Incident Summary #II-1718284-2024 (#47160) (FINAL)

SUPPORTING INFORMATION	Incident Date			June 4, 2024
	Location			North Vancouver, BC
	Regulated industry sector			Gas - Propane system
	Impact	Injury	Qty injuries	1
			Injury description	Minor burns to eyebrows, bruised leg
			Injury rating	Minor
		Damage	Damage description	Dislodgement of oven door, shattered windows of food truck.
			Damage rating	Moderate
	Incident rating			Moderate
	Incident overview			Gas built up for approximately 30 minutes in a commercial cooktop/oven appliance. A worker then lit the pilot light with a lighter, igniting the buildup of gas causing an explosion inside the oven. Resulting in damage and injury.
INVESTIGATION CONCLUSIONS	Site, system and components			**Components** Mobile Outdoor Food Service Equipment (MOFSE) is a food truck that contains a propane system and multiple gas appliances. The truck operates as a mobile commercial kitchen, incorporating a food prep area, multiple gas cooking appliances, and an exhaust system. The propane system consists of piping comprised of gas hose, black iron pipe, copper tubing and gas connectors. At the time of incident, the food truck was connected to a 420lb propane cylinder. The propane tank pressure is reduced through a 2-stage regulator that delivers propane to the appliances at a pressure of 11” WC. Individual appliance regulators further reduce the pressure to appliance specific pressures. The piping system provides propane to multiple appliances, including a water heater, deep fat fryer, range, oven and flat top oven. The cooking appliances are installed under a hood connected to a mechanical exhaust system that removes the smoke, grease and products of combustion from the food truck. Propane is a gas that is heavier than air and when released into the atmosphere it will accumulate at a low point. --- **Lighting Procedures** • When the main propane supply is turned on, each appliance must be manually lighted by a worker. • Each gas appliance has a lighting procedure specified by the manufacturer of the appliance. • Once energized with propane, some appliances must be lit immediately to avoid the build-up of propane within the appliance.

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	Uncontrolled Pilot The appliance central to the incident is a flat top oven that incorporates a flat top grill and oven. This certified appliance has an uncontrolled pilot system that allows a small quantity of gas through the pilot assembly, which must be lit by hand before lighting the main burner. This pilot assembly does not include a safety thermocouple which would ensure that the pilot is lit before gas is allowed to freely flow through the pilot valve. With this type of pilot system, gas will continually emit from the pilot valve, even when there is no flame, creating a buildup of gas within the appliance. For appliances that incorporate this type of pilot assembly, it is critical to light the pilots immediately after the appliance has been gasified. **Pilot with safety thermocouple** Other gas appliances incorporate a pilot with a safety thermocouple. In this configuration, the pilot must be lit and proven by the thermocouple before gas is allowed to flow freely to the pilot valve. The user presses a button which allows gas to flow to the thermocouple, where a handheld lighter is used to ignite the gas. Once the gas is lit, the safety thermocouple heats up and holds the pilot gas valve open. If the pilot light goes, out the safety thermocouple will close the pilot gas valve, stopping the flow of gas. This prevents any gas build up inside the appliance, should the pilot fail to light or lose flame.
Failure scenario(s)	The food truck was parked at a specific location and was not driven offsite at the end of the day. To accommodate the higher propane use, and to avoid refueling of the food truck's propane system. A 420lb propane cylinder was connected to the system. It is common practice in commercial kitchens to leave the appliance pilot lights running 24hrs, even when the kitchen is not in use. In doing so, the pilot lights do not need to be lit each day. For the first few weeks of operation, the appliance pilot lights were left on overnight and relighting the appliances was not performed each morning. A few days before the incident occurred, a routine inspection by the fire department identified that the pilot lights and the propane system were being left on overnight. The fire department requested that the pilot lights be turned off and the propane system isolated at the end of each shift. This resulted in the workers needing to turn on the propane supply and relight the appliance pilots every morning. On the morning of the incident, the worker who first arrived on site lit all the appliance pilots, except for the flat top oven.

	Unbeknownst to the cook, the flat top oven did not have a pilot valve or safety thermocouple. As a result, once the propane system was energized, propane continually discharged from the pilot assembly. This gas accumulated in the oven chamber. Approximately 30 minutes after the propane system was engaged, a second worker arrived on site to begin meal prep. Assuming that the propane pilot had been lit, he turned on the flat top oven's main burner valve and proceeded to place bacon on the flat top grill. Turning on the main burner added further propane to the oven chamber. Recognizing that the bacon was not sizzling the worker realized that the pilot had not been lit. He proceeded to light the pilot with a wand (BBQ style) lighter, at which point there was a loud explosion that dislodged the oven door and blew out the windows of the food truck, injuring the workers knee.
Facts and evidence	**Statements from worker #1** • Newer employee and unfamiliar with the lighting procedures of the flat top oven. • He did not feel comfortable lighting the flat top oven and was unaware that the appliance incorporated an uncontrolled pilot. • There was a change in work procedure after the fire department had requested that the propane supply be turned off when the food truck was not in use. • He did not light the flat top oven after engaging the propane system. **Statement from worker #2** • Stated that he arrived on site 30 minutes after the propane system was engaged by worker #1. • The fire department had issued instructions to turn off the propane system after each shift. • Assumed the flat top has been lit by worker #1. • Engaged the flat top main burners to start cooking. Realized the pilots had not been lit and attempted to light the pilots. • Immediately a loud explosion occurred, which dislodged the oven door, blew out a truck window and injured the worker's knee. **Physical Evidence** • Oven door was dislodged from the appliance. • Front windows of food truck were blown out. • Flat top incorporated an uncontrolled pilot assembly. This assembly allows for the release of propane once gas is supplied to the oven.
Causes and contributing factors	A buildup of propane gas in an enclosed oven for 30 minutes prior to lighting the pilot light caused an accumulation of gas and an explosion. Likely contributing factors include: • A recent change in work procedures. • Unclear pilot lighting training and protocols. • Lack of communication between worker 1 and 2.

Image 1 – Example of propane cylinder sizes.

Image 2 – Upper view of cooktop and oven post explosion.

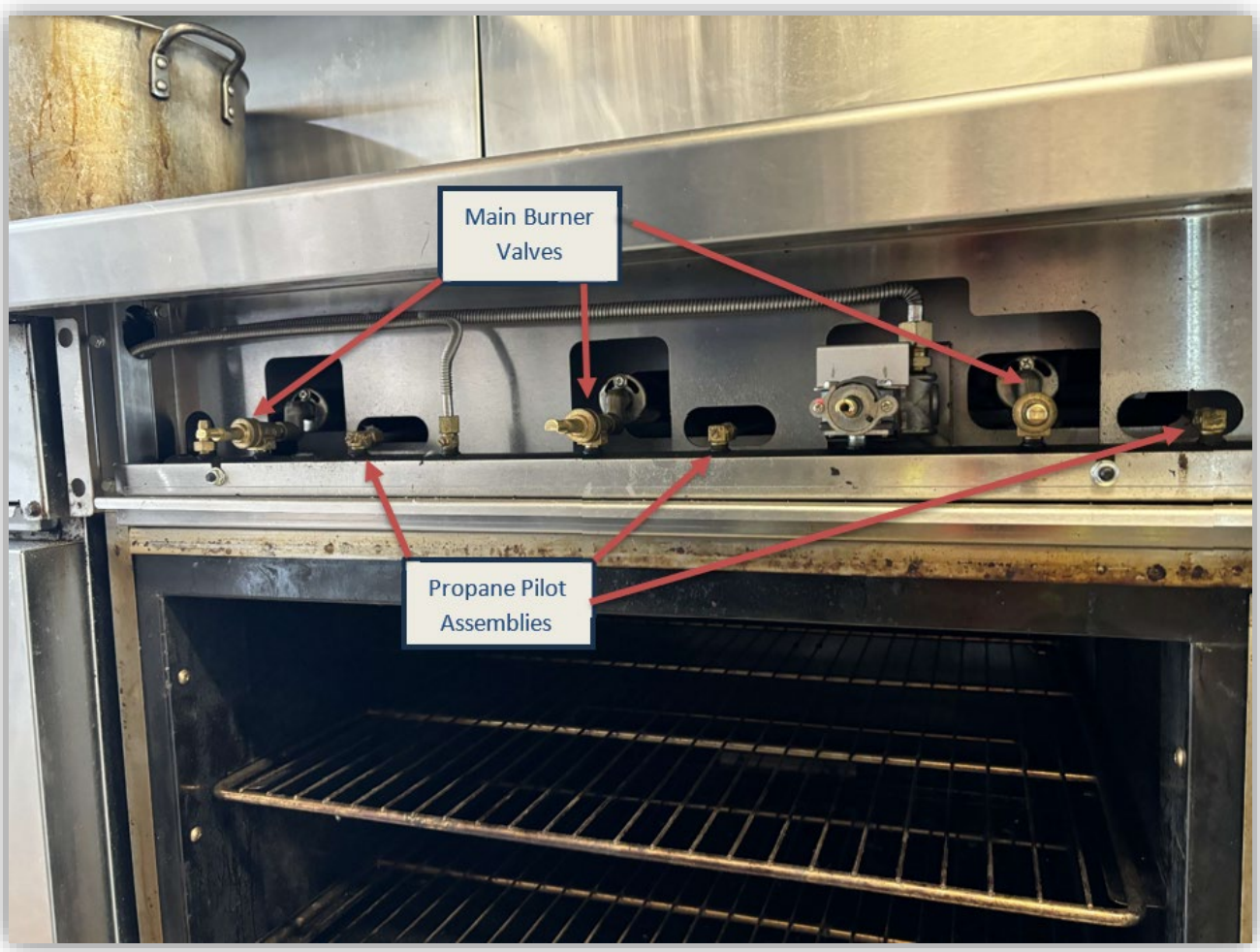

Image 3 – Oven burner valves and pilot assemblies.

Image 4 - Inside food truck.

Image 5 - Damage to food truck post explosion from front driver side.