

Incident Summary #II-1512003-2023 (#32273) (FINAL)

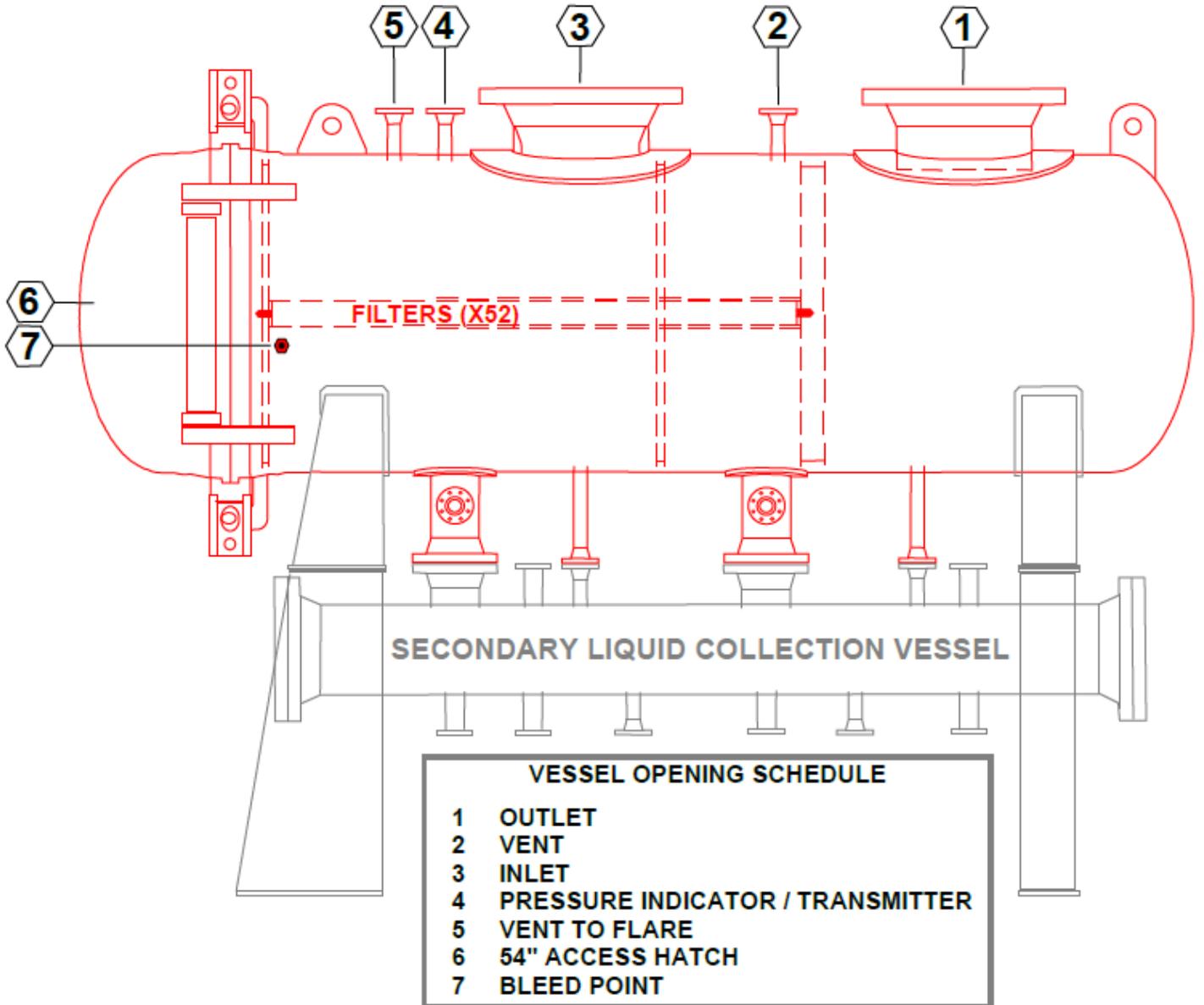
SUPPORTING INFORMATION	Incident Date	February 20, 2023	
	Location	Peace River South	
	Regulated industry sector	Boilers, PV & refrigeration - Boiler and pressure vessel system	
	Impact	Qty injuries	1
		Injury description	One person sustained bruising and contusions to the right-side torso and leg.
		Injury rating	Minor
	Damage	Damage description	Metal on metal scrape to a pressure vessels access hatch and destroyed light fixture.
		Damage rating	Minor
	Incident rating	Minor	
Incident overview	During a filter replacement at a natural gas processing plant a release of trapped pressure forced a pressure vessel 54" access hatch open. Injuring a worker and destroyed a light fixture.		
INVESTIGATION CONCLUSIONS	Site, system and components	<p>A natural gas processing plant is a facility designed to clean raw natural gas by separating impurities and various non-methane hydrocarbons and fluids to produce dry natural gas.</p> <p>Processing raw natural gas begins at the inlet gas piping or gas stream of a natural gas processing plant and this piping delivers the raw natural gas to each processing vessel. Two of these processing vessels are an inlet gas-liquid separator and an inlet filter. As the raw natural gas enters the inlet gas-liquid separator the design of the vessel separates most of the liquids from the gases. Separating the liquids from the gases reduces the probability of liquid slug or ice and hydrate dams downstream. As the gas continues downstream of the gas-liquid separator it enters the first in series of two inlet filter. After the first inlet filter vessel additional gas is introduced from two other sources into the gas stream and then the gas stream enters the second inlet filter vessel. As gas flows through each inlet filter vessel gas passes through filters which remove solids from the gas and allows for liquids to be drained away.</p> <p>Each inlet filter vessel has a primary pressure vessel with a 54" access hatch at one end to remove filters, a 24" gas inlet and outlet, and a secondary collection vessel underneath to collect liquids. This vessel also has other outlets that allow for operators to vent the vessel and verify pressure within the vessel. See pressure vessel diagram.</p>	
	Failure scenario(s)	<p>During operation process trending indicated that pressures were erratic on the inlet piping upstream of the second inlet filter. This erratic pressure represented a potential blockage in the inlet piping or the inlet filter vessel. So, on February 16 a plan was made to open both inlet filter vessels the morning of February 20, 2023, to investigate the erratic pressures and replace the filters.</p> <p>In the morning of February 20, 2023, three operators were tasked with opening the 54" access hatch to remove the filters. These operators first needed to isolate and depressurize the inlet filter vessel, and a predetermined Lock-Out-Tag-Out (LOTO)</p>	

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	<p>procedure would be utilized to ensure a safe opening. However, as the operators went through the steps of the LOTO they failed to confirm zero pressure inside the vessel with the control room. They also failed to consider the presence of a blockage inside the inlet filter vessel.</p> <p>Once the operators reached the last step of the LOTO and removed a bleed plug to verify complete depressurisation. They witnessed a normal amount of pressure released from the vessel that quickly ended. However, this release of pressure only came from a section downstream of the blockage. So, believing there was zero pressure in the vessel. The operators proceeded with loosening the clamp holding the 54" access hatch closed. Once the final bolt holding the access hatch closed was loose the access hatch unexpectedly opened. Releasing the filters, ice, and hydrate from the vessel striking one operator on the torso and leg. See failure scenario diagram and aerial diagram.</p>
<p>Facts and evidence</p>	<ul style="list-style-type: none"> • Owner reported that procedure was not followed. Personnel did not confirm zero pressure inside the vessel prior to loosening access hatch door. • Owner reported that procedure was inadequate. Procedure did not allow for additional pressure venting away from blockage if a blockage was present. • Photographic evidence was taken of the blockage. Blockage was observed to be approximately 1 meter in length and through all 52 filters.
<p>Causes and contributing factors</p>	<p>It is highly probable that since the operators did not confirm zero pressure inside the vessel prior to loosening the access hatch. The trapped pressure forced the access hatch open releasing the filters, ice, and hydrate from the vessel striking one operator and destroying a light fixture.</p>

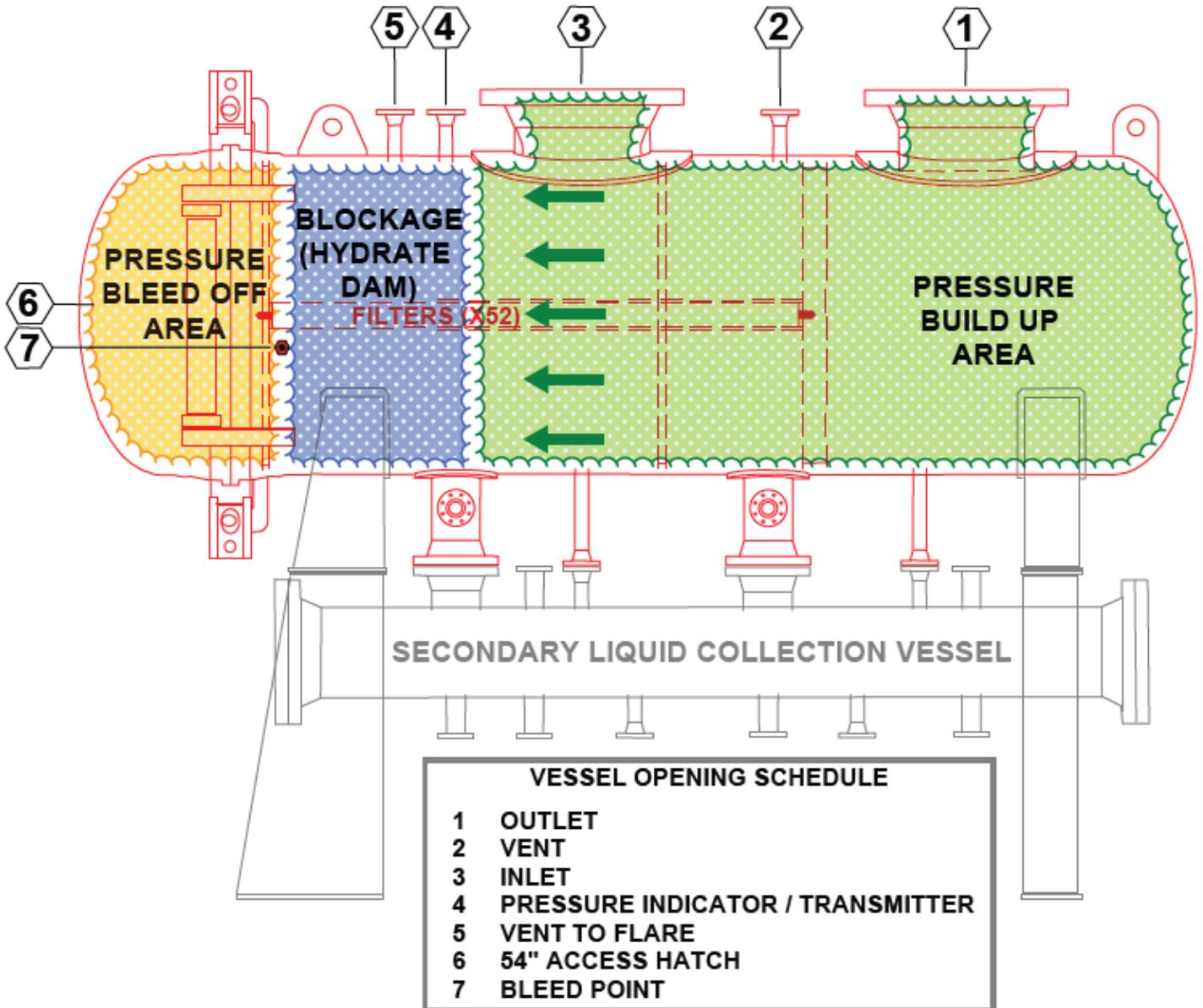
PRESSURE VESSEL DIAGRAM

INLET FILTER PRESSURE VESSEL



FAILURE SCENARIO DIAGRAM

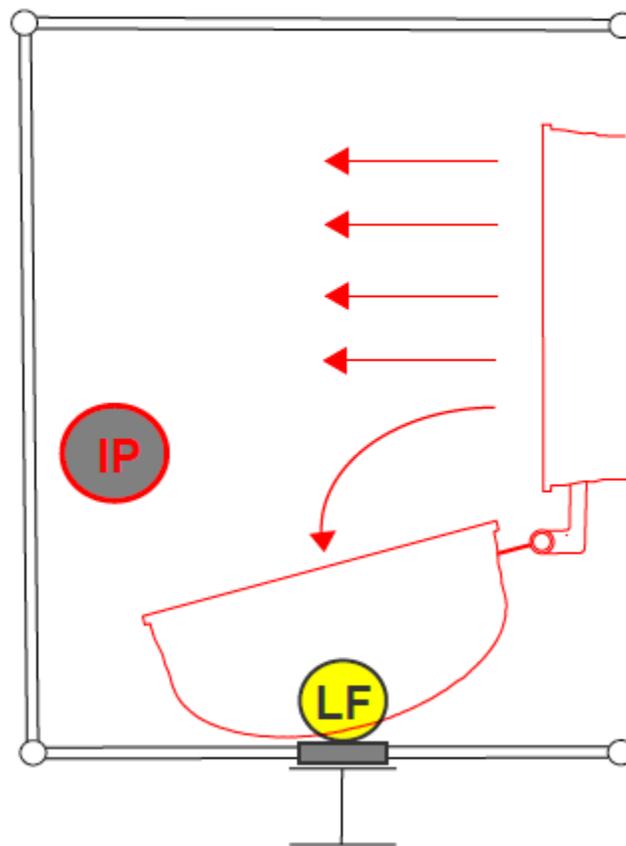
INLET FILTER PRESSURE VESSEL



BLOCKAGE (HYDRATE DAM)



**AERIAL DIAGRAM OF OPEN ACCESS HATCH,
SCAFFOLDING, LOCATION OF LIGHT FIXTURE, AND
POSITION OF INJURED PERSON**



EXAMPLE LIGHT FIXTURE & LOCATION OF DESTROYED LIGHT FIXTURE

