VanDriel OHS Consulting
Building A Healthy Workplace

January 16, 2020

School District 83 (North Okanagan – Shuswap)
5911 Auto Rd SE
Salmon Arm, BC V1E 2X2

Attention: Trevor Bettcher, Director of Operations

VanDriel OHS Consulting (VOHS) conducted three (3) indoor air quality (IAQ) investigations at Parkview Elementary School located at 605 Parksville Street, Sicamous, BC in response to an odour complaint in the building reported to us by SD83 operations. The following is a summary of the investigations:

19 September 2019: First IAQ investigation to identify the source of the odour. Focus areas were rooms 12, 16, 19, 21, general office area and crawlspace.

2 October 2019: Second IAQ investigation with additional sampling and use of gas monitors along with efforts made to mimic some of the conditions that were report on the day the odour was first detected. This investigation was carried out after SD83 had undertaken efforts to remove the source of the odour.

15 November 2019: Third IAQ investigation following the re-occupancy of the building after several weeks of school closure to asses IAQ in an occupied state. Focus areas were rooms 15, 18, 19 and the general office area.

The following is a summary of each IAQ investigation, including the findings and recommendations provided:

First IAQ Investigation

IAQ Parameter	Testing Method	Standard Reference	Findings
Temperature	IAQ standard digital data logging direct reading instrument	American Society of Heating, Refrigerating and Air-Conditioning Engineers *ASHRAE Standard 55 – Thermal Environmental Conditions for Human Occupancy* (2013)	Within recommended range of between 19-23 °C
Relative humidity			Within recommended range of 30%-60%
Carbon dioxide			Within recommended range, less than 700 ppm + outdoor level
Carbon monoxide		*ASHRAE Standard 62 Ventilation for Acceptable Indoor Air* (1989)	None detected

Volatile organic compounds (VOC)	Air canister (EPA TO-15). Analyzed at an environmental laboratory	European Commission recommended guideline for IAQ	Below recommended levels and detected VOCs correlated with products used in recent roof replacement project.
Mould (surface)	Surface mould via bulk samples analyzed at an environmental laboratory (5 samples)	Visual inspection of surfaces	No significant mould found on building materials
Mould (living in air)	Anderson n-stage sampler with malt extract agar plates	Indoor vs outdoor comparison	**Elevated mould found in crawlspace**

NOTE: ppm = parts per million, **bold** indicates abnormal result

A recommendation was made to keep the crawlspace dry to prevent further odour complaints and to finish the crawlspace floor with concrete in order to remove the potential for soil/sand from harvesting mould growth.

Second IAQ Investigation

IAQ Parameter	Testing Method	Standard Reference	Findings
Nitrogen dioxide	Electrochemical sensor on a digital data logging direct reading instrument	Less than 10% of WorkSafeBC's exposure limits	No significant source identified above background levels to none detected
Nitric oxide			
Sulfur dioxide			
Carbon monoxide			
Explosive gases	Catalytic bead sensor on a digital data logging direct reading instrument	0 %	
Volatile organic compounds (VOC)	Air canister (EPA TO-15). Analyzed at an environmental laboratory	European Commission recommended guideline for IAQ	Below recommended levels and detected VOCs correlated with products used in recent roof replacement project, cleaning products used in the building, low level of odourless refrigerant.

Mould (surface)	Surface mould via bulk samples analyzed at an environmental laboratory (2 samples)	Visual inspection of surfaces	**Sump tank pipe in west wing showed mould growth.**
Mould (non-living in air)	Air-O-Cell spore filters (10 samples)	*American Society for Testing and Materials (ASTM) D7391 Standard* Indoor vs outdoor comparison	**Elevated mould found in supply closet of east wing.**
Mould (living in air)	Anderson n-stage sampler with malt extract agar plates (8 samples)	Indoor vs outdoor comparison	**Elevated mould found in crawlspace and supply closet.**

Same recommendation was made as the first IAQ investigation.

Third IAQ Investigation – November 15, 2019

IAQ Parameter	Testing Method	Standard Reference	Findings
Temperature	IAQ standard digital data logging direct reading instrument	American Society of Heating, Refrigerating and Air-Conditioning Engineers *ASHRAE Standard 55 – Thermal Environmental Conditions for Human Occupancy* (2013)	Within recommended range of between 19-23 °C
Relative humidity			Within recommended range of 30%-60%
Carbon dioxide			**Carbon dioxide level was elevated above recommended range for the occupant load present.**
Carbon monoxide		*ASHRAE Standard 62 Ventilation for Acceptable Indoor Air* (1989)	None detected
Mould (surface)	Surface mould via bulk samples analyzed at an environmental laboratory (5 samples)	Visual inspection of surfaces	No significant mould found on building materials
Mould (non-living in air)	Air-O-Cell spore filters (9 samples)	Indoor vs outdoor comparison	**Elevated mould found in storage room and from the front office air vent**

Volatile organic compounds (VOC)	Digital sensor on data logging direct reading instrument	European Commission recommended guideline for IAQ, relative comparison of building areas	Front office and the councilor's room had higher VOC levels, yet below IAQ guidelines.

The recommendations provided included cleaning the duct system responsible for supplying air to the front office and councilor's room with a focus on the ducts that run through the crawlspace, to inspect the ducts to ensure there are no penetrations that allow crawlspace air to enter the ducts, and to increase the ventilation rate for the classrooms.

Prepared by:

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