Incident Summary #II-1054638-2020 (#19058) (FINAL)

SUPPORTING INFORMATION	Incident Date		August 20, 2020
	Location		Burnaby
	Regulated industry sector		Gas - Natural gas system
	Impact – Injury	Qty injuries	1
		Injury description	Suspected carbon monoxide exposure. One individual sent to hospital
		Injury rating	Moderate
	Impact – Damage	Damage description	Cracked heat exchanger in Engineered Air indirect fired make-up air heater.
		Damage rating	Moderate
	Incident rating		Moderate
	Incident overview		A cracked heat exchanger in a make-up air unit caused elevated carbon monoxide levels in an ice rink resulting in an evacuation of the building.
INVESTIGATION CONCLUSIONS	Site, system and components		-One propane fueled Zamboni -One gas-fired de-humidifier -One gas-fired Engineered Air DJS series make-up air heater -There are 2 ice surfaces used for figure skaters in this part of the facility. The skating area is heated to 10 degrees C for the figure skaters by the Engineered Air make-up air heater on the roof of the building. -The carbon monoxide monitoring system is calibrated to alarm if the carbon monoxide levels in the ice skating rink exceed 10 PPM. Ventilation fans are started when the alarm activates.
	Failure scenario(s)		An Engineered Air make-up air unit that provides fresh air to an ice rink had a cracked heat exchanger, which allowed products of combustion into the airstream. This caused elevated levels of carbon monoxide within the ice rink which resulted in the evacuation of the building and engagement of the ventilation system.
	Facts and evidence		-An aged egg smell was detected in the early morning at the ice rink. -The carbon monoxide sensor in the building triggered the alarm and the building was evacuated and ventilated. -The ice surface is cleaned by a propane fuelled Zamboni approximately every 50 minutes.

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	-The humidity in the area is regulated by a gas-fired dehumidifier. -The arena has a carbon monoxide sensing and alarm system that is set to alarm if the carbon monoxide level exceeds 10 parts per million (PPM). -A ventilation system is connected to the alarm system to ventilate the building when the alarm is activated. -There were approximately 20 figure skaters and 5 coaches on the 2 ice surfaces when the alarm indicated carbon monoxide in the building. It was reported that no one complained or showed signs of any of the typical symptoms of CO poisoning. -One 14 year boy was taken to the hospital and received oxygen. -The fire department responded but did not enter the building. -The gas fired Engineered Air unit and dehumidifier were shut off. The dehumidifier was turned back on and the building was checked for carbon monoxide and it was determined to not be a source of carbon monoxide. -A later check of the Engineered Air unit found that there was a crack in the heat exchanger which would permit products of combustion to enter the air stream into the building. -The heat exchanger was removed from the Engineered Air unit and sent to the manufacturer for examination.
Causes and contributing factors	It is highly likely that the gas-fired Engineered Air with the cracked heat exchanger was the source of carbon monoxide entering the building.