Asbestos Abatement Air Monitoring Report

AUGUST 16, 2018

PREPARED FOR:
School District of Philadelphia
440 North Broad Street, Room 3053
Philadelphia, Pennsylvania
Attn: Mr. Gerald Junod

PREPARED BY:
The Vertex Companies, Inc.
700 Turner Industrial Way
Aston, Pennsylvania 19014
PHONE 610.558.8902
VERTEX Project No: 51207
Work Order Numbers: 1759093
Control No: 2018252003.1
Encumbrance Number: 583018
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1.0 EXECUTIVE SUMMARY

In June 2018, The Vertex Companies, Inc. (VERTEX) was retained by the School District of Philadelphia to provide air monitoring and laboratory services in conjunction with an abatement project at the A.S. Jenks Elementary School located at 2501 S. 13th Street in Philadelphia, PA. These services were performed under Encumbrance Number 583018, School District Control Number 2018252003.1 and Work Order Number 1759093.

Work activities were initiated in response to the newspaper article (i.e., dated May 10, 2018 online at Philly.com and May 13, 2018 in the Philadelphia Inquirer). The article reported that wipe sampling was performed by a staff member in First Floor Classroom, Closest Floor (two samples), First Floor Classroom (two samples), Auditorium, and Gymnasium. The analytical results for the six wipe samples collected ranged from a level of 55,500 F/cm² to 1,630,000 F/cm².

Following the review of the article and the analytical results reported, the School District of Philadelphia initiated a remedial effort to address the reported concerns. To that end, the following protocol was employed:

Initial Response

1. The School District directed one of its contracted consultants to inspect these areas for presence of asbestos containing materials and/or the potential source of the results reported.
2. In accordance with School District standard protocol, the building inspector prepared an Asbestos Design Data Collection (DDC).
3. Reportedly, encapsulation of damaged pipe insulation was performed in the Gymnasium in May 2018.

Secondary Response

1. The School District of Philadelphia retained The Vertex Companies, Inc. (VERTEX) to consult/oversee any resulting remediation or abatement to be performed.
2. VERTEX, in conjunction with a representative of the Philadelphia Federation of Teachers, Mr. Jerry Roseman of Occupational Health Consultation Services, Inc. (OHCS) performed a re-inspection of Classroom 106, Classroom 106 Closet, Gymnasium, and Auditorium.
3. The re-inspection confirmed that asbestos containing pipe insulation was identified in the areas inspected.
4. A DDC was prepared by VERTEX. The DDC was utilized to define the abatement remedial effort to be employed. The scope of work included:
   - The removal of approximately 26 linear feet of pipe insulation within the Classroom #106 Closet.
   - The removal of approximately 37 linear feet of pipe insulation within Classroom #106.
   - The encapsulation of approximately 10 linear feet of pipe insulation within the Gymnasium. Note: Initial remediation included reported encapsulation of damaged areas of pipe insulation in May 2018. No remedial activity was performed as part of the response actions delineated in this report. Complete abatement within the area is scheduled to be performed in the Fall of 2018.
Abatement Redial Effort

1. Work was performed between August 3, 2018 and August 11, 2018.
2. All work was performed in full accordance with the City of Philadelphia’s Asbestos Control Regulations.
3. All work was performed by members of the School District of Philadelphia’s A-Team. The A-Team workers are all licensed by the City of Philadelphia and Commonwealth of Pennsylvania to perform asbestos abatement operations.
4. Daily air monitoring was performed by a licensed Asbestos Project Inspector (API) throughout the duration of the remedial effort.
5. At the completion of abatement, VERTEX’s API performed a visual inspection and did not observe any dust or debris on any surfaces within the work area.
6. The final air testing protocol employed included:
   - VERTEX and OHCS collecting five (5) samples within the major work area to be analyzed by TEM (the classroom and classroom closet were regulated in one work enclosure).
7. Analytical results of clearance testing within the major work area (i.e., Classroom #106/closet 106) found conflicting results. Specifically, VERTEX’s results yielded levels below the clearance criteria and OHCS’s results yielded levels above the clearance criteria.
8. The work area was re-cleaned on August 7, 2018. Following re-cleaning, the API performed a visual inspection and did not observe any dust or debris on any surfaces within the work area.
9. The second set of analytical results of clearance testing for both VERTEX and OHCS yielded levels above the City of Philadelphia’s clearance criteria of 0.00554 AS/cc. Note: Samples were slightly elevated over the City of Philadelphia’s Geometric Mean Clearance Criteria. All samples were below the AHERA criteria of <70 AS/mm².
10. The work area was re-cleaned on August 10, 2018. Following re-cleaning, the API performed a visual inspection and did not observe any dust or debris on any surfaces within the work area.
11. The third set of analytical results of clearance testing for both VERTEX and OHCS yielded levels below the City of Philadelphia’s clearance criteria of 0.00554 AS/cc, and the AHERA clearance criteria <70 AS/mm².

2.0 PROJECT OVERSIGHT

VERTEX provided an API for on-site inspection and daily air monitoring throughout the duration of the project. Services were performed by certified APIs Ed Keegan (certification no.911-1004), William Klinger (certification no. 011-1002), Bernard Brunner (certification no. 064-0008) and Louis DiMichele (certification no. 991-1004). The project was managed by Donald P. Heim.
3.0 RESULTS

1. Airborne concentrations (i.e., five PCM samples) collected in the three minor work areas after abatement (final clearances) were below the City of Philadelphia’s clearance criteria of 0.01 F/cc.

2. Airborne concentrations (i.e., five TEM samples) collected in the major work area after abatement (final clearances) were below the City of Philadelphia’s clearance criteria of 0.00554 AS/cc, and the AHERA clearance criteria <70 AS/mm². Note: Initial testing (i.e., two rounds) by OHCS failed to achieve the clearance criteria.

3. Airborne concentrations collected outside the regulated work areas during abatement activities (perimeters) yielded levels below 0.01 F/cc.

4. Airborne concentrations collected inside the regulated work areas during abatement activities also yielded levels below 0.01 F/cc.

Please refer to the attached PCM Air Sampling Results, for a summary of the air sample results.

4.0 ANALYTICAL / AIR MONITORING METHODLOGIES

Phase Contrast Microscopy (PCM) air samples were collected and analyzed in accordance with the National Institute of Safety and Health (NIOSH) Analytical Method #7400, “Asbestos Fibers in Air,” using A counting rules. A segment of the collected sample filter is mounted on a slide, treated chemically to make the filter transparent, and then examined using a special microscope reticule and counting procedure with phase contrast illumination at 400 to 500 magnification. Any particle having a length to width (or aspect) ratio greater than 3:1, and a length of 5 micrometers (μm) or greater is counted as a fiber. PCM analysis does not distinguish between asbestos and non-asbestos fibers.

All air samples were collected by the high-volume method in which a pump is used to draw a volume of air through a membrane filter at a known rate. Typical sampling rates for final air testing are less than 10 Liters per minute (L/min) for approximately 1200-1,800 liters. Samples are collected in 25-millimeter (mm) cassettes containing a mixed cellulose ester (MCE) filter with a 0.8 μm-effective pore size for PCM analysis.

Final clearance air samples were collected and analyzed by Transmission Electron Microscopy (TEM). Analysis was performed International Asbestos Testing Laboratories (IATL) of Mount Laurel, New Jersey (AIHA #100188).
5.0 ABATEMENT METHODOLOGIES

Abatement was performed by Commonwealth of Pennsylvania/City of Philadelphia licensed asbestos abatement workers. All licensed workers donned proper personal protective (PPE) equipment, including but not limited to TYVEK® suits and NIOSH approved half-face air purifying respirators.

Critical barriers consisting of two layers of plastic sheeting were used to seal over all openings in the work areas and prevent airborne asbestos from migrating to adjacent areas.

A Negative Pressure Enclosure (NPE) was constructed and consisted of two layers of six mil plastic sheeting on the walls and floor. Negative pressure was achieved by ventilating the contained area utilizing HEPA air filtration devices (AFDs). AFDs were utilized to achieve a minimum of four air changes per hour within the enclosure and a minimum of 0.02 column inches of water pressure differential.

An airlock was established at the entrance to the NPE and entrance to the airlock was controlled using a three-stage personal decontamination system, containing plastic doorways. The integrity of these barriers was checked visually, and negative pressure was monitored, utilizing smoke tube measurements.

The pipe insulation removal process consisted of pre-wetting of the pipe insulation, taping the glovebag to the pipe, re-wetting of the asbestos insulation, cutting metal bands, removing the insulation, wetting the insulation in the glovebag, wet wiping of the pipe, followed by glovebag removal. A HEPA vacuum was utilized to establish negative pressure inside the glovebags prior to removal. All bags were double bagged for disposal as asbestos waste.

At the completion of abatement operations, final air testing incorporated TEM (i.e., five samples) methodologies. All clearance samples performed by VERTEX yielded levels below applicable clearance criteria. Note: Initial clearance testing performed by OHCS yielded levels which exceeded the clearance criteria. As a result, the work area was re-cleaned and re-encapsulated. Re-testing of the work area found levels above the applicable clearance criteria by both VERTEX and OHCS. The work area was re-cleaned and re-encapsulated a second time. Re-testing of the work area found levels below the applicable clearance criteria by both VERTEX and OHCS.

Following the completion of the abatement operations, all waste generated as part of the removal project was double-bagged and labeled for proper disposal at an EPA approved landfill. Asbestos waste will be transported by Super Kwik, a licensed waste transporter, and disposed of Dauphin Meadows, an EPA approved landfill.
### 6.0 SUMMARY OF PCM AIR SAMPLING RESULTS

**Abram S. Jenks Elementary School**  
2501 South 13th Street  
Philadelphia, Pennsylvania

#### Date collected: 8/3/18  
Site Activity/Work Area: Baselines – Room #106

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Sample Location/Activity</th>
<th>Volume (L)</th>
<th>Fibers per 100 Fields</th>
<th>Sample Result (F/cc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.3.01</td>
<td>Baseline: Room #106</td>
<td>1220</td>
<td>0</td>
<td>&lt;0.002</td>
</tr>
<tr>
<td>8.3.02</td>
<td>Baseline: Room #106</td>
<td>1220</td>
<td>2.5</td>
<td>&lt;0.002</td>
</tr>
<tr>
<td>8.3.03</td>
<td>Baseline: Room #106 closet</td>
<td>1200</td>
<td>2</td>
<td>&lt;0.002</td>
</tr>
<tr>
<td>8.3.04</td>
<td>Baseline: Room #106 closet</td>
<td>1200</td>
<td>4</td>
<td>&lt;0.002</td>
</tr>
<tr>
<td>8.3.05</td>
<td>Baseline: Room #106 closet</td>
<td>1200</td>
<td>3.5</td>
<td>&lt;0.002</td>
</tr>
</tbody>
</table>

#### Date collected: 8/3/18  
Site Activity/Work Area: Pre-Clean & Prep – Room #106

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Sample Location/Activity</th>
<th>Volume (L)</th>
<th>Fibers per 100 Fields</th>
<th>Sample Result (F/cc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.3.06</td>
<td>Perimeter: In hall 30’ from Room #106 at electrical panel box</td>
<td>1203</td>
<td>6.5</td>
<td>0.003</td>
</tr>
<tr>
<td>8.3.07</td>
<td>Perimeter: In hall at teachers’ lounge</td>
<td>1200</td>
<td>4</td>
<td>&lt;0.002</td>
</tr>
<tr>
<td>8.3.08</td>
<td>Work area: Center of Room #106</td>
<td>861</td>
<td>5</td>
<td>&lt;0.003</td>
</tr>
<tr>
<td>8.3.09</td>
<td>Blank</td>
<td>-</td>
<td>0</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Date collected: 8/4/18  
Site Activity/Work Area: Prep Work, Building Containment – Room #106

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Sample Location/Activity</th>
<th>Volume (L)</th>
<th>Fibers per 100 Fields</th>
<th>Sample Result (F/cc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.4.10</td>
<td>Perimeter: 1st floor hallway approximately 30’ from Room #106 at electrical box</td>
<td>1302</td>
<td>4.5</td>
<td>&lt;0.002</td>
</tr>
<tr>
<td>8.4.11</td>
<td>Perimeter: 1st floor hallway adjacent to teachers’ lounge at electrical box</td>
<td>1296</td>
<td>4</td>
<td>&lt;0.002</td>
</tr>
<tr>
<td>8.4.12</td>
<td>Work area: Center of Room #106</td>
<td>1323</td>
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<td>&lt;0.002</td>
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<tr>
<td>8.4.13</td>
<td>Blank</td>
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<td>0</td>
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#### Date collected: 8/5/18  
Site Activity/Work Area: Removal of ACPI

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Sample Location/Activity</th>
<th>Volume (L)</th>
<th>Fibers per 100 Fields</th>
<th>Sample Result (F/cc)</th>
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</thead>
<tbody>
<tr>
<td>8.5.01</td>
<td>Perimeter: 1st floor Room #106 by doorway</td>
<td>1440</td>
<td>0</td>
<td>&lt;0.002</td>
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<tr>
<td>8.5.02</td>
<td>Work area: Containment by view port</td>
<td>1440</td>
<td>6.5</td>
<td>0.002</td>
</tr>
<tr>
<td>8.5.03</td>
<td>3-stage decon (clean room)</td>
<td>1440</td>
<td>3</td>
<td>&lt;0.002</td>
</tr>
<tr>
<td>8.5.04</td>
<td>Blank</td>
<td>-</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Sample #</td>
<td>Sample Location/Activity</td>
<td>Volume (L)</td>
<td>Fibers per 100 Fields</td>
<td>Sample Result (F/cc)</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------</td>
<td>------------</td>
<td>-----------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>8.7.01</td>
<td>Perimeter: 1st floor hallway</td>
<td>805</td>
<td>3</td>
<td>&lt;0.003</td>
</tr>
<tr>
<td>8.7.02</td>
<td>Perimeter: Classroom 106</td>
<td>810</td>
<td>3.5</td>
<td>&lt;0.003</td>
</tr>
<tr>
<td>8.7.03</td>
<td>3-stage decon (clean room)</td>
<td>810</td>
<td>5.5</td>
<td>0.003</td>
</tr>
<tr>
<td>8.7.04</td>
<td>Blank</td>
<td>-</td>
<td>0</td>
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</table>

Date collected: 8/10/18
Site Activity/Work Area: Baselines – Room #106

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Sample Location/Activity</th>
<th>Volume (L)</th>
<th>Fibers per 100 Fields</th>
<th>Sample Result (F/cc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.10.01</td>
<td>Perimeter: 1st floor hallway</td>
<td>790</td>
<td>2</td>
<td>&lt;0.003</td>
</tr>
<tr>
<td>8.10.02</td>
<td>Perimeter: Classroom 106</td>
<td>795</td>
<td>3</td>
<td>&lt;0.003</td>
</tr>
<tr>
<td>8.10.03</td>
<td>3-stage decon (clean room)</td>
<td>795</td>
<td>6</td>
<td>0.003</td>
</tr>
<tr>
<td>8.10.04</td>
<td>Blank</td>
<td>-</td>
<td>0</td>
<td>-</td>
</tr>
</tbody>
</table>
7.0 SUMMARY OF TEM AIR SAMPLING RESULTS
# Chain of Custody

## Contact Information
- **Client Company:** Vertex
- **Office Address:** 700 Turner Way
- **City, State, Zip:** Aston, PA 19014
- **Fax Number:**
- **Email Address:** dheim@vertexeng.com
- **Project Number:** 51207
- **Project Name:** PSD A.S. Tows Elson School
- **Primary Contact:** Don Heim
- **Office Phone:** 610-787-0902

## Matrix:
- Air
- Soil
- Bulk
- Surface Dust / Wipe
- Water
- Other

## Analysis Method:
- PCM: NIOSH 7400
- PCM: OSHA
- PCM: TWA
- Total Dust: NIOSH 0500
- Total Dust: NIOSH 0600
- AAS: Lead in Air
- AAS: Lead in Water
- AAS: Lead in Paint
- AAS: Lead Dust/Wipe,
- AAS: Lead in Soil
- AAS: TCLP
- AAS: Metals [Cd, Zn, Cr-circles]


## Special Instructions: Analyze Inside samples only - Hold blanks outside

## Turnaround Time
- Preliminary Results Requested Date: 6/2
- Specific date: 10 Day 5 Day 3 Day 2 Day 1 Day 12 Hour 6 Hour Rush

## Shipping Method
- FedEx
- UPS
- LSPS
- Other

## Chain of Custody
- **Relinquished (Name/Organization):** Ed Hogan, Vertex
- **Date:** 8/6/18
- **Time:**
- **Received (Name / iATL):**
- **Date:** 8/7/18
- **Time:**
- **Sample Label (Name / iATL):**
- **Date:** 8/7/18
- **Time:**
- **Analyst (Nameets) / iATL):**
- **Date:** 8/7/18
- **Time:**
- **QA/CO Review (Name / iATL):**
- **Date:** 8/7/18
- **Time:**
- ** Archived / Released:**
- **Date:**
- **Time:**
# Sample Log

---

**Airborne Asbestos**

**Client:** VERTEX  
**Project:** S1907 A.S. Jenkins Elem School 25th St 13th Street Philadelphia

**Sampling Date/Time:** 8/16/18

**Location/Description:** Classroom 106 (w/ perimeter wall containment)

<table>
<thead>
<tr>
<th>Client Sample #</th>
<th>iATL #</th>
<th>Location/Description</th>
<th>Flow Rate</th>
<th>Start</th>
<th>End</th>
<th>Sampling time (min)</th>
<th>Volume (L)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASJENK-0806 01</td>
<td>0575734</td>
<td>Room 106 N. side</td>
<td>9.5</td>
<td>8:14 AM</td>
<td>1:40 PM</td>
<td>190</td>
<td>1805</td>
<td></td>
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<tr>
<td>ASJENK-0806 02</td>
<td>0575735</td>
<td>Room 106 N. side</td>
<td>9.5</td>
<td>8:14 AM</td>
<td>1:40 PM</td>
<td>190</td>
<td>1805</td>
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<tr>
<td>ASJENK-0806 03</td>
<td>0575736</td>
<td>Room 106 N. side</td>
<td>9.5</td>
<td>8:14 AM</td>
<td>1:40 PM</td>
<td>190</td>
<td>1805</td>
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<tr>
<td>ASJENK-0806 04</td>
<td>0575737</td>
<td>Room 106 N. side</td>
<td>9.5</td>
<td>8:14 AM</td>
<td>1:40 PM</td>
<td>190</td>
<td>1805</td>
<td></td>
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<tr>
<td>ASJENK-0806 05</td>
<td>0575738</td>
<td>Room 106 N. side</td>
<td>9.5</td>
<td>8:14 AM</td>
<td>1:40 PM</td>
<td>190</td>
<td>1805</td>
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<tr>
<td>ASJENK-0806 06</td>
<td>0575739</td>
<td>Room 106 B. side</td>
<td>9.5</td>
<td>8:14 AM</td>
<td>1:40 PM</td>
<td>190</td>
<td>1805</td>
<td></td>
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<tr>
<td>ASJENK-0806 07</td>
<td>0575740</td>
<td>Room 106 B. side</td>
<td>9.5</td>
<td>8:14 AM</td>
<td>1:40 PM</td>
<td>190</td>
<td>1805</td>
<td></td>
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<tr>
<td>ASJENK-0806 08</td>
<td>0575741</td>
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<td>9.5</td>
<td>8:14 AM</td>
<td>1:40 PM</td>
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<td>1805</td>
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<tr>
<td>ASJENK-0806 09</td>
<td>0575742</td>
<td>Room 106 B. side</td>
<td>9.5</td>
<td>8:14 AM</td>
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<tr>
<td>ASJENK-0806 10</td>
<td>0575743</td>
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<td>8:14 AM</td>
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<tr>
<td>ASJENK-0806 11</td>
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<td>QA/LAB (Field Blank)</td>
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<tr>
<td>ASJENK-0806 12</td>
<td>0575745</td>
<td>QA/LAB (Field Blank)</td>
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<td>ASJENK-0806 12</td>
<td>0575746</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Notes:**

- "**" Insufficient Sample Provided to Perform QC Reanalysis (<200 ng)
- "**" Insufficient Sample Provided to Analyze (<50 ng)
- "***" Matrix/Matrix Interference Possible
- FB - Method Requires the addition of blank(s), ML - Multi Layered Sample, May result in inconsistent results

These preliminary results are issued by iATL to expedite procedures by clients based upon the above data. iATL assumes that all of the sampling methods and data upon which these results are based, has been accurately supplied by the client. These results may not have been reviewed by the Laboratory Director. Final Certificate of Analysis will follow these preliminary results. The signed COA is to be considered the official results. All EPA, HUD, and NIDEP conditions apply.
# PRELIMINARY RESULTS
Airborne Asbestos Analysis
TEM AHERA

<table>
<thead>
<tr>
<th>Client: The Vertex Companies, Inc.</th>
<th>Batch No.: 570000</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 Turner Way, Suite 105</td>
<td>Project: PSD A.S. Jenks Elementary School</td>
</tr>
<tr>
<td>ASTON, PA 19014</td>
<td>Project No.: 51207</td>
</tr>
<tr>
<td>Client No.: VER100</td>
<td>Philly Regs: Y</td>
</tr>
<tr>
<td></td>
<td>Turn-Around Time: 6 Hour Rush</td>
</tr>
</tbody>
</table>

## Client Contacts:
- Contacts: ____________________________
- Phone: ____________________________
- Fax: ____________________________
- Cell/Pager: ____________________________
- E-Mail: ____________________________

## Laboratory Contacts:
- Contacts: Frank E. Ehrenfeld III
- Phone: (856) 231-9449
- Fax: (856) 231-9818
- Cell/Pager: (609) 929-4211
- E-Mail: frankehrenfeld@iatl.com

## Chain of Custody:
- Samples Taken in Field: ____________________________
- Date: 8/6/2018
- Time: ____________________________
- Samples Rec'd at Laboratory: ____________________________
- Date: 8/6/2018
- Time: ____________________________
- Samples Analyzed: ____________________________
- Date: 8/6/2018
- Time: ____________________________
- Preliminary Results Fax'd: ____________________________
- Date: ____________________________
- Time: ____________________________
- Preliminary Results E-Mail: ____________________________
- Date: ____________________________
- Time: ____________________________

## Summary Data
Transmission Electron Microscopy
AHERA 40CFR 763

<table>
<thead>
<tr>
<th>Client Sample ID #</th>
<th>IATL Sample ID #</th>
<th>Volume (L)</th>
<th>Comments</th>
<th>Results s/mm²</th>
<th>Results s/cc</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASJenks-0806-01</td>
<td>6575734</td>
<td>1805</td>
<td>Chrysotile</td>
<td>19.2</td>
<td>0.0041</td>
</tr>
<tr>
<td>ASJenks-0806-02</td>
<td>6575735</td>
<td>1805</td>
<td>None Detected</td>
<td>&lt; 19.2</td>
<td>&lt; 0.0041</td>
</tr>
<tr>
<td>ASJenks-0806-03</td>
<td>6575736</td>
<td>1805</td>
<td>None Detected</td>
<td>&lt; 19.2</td>
<td>&lt; 0.0041</td>
</tr>
<tr>
<td>ASJenks-0806-04</td>
<td>6575737</td>
<td>1805</td>
<td>None Detected</td>
<td>&lt; 19.2</td>
<td>&lt; 0.0041</td>
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<tr>
<td>ASJenks-0806-05</td>
<td>6575738</td>
<td>1805</td>
<td>Chrysotile</td>
<td>19.2</td>
<td>0.0041</td>
</tr>
</tbody>
</table>

AHERA Clearance Criteria is 70 s/mm². Average (s/mm²) = 19.2
Phila. Regulations Clearance Criteria is 0.00554 s/cc Geo = 0.0041
Z Test Results (see attached. if applicable) ____________

Grid Box #: 1137
Instrument (I, II, III) II

These preliminary results are issued by IATL to expedite procedures by the clients based upon the above data. IATL assumes that all of the sampling methods and data upon which these results are based, has been accurately supplied by the client. These results may not have been reviewed by the Laboratory Director. Final Certificates of Analysis will follow these preliminary results. The signed COAs are to be considered the official results.

TEM-AHERA 061
Revision Date 06/23/18
### TEM Air Sample Worksheet

**Client Name:** The Vertex Companies, Inc.  
**Analysis Date:** 08/06/18  
**IATL Sample #:** 6575734  
**Client Sample #:** ASJenks-0806-01  
**IATL Grid Box #:** 1137  
**Grid Archive ID #:** R7R9

**Electron Microscope ID:** Hitachi H600AB, 542-47-7  
**Filter Dia. (mm):** 25  
**Effective Area (mm²):** 385  
**Filter Type:** MCE  
**Filter Pore Size (μm):** 0.45  
**Magnification:** 20,000X  
**Accelerating Voltage:** 100KeV

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type</th>
<th>Length 0.5 - 5.0 μm (μm)</th>
<th>Length &gt; 5.0 μm (μm)</th>
<th>Chrysotile</th>
<th><strong>Amphibole</strong></th>
<th>*<strong>Non-Asbestos</strong></th>
<th>Micrograph / EDS ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>R7 E6</td>
<td>NSD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F6</td>
<td>1</td>
<td>M</td>
<td>1</td>
<td></td>
<td>CX</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>R9 B4</td>
<td>NSD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B5</td>
<td>NSD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Asbestos Structures:** 1  
**Non-Asbestos Structures:** NSD

- **0.5μm - 5.0μm:** 1
- **>5.0μm:**
  - Asbestos: 19.2 s/mm²
  - Non-Asbestos: < 19.2 s/mm²
  - Asbestos: 0.0041 s/ce
  - Non-Asbestos: < 0.0041 s/ce

**Analysis Data:**

- **Prep Quality:** Good  
- **Dissolution:** Good  
- **Carbon Film:** Good  
- **Leading:** 8%

**Comments:**

**Prepared By:** J. Jeon  
**Reviewed By:**

---

1. Record Structure Length & Width (μm)
2. SEE REVERSE: FIBER ORIENTATION MAP

---

* Must confirm by Morphology, SAED, and EDXA for each suspect asbestos fiber
  
** Record visible prominent Chrysotile DP reflections (002, 004, 110, 130, 220, 200)
  
** Define Amphibole (DP obtained Y/N). Print-out EDS and attach.
  
*** Characterize by EDS

---

TEM AHERA WS 002  
2 of 7
### TEM Air Sample Worksheet

**Client Name:** The Vertex Companies, Inc.  
**Analysis Date:** 08/06/18  
**IATL Sample #:** 6575735  
**Client Project #:** 51207  
**Sample Type:** AHERA - Philly Regulations  
**QC Submittal**

- **Electron Microscope ID:**  
  - Filter Dia. (mm): 25  
  - Effective Area (mm): 385  
  - Magnification: 20,000X  
- **Hitachi H600AB, 542-47-7**  
  - Filter Type: MCE  
  - Accelerating Voltage: 100KeV  
- **EVEX**  
  - Filter Pore Size (μm): 0.45

<table>
<thead>
<tr>
<th>Grid Opening</th>
<th>Volume of Air Sampled</th>
<th>Total Area Analyzed</th>
<th>Grid Openings Read/Required</th>
<th>Analytical Sensitivity</th>
<th>Minimum Detection Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.115 mm</td>
<td>1805 Liters</td>
<td>0.0520 mm²</td>
<td>4</td>
<td>19.2 mm²</td>
<td>0.0041 s/cec</td>
</tr>
<tr>
<td>0.013 mm²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Asbestos Structures:** NSD  
**Non-Asbestos Structures:** NSD

<table>
<thead>
<tr>
<th>Structure ID</th>
<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>1 Length 0.5-5.0 μm</th>
<th>2 Length &gt; 5.0 μm</th>
<th>* Chrysotile</th>
<th>**Amphibole</th>
<th>***Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2</td>
<td>F3</td>
<td>NSD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>G3</td>
<td></td>
<td>NSD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S4</td>
<td>G4</td>
<td>NSD</td>
<td></td>
<td></td>
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<td></td>
<td>NSD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total:** NSD NSD 0 0 0 0 0

---

**Analysis Data:**

---

**Notes:**

- Must confirm by Morphology, SAED, and EDXA for each suspect asbestos fiber.
- Record visible prominent Chrysotile DP reflections (002, 004, 110, 130, 220, 200).
- Define Amphibole (DP obtained Y/N). Print-out EDS and attach.
- Characterize by EDS.

---

**Prep Quality:**

- Dissolution: Good
- Carbon Film: Good
- Loading: 9%

---

**Comments:**

---

**Prepared By:** J. Jean

---

**Reviewed By:**

---

**TEM AHERA WS 002**  
**3 of 7**
TEM Air Sample Worksheet

Client Name: The Vertex Companies, Inc.

Analysis Date: 08/06/18

IATL Sample #: 6575736

Client Project #: 51207

Sample Type: AHERA - Philly Regulations

IATL Grid Box #: 1137

QC Submittal: R

Grid Archive ID #: S658

Electron Microscope ID: Hitachi H600AB, 542-47-7

Filter Dia. (mm): 25

Magnification: 20,000X

Effective Area (mm²): 385

Accelerating Voltage: 100KeV

Filter Type: MCE

Filter Pore Size (μm): 0.45

Grid Opening: 0.115 mm

Volume of Air Sampled: 1805 Liters

Grid opening Area: 0.013 mm²

Analytical Sensitivity: 19.2 mm²

Grid Openings Read/Required: 4

Minimum Detection Limit: 0.0041 s/cc

Total Area Analyzed: 0.0520 mm²

Total Asbestos Structures: NSD

Non-Asbestos Structures: NSD

0.5μm - 5.0μm: NSD

Asbestos: < 19.2 s/mm²

Non-Asbestos: < 19.2 s/mm²

>5.0μm:

Asbestos: < 0.0041 s/cc

Non-Asbestos: < 0.0041 s/cc

Analysis Data:

<table>
<thead>
<tr>
<th>Grid Opening</th>
<th>Structure Number</th>
<th>Structure Type</th>
<th>1 Length 0.5 - 5.0 μm</th>
<th>2 Length &gt; 5.0 μm</th>
<th>* Chrysotile</th>
<th>**Amphibole</th>
<th>***Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>S6 E9</td>
<td>NSD</td>
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<td>NSD</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>S8 C8</td>
<td>NSD</td>
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<td>NSD</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

Total: NSD NSD 0 0 0 0 0 0

* Must confirm by Morphology, SAED, and EDXA for each suspect asbestos fiber

** Define Amphibole (DP obtained Y/N). Print-out EDS and attach.

*** Characterize by EDS

1, 2 Record Structure Length & Width (μm)

SEE REVERSE: FIBER ORIENTATION MAP

Prep Quality: Dissolution Good

Carbon Film Good

Loading 9%

Comments: Analyzed By: J. Jean

Reviewed By: 
**TEM Air Sample Worksheet**

**Client Name:** The Vertex Companies, Inc.  
**Analysis Date:** 08/06/18  
**IATL Sample #:** 6575737  
**Client Project #:** 51207  
**Sample Type:** AHERA -Philly Regulations  
**QC Submittal**  
**IATL Grid Box #:** 1137

**Electron Microscope ID:**  
- **Filter Dia. (mm):** 25  
- **Effective Area (mm²):** 385  
- **Magnification:** 20.000X  
- **Filter Type:** MCE  
- **Accelerating Voltage:** 100Kev

**Grid Opening:** 0.115 mm  
**Volume of Air Sampled:** 1805 liters  
**Grid opening Area:** 0.013 mm²  
**Grid Openings Read/Required:** 4/4  
**Total Area Analyzed:** 0.0520 mm²  
**Analytical Sensitivity:** 19.2 mm²  
**Minimum Detection Limit:** 0.0041 s/cc

**Total Asbestos Structures:** NSD  
**Non-Asbestos Structures:** NSD

<table>
<thead>
<tr>
<th>Total</th>
<th>NSD</th>
<th>NSD</th>
<th>&lt; 19.2</th>
<th>&lt; 0.0041</th>
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<tr>
<td>0.5μm - 5.0μm:</td>
<td>NSD</td>
<td>NSD</td>
<td>s/mm²</td>
<td>s/cc</td>
</tr>
<tr>
<td>&gt;5.0μm:</td>
<td>Asbestos:</td>
<td>&lt; 19.2</td>
<td>s/mm²</td>
<td></td>
</tr>
<tr>
<td>Asbestos:</td>
<td>&lt; 0.0041</td>
<td>s/cc</td>
<td></td>
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**Analysis Data:**

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<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>1 Length 0.5 -5.0 μm</th>
<th>2 Length &gt; 5.0 μm</th>
<th>* Chrysotile</th>
<th>**Amphibole</th>
<th>***Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
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<tbody>
<tr>
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<td>NSD</td>
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<td></td>
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<td>T1 C4</td>
<td>NSD</td>
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<td>NSD</td>
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</tr>
<tr>
<td>Total</td>
<td>NSD</td>
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<td>0</td>
<td>0</td>
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<td></td>
</tr>
</tbody>
</table>

* Must confirm by Morphology, SAED, and EDX for each suspect asbestos fiber  
  Record visible prominent Chrysotile DP reflections (002, 004, 110, 130, 220, 200)  
** Define Amphibole (DP obtained Y/N), Print-out EDS and attach.  
*** Characterize by EDS  
1, 2 Record Structure Length & Width (μm)  
SEE REVERSE: FIBER ORIENTATION MAP

**Comments:**

**Prep Quality:** Good  
**Dissolution:** Good  
**Carbon Film:**  
**Leading:** 8%

**Analyzed By:** J. Jeon  
**Reviewed By:**
TEM Air Sample Worksheet

Client Name: The Vertex Companies, Inc.  Analysis Date: 08/06/18  IATL Sample #: 6575738
Client Project #: 51207  Client Sample #: AS.Jenks-0806-05
Sample Type: AHERA - Philly Regulations  IATL Grid Box #: 1137
QC Submittal

<table>
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<tr>
<th>Electron Microscope ID:</th>
<th>Filter Dia. (mm): 25</th>
<th>Magnification: 20,000X</th>
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</thead>
<tbody>
<tr>
<td>Hitachi H600AB, 542-47-7</td>
<td>Effective Area (mm²): 385</td>
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</tr>
<tr>
<td>EVEX</td>
<td>Filter Type: MCF</td>
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<tr>
<td></td>
<td>Accelerating Voltage: 100KeV</td>
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<tr>
<td></td>
<td>Filter Pore Size (μm): 0.45</td>
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<table>
<thead>
<tr>
<th>Grid Opening: 0.115 mm</th>
<th>Volume of Air Sampled: 1805 Leters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid opening Area: 0.013 mm²</td>
<td></td>
</tr>
<tr>
<td>Grid Openings Read/Required: 4 / 4</td>
<td></td>
</tr>
<tr>
<td>Analytical Sensitivity: 19.2 mm²</td>
<td></td>
</tr>
<tr>
<td>Total Area Analyzed: 0.0520 mm²</td>
<td></td>
</tr>
<tr>
<td>Minimum Detection Limit: 0.0041 s/cc</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Asbestos Structures: 1</th>
<th>Non-Asbestos Structures: NSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5μm - 5.0μm: 1</td>
<td></td>
</tr>
<tr>
<td>&gt;5.0μm:</td>
<td></td>
</tr>
<tr>
<td>Asbestos: 19.2 s/mm²</td>
<td></td>
</tr>
<tr>
<td>Asbestos: 0.0041 s/cc</td>
<td></td>
</tr>
</tbody>
</table>

Analysis Data:

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>1 Length 0.5-5.0 μm</th>
<th>2 Length &gt; 5.0 μm</th>
<th>* Chrysotile</th>
<th>**Amphibole</th>
<th>***Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>T3 E7</td>
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<td>NSD</td>
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<td>T3 G2</td>
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<tr>
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<td>1</td>
<td>CX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total: 1 1 0 0

* Must confirm by Morphology, SAED, and EDX/A for each suspect asbestos fiber
** Record visible prominent Chrysotile DP reflections (002, 0.004, 110, 130, 220, 200)
*** Characterize by EDS
1, 2 Record Structure Length & Width (μm)

Prep Quality: 
Dissolution: Good
Carbon Film: Good
Loading: 9% 

SEE REVERSE: FIBER ORIENTATION MAP

Comments: 

Reviewed By: 

Analyzed By: J. Jeon

TEM AHERA WS 002

6 of 7
# CERTIFICATE OF ANALYSIS

**Client:** The Vertex Companies, Inc.  
700 Turner Way, Suite 105  
ASTON PA 19014  

**Report Date:** 8/7/2018  
**Report No.:** 570000 - TEM AHERA  
**Project:** PSD A.S. Jenks Elementary School  
**Project No.:** 51207  

**Client:** VER100

---

## TEM AIR SAMPLE ANALYSIS SUMMARY

<table>
<thead>
<tr>
<th>Lab No.</th>
<th>Volume</th>
<th>Location</th>
<th>Date Sampled</th>
<th>Density (s/mm²)</th>
<th>Concentration (s/cc)</th>
<th>Asbestos Type(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6575734</td>
<td>1805.0 L</td>
<td>IWA-Room 106 Left Side</td>
<td>8/6/18</td>
<td>19.2</td>
<td>0.0041</td>
<td>Chrysotile</td>
</tr>
<tr>
<td>6575735</td>
<td>1805.0 L</td>
<td>IWA-Room 106 Left Side</td>
<td>8/6/18</td>
<td>&lt;19.2</td>
<td>&lt;0.0041</td>
<td>None Detected</td>
</tr>
<tr>
<td>6575736</td>
<td>1805.0 L</td>
<td>IWA-Room 106 Center</td>
<td>8/6/18</td>
<td>&lt;19.2</td>
<td>&lt;0.0041</td>
<td>None Detected</td>
</tr>
<tr>
<td>6575737</td>
<td>1805.0 L</td>
<td>IWA-Room 106 Tunnel</td>
<td>8/6/18</td>
<td>&lt;19.2</td>
<td>&lt;0.0041</td>
<td>None Detected</td>
</tr>
<tr>
<td>6575738</td>
<td>1805.0 L</td>
<td>IWA-Room 106 Right Corner</td>
<td>8/6/18</td>
<td>19.2</td>
<td>0.0041</td>
<td>Chrysotile</td>
</tr>
</tbody>
</table>

Geo Mean: Geometric Mean = 0.0041 Structures/cc

---

Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/6/2018  
**Date Analyzed:** 08.07.2018  

**Signature:**  
**Analyst:** Jhoon Jeon

---

**Approved By:**
Frank E. Ehrenfeld, III  
Laboratory Director

**Dated:** 8/7/2018 9:49:49  
**Page:** 1 of 2
CERTIFICATE OF ANALYSIS

Client: The Vertex Companies, Inc.
700 Turner Way, Suite 105
ASTON PA 19014
Client: VER100

Report Date: 8/7/2018
Report No.: 570000 - TEM AHERA
Project: PSD A.S. Jenks Elementary School
Project No.: 51207

Appendix to Analytical Report:

Customer Contact: Don Hicim
Method: 40 CFR 763 Final Rule

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager: edavis@iatl.com
iATL Account Representative: Pete Lesniak
Sample Matrix: Air Cassette

General Terms, Warrants, Limits, Qualifiers:

General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at www.iATL.com and in our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warranties, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to the item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments nor any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

Information Pertinent to this Report:
Analysis by 40 CFR 763 Final Rule

Certifications:
- NIST-NVLAP No. 101165-0
- NYSDOH-LAP No. 11021

All results are based on the samples as received at the lab. iATL assumes that appropriate sampling methods have been used and that the data upon which these results are based have been accurately supplied by the client.

Detection Limit (Reporting Limit) is dependent upon the volume of air sampled. AHERA guidelines recommend a minimum of 1200 L. (0.0049 s/cc)

Disclaimers / Qualifiers:
There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation.

Dated: 8/7/2018 9:49:50
## TEM AIR SAMPLE ANALYSIS DETAILS

<table>
<thead>
<tr>
<th>Lab No.</th>
<th>6575734</th>
<th>Volume (L): 1805.0 L</th>
<th>Filter Type: MCE</th>
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</thead>
<tbody>
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<td>Client No.</td>
<td>ASJenkins-080601</td>
<td>Date Sampled: 8/6/18</td>
<td>Filter Size (mm²): 385</td>
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<tr>
<td></td>
<td></td>
<td>Location: IWA-Room 106 Left Side</td>
<td>Pore Size (µm): 0.45</td>
</tr>
<tr>
<td>Grid Openings:</td>
<td>4</td>
<td>Asbestos Structures:</td>
<td>Non-Asbestos Structures: None Detected</td>
</tr>
<tr>
<td>Opening Area (mm²):</td>
<td>0.013</td>
<td>Structures 0.5 µm to &lt;5.0 µm:</td>
<td>Structure Density (s/mm²): &lt;19.2</td>
</tr>
<tr>
<td>Area Analyzed (mm²):</td>
<td>0.0520</td>
<td>1</td>
<td>Structure Concentration (s/cc): &lt;0.0041</td>
</tr>
<tr>
<td>Sensitivity (s/mm²):</td>
<td>19.2</td>
<td>Structures ≥ 5.0 µm: None Detected</td>
<td>Non-Asbestos Type(s): None Detected</td>
</tr>
<tr>
<td>Detection Limit (s/cc):</td>
<td>0.0041</td>
<td>Structure Density (s/mm²):</td>
<td>Structure Concentration (s/cc):</td>
</tr>
<tr>
<td>Micrograph Number:</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>EDXA Spectrum ID:</td>
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<table>
<thead>
<tr>
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<tbody>
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<td>Date Sampled: 8/6/18</td>
<td>Filter Size (mm²): 385</td>
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<tr>
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<td>Pore Size (µm): 0.45</td>
</tr>
<tr>
<td>Grid Openings:</td>
<td>4</td>
<td>Asbestos Structures: None Detected</td>
<td>Non-Asbestos Structures: None Detected</td>
</tr>
<tr>
<td>Opening Area (mm²):</td>
<td>0.013</td>
<td>Structures 0.5 µm to &lt;5.0 µm: None Detected</td>
<td>Structure Density (s/mm²): &lt;19.2</td>
</tr>
<tr>
<td>Area Analyzed (mm²):</td>
<td>0.0520</td>
<td>Structures ≥ 5.0 µm: None Detected</td>
<td>Structure Concentration (s/cc): &lt;0.0041</td>
</tr>
<tr>
<td>Sensitivity (s/mm²):</td>
<td>19.2</td>
<td>Structure Density (s/mm²):</td>
<td>Non-Asbestos Type(s): None Detected</td>
</tr>
<tr>
<td>Detection Limit (s/cc):</td>
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<tr>
<td>Micrograph Number:</td>
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<td>Asbestos Type(s): None Detected</td>
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<td>EDXA Spectrum ID:</td>
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<table>
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</thead>
<tbody>
<tr>
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<td>ASJenkins-080603</td>
<td>Date Sampled: 8/6/18</td>
<td>Filter Size (mm²): 385</td>
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<tr>
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<td></td>
<td>Location: IWA-Room 106 Center</td>
<td>Pore Size (µm): 0.45</td>
</tr>
<tr>
<td>Grid Openings:</td>
<td>4</td>
<td>Asbestos Structures: None Detected</td>
<td>Non-Asbestos Structures: None Detected</td>
</tr>
<tr>
<td>Opening Area (mm²):</td>
<td>0.013</td>
<td>Structures 0.5 µm to &lt;5.0 µm: None Detected</td>
<td>Structure Density (s/mm²): &lt;19.2</td>
</tr>
<tr>
<td>Area Analyzed (mm²):</td>
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<td>Structures ≥ 5.0 µm: None Detected</td>
<td>Structure Concentration (s/cc): &lt;0.0041</td>
</tr>
<tr>
<td>Sensitivity (s/mm²):</td>
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<td>Structure Density (s/mm²):</td>
<td>Non-Asbestos Type(s): None Detected</td>
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<tr>
<td>Detection Limit (s/cc):</td>
<td>0.0041</td>
<td>Structure Concentration (s/cc): &lt;0.0041</td>
<td>Non-Asbestos Type(s): None Detected</td>
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<tr>
<td>Micrograph Number:</td>
<td></td>
<td>Asbestos Type(s): None Detected</td>
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</tr>
<tr>
<td>EDXA Spectrum ID:</td>
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</tr>
</tbody>
</table>

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 8/6/2018
Date Analyzed: 08/07/2018
Signature: Jhoon Jeon

Approved By: Frank E. Ehrenfeld, III
Laboratory Director

Dated: 8/7/2018 9:49:50 Page 1 of 3
CERTIFICATE OF ANALYSIS

Client: The Vertex Companies, Inc.
700 Turner Way, Suite 105
ASTON PA 19014

Report Date: 8/7/2018
Report No.: 570000 - TEM AHERA
Project: PSD A.S. Jenks Elementary School
Project No.: 51207

Client: VER100

TEM AIR SAMPLE ANALYSIS DETAILS

Lab No.: 6575737
Client No.: ASJenks-080604

Grid Openings: 4
Opening Area (mm²): 0.013
Area Analyzed (mm²): 0.0520
Sensitivity (s/mm²): 19.2
Detection Limit (s/cc): 0.0041

Micrograph Number:
EDXA Spectrum ID:

Volume (L): 1805.01
Date Sampled: 8/6/18
Location: IWA-Room 106 Tunnel

Asbestos Structures: None Detected
Structure Density (s/mm²): <19.2
Structure Concentration (s/cc): <0.0041
Asbestos Type(s): None Detected

Filter Type: MCF
Filter Size (mm²): 385
Pore Size (μm): 0.45
Non-Asbestos Structures: None Detected
Structure Density (s/mm²): <19.2
Structure Concentration (s/cc): <0.0041
Non-Asbestos Type(s): None Detected

Lab No.: 6575738
Client No.: ASJenks-080605

Grid Openings: 4
Opening Area (mm²): 0.013
Area Analyzed (mm²): 0.0520
Sensitivity (s/mm²): 19.2
Detection Limit (s/cc): 0.0041

Micrograph Number:
EDXA Spectrum ID:

Volume (L): 1805.0 L
Date Sampled: 8/6/18
Location: IWA-Room 106 Right Corner

Asbestos Structures: 1
Structure Density (s/mm²): <19.2
Structure Concentration (s/cc): <0.0041
Asbestos Type(s): Chrysotile

Filter Type: MCF
Filter Size (mm²): 385
Pore Size (μm): 0.45
Non-Asbestos Structures: None Detected
Structure Density (s/mm²): <19.2
Structure Concentration (s/cc): <0.0041
Non-Asbestos Type(s): None Detected

Geo Mean: Geometric Mean = 0.0041 Structures/cc

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 8/6/2018
Date Analyzed: 08/07/2018
Signature: 
Analyst: Joon Jeon

Approved By: Frank E. Ehrenfeld, III
Laboratory Director

<table>
<thead>
<tr>
<th>Client:</th>
<th>The Vertex Companies, Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>700 Turner Way, Suite 105</td>
</tr>
<tr>
<td></td>
<td>ASTON PA 19014</td>
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<tr>
<td>Client:</td>
<td>VER100</td>
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<td>Report Date:</td>
<td>8/7/2018</td>
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<td>Report No.:</td>
<td>570000 - TEM AHERA</td>
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<td>Project:</td>
<td>PSD A.S. Jenks Elementary School</td>
</tr>
<tr>
<td>Project No.:</td>
<td>51207</td>
</tr>
</tbody>
</table>
# Chain of Custody

## Contact Information
- **Client Company:** Vertex
- **Office Address:** 300 Turner Way
- **City, State, Zip:** Aston PA 19014
- **Fax Number:**
- **Email Address:** aheim@vertexeng.com

## Matrix:
- Air
- Soil
- Bulk
- Surface Dust
- Water
- Other

## Analysis Method:
- **PLM Use Bulk Asbestos Sample Log**
  - [ ] PLM: Bulk Asbestos EPA 600
  - [ ] PLM: Point Counting 198.1
  - [ ] PLM: NOB via 198.6 (PLM only)
  - [ ] If Mn by PLM, to TEM via 198.3

- **TEM: Alfa**
  - [ ] TEM: NIOSH 7400
  - [ ] TEM: ISO 13794
  - [ ] TEM: Wipe ASTM 6480
  - [ ] TEM: Microvace ASTM D5755
  - [ ] TEM: Microvace ASTM D5756
  - [ ] TEM: NOB 198.4
  - [ ] TEM: Bulk Analysis
  - [ ] TEM: Potable Water
  - [ ] TEM: Non-Potable Water

- **IAQ Use Mold Sample Log**
  - [ ] IAQ: 1 Biocersol Fungal Spore Trap
  - [ ] IAQ: 1 Biocersol Fungal Spore
  - [ ] IAQ: Tape, Bulk, Misc. Qualitative
  - [ ] IAQ: Tape, Bulk, Misc. Quantitative
  - [ ] IAQ: Other Culturable ID

- [ ] Soil: Call for Available Methods

## Special Instructions:
Analyze inside work area samples (IWA) only. Hold outside work area samples & blanks for possible future analysis.

## Turnaround Time
- **Preliminary Results Requested Date:** 8/11/18 7AM
- **Specific Date & Time:**
  - [ ] 6 Hour
  - [ ] 12 Hour
  - [ ] 24 Hour
  - [ ] 1 Day
  - [ ] 2 Day
  - [ ] 3 Day
  - [ ] 5 Day
  - [ ] 10 Day

* End of next business day unless otherwise specified.
** Matrix Dependent.
*** Please notify the lab before shipping.

## Shipping Method
- [ ] FedEx
- [ ] LPS
- [ ] LSPS
- [Other]

## Chain of Custody
- **Received (Name/ Organization):** Vertex, J.B. Branner
- **Received Date:** 8/1/18
- **Received Time:** 7:00 PM
- **Sample taken by:**
- **Sample taken Date:** 8/4/18
- **Sample taken Time:**
- **Sample Analysis:**
  - **Analysis (Name/ I/AI):**
    - **Analysis Date:** 8/1/18
    - **Analysis Time:**
  - **QA/QC Review (Name/ I/AI):**
    - **QA/QC Review Date:** 8/8/18
    - **QA/QC Review Time:**
## Sample Log

### Airborne Asbestos

**Client:** Vertex  
**Project:** AS Jenks ES

**Sampling Date/Time:** 8/8/18

<table>
<thead>
<tr>
<th>Client Sample #</th>
<th>iATL #</th>
<th>Location/Description</th>
<th>Flow Rate</th>
<th>Start End</th>
<th>Sampling time (min)</th>
<th>Area (ft²)</th>
<th>Volume (L)</th>
<th>Results</th>
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</thead>
<tbody>
<tr>
<td>ASJ-01</td>
<td>6577757</td>
<td>SWA Classroom 106 closel</td>
<td>9.5</td>
<td>5/20 PM</td>
<td>32 PM</td>
<td>190</td>
<td>1805</td>
<td></td>
</tr>
<tr>
<td>ASJ-02</td>
<td>6577758</td>
<td>SWA Classroom 106 office closei</td>
<td>9.5</td>
<td>5/20 PM</td>
<td>32 PM</td>
<td>190</td>
<td>1805</td>
<td></td>
</tr>
<tr>
<td>ASJ-03</td>
<td>6577759</td>
<td>SWA Classroom 106 control wall2</td>
<td>9.5</td>
<td>5/20 PM</td>
<td>32 PM</td>
<td>190</td>
<td>1805</td>
<td></td>
</tr>
<tr>
<td>ASJ-04</td>
<td>6577760</td>
<td>SWA Classroom 106 control 333rd floor</td>
<td>9.5</td>
<td>5/20 PM</td>
<td>32 PM</td>
<td>190</td>
<td>1805</td>
<td></td>
</tr>
<tr>
<td>ASJ-05</td>
<td>6577761</td>
<td>SWA Classroom 106 control 3rd floor</td>
<td>9.5</td>
<td>5/20 PM</td>
<td>32 PM</td>
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<td>1805</td>
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<td>ASJ-06</td>
<td>6577762</td>
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<td>1805</td>
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<td>ASJ-07</td>
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<td>SWA Classroom 106 control 4th floor</td>
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<td>5/20 PM</td>
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<td>1805</td>
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<td>ASJ-10</td>
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<td>190</td>
<td>1805</td>
<td></td>
</tr>
</tbody>
</table>

* = Insufficient Sample Provided to Perform QC Reanalysis (<200mg)  
** = Insufficient Sample Provided to Analyze (<10mg)  
*** = Matrix / Substrate Interference Possible  
F = Method Requires the submittal of blank(s).  
ML = Multi Layered Sample. May result in inconsistent results.

These preliminary results are issued by iATL to expedite procedures by clients based upon the above data. iATL assumes that all of the sampling methods and data upon which these results are based, has been accurately supplied by the client. These results may not have been reviewed by the Laboratory Director. Final Certificate of Analysis will follow these preliminary results. The signed COA is to be considered the official results. All EPA, HUD, and NJDEP conditions apply.
Highlighted info has just been changed by Jerry.

From: jhedrick@iatl.com  [mailto:jhedrick@iatl.com]
Sent: Wednesday, August 8, 2018 11:40 AM
To: 'Customer Service'; login@iatl.com; kgoedde@iatl.com; Shirley Clark; frankehrenfeld@iatl.com; Eric snyder; sjohnson@iatl.com; tarmstrong@iatl.com; ngutowiecz@iatl.com
Cc: cdcvis@iatl.com
Subject: Client Communication

Staff Member: Jeanenne

Date and Time: 8/8/2018 11:26 AM

Client Code/Name: OHCS/OHC164 and VER001

Client Phone Number: 609-338-1560

Contact: OHCS – Tim, 609-338-1560 VERTEX: Don Heim, 610.787.0402

Sample Type/Number of Samples: OHCS 10 TEM AHERA Philly Regs + 10 from Vertex

Date/Time Samples Arriving: 8-8-18 around 7:30pm hand delivery

Date/Time Results Requested: ALL 20 samples needed by 7am

Turnaround Time: 12 hours

Details:

Project Name: Jenks

Client request/expectations: verbals to Jerry and email to: jeralia@icloud.com AND Vertex results to: dheim@vertexeng.com and verbals to Don
**PRELIMINARY RESULTS**
Airborne Asbestos Analysis
**TEM AHERA**

**Client:** The Vertex Companies, Inc.  
700 Turner Way, Suite 105  
ASTON, PA 19014

**Batch No.:** 570201

**Project:** AS Jenkins ES

**Project No.:**

**Philly Regs:** Y

**Turn-Around Time:** Rush

**Client Contacts:**
- **Contacts:**
  - Frank E. Ehrenfeld III
- **Phone:** (856) 231-9449
- **Fax:** (856) 231-9818
- **Cell/Pager:** (609) 929-4211
- **E-Mail:** frankehrenfeld@iatl.com

**Laboratory Contacts:**

**Chain of Custody:**
- **Samples Taken in Field:**
- **Samples Rec'd at Laboratory:** L. D'Ornellas
- **Samples Analyzed:** C. Liska
- **Preliminary Results Faxed:**
- **Preliminary Results E-Mail:**

**Summary Data**
Transmission Electron Microscopy
**AHERA 40CFR 763**

<table>
<thead>
<tr>
<th>Client</th>
<th>IATL Sample ID #</th>
<th>Volume (L)</th>
<th>Comments</th>
<th>Results s/mm²</th>
<th>Results s/cc</th>
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<tbody>
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<td>ASJ-01</td>
<td>6577757</td>
<td>1805</td>
<td>Amosite</td>
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<td>ASJ-02</td>
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<td>1805</td>
<td>Chrysotile Amosite</td>
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<td>0.012</td>
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<td>6577759</td>
<td>1805</td>
<td>None Detected</td>
<td>&lt; 19.2</td>
<td>&lt; 0.0041</td>
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<tr>
<td>ASJ-04</td>
<td>6577760</td>
<td>1805</td>
<td>None Detected</td>
<td>&lt; 19.2</td>
<td>&lt; 0.0041</td>
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<td>ASJ-05</td>
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<td>Chrysotile Amosite</td>
<td>57.7</td>
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</tr>
</tbody>
</table>

**AHERA Clearance Criteria is 70 s/mm².**  
Average (s/mm²) = 34.6

**Phiila. Regulations Clearance Criteria is 0.00554 s/cc**  
Geo = 0.0063

**Z Test Results (see attached, if applicable)**

Sample analysis terminated. Set fails by Phiila. Regulations. (Geometric mean > 0.00554 s/cc)

These preliminary results are issued by IATL to expedite procedures by the clients based upon the above data. IATL assumes that all of the sampling methods and data upon which these results are based, has been accurately supplied by the client. These results may not have been reviewed by the Laboratory Director. Final Certificates of Analysis will follow these preliminary results. The signed COAs are to be considered the official results.

**Revision Date: 06/30/18**
## PRELIMINARY RESULTS
### Airborne Asbestos Analysis
#### TEM AHERA

### Client Contact Information:
- **Client**: The Vertex Companies, Inc.
  - 700 Turner Way, Suite 105
  - ASTON, PA 19014
- **Client No.**: VER100

### Laboratory Contact Information:
- **Contacts**: Frank E. Ehrenfeld III
- **Phone**: (856) 231-9449
- **Fax**: (856) 231-9818
- **Cell/Pager**: (609) 929-4211
- **E-Mail**: frankehrenfeld@iatl.com

### Chain of Custody:
- **Samples Taken in Field**
- **Samples Rec'd at Laboratory**: L. D'Omelias
- **Samples Analyzed**: C. Liska
- **Preliminary Results Faxed**:
- **Preliminary Results E-Mail**:

### Summary Data
#### Transmission Electron Microscopy
**AHERA 40CFR 763**

<table>
<thead>
<tr>
<th>Client</th>
<th>IATL Sample ID #</th>
<th>Volume (L)</th>
<th>Comments</th>
<th>Results s/mm²</th>
<th>Results s/cc</th>
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<td>6577757</td>
<td>1805</td>
<td>Amosite</td>
<td>19.2</td>
<td>0.0041</td>
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<tr>
<td>ASJ-02</td>
<td>6577758</td>
<td>1805</td>
<td>Chrysotile Amosite</td>
<td>57.7</td>
<td>0.012</td>
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<tr>
<td>ASJ-03</td>
<td>6577759</td>
<td>1805</td>
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<td>&lt; 19.2</td>
<td>&lt; 0.0041</td>
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<td>ASJ-04</td>
<td>6577760</td>
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<td>1805</td>
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<td>38.5</td>
<td>0.0002</td>
</tr>
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</table>

**AHERA Clearance Criteria is 70 s/mm².**
**Average (s/mm²) = 30.8**
**Phila. Regulations Clearance Criteria is 0.00554 s/cc**
**Geo = 0.00584**
**Z Test Results (see attached, if applicable)**

### Sample Analysis Terminated
Set fails by Phila. Regulations. (Geometric mean > 0.00554 s/cc)

These preliminary results are issued by IATL to expedite procedures by the clients based upon the above data. IATL assumes that all of the sampling methods and data upon which these results are based, has been accurately supplied by the client. These results may not have been reviewed by the Laboratory Director. Final Certificates of Analysis will follow these preliminary results. The signed COAs are to be considered the official results.

**Revision Date: 06/30/18**
**TEM Air Sample Worksheet**

**Client Name:** The Vertex Companies, Inc.  
**Analysis Date:** 08/09/18  
**IATL Sample #:** 6577757  
**Client Project #:**  
**Sample Type:** AHERA - Philly Regulations  
**QC Submittal**  
**IATL Grid Box #:** 1141  
**Grid Archive ID #:** R3R5

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<tr>
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<th>Filter Dia. (mm):</th>
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<th>Magnification:</th>
<th>20,000X</th>
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<tbody>
<tr>
<td></td>
<td>Effective Area (mm²):</td>
<td>385</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Hitachi H600AB, 542-47-3</td>
<td>Filter Type:</td>
<td>MCE</td>
<td>Accelerating Voltage:</td>
<td>100KeV</td>
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<tr>
<td>EVEX</td>
<td>Filter Pore Size (µm):</td>
<td>0.45</td>
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</table>

<table>
<thead>
<tr>
<th>Grid Opening:</th>
<th>0.115 mm</th>
<th>Volume of Air Sampled:</th>
<th>1805 Liters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid opening Area:</td>
<td>0.013 mm²</td>
<td>Grid Openings Read/Required:</td>
<td>4/4</td>
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<tr>
<td>Total Area Analyzed:</td>
<td>0.0520 mm²</td>
<td>Analytical Sensitivity:</td>
<td>19.2 mm²</td>
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<tr>
<td>Minimum Detection Limit:</td>
<td>0.0041 s/cc</td>
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<td></td>
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</tbody>
</table>

**Total Asbestos Structures:** 1  
**Non-Asbestos Structures:** NSD

<table>
<thead>
<tr>
<th>0.5µm - 5.0µm:</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asbestos:</td>
<td>19.2 s/mm²</td>
</tr>
<tr>
<td>Asbestos:</td>
<td>0.0041 s/cc</td>
</tr>
<tr>
<td>Non-Asbestos:</td>
<td>&lt; 19.2 s/mm²</td>
</tr>
<tr>
<td>Non-Asbestos:</td>
<td>&lt; 0.0041 s/cc</td>
</tr>
</tbody>
</table>

**Analysis Data:**

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>¹ Length 0.5 - 5.0 µm</th>
<th>² Length &gt; 5.0 µm</th>
<th>* Chrysotile</th>
<th>** Amphibole</th>
<th>*** Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
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</thead>
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<tr>
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<td>NSD</td>
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<tr>
<td>R5</td>
<td>C1</td>
<td>NSD</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>D2</td>
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<td>1</td>
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<td></td>
<td></td>
<td></td>
<td>DP 3256</td>
</tr>
</tbody>
</table>

**Total:** 1 1 0 1 0

---

* Must confirm by Morphology, SAED, and EDXA for each suspect asbestos fiber

Record visible prominent Chrysotile DP reflections (002, 004, 110, 130, 220, 200)

** Define Amphibole (DP obtained Y/N), Print-out EDS and attach.

*** Characterize by EDS

1.2 Record Structure Length & Width (µm)

SEE REVERSE: FIBER ORIENTATION MAP

Comments:

Prep Quality:
Dissolution: GOOD
Carbon Film: GOOD
Loading: 2%

Analyzed By: [Signature]
Reviewed By: [Signature]

TEM.AHERA WS.002  1 of 5
**TEM Air Sample Worksheet**

**Client Name:** The Vortex Companies, Inc.  
**Client Project #:**  
**Sample Type:** AHERA - Philly Regulations  
**QC Submittal**

<table>
<thead>
<tr>
<th>Electron Microscope ID: Hitachi H600AB, 542-47-3</th>
<th>Filter Dia. (mm): 25</th>
<th>Magnification: 20,000X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective Area (mm²): 385</td>
<td>Filter Type: MCE</td>
<td>Accelerating Voltage: 100KeV</td>
</tr>
<tr>
<td>Filter Pore Size (μm): 0.45</td>
<td>Grid Archive ID #: R7R9</td>
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</table>

<table>
<thead>
<tr>
<th>Grid Opening: 0.115 mm</th>
<th>Volume of Air Sampled: 1805 Liters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid Opening Area: 0.013 mm²</td>
<td>Analytical Sensitivity: 19.2 mm²</td>
</tr>
<tr>
<td>Grid Openings Read/Required: 4/4</td>
<td>Minimum Detection Limit: 0.0041 s/cc</td>
</tr>
<tr>
<td>Total Area Analyzed: 0.0520 mm²</td>
<td></td>
</tr>
</tbody>
</table>

**Total Asbestos Structures:** 3  
**Non-Asbestos Structures:** NSD

- 0.5μm - 5.0μm: 3  
- >5.0μm:
  - Asbestos: 57.7 s/mm²  
  - Non-Asbestos: < 19.2 s/mm²  
  - Asbestos: 0.012 s/cc  
  - Non-Asbestos: < 0.0041 s/cc

### Analysis Data:

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>Length 0.5 - 5.0 μm</th>
<th>Length &gt; 5.0 μm</th>
<th><em>Chrysotile</em></th>
<th><strong>Amphibole</strong></th>
<th><em><strong>Non-Asbestos</strong></em></th>
<th>Micrograph / EDS ID</th>
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<tr>
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</tr>
</tbody>
</table>

**Total:** 3  
2  
1  
0

* Must confirm by Morphology, SAED, and EDXA for each suspect asbestos fiber  
** Record visible prominent Chrysotile DP reflections (002, 004, 110, 130, 220, 200)  
*** Define Amphibole (DP obtained Y/N). Print-out EDS and attach.  
Characterize by EDS  
1. Record Structure Length & Width (μm)  

**SEE REVERSE: FIBER ORIENTATION MAP**

**Prep Quality:**  
Dissolution: GOOD  
Carbon Film: GOOD  
Loading: <1

**Comments:**

**Analyzed By:** C. Liska  
**Reviewed By:**

---

IATL International Asbestos Testing Laboratories
## TEM Air Sample Worksheet

**Client Name:** The Vertex Companies, Inc.  
**Analysis Date:** 08/09/18  
**IATL Sample #:** 6577759  
**Client Sample #:** ASJ–03  
**IATL Grid Box #:** 1141  
**Grid Archive ID #:** S254

### Electron Microscope ID:
- **Hitachi H600AB, 542-47-3**
- **Filter Dia (mm):** 25
- **Effective Area (mm²):** 385
- **Filter Type:** MCE
- **Filter Pore Size (µm):** 0.45
- **Magnification:** 20,000X
- **Accelerating Voltage:** 100KeV

### Grid Opening:
- **Grid Opening:** 0.115 mm
- **Gridopening Area:** 0.013 mm²
- **Grid Openings Read/Required:** 4/4
- **Total Area Analyzed:** 0.0520 mm²

### Volume of Air Sampled:
- **1805 Liters**

### Analytical Sensitivity:
- **19.2 mm²/s/mm²**
- **Minimum Detection Limit:** 0.0041 s/cc

### Total Asbestos Structures:
- **NSD**
- **0.5µm - 5.0µm:** NSD
- **>5.0µm:**
  - **Asbestos:** < 19.2 s/mm²
  - **Non-Asbestos:** < 19.2 s/mm²
  - **Asbestos:** < 0.0041 s/cc
  - **Non-Asbestos:** < 0.0041 s/cc

### Analysis Data:

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>1 Length 0.5 - 5.0 µm</th>
<th>2 Length &gt; 5.0 µm</th>
<th>* Chrysotile</th>
<th>** Amphibole</th>
<th>*** Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2</td>
<td>H3</td>
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<td>0</td>
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<td>0</td>
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<td>NSD</td>
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<tr>
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<td>C9</td>
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</tr>
</tbody>
</table>

### Notes:
- *Must confirm by Morphology, SAED, and EDXa for each suspect asbestos fiber*
- Record visible prominent Chrysotile DP reflections (002, .004, 110, 130, 220, 200)
- **Define Amphibole (DP obtained Y/N). Print-out EDS and attach.**
- **Characterize by EDS**

### Comments:

| **CRYSTALOE. AMOSITE PRESENT BUT NOT COUNTABLE** |
| **BY AHERA RULES (2 AMOSITE, 1 CHRYSOTILE MATRICES)** |

### Prep Quality:
- **Dissolution:** GOOD
- **Carbon Film:** GOOD
- **Loading:** 1%

### Analyzed By:
- C. Liska

### Reviewed By:

---

**IATL AHERA WS 002**

3 of 5
TEM Air Sample Worksheet

Client Name: The Vertex Companies, Inc.  
Client Project #:  
Sample Type: AHERA - Philly Regulations  
QC Submittal  

Electron Microscope ID:  
Filter Dia. (mm): 25  
Effective Area (mm²): 385  
Filter Type: MCE  
Filter Pore Size (µm): 0.45  
Accelerating Voltage: 100KeV  

<table>
<thead>
<tr>
<th>Grid Opening</th>
<th>Volume of Air Sampled: 1805 Liters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening Area</td>
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</tr>
<tr>
<td>mm²</td>
<td></td>
</tr>
<tr>
<td>Total Area Analyzed</td>
<td>0.0520 mm²</td>
</tr>
<tr>
<td>Analytical Sensitivity</td>
<td>19.2 mm²</td>
</tr>
<tr>
<td>Minimum Detection Limit</td>
<td>0.0041 s/cc</td>
</tr>
</tbody>
</table>

Total Asbestos Structures: NSD  
Non-Asbestos Structures: NSD  
0.5µm - 5.0µm: NSD  
>5.0µm: NSD  
Asbestos: < 19.2 s/mm²  
Non-Asbestos: < 19.2 s/mm²  
Asbestos: < 0.0041 s/cc  
Non-Asbestos: < 0.0041 s/cc

Analysis Data:

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>1 Length 0.5 - 5.0 µm</th>
<th>2 Length &gt; 5.0 µm</th>
<th>* Chrysotile</th>
<th>** Amphibole</th>
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<th>Micrograph / EDS ID</th>
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</tr>
<tr>
<td>J2</td>
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<td>NSD</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Total: NSD NSD 0 0 0 0 0 0

* Must confirm by Morphology, SAED, and EDX for each suspect asbestos fiber  
** Record visible prominent Chrysotile Dp reflections (002 .004. 110. 130. 220. 300)  
*** Characterize by EDS  
1, 2 Record Structure Length & Width (µm)  
Prep Quality:  
Dissolution: GOOD  
Carbon Film: GOOD  
Loading: <1

Comments:  

Prep Quality: GOOD  
Analyst: C. Liska  
Reviewed: C. Liska
**TEM Air Sample Worksheet**

**Client Name:** The Vertex Companies, Inc.  
**Analysis Date:** 08/09/18  
**IATL Sample #:** 6577761  
**Client Project #:**  
**IATL Grid Box #:** 1141  
**IATL Sample #:**  
**Client Sample #:** ASJ-05

**Sample Type:** AIIERA -Philly Regulations  
**QC Submittal:**

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<th>Magnification: 20,000X</th>
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<tbody>
<tr>
<td>Effective Area (mm²): 385</td>
<td>Accelerating Voltage: 100KeV</td>
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</tbody>
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**Filter Type:** MCE  
**Filter Pore Size (µm):** 0.45

**Grid Opening: 0.115 mm**  
**Grid opening Area: 0.013 mm²**  
**Grid Openings Read/Required:** 4/4  
**Total Area Analyzed:** 0.0520 mm²  
**Volume of Air Sampled:** 1805 Liters

**Analytical Sensitivity:** 19.2 mm²  
**Minimum Detection Limit:** 0.0041 s/cc

**Total Asbestos Structures:** 3  
**Non-Asbestos Structures:** NSD

- 0.5μm - 5.0μm: 2
- >5.0μm: 1
  - Asbestos: 57.7 s/mm²  
  - Non-Asbestos: < 19.2 s/mm²
  - Asbestos: 0.012 s/cc  
  - Non-Asbestos: < 0.0041 s/cc

### Analysis Data:

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>Length 0.5 - 5.0 µm</th>
<th>Length &gt; 5.0 µm</th>
<th>Chrysotile CD</th>
<th>Amphibole</th>
<th>Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
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<td>F</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total: 3 | 2 | 1 | 2 | 1 | 0 |

* Must confirm by Morphology, SAED, and EDXA for each suspect asbestos fiber

**Record visible prominent Chrysotile DP reflections (002, 004, 110, 130, 220, 200)**  
**Define Amphibole (DP obtained Y/N). Print-out EDS and attach.**  
**Characterize by EDS**

**I, 2 Record Structure Length & Width (µm)**

**SEE REVERSE: FIBER ORIENTATION MAP**

**Comments:**

**Prep Quality:**  
Dissolution: GOOD  
Carbon Film: GOOD  
Loading: 1%

**Analyzed By:** C. Liska  
**Reviewed By:**

---

**TEM AIIERA WS 902**  
5 of 5
TEM Air Sample Worksheet

Client Name: The Vertex Companies, Inc.  
Client Project #:  
Sample Type: AHERA - Philly Regulations  
QC Submittal:  

Electron Microscope ID: Hitachi H600AB, 542-47-3  
Filter Dia. (mm): 25  
Effective Area (mm²): 385  
Filter Type: MCE  
Filter Pore Size (μm): 0.45  
Magnification: 20.000X  
Accelerating Voltage: 100KeV

<table>
<thead>
<tr>
<th>Grid Opening</th>
<th>Volume of Air Sampled: 1805 Liters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid Opening Area: 0.013 mm²</td>
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</tr>
<tr>
<td>Grid Openings Read/Required: 4/4</td>
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<tr>
<td>Total Area Analyzed: 0.0520 mm²</td>
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</tbody>
</table>

Total Asbestos Structures: 30  
Non-Asbestos Structures: NSD

Analysis Data:

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<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type</th>
<th>1 Length 0.5 - 5.0 μm</th>
<th>2 Length &gt; 5.0 μm</th>
<th>* Chrysotile</th>
<th>** Amphibole</th>
<th>*** Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
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<tbody>
<tr>
<td>S10 B2</td>
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<td>2</td>
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<td>CD</td>
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<td></td>
</tr>
</tbody>
</table>

Total: 3 2 1 2 0 0

* Must confirm by Morphology, SAED, and EDX for each suspect asbestos fiber

** Define Amphibole (DP obtained Y/N). Print-out EDS and attach.

*** Characterize by EDS

1. Record Structure Length & Width (μm)

SEE REVERSE: FIBER ORIENTATION MAP

Comments: ____________________________

Prep Quality:  
Dissolution: GOOD  
Carbon Film: GOOD  
Loading: 1%

Analyzed By: C. Liska  
Reviewed By: ____________________________

IATL Sample #: 6577761  
Client Sample #: ASJ-05  
IATL Grid Box #: 1141  
Grid Archive ID #: S10T1
# PRELIMINARY RESULTS

**Airborne Asbestos Analysis**
**TEM AHERA**

<table>
<thead>
<tr>
<th>Client</th>
<th>700 Turner Way Suite 105</th>
<th>Batch No.: 570201</th>
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<tr>
<td></td>
<td>Aston PA 19014</td>
<td>Project: AS Jobs ES</td>
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<td>Client No.:</td>
<td>VER100</td>
<td>Project No.:</td>
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<tr>
<td></td>
<td></td>
<td>Philly Regs: Y</td>
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<td></td>
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<td>Turn-Around Time: 6 Hour Rush</td>
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<table>
<thead>
<tr>
<th>Client Contacts</th>
<th>Laboratory Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contacts:</td>
<td>Frank E. Ehrenfeld III</td>
</tr>
<tr>
<td>Phone:</td>
<td>(856) 231-9449</td>
</tr>
<tr>
<td>Fax:</td>
<td>(856) 231-9818</td>
</tr>
<tr>
<td>Cell/Pager:</td>
<td>(609) 929-4211</td>
</tr>
<tr>
<td>E-Mail:</td>
<td><a href="mailto:frankehrenfeld@iatl.com">frankehrenfeld@iatl.com</a></td>
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</tbody>
</table>

**Summary Data**

**Transmission Electron Microscopy**
**AHERA 40CFR 763**

<table>
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<tr>
<th>Client</th>
<th>Sample ID #</th>
<th>IATL Sample ID #</th>
<th>Volume (L)</th>
<th>Comments</th>
<th>Results s/mm²</th>
<th>Results s/cc</th>
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<td>1805</td>
<td>None Detected</td>
<td>&lt; 19.2</td>
<td>&lt; 0.0041</td>
</tr>
</tbody>
</table>

**AHERA Clearance Criteria is 70 s/mm².**
**Average (s/mm²) = 23.1**
**Phila. Regulations Clearance Criteria is 0.00554 s/cc**
**Geo = 0.00471**

These preliminary results are issued by IATL to expedite procedures by the clients based upon the above data. IATL assumes that all of the sampling methods and data upon which these results are based, has been accurately supplied by the client. These results may not have been reviewed by the Laboratory Director. Final Certificates of Analysis will follow these preliminary results. The signed COAs are to be considered the official results.

**Revision Date: 06/22/18**
### TEM Air Sample Worksheet

**Client Name:** Vertex  
**Client Project #:**  
**Sample Type:** AHERA - Philly Regulations  
**QC Submittal:** R  
**Analysis Date:** 08/08/18  
**IATL Sample #:** 6577757  
**Client Sample #:** ASJ-01  
**IATL Grid Box #:** 1141  
**Grid Archive ID #:** R3R5  

**Electron Microscope ID:**  
- Filter Dia. (mm): 25  
- Effective Area (mm): 385  
- Magnification: 20,000X  
- Filter Type: MCE  
- Accelerating Voltage: 100KeV  
- Filler Pore Size (μm): 0.45

<table>
<thead>
<tr>
<th>Grid Opening</th>
<th>0.115 mm</th>
<th>Volume of Air Sampled: 1805 Liters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid opening Area</td>
<td>0.013 mm²</td>
<td></td>
</tr>
<tr>
<td>Grid Openings Read/Required</td>
<td>4/4</td>
<td></td>
</tr>
<tr>
<td>Total Area Analyzed</td>
<td>0.0520 mm²</td>
<td></td>
</tr>
</tbody>
</table>

**Total Asbestos Structures:**  
- NSD  
- 0.5μm - 5.0μm: NSD  
- >5.0μm:  
  - Asbestos: < 19.2 s/mm²  
  - Asbestos: < 0.0041 s/μm

**Non-Asbestos Structures:**  
- NSD

### Analysis Data:

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type</th>
<th>F/B/C/M</th>
<th>¹ Length 0.5 - 5.0 μm</th>
<th>² Length &gt; 5.0 μm</th>
<th>* Chrysotile</th>
<th>**Amphibole</th>
<th>***Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
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<tr>
<td>R3</td>
<td>I3</td>
<td>NSD</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total: NSD NSD 0 0 0 0 0 0

* Must confirm by Morphology, SAED, and EDXRA for each suspect asbestos fiber

** Record visible prominent Chrysotile DP reflections (002, 004, 110, 130, 220, 200)

** Define Amphibole (DP obtained Y/N). Print-out EDS and attach.

*** Characterize by EDS

1, 2 Record Structure: Length & Width (μm)  

SEE REVERSE: FIBER ORIENTATION MAP

**Prep Quality:**  
- Dissolution: Good  
- Carbon Film: Good  
- Loading: 3%

**Comments:**  

**Analyzed By:** P. Secchia  
**Reviewed By:**
# TEM Air Sample Worksheet

**Client Name:** Vertex  
**Analysis Date:** 08/08/18  
**IATL Sample #:** 6577758  
**Client Project #:**  
**Sample Type:** AHERA - Philly Regulations  
**IATL Grid Box #:** 1141  
**QC Submittal**  
**Grid Archive ID #:** R7R9

**Electron Microscope ID:** Hitachi H600AB, 542-47-3  
**Filter Dia. (mm):** 25  
**Effective Area (mm²):** 385  
**Magnification:** 20,000X  
**Filter Type:** MCE  
**Accelerating Voltage:** 100KeV  
**Filter Pore Size (µm):** 0.45

<table>
<thead>
<tr>
<th>Grid Opening (mm)</th>
<th>Volume of Air Sampled (Liters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.115</td>
<td>1805</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grid Opening Area (mm²)</th>
<th>Analytical Sensitivity (mm³)</th>
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</thead>
<tbody>
<tr>
<td>0.013</td>
<td>19.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grid Openings Read/Required</th>
<th>Total Area Analyzed (mm²)</th>
<th>Minimum Detection Limit (s/cc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0.0520</td>
<td>0.0041</td>
</tr>
</tbody>
</table>

### Asbestos Structures

<table>
<thead>
<tr>
<th>Total Asbestos Structures</th>
<th>Non-Asbestos Structures</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>NSD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Structure Type F/B/C/M</th>
<th>1 Length 0.5 - 5.0 µm</th>
<th>2 Length &gt; 5.0 µm</th>
<th>Chrysotile</th>
<th>Amphibole</th>
<th>Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
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</thead>
<tbody>
<tr>
<td>R7 J7</td>
<td>NSD</td>
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</tr>
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<tr>
<td>1</td>
<td>M</td>
<td>1</td>
<td>CX</td>
<td></td>
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</tr>
<tr>
<td>R9 J4</td>
<td>NSD</td>
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</tr>
<tr>
<td>J5</td>
<td>NSD</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

| Total: 2 | 1 | 1 | 2 | 0 | 0 |

* Must confirm by Morphology, SAED, and EDX/A for each suspect asbestos fiber  
** Record visible prominent Chrysotile DP reflections (002, 004, 110, 130, 220, 200)  
*** Define Amphibole (DP obtained Y/N). Print-out EDS and attach.  
** Characterize by EDS  
1, 2 Record Structure Length & Width (µm)  

**Prep Quality:**  
Dissolution: Good  
Carbon Film: Good  
Loading: 2%

**Analysis Data:**

**Analysis By:** P. Secchia  
**Reviewed By:**

SEE REVERSE: FIBER ORIENTATION MAP
TEM Air Sample Worksheet

Client Name: Venus
Client Project #: 6577759
Sample Type: AHERA -Philly Regulations
QC Submittal

Electron Microscope ID: Hitachi H600AB, 542-47-3
Filter Dia. (mm): 25
Effective Area (mm²): 385
Filter Type: MCE
Filter Pore Size (µm): 0.45
Magnification: 20,000X
Accelerating Voltage: 100KeV

Grid Opening: 0.115 mm
Volume of Air Sampled: 1805 Liters
Grid opening Area: 0.013 mm²
Grid Openings Read/Required: 4 / 4
Total Area Analyzed: 0.0320 mm²
Minimum Detection Limit: 0.0041 s/cc
Analytical Sensitivity: 19.2 mm²

Total Asbestos Structures: NSD
Non-Asbestos Structures: NSD

Analysis Data:

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>¹ Length 0.5 - 5.0 µm</th>
<th>² Length &gt; 5.0 µm</th>
<th>* Chrysotile</th>
<th>** Amphibole</th>
<th>*** Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
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</thead>
<tbody>
<tr>
<td>S2 H3</td>
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<td></td>
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<td>NSD</td>
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<td>NSD</td>
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<td>NSD</td>
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<td></td>
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<tr>
<td>Total</td>
<td>NSD</td>
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<td>0</td>
<td>0</td>
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<td>0</td>
<td></td>
</tr>
</tbody>
</table>

* Must confirm by Morphology, SAED, and EDX A for each suspect asbestos fiber
  Record visible prominent Chrysotile DP reflections (002, .004, 110, 130, 220, 200)
** Define Amphibole (DP obtained Y/N). Print-out EDS and attach.
*** Characterize by EDS
1, 2 Record Structure Length & Width (µm)

Prep Quality: Good
Dissolution: Good
Carbon Film: Good
Loading: 2%

SEE REVERSE: FIBER ORIENTATION MAP

Comments:

Prepared By: P. Vecchio
Reviewed By:
TEM Air Sample Worksheet

Client Name: Vertex
Client Project #: 
Sample Type: AHERA - Philly Regulations
QC Submittal: 

Analysis Date: 08/08/18
IATL Sample #: 6577760
Client Sample #: ASJ-04
IATL Grid Box #: 1141
Grid Archive ID #: S6S8

Electron Microscope ID: Hitachi H600AB, 542-47-3
Filter Dia. (mm): 25
Effective Area (mm²): 385
Filter Type: MCE
Filter Pore Size (μm): 0.45

Magnification: 20,000X
Accelerating Voltage: 100KcV

Grid Opening: 0.115 mm
Grid opening Area: 0.013 mm²
Grid Openings Read/Required: 4/4
Total Area Analyzed: 0.0520 mm²
Volume of Air Sampled: 1805 Liters
Analytical Sensitivity: 19.2 mm²
Minimum Detection Limit: 0.0041 s/cc

Total Asbestos Structures: NSD
Non-Asbestos Structures: NSD

0.5μm - 5.0μm: NSD
>5.0μm: NSD
Asbestos: < 19.2 s/mm²
Non-Asbestos: < 19.2 s/mm²
Asbestos: < 0.0041 s/cc
Non-Asbestos: < 0.0041 s/cc

Analysis Data:

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>1 Length 0.5 -5.0 μm</th>
<th>1 Length &gt; 5.0 μm</th>
<th>* Chrysotile</th>
<th>**Amphibole</th>
<th>***Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
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</thead>
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<tr>
<td>S6 I1</td>
<td>NSD</td>
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<td>S6 J2</td>
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</tr>
<tr>
<td>S8 E1</td>
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<tr>
<td>S8 D2</td>
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<td></td>
</tr>
</tbody>
</table>

Total: NSD NSD 0 0 0 0 0

* Must confirm by Morphology, SAED, and EDX for each suspect asbestos fiber
** Record visible prominent Chrysotile DP reflections (002, 004, 110, 130, 220, 200)
*** Characterize by EDS

1, 2 Record Structure Length & Width (μm)

Prep Quality:
Dissolution: Good
Carbon Film: Good
Loading: 2%

Comments: 

Analyzed By: P. Secchia
Reviewed By: 

SEE REVERSE: FIBER ORIENTATION MAP
## TEM Air Sample Worksheet

**Client Name:** Vertex  
**Client Project #:**  
**Sample Type:** AHERA - Philly Regulations  
**QC Submittal**  

**Electron Microscope ID:** Hitachi H600/AB. 542-47-3  
**Filter Dia. (mm):** 25  
**Effective Area (mm²):** 385  
**Filter Type:** NICE  
**Filter Porc Size (µm):** 0.45  
**Magnification:** 20,000X  
**Accelerating Voltage:** 100KeV

<table>
<thead>
<tr>
<th>Grid Opening</th>
<th>Volume of Air Sampled</th>
<th>Total Area Analyzed</th>
<th>Analytical Sensitivity</th>
<th>Minimum Detection Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.115 mm</td>
<td>1805 liters</td>
<td>0.0320 mm²</td>
<td>19.2 mm²</td>
<td>0.0041 s/cele</td>
</tr>
<tr>
<td>0.013 mm²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Grid Openings Read/Required:** 4/4  
**Total Area Analyzed:** 0.0520 mm²

**Total Asbestos Structures:** NSD  
**Non-Asbestos Structures:** NSD

**0.5µm - 5.0µm:** NSD

<table>
<thead>
<tr>
<th>&gt;5.0µm</th>
<th>Asbestos:</th>
<th>&lt; 19.2 s/mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asbestos:</td>
<td>&lt; 0.0041 s/cele</td>
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</table>

### Analysis Data:

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>1 Length 0.5 - 5.0 µm</th>
<th>2 Length &gt; 5.0 µm</th>
<th>* Chrysotile</th>
<th>** Amphibole</th>
<th>*** Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
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<td></td>
</tr>
</tbody>
</table>

---

* Must confirm by Morphology, SAED, and EDX for each suspect asbestos fiber  
** Record visible prominent Chrysotile DP reflections (002, 004, 110, 130, 220, 200)  
*** Define Amphibole (DP obtained Y/N). Print-out EDS and attach.  
**** Characterize by EDS

1, 2 Record Structure Length & Width (µm)  
SEE REVERSE: FIBER ORIENTATION MAP

**Prep Quality:**  
**Dissolution:** Good  
**Carbon Film:** Good  
**Loading:** 2%

**Analyzed By:** P. Sceheia  
**Reviewed By:**

---

6 of 6
**CERTIFICATE OF ANALYSIS**

<table>
<thead>
<tr>
<th>Client: The Vertex Companies, Inc.</th>
<th>Report Date: 8/9/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 Turner Way, Suite 105</td>
<td>Report No.: 570201 - TEM AHERA</td>
</tr>
<tr>
<td>ASTON  PA  19014</td>
<td>Project: AS Jenks ES</td>
</tr>
<tr>
<td>Client: VER100</td>
<td>Project No.:</td>
</tr>
</tbody>
</table>

**TEM AIR SAMPLE ANALYSIS SUMMARY**

<table>
<thead>
<tr>
<th>Lab No.: 6577757</th>
<th>Volume: 1805.0 L.</th>
<th>Density (s/mm²): 19.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client No.: ASJ-01</td>
<td>Location: IWA Classroom 106 Closet</td>
<td>Concentration (s/cc): 0.0041</td>
</tr>
<tr>
<td></td>
<td>Date Sampled: 8/8/18</td>
<td>Asbestos Type(s): Amosite</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab No.: 6577758</th>
<th>Volume: 1805.0 L.</th>
<th>Density (s/mm²): 57.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client No.: ASJ-02</td>
<td>Location: IWA Classroom 106 Outside Closet</td>
<td>Concentration (s/cc): 0.012</td>
</tr>
<tr>
<td></td>
<td>Date Sampled: 8/8/18</td>
<td>Asbestos Type(s): Chrysotile Amosite</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab No.: 6577759</th>
<th>Volume: 1805.0 L.</th>
<th>Density (s/mm²): &lt;19.2</th>
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</thead>
<tbody>
<tr>
<td>Client No.: ASJ-03</td>
<td>Location: IWA Classroom 106 Center Of Wall 2</td>
<td>Concentration (s/cc): &lt;0.0041</td>
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<td>Date Sampled: 8/8/18</td>
<td>Asbestos Type(s): None Detected</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab No.: 6577760</th>
<th>Volume: 1805.0 L.</th>
<th>Density (s/mm²): &lt;19.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client No.: ASJ-04</td>
<td>Location: IWA Classroom 106 Corner Of Walls 2 And 3</td>
<td>Concentration (s/cc): &lt;0.0041</td>
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<tr>
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<td>Date Sampled: 8/8/18</td>
<td>Asbestos Type(s): None Detected</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab No.: 6577761</th>
<th>Volume: 1805.0 L.</th>
<th>Density (s/mm²): 57.7</th>
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</thead>
<tbody>
<tr>
<td>Client No.: ASJ-05</td>
<td>Location: IWA Classroom 106 Corner Of Walls 3 And 4</td>
<td>Concentration (s/cc): 0.012</td>
</tr>
<tr>
<td></td>
<td>Date Sampled: 8/8/18</td>
<td>Asbestos Type(s): Chrysotile Amosite</td>
</tr>
</tbody>
</table>

Geometric Mean = 0.00584 Structures/cc

Note: Sample analysis terminated. Clearance criteria exceeded (geometric mean >0.00554 s/cc). Set fails by Philadelphia Regulations.

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 8/8/2018
Date Analyzed: 08/09/2018
Signature: [Signature]
Analyst: Craig Liska

Dated: 8/9/2018 11:21:01  Page 1 of 2

Approved By: [Signature]
Frank E. Ehrenfeld, III
Laboratory Director
Appendix to Analytical Report:

Customer Contact: Don Hein
Method: 40 CFR 763 Final Rule

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decision for you and your customers. Please note the following points of contact for any questions you may have:

iATL Customer Service: customerservice@iatl.com
iATL Office Manager: cdavis@iatl.com
iATL Account Representative: Pete Lesniak
Sample Matrix: Air Cassettes

General Terms, Warrants, Limits, Qualifiers:
General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at www.iatl.com and in our Quality Assurance Manual per ISO 17025 standard requirements. The information herein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP L.L.C, or any agency of local, state or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

Information Pertinent to this Report:
Analysis by 40 CFR 763 Final Rule

Certifications:
- NIST-NVLAP No. 101165-0
- NYSDOH-ELAP No. 11021

All results are based on the samples as received at the lab. iATL assumes that appropriate sampling methods have been used and that the data upon which these results are based have been accurately supplied by the client.

Detection Limit (Reporting Limit) is dependent upon the volume of air sampled. AHERA guidelines recommend a minimum of 1200 L (0.0049 s/cc).

Disclaimers / Qualifiers:
There may be some samples in this project that have a "NOTE: “ associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation.
# CERTIFICATE OF ANALYSIS

**Client:** The Vertex Companies, Inc.  
700 Turner Way, Suite 105  
ASTON PA 19014  

**Report Date:** 8/9/2018  
**Report No.:** 570201 - TEM AHERA  
**Project:** AS Jenks ES  
**Project No.:**  

**Client:** VER100

## TEM AIR SAMPLE ANALYSIS DETAILS

<table>
<thead>
<tr>
<th>Lab No.</th>
<th>6577757</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client No.</td>
<td>ASJ-01</td>
</tr>
<tr>
<td><strong>Grid Openings:</strong> 4</td>
<td></td>
</tr>
<tr>
<td><strong>Opening Area (mm²):</strong> 0.013</td>
<td></td>
</tr>
<tr>
<td><strong>Area Analyzed (mm²):</strong> 0.0520</td>
<td></td>
</tr>
<tr>
<td><strong>Sensitivity (s/mm²):</strong> 19.2</td>
<td></td>
</tr>
<tr>
<td><strong>Detection Limit (s/cc):</strong> 0.0041</td>
<td></td>
</tr>
<tr>
<td><strong>Micrograph Number:</strong> DP 5256</td>
<td></td>
</tr>
<tr>
<td><strong>EDXA Spectrum ID:</strong> 7:46:51AM</td>
<td></td>
</tr>
<tr>
<td><strong>Volume (L):</strong> 1805.0 L</td>
<td></td>
</tr>
<tr>
<td><strong>Date Sampled:</strong> 8/8/18</td>
<td></td>
</tr>
<tr>
<td><strong>Location:</strong> IWA Classroom 106 Closet</td>
<td></td>
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<tr>
<td><strong>Asbestos Structures:</strong> 1</td>
<td></td>
</tr>
<tr>
<td><strong>Filter Type:</strong> MCE</td>
<td></td>
</tr>
<tr>
<td><strong>Filter Size (mm²):</strong> 385</td>
<td></td>
</tr>
<tr>
<td><strong>Pore Size (µm):</strong> 0.45</td>
<td></td>
</tr>
<tr>
<td><strong>Non-Asbestos Structures:</strong> None Detected</td>
<td></td>
</tr>
<tr>
<td><strong>Structure Density (s/mm²):</strong> &lt;19.2</td>
<td></td>
</tr>
<tr>
<td><strong>Structure Concentration (s/cc):</strong> &lt;0.0041</td>
<td></td>
</tr>
<tr>
<td><strong>Asbestos Type(s):</strong> Amosite</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Lab No.</th>
<th>6577758</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client No.</td>
<td>ASJ-02</td>
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<tr>
<td><strong>Grid Openings:</strong> 4</td>
<td></td>
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<tr>
<td><strong>Opening Area (mm²):</strong> 0.013</td>
<td></td>
</tr>
<tr>
<td><strong>Area Analyzed (mm²):</strong> 0.0520</td>
<td></td>
</tr>
<tr>
<td><strong>Sensitivity (s/mm²):</strong> 19.2</td>
<td></td>
</tr>
<tr>
<td><strong>Detection Limit (s/cc):</strong> 0.0041</td>
<td></td>
</tr>
</tbody>
</table>
| **Micrograph Number:**  
| **EDXA Spectrum ID:**  
| **Volume (L):** 1805.0 L |  
| **Date Sampled:** 8/8/18 |  
| **Location:** IWA Classroom 106 Outside Closet |  
| **Asbestos Structures:** 3 |  
| **Filter Type:** MCE |  
| **Filter Size (mm²):** 385 |  
| **Pore Size (µm):** 0.45 |  
| **Non-Asbestos Structures:** None Detected |  
| **Structure Density (s/mm²):** <19.2 |  
| **Structure Concentration (s/cc):** <0.0041 |  
| **Asbestos Type(s):** Chrysotile Amosite |  

---

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<tr>
<th>Lab No.</th>
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<tbody>
<tr>
<td>Client No.</td>
<td>ASJ-03</td>
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<tr>
<td><strong>Grid Openings:</strong> 4</td>
<td></td>
</tr>
<tr>
<td><strong>Opening Area (mm²):</strong> 0.013</td>
<td></td>
</tr>
<tr>
<td><strong>Area Analyzed (mm²):</strong> 0.0520</td>
<td></td>
</tr>
<tr>
<td><strong>Sensitivity (s/mm²):</strong> 19.2</td>
<td></td>
</tr>
<tr>
<td><strong>Detection Limit (s/cc):</strong> 0.0041</td>
<td></td>
</tr>
</tbody>
</table>
| **Micrograph Number:**  
| **EDXA Spectrum ID:**  
| **Volume (L):** 1805.0 L |  
| **Date Sampled:** 8/8/18 |  
| **Location:** IWA Classroom 106 Center Of Wall 2 |  
| **Asbestos Structures:** None Detected |  
| **Filter Type:** MCE |  
| **Filter Size (mm²):** 385 |  
| **Pore Size (µm):** 0.45 |  
| **Non-Asbestos Structures:** None Detected |  
| **Structure Density (s/mm²):** <19.2 |  
| **Structure Concentration (s/cc):** <0.0041 |  
| **Asbestos Type(s):** None Detected |  

---

Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/8/2018  
**Date Analyzed:** 08/09/2018  
**Signature:**  
**Analyst:** Craig Liska  

Dated: 8/9/2018 11:21:01  
Page 1 of 3

---

Approved By:  
Frank E. Ehrenfeld, III  
Laboratory Director
CERTIFICATE OF ANALYSIS

Client: The Vertex Companies, Inc.
700 Turner Way, Suite 105
ASTON PA 19014

Report Date: 8/9/2018
Report No.: 570201 - TEM AHERA
Project: AS Jenks ES
Project No.: VER100

TEM AIR SAMPLE ANALYSIS DETAILS

Lab No.: 6577760
Client No.: ASJ-04

Volume (L): 1805.0 L
Date Sampled: 8/8/18
Location: IWA Classroom 106 Corner Of Walls 2 And 3

Asbestos Structures: None Detected

Non-Asbestos Structures: None Detected

Filter Type: MCE
Filter Size (mm²): 385
Pore Size (µm): 0.45

Structure Density (s/mm²): <19.2
Structure Concentration (s/cc): <0.0041

Grid Openings: 4
Opening Area (mm²): 0.013
Area Analyzed (mm²): 0.0520
Sensitivity (s/mm²): 19.2
Detection Limit (s/cc): 0.0041

Micrograph Number:
EDXA Spectrum ID:

Lab No.: 6577761
Client No.: ASJ-05

Volume (L): 1805.0 L
Date Sampled: 8/8/18
Location: IWA Classroom 106 Corner Of Walls 3 And 4

Asbestos Structures: 3

Non-Asbestos Structures: None Detected

Filter Type: MCE
Filter Size (mm²): 385
Pore Size (µm): 0.45

Structure Density (s/mm²): <19.2
Structure Concentration (s/cc): <0.0041

Grid Openings: 4
Opening Area (mm²): 0.013
Area Analyzed (mm²): 0.0520
Sensitivity (s/mm²): 19.2
Detection Limit (s/cc): 0.0041

Micrograph Number:
EDXA Spectrum ID:

Geometric Mean = 0.00584 Structures/cc
Note: Sample analysis terminated. Clearance criteria exceeded (geometric mean >0.00554 s/cc). Set fails by Philadelphia Regulations.

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 8/8/2018
Date Analyzed: 08/09/2018
Signature: Craig Liska

Dated: 8/9/2018 11:21:01

Page 2 of 3
<table>
<thead>
<tr>
<th>Client:</th>
<th>Report Date:</th>
<th>Report No.:</th>
<th>Project:</th>
<th>Project No.:</th>
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<td>8/9/2018</td>
<td>570201 - TEM AHERA</td>
<td>AS Jenks ES</td>
<td></td>
</tr>
<tr>
<td>700 Turner Way, Suite 105</td>
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<tr>
<td>ASTON PA 19014</td>
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<tr>
<td>Client: VER100</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Chain of Custody

Contact Information
Client Company: Vertex
Office Address: 700 Turner Way
City, State, Zip: Aston PA 19014
Fax Number:
Email Address: dhein@vertexeng.com

Project Number: 51207
Project Name: Psd As. & Soks Elem School
Primary Contact: Dan Heim
Office Phone: 610-787-0402
Cell Phone:

Matrix:
- Air X
- Soil
- Water
- Bulk
- Paint
- Surface Dust / Wipe
- Other

Analysis Method:
- PCM: NIOSH 7400
- PCM: OSHA
- PCM: TWA

Total Dust: NIOSH 0500
Total Dust: NIOHS 0600

AAS: Lead in Air
AAS: Lead in Water
AAS: Lead in Paint
AAS: Lead Dust / Wipe
AAS: Lead in Soil
AAS: TCLP
AAS: Metals [Cd, Zn, Cr-circle]

PLM Use Bulk Asbestos Sample Log: TEM: AHERA
PLM: Bulk Asbestos EPA 600
PLM: Point Counting 158.1
PLM: NIB via 198.6 (PLM only)
PLM: PM by PLM to TEM via 198.4

QA Use Mold Sample Log: TEM: NIOSH 7402
IAQ: I Biomass Fungal Spore Trap
IAQ: II Biomass Fungal Spore
IAQ: Tape, Bulk, Alisc. Qualitative
IAQ: Tape, Bulk, Alisc. Quantitative
IAQ: Other Culturable ID
IAQ: Other Non-Culturable ID
IAQ: Soil Call for Available Methods

1: Requires ASTM acceptable material 2: Call to confirm TAT 3: Non-culturable 4: With Non-thermal Microorganism

Special Instructions: Samples for Later Analysis, If Requested

Turnaround Time
Preliminary Results Requested Date: 8/13
Specific date/time:
- 10 Day
- 5 Day
- 3 Day
- 2 Day
- 1 Day
- 12 Hour
- 6 Hour
- RUSH

* End of next business day unless otherwise specified. ** Matrix Dependent. *** Please notify the lab before shipping

Shipping Method
- FedEx
- UPS
- USPS
- Other

Chain of Custody
- Relinquished (Name/Organization):
- Received (Name / iATL):
- Sample Login (Name / iATL):
- Analyst (Names) / iATL:
- QA/QC Review (Name / iATL):
- Archived / Released:

Date: 8/12/18
Date: 8/13/18
Date: Aug 11, 2018
Date: Aug 11, 2018
Date: Aug 11, 2018
# Sample Log

- Airborne Asbestos - Philadelphia School District

## VERTEX

**Client:**

**Project:** 51207 2501 513th Street, Phila PA

**Room 106** - Outer Perimeter Wall Containment

**Sampling Date/Time:** 8/11/18

<table>
<thead>
<tr>
<th>Client Sample #</th>
<th>iATL #</th>
<th>Location/Description</th>
<th>Flow Rate</th>
<th>Start Time</th>
<th>End Time</th>
<th>Sampling time (min)</th>
<th>Area (ft²)</th>
<th>Results (ng/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASJ0601-0811-01</td>
<td>6580247</td>
<td>Room 106 Left corner, (cont)</td>
<td>9.5</td>
<td>10:00 AM</td>
<td>1:00 PM</td>
<td>190</td>
<td>1805</td>
<td></td>
</tr>
<tr>
<td>ASJ0601-0811-02</td>
<td>6580248</td>
<td>Room 106 Exterior (729)</td>
<td>9.5</td>
<td>10:00 AM</td>
<td>1:00 PM</td>
<td>190</td>
<td>1805</td>
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<tr>
<td>ASJ0601-0811-03</td>
<td>6580249</td>
<td>Room 106 Exterior (729)</td>
<td>9.5</td>
<td>10:00 AM</td>
<td>1:00 PM</td>
<td>190</td>
<td>1805</td>
<td></td>
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<tr>
<td>ASJ0601-0811-04</td>
<td>6580250</td>
<td>Room 106 Exterior (729)</td>
<td>9.5</td>
<td>10:00 AM</td>
<td>1:00 PM</td>
<td>190</td>
<td>1805</td>
<td></td>
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<tr>
<td>ASJ0601-0811-05</td>
<td>6580251</td>
<td>Room 106 Exterior (729)</td>
<td>9.5</td>
<td>10:00 AM</td>
<td>1:00 PM</td>
<td>190</td>
<td>1805</td>
<td></td>
</tr>
<tr>
<td>ASJ0601-0811-06</td>
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<td>Room 106 Exterior OWA</td>
<td>9.5</td>
<td>10:00 AM</td>
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<td>1805</td>
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<tr>
<td>ASJ0601-0811-07</td>
<td>6580253</td>
<td>Room 106 Exterior OWA</td>
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<td>ASJ0601-0811-08</td>
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<td>Room 106 Exterior OWA</td>
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<td>1:00 PM</td>
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<td>1805</td>
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<tr>
<td>ASJ0601-0811-09</td>
<td>6580255</td>
<td>Room 106 Exterior OWA</td>
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<td>10:00 AM</td>
<td>1:00 PM</td>
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<td>ASJ0601-0811-10</td>
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<td>Room 106 Exterior OWA</td>
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<td>1805</td>
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<tr>
<td>ASJ0601-0811-11</td>
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</tbody>
</table>

* Insufficient Sample Provided to Perform QC Reanalysis (<200ng/g)

** = Insufficient Sample Provided to Analyze (<50ng/g)  *** = Matrix/substrate Interference Possible

FB - Method Requires the submittal of blank(s). ML - Multi Layered Sample. May result in inconsistent results.

These preliminary results are issued by iATL to expedite procedures by clients based upon the above data. iATL assumes that all of the sampling methods and data upon which these results are based, have been accurately supplied by the client. These results may not have been reviewed by the Laboratory Director. Final Certificate of Analysis will follow these preliminary results. The signed COA is to be considered the official results. All EPA, HUD, and NIDEP conditions apply.

---

* iATL
### PRELIMINARY RESULTS
**Airborne Asbestos Analysis**
**TEM AHERA**

**Client:** The Vertex Companies, Inc.  
**Address:** 700 Turner Way, Suite 105  
**City:** ASTON  
**State:** PA  
**Zip Code:** 19014  
**Client No.:** VER100

**Batch No.:** 570425  
**Project:** PSD A.S. Jenkins Elem School  
**Project No.:** 51207  
**Philly Regs.:** Y  
**Turn-Around Time:** 12 Hour Rush

### Client Contacts:
- **Contacts:**  
- **Phone:**  
- **Fax:**  
- **Cell/Pager:**  
- **E-Mail:**

### Laboratory Contacts:
- **Contacts:** Frank E. Ehrenfeld III  
- **Phone:** (856) 231-9449  
- **Fax:** (856) 231-9818  
- **Cell/Pager:** (609) 929-4211  
- **E-Mail:** frankehrenfeld@iatl.com

### Chain of Custody:
- **Samples Taken in Field:**  
- **Date:** 8/11/2018  
- **Time:**  
- **Samples Rec'd at Laboratory:** PW  
- **Date:** 8/11/2018  
- **Time:**  
- **Samples Analyzed:** J. Joon  
- **Date:** 8/12/2018  
- **Time:**  
- **Preliminary Results Faxed:**  
- **Date:**  
- **Time:**  
- **Preliminary Results E-Mail:**  
- **Date:**  
- **Time:**

### Summary Data
**Transmission Electron Microscopy**  
**AHERA 40CFR 763**

<table>
<thead>
<tr>
<th>Client Sample ID #</th>
<th>IATL Sample ID #</th>
<th>Volume (L)</th>
<th>Comments</th>
<th>Results s/mm²</th>
<th>Results s/cc</th>
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<tbody>
<tr>
<td>ASJenks-0811 01</td>
<td>6580247</td>
<td>1805</td>
<td>None Detected</td>
<td>&lt; 19.2</td>
<td>&lt; 0.0041</td>
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<tr>
<td>ASJenks-0811 02</td>
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<td>1805</td>
<td>None Detected</td>
<td>&lt; 19.2</td>
<td>&lt; 0.0041</td>
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<tr>
<td>ASJenks-0811 03</td>
<td>6580249</td>
<td>1805</td>
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<td>&lt; 19.2</td>
<td>&lt; 0.0041</td>
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<tr>
<td>ASJenks-0811 04</td>
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<td>1805</td>
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<td>&lt; 19.2</td>
<td>&lt; 0.0041</td>
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<tr>
<td>ASJenks-0811 05</td>
<td>6580251</td>
<td>1805</td>
<td>None Detected</td>
<td>&lt; 19.2</td>
<td>&lt; 0.0041</td>
</tr>
</tbody>
</table>

**AHERA Clearance Criteria is 70 s/mm².**  
**Average (s/mm²) = 19.2**  
**Grid Box #: 1140**  
**Phi. Regulations Clearance Criteria is 0.00554 s/cc**  
**Geo = 0.0041**  
**Z Test Results (see attached, if applicable)**  
**Instrument (I, II, III) II**

These preliminary results are issued by IATL to expedite procedures by the clients based upon the above data. IATL assumes that all of the sampling methods and data upon which these results are based, have been accurately supplied by the client. These results may not have been reviewed by the Laboratory Director. Final Certificates of Analysis will follow these preliminary results. The signed COAs are to be considered the official results.

**Revision Date:** 06/22/18
<table>
<thead>
<tr>
<th>Client Name:</th>
<th>The Vertex Companies, Inc.</th>
<th>Analysis Date:</th>
<th>IATL Sample #:</th>
<th>6580247</th>
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<tbody>
<tr>
<td>Client Project #:</td>
<td>51207</td>
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<tr>
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<td>AHERA -Philly Regulations</td>
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<td>IATL Grid Box #:</td>
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<tr>
<td>QC Submittal</td>
<td></td>
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<td>Grid Archive ID #:</td>
<td>R3R5</td>
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<td>Electron Microscope ID:</td>
<td>Hitachi H600AB, 542-47-7</td>
<td></td>
<td>Magnification:</td>
<td>20,000X</td>
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<td></td>
<td>EVEX</td>
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<td>100KeV</td>
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<td>Filter Dia. (mm):</td>
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<td>Filter Type:</td>
<td>MCE</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Filter Por Size (µm):</td>
<td>0.45</td>
</tr>
</tbody>
</table>

| Grid Opening: | 0.115 mm |
| Grid opening Area: | 0.013 mm² |
| Grid Openings Read/Required: | 4/4 |
| Total Area Analyzed: | 0.0520 mm² |

| Volume of Air Sampled: | 1805 Liters |
| Analytical Sensitivity: | 19.2 mm² |
| Minimum Detection Limit: | 0.0041 s/ce |

| Total Asbestos Structures: | NSD |
| Non-Asbestos Structures: | NSD |
| 0.5µm - 5.0µm: | NSD |
| >5.0µm: | NSD |
| Asbestos: | < 19.2 s/mm² |
| Non-Asbestos: | < 19.2 s/mm² |
| Asbestos: | < 0.0041 s/ce |
| Non-Asbestos: | < 0.0041 s/ce |

### Analysis Data:

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>1 Length 0.5 - 5.0 µm</th>
<th>2 Length &gt; 5.0 µm</th>
<th>* Chrysotile</th>
<th>**Amphibole</th>
<th>***Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>R3 B3</td>
<td>NSD</td>
<td></td>
<td></td>
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<td>NSD</td>
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</tr>
<tr>
<td>R5 A3</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total: | NSD | NSD | 0 | 0 | 0 | 0 | 0 |                  |

* Must confirm by Morphology, SAED, and EDXA for each suspect asbestos fiber

Record visible prominent Chrysotile DP reflections (002, 004, 110, 130, 220, 200)

** Define Amphibole (DP obtained Y/N). Print-out F/R and attach.

*** Characterized by EDS

1, 2 Record Structure Length & Width (µm)  SET REVERSE: FIBER ORIENTATION MAP

Comments:  

Prep Quality: Good  
Carbon Film: Fair  
Loading: 1%

Analyzed By: J. Jacon  
Reviewed By: L. J. Jacon
<table>
<thead>
<tr>
<th>Electron Microscope ID:</th>
<th>Filter Dia. (mm):</th>
<th>Magnification:</th>
<th>IATL Sample #:</th>
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</thead>
<tbody>
<tr>
<td>Hitachi H600AB, 542-47-7</td>
<td>25</td>
<td>20,000X</td>
<td>6580248</td>
</tr>
<tr>
<td>Filter Type: MCE</td>
<td>Effective Area (mm²):</td>
<td>185</td>
<td></td>
</tr>
<tr>
<td>Filter Pore Size (µm):</td>
<td>Accelerating Voltage:</td>
<td>100KeV</td>
<td></td>
</tr>
<tr>
<td>0.45</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grid Opening:</th>
<th>Volume of Air Sampled:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.115 mm</td>
<td>1805 liters</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grid opening Area:</th>
<th>Grid Openings Required:</th>
<th>Analytical Sensitivity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.013 mm²</td>
<td>4</td>
<td>19.2 mm²</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Area Analyzed:</th>
<th>Minimum Detection Limit:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0520 mm²</td>
<td>0.0041 s/cc</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Asbestos Structures:</th>
<th>Non-Asbestos Structures:</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSD</td>
<td>NSD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type</th>
<th>¹ Length 0.5 - 5.0 µm</th>
<th>² Length &gt; 5.0 µm</th>
<th>* Chrysotile</th>
<th>** Amphibole</th>
<th>*** Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>R7</td>
<td>B9</td>
<td>NSD</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C9</td>
<td>NSD</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>R9</td>
<td>B1</td>
<td>NSD</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td></td>
<td>C1</td>
<td>NSD</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

| Total:          | NSD             | NSD             | 0                   | 0                | 0           | 0           | 0               |                     |

* Must confirm by Morphology, SAED, and EDS for each suspect asbestos fiber
** Define Amphibole (DP obtained Y/N). Print-out EDS and attach.
*** Characterize by EDS

1.2 Record Structure Length & Width (µm)  
SEE REVERSE: FIBER ORIENTATION MAP

Prep Quality: Good
Distillation: Good
Cavite Film: Good
Loading: 1%

Comments: ________________________________  
Analyzed By: J. Jeon  
Reviewed By: ________________________________

TEM: AHERA WS 002  
3 of 7
### TEM Air Sample Worksheet

**Client Name:** The Vertex Companies, Inc.  
**Client Project #:** 51207  
**Sample Type:** AHERA - Philly Regulations  
**Analysis Date:** 08/12/18  
**IATL Sample #:** 6580249  
**Client Sample #:** ASJenks-081103  
**IATL Grid Box #:** 1140  
**Grid Archive ID #:** S2S4

<table>
<thead>
<tr>
<th>Electron Microscope ID:</th>
<th>Filter Dia. (mm):</th>
<th>25</th>
<th>Magnification:</th>
<th>20,000X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hitachi H600AB, 542-47-7</td>
<td>Effective Area (mm²):</td>
<td>385</td>
<td>Accelerating Voltage:</td>
<td>100KeV</td>
</tr>
<tr>
<td>EVEX</td>
<td>Filter Type:</td>
<td>MCE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Filter Pore Size (µm):</td>
<td>0.45</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grid Opening:</th>
<th>0.115 mm</th>
<th>Volume of Air Sample:</th>
<th>1805 Liters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid opening Area:</td>
<td>0.013 mm²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grid OpeningsReq’d/Required:</td>
<td>4/4</td>
<td>Analytical Sensitivity:</td>
<td>19.2 mm²</td>
</tr>
<tr>
<td>Total Area Analyzed:</td>
<td>0.0520 mm²</td>
<td>Minimum Detection Limit:</td>
<td>0.0041 s/ee</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Asbestos Structures:</th>
<th>NSD</th>
<th>Non-Asbestos Structures:</th>
<th>NSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5µm - 5.0µm:</td>
<td>NSD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;5.0µm:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asbestos:</td>
<td>&lt; 19.2 s/mm²</td>
<td>Non-Asbestos:</td>
<td>&lt; 19.2 s/mm²</td>
</tr>
<tr>
<td>Asbestos:</td>
<td>&lt; 0.0041 s/ee</td>
<td>Non-Asbestos:</td>
<td>&lt; 0.0041 s/ee</td>
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**Analysis Data:**

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>1 Length 0.5-5.0 µm</th>
<th>2 Length &gt; 5.0 µm</th>
<th>* Chrysotile</th>
<th>** Amphibole</th>
<th>*** Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2 A5</td>
<td>NSD</td>
<td>NSD</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>S4 G1</td>
<td>NSD</td>
<td>NSD</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>H1</td>
<td>NSD</td>
<td>NSD</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

| Total: | NSD | NSD | 0 | 0 | 0 | 0 | 0 | 

* Must confirm by Morphology, SAFD, and EDXA for each suspect asbestos fiber

** Record visible prominent Chrysotile DP reflections (002, 004, 110, 130, 220, 200)

** Define Amphibole (DP obtained Y/N). Print-out FDS and attach.

*** Characteristic by FDS

1. 2 Record Structure Length & Width (µm)  

SEE REVERSE: FIBER ORIENTATION MAP

** Comments: **

** Prep Quality:**  
- **Dissolution:** Good  
- **Carbon Film:** Good  
- **Loading:** 3%

** Analyzed By:** J. Jeon  
** Reviewed By:** 

---

**IATL AHERA WS 002**  
**4 of 7**
## TEM Air Sample Worksheet

### Client Information
- **Client Name:** The Vertex Companies, Inc.
- **Client Project #:** ASH207
- **Sample Type:** AHERA - Philly Regulations
- **QC Submittal:**
  - **Electron Microscope ID:** Hitachi H600AB, 542-47-7
  - **Filter Dia. (mm):** 25
  - **Effective Area (mm²):** 385
  - **Filter Type:** NCE
  - **Filter Porosity (µm):** 0.45
- **IATL Sample #:** 6580250
- **Analysis Date:** 08/12/18
- **Client Sample #:** ASJenks-0911-04
- **IATL Grid Box #:** 1140
- **Grid Archive ID #:** S6S8

### Grid Opening Data
- **Grid Opening:** 0.115 mm
- **Grid Opening Area:** 0.013 mm²
- **Grid Openings Read/Required:** 4/4
- **Total Area Analyzed:** 0.0520 mm²
- **Volume of Air Sampled:** 1805 L

### Analysis Data

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>1 Length 0.5 - 5.0 µm</th>
<th>2 Length &gt; 5.0 µm</th>
<th>* Chrysotile</th>
<th>** Amphibole</th>
<th>*** Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>S6</td>
<td>D2</td>
<td>NSD</td>
<td>NSD</td>
<td>NSD</td>
<td>NSD</td>
<td>NSD</td>
<td>NSD</td>
<td>NSD</td>
</tr>
<tr>
<td></td>
<td>E2</td>
<td>NSD</td>
<td>NSD</td>
<td>NSD</td>
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<tr>
<td>S8</td>
<td>J8</td>
<td>NSD</td>
<td>NSD</td>
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<tr>
<td></td>
<td>J9</td>
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<td>NSD</td>
<td>NSD</td>
<td>NSD</td>
<td>NSD</td>
<td>NSD</td>
</tr>
</tbody>
</table>

### Quality Control
- **Prep Quality:**
  - Dissolution: Good
  - Carbon Film: Fair
  - Loading: 1%

### Comments

- **Record Structure Length & Width (µm):**
  - **SEE REVERSE: FIBER ORIENTATION MAP**
- **Analyzed By:** J. Jean
- **Reviewed By:**

---

* Must confirm by Morphology, SAED, and EDSX for each suspect asbestos fiber
** Record visible prominent Chrysotile DP reflections (002, 004, 110, 130, 220, 200)
*** Characterize by EDS
1, 2 Record Structure Length & Width (µm)
Client Name: The Vertex Companies, Inc.  
Client Project #: 31207  
Sample Type: AHERA -Philly Regulations  
QC Submittal:  
Analysis Date: 08/12/18  
IATL Sample #: 6580251  
Client Sample #: ASJenks-0811 05  
IATL Grid Box #: 1140  
Grid Archive ID #: S1OT1  

<table>
<thead>
<tr>
<th>Electron Microscope ID:</th>
<th>Filter Dia. (mm):</th>
<th>Effective Area (mm²):</th>
<th>Magnification:</th>
<th>Accelerating Voltage:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hitachi H600AB, 542-47-7</td>
<td>25</td>
<td>385</td>
<td>20,000X</td>
<td>100KeV</td>
</tr>
<tr>
<td>EVEX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grid Opening:</th>
<th>Volume of Air Sampled:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.115 mm</td>
<td>1805 liters</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grid Openings Read/Required:</th>
<th>Analytical Sensitivity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>19.2 mm²</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Area Analyzed:</th>
<th>Minimum Detection Limit:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0520 mm²</td>
<td>0.0041 s/cc</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Asbestos Structures:</th>
<th>Non-Asbestos Structures:</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSD</td>
<td>NSD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>0.5μm - 5.0μm:</th>
<th>Non-Asbestos:</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 19.2 s/mm²</td>
<td>&lt; 19.2 s/mm²</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&gt;5.0μm:</th>
<th>Non-Asbestos:</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.0041 s/cc</td>
<td>&lt; 0.0041 s/cc</td>
</tr>
</tbody>
</table>

### Analysis Data:

<table>
<thead>
<tr>
<th>Grid Opening ID</th>
<th>Structure Number</th>
<th>Structure Type F/B/C/M</th>
<th>1 Length 0.5-5.0 μm</th>
<th>2 Length &gt;5.0 μm</th>
<th>* Chrysotile</th>
<th>**Amphibole</th>
<th>***Non-Asbestos</th>
<th>Micrograph / EDS ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>S10 C5</td>
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<td>0</td>
</tr>
<tr>
<td>D5</td>
<td>NSD</td>
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<td>T1 E7</td>
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<tr>
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<td>0</td>
</tr>
</tbody>
</table>

Total: NSD NSD 0 0 0 0 0 0

* Must confirm by Morphology, SAED, and EDXA for each suspect asbestos fiber

** Define Amphibole (DP obtained Y/N). Print out EDS and attach.

*** Characterize by EDS

1, 2 Record Structure Length & Width (μm)  
SEE REVERSE: FIBER ORIENTATION MAP

Comments:  
Prep Quality: Good  
Dissolution Good  
Carbon Film Good  
Loading 4%

Analyzed By: J. Jeon  
Reviewed By:
CERTIFICATE OF ANALYSIS

Client: The Vertex Companies, Inc.
700 Turner Way, Suite 105
ASTON PA 19014

Client: VER100

Report Date: 8/12/2018
Report No.: 570425 - TEM AHERA
Project: PSD A.S Jenks Elem School
Project No.: 51207

TEM AIR SAMPLE ANALYSIS SUMMARY

<table>
<thead>
<tr>
<th>Lab No.</th>
<th>Volume:</th>
<th>Location:</th>
<th>Date Sampled:</th>
</tr>
</thead>
<tbody>
<tr>
<td>6580247</td>
<td>1805.0 L</td>
<td>IWA-Room 106 Left Corner Out Cove</td>
<td>8/11/18</td>
</tr>
<tr>
<td>6580248</td>
<td>1805.0 L</td>
<td>IWA-Room 106 Left Side By Decon</td>
<td>8/11/18</td>
</tr>
<tr>
<td>6580249</td>
<td>1805.0 L</td>
<td>IWA-Room 106 Left Side Corner At Window Wall</td>
<td>8/11/18</td>
</tr>
<tr>
<td>6580250</td>
<td>1805.0 L</td>
<td>IWA-Room 106 Tunnel Section</td>
<td>8/11/18</td>
</tr>
<tr>
<td>6580251</td>
<td>1805.0 L</td>
<td>IWA-Room 106 Right Corner</td>
<td>8/11/18</td>
</tr>
</tbody>
</table>

Density (s/mm²): <19.2
Concentration (s/cc): <0.0041
Asbestos Type(s): None Detected

Geometric Mean = 0.0041 Structures/cc

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 8/11/2018
Date Analyzed: 08/12/2018
Signature: 
Analyst: Jhoon Jeon

Approved By: Frank E. Ehrenfeld, III
Laboratory Director

Dated: 8/13/2018 10:30:54
CERTIFICATE OF ANALYSIS

Client: The Vertex Companies, Inc.
700 Turner Way, Suite 105
ASTON PA 19014

Client: VER100

Report Date: 8/12/2018
Report No.: 570425 - TEM AHERA
Project: PSD A.S Jenks Elem School
Project No.: 51207

Appendix to Analytical Report:

Customer Contact: Don Heim
Method: 40 CFR 763 Final Rule

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager: cdavis@iatl.com
iATL Account Representative: Pete Iesnak
Sample Matrix: Air Cassettes

General Terms, Warrants, Limits, Qualifiers:
General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at www.iATL.com and in our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

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This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments or of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

Information Pertinent to this Report:
Analysis by 40 CFR 763 Final Rule
Certifications:
- NIST-NVLAP No. 101165-0
- NYSDOH-ILAP No. 11021

All results are based on the samples as received at the lab. iATL assumes that appropriate sampling methods have been used and that the data upon which these results are based have been accurately supplied by the client.

Detection Limit (Reporting Limit) is dependent upon the volume of air sampled. AHERA guidelines recommend a minimum of 1200 L (0.0049 s/cc).

Disclaimers / Qualifiers:
There may be some samples in this project that have a “NOTE.” associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation.
# CERTIFICATE OF ANALYSIS

**Client:** The Vertex Companies, Inc.  
700 Turner Way, Suite 105  
ASTON PA 19014

**Report Date:** 8/12/2018  
**Report No.:** 570425 - TEM AHERA  
**Project:** PSD A.S Jenks Elem School  
**Project No.:** 51207

**Client:** VER100

## TEM AIR SAMPLE ANALYSIS DETAILS

<table>
<thead>
<tr>
<th>Lab No.: 6580247</th>
<th>Volume (L): 1805.0 L.</th>
<th>Filter Type: MCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client No.: ASJenks-081101</td>
<td>Date Sampled: 8/11/18</td>
<td>Filter Size (mm²): 385</td>
</tr>
<tr>
<td></td>
<td>Location: IWA-Room 106 Left Corner Out Cove</td>
<td>Pore Size (μm): 0.45</td>
</tr>
<tr>
<td>Grid Openings: 4</td>
<td>Asbestos Structures: None Detected</td>
<td>Non-Asbestos Structures: None Detected</td>
</tr>
<tr>
<td>Opening Area (mm²): 0.013</td>
<td>Structures 0.5 μm to &lt;5.0 μm: None Detected</td>
<td>Structure Density (s/mm²): &lt;19.2</td>
</tr>
<tr>
<td>Area Analyzed (mm²): 0.0520</td>
<td>Structures ≥ 5.0 μm: None Detected</td>
<td>Structure Concentration (s/cc): &lt;0.0041</td>
</tr>
<tr>
<td>Sensitivity (s/mm²): 19.2</td>
<td>Structure Density (s/mm²): &lt;19.2</td>
<td>Non-Asbestos Type(s): None Detected</td>
</tr>
<tr>
<td>Detection Limit (s/cc): 0.0041</td>
<td>Structure Concentration (s/cc): &lt;0.0041</td>
<td></td>
</tr>
</tbody>
</table>

**Micrograph Number:** EDXA Spectrum ID:

<table>
<thead>
<tr>
<th>Lab No.: 6580248</th>
<th>Volume (L): 1805.0 L.</th>
<th>Filter Type: MCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client No.: ASJenks-081102</td>
<td>Date Sampled: 8/11/18</td>
<td>Filter Size (mm²): 385</td>
</tr>
<tr>
<td></td>
<td>Location: IWA-Room 106 Left Side By Decon</td>
<td>Pore Size (μm): 0.45</td>
</tr>
<tr>
<td>Grid Openings: 4</td>
<td>Asbestos Structures: None Detected</td>
<td>Non-Asbestos Structures: None Detected</td>
</tr>
<tr>
<td>Opening Area (mm²): 0.013</td>
<td>Structures 0.5 μm to &lt;5.0 μm: None Detected</td>
<td>Structure Density (s/mm²): &lt;19.2</td>
</tr>
<tr>
<td>Area Analyzed (mm²): 0.0520</td>
<td>Structures ≥ 5.0 μm: None Detected</td>
<td>Structure Concentration (s/cc): &lt;0.0041</td>
</tr>
<tr>
<td>Sensitivity (s/mm²): 19.2</td>
<td>Structure Density (s/mm²): &lt;19.2</td>
<td>Non-Asbestos Type(s): None Detected</td>
</tr>
<tr>
<td>Detection Limit (s/cc): 0.0041</td>
<td>Structure Concentration (s/cc): &lt;0.0041</td>
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**Micrograph Number:** EDXA Spectrum ID:

<table>
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<tr>
<th>Lab No.: 6580249</th>
<th>Volume (L): 1805.0 L.</th>
<th>Filter Type: MCE</th>
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</thead>
<tbody>
<tr>
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<td>Date Sampled: 8/11/18</td>
<td>Filter Size (mm²): 385</td>
</tr>
<tr>
<td></td>
<td>Location: IWA-Room 106 Left Side Corner At Window Wall</td>
<td>Pore Size (μm): 0.45</td>
</tr>
<tr>
<td>Grid Openings: 4</td>
<td>Asbestos Structures: None Detected</td>
<td>Non-Asbestos Structures: None Detected</td>
</tr>
<tr>
<td>Opening Area (mm²): 0.013</td>
<td>Structures 0.5 μm to &lt;5.0 μm: None Detected</td>
<td>Structure Density (s/mm²): &lt;19.2</td>
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<tr>
<td>Area Analyzed (mm²): 0.0520</td>
<td>Structures ≥ 5.0 μm: None Detected</td>
<td>Structure Concentration (s/cc): &lt;0.0041</td>
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<td>Sensitivity (s/mm²): 19.2</td>
<td>Structure Density (s/mm²): &lt;19.2</td>
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<tr>
<td>Detection Limit (s/cc): 0.0041</td>
<td>Structure Concentration (s/cc): &lt;0.0041</td>
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</tr>
</tbody>
</table>

**Micrograph Number:** EDXA Spectrum ID:

Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/11/2018  
**Date Analyzed:** 08/12/2018  
**Signature:** Jhoon Jeon  
**Analyst:** Frank E. Ehrenfeld, III  
**Dated:** 8/13/2018 10:30:55  
**Page:** 1 of 3
CERTIFICATE OF ANALYSIS

Client: The Vertex Companies, Inc.
700 Turner Way, Suite 105
ASTON PA 19014

Report Date: 8/12/2018
Report No.: 570425 - TEM AHERA
Project: PSD A.S Jenks Elem School
Project No.: 51207

Client: VER100

TEM AIR SAMPLE ANALYSIS DETAILS

<table>
<thead>
<tr>
<th>Lab No.</th>
<th>6580250</th>
</tr>
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<tbody>
<tr>
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<tr>
<td>Grid Openings:</td>
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<tr>
<td>Sensitivity (s/mm²):</td>
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<tr>
<td>Detection Limit (s/cc):</td>
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<td>Micrograph Number:</td>
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<td>EDX Spectrum ID:</td>
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<td>Volume (L):</td>
<td>1805.0 l.</td>
</tr>
<tr>
<td>Date Sampled:</td>
<td>8/11/18</td>
</tr>
<tr>
<td>Location:</td>
<td>IWA-Room 106 Tunnel Section</td>
</tr>
<tr>
<td>Asbestos Structures:</td>
<td>None Detected</td>
</tr>
<tr>
<td>Structures 0.5 μm to &lt;5.0 μm:</td>
<td>None Detected</td>
</tr>
<tr>
<td>Structures ≥ 5.0 μm:</td>
<td>None Detected</td>
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<tr>
<td>Structure Density (s/mm²):</td>
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<tr>
<td>Filter Type:</td>
<td>MCE</td>
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<tr>
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<td>Pore Size (μm):</td>
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<td>Structure Density (s/mm²):</td>
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<td>Non-Asbestos Type(s):</td>
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<td>Sensitivity (s/mm²):</td>
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<td>Volume (L):</td>
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<tr>
<td>Date Sampled:</td>
<td>8/11/18</td>
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<tr>
<td>Location:</td>
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<tr>
<td>Asbestos Structures:</td>
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<td>Structures 0.5 μm to &lt;5.0 μm:</td>
<td>None Detected</td>
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<tr>
<td>Structures ≥ 5.0 μm:</td>
<td>None Detected</td>
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<tr>
<td>Structure Density (s/mm²):</td>
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<td>Structure Concentration (s/cc):</td>
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<td>Pore Size (μm):</td>
<td>0.45</td>
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<td>Non-Asbestos Structures:</td>
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<tr>
<td>Structure Density (s/mm²):</td>
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<tr>
<td>Non-Asbestos Type(s):</td>
<td>None Detected</td>
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</table>

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 8/11/2018
Date Analyzed: 08/12/2018
Approved By: [Signature]

Signature: [Signature]
Analyst: [Signature]

Dated: 8/13/2018 10:30:55
## CERTIFICATE OF ANALYSIS

<table>
<thead>
<tr>
<th>Client:</th>
<th>The Vertex Companies, Inc.</th>
<th>Report Date:</th>
<th>8/12/2018</th>
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<tr>
<td></td>
<td>700 Turner Way, Suite 105</td>
<td>Report No.:</td>
<td>570425 - TEM AHERA</td>
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<tr>
<td></td>
<td>ASTON PA 19014</td>
<td>Project:</td>
<td>PSD A.S Jenks Elem School</td>
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<tr>
<td>Client:</td>
<td>VER100</td>
<td>Project No.:</td>
<td>51207</td>
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Dated: 8/13/2018 10:30:55
## TEM AIR SAMPLE ANALYSIS SUMMARY

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<tr>
<th>Lab No.</th>
<th>Client No.</th>
<th>Volume</th>
<th>Location</th>
<th>Date Sampled</th>
<th>Density (s/mm³)</th>
<th>Concentration (s/cc)</th>
<th>Asbestos Type(s)</th>
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<tbody>
<tr>
<td>6580247</td>
<td>ASJenks-081101</td>
<td>1805.0 l</td>
<td>IWA-Room 106 Left Corner Out Cove</td>
<td>8/11/18</td>
<td>&lt;19.2</td>
<td>&lt;0.0041</td>
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<tr>
<td>6580248</td>
<td>ASJenks-081102</td>
<td>1805.0 l</td>
<td>IWA-Room 106 Left Side By Decon</td>
<td>8/11/18</td>
<td>&lt;19.2</td>
<td>&lt;0.0041</td>
<td>None Detected</td>
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<td>6580249</td>
<td>ASJenks-081103</td>
<td>1805.0 l</td>
<td>IWA-Room 106 Left Side Corner At Window Wall</td>
<td>8/11/18</td>
<td>&lt;19.2</td>
<td>&lt;0.0041</td>
<td>None Detected</td>
</tr>
<tr>
<td>6580250</td>
<td>ASJenks-081104</td>
<td>1805.0 l</td>
<td>IWA-Room 106 Tunnel Section</td>
<td>8/11/18</td>
<td>&lt;19.2</td>
<td>&lt;0.0041</td>
<td>None Detected</td>
</tr>
<tr>
<td>6580251</td>
<td>ASJenks-081105</td>
<td>1805.0 l</td>
<td>IWA-Room 106 Right Corner</td>
<td>8/11/18</td>
<td>&lt;19.2</td>
<td>&lt;0.0041</td>
<td>None Detected</td>
</tr>
</tbody>
</table>

Geometric Mean = 0.0041 Structures/cc

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 8/11/2018
Date Analyzed: 08/12/2018
Signature: Jhoon Jeon
Analyst: Jhoon Jeon

Approved By: Frank E. Ehrenfeld, III
Laboratory Director

Dated: 8/13/2018 10:30:54
CERTIFICATE OF ANALYSIS

Client: The Vertex Companies, Inc.
700 Turner Way, Suite 105
ASTON PA 19014

Client: VER100

Report Date: 8/12/2018
Report No.: 570425 - TEM AHERA
Project: PSD A.S Jenks Elem School
Project No.: 51207

Appendix to Analytical Report:

Customer Contact: Don Heim
Method: 40 CFR 763 Final Rule

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager: cdavis@iatl.com
iATL Account Representative: Pete Lesniak
Sample Matrix: Air Cassettes

General Terms, Warrants, Limits, Qualifiers:
General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at www.iatl.com and in our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to these item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state, or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

Information Pertinent to this Report:
Analysis by 40 CFR 763 Final Rule

Certifications:
- NIST-NVLAP No. 101165-0
- NYSDOH-ELAP No. 11021

All results are based on the samples as received at the lab. iATL assumes that appropriate sampling methods have been used and that the data upon which these results are based have been accurately supplied by the client.

Detection Limit (Reporting Limit) is dependent upon the volume of air sampled. AHERA guidelines recommend a minimum of 1200 L (0.0049 s/cc).

Disclaimers / Qualifiers:
There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation.

Dated: 8/13/2018 10:30:54
# Certificate of Analysis

**Client:** The Vertex Companies, Inc.  
700 Turner Way, Suite 105  
ASTON PA 19014  

**Report Date:** 8/12/2018  
**Report No.:** 570425 - TEM AHERA  
**Project:** PSD A.S Jenks Elem School  
**Project No.:** 51207  
**Client:** VER100  

## TEM Air Sample Analysis Details

<table>
<thead>
<tr>
<th>Lab No.: 6580247</th>
<th>Volume (L): 1805.0 L.</th>
<th>Filter Type: MCE</th>
<th>Asbestos Structures: None Detected</th>
<th>Non-Asbestos Structures: None Detected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client No.: ASJenks-081101</td>
<td>Date Sampled: 8/11/18</td>
<td>Filter Size (mm²): 385</td>
<td>Structures 0.5 μm to &lt;5.0 μm: None Detected</td>
<td>Structure Density (s/mm²): &lt;19.2</td>
</tr>
<tr>
<td></td>
<td>Location: IWA-Room 106 Left Corner Out Cave</td>
<td>Pore Size (μm): 0.45</td>
<td>Structures ≥ 5.0 μm: None Detected</td>
<td>Structure Concentration (s/cc): &lt;0.0041</td>
</tr>
<tr>
<td></td>
<td>Asbestos Type(s): None Detected</td>
<td></td>
<td>Structure Density (s/mm²): &lt;19.2</td>
<td>Non-Asbestos Type(s): None Detected</td>
</tr>
<tr>
<td></td>
<td>Micrograph Number:</td>
<td></td>
<td>Structure Concentration (s/cc): &lt;0.0041</td>
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</tr>
<tr>
<td></td>
<td>EDXA Spectrum ID:</td>
<td></td>
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</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Lab No.: 6580248</th>
<th>Volume (L): 1805.0 L.</th>
<th>Filter Type: MCE</th>
<th>Asbestos Structures: None Detected</th>
<th>Non-Asbestos Structures: None Detected</th>
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</thead>
<tbody>
<tr>
<td>Client No.: ASJenks-081102</td>
<td>Date Sampled: 8/11/18</td>
<td>Filter Size (mm²): 385</td>
<td>Structures 0.5 μm to &lt;5.0 μm: None Detected</td>
<td>Structure Density (s/mm²): &lt;19.2</td>
</tr>
<tr>
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<td>Location: IWA-Room 106 Left Side By Decon</td>
<td>Pore Size (μm): 0.45</td>
<td>Structures ≥ 5.0 μm: None Detected</td>
<td>Structure Concentration (s/cc): &lt;0.0041</td>
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<tr>
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<td>Asbestos Type(s): None Detected</td>
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<td>Structure Density (s/mm²): &lt;19.2</td>
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<td></td>
<td>Micrograph Number:</td>
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<td>Structures 0.5 μm to &lt;5.0 μm: None Detected</td>
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<td>Location: IWA-Room 106 Left Side Corner At Window Wall</td>
<td>Pore Size (μm): 0.45</td>
<td>Structures ≥ 5.0 μm: None Detected</td>
<td>Structure Concentration (s/cc): &lt;0.0041</td>
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Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/11/2018  
**Date Analyzed:** 08/12/2018  
**Signature:**  
**Analyst:** Jhoon Jeon

**Dated:** 8/13/2018 10:30:55  
**Page:** 1 of 3
CERTIFICATE OF ANALYSIS

Client: The Vertex Companies, Inc.  
700 Turner Way, Suite 105  
ASTON PA 19014

Report Date: 8/12/2018
Report No.: 570425 - TEM AHERA
Project: PSD A.S Jenks Elem School
Project No.: 51207

Client: VER100

TEM AIR SAMPLE ANALYSIS DETAILS

Lab No.: 6580250  
Client No.: ASJenks-081104

Grid Openings: 4  
Opening Area (mm²): 0.013  
Area Analyzed (mm²): 0.0520  
Sensitivity (s/mm²): 19.2  
Detection Limit (s/cc): 0.0041

Volume (L): 1805.0 L  
Date Sampled: 8/11/18  
Location: IWA-Room 106 Tunnel Section

Asbestos Structures: None Detected

Structures 0.5 μm to <5.0 μm: None Detected
Structures ≥ 5.0 μm: None Detected
Structure Density (s/mm²): <19.2
Structure Concentration (s/cc): <0.0041
Asbestos Type(s): None Detected

Filter Type: MCE  
Filter Size (mm²): 385  
Pore Size (μm): 0.45
Non-Asbestos Structures: None Detected
Structure Density (s/mm²): <19.2
Structure Concentration (s/cc): <0.0041
Non-Asbestos Type(s): None Detected

Lab No.: 6580251  
Client No.: ASJenks-081105

Grid Openings: 4  
Opening Area (mm²): 0.013  
Area Analyzed (mm²): 0.0520  
Sensitivity (s/mm²): 19.2  
Detection Limit (s/cc): 0.0041

Volume (L): 1805.0 L  
Date Sampled: 8/11/18  
Location: IWA-Room 106 Right Corner

Asbestos Structures: None Detected

Structures 0.5 μm to <5.0 μm: None Detected
Structures ≥ 5.0 μm: None Detected
Structure Density (s/mm²): <19.2
Structure Concentration (s/cc): <0.0041
Asbestos Type(s): None Detected

Filter Type: MCE  
Filter Size (mm²): 385  
Pore Size (μm): 0.45
Non-Asbestos Structures: None Detected
Structure Density (s/mm²): <19.2
Structure Concentration (s/cc): <0.0041
Non-Asbestos Type(s): None Detected

Geometric Mean = 0.0041 Structures/cc

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 8/11/2018  
Date Analyzed: 08/12/2018

Signature:  
Analyst: Jhoon Jeon

Approved By: Frank E. Ehrenfeld, III  
Laboratory Director

Dated: 8/13/2018 10:30:55  
Page 2 of 3
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