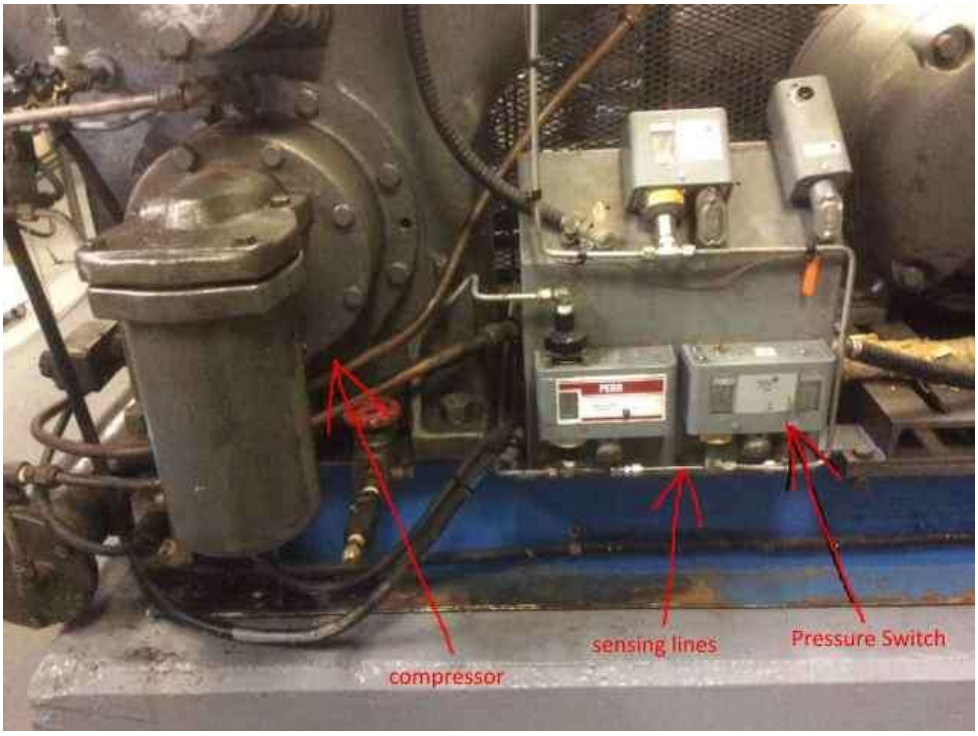
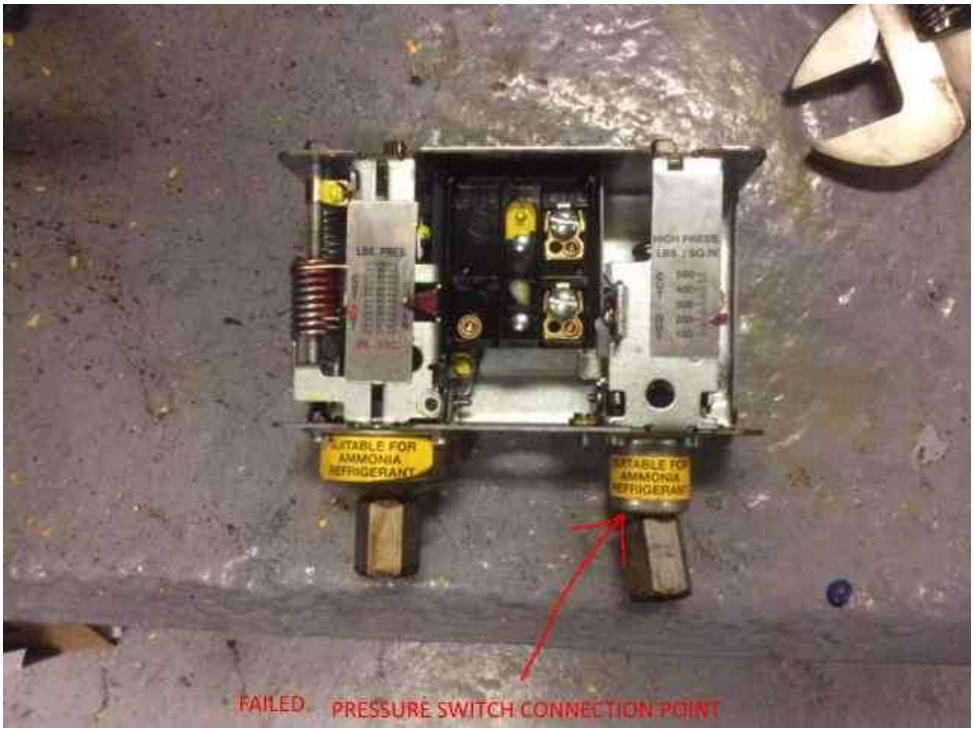
Incident Summary #II-740302-2018 (#775050) (FINAL)

SUPPORTING INFORMATION	Incident Date		September 5, 2018
	Location		North Delta
	Regulated industry sector		Boilers, PV & refrigeration - Refrigeration system
	Impact – Injury	Qty injuries	0
		Injury description	none
		Injury rating	None
	Impact – Damage	Damage description	Cracked bellows fitting on Ammonia compressor Pressure switch.
		Damage rating	moderate
	Incident rating		Moderate, due to the release of ammonia in a ventilated space
	Incident overview		In a public assembly arena mechanical room an Ammonia leak occurred at the connection point of ¼ inch pressure sensing line connected to a pressure switch bellows for an ammonia compressor.
INVESTIGATION CONCLUSIONS	Site, system and components		The arena refrigeration system Pressure switch, which starts and stops the compressor, is attached to 3 feet of ¼ inch stainless steel sensing line that leads to the compressor discharge piping. Anti-Vibration clamps are commonly used on most sensing lines to dampen the vibrations caused by the pulsations of reciprocating compressors.
	Failure scenario(s)		The lack of anti-vibration clamps on this particular sensing line would allow the constant vibration will over a period of time to cause metal fatigue and cracking on the pressure switch bellows. Vibrations are often amplified due to harmonic effects if the sensing lines that are not clamped down tight with anti-vibration clamps.
	Facts and evidence		Pictures attached show the location of the crack on the pressure switch bellows and a sensing line that did not have any anti vibration clamps near the failed switch. Examination by an Industry service and maintenance expert indicated the sensing line vibrations had also started to rub or erode the line against a contact point on an electrical fitting. In consultation with the industry service provider this line has been replaced.
	Causes and contributing factors		The Likely cause is the lack of anti-vibration clamps on the sensing line that would allow the constant compressor vibrations will over a period of time to cause metal fatigue and cracking on the pressure switch bellows. The age of the plant is a contributing factor as the date of installation over 20 years ago did not commonly use anti-vibration clamps. Industry practice is to now clamp sensing lines at various points to ensure vibration is not amplified and allowed to travel up the sensing lines to connection points on pressure switches.

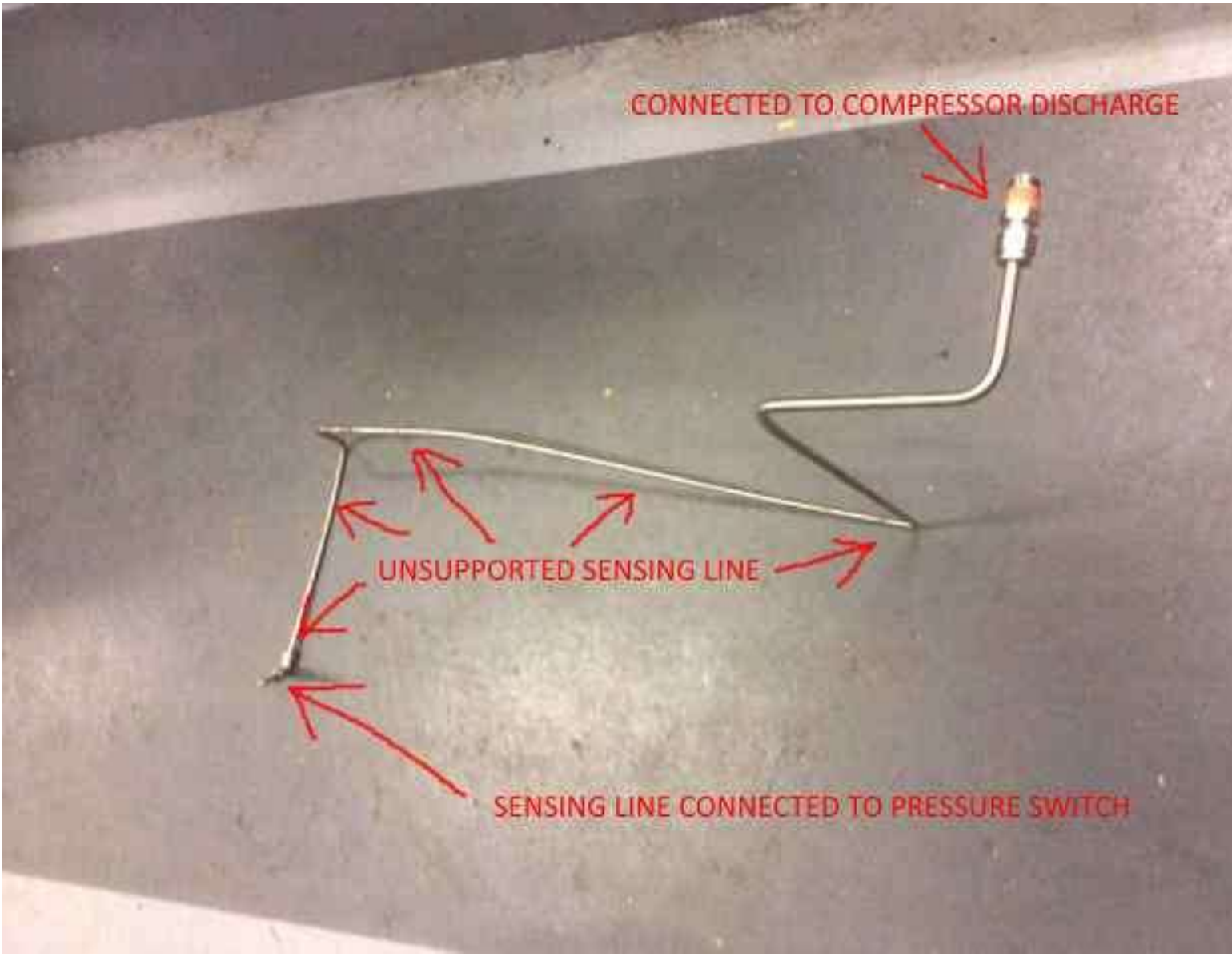
Photos or diagrams (if necessary)



Show location of mounted control in proximity to compressor and location of pressure switch and sensing lines



Shows failed pressure switch connection point, Note: the Pressure switch connection fitting has been bent or opened up to show where the crack started.



Shows unsupported section of sensing line that was connected to the pressure switch