Incident Summary #II-1317008-2022 (#25858) (FINAL)

SUPPORTING INFORMATION	Incident Date		January 19, 2022
	Location		Chilliwack
	Regulated industry sector		Gas - Natural gas system
	Impact – Injury	Qty injuries	0
		Injury description	N/A
		Injury rating	None
	Impact – Damage	Damage description	Fireplace front glass shattered.
		Damage rating	Minor
	Incident rating		Minor
	Incident overview		The front protective glass shattered on a natural gas fireplace when the main burner which creates the visible flame surrounding the decorative log set was ignited from the pilot flame. No injury or damage to the home was reported.
INVESTIGATION CONCLUSIONS	Site, system and components		The natural gas fireplace being investigated uses a standing pilot flame as a means of ignition for a main burner that provides a luminous flame through the decorative log set The fireplace main burner is turned on and off by using a manual on/off switch or an automatic room thermostat. In this installation, an automatic room thermostat was used to operate the fireplace. When the fireplace is switched to on, the gas valve safeguard confirms that the pilot flame is present and no thermal safety switches are open before gas will be delivered to the main burner at a certain pressure calculated for the BTU input of the appliance. This fireplace uses a continuous pilot flame for ignition which is described in the B149.1-15 Natural Gas and propane installation code for Continuous Pilot, “a pilot that burns without turndown throughout the entire time the burner is in service, whether the main burner is firing or not”. This form of pilot flame never turns off and the appliance cannot operate unless the flame is proven to exist. The quantity of fuel measured in BTU to the main burner for safe operation, and the required pressure it is to be supplied to the main burner at, will be present on the manufacturers name plate attached to the appliance. If operating properly, the fuel delivered to the burner will be ignited quickly and smoothly by the pilot flame
	Failure scenario(s)		An abnormal operation of the fireplace was observed by the homeowner in the 3 to 4 days prior to the incident. According to a gas fitter attending after the incident, his reported diagnosis of the appliance describes the appliance gas valve fuel delivery to the main burner would pulse or flutter. An unstable supply of fuel to the main burner created an accumulation of unburnt gas in the combustion chamber before ignition.

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	When fuel accumulates before ignition occurs, a hard or explosive ignition can create a higher pressure in the combustion chamber than design allows and can result in the fireplace glass failing and being blown out into the room.
Facts and evidence	Interview with homeowner: - The residence was purchased new by the current homeowner upon completion of construction in 2012. - The fireplace has not received any maintenance from a certified gas fitter since the installation of the fireplace in 2012 as described by the homeowner. - The homeowner became aware of an abnormal operation of the fireplace 3 to 4 days prior to the incident and described a randomly occurring “larger than normal flame” and when the larger flame was present, the fireplace “produced more heat than normal”. - The pilot flame and safeguard components were not suspect Interview with the gas fitter: - The gas fitter used a manometer to measure the pressure of the fuel delivered from the appliance gas valve to the main burner. The gas fitter found that the fuel pressure was not stable and would pulse or flutter. - The pressure of the gas supplied to the appliance gas valve was within manufacturers specification. - After the gas fitter replaced the appliance gas valve and the front glass, the gas fitter then tested the fireplace for safe operation. The main burner flame was stable, and the fireplace operated correctly. - In speaking with the manufacturer, it was confirmed the original gas valve was installed in this model of fireplace around the time this fireplace was built.
Causes and contributing factors	It is likely that a malfunctioning gas valve led to a hard light off situation causing an explosive ignition of the main burner that blew out the fireplace glass.

Image 1 - The condition of the fireplace at the time of inspection. The homeowner had removed the fireplace logs and had vacuumed up the glass on the floor and interior of the fireplace before inspection.

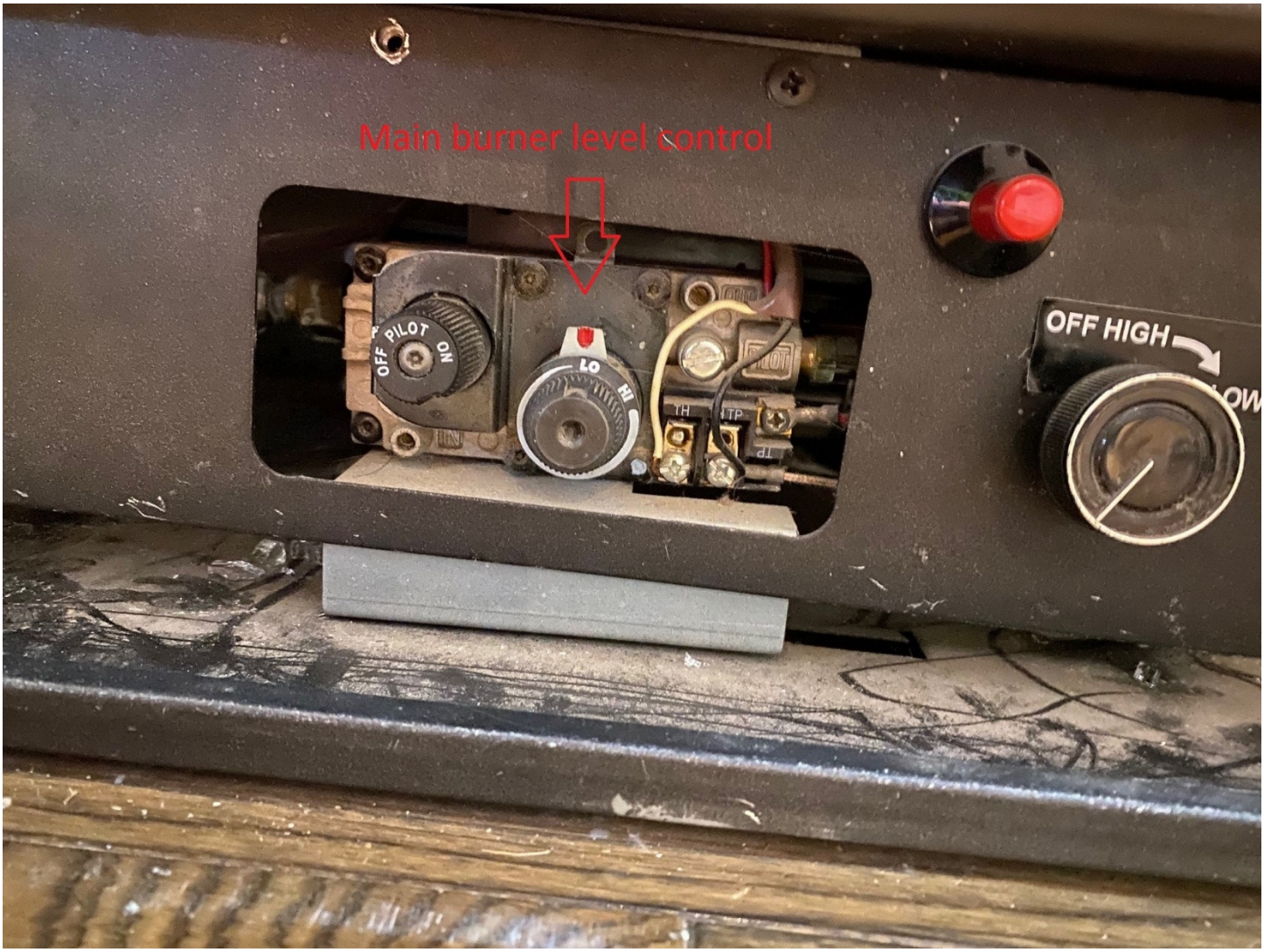

Image 2 - The original gas valve present at time of inspection.

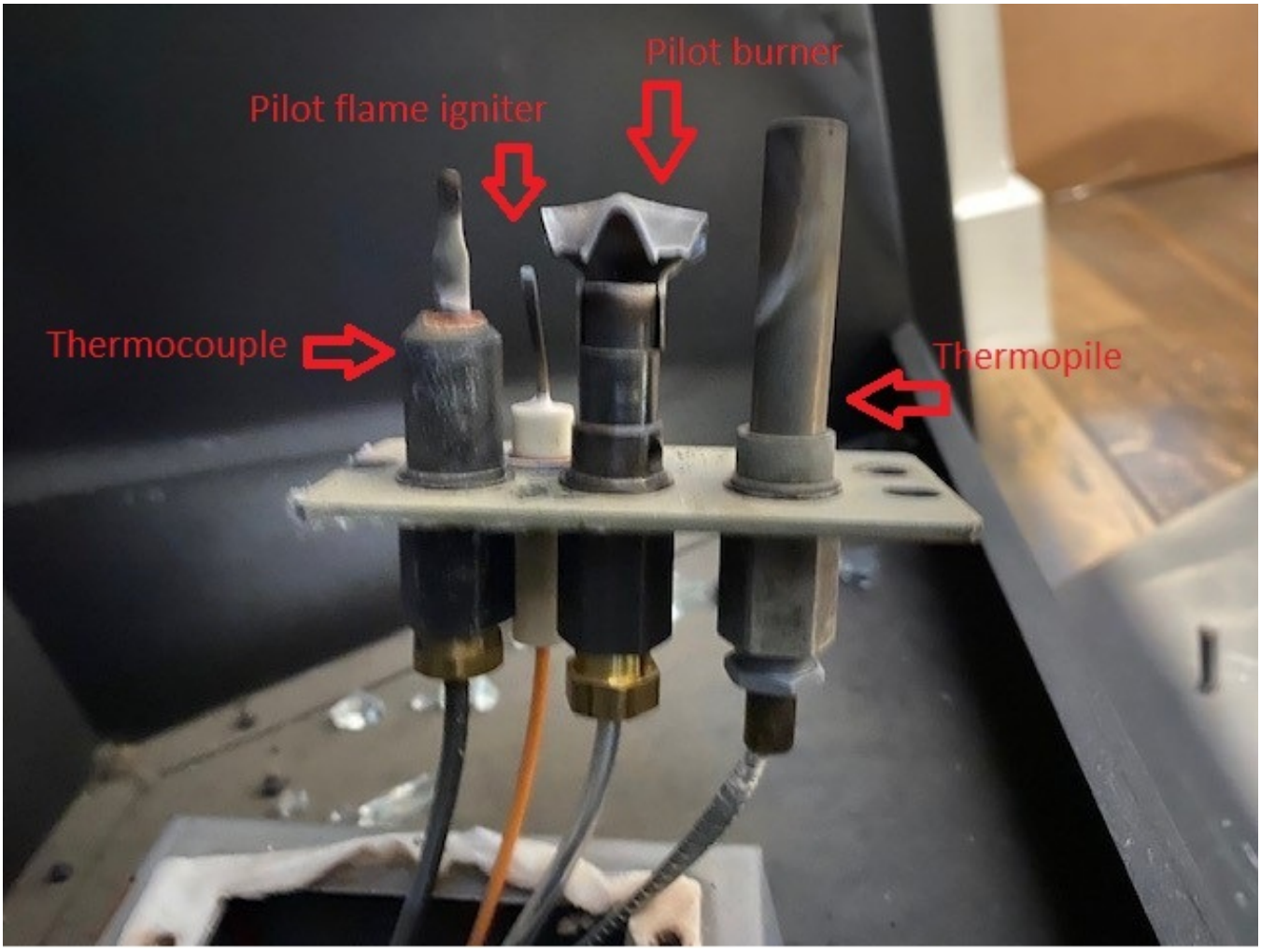

Image 3 - The continuous pilot assembly.

Image 4 - The original gas valve as provided to Technical Safety BC by the contractor who repaired the fireplace.