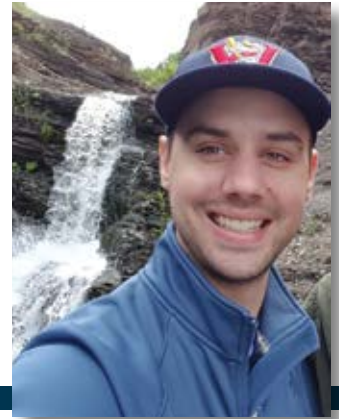


Countdown to Disaster:

The Obed Mine Spill



By Nick Pink, *AWA Conservation Specialist*

October 31. To most people, the first thing that comes to mind is Halloween. It's a fun time of year; excessive consumption of candy is encouraged and you might dress up in a favourite costume. Who knows...maybe you'll get invited to a party. Fun indeed!

But, connotations of fun aside, Halloween has a darker side; the "trick" to the proverbial "treat". Four years ago a Halloween horror was delivered to Alberta's environment. Halloween was the day in 2013 of the Obed Mountain Mine coal tailings spill. That spill released 670,000 cubic metres of water and toxic tailings into the Athabasca River via two tributaries: Apetowun and Plan-te Creeks. The spill, despite receiving little media attention, is considered one of the most damaging environmental disasters in Alberta history. It took nearly four years for the courts to pass judgment on this spill. In June, Prairie Mines & Royalty ULC (Prairie Mines) – the owner and operator of Obed Mountain Mine – pleaded guilty to two counts of violating the federal *Fisheries Act* and one count of violating Alberta's *Environmental Protection and Enhancement Act*. It was ordered to pay nearly \$4.5 million for the contamination the spill caused. AWA has compiled troubling details since that judgment through sentencing documents, an agreed statement of facts, the Alberta Energy Regulator (AER) Investigation Summary Report, and through a *Freedom of Information and Protection of Privacy Act* inquiry by Ecojustice, on behalf of AWA. Those details lead us to question whether the operator and regulator acted with due diligence.

The Mine, the Tailings, the "Impoundment Release"

Obed Mountain Mine is an open pit coal mine – not currently in operation – approximately 30 kilometres northeast of Hinton. The Obed operation mined thermal coal (thermal coal is used to generate electricity as opposed to metallurgical coal which is used in steel production). The mine opened in 1983 and operations waxed and waned according to coal prices. Obed began shut-down and reclamation procedures in 2012 when coal prices sank. Now owned through a subsidiary of Westmoreland Coal Company, Sheritt International Corporation owned the Obed mine at the time of what Westmoreland called the "impoundment release."

Like other mountain coal mines, the Obed mine used water to process raw coal. The process creates a mixture of fine particles and water, called "tailings", which were pumped to a tailings pond. Fine particles would settle to the bottom of the tailings pond and the water would be re-used for coal processing. Over time, as the volume of settled coal fines increases in a pond the size/capacity of the pond must be enlarged to continue to process coal. One way to do this is to increase the height of existing ponds. Building additional ponds would be another way of increasing capacity. Though Obed planned to increase the height of their main tailings pit, this was never completed. Instead, two ponds were constructed and an additional two that joined mined out pits were converted to hold tailings. Four years ago, a catastrophic failure of a containment wall, Dyke E, caused 670,000 cubic metres of toxic water to spill into the environment.

How much water is that? More than twice the volume of water than what the 1.4 million residents of Calgary use daily.

The Countdown to Disaster

Red Flag #1: Shoddy construction that didn't meet regulatory requirements

The countdown to this disaster started in 1996. Then Obed Mountain Coal Ltd., the mine submitted a proposal to prepare the aforementioned joined mined out pits, named the Red/Green Pit, to accept tailings; six dykes (dykes A through F) would be built to increase storage capacity of the pits. These plans, designed by a senior engineering geologist, specified building materials, location, method of construction, and the eventual construction of a spillway. One week, seven days, after receiving the miner's submission, the then-regulator, the Energy Utilities Board, approved the proposal. Construction of Dykes E and F began soon after.

During the AER's investigation of the spill, the Regulator interviewed the engineering geologist who had designed Dyke E. He stated that, not only had Dyke E been built in the wrong location, but that it was built too quickly to have been done properly. The environmental coordinator at the time Dyke E was constructed corroborated these serious inadequacies. He stated:

"I think we probably just dumped material in and pushed across to fill in the old access [...] I suspect that we just started building a road across, dumped on the bottom and then just compacting [sic] the ma-

terial with trucks.”

Both statements are accurate. The Regulator’s investigation revealed that the construction of Dyke E did not comply with the design the Regulator had approved. The dam was constructed using low density coarse coal waste rock, an inappropriate material prone to erosion. It also used debris, what some would call garbage or junk, to build the dyke. Rubber hoses, truck air filters, and a truck door were used to build a dyke to keep toxic tailings from despoiling the environment.

About the construction of Dyke E the environmental coordinator went on to say that it was “probably the cheapest way to get it done, that would have been the approach I think we would have taken at that point just because it’s the economics that were associated with that.”

Following construction of Dyke E, no as-built was submitted to the Regulator, nor was there any evidence that one had been created. An as-built is a drawing of a completed project that shows how it was actually constructed and includes any deviations from the original design. This is important for operation and maintenance, as well as

a requirement by the Regulator to ensure the completed structure still meets approval conditions. Neither Prairie Mines nor regulators have documentation of any maintenance or inspection activities regarding Dyke E from 1998 to 2009. In addition, Prairie Mines was not authorized under the *Water Act* to operate Dyke E as a dam. As owners of a dam (albeit, unauthorized), they were also in contravention of *Water Act* Regulations for operating a dam, including such requirements as operating the dam according to an emergency response plan.

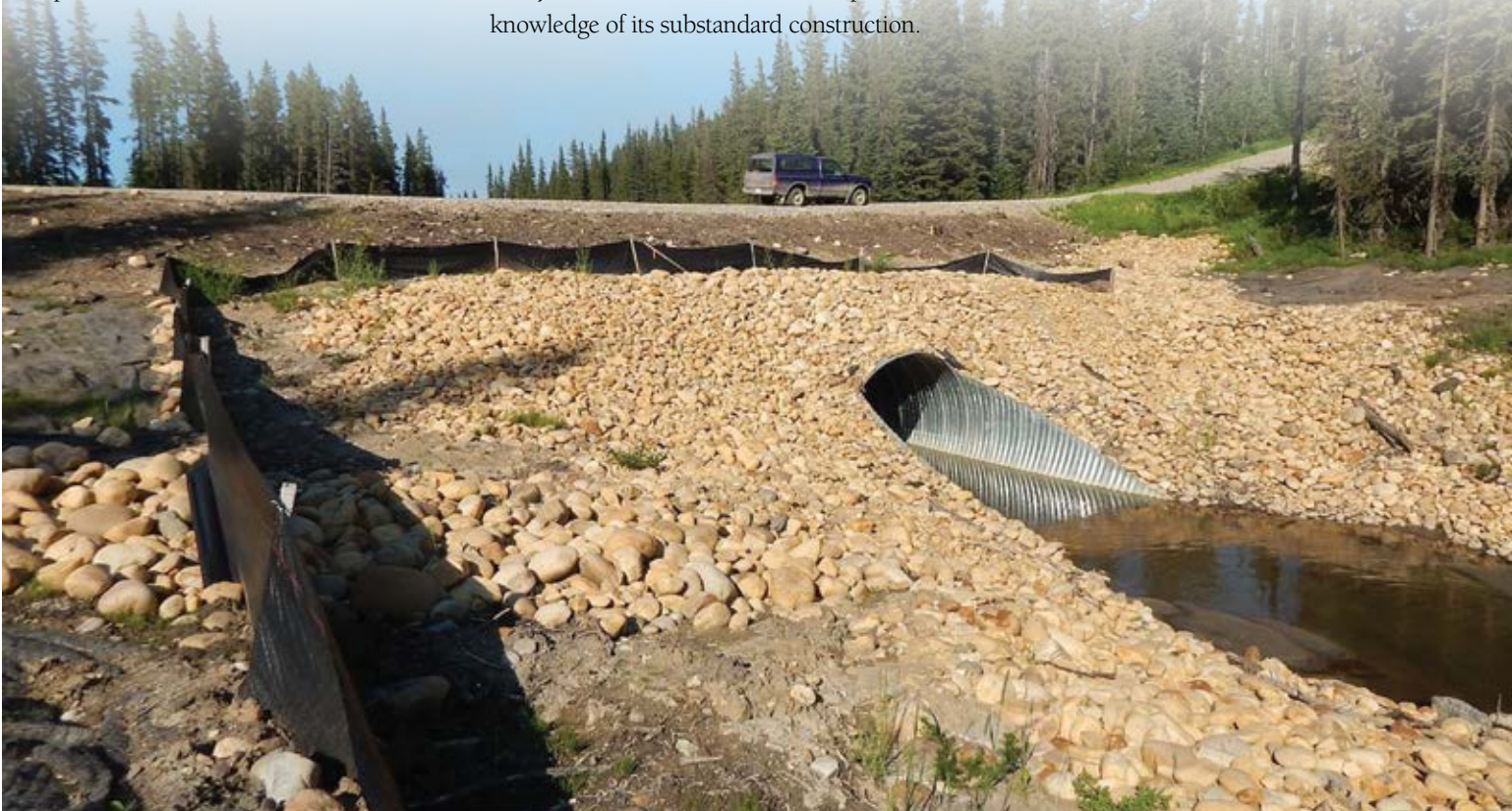
Red Flag #2: The same may be said about Dyke F

Dyke F is located on the opposite side of the Red/Green Pit and was built around the same time as Dyke E. The AER investigation found that it too was built improperly and very nearly failed when wastewater seepage was discovered in 2002. Internal memos between Obed employees, revealed during the investigation, showed that a near-disaster was averted when the dyke was reinforced with additional material. It doesn’t appear any lessons were learned from this close call as Dyke E was not assessed – despite the knowledge of its substandard construction.

Red Flag #3: Where maximum water levels are ignored.

In mid-April 1997, the Red/Green Pit began receiving tailings water from the processing plant. The pit had a maximum water level of 1440 metres above sea level (ASL) which was to be maintained by one, occasionally two, outflow pumps. In 2000, plans to raise the height of Dyke E, to increase its water storage capacity, were not supported by the original designer of Dyke E since the original dyke’s integrity was suspect. Thus, the maximum water level remained 1440 metres ASL.

In June 2010, water level surveys of the Red/Green Pit began to be conducted, with the first reading being recorded at 1441.4 metres ASL – 1.4 metres above the do-not-exceed rating of Dyke E (1440 metres ASL). At that time, Dyke E was judged to be stable. Just one month later water was found leaking from dams at two unspecified locations at the Red/Green Pit. Six months after Dyke E was assessed as stable, in December 2010, leaks had been observed coming from three locations at the Red/Green Pit.



Rebuilt road and culvert along Apetowun creek. The wall of water and sludge that rushed down this creek blew out the original road. PHOTO: © P. BELANGER

The maximum water level for Dyke E continued to be ignored. In June 2011, it had risen to 1443.6 metres ASL; in July 2012 it had crept up to 1444.2 metres. By then the water level was only about 1.5 metres from overtopping the dyke. Not only were these maximum levels exceeded, they don't appear to have ever been numerically reported during regular inspections. The water levels of the Red/Green Pit were checked twice a day. Sometimes there was no comment made about the water level; on other occasions the checklists contained comments such as "low," "good," "ok," "full," "high," "very high," and "100%." The reality of the water levels being well past the maximum was not acknowledged or reported during these inspections.

Red Flag #4: The missing emergency spillway.

An emergency spillway would provide a channel for the release of water should levels become too high. It would prevent the dam from being destroyed. The original application of Dyke E was designed with the understanding that an emergency spillway would be constructed, as per the approved design plan. It was never built.

Instead, according to the AER investigation report, construction of a spillway was discussed internally by Obed staff with some frequency. The original designer of Dyke E expressed concern to mine employees in 2010 that the water level was approaching the maximum 1440 metre level. When the three leaks from the Red/Green Pit were recorded in December 2010, an emergency spillway was again discussed. The employees concluded that the outflow pump was the immediate solution to managing water levels and that continual operation of the pump would be required for as long as the Red/Green Pit received tailings. In June 2012, when the water level was identified as being approximately 1.5 metres from the top of Dyke E, an emergency spillway was identified as the long term solution. This conclusion was reiterated in December 2012. No action was taken.

Red Flag #5: Neglecting water management responsibilities

In November 2012, the mine stopped processing coal in response to the declining price of coal. It also shut off the outflow pump from the Red/Green pit. It did

this despite the fact the pit was still over capacity. It appears that when the mine stopped processing coal it acted as if its water management responsibilities ended. No thought appears to have been given to the risks that precipitation events would add to a pit that already contained more water than it was designed to hold.

In October 2013, the mine began to process its remaining stockpile of coal. In twenty-three days of pumping waste water to the Red/Green Pit, water was only pumped out of the pit for eight and one half days. This pump, as noted above, was the only thing preventing a dam failure at Dyke E. The additional waste water pushed the water level of the Red/Green Pit up to 1445 metres – the lowest point of the rim along the top of Dyke E.

Disaster

On October 31, 2013, twenty three days after Obed Mountain Mine once again began to process coal, Dyke E failed. Water rushed from the Red/Green Pit into the Main Tailings Pond. This surge of water caused the Main Tailings Pond to spill over the containment wall. The failure released 670,000 cubic metres of water and 90,000 tonnes of sediment into Apetowun Creek. The water rushed down this stream bed for 22 kilometres before it reached Plante Creek. Once in Plante Creek these floodwaters were only six kilometres from the Athabasca River. Over two days, enough waste water to fill 268 Olympic swimming pools poured into the Athabasca.

Environmental Impact

The initial release tore a deep 1.75 kilometre long gully from the Main Tailings Pond into Apetowun Creek. The streambed and banks of the uppermost portion of the Apetowun Creek were eroded and degraded seriously by the wave of wastewater from this failure. Nearly all the riparian vegetation was washed away and large quantities of sediment were deposited in their place. The price tag to rehabilitate this portion of Apetowun Creek alone is estimated to still require more than \$6 million.



The force of the wastewater was powerful enough to uproot large trees. PHOTO: © P. BELANGER

The lower segment of the Apetowun Creek also was significantly eroded, while the Plante Creek and Athabasca River were mostly spared from streambank erosion. But fine coal sediments were deposited throughout these watercourses. Up to fifty centimetres were deposited in some areas. As hard as it may be to imagine, a large sediment plume was carried over 1,100 kilometres from where the spill entered the Athabasca to Lake Athabasca. Suspended sediment levels in the Athabasca River were recorded at levels exceeding Canadian Environmental Quality Guidelines (CEQG) up to 400km downstream. They remained at these excessive levels as late as a week after the spill.

Water sampling at the time of the “impoundment release” showed that the levels of 11 metals and several hydrocarbons were also in excess of CEQG levels. These levels improved quickly and no effects of metal or hydrocarbon toxicity have been observed. No immediate or

long term effects to human health were expected from the release.

Among other fish, Apetowun Creek, Plante Creek, and the Athabasca River all contain endangered Athabasca rainbow trout, while the Athabasca River also contains endangered bull trout. The torrential release of wastewater likely eliminated any resident fish in the upper reaches of the Apetowun Creek and removed significant fish habitat suitable for a wide range of uses, including spawning, food supply, and overwintering pools. Along the rest of the flow path, fish were assumed to be affected by increased sedimentation.

On June 9, 2017, Prairie Mines & Royalty Ltd. (Prairie Mines) was sentenced to pay monetary penalties totaling \$3,500,000 after pleading guilty to two counts under the federal *Fisheries Act*. The same day, the AER levied a \$925,000 penalty after finding the company guilty under one count under the provincial *Environment Protection and*

Enhancement Act. If those totals sound high, that’s because environmental offences typically do not garner multi-million dollar fines in Alberta. If those totals sound low, that may be because this fine is equivalent of paying a roughly \$1.40 tax on every tonne of coal produced **in one year** at Obed Mountain Mine. In addition to these fines, Prairie Mines reported it spent over \$55 million in response to the spill.

The most positive aspect of these judgments rests in the fact that polluters will be held accountable for their environmental transgressions in Alberta. There are over 100 tailings facilities in Alberta, some with over 1,000 times the storage capacity of the facilities that failed at Obed. Therefore, it is critical for government and corporations alike to ensure that the regulatory and operational shortcomings that led to the Obed spill do not contribute to a similar disaster in the future. ♣



Part of the reclamation efforts along Apetowun creek. PHOTO: © P. BELANGER