MEMORANDUM

To: Priscilla Tomlinson
Washington State Department of Ecology

Date: December 1, 2021

From: Evelyn Lundeen, EIT

Project No.: 1803.01.05

RE: September and October 2021 Slab Inspection and Vapor Intrusion Priority Monitoring
Precision Engineering, Inc., Seattle, Washington
Agreed Order No. DE 18079; Facility Site ID 2056; Cleanup Site ID 4532

Maul Foster & Alongi, Inc. (MFA) prepared this memorandum to describe results from the fourth quarterly slab inspection and vapor intrusion priority (VIP) air monitoring event conducted at the Precision Engineering, Inc., site. Activities were conducted in accordance with the Washington State Department of Ecology (Ecology)-approved VIP work plan, included as Section 7 of MFA's vapor report (MFA, 2020a).

SLAB INSPECTION

A site visit was conducted on September 20, 2021, to inspect slab conditions. Slab inspection documentation includes an inspection form summarizing observed slab conditions, a figure showing locations of slab conditions noted in the inspection form, and photographs taken during the site reconnaissance (see Attachment A).

MFA observed localized areas of sealant wear, but overall, the slab appeared to be in good condition (see Attachment A). The only change in condition observed since the last slab inspection, conducted on June 21, 2021, was the presence of an unsealed, approximately 6-foot-long crack in Warehouse 1, which had previously been covered by inventory. The crack is narrow and does not appear to pose a vapor intrusion concern based on air monitoring results.

AIR MONITORING

Radiello 130 passive vapor samplers were deployed over a three-week period from September 20, 2021, to October 11, 2021, in three locations: the office (RAD1), the sewing room (RAD4), and Warehouse 1 (RAD5) (see the attached figure).

The samples and a trip blank were analyzed for trichloroethene (TCE) by U.S. Environmental Protection Agency Method TO-17. The laboratory analytical report is provided as Attachment B.

Analytical data and the laboratory's internal quality assurance and quality control data were reviewed to assess whether they met project-specific data quality objectives. A data validation memorandum summarizing data evaluation procedures, data usability, and deviations from specific field and/or laboratory methods is included as Attachment C. The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

TCE was detected in all three samples at concentrations ranging from 0.16 to 0.28 micrograms per cubic meter (ug/m^3), below the Model Toxics Control Act Method B indoor air cleanup level of 0.33 ug/m^3 and Ecology's workplace scenario short-term action limit of 7.5 ug/m^3, provided in Implementation Memorandum No. 22 (Ecology, 2019) (see the attached table). TCE detections at all sampling locations were below the June and July 2021 vapor monitoring results, which ranged from 0.38 to 0.76 ug/m^3.

DISCUSSION AND RECOMMENDATIONS

The slab was observed to be in generally good condition, aside from the minor issues noted in Attachment A. The most significant sealant wear was observed in seams (i.e., expansion joints) that extend only a few centimeters into the concrete slab. Seams do not extend through the entire slab thickness and as such, are not considered to be a vapor intrusion concern. Cracks may extend deeper into the slab. During the interim action, several rounds of concrete mix and sealant were applied to cracks to ensure a complete seal (MFA, 2020a). Sealant wear observed in cracks appears to be surficial and does not appear to penetrate the entire sealed thickness, except for in areas with observed groundwater seepage, as identified in Warehouse 3. Warehouse 3 receives the heaviest forklift traffic, which has contributed to significant sealant wear in those areas. Historical groundwater data from borings in the area suggests that the groundwater seepage does not present an immediate health concern or a vapor intrusion concern (MFA, 2020b). Unsealed cracks were observed in areas previously covered by inventory, but they are narrow or do not appear to extend through the slab and air monitoring results have not identified short-term action limit exceedances. Based on these observations, the slab issues do not appear to present a significant vapor intrusion concern.

The minor slab issues do not appear to be impacting indoor air quality. TCE in indoor air from confirmation vapor sampling conducted immediately after implementation of the interim remedial actions ranged in concentration from 1.4 to 2.6 ug/m^3 (MFA, 2020a). TCE concentrations in samples collected during this and previous VIP monitoring events were lower than those detected during the initial confirmation vapor sampling and below the short-term action limit; therefore, the minor slab issues do not appear to be contributing to worsening conditions. Based on these findings, MFA does not recommend resuming air purification.

MFA will continue to visually monitor the slab conditions and conduct air monitoring, as described in the VIP work plan. The next quarterly event is scheduled for December 2021.

ATTACHMENTS

Limitations
References
Table
Figure
Attachment A—Slab Inspection Documentation
Attachment B—Analytical Lab Report
Attachment C—Data Validation Memorandum

LIMITATIONS

The services undertaken in completing this memorandum were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This memorandum is solely for the use and information of our client unless otherwise noted. Any reliance on this memorandum by a third party is at such party's sole risk.

Opinions and recommendations contained in this memorandum apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this memorandum.

REFERENCES

Ecology. 2019. Implementation memorandum no. 22: vapor intrusion investigations and short-term trichloroethene toxicity. Washington State Department of Ecology, Lacey, Washington. October 1.

MFA. 2020a. Vapor report: vapor intrusion assessment, interim remedial actions, vapor intrusion priority work plan, Precision Engineering, Inc., site. Prepared for Dick Morgan. Maul Foster & Alongi, Inc., Bellingham, Washington. December 30.

MFA. 2020b. Email (re: Precision Engineering—vapor report and VIP work plan) to M. Adams, Washington State Department of Ecology, from H. Good, Maul Foster & Alongi, Inc., Bellingham, Washington. December 9.

TABLE

Table
Vapor Intrusion Priority Monitoring
Analytical Results
Precision Engineering, Inc.
Dick Morgan
Seattle, Washington

Location	Sample Name	Collection Start Date	Collection End Date	Trichloroethene ug/m^3
			MTCA Method B VI CUL[1]	0.33
			Indoor Air Action Level, Workplace Scenario[2]	7.5
RAD1	RAD1-121720	12/17/2020	01/07/2021	0.54
	RAD1-032221	03/22/2021	04/12/2021	0.44
	RAD1-062121	06/21/2021	07/12/2021	0.42
	RAD1-092021	09/20/2021	10/11/2021	0.27
RAD4	RAD4-121720	12/17/2020	01/07/2021	0.87
	RAD4-032221	03/22/2021	04/12/2021	0.95
	RAD4-062121	06/21/2021	07/12/2021	0.76
	RAD4-092021	09/20/2021	10/11/2021	0.28
RAD5	RAD5-121720	12/17/2020	01/07/2021	0.77
	RAD5-032221	03/22/2021	04/12/2021	0.71
	RAD5-062121	06/21/2021	07/12/2021	0.38
	RAD5-092021	09/20/2021	10/11/2021	0.16

NOTES:
Each sample was collected over a three-week period, using a Radiello® R130 passive indoor air sampler.
Shading indicates an exceedance of MTCA Method B VI CUL.
CUL = cleanup level.
MTCA = Model Toxics Control Act.
ug/m^3 = micrograms per cubic meter.
VI = vapor intrusion.
REFERENCE:
[1]Ecology. Cleanup level and risk calculation data tables. Washington State Department of Ecology, Lacey, Washington. February 2021.

[2]Ecology. Implementation memorandum no. 22: vapor intrusion investigations and short-term trichloroethene toxicity. Washington State Department of Ecology, Lacey, Washington. October 1, 2019.

FIGURE

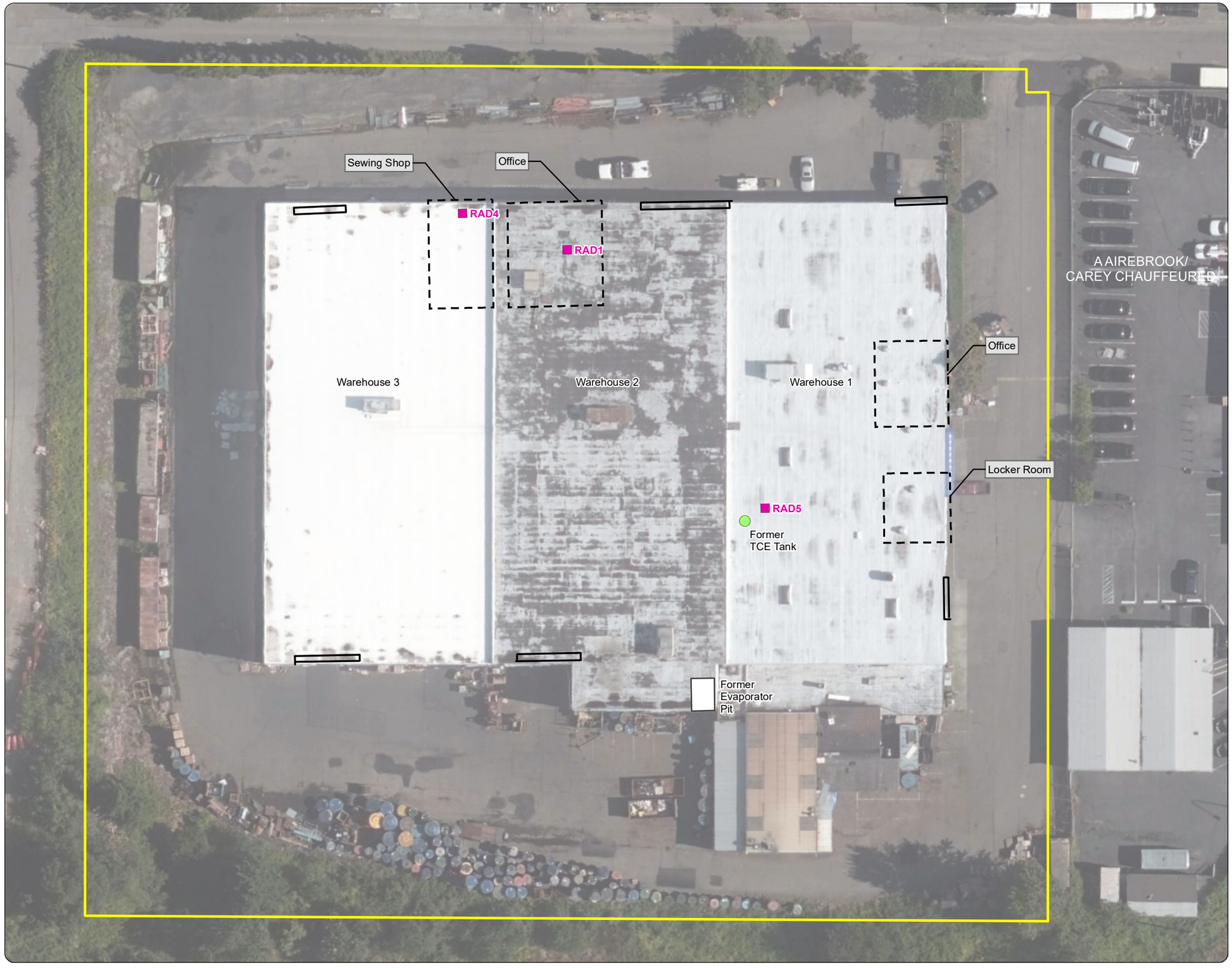

Figure
Vapor Intrusion Priority Monitoring Locations

Precision Engineering, Inc.
Seattle, Washington

Legend

- Passive Sampler

Property Features

- Second Story Areas (approximate)
- Overhead Door (approximate)
- Property Parcel

NOTES:
All sample locations are approximate.
TCE = trichloroethene.

0 20 40
Feet

Source:
Aerial photograph obtained from Mapbox.
Parcel data obtained from King County GIS.

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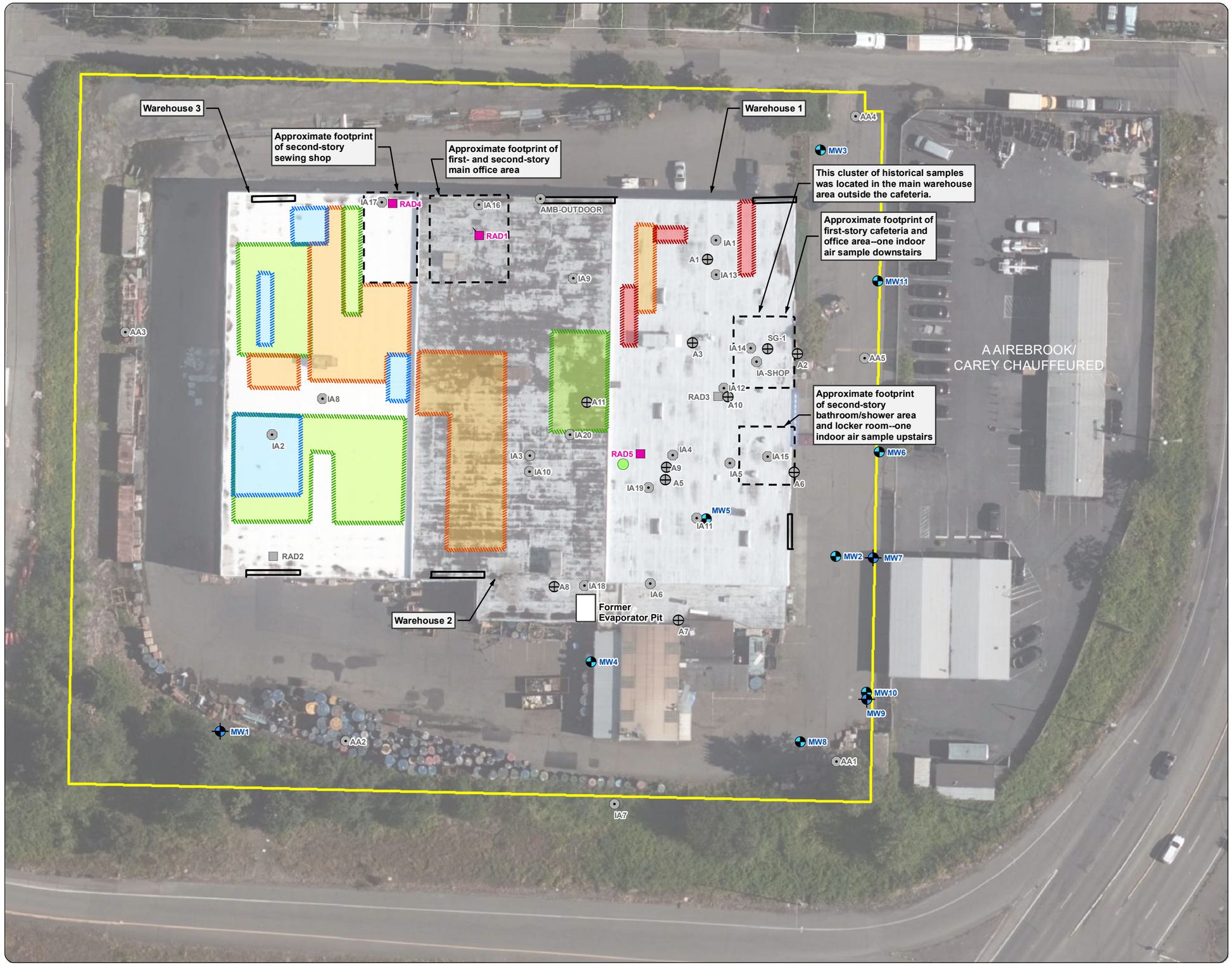
Path: X:\1803.01_04\Projects\Slab_Inspections\Fig_VaporMonitoringLocations.mxd
Print Date: 5/10/2021
Approved By: hgood
Produced By: abixby
Project: 1803.01

ATTACHMENT A

SLAB INSPECTION DOCUMENTATION

Figure
September 2021
Slab Inspection

Precision Engineering, Inc.
Seattle, Washington



Legend

Slab Inspection Areas

- Unsealed Cracks and Seams (a)
- Groundwater Seepage
- Minor Sealant Wear
- Sealant Peeling from Seams (a)

Vapor Sample Locations

- Passive Sampler

Previous Vapor Sample Locations

- Indoor/Ambient Air
- Sub-slab Soil Gas
- Passive Sampler

Property Features

- Former Trichloroethene Tank
- Shallow Monitoring Well
- Deep Monitoring Well
- Overhead Door (Approximate)
- Property Parcel
- King County Parcel

NOTES:
The slab inspection was conducted by Evelyn Lundeen on September 20, 2021.
Well locations for MW1 to MW8 were surveyed by Duncanson, Inc. All other feature locations are approximate.
(a) Seams are approximately 1-centimeter deep, linear depressions in the concrete slab with a visible bottom. Seams are not anticipated to contribute to vapor intrusion.

0 25 50
Feet

Source:
Aerial photograph obtained from Mapbox.
Parcel data obtained from King County GIS.

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Path: X:\1803.011_04\Projects\Slab_Inspections\Fig_Sept2021_SlabInspectionLocations.mxd
Print Date: 11/9/2021
Approved By: elundeen
Produced By: abixby
Project: 1803.01.05

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PHOTOGRAPHS

Project Name: Precision Engineering, Inc.
September 20, 2021 Slab Inspection
Project Number: 1803.01.05
Location: 1231 S Director Street, Seattle, Washington

Photo No. 1.

Description
Typical sealed crack in Warehouse 1. No sealant wear was observed.

Photo No. 2.

Description
Typical sealed crack in Warehouse 1. No sealant wear was observed.

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PHOTOGRAPHS

Project Name: Precision Engineering, Inc.
September 20, 2021 Slab Inspection
Project Number: 1803.01.05
Location: 1231 S Director Street, Seattle, Washington

Photo No. 3.

Description
Crack without sealant in the northwest portion of Warehouse 1. This crack was not observed during previous inspections as it was covered by inventory.

Photo No. 4.

Description
Minor sealant wear in Warehouse 1. The crack does not appear to extend through the slab.

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PHOTOGRAPHS

Project Name: Precision Engineering, Inc.
September 20, 2021 Slab Inspection
Project Number: 1803.01.05
Location: 1231 S Director Street, Seattle, Washington

Photo No. 5.

Description
Typical sealant wear in Warehouse 2.

Photo No. 6.

Description
Example of sealant wear in a crack located in Warehouse 2 in an area of heavy forklift traffic. The crack does not appear to extend into the slab.

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PHOTOGRAPHS

Project Name: Precision Engineering, Inc.
September 20, 2021 Slab Inspection
Project Number: 1803.01.05
Location: 1231 S Director Street, Seattle, Washington

Photo No. 7.

Description
Former evaporator pit, covered by heavy equipment and inventory.

Photo No. 8.

Description
Example of seam without sealant in Warehouse 3. Seams are approximately 1 centimeter deep and do not appear to extend through the slab.

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PHOTOGRAPHS

Project Name: Precision Engineering, Inc.
September 20, 2021 Slab Inspection
Project Number: 1803.01.05
Location: 1231 S Director Street, Seattle, Washington

Photo No. 9.

Description
Example of seam without sealant in Warehouse 3. Seams are approximately 1 centimeter deep and do not appear to extend through the slab.

Photo No. 10.

Description
Typical sealant wear in seams in Warehouse 3. Seams are approximately 1 centimeter deep and do not appear to extend through the slab.

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PHOTOGRAPHS

Project Name: Precision Engineering, Inc.
September 20, 2021 Slab Inspection
Project Number: 1803.01.05
Location: 1231 S Director Street, Seattle, Washington

Photo No. 11.

Description
Typical sealant wear in seams in Warehouse 3. Seams are approximately 1 centimeter deep and do not appear to extend through the slab.

Photo No. 12.

Description
Typical sealant wear in seams in Warehouse 3. Seams are approximately 1 centimeter deep and do not appear to extend through the slab.

Slab Inspection Form
Precision Engineering, Inc.
Dick Morgan
Seattle, Washington

Date:	9/20/2021
Weather:	Overcast, 57° Fahrenheit
Precipitation (prior 24 hours.):	0 inches on 9/19/2021
Completed By:	E. Lundeen, EIT, Maul Foster & Alongi, Inc.

General Observations:

No noticeable changes in conditions from the previous inspection conducted on June 21, 2021 were observed, except for one additional unsealed crack, previously covered with inventory, identified in Warehouse 1.

The evaporator pit cap appears to be in good condition.

Specific Observations:

Slab Sealing:

In Warehouse 1, the sealed cracks are generally in good condition. There is minimal cracking or flaking of sealant. An unsealed crack was identified that had been covered with inventory during the slab sealing work (see the attached figure).

In Warehouse 2, no significant changes from the previous inspection were observed. A few areas continue to show minor sealant wear, but these appear to be surficial. Areas with the heaviest forklift traffic have the most obvious sealant wear, and in some cases sealant is no longer present(see the attached figure).

In Warehouse 3, no significant changes from the previous inspection were observed. As the most significant wear has been observed in this area and this area receives the heaviest forklift traffic, this area should continue to be monitored (see the attached figure).

Evaporator Pit Cap:

The former evaporator pit was backfilled with compacted gravel and capped with concrete on April 13, 2020. The cap is currently in good condition.

The former evaporator pit is currently covered with heavy equipment, but the exposed areas appear to be intact, with no visible damage to the concrete.

No settling or bulging was observed.

ATTACHMENT B

ANALYTICAL LAB REPORT

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10/15/2021
Ms. Heather Good
Maul Foster and Alongi Inc.
1329 North State Street
Suite 301
Bellingham WA 98225

Project Name: Precision Engineering
Project #: 1803.01.05
Workorder #: 2110248R1

Dear Ms. Heather Good

The following report includes the data for the above referenced project for sample(s) received on 10/12/2021 at Eurofins Air Toxics LLC.

The data and associated QC analyzed by Passive S.E. RAD130/SKC are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics LLC. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Monica Tran at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Monica Tran

Project Manager

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WORK ORDER #: 2110248R1

Work Order Summary

CLIENT:	Ms. Heather Good Maul Foster and Alongi Inc. 1329 North State Street Suite 301 Bellingham, WA 98225	**BILL TO:**	Accounts Payable Maul Foster and Alongi Inc. 400 E. Mill Plain Blvd Suite 400 Vancouver, WA 98660
PHONE:	360-594-6262	**P.O. #**	
FAX:	360-594-6270	**PROJECT #**	1803.01.05 Precision Engineering
DATE RECEIVED:	10/12/2021	**CONTACT:**	Monica Tran
DATE COMPLETED:	10/15/2021		
DATE REISSUED:	10/15/2021		

FRACTION #	NAME	TEST
01A	RAD4-092021	Passive S.E. RAD130/SKC
02A	RAD1-092021	Passive S.E. RAD130/SKC
03A	RAD5-092021	Passive S.E. RAD130/SKC
04A	TRIP BLANK	Passive S.E. RAD130/SKC
05A	Lab Blank	Passive S.E. RAD130/SKC
06A	CCV	Passive S.E. RAD130/SKC
07A	LCS	Passive S.E. RAD130/SKC
07AA	LCSD	Passive S.E. RAD130/SKC

CERTIFIED BY: Heidi Hayes DATE: 10/15/21

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209220, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-20-16, UT NELAP – CA009332020-12, VA NELAP - 10615, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-014, Effective date: 10/18/2020, Expiration date: 10/17/2021.
Eurofins Air Toxics, LLC certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 351-8279

LABORATORY NARRATIVE
RAD130 Passive SE by Mod EPA TO-17
Maul Foster and Alongi Inc.
Workorder# 2110248R1

Four Radiello 130 (Solvent) samples were received on October 12, 2021. The laboratory analyzed the charcoal sorbent bed of the passive sampler following modified method EPA TO-17. The VOCs were chemically extracted using carbon disulfide and an aliquot of the extract was injected into a GC/MS for identification and quantification of volatile organic compounds (VOCs).

The mass of each target compound adsorbed by the sampler was converted to units of concentration using the sample deployment time and the sampling rate for each VOC. If sampling rates were calculated by the lab or the manufacturer, the concentration result has been flagged as an estimated value. Results are not corrected for desorption efficiency.

The reference method used for this procedure is EPA TO-17, which describes the collection of VOCs in ambient air using sorbents and analysis by GC/MS. Because TO-17 describes active sample collection using a pump and thermal desorption as the preparation step, several modifications are required. Modifications to TO-17 are listed in the table below:

Requirement	***TO-17***	***ATL Modifications***
Sample Collection	Pump pulls measured air volume through sorbent tube	VOCs in air adsorbed onto sorbent bed passively through diffusion
Sample Preparation	Thermal extraction	Solvent extraction
Sorbent tube conditioning	Condition newly packed tubes prior to use	Charcoal-based sorbent is a single use media and conditioning is conducted by vendor.
Instrumentation	Thermal desorption introduction system	Liquid injection introduction system
Internal Standard	Gas-phase internal standard introduced on the tube or focusing trap during analysis	Liquid-phase internal standard introduced on the tube at the time of extraction
Media and sample storage	<4 deg C, 30 days	Media shelf life is determined by vendor; sample hold-time is 6 months for the RAD130 and WMS. Sample preservation requirements are storage in a cool, solvent-free refrigerator and optional use of ice during shipping.
Internal Standard Recovery	+/-40% of daily CCV area	-50% to +100% of daily CCV area

Receiving Notes

There were no receiving discrepancies.

The work order was reissued on 10/15/21 to change identification of samples 01A-03A per emailed client request from 10/15/21.

Analytical Notes

The uptake rates were corrected based on average field temperatures if provided. In the absence of field temperatures, the uptake rates determined at 25 deg C were used.

To calculate ug/m3 concentrations in the Lab Blank and TRIP BLANK, a sampling duration of 30240 minutes was applied. The assumed temperature used for the uptake rate is listed on the data page. If the field temperatures were provided, the rate was adjusted in the same manner as the field samples.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

C - Estimated concentration due to calculated sampling rate

CN - See case narrative explanation.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
VOCS BY PASSIVE SAMPLER - GC/MS

Client Sample ID: RAD4-092021

Lab ID#: 2110248R1-01A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.048	0.59	0.28

Client Sample ID: RAD1-092021

Lab ID#: 2110248R1-02A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.048	0.56	0.27

Client Sample ID: RAD5-092021

Lab ID#: 2110248R1-03A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.048	0.34	0.16

Client Sample ID: TRIP BLANK

Lab ID#: 2110248R1-04A

No Detections Were Found.

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Client Sample ID: RAD4-092021

Lab ID#: 2110248R1-01A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	**c101406sim**	**Date of Collection: 10/11/21 10:10:00 A**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/14/21 01:38 PM**	
		Date of Extraction: 10/14/21	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.048	0.59	0.28

Temperature = 77.0F , duration time = 30240 minutes.
Container Type: Radiello 130 (Solvent)

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130

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Client Sample ID: RAD1-092021

Lab ID#: 2110248R1-02A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	**c101407sim**	**Date of Collection: 10/11/21 10:05:00 A**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/14/21 02:05 PM**	
		Date of Extraction: 10/14/21	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.048	0.56	0.27

Temperature = 77.0F , duration time = 30240 minutes.
Container Type: Radiello 130 (Solvent)

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130

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Client Sample ID: RAD5-092021

Lab ID#: 2110248R1-03A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	**c101408sim**	**Date of Collection: 10/11/21 10:15:00 A**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/14/21 02:31 PM**	
		Date of Extraction: 10/14/21	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.048	0.34	0.16

Temperature = 77.0F , duration time = 30240 minutes.
Container Type: Radiello 130 (Solvent)

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130

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Client Sample ID: TRIP BLANK

Lab ID#: 2110248R1-04A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	**c101409sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/14/21 02:58 PM**	
		Date of Extraction: 10/14/21	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.048	Not Detected	Not Detected

Temperature = 77.0F , duration time = 30240 minutes.
Container Type: Radiello 130 (Solvent)

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130

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Client Sample ID: Lab Blank

Lab ID#: 2110248R1-05A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	**c101405sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/14/21 01:12 PM**	
		Date of Extraction: 10/14/21	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.10	0.048	Not Detected	Not Detected

Temperature = 77.0F , duration time = 30240 minutes.
Container Type: Radiello 130 (Solvent)

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130

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Client Sample ID: CCV

Lab ID#: 2110248R1-06A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	**c101402sim**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 10/14/21 10:57 AM**
		Date of Extraction: NA

Compound	%Recovery
Trichloroethene	98

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130

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Client Sample ID: LCS

Lab ID#: 2110248R1-07A

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	**c101403sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/14/21 11:57 AM**	
		Date of Extraction: 10/14/21	

Compound	%Recovery	Method Limits
Trichloroethene	101	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130

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Client Sample ID: LCSD

Lab ID#: 2110248R1-07AA

VOCS BY PASSIVE SAMPLER - GC/MS

File Name:	**c101404sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/14/21 12:27 PM**	
		Date of Extraction: 10/14/21	

Compound	%Recovery	Method Limits
Trichloroethene	111	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130

ATTACHMENT C

DATA VALIDATION MEMORANDUM

DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 1803.01.05 | DECEMBER 1, 2021 | PRECISION ENGINEERING, INC.

Maul Foster & Alongi, Inc. (MFA), conducted an independent stage 2A review of the quality of analytical results for indoor air samples and associated quality control samples collected at the Precision Engineering, Inc., property at 1231 S Director Street, Seattle, Washington. Samples were collected from September 20 to October 11, 2021.

Eurofins Air Toxics, LLC (Eurofins), performed the analyses. Eurofins report number 2110248R1 was reviewed. The analyses performed and samples analyzed are listed below.

Analysis	Reference
TCE—Radiello 130	EPA TO-17 Modified
NOTES: EPA = U.S. Environmental Protection Agency. TCE = trichloroethene.	

Samples Analyzed
Report 2110248R1
RAD4-092021 (Sewing Room)
RAD1-092021 (Office)
RAD5-092021 (Warehouse 1)
TRIP BLANK

DATA QUALIFICATION

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (EPA) guidelines for data review (EPA, 2020) and appropriate laboratory- and method-specific guidelines (EPA, 1986; Eurofins, 2021).

Based on the results of the data quality review procedures described below, the data are considered acceptable for their intended use, with the appropriate final data qualifiers assigned. Final data qualifiers represent qualifiers originating from the laboratory and accepted by the reviewer, as well as any data qualifiers assigned by the reviewer during validation.

- Final data qualifier:
  - "U" = result is non-detect at the method reporting limit (MRL).

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

Extractions and analyses were performed within the recommended holding time criteria.

Preservation and Sample Storage

The samples were preserved and stored appropriately.

BLANKS

Method Blanks

Laboratory method blanks are used to assess whether laboratory contamination was introduced during sample preparation and analysis. Laboratory method blank analysis was performed at the required frequency. For purposes of data qualification, the laboratory method blank was associated with all samples prepared in the analytical batch.

The laboratory method blank result was non-detect to the MRL.

Equipment Rinsate Blanks

Equipment rinsate blanks are used to evaluate field equipment decontamination. These blanks were not required for this sampling event.

Trip Blanks

Trip blanks are used to evaluate whether volatile organic compound contamination was introduced during sample storage and shipment between the sampling location and the laboratory.

A trip blank was submitted with the sample delivery group 2110248R1 for EPA method TO-17 analysis. Eurofins noted that the trip blank sample volume was calculated based on a sampling duration of 30,240 minutes (three weeks).

The trip blank result was non-detect to the MRL.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample (LCS) and a laboratory control sample duplicate (LCSD) are spiked with target analytes to provide information about laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency.

All LCS/LCSD results were within acceptance limits for percent recovery and relative percent difference.

LABORATORY DUPLICATE RESULTS

Laboratory duplicate results are used to evaluate laboratory precision. Laboratory duplicate analysis was not required for EPA method TO-17. Batch precision was evaluated using LCS/LCSD results.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy as well as the effect of the sample matrix on sample preparation and analysis. MS/MSD analysis was not required for EPA method TO-17. Batch precision and accuracy were evaluated using LCS/LCSD results.

SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance for individual samples.

All surrogate results were within percent recovery acceptance limits.

CONTINUING CALIBRATION VERIFICATION RESULTS

Continuing calibration verification (CCV) results are used to demonstrate instrument precision and accuracy through the end of the sample batch. CCV results were not required for validation but were reviewed when provided.

The CCV result was within percent recovery acceptance limits.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. No field duplicate samples were submitted for analysis.

REPORTING LIMITS

Eurofins used routine MRLs for non-detect results. According to the chain of custody accompanying report 2110248R1, MFA requested an MRL of equal to or less than 0.37 micrograms per cubic meter. Eurofins reported trichloroethene at an MRL of 0.048 micrograms per cubic meter for all samples.

DATA PACKAGE

The data package was reviewed for transcription errors, omissions, and anomalies.

According to report 2110248R1, the report was reissued on October 15, 2021, to update several sample names. Samples were listed on the chain of custody form accompanying report

2110248R1 as "Sewing Room," "Office," and "Warehouse 1." These sample names were updated and reported as "RAD4-092021," "RAD1-092021," and "RAD5-092021," respectively, at the request of MFA.

No other issues were found.

REFERENCES

EPA. 1986. Test methods for evaluating solid waste, physical/chemical methods. EPA publication SW-846. 3d ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), VI phase II (2018), VI phase III (2019).

EPA. 2020. EPA contract laboratory program, national functional guidelines for Superfund organic methods data review. EPA 540-R-20-005. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. November.

Eurofins. 2021. Laboratory quality assurance manual. Revision 32. Eurofins Air Toxics, LLC. Folsom, California. January 4.