Incident Summary #II-821645-2019 (#11290) (FINAL)

SUPPORTING INFORMATION	Incident Date		March 5, 2019
	Location		Vancouver
	Regulated industry sector		Gas - Natural gas system
	Impact – Injury	Qty injuries	0
		Injury description	NA
		Injury rating	None
	Impact – Damage	Damage description	Fire damage to one suite, moderate damage to building exterior and roof. Total loss of one fireplace. Fire suppression efforts caused water damage to a significant portion of the building
		Damage rating	Major
	Incident rating		Major
	Incident overview		A broken gas line serving a fireplace resulted in a major fire in a 4th floor suite of a 4 story apartment complex
INVESTIGATION CONCLUSIONS	Site, system and components		A large 4 story apartment complex incorporates a natural gas system that serves fireplaces contained in each suite of the building. The natural gas system consists of regulators, black iron pipe, copper tubing. The gas system energizes a natural draft, standing pilot fireplaces. The natural gas supply is connected to each fireplace via a black iron pipe, isolation valve and copper tubing. The fireplaces incorporate a gas valve and standing pilot. The exhaust gasses are carried to the outside via a metallic vent. The black iron pipe serving the suite in question consists of a horizontal length of ½ inch pipe and a 90 degree elbow fitting that connects to the common vertical gas riser. The black iron pipe is threaded and screwed together. The pipe enters the fireplace through a small access opening in the fireplace shell, where it connects to a gas valve and a length of copper tubing. When installed correctly the horizontal pipe entering the access opening would be oriented in the centre.
	Failure scenario(s)		The building in question was built in 1989 has been settling over time putting strain on the black iron natural gas piping located throughout the building. The strain on a horizontal section of pipe serving a gas fireplace eventually caused the pipe to break, releasing a significant amount of gas into the fireplace cavity. The standing pilot on the fireplace provided a ready source of ignition that resulted in a fire that burned behind the fireplace cavity before making its way to the roofline, causing major damage to the suite and roof.
	Facts and evidence		-There is evidence that the building is settling on a downward angle towards the affected suite. This is supported by visible stress fractures found throughout the building. A 2 foot level placed in the common hallway indicated a ¼ inch per foot downward grade towards the affected suite. This downward grade was found to be

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	consistent on each floor of the 4 story building and for the length of the hallway. (photo 5) -The building is located on the shore of a body of water. The angle of the downward slope is in the direction of the shoreline. -The isolation valve connected to the pipe was found to be in direct contact with the top of the access opening of the fireplace surround providing a point of strain capable of breaking the pipe. (photo 2) -The break in the pipe occurred at the location of a thread, a weak point in the integrity of the pipe. (photo 1) -Upon investigation the horizontal length of black iron pipe connected to the 90 degree elbow fitting that served the fireplace in question was found to be on a downward angle, (approximately 75 degrees). Upon further examination a hole/fracture on the threads of the pipe was found.(photo 1) -The Fortis technician who arrived on scene with the first responders performed a leak test on the horizontal pipe in question and found evidence of a leak -The fireplace in question incorporates a standing pilot (source of ignition) in close proximity to the location of the leak. (photo 4) -Statement from the tenant who witnessed the event corroborates that the fireplace was the source of ignition and the genesis of the fire was in the fireplace cavity -The adjacent suite revealed a similar pipe and fireplace configuration to the affected suite. The valve in this case was pressed tight against the top of the access opening, placing strain on the pipe and 90 degrees elbow connected to the riser. (photo 6) -Other suites observed in the building showed the horizontal pipe entering the fireplace access opening to be at different locations in terms of its orientation within the access opening
Causes and contributing factors	The incident is very likely the result of building settling putting strain on the gas system. The strain over time was significant enough to cause a horizontal piece of gas pipe to break and release a large amount of raw gas into the fireplace cavity where a ready source of ignition was present. The configuration of the gas riser system contributed to the incident in that the horizontal section of pipe entering the access opening in the fireplace was installed in close proximity to the top of the access opening as opposed to the centre. Because the section of pipe had been installed close to the top of the opening there was little buffer room between the pipe and the top of the access.

Photo 1

Photo 2.

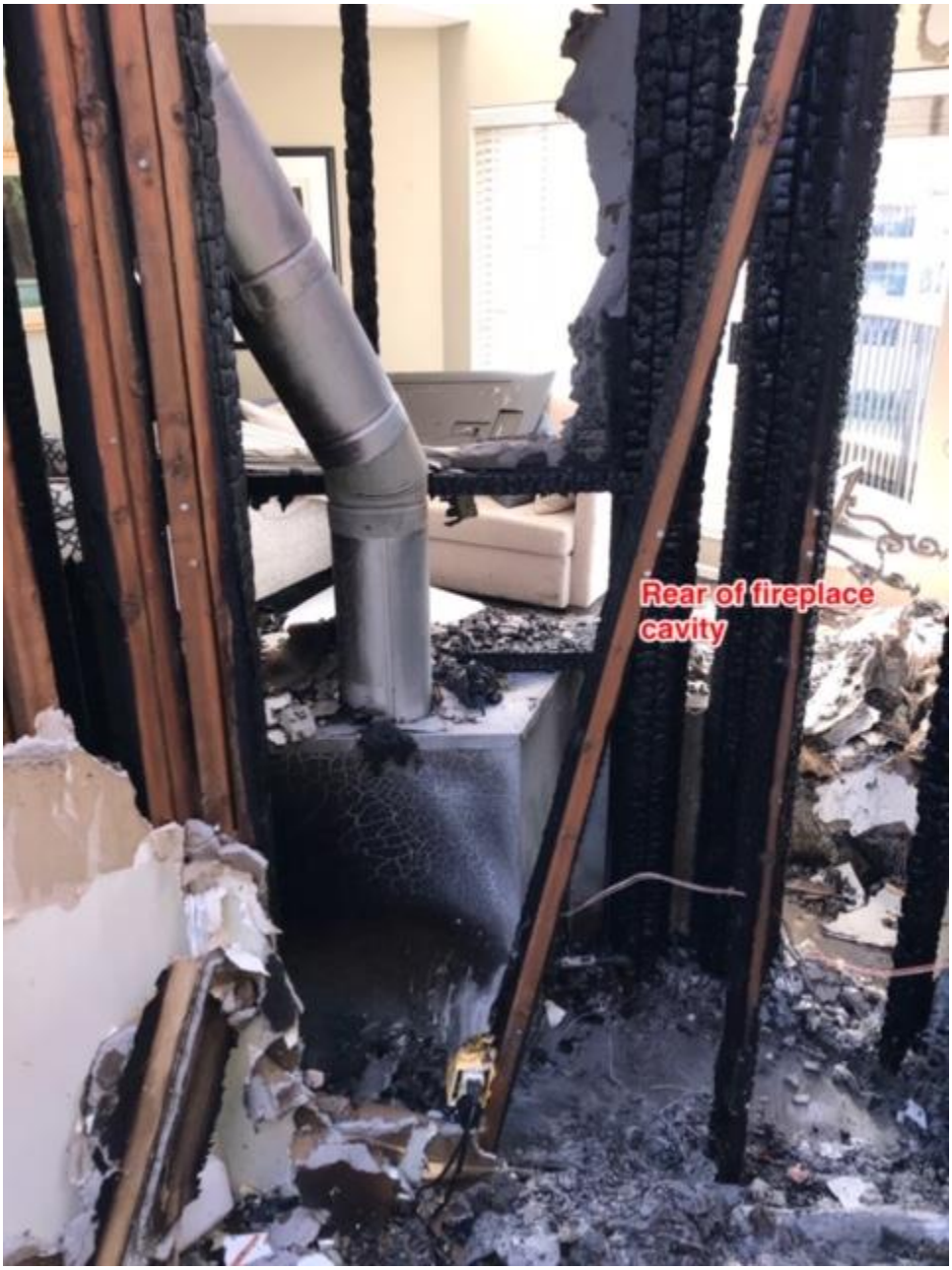

Photo 3


Type B Vent
Location of broken pipe
Pilot light (source of ignition)

Photo 4


STANLEY
1/4 inch per foot grade
measurement taken in hallway.

Photo 5

Photo 6