				
(d) These are not necessarily final cleanup levels. These values may need to be adjusted for ARARs, additive risk, PQLs and natural background per WAC 173-340-750(5).				

¹⁰ See WAC 173-340-750(3) for definitions of terms in this equation. Because the age-adjusted cancer potency factor already takes into account body weight, breathing rate and exposure duration, these factors are left out of this equation when calculating this cleanup level.

**Tetrachloroethylene Toxicity Information & MTCA Cleanup Levels
(Perc, PCE, Perchloroethylene)
CAS # 127-18-4**

Background Information

On February 10, 2012, the U.S. Environmental Protection Agency (EPA) provided new toxicity values for its Integrated Risk Information System (IRIS) for tetrachloroethylene (CAS # 127-18-4). The new IRIS toxicity information for tetrachloroethylene is summarized in the Table 1 below. No early-life exposure age adjustments are required for tetrachloroethylene because EPA has determined that there is insufficient or equivocal information to characterize the carcinogenic mode of action for tetrachloroethylene as mutagenic.

Table 1: New IRIS Toxicity Information for Tetrachloroethylene

	Oral Cancer Potency Factor (CPFo) (a) (mg/kg-day)⁻¹	Inhalation Cancer Potency Factor (CPF_i) (b) (mg/kg-day)⁻¹	Oral Reference Dose (RfDo) (mg/kg-day)	Inhalation Reference Dose (RfDi) (c) (mg/kg-day)
Old Tox Values	0.54	0.021	0.01	Not available
New Tox Values:	2.1E-03	9.1E-04	6.0E-03	1.14E-02

(a) MTCA uses the term (oral) "Cancer Potency Factor" or CPF_o; EPA uses the term (oral cancer) "Slope Factor" in the Integrated Risk Information System (IRIS). The units are the same for both terms (mg/kg-day)⁻¹.

(b) EPA uses the term "Unit Risk Factor" (URF) in risk calculations for the air exposure pathway. The MTCA rule uses the term (inhalation) "Cancer Potency Factor" (CPF_i). Until the MTCA rule is updated to incorporate this new EPA approach, the URF needs to be converted to a cancer potency factor so the current MTCA equations can be used to calculate cleanup levels.

Inhalation URF for tetrachloroethylene = 2.6E-07 per µg/ m³

To convert this URF to an inhalation CPF use the following equation:

$$\text{CPF}_i (\text{kg-day/mg}) = (\text{URF} [\text{m}^3/\mu\text{g}] * 70 \text{ kg}) \div (20 \text{ m}^3/\text{day} * 10^{-3} \text{ mg}/\mu\text{g})$$

$$\text{Perc CPF}_i = 9.1\text{E-}04 \text{ kg-day/mg}$$

(c) Similarly, EPA uses the term "Reference Concentration" (RfC), while MTCA uses the term (inhalation) reference dose (RfDi).

RfC for tetrachloroethylene = 4E-02 mg/m³

To convert a RfC to a RfDi using the following equation:

$$\text{RfDi} = (\text{RfC} [\text{mg}/\text{m}^3] \div 70 \text{ kg}) * 20 \text{ m}^3/\text{day};$$

$$\text{Perc RfDi} = 1.14\text{E-}02 \text{ mg/kg-day}$$

U.S. Environmental Protection Agency, Integrated Risk Information System, link:

<http://www.epa.gov/iris/index.html>

Table 2: MTCA Standard Method B and C Groundwater Cleanup Levels for Tetrachloroethylene (Perc) [WAC 173-340-720(4) & (5)] (a)				
Toxicity Values From Table 1	MTCA Method B (µg/L)		MTCA Method C (µg/L)	
	Eqn 720-1 Non-Cancer (@ HQ = 1)	Eqn 720-2 Cancer (@ Risk = 10 ⁻⁶)	Eqn 720-1 (mod) Non-Cancer (@ HQ = 1) (b)	Eqn 720-2 Cancer (@ Risk = 10 ⁻⁵)
Using new CPFo of 2E-03 (mg/kg-day) ⁻¹	-----	2.1E+01	-----	2.1E+02
Using new RfDo of 6E-03 mg/kg-day	4.8E+01	-----	1.1E+02	-----
Applicable State and Federal Law: State & Federal MCL = 5.0 µg/L; Federal drinking water standards located at: http://water.epa.gov/action/advisories/drinking/drinking_index.cfm				
New Perc Groundwater Cleanup Levels (c)				
	MTCA Method B		MTCA Method C	
	5 µg/L		5 µg/L	
(a) All cleanup levels calculated using an inhalation correction factor (INH) = 2.				
(b) Method C (non-cancer) groundwater CUL calculated using equation 720-1 modified for an adult exposure scenario by changing the body weight to 70 kg and the drinking water intake rate to 2 liters/day per WAC 173-340-720(5).				
(c) Because the MCL does not exceed a hazard quotient of 1 or a cancer risk of 1 x 10 ⁻⁵ , the MCL can be used as the Method B and Method C ground water cleanup level [WAC 173-340-720 (7) (b)]. Thus, the MTCA groundwater cleanup levels are based on the drinking water standard (MCL) for Perc of 5 µg/L.				
NOTE: These are not necessarily final cleanup levels. These values may need to be adjusted for additive risk, PQLs and natural background per WAC 173-340-720(7). (They are already adjusted for ARARs.)				
Also, if contaminants in the groundwater are likely to discharge to a surface water, surface water CULs may need to be considered when determining a final CUL (see Table 3).				

Table 3: MTCA Standard Method B and C Surface Water Cleanup Levels for Tetrachloroethylene (Perc) [WAC 173-340-730(3) and (4)] (a)				
Toxicity Values from Table 1	MTCA Method B (µg /L)		MTCA Method C (µg /L) (b)	
	Eqn 730-1 Non-Cancer (@ HQ=1)	Eqn 730-2 Cancer (@Risk = 10 ⁻⁶)	Eqn 730-1 (mod) Non-Cancer (@ HQ=1)	Eqn 730-2 (mod) Cancer (@Risk = 10 ⁻⁵)
Using new CPFo of 2E-03 (mg/kg-day) ⁻¹	-----	1.0E+02	-----	2.5E+03
Using new RfDo of 6E-03 mg/kg-day	5.0E+02	-----	1.3E+03	-----
Applicable State & Federal Law: Ambient water quality criteria (AWQC)				
U.S. EPA's AWQC	Drinking Water + organism consumption = 0.69 µg/L			
	Consumption of organism only = 3.3 µg/L			
U.S. EPA's AWQC web location: http://water.epa.gov/scitech/swguidance/standards/current/index.cfm				
New MTCA Surface Water Cleanup levels (c)				
	MTCA Method B		MTCA Method C	
	0.69 µg/L or 3.3 µg/L		0.69 µg/L or 3.3 µg/L	
(a) All cleanup levels calculated using a BCF = 31 liters/kg. (b) Method C cleanup levels calculated using equations 730-1 and 730-2 modified with a FDF = 0.2 and a cancer risk of 1x 10⁻⁵ per WAC 173-340-730(4). (c) MTCA requires CULs to comply with ARARs, which in this case are the federal and state water quality criteria. This includes consideration of both the survivability of the organisms and risk to humans eating fish and shellfish. It also includes consideration of whether or not the surface water has drinking water as a designated beneficial use under state law. The most stringent ARARs for Perc are the Federal Ambient Water Quality Criteria (AWQC), and thus these criteria govern the cleanup levels in this case. If drinking the surface water is identified as a beneficial use under WAC 173-340-201A, then use 0.69 ug/L as the cleanup level. Otherwise, use 3.3 ug/L. NOTE: These are not necessarily final cleanup levels. These values may need to be adjusted for additive risk, PQLs and natural background per WAC 173-340-730(5). (They are already adjusted for ARARs.)				

Table 4: MTCA Standard Method B and C Soil Cleanup Levels for Tetrachloroethylene (Perc) Protective of the Soil Ingestion Pathway
[see WAC 173-340-740 (3)(b)(iii)(B) & 173-340-745(5)(b)(iii)(B)]

Toxicity Values from Table 2	MTCA Method B (mg/kg)		MTCA Method C (mg/kg)	
	Eqn 740-1 Non-Cancer (@ HQ=1)	Eqn 740-2 Cancer (@Risk = 10 ⁻⁶)	Eqn 745-1 Non-Cancer (@ HQ=1)	Eqn 745-2 Cancer (@Risk = 10 ⁻⁵)
Using new CPFo of 2E-03 (mg/kg-day) ⁻¹	-----	4.8E+02	-----	6.3E+04
Using new RfDo of 6E-03 mg/kg-day	4.8E+02	-----	2.1E+04	-----
New Perc Soil Cleanup Levels for the Soil Ingestion Pathway (a)				
	MTCA Method B		MTCA Method C	
	480 mg/kg		21,000 mg/kg	

(a) NOTE: These are not necessarily final cleanup levels. These values may need to be adjusted for additive risk PQLs and natural background per WAC 173-340-740(5) and 745(6). (There are no known ARARs, so there is no adjustment for ARARs.)

Also, this is just the soil ingestion exposure pathway. Other pathways such as leaching (see Table 5) and vapors may need to be considered when determining a final cleanup level.

Table 5: MTCA Soil Cleanup Levels for Tetrachloroethylene (Perc) Protective of Potable Groundwater through the Soil Leaching Pathway
(see WAC 173-340-747(4))

Target Groundwater Cleanup Level	Based on Protection of Potable Groundwater		Based on Protection of Surface Water	
	Method B Drinking H2O (see Table 2)	Method C Drinking H2O (See Table 2)	Drinking H2O and Fish Consumption (see Table 3)	Fish Consumption Only (see Table 3)
	5.0 µg/L	5.0 µg/L	0.69 µg/L	3.3 µg/L
New Perc Soil Cleanup Level for Leaching Pathway (a)	0.05 mg/kg	0.05 mg/kg	0.007 mg/kg	0.04 mg/kg

(a) Calculated using Equation 747-1 (3-phase model), default assumptions and the following Perc specific properties: Koc = 265 L/kg; Henry's Law Constant (Hcc) = 0.754 (unitless)

These values are the same for unrestricted and industrial uses as the surface land use (zoning) does not affect the leachability of a chemical.

NOTE: These are not necessarily final cleanup levels. These values may need to be adjusted for additive risk, PQLs and natural background per WAC 173-340-740(5) and 745(6). (There are no known ARARs, so there is no adjustment needed for ARARs.)

Table 6: MTCA Standard Method B and C Air Cleanup Levels for Tetrachloroethylene (Perc) [WAC 173-340-750(3)and (4)]				
Toxicity Values from Table 1	MTCA Method B (µg/m ³)		MTCA Method C (µg/m ³)	
	Eqn 750-1 Non-Cancer (@ HQ = 1)	Eqn 750-2 Cancer (@ Risk = 10 ⁻⁶)	Eqn 750-1 (mod) Non-Cancer (a) (@ HQ = 1)	Eqn 750-2 Cancer (@ Risk = 10 ⁻⁵)
Using new CPFi of 9.10E-04 (mg/kg-day) ⁻¹	-----	9.6E+00	-----	9.6E+01
Using new RfDi of 1.14E-02 mg/kg-day	1.8E+01	-----	4.0E+01	-----
New Perc Air Cleanup Levels (b)				
	MTCA Method B		MTCA Method C	
	9.6 µg/m ³		40 µg/m ³	
(a) Method C (non-cancer) air CUL calculated using equation 750-1 modified for an adult exposure scenario by changing the body weight to 70 kg and the breathing rate to 20 m ³ /day per WAC 173-340-750(4).				
(b) These are not necessarily final cleanup levels. These values may need to be adjusted for ARARs, additive risk, PQLs and natural background per WAC 173-340-750(5).				