



AGNICO EAGLE

Meliadine Project

Saline Effluent Discharge to Marine Environment

ACCIDENTS AND MALFUNCTIONS



PRESENTATION OVERVIEW



- Spill Management Plan
- Accidents and Malfunctions
- FMEA Summary

A long-exposure photograph of an industrial facility at night. The scene is dominated by a large, dark green building with several windows. In the foreground, there are stacks of shipping containers and a dirt road. The ground is covered with light trails from moving vehicles, creating a sense of motion. The sky is a deep blue, and the overall lighting is a mix of the cool blue of the night and the warm yellow of the artificial lights.

SPILL MANAGEMENT PLAN

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- Community concerns were raised around spill contingency (e.g., the ability to detect spills) and emergency measures (e.g., mitigation to stop leaks when they occur) for the waterline.
- Agnico Eagle integrated community feedback into the design of the waterlines:
 - leak detection system (fiber-optic cable capable of pinpointing the location of a leak within 10 m, in real time)
 - Two waterlines with smaller volume rather than one waterline
 - Pumps equipped with an emergency stop
 - Leak volume will be limited to the volume contained between up and down hill high point from the failure point
- Other mitigations:
 - emergency spill line number will be made available to the public
 - follow the requirements to report spills
 - Adhere to the Spill Contingency Plan
 - Apply the General Procedure for Spilled Saline Water (Spill Contingency Plan)



ACCIDENTS AND MALFUNCTIONS

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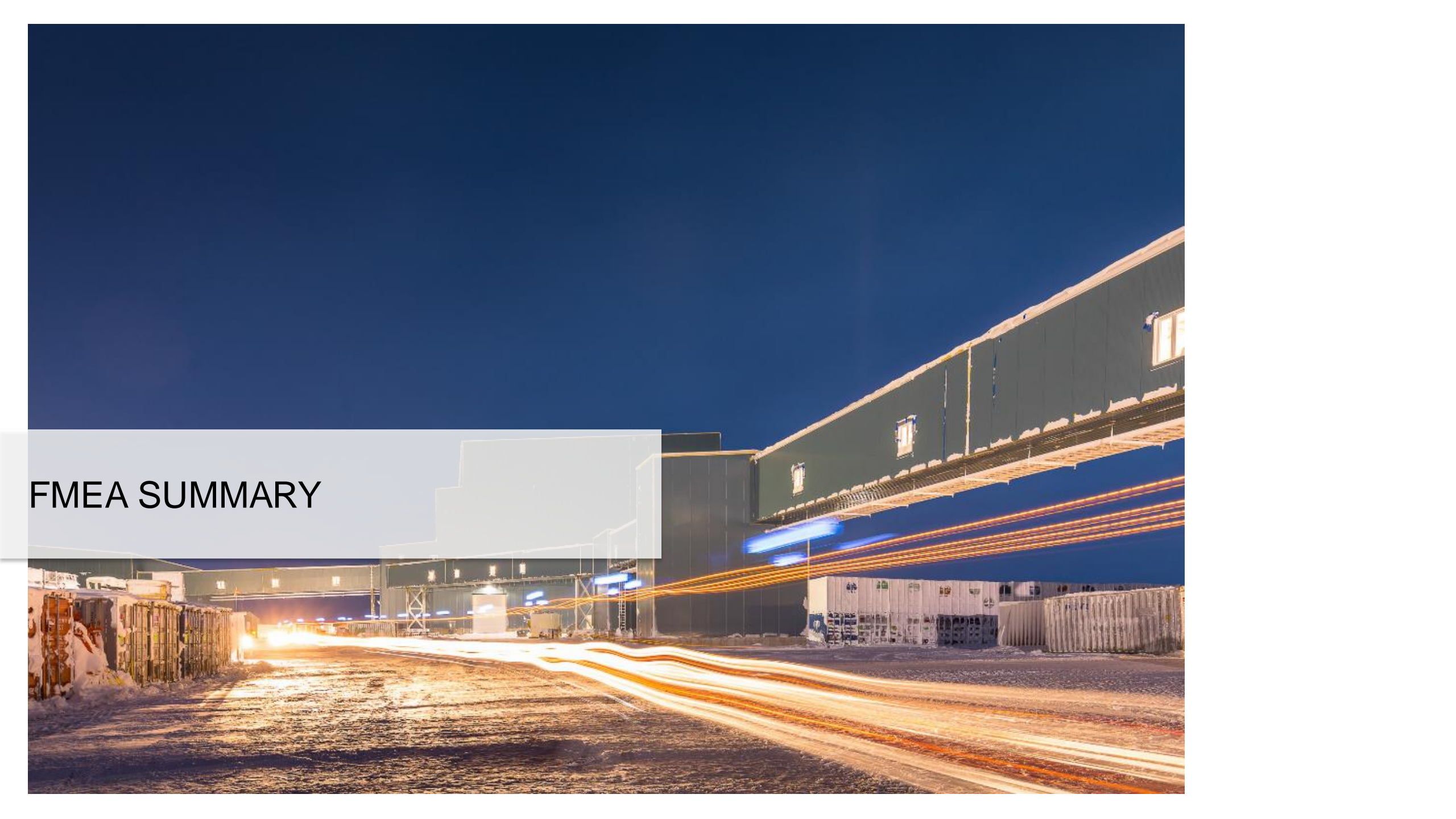


Accident or Malfunction	Mitigation	Consequence	Likelihood
Failure of the covered/buried portions of the waterline	Buried/covered; Regular internal inspections; Leak detection system, Designed for corrosion protection and freeze/thaw; Spill Contingency Plan	Dependent on the location and the size of the leak or spill from the waterline. A reasonable worst-case scenario is localized measurable impacts to fish and fish habitat if the spill or leak was to occur over a river or localized measurable impacts to soils, terrain and vegetation on land.	The likelihood of small leaks with limited to no detectable effect could occur at some point during the mine life. The chance of a large leak going undetected and causing harm to fish or wildlife is low.
Failure of exposed waterline	Regular internal inspections; Leak detection system; Designed for corrosion protection and freeze/thaw; Emergency response plan		
Spills during construction from construction equipment	Trained drivers; Speed restrictions; Regular maintenance; Emergency response plans; Spill Response Plan	Limited impacts on the environment due to the detection time and ability to contain the spill.	The likelihood of small spills with limited to no detectable effect could occur at some point during the mine life.

ACCIDENTS AND MALFUNCTIONS



Accident or Malfunction	Mitigation	Consequence	Likelihood
Sloughing below the waterline	Regular internal inspections; HDPE can tolerate a certain amount of movement without failing	Measurable change in terrain, soils and permafrost.	Low chance of occurring due to project design.
Water freezing in the waterline, compromising performance and/or leading to failure	Limit the discharge during freezing conditions; Winterization of the waterline; Regular inspection and maintenance.	Reasonable worst-case scenario is the waterline is damaged and requires repair and/or portions of it may require removal and replacement. This could result in additional construction effort and additional sensory disturbance to wildlife while this additional work occurs.	This is unlikely to occur due to Agnico Eagle's experience with other lines on the mine site and experience clearing lines.
Cover and slope failure	Sufficient cover depth; Use of gravel and sand to construct covers; Designed for travel otop; Appropriate sloping 2.5H:1V for stability	Localized cover failure could make it more difficult for wildlife to cross the waterline. There is a potential for a small localized effect to a few individual animals.	This is unlikely to occur due to the planned slopes and planned construction material and regular inspections.
Seepage from the underground portion of the marine discharge pipe	Marine water quality monitoring	Localized minor impacts to marine habitat due to the flushing capacity of Melvin Bay discharge.	This may occur during the Project life. Monitoring water quality during the discharge season will occur.



FMEA SUMMARY

FAILURE MODES AND EFFECTS ANALYSIS



- Identify potential failures related to the waterline
- Each failure is classified by
 - Likelihood of occurrence x Consequence if occurs = Severity Rating
- 47 identified failure modes, with 30 being credible; severity ratings:
 - 11 moderate
 - 13 low
 - 4 very low
 - 2 negligible

Probability	Combined Consequence						
	None	Negligible	Very Low	Low	Moderate	High	Very High
None	None	None	None	None	None	None	None
Very Low	None	Negligible	Negligible	Negligible	Negligible	Very Low	Low
Low	None	Negligible	Negligible	Negligible	Very Low	Low	Moderate
Moderate	None	Negligible	Negligible	Very Low	Low	Moderate	High
High	None	Negligible	Very Low	Low	Moderate	High	Very High
Very High	None	Very Low	Low	Moderate	High	Very High	Extreme
Given	None	Very Low	Low	Moderate	High	Very High	Extreme

FAILURE MODES AND EFFECTS ANALYSIS



The four highest ranked failure modes with a moderate severity (low consequence with high probability):

- Snowmobile/ATV/pickup damage at uncovered sections
- Heavy equipment traffic damage at the uncovered sections
- Internal pressure in the waterline
- Submarine diffuser damage/movement

Probability	Combined Consequence						
	None	Negligible	Very Low	Low	Moderate	High	Very High
None	None	None	None	None	None	None	None
Very Low	None	Negligible	Negligible	Negligible	Negligible	Very Low	Low
Low	None	Negligible	Negligible	Negligible	Very Low	Low	Moderate
Moderate	None	Negligible	Negligible	Very Low	Low	Moderate	High
High	None	Negligible	Very Low	Low	Moderate	High	Very High
Very High	None	Very Low	Low	Moderate	High	Very High	Extreme
Given	None	Very Low	Low	Moderate	High	Very High	Extreme

QUESTIONS ?

