

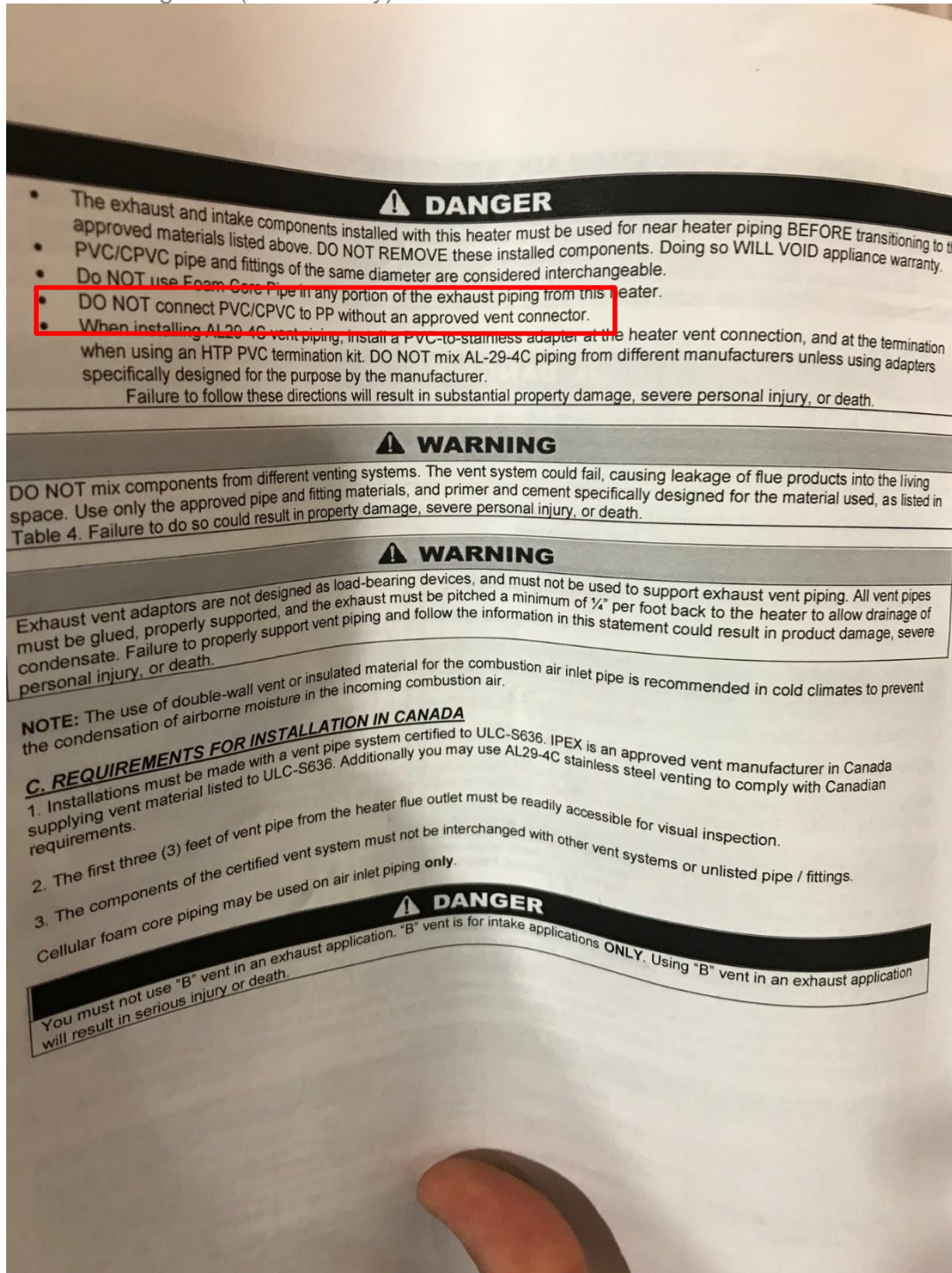
Incident Summary (Reference #II-607706-2017)

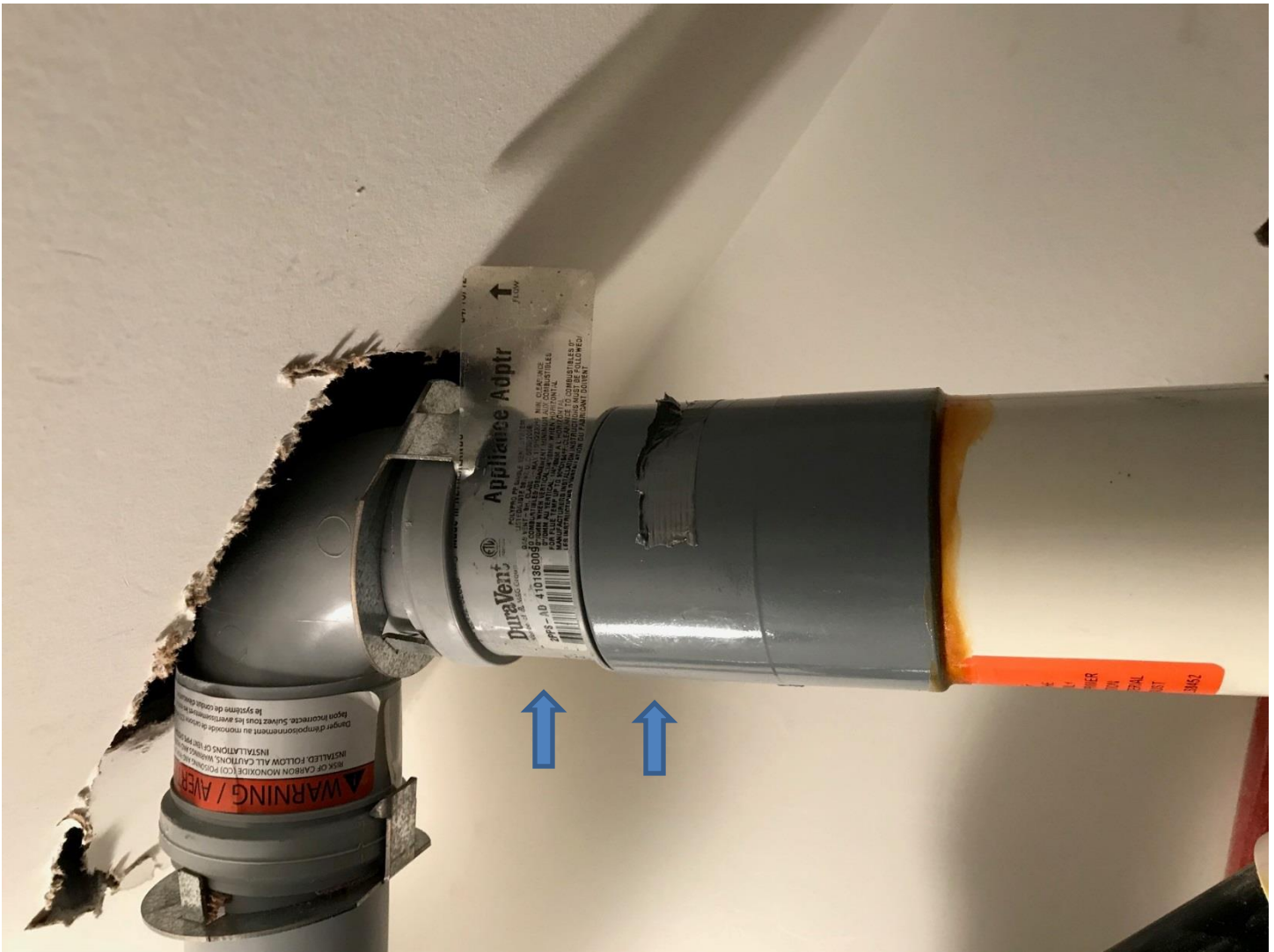
SUPPORTING INFORMATION	Incident Date	October 31, 2017	
	Location	Coquitlam, BC	
	Regulated industry sector	Natural gas system	
	Impact	Qty injuries	1
		Injury description	One person experienced carbon monoxide poisoning symptoms.
		Injury rating	Minor
	Damage	Damage description	A section of the venting system had separated from the boiler.
		Damage rating	Moderate
Incident rating	Moderate		
Incident overview	The venting system had separated at the vent outlet of the boiler. The gasses produced by the operation of the boiler were released into the house causing the carbon monoxide levels to increase and the carbon monoxide alarms to go off.		
INVESTIGATION CONCLUSIONS	Site, system and components	The boiler is a two vent pipe style appliance which pulls fresh air needed for the combustion process from outside through one vent pipe, and vents the exhaust gases out through a second pipe to the outdoors. The boiler is supplied with gas from a regulator which reduces the pressure of the gas from the house gas meter to a pre-set pressure required by the boiler for proper operation of the burner. When the temperature of the heating system drops the room thermostat will send an electrical signal to an internal gas valve with-in the boiler, allowing it to open sending gas to the burner, which will then be ignited by an ignition source, the heat produced by the burner transfers to the hot water that is circulated through the boiler.	
	Failure scenario(s)	The boiler located in the mechanical room closet in the basement appeared to have "hard light off" during ignition resulting in a blast of pressure in the venting system. The venting system was installed without a clamp that secured the venting coming out of the boiler to the rest of the venting system. The blast of pressure in the venting system was enough pressure to separate the piece of venting allowing the exhaust gasses produced from the burner to vent inside the boiler room.	
	Facts and evidence	<ul style="list-style-type: none"> - Venting system was found separated above boiler - According to the homeowners, no regular maintenance performed on boiler system - Missing piece of equipment vital to venting system operation - Gas supply to boiler not installed as per manufacturer's instructions - Venting system not installed to manufacturer's instructions 	
	Causes and contributing factors	It was very likely the boiler was being supplied with too much gas during the initial lighting of the appliance. This caused excessive pressure within the appliance and venting system. The missing piece of the venting system and the plausible blast of	

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pressure most likely caused the venting system to come apart inside the boiler room causing exhaust gasses from the boiler to be vented inside the house.

Photos or diagrams (if necessary)





Missing clamping piece as part of approved appliance CPVC-polypropylene adaptor

Do not remove the adaptor in Figure 28! It is mandatory that this fitting is used for connection to a field fabricated drip leg per the National Fuel Gas Code. You must ensure that the entire gas line to the connection at the heater is no smaller than 1/4".



Figure 28 – LP-171-BB

⚠ WARNING

Do not attempt to support the weight of gas piping with the heater or its accessories. The gas valve and blower will not support the weight of the piping. Failure to follow this warning could result in substantial property damage, severe personal injury, or death.

Once all inspections have been performed, the piping must be leak tested. If the leak test requirement is a higher test pressure than the maximum gas inlet pressure, you must isolate the heater from the gas line to continue leak testing. To do this, you must turn off the factory and field-installed gas cocks. This will minimize the possibility of damaging the gas valve. Failure to do so may damage the gas valve. In the event the gas valve is exposed to a pressure greater than 1/2 PSI, 14" water column, the gas valve must be replaced. Never use an open flame (match, lighter, etc.) to check gas connections.

Refer to the table below to size the supply piping to minimize pressure drop between meter or regulator and unit.

Maximum capacity of pipe in cubic feet of gas per hour for gas pressures of .5 psi or less and a pressure drop of .3 inch water column.

Nominal Iron Pipe Size (Inches)	Internal Diameter (Inches)	Length of Pipe (Feet)														BTU's Per Hour x 1,000
		10	20	30	40	50	60	70	80	90	100	125	150	175	200	
3/4	.824	278	190	152	130	115	105	96	90	84	79	72	64	59	55	
1	1.049	520	350	285	245	215	195	180	170	160	150	130	120	110	100	
1 1/4	1.380	1,050	730	590	500	440	400	370	350	320	305	275	250	225	210	
1 1/2	1.610	1,600	1,100	890	760	670	610	560	530	490	460	410	380	350	320	

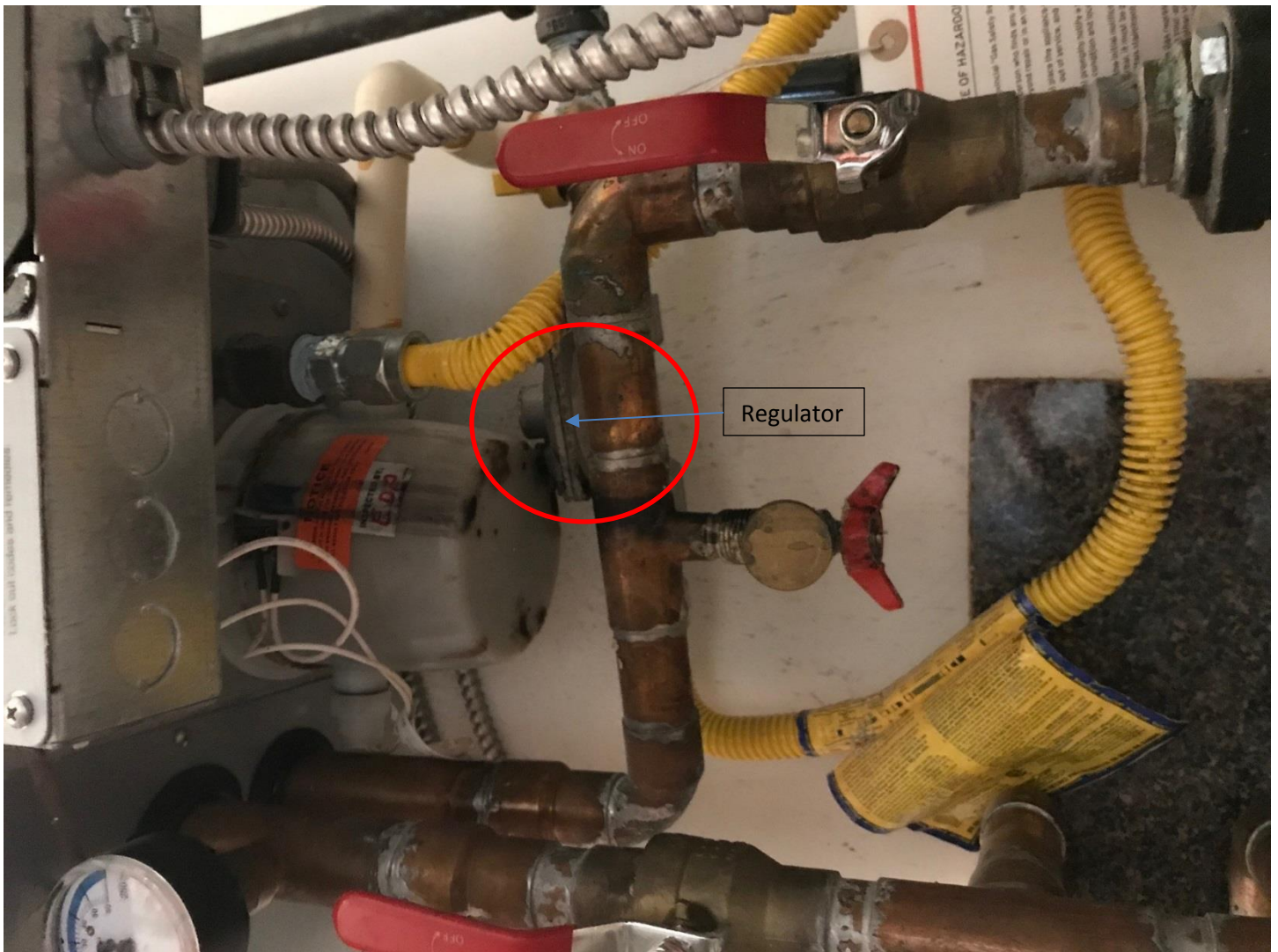
Table 8

It is recommended that a soapy solution be used to detect leaks. Bubbles will appear on the pipe to indicate a leak is present. The gas piping must be sized for proper flow and length of pipe to avoid excessive pressure drop. Both the gas meter and the gas regulator must be properly sized for the total gas load. If you experience a pressure drop greater than 1" WC, the meter, regulator or gas line is undersized or in need of service. You can attach a manometer to the incoming gas drip leg by removing the cap. The gas pressure must remain between 3.5" WC and 14" WC during stand-by (static) mode and while in operating (dynamic) mode at full output.

If an in-line regulator is used, it must be a minimum of 10 feet from the heater. It is very important that the gas line is properly purged by the gas supplier or utility. Failure to properly purge the lines or improper line sizing will result in ignition failure.

This problem is especially noticeable in NEW LP installations and also in empty tank situations. This can also occur when a utility company shuts off service to an area to provide maintenance to their lines. The gas valve must not be replaced with a conventional gas valve under any circumstances. As an additional safety feature, the gas valve in this heater has a flanged connection to the swirl plate and blower.

LP-171 Rev. 3.3.15



Picture showing ½ inch gas connector being used and 2 psi regulator installed less than 10 feet away.