

Limited Indoor Air Quality Assessment Report

Rhodes Center

5th Floor OAH Office and 4th Floor Office Space 416

992 Broadway, Tacoma, WA 98402

Prepared for:

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February 7, 2019

PBS Project 40535.401



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1 INTRODUCTION

The following is a description of project background, the general building construction and project limitations.

1.1 Project Background

On January 29th and 30th, 2019 PBS Engineering and Environmental Inc. (PBS) performed a limited indoor air quality (IAQ) investigation at the Rhodes Center Building, located at 992 Broadway, Tacoma, Washington. According to DES staff, concerns regarding IAQ were expressed by occupant(s) in the 5th Fl. OAC Office. Also reported were concerns over potential sources of IAQ issues from the vacant tenant space (416) directly below the 5th Fl. OAC Office.

PBS was advised that a water leak in the closed-loop HVAC hydronic system had occurred between three and four weeks prior to our investigation in the equipment room on the south side of the 5th Fl. OAC Office. The leak travelled through and below the demising wall into the 5th Fl. OAC Office, and subsequently downward. Reportedly, within 24 hours of the leak, DES contracted a professional restoration firm to address the leak. Response to the cleanup was reported to include extraction of water in floorings, floor dryers, ventilation of select gypsum wallboard walls, and replacement of select gypsum wallboard walls up to a height of approximately 1 foot.

Areas of the building included in the scope of our investigation were limited to the 5th Fl. OAC Office and the offices within space 416 below. Components of the investigation included visual assessment and sampling of representative locations for:

- Non-viable fungal airborne particulate
- Volatile Organic Compounds (VOCs)

1.2 Project Limitations

This study was limited to the tests and locations as indicated to determine the absence or presence of certain contaminants. The site may have other concerns that were not characterized by this study. Further study may be warranted. It is important to understand that statistically valid data come only from the collection of numerous samples in the study areas. The findings and conclusions of this investigation are not scientific certainties, but rather probabilities based on professional judgment concerning the significance of the data gathered during the course of this investigation. PBS is not able to represent conditions on the site beyond those conditions detected or observed at the time of the investigation.

The spectrum of potential sources affecting indoor air quality is broad, and the sensitivity of individuals to these sources can vary significantly. This investigation was limited in scope and was intended to screen for potential pollutants and/or sources that may degrade the quality of the indoor air.

2 DISCUSSION OF FINDINGS

PBS conducted indoor air quality investigation and testing activities at the 5th Fl. OAC Office and the Office Space 416 directly below on January 29th and 30th, 2019. During the site visit, were evaluated. The following section describes our visual observations and testing activities.

2.1 Visual Investigation

PBS conducted visual examination of interior features and building conditions in the noted areas of concern during occupied hours. Accessible portions of the floors, walls, ceilings, and above-ceiling spaces were visually examined. The following summarizes our observations.

January 29, 2019:

- PBS observed a very light chemical odor in the 5th Fl. OAC Office.
- A pipe penetration on the east side of the 5th Fl. OAC Office had been sealed and boxed-in with sheet metal.
- PBS examined the carpeting in the 5th Fl. OAC Office. No indications of abnormal odors or fungal growth were noted on or below the carpeting squares. Pliable and tacky layers of tan and black mastic were noted below the carpeting.
- A chemical type odor was evident in space 416 during PBS' initial visit on January 29-2019. Windows within the space were closed. No fungal growth was observed on, or below the glued-down carpeting. A chemical-type odor was noted as the carpet was pulled-up in select locations. The odor became more persistent over the course of the subsequent approx. 30 minutes prior to PBS' departure.

January 30, 2019:

- PBS returned to the areas of concern on January 30th, 2019 to perform limited testing outlined under sections 2.2. and 2.3. Upon PBS' arrival an air filtration unit was running within the space, moving the interior building air. The east perimeter windows were open during this response. PBS examined additional locations below carpeting revealing conditions as observed previously.

2.2 Non-viable Fungal Particulate Air Sampling

PBS collected and analyzed non-viable airborne particulate samples from the previously noted areas within the Rhodes Center. These air samples were analyzed for fungal particulate to characterize the composition of airborne particulates in the building.

An air filtration unit was operating within the 416 Office space upon PBS' arrival on January 30, 2019. This equipment was deactivated approximately twenty minutes prior to testing and was removed by unidentified personnel approximately ten minutes prior to PBS conducting the non-viable airborne particulate sampling. Operation of the filtration unit within the spaces tested increases the potential for detection of particulate which may otherwise not be detected by the sampling methodology.

Human health can be affected by exposure to both living (viable) and non-living (non-viable) biological contaminants in the air (bioaerosols) and biological contaminants on building materials. Microorganisms are among the most common organisms found on earth and have adapted to a wide variety of environmental conditions. They can be found in environments in all parts of the world. Fortunately, most do not cause human sickness or other health complaints, and some are even essential to human health. The risk of illness from microorganisms increases when they grow in overwhelming numbers or multiply indoors.

Airborne contaminants vary in size. Large particles settle quickly and can be trapped in the body's upper respiratory system. Small particles are more likely to remain airborne and can pass through the body's respiratory tract and enter deeper areas of the lungs. Fungal particulate is generated from hyphal fragments (i.e. fragments of filamentous structures that make up the body of the fungi) and fungal spores. Dust includes non-fungal and fungal particulates. Air filters can capture most of these particles. Many bacteria (99 percent exceed 1 micrometer in size) attach to larger particles such as human skin flakes (dander). Viruses generally occur in clusters or in and on other particles. Lung-damaging particles that can be retained in the lungs range from 0.2 to 5 micrometers in size. To help keep dust and airborne particulate contaminants to a minimum, good housekeeping is necessary. Damp dusting, HEPA vacuum cleaners and high-performance HVAC filters should be considered to help minimize airborne particulate contaminant levels.

PBS collected samples of airborne particulate using the spore trap method. This method uses a high-volume vacuum pump fitted with an Allergenco-D™ cassette. The air pump draws a measured volume of air through the cassette, which impacts airborne particulates onto a specially treated slide mounted inside the cassette. Characteristic morphologies were observed by optical microscopy at a magnification of 600x. For each particle type observed, data was reported in particle counts per cubic meter (m³) or counts/m³ of air. The high-volume air pump is calibrated before and after testing with a pre-calibrated rotameter. The rotameter is calibrated annually with a primary standard.

PBS collected 3 indoor samples and 1 outdoor sample during this monitoring event, for a total of 4 samples. The outdoor sample was taken as a control to compare the composition of the indoor air particulates to that of outdoor air. Each sample was collected at a flow rate of 15 liters per minute for 10 minutes (150 liters per sample) from approximately 4 feet above floor level (i.e. in the breathing zone) during occupied hours. The samples were labeled with unique identification numbers, packaged, and delivered with chain-of-custody documentation to Lab/Cor, Inc. of Seattle, Washington. Air samples follow preparation and analysis techniques outlined in Method 5 of the laboratory standard operating procedures (SOP). This method is based on guidelines from the Pan-American Aerobiology Association Standardized Protocol and ASTM Method 7391-09. See Appendix B for laboratory reports.

The following table provides a list of sample locations and the corresponding summary test data:

Table 2. Fungal Particulate Sampling Locations and Corresponding Lab Results

Sample ID	Location Description	Total Fungal (Count/m ³)
A01	Exterior, east alley at loading dock	3,300
A02	5 th Fl. OAC (Lisa's) Office	200
A03	Space 416, southeast office	3,966
A04	Space 416, northwest office	2,933*

* Heavy particulate loading reported by lab. Spore counts may be an-under-estimate.

Airborne fungal particulate concentrations reported in the 5th Fl. OAC Office were significantly lower than concentrations reported on the outdoor control sample.

Airborne fungal particulate concentrations reported in Office Space 416 were slightly elevated above concentrations reported on the outdoor control sample.

2.3 Volatile Organic Compound (VOC) Testing

PBS screened for volatile organic compounds (VOC's) in the interior spaces included in this investigation. Screening for VOC's was performed using a direct-reading Rae Systems Photoionization Detector (PID) MiniRAE AE2000 with a 10.3 eV lamp. Volatile organic compounds (VOCs) are emitted by a wide array of products numbering in the thousands. Examples include paints, lacquers, cleaning supplies, pesticides, building materials and furnishings, office equipment such as copiers and printers, correction fluids, glues and adhesives, permanent markers, cosmetics, perfumes, and air fresheners. These products can release VOCs while in-use and when they are stored.

- No VOCs were identified at the areas inspected as part of this investigation.

3 CONCLUSIONS AND RECOMMENDATIONS

The following is a summary of our conclusions and recommendations that have the potential to impact indoor air quality and/or potentially cause adverse health effects to sensitive individuals. They are based on our site observations, interviews and testing at the subject site. These conclusions and recommendations are not presented in order of priority.

- PBS' investigation of the 5th Fl. OAC Office did not reveal issues of concern.
- Based on the limited test data, PBS does not consider airborne fungal particulate to be a concern in the 5th Fl. OAC Office.
- Based on the limited test data, slightly elevated airborne fungal particulate compared to the exterior sample was identified in Office Space 416.
 - Known previous water intrusion events affecting Office Space 416 raise the possibility that fungal particulate may remain within or below the carpeting or within wall/ceiling cavities.
 - Removal of existing carpeting that previously underwent extraction may help alleviate airborne particulate concentrations relative to outside air.
 - Additional investigation is required to potentially determine the source of the slightly elevated non-viable airborne particulate concentrations identified as part of this investigation.

4 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

PBS has performed this investigation in conformance with current standard industry practices.

PBS Engineering and Environmental Inc.
Report Prepared By:

Report Reviewed By:

Michael Smith
Senior Industrial Hygiene Technician

Tim Ogden
Principal/Sr. Project Manager

APPENDIX A

**Airborne Particulate Laboratory Data Sheets
Airborne Particulate Chain-of-Custody Documentation**

Job Number: 190070 SEA
Client: PBS Engineering + Environmental
Address: 214 E Galer Street
Suite 300
Seattle, WA 98102
Project Name: Rhodes Center 4th & 5th Fl.
Project No.: 40535.401
PO Number:
Sub Project:
Reference No.:

Report Number: 190070R02
Report Date: 1/31/2019

Enclosed please find results for samples submitted to our laboratory. A list of samples and analyses follows:

Lab/Cor Sample #	Client Sample # and Description	Analysis	Analysis Notes	Date Received:
190070 - S1	A01 - Exterior E by Loading Dock	NV, Air, Fungal ID		1/30/2019
190070 - S2	A02 - 5th Fl. OAH Cent. Of Lisa's Office	NV, Air, Fungal ID		1/30/2019
190070 - S3	A03 - 416 - SE Office	NV, Air, Fungal ID		1/30/2019
190070 - S4	A04 - 416 - NW Office	NV, Air, Fungal ID	Due to heavy particulate loading on S4, spore counts may be an under-estimate.	1/30/2019

Nonviable Air Air samples follow preparation and analysis techniques outlined in Method 5 of the laboratory SOP; this method is based on guidelines from the Pan-American Aerobiology Association Standardized Protocol and ASTM Method 7391-09. Samples were collected using either an Air-O-Cell, Cyclex-D, Allergenco-D, or M2 Multi-Mold nonviable air sampling cassette. Characteristic morphologies were observed by optical microscopy at a magnification of 600x. For each individual particle type observed, data was reported in particles per cubic meter of air (m3).

Due to various factors that influence uncertainty (media type, particle loading, staining, instrumentation and other variable aspects of the method), only the first two figures reported are considered to be significant. The area analyzed on each sample is 20%.

Disclaimer The results reported relate only to the samples tested or analyzed; the laboratory is not responsible for data collected by personnel who are not affiliated with the laboratory. Results reported in both structures/cm3 and structures/mm2 are dependent on the sample volume and area. These parameters are measured and recorded by non-laboratory personnel and are not covered by the laboratory's accreditation. Interpretation of these results is the sole responsibility of the client.

If further clarification of these results is needed, please call us. Thank you for allowing the staff at Lab/Cor, Inc. the opportunity to provide you with the analytical services.

Sincerely,

Derk Wipprecht
Laboratory Supervisor

Nonviable Air

Job Number: 190070

Client: PBS Engineering + Environmental

Project Name: Rhodes Center 4th & 5th Fl.

Project No.: 40535.401

Reference No.:

Report Number: 190070R02

Date Received: 1/30/2019

Lab/Cor ID:	S1	S2
Sample No.:	A01	A02
Description:	Exterior E by Loading Dock	5th Fl. OAH Cent. Of Lisa's Office
Sample Measure:	150 L	150 L
Media Type:	Fungal-AllergencoD	Fungal-AllergencoD
Analyst - Analysis Date:	SL - 1/30/2019	SL - 1/30/2019
MRL:	33	33
Scope - Magnification:	Olympus BHS - 600	Olympus BHS - 600
Notes:		

Fungal Identification	Raw Count*	Total Count**	Total/m³	Raw Count*	Total Count**	Total/m³
Ascospores, non-specified	3	15	100			
Aspergillus/ Penicillium-like	23	115	767	1	5	33
Basidiospores - like	70	350	2333	5	25	167
Chaetomium						
Cladosporium	3	15	100			
Ganoderma						
Myxo./Periconia/Smuts/Rusts						
Summary Total:	99	495	3300	6	30	200

Lab/Cor ID:	S3	S4
Sample No.:	A03	A04
Description:	416 - SE Office	416 - NW Office
Sample Measure:	150 L	150 L
Media Type:	Fungal-AllergencoD	Fungal-AllergencoD
Analyst - Analysis Date:	SL - 1/30/2019	SL - 1/30/2019
MRL:	33	33
Scope - Magnification:	Olympus BHS - 600	Olympus BHS - 600
Notes:		Due to heavy particulate loading on S4, spore counts may be an under-estimate.

Fungal Identification	Raw Count*	Total Count**	Total/m³	Raw Count*	Total Count**	Total/m³
Ascospores, non-specified	3	15	100	2	10	67
Aspergillus/ Penicillium-like	88	440	2933	83	415	2767
Basidiospores - like	16	80	533	1	5	33
Chaetomium	1	5	33			
Cladosporium	8	40	267	1	5	33
Ganoderma				1	5	33
Myxo./Periconia/Smuts/Rusts	3	15	100			
Summary Total:	119	595	3966	88	440	2933

* - Raw Counts per 20% of Sample

** - Total Count per Sample

Nonviable Air

Job Number: 190070

Client: PBS Engineering + Environmental

Project Name: Rhodes Center 4th & 5th Fl.

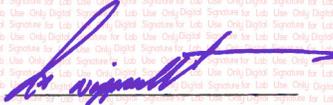
Project No.: 40535.401

Reference No.:

Report Number: 190070R02

Date Received: 1/30/2019

Reviewed by:


X Digital Signature for Lab Use Only

Derk Wipprecht
Laboratory Supervisor

Fungal / Particulate Sample Chain of Custody Record

190070

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Client: PBS ENGINEERING & ENVIRONMENTAL
 Address: 214 E GAUER SE, SUITE # 300
 City, State, Zip: SEATTLE, WA 98102
 Contact: TIM OGDEN & MIKE SMITH
 Phone: (206) 233-9639 Fax: _____
 Email: Tim.Ogden@PBSUSA.com
 Other Info: MIKE.SMITH@PBSUSA.COM

Analysis Type:
Nonviable Options:
 Fungal ID
 Fungal & Particulate ID
 Particulate ID
 Quantitative Analysis
 (Total Count)
 Qualitative Analysis
 (Relative Abundance)
Viable Options:
 Complete Analysis
 Genera Only Stachy Only

Turnaround Time:
 _____ 6 hr RUSH*
 24 hours*
 _____ 48 hours
 _____ 3 days
 (NV Std)
 _____ 5 days
 _____ Viable
 (7-10 days)

Project Name: RHODES CENTER 4th & 5th FL Project Number: RHODES CTR 4th, 5th FL P.O. Number: _____

Sample #	Sample Description	Sample Information											Sampling Information					Total Volume / Area						
		Sample Type										Media Type			Sample Date	Sample Time			Sample Flow Rate					
		Air		Swab		Bulk		Dust		Tape	MEA	Stachy	Other	On		Off	Start		End	Avg				
NV	V	NV	V	NV	V	NV	V	NV	V	NV														
A01	EXTERIOR E BY LOADING DOCK	✓													✓	1/30/19	1207	1217	15	15	15	150L		
A02	5 th FL. OAH - CENT. OF LISA'S OFFICE	✓													✓	↓	1231	1241	15	15	15	150L		
A03	416 - SE OFFICE	✓													✓	↓	1321	1331	15	15	15	150L		
A04	416 - NW OFFICE	✓													✓	↓	1323	1333	15	15	15	150L		

Internal Lab Use Only:
 Prelim Released: _____ Final Results Released: _____ Hardcopy / Invoice Mailed: _____
 By: Fax Phone E-mail Verbal By: Fax Phone E-mail QC & Data Reviewed By: _____

By signing below you are agreeing to comply with Lab/Cor's Requests, Tenders and Contracts. * Call ahead for TATs of 24hrs or less
 Relinquished by: Michael Smith Date: 1/30/19 Time: 1634 Relinquished by: _____ Date: _____ Time: _____
 Received by: Jason Stahl Date: 1/30/19 Time: 1634 Received by: _____ Date: _____ Time: _____