Incident Summary (Reference #5580487)

SUPPORTING INFORMATION	Incident Date			February 26, 2016
	Location			Prince George
	Regulated industry sector			Boiler Pressure Vessel – Pressure Piping
	Impact	Injury	Qty Injuries	0
			Injury description	No injuries
			Injury rating	None
		Damage	Damage description	A 4 inch diameter pipe collapsed under a vacuum and developed a longitudinal crack.
			Damage rating	Minor
	Incident rating			Minor
DESCRIPTION	Incident overview			A small fire occurred at the base of a Vacuum Tower located at a light oil refinery. The fire was quickly extinguished and there were no injuries. A loss of containment on one of the process piping systems associated with the vacuum tower released a hydro carbon which self-ignited and caused the fire. Minor damage to piping, cladding & insulation resulted.
	Site, system and components			The process piping runs vertically up the side of the Vacuum Tower. The product transferred in the lines is a hydrocarbon solution with a high sulphur content, it operates at a temperature of 600-700 degrees Fahrenheit (F) and an auto ignition temperature of approximately 500 F and operates under a vacuum. The 4” piping material is a made of 5% chrome alloy which provides a degree of resistance to corrosion. The piping is insulated.
CONCLUSIONS	Failure scenario(s)			The process piping wall thickness was thinned due to corrosion, to the extent that the operating vacuum pressure collapsed the pipe. The pipe rupture occurred due to the collapse, the vacuum pressure was broken and hydrocarbon released. The high temperature contents self-ignited upon exposure to atmosphere. A fire exited at the base of the insulated pipe but was largely contained in the pipe cladding.
	Facts and Evidence			Inspection of the pipe found extensive thinning evenly along its entire length. The product in the piping has a high sulphur content which is very corrosive. The piping was replaced in 2008 with piping of a lower chrome alloy than originally constructed. The piping failed prior to its expected life span.
	Causes and Contributing Factors			It is highly probable that corrosion is the damage mechanism. It is probable that changes to material used in prior construction and/or changes to process resulted in accelerated corrosion.