

Incident Summary #II-878242-2019 (#14245) (FINAL)

SUPPORTING INFORMATION	Incident Date	July 11, 2019	
	Location	Langley	
	Regulated industry sector	Gas - Propane system	
	Impact	Qty injuries	2
		Injury description	1 st injury was a teacher from inside the school with a reported respiratory issue and was transported to hospital for observation. 2 nd injury was the gas fitter who was performing the work and he received 1 st degree freezer burn on his right leg between his knee and ankle and he was transported to hospital for treatment and then released.
		Injury rating	Minor
	Damage	Damage description	Approximately 560 litres of liquid propane spilled to atmosphere in less than one minute.
		Damage rating	Moderate
	Incident rating	Moderate	
	Incident overview	The gas fitter was performing a propane tank exchange and fuel transfer in the yard of a elementary school located beside a service road on the north west corner of the school property (refer to photos #1 and # 5). When setting up to transfer the propane from the old tank to the new tank the gas fitter accidentally allowed all the fuel to escape from the old propane tank into the atmosphere.	
INVESTIGATION CONCLUSIONS	Site, system and components	Propane tanks are fitted with evacuation valves which are designed to provide a safe means to transfer liquid fuel safely from one storage tank to another. The procedure for safe liquid transfer when using the evacuation valve. <ul style="list-style-type: none"> - Position one wrench on the evacuation valve fitting to prevent the fitting from being removed from the tank and another wrench on the evacuation valve cap for removal of the cap. (refer to photo #2) - Slowly loosen the cap from the evacuation valve to release any trapped propane liquid and to ensure that the evacuation valve is sealed. - Once the cap is removed you then connect the liquid transfer shut-off valve using the approved adaptor to the evacuation valve.(refer to photo #4) - Hoses are then connected between the old tank (liquid transfer valve) and the new tank's fill valve and fuel transfer procedure can be started. - Propane is a colourless odorless gas that is stored under pressure in its liquid state at -42 degrees Celsius, liquid contact with skin will cause freezer burns. Propane vapour is also extremely flammable. 	
	Failure scenario(s)	The gas fitter was removing an old 500 gallon propane tank from service and replacing it with a new tank of the same size that was supplying fuel to a portable behind the school being used as a daycare. The daycare was in operation. When swapping tanks the existing fuel is transferred from the old tank to the new tank by	

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	<p>connecting to the evacuation valve on the old tank and transferring the fuel to the new tank.</p> <p>The gas fitter was using one 24" pipe wrench and when he was trying to loosen the cap on the evacuation valve, he was actually loosening the entire evacuation valve from the 500 gallon propane tank. The gas fitter loosened the evacuation valve until it blew out of the tank body causing a uncontrolled liquid propane spill of approximately 560 liters of fuel. (refer to photo # 3) The gas fitter needed to be using two wrenches to perform this work, one to control the evacuation valve and the other to remove the cap.</p>
<p>Facts and evidence</p>	<p>Supervisor interview and tank / valve inspection</p> <ul style="list-style-type: none"> - Supervisor described his worker as having five years of gas fitting experience, but with only 4 months experience in the propane industry working for them. - Training procedure when working using an evacuation valve was one on one job training and job shadowing . - Worker had been shown how to perform liquid transfers using an evacuation valve and had been doing the work function successfully on his own in the field. - There were no written procedures that the worker was trained with and all liquid transfer training when using an evacuation valve was done in the field - The old propane tank and evacuation valve at the propane company's yard were inspected. It was determined that the evacuation valve was in safe working condition, and based on the time it took for the tank to empty, that the entire evacuation valve had been removed from the propane tank in error resulting in the propane release. - <p>Gas Fitter interview</p> <ul style="list-style-type: none"> - Confirmed that his injuries were to his lower extremities 1st degree burns to his right leg below the knee and tender and redness to his left leg. - He was aware that there was an operating daycare on site and waited until the children had been dropped off and safely inside before he started to exchange the old propane tank with the new one. - Due to the location of the old tank the gas fitter used a crane truck to lift the old tank onto the truck bed so he could connect to the evacuation valve and transfer the propane to the new tank. - Before starting, the gas fitter confirmed that the tank was 30% full (560 litres) of propane liquid. - Using one 24" pipe wrench he attempted to remove the cap from the evacuation valve and after turning the valve two or three times the evacuation valve blew out of the propane tank causing a significant uncontrolled spill of liquid propane (refer to photo # 3). - After realizing that the situation was out of control, he went to the daycare and spoke to staff through the window and told them to close all the windows and doors and remain inside until the situation was safe. - The school principle came out and the gas fitter informed him to keep the school staff and students away from the area. - The school principle informed him that the fire department had been called.
<p>Causes and contributing factors</p>	<p>The cause of this incident was very likely the gas fitter using an incorrect work procedure to remove the evacuation valve cap in preparation for transferring propane from the old propane tank to the new one.</p>

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Failure to properly utilize two wrenches to safely hold the evacuation valve in place while attempting to remove the evacuation cap allowed the fitting to be removed from the tank resulting in the uncontrolled release of liquid propane.

A contributing factor was that the gas fitter had five years of experience as a gas fitter but he only had four months experience working in the propane industry. The worker may have needed additional training and supervision.

Lack of documented work procedures, for reference by workers new to the job, may have also been a contributing factor.



Photo #1: 500 US water gallon propane tank in propane company's yard.



Photo #2: Evacuation valve on old propane tank.



Photo #3: Evacuation valve's internal seal. Photo shows that the seat is not damaged on the evacuation valve.



Photo #4: Evacuation valve adaptor and shut off valve. This is the shut off valve and adaptor used to connect to the evacuation valve on the existing tank that needs to have propane liquid removed.



Photo #5: Propane tank location at school.