

Incident Summary (II-624782-2017)

SUPPORTING INFORMATION	Incident Date	<i>November 28, 2017</i>	
	Location	<i>Port Moody</i>	
	Regulated industry sector	<i>Refrigeration system</i>	
	Impact	Qty injuries	<i>0</i>
		Injury description	<i>None</i>
		Injury rating	<i>None</i>
	Damage	Damage description	<i>An electric solenoid valve developed a leak on the flange gaskets.</i>
		Damage rating	<i>Insignificant</i>
Incident rating	<i>Insignificant</i>		
Incident overview	<i>The electric solenoid valve / strainer utilizes sealing gaskets between the valve and strainer and the pipe connections. The sealing gaskets developed a leak allowing ammonia gas to leak in to the compressor room. The compressor room ammonia leak detection activated the low level alarm at 25ppm. The leak was traced to the solenoid valve on one of the compressors that was online at the time. The refrigeration plant Chief Engineer and the maintenance contractor were able to shut down the compressor and isolate the leaking solenoid valve.</i>		
INVESTIGATION CONCLUSIONS	Site, system and components	<i>The site is a recreation centre skating rink that utilizes an ammonia refrigeration system. The electric solenoid valve is energized and in the "OPEN" position when the refrigeration compressor is operating. The solenoid valve serves as an isolation point between the oil separator vessel and the compressor. Lubricating oil that may be carried over with the refrigerant gas that has been discharged from the compressor must pass through the oil separator. The oil that is separated out of the refrigerant gas stream is allowed to drain back to the refrigeration compressor by way of the piping between the separator, solenoid valve, and compressor. The refrigerant gas carries on to the condenser through another pipe connection on the oil separator. SEE PHOTO 1 Solenoid Valve / Strainer</i>	
	Failure scenario(s)	<i>The solenoid valve receives very little maintenance other than replacing the electric coil. The flange gaskets are basically compressed between the mating surfaces by way of the 2 flange bolts. The piping that connects the solenoid valve to the oil separator and compressor is very rigid and subject to a certain amount of vibration that is produced by the 6 cylinder Mycom compressor. This vibration overtime may loosen the flange bolts and in turn compromise the flange gasket sealing capability.</i>	
	Facts and evidence	<i>The refrigeration plant operator noticed on the vestibule leak detection monitor that there was 35ppm of ammonia present in the compressor room and called the Chief Engineer to inform her of the situation. The Chief Engineer immediately called the maintenance contractor and apprised them of the situation. When the Chief Engineer and maintenance contractor arrived onsite the ammonia levels had dropped to 24ppm. They entered the compressor room and noticed liquid ammonia leaking from the solenoid valve on compressor #3. The compressor was immediately shutdown and all necessary isolating valves were closed to stop the flow</i>	

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	<p>of ammonia in to the compressor. The concentration of ammonia reached a point of 69ppm during the leak investigation and compressor valve isolation period.</p> <p>-Gaskets Dry and brittle</p>
Causes and contributing factors	<ul style="list-style-type: none">- It is likely with the solenoid valve being subjected to a certain amount of vibration from the refrigeration compressor over time this impacts the sealing capability of the gaskets due to the flange bolts loosening.- The gaskets were dry and brittle and this impacts the sealing capability.

Photos or diagrams (if necessary)



1 Solenoid Valve / Strainer

