

Lessons Learned From Dam Safety Incidents



Some of the world's largest dams are located at oil sands mines in Alberta. We regulate dams associated with coal and oil sands mines and oil and gas operations across Alberta. Industry operators have dam safety management systems (DSMSs) that provide controls and checks for safely managing dams throughout their entire life cycle, from site selection and construction through to decommissioning and closure.

We are sharing several dam safety incidents here in order to help prevent similar incidents by raising awareness among dam operators.

Incident description	Contributing factors	AER actions	Lessons learned
<p>Failure of a tailings dam and release of fluid mine waste into the environment.</p> <p>The released waste caused extensive damage to two creeks, destroyed fish habitat, and entered the Athabasca River, resulting in water use restrictions.</p>	<p>The mine did not have a DSMS, the dam was not built according to design, the construction details were not recorded, the fluid levels behind the dam were not adequately monitored, and the dam did not have regulatory approval.</p>	<p>Alberta Environment and Sustainable Resource Development (currently Alberta Environment and Parks) issued an environmental protection order on November 19, 2013.</p> <p>The operator was convicted under the <i>Environmental Protection and Enhancement Act</i> on June 9, 2017.</p> <p>Details of the investigation are available on the AER's Compliance Dashboard (file 2013-006) at www.aer.ca.</p>	<p>Operators must follow the regulatory approval process and clearly communicate the status of regulatory applications to their teams.</p> <p>Operators must have DSMSs to reduce the risk of dam failures and emergency response plans to mitigate failures.</p>
<p>Start of dam construction at a mine without approval.</p>	<p>Communication broke down between the operator's planning, regulatory, and operations teams, resulting in construction starting before the design of the dam was approved.</p>	<p>Discovered incident during a routine inspection and issued a notice of noncompliance stopping construction until a detailed design was submitted and approved.</p>	<p>Operators must ensure that the status of applications is clearly communicated to their teams before construction begins.</p>
<p>Operation of a tailings pond deviated from approval conditions, and operator did not inform the AER of the deviation.</p>	<p>A tailings beach¹ was not built upstream of the dam because permanent tailings and water lines entered the pond at this location, preventing a beach from being built there.</p>	<p>Discovered incident during a routine dam inspection and issued a notice of noncompliance requiring the operator to demonstrate the dam was safe and provide a mitigation plan.</p>	<p>Permanent or temporary infrastructure that might affect dam operation must be identified and addressed in dam designs.</p>
<p>Operation of a tailings pond deviated from approval conditions, and operator did not inform the AER of the deviation.</p>	<p>A tailings beach that was part of the design of the dam was not built. The designer did not indicate that a beach was needed only at high dam elevations.</p>	<p>Discovered incident during a routine dam inspection and issued a notice of noncompliance requiring the operator to demonstrate the dam was safe and provide a mitigation plan.</p>	<p>Operating conditions for dam components must be identified and addressed in dam designs.</p>
<p>Operation of a saline pond deviated from approval conditions, and operator did not inform the AER of the deviation.</p>	<p>Instrumentation to monitor dam performance that was included in the approved design was not installed before the dam began operating.</p>	<p>Discovered incident during a routine inspection and issued a notice of noncompliance requiring operator to install dam monitoring instrumentation.</p>	<p>Operators must ensure that dams are built and operated to the approved designs.</p>
<p>Portion of a dam at a mine raised above the approved elevation while an application to raise the dam was under review by the AER.</p>	<p>Communication broke down between the operator's engineering, planning, regulatory, and operations teams.</p>	<p>Discussed approval conditions with the operator, who self-reported the deviation, and the AER issued a notice of noncompliance.</p>	<p>Operators must ensure that the status of applications is clearly communicated to their teams before dams are altered.</p>

¹ A tailings beach keeps tailings fluid away from the dam to reduce the risk of the dam failing and is often a required component of a dam built using the upstream method.