The Workers Compensation Act requires that the employer must post a copy of this report in a conspicuous place at or near the workplace inspected for at least seven days, or until compliance has been achieved, whichever is the longer period. A copy of this report must also be given to the joint committee or worker health and safety representative, as applicable.

### Inspection Report #201818448005B

<table>
<thead>
<tr>
<th>Employer Name</th>
<th>Jobsite Inspected</th>
<th>Scope of Inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMON FRASER UNIVERSITY</td>
<td>8888 University Dr Burnaby BC V5A 1S6</td>
<td>Indoor air quality for Shrum Chemistry Building</td>
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</table>

<table>
<thead>
<tr>
<th>Date of Initiating Inspection</th>
<th>Date of This Inspection</th>
<th>Delivery Date of This Report</th>
<th>Delivery Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 19, 2018</td>
<td>Mar 09, 2018</td>
<td>Mar 15, 2018</td>
<td></td>
</tr>
</tbody>
</table>

**THERE ARE ZERO (0) ORDERS OR OTHER ITEMS OUTSTANDING**

**ACTION MAY STILL BE NECESSARY TO ENSURE COMPLIANCE**

**PLEASE READ FULL REPORT**

### Summary of Orders or other Items

See “Orders/Items – Full Details” section of this Inspection Report for orders/items cited

<table>
<thead>
<tr>
<th>Order/Item No.</th>
<th>Status</th>
<th>Cited</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Complied</td>
<td>OHS4.79(2)(b)</td>
</tr>
<tr>
<td>2</td>
<td>Complied</td>
<td>OHS4.76(1)</td>
</tr>
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<td>3</td>
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</tr>
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<td>OHS4.72(1)(b)</td>
</tr>
<tr>
<td>5</td>
<td>Complied</td>
<td>WCA115(1)(a)(i)</td>
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### ORDER STATUS LEGEND

<table>
<thead>
<tr>
<th>Order Status</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Outstanding</td>
<td>Order Outstanding - Action Required to Achieve Compliance</td>
</tr>
<tr>
<td>Complied</td>
<td>Compliance Achieved - No Further Action Required</td>
</tr>
<tr>
<td>Closed</td>
<td>Order is Closed</td>
</tr>
<tr>
<td>Rescinded</td>
<td>Order has been cancelled – No Further Action Required</td>
</tr>
</tbody>
</table>
INSPECTION NOTES

This was a follow-up inspection to authenticate appropriate compliance with the order(s) noted.

All orders are considered complied at this time. Refer to Order Text for details.
**ORDERS/ITEMS**

An employer who fails to comply with Part 3 of the *Workers Compensation Act*, the Occupational Health & Safety Regulation, or WorkSafeBC orders may be subject to monetary or other sanctions as prescribed by the *Workers Compensation Act*.

### Orders/Items - Full Details

<table>
<thead>
<tr>
<th>Order/Item No.1</th>
<th>Status: Complied</th>
<th>Cited: OHS4.79(2)(b)</th>
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</table>

**Progress towards compliance:**

**Mar 09, 2018** - This employer hired a health and safety consultant (Arcose Consulting Ltd.) and a mechanical engineer (Integral Group) to conduct an indoor air quality investigation of the Chemistry Laboratories (rooms C8045, C8073 and C8074) and also assess the HVAC system. On February 26, 2018, this employer provided a report detailing the findings of Arcose Consulting Ltd. The report by Arcose Consulting Ltd. provided the following recommendations and the employer representatives verified on March 9, 2018 that these have been implemented:

- An engineering review of the HVAC system in the Chemistry building was initiated.
- Continuous real-time monitoring for carbon monoxide was initiated on Feb 2, 2018.
- Weekly inspections and reviews of occupant complaints are being conducted by Arcose Consulting.
- An email distribution system was established with representatives from SFU – EHS Facilities Services and Chemistry department as well as representatives from ProCan Construction.
- Weekly health and safety meetings have been established between ProCan and SFU.
- The use of two-stroke motors has been restricted and use of combustion exhaust systems has been limited on site.

An engineering review of the HVAC system in the Chemistry building was conducted by Integral Group on February 16, 2018. The report by Integral Group provided the following recommendations and the employer representatives on March 9, 2018 verified that the following corrective actions have been taken or are in place:

- Carbon filters have been ordered and installed.
- A service request has been initiated to replace draft seals at external doorways. This is expected to be completed by March 16, 2018.
- A service request was initiated for review of the air balancing in the affected spaces. The review began the week of Feb 26, 2018 and is in-progress.
- A project was initiated on Feb 22, 2018 to review and develop a design for a sheet metal plenum as outlined by Integral Group. The design project for the sheet metal plenum is now complete.
Orders/Items - Full Details

Initiating order:
Jan 19, 2018 - This employer has responded to numerous indoor air quality complaints from occupants in the Shrum Science Centre for Chemistry Building (SCCB), specifically in the Chemistry Laboratory Room C8045 where its building air intake is immediately adjacent to an active construction site for the Student Union Building. Air quality complaints have been brought to the employer's attention regarding health symptoms of headache, dizziness, discomfort, and building evacuation. Workers/occupants relate the odour intrusion or air quality to the use of diesel and gas-powered mobile equipment and tools used by contractors at the construction site within the air intakes. The employer has not assessed the ventilation rate or investigated/inspected the ventilation system. The employer has conducted air quality tests but did not inspect the ventilation system as required in section 4.78(2). In particular, the employer representative stated that the HVAC system does not have air filters.

This is in contravention of the Occupational Health and Safety Regulation Section 4.79(2)(b).

An air quality investigation must include inspection of the ventilation system as required in section 4.78(2).

Measures to Ensure Compliance:
This employer must conduct a proper indoor air quality investigation (specifically in the Chemistry Laboratory Room C8045 located in the Shrum Science Centre for Chemistry Building (SCCB). The investigation must include the inspection of the ventilation system which include all the elements listed in OHSR section 4.78(2) and any actions taken at this workplace. This employer is requested to provide the ventilation system inspection report.

Order/Item No.2  ✔ Status: Complied  Cited: OHS4.76(1)

Progress towards compliance:
Mar 09, 2018 - The employer representative has removed the black cloth-like material on the air intake grilles located outside room C8045 of the Shrum Science Centre for Chemistry Building.

Initiating order:
Jan 19, 2018 - The Shrum Science Centre for Chemistry Building's air intake located outside Room C0845 is observed to be obstructed.blocked by a black cloth-like material on the air intake grilles and other materials were placed in front of the air intake at the time of this inspection.

This is in contravention of the Occupational Health and Safety Regulation Section 4.76(1).

A ventilation system must not be obstructed by material or equipment placed in front of the ventilation air intakes or discharge points.

Measures to Ensure Compliance:
Without undue delay, the employer must remove anything that blocks the outdoor air supply for the ventilation system at this workplace.
### Orders/Items - Full Details

<table>
<thead>
<tr>
<th>Order/Item No.</th>
<th>Status</th>
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</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Complied</td>
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</table>

#### Progress towards compliance:

**Mar 09, 2018** - This employer has taken the following actions to comply with this order:
- Hired Arcose Consulting Ltd. (health and safety consultant) to conduct an indoor air quality investigation in the areas where complaints were reported
- Hired Integral Group (mechanical engineer) to review and assess the air intakes and air handling units for the Chemistry Building.
- With the guidance of the mechanical engineer, installed charcoal filters in the HVAC systems to minimize air contaminants/pollutants entering the building's indoor air.

In addition, the prime contractor, ProCan Construction, has implemented the following controls at the Chemistry Building's air intake:
- Provided an Exhaust Gas Emissions Assessment Report (prepared by Kinetic OHS Services). Based on the findings of this report, an exposure control plan for carbon monoxide was developed for this employer.
- Replaced some of the combustion engine equipment with electric equipment (i.e. aerial lift) and equipped the remaining combustion engine equipment with catalytic converters (scrubbers).

This meets the requirements of OHSR section 4.76(2). This order is complied.

#### Initiating order:

**Jan 19, 2018** - Outdoor air intakes are not located so that outdoor air entering the ventilation system does not contain any contaminants in a concentration greater than normal outdoor ambient air in that locality as evidenced by:

- The Shrum Science Centre for Chemistry Building's air intake is located in close proximity to the operation of gas and diesel-powered operated mobile equipment and tools.

- The building air intakes are situated/located in a way that would allow gas exhaust emissions from gas and diesel powered mobile equipment and tools to be directed and entrained into the building’s air intake.

This is in contravention of the Occupational Health and Safety Regulation Section 4.76(2).

Outdoor air intakes must be located so that outdoor air entering the ventilation system does not contain any contaminant in a concentration greater than normal outdoor ambient air in that locality.

#### Measures to Ensure Compliance:

This employer is ordered to ensure outdoor air entering the ventilation system does not contain any contaminants in a concentration greater than normal outdoor ambient air in that locality.
Orders/Items - Full Details

<table>
<thead>
<tr>
<th>Order/Item No.</th>
<th>Status</th>
<th>Cited: OHS4.72(1)(b)</th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>✔ Closed</td>
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</table>

**Progress towards compliance:**

**Mar 09, 2018** - This employer has contracted a health and safety consultant (Arcose Consulting Ltd.) and a professional engineer (Integral Group) to address the plenum, air intake and HVAC system. This employer hired Integral Group to review and assess the air plenum, an extension of the Chemistry Building’s air intake. The recommendations from Integral Group report states (in sequential order):

- Install carbon filters into the air handling units and fans serving the affected spaces.
- Draft seals at any external doorways to be replaced.
- Review the air balancing in each of the affected spaces. While lab spaces are required to be under negative pressure, the degree of negativity in the space should be confirmed.
- Construct sheet metal plenum from outdoor air intake louvres and extend to south along rooftop of Shrum.

This employer has implemented these recommended controls, except constructing a sheet metal plenum. The design of the sheet metal plenum is now complete. Given the other corrective actions taken, the employer representative stated that construction of the sheet metal plenum may not be required; however, is ready when it is required.

This order is being coded as closed as the initial plenum is no longer being used. This employer is reminded that if they are required to install the plenum to ensure that it is installed as per ASHRAE Standard 62-1989, Ventilation for Acceptable Indoor Air Quality.
Orders/Items - Full Details

**Initiating Order:**

Jan 19, 2018 - The ventilation system has not been constructed and operated in accordance with ASHRAE Standard 62-1989, Ventilation for Acceptable Indoor Air Quality as evidenced by:

- The Shrum Science Centre for Chemistry Building is ventilated by mechanical system where one of the building’s air intake is located on the west side of the building and immediately adjacent to adjacent to active construction of the new Student Union Building.
- This employer has permitted the prime contractor, Pro-Can Construction Group Ltd, to install a temporary “air plenum” in front of the Shrum Science Centre for Chemistry Building located outside of the Chemistry Laboratory in Room C0845.
- The poly enclosure “air plenum” is constructed of 2x4 lumber and poly sheeting. Representatives of Pro-Can Construction stated that this “air plenum” is not an air-tight construction. The intent of the “air plenum” is to redirect the air take approximately 40 to 50 feet to the south to minimize the intrusion and entrainment of air contaminants generated from construction activities, equipment and tools.
- The modification of the ventilation system has not provide proper seal from outdoor contaminants. Pro-Can Construction representative stated that breaches and gaps include the contour around the drain pipe, unsealed overlapping poly, and poly is not sealed against the building exterior.
- Pro-Can Construction Group attempted to place charcoal filters (i.e., black cloth-like material) partially over the air intake in the attempt to treat the outdoor air to remove outdoor air contaminants; however, had not maintained (e.g., replaced) in approximately 1.5 years. The treatment of outdoor air contaminants has been evident that it has not been effective due to ongoing complaints and a testament of the poor air quality.
- In addition, changes have not been taken into account of unusually strong sources of specific contaminants being introduced into the occupied space (i.e., Chemistry Laboratory, Room C0845) as per section 4.2 of the ASHREA Standard.

See Inspection Text for additional information.

This is in contravention of the Occupational Health and Safety Regulation Section 4.72(1)(b).

An employer must ensure that a ventilation system for the supply and distribution of air and removal of indoor air contaminants is designed, constructed and operated in accordance with ASHRAE Standard 62-1989, Ventilation for Acceptable Indoor Air Quality.

**Measures to Ensure Compliance:**

The employer is ordered to ensure that the ventilation system is constructed in accordance with ASHRAE Standard 62-1989, Ventilation for Acceptable Indoor Air Quality.

<table>
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<tbody>
<tr>
<td>5</td>
<td>Complied</td>
<td>WCA115(1)(a)(i)</td>
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</tbody>
</table>

**Progress towards Compliance:**

Mar 09, 2018 - On February 26, 2018, this employer provided their notice of compliance detailing their actions for complying with this order. Examples of the employer's actions include but are not limited to:

- Removal of cloth filters in front of the air intakes for the Shrum Science Centre for Chemistry Building.
- Hiring a health and safety consultant (Arcose Consulting Ltd.) to perform an investigation of the IAQ concerns and ventilation system and implementing the recommendations.
- Hiring a professional engineer (Integral Group) to review the HVAC system and air intake of the affected rooms in the Shrum Science Centre for Chemistry Building and implementing the recommendations.

This meets the requirements of WCA section 115(1)(a)(i). This order is complied.
Initiating order:
Jan 19, 2018 - The employer has failed to ensure the health and safety of all workers working for the employer as evidenced by:

- Refer to Orders #1 to #4 issued above.
- Repeat and ongoing complaints of air quality reports from building occupants of the Shrum Science Centre for Chemistry Building, specifically Chemistry Laboratory in Room C0845, since May 2016 has not been resolved.
- Complaints were related to exhaust gas emission intrusion from gas and diesel-powered mobile equipment and tools operated by contractors in the active construction of the new Student Union Building immediately adjacent to the Shrum Science Centre for Chemistry Building's air intake. Adverse health symptoms of headache, dizziness, discomfort, and building evacuation had been reported and related to these equipment operation.
- This employer failed to ensure that the outdoor air intakes are located so that outdoor air entering the ventilation system does not contain any contaminants in a concentration greater than normal outdoor ambient air in that locality. In particular, the poly structure built to re-direct the air intake is not effective and evident by the continue intrusion of exhaust gas emissions and ongoing building occupant complaints.

This is in contravention of the Workers Compensation Act Section 115 (1)(a)(i).

Every employer must ensure the health and safety of all workers working for that employer.

Measures to Ensure Compliance:
Pursuant to section 194 (1) of the Workers Compensation Act, the employer must prepare a Notice of Compliance report. In accordance with section 194 (2), this report must detail what has been done to comply with the order, and where compliance has not been achieved by the time the report has been submitted, include a plan of what will be done to comply and when compliance will be achieved. Please submit the report no later than February 25, 2018.
FOLLOW UP INSPECTION REPORT #1
Worker and Employer Services Division
201818448005B

Employer # | Mailing Address | Classification Unit # | Operating Location
---|---|---|---
112786 | 8888 UNIVERSITY DR BURNABY BC V5A 1S6 | 765010 | 001

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<th>Lab Samples Taken</th>
<th>Direct Readings</th>
<th>Results Presented</th>
<th>Sampling Inspection(s)</th>
<th>Workers onsite during Inspection</th>
<th>Notice of Project Number</th>
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<tr>
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<th>Employer Representative Present During Inspection</th>
<th>Worker Representative Present During Inspection</th>
<th>Labour Organization &amp; Local</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tajinder Aujla</td>
<td>Tajinder Aujla</td>
<td>Hamel Taylor</td>
<td></td>
</tr>
</tbody>
</table>

WorkSafeBC Officer Conducting Inspection
Sanjesh Roop

*Inspection Time | *Travel Time
---|---
2.00 hrs | 0.50 hrs

*The time recorded above reflects the inspection time and travel time associated with this inspection report and includes time spent on pre and post-inspection activities. Additional time may be added for subsequent activity.

Right to Review
Any employer, worker, owner, supplier, union, or a member of a deceased worker’s family directly affected may, within 45 calendar days of the delivery date of this report, in writing, request the Review Division of WorkSafeBC to conduct a review of an order, or the non-issuance of an order, by contacting the Review Division. Employers requiring assistance may contact the Employers’ Advisers at 1-800-925-2233.

WorkSafeBC values your feedback. To obtain that feedback, an external market research provider may be contacting you to complete a survey.