



**ENVIRONMENTAL
LAW CENTRE**
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Request for an Inquiry into Regulatory Negligence: Canada's Failure to Control Elk Valley Coal Mine Pollution

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Cover Image: High elevation grassland habitat in the Elk Valley. The site of Teck Coal's proposed Castle coal mine. (Provided by Wildsight)

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1. Introduction

On behalf of Wildsight, we request that you undertake a formal inquiry into the Government of Canada's longstanding failure to properly regulate the devastating pollution flowing from British Columbia's Elk Valley coal mines.¹ We urge you to conduct this investigation specifically into the regulatory negligence of Environment and Climate Change Canada and Fisheries and Oceans Canada, and issue a formal report on your findings. Authority for such an examination and report is found in the following provisions of the *Auditor General Act*:

- Section 7(2), which authorizes the Auditor General to report on whether government is operating efficiently; measuring and reporting in a satisfactory manner on effectiveness of programs; and expending money without due regard to the environmental effects of expenditures²;
- Section 21.1, which states "...the purpose of the Commissioner is to provide sustainable development monitoring and reporting on the progress of designated entities [such as ECCC and Fisheries and Oceans Canada] towards sustainable development..."³;
- Section 23(1), which states "The Commissioner shall make any examinations and inquiries that the Commissioner considers necessary in order to monitor...the extent to which designated entities have contributed to meeting the targets set out in the Federal Sustainable Development Strategy and have met the objectives, and implemented the plans, set out in their own sustainable development strategies..."⁴; and
- Section 23(2), which authorizes the Commissioner to report to Parliament "anything that the Commissioner considers should be brought to the attention of Parliament in relation to environmental and other aspects of sustainable development."⁵

We submit that no issue of "sustainable development" could be more significant than government's longstanding failure to use the *Fisheries Act* and other federal powers to address catastrophic coal mine pollution in the Elk Valley. This regulatory failure has directly contributed to one of the most serious and permanent environmental disasters in Canadian history.

Therefore, it is essential that you review the errors made by federal regulators, so that such failures

¹ See below for detailed documentation of the broad spectrum of profound environmental impacts caused by the pollution coming from the Elk Valley coal mines. For a brief discussion of the importance of this devastating pollution, see the Auditor General of BC report Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 9, online (pdf): *BC Auditor* <<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [https://perma.cc/AVD2-UB9B]. This BC Auditor General report succinctly lays out the problem: "As selenium accumulates up the food chain, it can affect the development and survival of birds and fish, and may also pose health risks to humans."

² *Auditor General Act*, RSC 1985, c A-17, s 7(2).

³ *Auditor General Act*, RSC 1985, c A-17, s 21.1.

⁴ *Auditor General Act*, RSC 1985, c A-17, s 23.

⁵ *Auditor General Act*, RSC 1985, c A-17, s 23(2)

are not made in the future. This inquiry is made ever more urgent by several new proposals to massively expand coal mining in the Elk Valley.

Background

Over recent decades, coal mining in the Elk Valley of BC has boomed. Today, Teck Resources Limited operates four major open-pit mines in the Valley and has recently closed a fifth mine.⁶ As a result, selenium and other pollution in the Elk Valley watershed has dramatically increased.⁷ Elk Valley mine discharge now stands as one of the world's largest selenium contamination events – and one of North America's most serious pollution problems.⁸ However, as the BC Auditor General pointedly noted in 2016, governments have failed to stop “the dramatic annual increases of selenium in the watershed's tributaries.”⁹ To make matters worse, four new additional Elk Valley mine projects (to produce almost 500 million tonnes of coal) are being proposed – and have already begun the environmental assessment process.¹⁰

The governments of Montana, Idaho, and the United States have long complained about Canada's remarkable failure to control the pollution now poisoning American waters and fish downstream from the Elk Valley coal mines. Those governments are now desperately attempting more definitive action to prompt Canada to address its international obligations – and to stop polluting its neighbour.¹¹ Canada's breach of its international environmental obligations recently attracted

⁶ Current Teck coal mines include Fording River, Greenhills, Line Creek, and Elkview, with Coal Mountain in care and maintenance. Teck, *Teck Access Boundaries in the Elk Valley 2020–21* at 2, online (pdf): Teck <<https://www.teck.com/media/2020-2021-Elk-Valley-Overview.pdf>>. Teck is now proposing an additional new Castle coal mining operation. Teck, *Fording River Operations: Castle Project*, at 1, online (pdf): Teck <https://www.teck.com/media/Castle_one_pager.pdf>. Note that at least some of the Teck Mines are operated by Teck Coal Limited, a fully-owned indirect subsidiary of Teck Resources Limited.

⁷ Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 95, online (pdf): *BC Auditor* <<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [https://perma.cc/AVD2-UB9B].

⁸ Chloe Williams, “From Canadian Coal Mines, Toxic Pollution That Knows No Borders,” *Yale Environment 360* (1 April 2019), online: *Yale Environment 360* <<https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders>> [https://perma.cc/VD2J-YRDT].

⁹ In 2016, the BC Auditor General pointed out the problem: “For 20 years, MoE [BC Ministry of Environment] has been monitoring selenium levels in the Elk Valley and over that time has noted dramatic annual increases of selenium in the watershed's tributaries. MoE tracked this worsening trend, but took no substantive action to change it.” Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 95, online (pdf): *BC Auditor* <<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [https://perma.cc/AVD2-UB9B]. Note that, since the Auditor General made that statement, governments have taken certain steps, but, as we will see, they are inadequate to the problem.

¹⁰ There are four new major coal mine projects proposed in the Elk Valley, including Teck's Fording River Castle Mine Extension (recently renamed Fording River Extension), Crown Mountain proposed by NWP Coal Canada Limited, Bingay proposed by Centermount Coal Limited, and Michel Coal proposed by North Coal Limited. See section 9 below for the details of those new proposed Elk Valley coal projects.

¹¹ See the criticisms leveled at Canadian pollution efforts by the US Environmental Protection Agency, described in detail below.

comment from both the UN Rapporteur on Hazardous Substances,¹² and from the US Senators representing states downstream. All eight US senators from Alaska, Montana, Washington, and Idaho wrote a bipartisan letter to Premier Horgan to complain about the lack of adequate regulation of the Elk Valley mines and other Canadian mines polluting US watersheds – and raised questions concerning “the enforcement of the Boundary Waters Treaty of 1909.”¹³ US Senator Jon Tester of Montana issued a letter to US Secretary of State Blinken, calling for referral of the Elk Valley coal mining pollution problem to the International Joint Commission – a call already made by the State of Montana and the Confederated Salish and Kootenai Tribes of the US.¹⁴

In addition, two US members of the International Joint Commission have not only suggested that Canada may be violating the Boundary Waters Treaty but, surprisingly, also accused Canadian IJC Commissioners of suppressing key scientific evidence on risks posed by Elk Valley selenium discharge.¹⁵

In 2016, the Auditor General of BC conducted a review of the Elk Valley mines, which is highly relevant to our request. While conducting a province-wide review of compliance and enforcement in the mining sector, the Auditor General became troubled by the Elk Valley situation specifically.

¹² See below for more detail on the US objections. Note that the UN Rapporteur on Hazardous Substances has raised concerns about the lack of compliance with provincial and federal water quality guidelines that is causing BC to seriously pollute the United States of America with selenium. See the statements of the Baskut Tuncak, Special Rapporteur on the Implications for Human Rights of the Environmentally Sound Management and Disposal of Hazardous Substances and Wastes found at Baskut Tuncak, *Visit to Canada: Report of the Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes*, UNHRC, 45th Sess, UN Doc A/HRC/45/12/Add.1 (2020) 1, online (pdf): [UN Documents <https://documents-dds-ny.un.org/doc/UNDOC/GEN/G20/328/37/pdf/G2032837.pdf?OpenElement>](https://documents-dds-ny.un.org/doc/UNDOC/GEN/G20/328/37/pdf/G2032837.pdf?OpenElement) [Accessed 12 March 2021].

¹³ Letter from Senators Lisa Murkowski, Dan Sullivan, Mike Crap, James Risch, Jon Tester, Steve Daines, Patty Murray & Maria Cantwell to Premier John Horgan (13 June 2019) at 2, online (pdf): <https://www.murkowski.senate.gov/imo/media/doc/06.13.2019%20Multistate%20Delegation%20Letter%20to%20Premier%20Horgan.pdf> [https://perma.cc/U7T6-59L4]. Among other things, the Senators wrote: “Members of Congress . . . as well as state governments have called for oversight and accountability measures in shared transboundary watersheds equivalent to those on the US side of the border.”

¹⁴ See Appendix, pp. 284-285.

¹⁵ In a recent letter to the US State Department, two US members of the International Joint Commission suggested that BC’s negligent regulation of this pollution problem goes to the “foundation of the 1909 Boundary Waters Treaty.” Letter from Lana Pollack and Rich Moy to Cynthia Kierscht (20 June 2018) at 1, online: <https://www.scribd.com/document/383221661/US-IJC-Commissioners-Letter-to-Dept-of-State-on-Selenium-Report> [Accessed 12 March 2021]. In doing so, Pollack and Moy were echoing the same point made by BC’s Auditor General – who has stated that the pollution of waters entering Montana and Idaho via Lake Kootenai may well be a contravention of the US/Canada *Boundary Waters Treaty*. Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 10, 95, and 102, online (pdf): [BC Auditor <https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>](https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf) [https://perma.cc/AVD2-UB9B]. For reference, article IV of the 1909 *Boundary Waters Treaty* states, “waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other.” *Treaty Relating to Boundary Waters and Questions Arising Within Canada*, United States and United Kingdom, 11 January 1909, 36 US Stat 2448 (entered into force 5 May 1910) at art IV, online (pdf): [International Joint Commission <https://www.ijc.org/sites/default/files/2018-07/Boundary%20Water-ENGFR.pdf>](https://www.ijc.org/sites/default/files/2018-07/Boundary%20Water-ENGFR.pdf) [https://perma.cc/5S6A-G745]. Also, for the accusation made against the Canadian IJC Commissioners, see Chloe Williams, “From Canadian Coal Mines, Toxic Pollution That Knows No Borders,” *Yale Environment 360* (1 April 2019), online: [Yale Environment 360 <https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders>](https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders) [https://perma.cc/VD2J-YRDT]. Also see Judith Lavoie, “Canada suppressing data on coal mine pollution, say U.S. officials,” *The Narwhal* (4 July 2018), online: [The Narwhal <https://thenarwhal.ca/canada-suppressing-data-on-coal-mine-pollution-say-u-s-officials/>](https://thenarwhal.ca/canada-suppressing-data-on-coal-mine-pollution-say-u-s-officials/) [https://perma.cc/Q9SU-ZQLR].

As a result, she dedicated an entire separate section of her review to the failed BC government permitting and enforcement efforts in the Elk Valley. Acknowledging the escalating economic and environmental risks of this pollution, the Auditor General sharply criticized the provincial regulators' failure to deal with the risks – and made numerous recommendations for change to both the Ministries of Environment and Mines.¹⁶ See the *Audit of Compliance and Enforcement in the Mining Sector* for those recommendations.¹⁷

Carrying out her role as a public watchdog, the BC Auditor General highlighted the provincial government's profound failures. In a typical passage of her scathing report, the Auditor General pointed out how the BC Ministry of Environment has played a key role in creating the serious Elk Valley pollution problems:

*Lack of sufficient and effective regulatory oversight and action by MoE [the Ministry of Environment] to address known environmental issues has allowed degradation of water quality in the Elk Valley. Coal mining, which has been underway in the area for over 100 years, has resulted in high concentrations of selenium in the water system. As selenium accumulates up the food chain, it can affect the development and survival of birds and fish, and may also pose health risks to humans.*¹⁸

We now write to you because British Columbia did not act alone in creating this problem. Indeed, the Government of Canada bears equal responsibility for the joint federal/provincial failure to apply laws and prevent this environmental catastrophe. For far too long, Ottawa has acted as a passive bystander as a “monumental selenium spill in slow motion” poisons the Elk Valley, Fording River, Lake Kootenai and Kootenai River.¹⁹ In spite of the fact that this pollution most seriously impacts fish – a core area of federal jurisdiction – Ottawa has failed to effectively enforce and implement the *Fisheries Act* and other laws to stop the pollution disaster.

For the most part, Environment and Climate Change Canada [“Environment Canada”] and Fisheries

¹⁶ See Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 95, online (pdf): *BC Auditor*

<<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [https://perma.cc/AVD2-UB9B]: “For 20 years, MoE has been monitoring selenium levels in the Elk Valley and over that time has noted dramatic annual increases of selenium in the watershed’s tributaries.” As discussed in more detail below, the Auditor General was remarkably critical of the failure of provincial officials to deal adequately with the serious environmental pollution – and to protect taxpayers from paying for the cleanup, far into the future. Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 9-10, online (pdf): *BC Auditor* <<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [https://perma.cc/AVD2-UB9B].

¹⁷ For a list of the recommendations the Auditor General made, see Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 11-15, online (pdf): *BC Auditor* <<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [https://perma.cc/AVD2-UB9B].

¹⁸ See Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 9, online (pdf): *BC Auditor*

<<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>>.

¹⁹ Carol Linnitt, “For Decades B.C. failed to address selenium pollution in the Elk Valley. No one knows how to stop it.” *The Narwhal* (4 December 2018) at para 16, online: *The Narwhal* <<https://thenarwhal.ca/for-decades-b-c-failed-to-address-selenium-pollution-in-the-elk-valley-now-no-one-knows-how-to-stop-it/>>.

and Oceans Canada²⁰ have eschewed *Fisheries Act* prosecutions and orders. Instead, they have relied upon endless negotiations between BC and Teck – and dilatory development of weak new provincial rules and permits – to fix the problem.²¹ Indeed, federal action has been a classic example of “far too little, far too late.”

This tardiness was highlighted when the federal Crown – perhaps heeding increasing international protest – finally acted. After more than a decade of delay, on March 26, 2021, the federal Crown finally brought s. 36(3) *Fisheries Act* pollution charges to court against Teck Coal Limited. Teck plead guilty, and a \$60 million fine was imposed on the company for offences committed every day *in the year of 2012*. Teck admitted that it did not exercise due diligence to prevent the pollution, and did not have a comprehensive plan to address the known problem. It is important to note that the initial charges approved by the Crown had been for entire period of 2009-2019 – but the plea bargain led to the dropping of charges for the other ten years of pollution.²² This court action came far too late to protect the Upper Fording River Westslope Cutthroat Trout, which now stand at the brink of extirpation, as detailed below.²³

Clearly, the fault in this long-neglected environmental tragedy belongs to both the federal and provincial governments.

In 2016, your provincial counterpart, the BC Auditor General, recognized the massive scope of the Elk Valley environmental disaster that regulators have bequeathed to future generations. In turn, she acted to prepare a stern critique of British Columbia’s failed regulatory response. For example, the Auditor General concluded:

*For 20 years, MoE [Ministry of Environment] has been monitoring selenium levels in the Elk Valley and over that time has noted dramatic annual increases of selenium in the watershed’s tributaries. MoE tracked this worsening trend, but took no substantive action to change it.*²⁴

In spite of the BC Auditor General’s strong concerns, the Province has continued a pattern of remarkably poor enforcement. This was most recently acknowledged in March of this year, when the Province also woke from its regulatory slumbers and imposed a relatively significant pollution penalty of \$120,000 on Teck Coal Limited for 2018-2019 Elk Valley contraventions. While imposing this penalty, the provincial decision maker listed *28 previous toxicity contraventions from 2014-2018* that had not been penalized, but just left with “warnings” and “advisories.” The Province’s own statutory decision maker stated:

²⁰ Environment and Climate Change Canada administers and enforces the pollution prevention provisions of the *Fisheries Act* and its regulations. Fisheries and Oceans Canada has authority to approve mining activities that may seriously harm fish and their habitat.

²¹ See discussion below that details the inadequate measures that the federal government has taken.

²² Regina v. Teck Coal Limited, 2021 BCPC 118 (CanLII) March 26, 2021, *Reasons for Sentence* of Judge Dohm, Provincial Court of BC, Cranbrook Registry, File No. 35390-1, paragraphs 1, 14, 22. See: <https://www.canlii.org/en/bc/bcpc/doc/2021/2021bcpc118/2021bcpc118.html?autocompleteStr=R%20v%20Teck%20Coal%20Limi&autocompletePos=1>

²³ See section 3 below for further details.

²⁴ Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 95, online (pdf): *BC Auditor* <<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [https://perma.cc/AVD2-UB9B]. The Auditor General also critiqued actions of the BC Ministry of Mines in great detail.

The history illustrated in the preceding table [of toxicity contraventions] suggests that the Ministry did not comply with established guidance on compliance escalation...I do not know or understand why this matter was not the subject of an administrative penalty referral considerably earlier.²⁵

Yet such inexplicable failure to enforce has long been rule – not the exception – for both federal and provincial regulators in the Elk Valley. In 2016 the BC Auditor General did her job by pointing out the magnitude of the problem in the Elk Valley. She sounded the alarm on this situation – examining provincial mistakes and issuing strong recommendations for provincial change.²⁶ Now, it is past time for a similar examination of federal actions and omissions in regulating pollution in the Elk Valley.

As we demonstrate in detail below, the federal government, too, has stood idly by over the last two decades as this pollution catastrophe developed. The gravity of the situation now demands a review of the *federal* failure to discharge its core public duty to protect Canada’s fish and waters. Therefore, we ask that you investigate the federal regulation of Elk Valley coal mining pollution – and develop recommendations on how the federal government can begin to do its job, fix this problem, and avoid repeating Elk Valley mistakes elsewhere.

As Winston Churchill noted:

Those that fail to learn from history are doomed to repeat it.

With massive *new coal developments* proposed for the Elk Valley, we simply cannot afford to repeat the same mistakes that have fouled this precious watershed. You need to get to the bottom of this epic regulatory failure.

²⁵ Determination of Administrative Penalty, March 8, 2021, File 2018-17 107517, Daniel Bings, for the Director, *Environmental Management Act*, pp. 1, 5-6.

²⁶ Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016), online (pdf): *BC Auditor* <<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [https://perma.cc/AVD2-UB9B].

2. The Problem

“A 2014 review by Lemly, the selenium ecotoxicology expert, details evidence of selenium poisoning in fish, including telltale signs such as twisted spines and cranial deformities...

The situation in the Elk has been called “a monumental selenium spill in slow motion.”

...

“We have one of the biggest selenium contamination issues in the world in the Elk River,” says Erin Sexton, a biologist at the University of Montana who has been studying the region for nearly 20 years.”²⁷

Chloe Williams, *Yale Environment 360*

“Water quality is the cornerstone of Montana’s way of life and our \$7.1 billion outdoor recreation economy. Selenium contamination from mining on the Canadian Elk River poses a direct threat to that way of life, and the region’s outdoor recreation economy. For decades, mining operations in Canada have caused elevated selenium levels in the transboundary watershed. Efforts to curb selenium contamination have been unsuccessful, and selenium levels continue to rise. Meanwhile, mining companies are proposing new mines without a tested plan in place to control selenium and other contaminants.”²⁸

Jon Tester, *US Senator from Montana*

²⁷ Chloe Williams, “From Canadian Coal Mines, Toxic Pollution That Knows No Borders,” *Yale Environment 360* (1 April 2019), online: *Yale Environment 360* <<https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders>> [<https://perma.cc/VD2J-YRDT>].

²⁸ See letter from Senator Jon Tester to US Secretary of State Blinken found at Appendix, pp. 284-285.

3. Westslope Cutthroat Trout are the Canary in the Mine

In the last century, coal miners took canaries into the mines with them as an early warning system.²⁹ If the canary died from the carbon monoxide, the miners would immediately evacuate the lethal environment. It turns out that coal mining is killing the Elk Valley's Westslope Cutthroat Trout just as surely as coal mining killed those canaries. And, the trout are serving the same purpose, because they are a sentinel species for the region – their population collapse is a warning of much broader environmental harms.³⁰ We ignore this warning at our own peril.

Elk Valley mine pollution is likely causing a wide-range of environmental harms – on water quality,³¹ algae,³² plants, invertebrates,³³ birds,³⁴ and other wildlife.³⁵ It is also showing up in human drinking water supplies.³⁶ Currently, seven wells have been found to have selenium above the BC drinking water guideline and Teck is providing bottled water or water treatment.³⁷ Teck has had to pay for a new well for the District of Sparwood because it's well exceeded the BC drinking

²⁹ Christal Pollock, "The Canary in the Coal Mine," (2016) 30:4 *Journal of Avian Medicine and Surgery* 386 at 386, online (pdf): *JSTOR* <https://www.jstor.org/stable/44805832?seq=1#metadata_info_tab_contents> [Accessed 15 March 2021].

³⁰ Dennis Lemly as cited in Chloe Williams, "From Canadian Coal Mines, Toxic Pollution That Knows No Borders," *Yale Environment 360* (1 April 2019), online: *Yale Environment 360* <<https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders>> [https://perma.cc/VD2J-YRDT].

³¹ A. Dennis Lemly, "Review of Environment Canada's Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia" (25 September 2014) at 45, online (pdf): *Teck Resources Limited* <https://www.teck.com/media/2014-Water-review_environment_canada-T3.2.3.2.1.pdf> [https://perma.cc/7T4J-QBXR].

³² A. Dennis Lemly, "Review of Environment Canada's Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia" (25 September 2014) at 5, online (pdf): *Teck Resources Limited* <https://www.teck.com/media/2014-Water-review_environment_canada-T3.2.3.2.1.pdf> [https://perma.cc/7T4J-QBXR].

³³ A. Dennis Lemly, "Review of Environment Canada's Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia" (25 September 2014) at 5, online (pdf): *Teck Resources Limited* <https://www.teck.com/media/2014-Water-review_environment_canada-T3.2.3.2.1.pdf> [https://perma.cc/7T4J-QBXR].

³⁴ As selenium bioaccumulates, it can have devastating impacts on birds. A. Dennis Lemly, "Review of Environment Canada's Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia" (25 September 2014) at 6, online (pdf): *Teck Resources Limited* <https://www.teck.com/media/2014-Water-review_environment_canada-T3.2.3.2.1.pdf> [https://perma.cc/7T4J-QBXR].

³⁵ See the Crown submission on impacts of selenium on various organisms, found at "Proceedings on Sentencing, *Regina v. Teck Coal Limited*, March 26, 2021, p. 6, lines 25-38. As selenium bioaccumulates, it can have devastating impacts on wildlife. Jeffrey A. Peterson and Alan V. Nebeker, "Estimation of Waterborne Selenium Concentrations that are Toxicity Thresholds for Wildlife," (1992) 23 *Archives of Environmental Contamination and Toxicology* 154 at 154.

³⁶ Note that in humans, chronic exposure to high selenium concentrations can cause nausea, fatigue, skin lesions, and neurological disorders. Note that some drinking water supplies in the Elk Valley are reaching levels of concern for human health. Chloe Williams, "From Canadian Coal Mines, Toxic Pollution That Knows No Borders," *Yale Environment 360* (1 April 2019), online: *Yale Environment 360* <<https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders>> [https://perma.cc/VD2J-YRDT].

³⁷ Teck, Public Notification Regarding Potable Water Use in the Elk Valley, online (pdf): Teck <<https://www.teck.com/media/Public-Notification-Potable-Water-Use-in-the-Elk-Valley-March-2021.pdf>>

water quality guideline.³⁸ Increasing selenium levels in municipal wells in Fernie have also become a concern.³⁹

But, the grievous impact that selenium – along with other mining pollution such as calcite, nickel, sulphate, nitrates, and so on – is having on Elk Valley *fish* is particularly relevant to federal responsibility. The shocking recent collapse of the Upper Fording River's Westslope Cutthroat Trout is a crucial warning sign.⁴⁰ It vividly demonstrates the epic failure of federal fisheries regulation in the Elk Valley.

Elk Valley's Westslope Cutthroat Trout truly are the canary in the coal mine. World-leading selenium expert, Dr. Lemly, identifies these trout as a sentinel species for the broader ecosystem.⁴¹ He pointedly warns,

*As they go, the aquatic system goes.*⁴²

That is why the recent collapse of this species in the Upper Fording River is so troubling. The collapse sends an urgent sentinel signal that the entire Elk Valley watershed is in deep trouble. We had best pay attention.

Westslope Cutthroat Trout are listed as a species of special concern under Canada's *Species at Risk Act*, are listed as a species of concern by British Columbia, and are a high priority conservation target.⁴³ The Westslope Cutthroat Trout of the Upper Fording River are "one of the limited group

³⁸ District of Sparwood, *District of Sparwood to Bring New Drinking Water Well Online*, online: District of Sparwood <<http://sparwood.ca/district-of-sparwood-to-bring-new-drinking-water-well-online/>>.

³⁹ Selenium levels in Fernie's secondary drinking water source, an aquifer accessed by a well near the Elk River, were a concern before it was opened, in 2015. Bernadette Lyons, Technical Memorandum: Environmental Assessment, Technical Review, James White Park Wells Project, Fernie BC, Selenium Concentrations, online at 2: <https://projects.eao.gov.bc.ca/api/public/document/58868f4ce036fb010576805d/download/Ktunaxa%20Tech%20Memo%20Selenium_3May2015.pdf>. Since that time, selenium levels in the aquifer have risen. City of Fernie Annual Drinking Water Report 2019, at 30, online: City of Fernie <<https://fernie.civicweb.net/document/106348>>.

⁴⁰ Carol Linnit, "Unique B.C. trout population suffers 93 per cent crash downstream of Teck's Elk Valley coal mines," online: *The Narwhal* <<https://thenarwhal.ca/teck-resources-elk-valley-mines-bc-fish/>> [https://perma.cc/8MSL-J372].

⁴⁰ Dennis Lemly as cited in Chloe Williams, "From Canadian Coal Mines, Toxic Pollution That Knows No Borders," *Yale Environment 360* (1 April 2019), online: *Yale Environment 360* <<https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders>> [https://perma.cc/VD2J-YRDT]; Teck, "Elk Valley Fish and Fish Habitat Committee Meeting" (31 October 2019) at 16-17, online (pdf): *SCRIBD* <<https://www.scribd.com/document/456418138/Elk-Valley-Fish-and-Fish-Habitat-Committee-Meeting-Slide-Deck-October-31-2019>>.

⁴¹ Dennis Lemly as cited in Chloe Williams, "From Canadian Coal Mines, Toxic Pollution That Knows No Borders," *Yale Environment 360* (1 April 2019), online: *Yale Environment 360* <<https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders>> [https://perma.cc/VD2J-YRDT].

⁴² Chloe Williams, "From Canadian Coal Mines, Toxic Pollution That Knows No Borders," *Yale Environment 360* (1 April 2019), online: *Yale Environment 360* <<https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders>> [https://perma.cc/VD2J-YRDT].

⁴³ A. Dennis Lemly, "Review of Environment Canada's Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia" (25 September 2014) at 1, 5, online (pdf): *Teck Resources Limited* <<https://www.teck.com/media/2014-Water-review-environment-canada-T3.2.3.2.1.pdf>> [https://perma.cc/7T4J-QBXR]. The species as a whole was federally assessed as being of special concern in BC in both 2007 and 2016, but is listed as threatened in Alberta. Government of Canada, "Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*), Pacific populations," (2 February 2021), online: *Species at risk public registry* <<https://species-registry.canada.ca/index-en.html#/species/860-604>>

of populations that have been identified as genetically pure, making it an important population for the Westslope cutthroat trout conservation.”⁴⁴ But, an alarming recent survey of Westslope Cutthroat Trout populations in the Upper Fording River showed that, between 2017 and 2019, there were collapses of 93% of the adult population and 73% of the juvenile population.⁴⁵ Adult population counts fell from 1,573 individuals in 2017 to just 104 individuals in 2019.⁴⁶

This is distressing news. A report prepared for Teck in 2013 concluded that the *minimum viable count* for the population would be at least four times that number – 470 fish.⁴⁷ The population is likely doomed. Yet this outcome was long predicted.

It is important to note that the collapse of this fish species might have been avoided if Environment Canada had acted when its own special adviser warned the department that failure to curb mounting selenium pollution would inevitably lead to the total population collapse of Upper Fording River Westslope Cutthroat Trout. (See below.) The population collapse is the inevitable consequence of the provincial government approving ever-expanding coal mining in the watershed – and the federal government failing to take timely action to enforce the *Fisheries Act*. And it is the inevitable consequence of federal and provincial failures to stop the ever-burgeoning pollution of the Elk Valley watershed.

The looming threat to the Elk Valley trout and other fish has been recognized for many years. As early as 1998 a scientific study of the Elk River Basin reported selenium levels above published

[<https://perma.cc/NFJ6-79BW>]. Government of Canada, “Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*), Alberta population,” (2 February 2021), online: *Species at risk public registry* <<https://species-registry.canada.ca/index-en.html#/species/861-605>> [<https://perma.cc/52Y8-LNW8>]. Also see the comments of His Honour Judge Dohm in *Regina v. Teck Coal Limited*, 2021 BCPC 118 (CanLII) March 26, 2021, *Reasons for Sentence* of Judge Dohm, Provincial Court of BC, Cranbrook Registry, File No. 35390-1, paragraph 4. See: <https://www.canlii.org/en/bc/bcpc/doc/2021/2021bcpc118/2021bcpc118.html?autocompleteStr=R%20v%20Teck%20Coal%20Limi&autocompletePos=1>

⁴⁴ Comments of His Honour Judge Dohm in *Regina v. Teck Coal Limited*, 2021 BCPC 118 (CanLII) March 26, 2021, *Reasons for Sentence* of Judge Dohm, Provincial Court of BC, Cranbrook Registry, File No. 35390-1, paragraph 4. See: <https://www.canlii.org/en/bc/bcpc/doc/2021/2021bcpc118/2021bcpc118.html?autocompleteStr=R%20v%20Teck%20Coal%20Limi&autocompletePos=1>

⁴⁵ Carol Linnit, “Unique B.C. trout population suffers 93 per cent crash downstream of Teck’s Elk Valley coal mines,” online: *The Narwhal* <<https://thenarwhal.ca/teck-resources-elk-valley-mines-bc-fish/>> [<https://perma.cc/8MSL-J372>]; Dennis Lemly as cited in Chloe Williams, “From Canadian Coal Mines, Toxic Pollution That Knows No Borders,” *Yale Environment 360* (1 April 2019), online: *Yale Environment 360* <<https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders>> [<https://perma.cc/VD2J-YRDT>]; Teck, “Elk Valley Fish and Fish Habitat Committee Meeting ” (31 October 2019) at 16-17, online (pdf): *SCRIBD* <<https://www.scribd.com/document/456418138/Elk-Valley-Fish-and-Fish-Habitat-Committee-Meeting-Slide-Deck-October-31-2019>>.

⁴⁶ Note that this study was carried out by the coal mining company, Teck Resources. Scott Cope, “Upper Fording River Westslope Cutthroat Trout Population Monitoring Project: 2019,” (9 April 2020) at ii, online (pdf): *Teck Resources Limited* <https://www.teck.com/media/UFR_WCT_Monitor_Final_Report_April_9_2020.pdf> [<https://perma.cc/UTP5-K7B8>].

⁴⁷ Scott Cope, “Upper Fording River Westslope Cutthroat Trout Population Assessment – Telemetry Project” (June 2013) at v, online (pdf): *Teck Resources Limited* <https://www.teck.com/media/2013-Water-first_interim_report_-_upper_fording_river_wct_population_assessment_study-T3.2.3.2.1.pdf> [<https://perma.cc/52WU-QETH>]. Also see Scott Cope, “Upper Fording River Westslope Cutthroat Trout Population Monitoring Project: 2019” (9 April 2020) at ii, online (pdf): *Teck Resources Limited* <https://www.teck.com/media/UFR_WCT_Monitor_Final_Report_April_9_2020.pdf> [<https://perma.cc/UTP5-K7B8>].

toxic effects thresholds – and stated that there might be chronic toxic effects in Westslope Cutthroat Trout.⁴⁸ In the same year the Elk Valley Selenium Task Force (including the Province and mining companies) was established because of growing concerns about rising selenium levels and potential impacts on the environment, including fish.⁴⁹

In 2014, the landmark *Review of Environment Canada’s Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers* was published. Commissioned by Environment Canada and carried out by Dr. Dennis Lemly, a world-leading expert on selenium and fish, this study accurately predicted the current environmental disaster.

After comprehensively reviewing all of the research and information available to Environment Canada, Lemly’s *Review* warned Environment Canada of the urgent selenium threat to Elk Valley’s Westslope Cutthroat Trout. Tragically, Environment Canada failed to heed the warning from its own selenium adviser.

In the 2014 *Review*, Dr. Lemly estimated that selenium was already killing 54.4% of westslope cutthroats’ annual reproductive output in the upper Fording River (about 180,794 juvenile fish) each year.⁵⁰ Reviewing all the available data, Dr. Dennis Lemly specifically warned Environment Canada about the impact that mine pollution was having on the valued cutthroat trout and other fish:

These results conclusively and definitively confirm that cutthroat trout in the Upper Fording River study area are experiencing both pre- and post swim-up mortality due to selenium poisoning.

...

Selenium toxicity is evident in fish, especially in the Upper Fording River, and further increases in waterborne and fish tissue concentrations can lead to only one outcome.....[ellipses in original] total population collapse of sensitive species such as westslope cutthroat trout.

...

The toxicology findings, increasing trends in selenium levels, and historic and current population data, all indicate that the Upper Fording River population of westslope cutthroat trout is in a critical downward spiral.

⁴⁸McDonald, Leslie and Stroscher, Mark, “Selenium Mobilization from Surface Coal Mining in the Elk River Bssin, British Columbia” Ministry of Environment, Cranbrook, BC, September 1998.
https://a100.gov.bc.ca/pub/acat/documents/r12589/1seleniumelk_1205347116802_8e248a68ce5980fb2667bdb4930a251fb186e4d5b0b.pdf.

⁴⁹ Pumphrey, John F.; Gilron, Guy, “Elk Valley Selenium Task Force (EVSTF) update and overview, 2009” (2009) at 1, online: UBC <<https://open.library.ubc.ca/cIRcle/collections/59367/items/1.0042573>>

⁵⁰ A. Dennis Lemly, “Review of Environment Canada’s Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia” (25 September 2014) at 5, online (pdf): *Teck Resources Limited* <https://www.teck.com/media/2014-Water-review_environment_canada-T3.2.3.2.1.pdf> [<https://perma.cc/7T4J-QBXR>].

Full recovery of the Upper Fording River population . . . is only possible through remediation measures that substantially reduce selenium discharges from coal mining.⁵¹

Yet, since these warnings were issued in the federal 2014 *Review*, the provincial and federal governments have allowed selenium levels to continue their relentless increase in the Elk Valley watershed. Massive coal mining has continued, and selenium levels in the environment continue to rise.

In 2016, the BC Auditor General expressed her deep concerns about Elk Valley, emphasizing how dramatic the increases in selenium had become. She wrote,

MoE [Ministry of Environment] monitoring data from 1996 to 2012 shows that selenium levels in the Fording River are increasing annually at a rate of approximately 13% within the Fording River, and 8% within the Elk River.⁵²

Yet, instead of reducing the levels of selenium in the rivers, even now selenium levels continue to relentlessly *increase*. Using the most recent data available, we find that for the period 2012-2018 the annual rate of increase in the Elk River was 2%; and from 2015-2019 the annual rate of increase for selenium in the upper Fording River was 6%.⁵³

Tragically, even after Dr. Lemly's urgent 2014 warning – and in spite of the issuance of a provincial ministerial order and some other modest regulatory changes – selenium continues to increase today in the Elk Valley watershed. In 2019, the US Environmental Protection Agency decried Canada's abysmal failure to meet promised goals of selenium reduction:

The EPA notes that selenium water column concentrations continue to increase in the Elk River despite B.C.'s Ministerial Order #M113 (signed in 2014) that has a stated goal to “stabilize and reverse increasing trends in water contaminant concentrations in the short-term[.]”⁵⁴

⁵¹ A. Dennis Lemly, “Review of Environment Canada’s Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia” (25 September 2014) at 5-7, online (pdf): *Teck Resources Limited* <https://www.teck.com/media/2014-Water-review_environment_canada-T3.2.3.2.1.pdf> [https://perma.cc/7T4J-QBXR].

⁵² Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 97, online (pdf): *BC Auditor* <<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [https://perma.cc/AVD2-UB9B].

⁵³ These rates are calculated from three-year averages of data available from the BC Environmental Monitoring System for Total Selenium at sites 0200378 (Fording River at Greenhills) and 0200016 (Elk River above Highway 93). <<https://a100.gov.bc.ca/pub/ems/mainmenu.do?userAction=mainmenu>>.

⁵⁴ Letter from Gregory Sopkin and Chris Hladick to Mark Zacharias (22 July 2019) (Re: Implementation Plan Adjustment Summary) at 1 [unpublished, archived at the University of Victoria Environmental Law Centre]. This letter can be found in the Appendix to this report, pp. 24-25.

Indeed, the levels are now astonishingly high. *Yale Environment 360* has stated:

*British Columbia's guideline for the protection of aquatic life is 2 micrograms per liter. The U.S. Environmental Protection Agency's standard is 3.1 micrograms per liter in rivers and 1.5 in lakes. In the Elk Valley's waters, selenium has been recorded at 50 to 70 micrograms per liter and in some cases, as high as 100 micrograms per liter.*⁵⁵

During low flow conditions, selenium in the upper Fording near the Fording mine now typically runs above **100 µg/l for half of the year**, with many recorded samples at twice that value or higher.⁵⁶

The continued rise of selenium and other pollutants in the watershed has made tragedy inevitable. And, now, we are seeing it with the collapse of the Westslope Cutthroat Trout.

⁵⁵ Chloe Williams, "From Canadian Coal Mines, Toxic Pollution That Knows No Borders," *Yale Environment 360* (1 April 2019), online: *Yale Environment 360* <<https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders>> [<https://perma.cc/VD2J-YRDT>]. [emphasis added]

⁵⁶ [Emphasis added in the paragraphs above.] At this site (BC EMS ID E300071), there have been concerns raised about potential lack of mixing of the upper Fording River with Cataract Creek resulting in higher selenium values. While some of the higher selenium concentrations recorded at nearly 700 µg/l are perhaps measurements of selenium in Cataract Creek, frequent seasonal values of 100-200 µg/l or higher are found over a number of years. This data is available from the BC Environmental Monitoring System for Total Selenium at site E300071 (Fording River d/s Cataract Ck), online: <<https://a100.gov.bc.ca/pub/ems/mainmenu.do?userAction=mainmenu>>.

4. Negative Impacts are Far Broader Than One Species, One River Reach, or Even One Country

In addition to documented short-term impacts, it is well understood that high concentrations of selenium will have long lasting impacts on water quality, fish, other aquatic species, wildlife and human health in southeast BC and northwestern Montana communities. These impacts could become permanent[.]⁵⁷

Lana Pollack, Chair, U.S. Section, and Rich Moy, Commissioner, U.S. Section, International Joint Commission Canada and United States

As Dr. Dennis Lemly pointed out, the Upper Fording River Westslope Cutthroat Trout is a sentinel species – and, as they decline, so does the entire aquatic ecosystem.⁵⁸ We know these trout are suffering grotesque spinal and cranial deformities, and massive reproductive failure.⁵⁹ The question becomes, what is coal mining and selenium pollution doing to the rest of the Elk Valley aquatic ecosystem?

Selenium is a naturally occurring element that is essential to life in very small quantities but becomes toxic very quickly after a certain threshold. It is found naturally in high quantities in rock adjacent to coal deposits and leaches into the environment from mine wastes and rock once exposed to air and the elements.⁶⁰ The billions of bank cubic meters of waste rock at the Elk Valley coal mines are rich with selenium, which finds its way into the watershed by way of rain, snow, and weathering. In the Upper Fording River area alone there are numerous such waste rock piles, each running 100 metres high with a surface area over 100 hectares.⁶¹ After finding its way from

⁵⁷ Letter from Lana Pollack and Rich Moy to Cynthia Kierscht (20 June 2018) at 1, online: <<https://www.scribd.com/document/383221661/US-IJC-Commissioners-Letter-to-Dept-of-State-on-Selenium-Report>> [Accessed 12 March 2021].

⁵⁸ Dennis Lemly as cited in Chloe Williams, “From Canadian Coal Mines, Toxic Pollution That Knows No Borders,” *Yale Environment 360* (1 April 2019), online: *Yale Environment 360* <<https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders>> [https://perma.cc/VD2J-YRDT].

⁵⁹ A. Dennis Lemly, “Assessing the Toxic Threat of Selenium to Fish and Aquatic Birds” (1996) 43 *Environmental Monitoring and Assessment*, 19 at 19, online (pdf): *Teck* <<https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.449.8014&rep=rep1&type=pdf>> [https://perma.cc/H3HN-EAUD]. Also see A. Dennis Lemly, “Review of Environment Canada’s Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia” (25 September 2014) at 7-8 & 10-11, online (pdf): *Teck* <<https://www.teck.com/media/2014-Water-review-environment-canada-T3.2.3.2.1.pdf>> [https://perma.cc/7T4J-QBXR].

⁶⁰ *Teck Resources Limited* “Going Natural: Applying Innovative Solutions to Improve Water Quality” (27 December 2018), online (blog): *Teck Resources Limited* <<https://www.teck.com/news/stories/2018/going-natural-applying-innovative-solutions-to-improve-water-quality>> [https://perma.cc/P9AL-MZ16].

⁶¹ *Regina v. Teck Coal Limited*, 2021 BCPC 118 (CanLII) March 26, 2021, *Reasons for Sentence* of Judge Dohm, Provincial Court of BC, Cranbrook Registry, File No. 35390-1, paragraphs 8 and 11. See: <https://www.canlii.org/en/bc/bcpc/doc/2021/2021bcpc118/2021bcpc118.html?autocompleteStr=R%20v%20Teck%20C>

waste rock into waterways, selenium works itself up the food chain, accumulating in algae that, in turn, get eaten by invertebrates,⁶² fish, amphibians, birds⁶³ – and, eventually, humans.⁶⁴ The impacts across the ecosystem are remarkably broad.

Impacts on Fish Generally

The collapse of the Upper Fording River Westslope Cutthroat Trout was entirely predictable – but the threat to other fish such as endangered white sturgeon is also critical.⁶⁵ The downstream Kootenay Tribe of Idaho has recently raised the alarm “that burbot in the mainstem Kootenai River [in Idaho and Montana] are accumulating selenium at rates that are known to cause significant negative physiological effects on other fish species[.]”⁶⁶ Numerous studies have documented how selenium contamination has led to deformities, reproductive failure and elimination of entire communities of fish.⁶⁷ Biologists have known since the 1980s

[oal%20Limi&autocompletePos=1](#) At paragraph 11 the Court estimated 2.623 billion bank cubic meters were present in 2012. The amount of waste rock has grown significantly with new mining activity.

⁶² In a recent letter, two International Joint Commission Commissioners stated that not only was mine pollution resulting in “deformities and reproductive failure in trout and increasing fish mortality of up to 50 per cent in some portions of the Elk and Fording watersheds.” Letter from Lana Pollack and Rich Moy to Cynthia Kierscht (20 June 2018) at 6, online: <https://www.scribd.com/document/383221661/US-IJC-Commissioners-Letter-to-Dept-of-State-on-Selenium-Report> [Accessed 12 March 2021]. The pollution is impacting species up and down the food chain. For example, the Commissioners pointed out, “mine pollutants are poisoning and killing off the more sensitive species of macro-invertebrates downstream of the mines.” Judith Lavoie, “Canada suppressing data on coal mine pollution, say U.S. officials,” *The Narwhal* (4 July 2018), online: *The Narwhal* <<https://thenarwhal.ca/canada-suppressing-data-on-coal-mine-pollution-say-u-s-officials/>> [<https://perma.cc/Q9SU-ZQLR>]. Researchers have found reduced algae and invertebrate diversity in the Elk compared to the Flathead — a sign that selenium pollution was killing off sensitive species. Chloe Williams, “From Canadian Coal Mines, Toxic Pollution That Knows No Borders,” *Yale Environment 360* (1 April 2019), online: *Yale Environment 360* <<https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders>> [<https://perma.cc/VD2J-YRDT>].

⁶³ Note that 2020 Teck reports noted negative effects on mayfly and other macroinvertebrate populations in the Elk Valley that are not present elsewhere in the Kootenay region. Teck, “Local Aquatic Effects,” at 1 [archived at the University of Victoria Environmental Law Centre, see Appendix page 158 for this document].

⁶⁴ Letter from Judy Bloom to Steven Ruffatto (25 February 2021) (Re: EPA’s action on Montana’s Revised Selenium Criteria for Lake Koocanusa and the Kootenai River (ARM 17.30.632 & ARM 17.30.602(32)) at 6 [unpublished, archived at the University of Victoria Environmental Law Centre, see Appendix page 195 for this pinpoint]. Also see Carol Bellingranger (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 9, online (pdf): *BC Auditor* <<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [<https://perma.cc/AVD2-UB9B>].

⁶⁵ Laura Lundquist, “Mining industry, Montana GOP oppose selenium limit for Kootenai River, Lake Koocanusa”, *Missoula Current* (9 November 2020), online: *Missoula Current* <<https://missoulacurrent.com/outdoors/2020/11/republicans-selenium-limit/#:~:text=On%20Oct.,organs%20that%20exceeded%20EPA%20limits>> [<https://perma.cc/PB4B-SB39>].

⁶⁶ Hoyle, Genny and Sexton, Erin. Letter from Kootenay Tribe of Idaho and Consolidated Salish and Kootenai Tribes to Lake Koocanusa Monitoring and Research Working Group Selenium Technical Sub-Committee Co-Chairs (28 August 2020) at 62, online (pdf): *Montana Department of Environmental Quality* <https://deq.mt.gov/Portals/112/Water/WQP/B/Standards/Koocanusa/TSD_Lake%20Koocanusa_Sep2020_Final.pdf>

⁶⁷ A. Dennis Lemly, “Assessing the Toxic Threat of Selenium to Fish and Aquatic Birds” (1996) 43 *Environmental Monitoring and Assessment*, 19 at 19, online (pdf): *Teck* <<https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.449.8014&rep=rep1&type=pdf>> [<https://perma.cc/H3HN->

that selenium concentrations of more than **10-15 µg/g dry weight** in fish eggs is enough to begin to see deleterious effects.⁶⁸ For this reason, the EPA has set a standard with their criterion of 15.1 µg/g dry weight for egg/ovary tissue in fish.⁶⁹

Yet, Dr. Lemly noted that Westslope Cutthroat Trout fish eggs concentrations “**frequently exceeded 60 µg/g dry weight.**”⁷⁰ And, impacts on other species of fish are troubling. Teck’s environmental consultants’ testing shows that selenium concentrations in three other fish species’ ovaries (peamouth chub, northern pikeminnow, and redbreast shiner) continuously exceed BC gonad/ovary tissue guidelines in Lake Kootenai. Many species show muscle tissue selenium above the BC guideline, including the above species as well as cutthroat trout, mountain whitefish, burbot, yellow perch, longnose sucker and largescale sucker.⁷¹

The Elk Valley coal mining pollution extends far downstream, across the US border in Lake Kootenai and into the Kootenai River.⁷² The US EPA recently approved the state of Idaho’s classification of the Kootenai River downstream as “impaired” by selenium pollution coming from the Elk Valley mines – and requiring special protection.⁷³ This serious pollution classification was imposed after mountain whitefish in the US river were found with excessively high selenium ovary concentrations.⁷⁴ Such findings raise concerns for other fish, including endangered white sturgeon and Lower Kootenai River burbot in the US.⁷⁵

EAUD]. Also see A. Dennis Lemly, “Review of Environment Canada’s Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia” (25 September 2014) at 7-8 & 10-11, online (pdf): Teck <https://www.teck.com/media/2014-Water-review_environment_canada-T3.2.3.2.1.pdf> [https://perma.cc/7T4J-QBXR].

⁶⁸ [Emphasis added in the paragraph above] A. Dennis Lemly, “Review of Environment Canada’s Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia” (25 September 2014) at 4-5, 11, online (pdf): Teck <https://www.teck.com/media/2014-Water-review_environment_canada-T3.2.3.2.1.pdf> [https://perma.cc/7T4J-QBXR].

⁶⁹ US Environmental Protection Agency, “Aquatic Life Ambient Water Quality Criterion for Selenium in Freshwater 2016 – Fact Sheet” (June 2016) at 1, online (pdf): EPA <https://www.epa.gov/sites/production/files/2016-06/documents/se_2016_fact_sheet_final.pdf>.

⁷⁰ [Emphasis added in the paragraph above] A. Dennis Lemly, “Review of Environment Canada’s Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia” (25 September 2014) at 5, online (pdf): Teck <https://www.teck.com/media/2014-Water-review_environment_canada-T3.2.3.2.1.pdf> [https://perma.cc/7T4J-QBXR] [emphasis added].

⁷¹ Minnow Environmental Inc, “Kootenai Reservoir Monitoring Program Annual Report 2019” (June 2020) at 84-89, online (pdf): Teck <https://www.teck.com/media/02_Kootenai-Reservoir-Monitoring-2019-Report_w-Cover-Page.pdf> [https://perma.cc/7DBU-FGZ4]. Also, see: <https://www.teck.com/media/Kootenai-Reservoir-Monitoring-2018-Report.pdf> 104-107

⁷² Minnow Environmental Inc, “Kootenai Reservoir Monitoring Program Annual Report 2019” (June 2020) at 63, online (pdf): Teck <https://www.teck.com/media/02_Kootenai-Reservoir-Monitoring-2019-Report_w-Cover-Page.pdf> [https://perma.cc/7DBU-FGZ4].

⁷³ Enclosure to EPA November 3, 2020 Letter to IAAC,” in Letter from Ayn Schmit to Regina Wright (3 November 2020) (Re: Castle Project) at 2 [unpublished, archived at the University of Victoria Environmental Law Centre]. Letter found at appendix page 13. Pinpoint found at appendix page 16.

⁷⁴ Letter from Brad Smith (Idaho Conservation League) to Fraser Ross (30 October 2020) (Re: Initial Project Description and request to designate a federal review panel for to Castle Project) at 2 [unpublished, archived at the University of Victoria Environmental Law Centre]. Letter found at Appendix page 48. Pinpoint found at Appendix page 49.

⁷⁵ Letter from Confederated Salish and Kootenai Tribes and Kootenai Tribe of Idaho to Hon. Jonathan Wilkinson (30 October 2020) (Re: First Comments Regarding Teck Coal Limited’s Initial Project Description for the Castle Project) [unpublished, archived at the University of Victoria Environmental Law Centre, letter found at Appendix page 44,

Impacts on Birds and Amphibians

In addition to fish, selenium is particularly toxic to other egg-laying creatures such as birds and amphibians, as it bio-accumulates in their reproductive organs.⁷⁶ As the BC Auditor General noted in her critique of the lack of regulation over the Teck Resources Elk Valley coal mines:

As selenium accumulates up the food chain, it can affect the development and survival of birds and fish, and may also pose health risks to humans . . .

*The result in fish is reduced growth, behavioural changes, greater incidence of deformity and increased rates of mortality. For birds, the result is reduced egg hatchability and greater incidence of deformity in the chicks that do hatch.*⁷⁷

There is significant concern about the effects that selenium may be causing to the Elk Valley's many migratory and resident birds – including spotted sandpipers, American dippers, “northern waterthrush, varied thrush, harlequin duck, and Canada goose.”⁷⁸ For example, scientists have

pinpoint found at Appendix Page 45]; Also see Letter from Brad Smith (Idaho Conservation League) to Fraser Ross (30 October 2020) (Re: Initial Project Description and request to designate a federal review panel for to Castle Project) [unpublished, archived at the University of Victoria Environmental Law Centre, letter found at Appendix page 48, pinpoint at Appendix page 50]; Also see Letter from Randy Christensen and Daniel Cheater to Hon. Jonathan Wilkinson (23 June 2020) (Re: Request for Designation of the Castle Project under s. 19(1) of the Schedule to the Physical Activities Regulations and s. 9(1) of the Impact Assessment Act) [unpublished, archived at the University of Victoria Environmental Law Centre, letter found at Appendix page 52, pinpoint at Appendix Page 73-74]. Laura Lundquist, “Mining industry, Montana GOP oppose selenium limit for Kootenai River, Lake Koocanusa”, *Missoula Current* (9 November 2020), online: *Missoula Current* <<https://missoulacurrent.com/outdoors/2020/11/republicans-selenium-limit/#:~:text=On%20Oct.,organs%20that%20exceeded%20EPA%20limits>> [https://perma.cc/PB4B-SB39].

⁷⁶ “Rationale for the EPA’s Approval of Revised Selenium Criteria” in letter from Judy Bloom to Steven Ruffatto (25 February 2021) (Re: EPA’s action on Montana’s Revised Selenium Criteria for Lake Koocanusa and the Kootenai River (ARM 17.30.632 & ARM 17.30.602(32)) at 2 [unpublished, archived at the University of Victoria Environmental Law Centre, See Appendix, pages 191 and 195]. On selenium effects on food chain organisms, generally, see A. Dennis Lemly, “Review of Environment Canada’s Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia” (25 September 2014) at 54, online (pdf): *Teck* <https://www.teck.com/media/2014-Water-review_environment_canada-T3.2.3.2.1.pdf> [https://perma.cc/7T4J-QBXR]. On birds, see, Minnow Environmental Inc, “Evaluation of selenium sensitivity of spotted sandpipers breeding in the Elk River watershed of southeastern British Columbia” at 10 online (pdf): *Teck* <[https://www.teck.com/media/Evaluation-of-selenium-sensitivity-of-spotted-sandpipers-breeding-in-the-Elk-River-watershed-of-southeastern-British-Columbia,-2013-2014-\(February-2016\).pdf](https://www.teck.com/media/Evaluation-of-selenium-sensitivity-of-spotted-sandpipers-breeding-in-the-Elk-River-watershed-of-southeastern-British-Columbia,-2013-2014-(February-2016).pdf)> [Accessed 19 March 2021] and A. Dennis Lemly, “Assessing the toxic threat of selenium to fish and aquatic birds,” 1996 43 *Environmental Monitoring and Assessment* 19 at 19. On amphibians, see “Dietary selenomethionine Exposure Induces Physical Malformations and Decreases Growth and Survival to Metamorphosis in an Amphibian (*Hyla chrysoscelis*),” (2013) 64 *Arch Environ Contam Toxicol* 504 at 512.

⁷⁷ Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 9, 96-97, online (pdf): *BC Auditor* <<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [https://perma.cc/AVD2-UB9B]. Also see A. Dennis Lemly, “Review of Environment Canada’s Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia” (25 September 2014), online (pdf): *Teck* <https://www.teck.com/media/2014-Water-review_environment_canada-T3.2.3.2.1.pdf> [https://perma.cc/7T4J-QBXR].

⁷⁸ Letter from Randy Christensen and Daniel Cheater to Hon. Jonathan Wilkinson (23 June 2020) (Re: Request for Designation of the Castle Project under s. 19(1) of the Schedule to the Physical Activities Regulations and s. 9(1) of the Impact Assessment Act) at 21 [unpublished, archived at the University of Victoria Environmental Law Centre at Appendix page 72].

identified concerns that spotted sandpipers breeding in the Elk River watershed may be affected, and have done research to investigate those concerns.⁷⁹

Impacts on Human Health and Indigenous Peoples

Various concerns about Impacts on humans and human health arise from the contamination of country foods and the contamination of water supplies. The contamination of numerous drinking water supplies has been detailed above, and the contamination of fish and other country foods raises obvious human health concerns.

However, the Elk Valley coal mine pollution particularly impacts the Ktunaxa people, who rely heavily on local fish and waters. In the recent \$60 million Teck *Fisheries Act* prosecution, the Ktunaxa Nation filed a moving Community Impact Statement that pointed out how the water pollution from Teck's coal mines alienates the Ktunaxa people from their land and culture.⁸⁰

...the ability to drink confidently from the mountain stream is an aspect of Ktunaxa rights all intergenerations should enjoy...Ktunaxa perceptions of contamination in fish is already . . . [impairing Ktunaxa] practice of rights on the Elk and Fording Rivers, including avoidance of these areas for fishing. Knowing that the fish habitat is impacted by these polluted waters leads to concern for the safety of the fish as well as for Ktunaxa consuming them. The result is an alienation of our people from our lands, waters, and cultural practices.⁸¹

The Ktunaxa Nation have calculated that to avoid selenium human health impacts at the consumption rate that is culturally preferred, fish tissue selenium should not exceed 5.3 µg/g whole body dry weight.⁸² Yet mountain whitefish are being found with selenium concentrations above this level – not just in the Elk River, but also in Lake Koochanusa⁸³ and hundreds of kilometres

⁷⁹ Harding, Lee E.; Graham, Mark; Paton, Dale, "Accumulation of selenium and lack of effects on American dippers and spotted sandpipers" (2004, with data from 2002) at 5, online (pdf): [Harding https://open.library.ubc.ca/cIRcle/collections/59367/items/1.0042448](https://open.library.ubc.ca/cIRcle/collections/59367/items/1.0042448) See also: Minnow Environmental Inc, "Evaluation of selenium sensitivity of spotted sandpipers breeding in the Elk River watershed of southeastern British Columbia" at 3 (citing Ministry of Environment concerns and the Beatty study) and 10 online (pdf): [Teck <https://www.teck.com/media/Evaluation-of-selenium-sensitivity-of-spotted-sandpipers-breeding-in-the-Elk-River-watershed-of-southeastern-British-Columbia,-2013-2014-\(February-2016\).pdf>](https://www.teck.com/media/Evaluation-of-selenium-sensitivity-of-spotted-sandpipers-breeding-in-the-Elk-River-watershed-of-southeastern-British-Columbia,-2013-2014-(February-2016).pdf) [Accessed 19 March 2021].

⁸⁰ Proceedings at Sentencing in *Regina v. Teck Coal Limited*, Provincial Court of BC, Cranbrook Registry 335390-1, March 26, 2021, Submissions of the Federal Crown Clarkson (quoting from the Ktunaxa Community Impact Statement) pp. 16-17.

⁸¹ Proceedings at Sentencing in *Regina v. Teck Coal Limited*, Provincial Court of BC, Cranbrook Registry 335390-1, March 26, 2021, Submissions of the Federal Crown Clarkson (quoting from the Ktunaxa Community Impact Statement) p. 16, lines 46-47 and p. 17, lines 1 and 12-21.

⁸² Sinclair, Jesse and McMahon, Heather, Ktunaxa Nation Council letter "RE: KNC Selenium Technical Sub-Committee recommendations on Presser and Naftz (2020) selenium bioaccumulation model for Koochanusa Reservoir" at 68-70, online (pdf): [<https://deq.mt.gov/Portals/112/Water/WQPB/Standards/Koochanusa/TSD_Lake%20Koochanusa_Sep2020_Final.pdf>](https://deq.mt.gov/Portals/112/Water/WQPB/Standards/Koochanusa/TSD_Lake%20Koochanusa_Sep2020_Final.pdf)

⁸³ Minnow Environmental, "Koochanusa Reservoir Monitoring Program Annual Report, 2019" at 85, online (pdf): [Teck <https://www.teck.com/media/02_Koochanusa-Reservoir-Monitoring-2019-Report_w-Cover-Page.pdf>](https://www.teck.com/media/02_Koochanusa-Reservoir-Monitoring-2019-Report_w-Cover-Page.pdf)

downstream of the mines in the Kootenai River in Idaho.⁸⁴ Thus, numerous US tribes are being impacted as well. This is why the Confederated Salish and Kootenai Tribes and Kootenai Tribe of Idaho recently wrote to Canada's Minister of Environment, Jonathan Wilkinson, raising concerns about proposed expansion of the Castle Teck Coal Mine – and the contamination of the sturgeon and burbot fish that they rely upon.⁸⁵

⁸⁴ Mebane, C.A., and Schmidt, C.G., "Selenium and mercury in the Kootenai River, Montana and Idaho, 2018-2019" (2019) in file Fish_Se_summary.xlsx, online: *US Geological Survey* <<https://www.sciencebase.gov/catalog/item/5d6d38efe4b0c4f70cf62b74>>

⁸⁵ Letter from Confederated Salish and Kootenai Tribes and Kootenai Tribe of Idaho to Hon. Jonathan Wilkinson (30 October 2020) (Re: First Comments Regarding Teck Coal Limited's Initial Project Description for the Castle Project) [unpublished, archived at the University of Victoria Environmental Law Centre, letter found at Appendix page 44, pinpoint found at Appendix Page 45]

5. Egregious Provincial Failures: Why Federal Agencies Should Have Acted

Why did the federal agencies fail to meet its obligation to protect fish and water? Why did Ottawa abdicate its responsibility to deal with matters clearly falling under federal jurisdiction over:

- Fish;
- Fish habitat;
- Transboundary impacts; and
- Impacts on Indigenous peoples?

Perhaps Environment Canada's biggest mistake was to withhold federal action and defer to British Columbia regulators. Federal agencies deferred for far too long to provincial regulators who were simply not doing their job. In her 2016 Audit, the BC Auditor General examined British Columbia's province-wide efforts to regulate mining, and she couldn't have been more scathing, writing:

*The Ministry of Energy and Mines and Ministry of Environment's compliance and enforcement activities of the mining sector are inadequate to protect the province from significant environmental risks...*⁸⁶

*The [Ministry of Energy and Mines] is deficient in carrying out most of the expected regulatory activities...*⁸⁷

*On several occasions in the past 10 years, [Ministry of Energy and Mines] staff told higher-level management that inadequate monitoring and inspection, due to insufficient staffing levels, was putting the province at risk.*⁸⁸

⁸⁶ Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 6, online (pdf): *BC Auditor* <<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [https://perma.cc/AVD2-UB9B]. Note that the Auditor General was similarly critical of Ministry of Environment regulatory efforts.

⁸⁷ Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 41, online (pdf): *BC Auditor* <<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [https://perma.cc/AVD2-UB9B]. Note that the Auditor General was similarly critical of Ministry of Environment regulatory efforts.

⁸⁸ Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 54, online (pdf): *BC Auditor* <<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [https://perma.cc/AVD2-UB9B]. Note that the Auditor General was similarly critical of Ministry of Environment regulatory efforts.

Five years later, In the Elk Valley provincial mine pollution discharge permits still remain deeply flawed. They still set levels that are overwhelmingly site-specific and far exceed British Columbia's Water Quality Guidelines for aquatic species, wildlife, and drinking water.⁸⁹ Important pollutants such as nickel are not being regulated.⁹⁰

Nevertheless, it must be acknowledged that, in recent years, there has been a somewhat grudging provincial recognition of the scope of the devastating pollution problem. Certain half-measures have been taken by the provincial government, including the issuance of a BC Ministerial Order,⁹¹ the mandating and approval of a Water Quality Plan,⁹² and the establishment of a regional water quality permit with targets for selenium and other pollutants.⁹³

Unfortunately, those recent provincial measures – and half-hearted follow-through on those regulatory measures⁹⁴ – have proven grossly inadequate to address the true gravity of the problem.

For example, in 2013, a much-touted BC Ministerial Order M113 set a goal to “stabilize and reverse increasing trends in water contaminant concentrations in the short term.”⁹⁵ Yet, eight years later, BC continues to allow Teck Resources to continue to exceed limits set under the plan required by the order.

[Not to mention that the permit levels themselves often grossly exceed British Columbia's own Water Quality Guidelines. For example, at Elkview SRF the downstream selenium limit in Michel Creek is *fourteen times* the BC Water Quality Guidelines for aquatic life and wildlife – and nearly *three times* the BC Water Quality Guideline for drinking water.⁹⁶ At Fording River South AWTF, the

⁸⁹ British Columbia, Ministry of Environment, *Ambient Water Quality Guidelines for Selenium: Technical Report Update*, (Victoria: BC Ministry of Environment, April 2014) at 4, online (pdf): *BC Government* <https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/bc_moe_se_wqg.pdf> [https://perma.cc/VVZ4-KNTL].

⁹⁰ Nickel is not included in Elk Valley Water Quality Plan or ministerial order, but it has increased significantly in recent years, likely causing impacts to aquatic ecosystems. Yet, BC has failed to regulate this

⁹¹ *Province of British Columbia Order of the Minister of Environment Section 89, Environmental Management Act Ministerial Order No M113*, 15 April 2013, MO No 113, online (pdf): *BC Laws* <https://www.bclaws.gov.bc.ca/civix/document/id/mo/hmo/m0113_2013> [https://perma.cc/2XES-FLCR].

⁹² Letter from Hon. Mary Polak to Marcia Smith (18 November 2014), online (pdf): Note that the ministerial order mandated the water quality plan. <https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/area-based-man-plan/211287-abmp_approval_letter_nov18-2014.pdf> [https://perma.cc/H85Z-NS47].

⁹³ Which made some actions in Teck's water quality plan legal requirements. Environmental Monitoring Committee, “Permit 107517 Environmental Monitoring Committee 2019 Public Report” (2019) at 7, online (pdf): *Teck* <<https://www.teck.com/media/2019-EMC.pdf>> [https://perma.cc/9YFS-SJCX].

⁹⁴ Again, see the Determination of Administrative Penalty, March 8, 2021, File 2018-17 107517, Daniel Bings, for the Director, *Environmental Management Act*, pp. 1, 5-6, (discussed above) where repeated contraventions were not penalized by the province – to the extent that a subsequent provincial decision maker raised serious concerns about the chronic lack of previous regulatory action.

⁹⁵ *Province of British Columbia Order of the Minister of Environment Section 89, Environmental Management Act Ministerial Order No M113*, 15 April 2013, MO No 113 at 1, online (pdf): *BC Laws* <https://www.bclaws.gov.bc.ca/civix/document/id/mo/hmo/m0113_2013> [https://perma.cc/2XES-FLCR].

⁹⁶ The current limit for the Michel Creek, approximately 15km downstream of the Elkview SRF, is 29µg/L monthly average selenium. Province of British Columbia, Waste discharge permit 107517 (11 March 2021) at 10, available online by searching at <<https://j200.gov.bc.ca/pub/ams/Default.aspx?PossePresentation=DocumentSearch>>

downstream selenium limit in the upper Fording River is *42 times the BC Water Quality Guidelines for aquatic life and wildlife* – and more than *eight times the BC Water Quality Guideline* for drinking water.^{97]}

The United States government has recently pointed out the glaring inconsistencies in British Columbia’s pollution efforts. In a blistering February 2020 letter to the BC Ministers of Environment and Mines, the US EPA objected to the fact that the BC government had failed to reject Teck’s announced “Implementation Plan Amendment” – which allows Teck to not meet permit levels for additional years. The original permit levels are not being enforced. Yet again, Teck Resources is allowed to continue to exceed water quality limits into the future. Not surprisingly, the Environmental Protection Agency found this “unacceptable,”

*particularly given that it is already seven years since Ministerial Order M113 set a goal to “stabilize and reverse increasing trends in water contaminant concentrations” in the Elk River Valley.*⁹⁸

It is no wonder the EPA is losing patience. Even though M113 specifically instructs Teck to set a long-term target of 2µg/L for Lake Koocanusa, BC Ministry of Environment opted to make the limit for Lake Koocanusa unenforceable (a site performance objective).⁹⁹ In recent years, selenium levels in Lake Koocanusa exceeded 2.0µg/L, but the province did not act on those exceedances.¹⁰⁰ This lack of British Columbia action on levels above 2.0 is egregious. This inaction is exacerbated by the recent BC-Montana scientific research demonstrates that even the ignored 2.0 limit itself is not safe for fish – which is why Montana and the US have recently set a far lower limit – .8 ug/L¹⁰¹

⁹⁷ The current limit for the upper Fording River, approximately 5km downstream of the Fording AWTF, is 85µg/L monthly average selenium. Province of British Columbia, Waste discharge permit 107517 (11 March 2021) at 6, available online by searching at <<https://i200.gov.bc.ca/pub/ams/Default.aspx?PossePresentation=DocumentSearch>>

⁹⁸ Letter from W.C. McIntosh, Gregory Sopkin, and Chris Hladick to Hon. George Heyman and Hon. Bruce Ralston (4 February 2020). See Appendix at page 1 for a copy of the letter.

⁹⁹ Province of British Columbia, Waste discharge permit 107517 (11 March 2021) at 11-12, available online by searching at <<https://i200.gov.bc.ca/pub/ams/Default.aspx?PossePresentation=DocumentSearch>>

¹⁰⁰ Monthly average selenium at the Lake Koocanusa Order Station was 2.5µg/l in April 2018 and also above 2.0µg/l in February through April 2020 and January and March 2021. This data is available from the BC Environmental Monitoring System for Total Selenium at site E300230 (Lake Koocanusa South of Elk River), online: <<https://a100.gov.bc.ca/pub/ems/mainmenu.do?userAction=mainmenu>>.

¹⁰¹ Montana’s Department of Environmental Quality tried to work with the BC Ministry of Environment and Climate Change Strategy over the past 6 years to develop a bilateral selenium standard for Lake Koocanusa. Montana set a proposed limit of 0.8 µg/L , 1.2 µg/L below Teck’s current unenforceable permit target of 2.0 ug/L, and 0.7 µg/L below the current federal limit for lakes set by the EPA. Myla Kelly and Lauren Sullivan, “Establishing Selenium Standards for Lake Koocanusa and Kootenai River that Protect Aquatic Life” (24 September 2020), online (pdf): *Montana Department of Environmental Quality* <https://deq.mt.gov/Portals/112/DEQAdmin/BER/Documents/AGENDA/DEQ_SMS.pdf> [<https://perma.cc/3FFB-HDYS>]. However, despite over six years of collaboration on this limit, BC failed to select a proposed water quality objective for selenium for Lake Koocanusa. British Columbia Ministry of Environment and Climate Change Strategy, “B.C.’s response on establishing a selenium-level objective for Lake Koocanusa” *BC Gov News* (28 September 2020), online: *BC Gov News* <<https://news.gov.bc.ca/releases/2020ENV0058-001855>> [<https://perma.cc/KTB7-ZQA5>]. Frustrated with a lack of Canadian movement toward establishing a binational standard, Montana passed the proposed standard in December of 2020 without BC’s support – based on the findings of peer-reviewed scientific reports. In making this decision, the Montana Board cited “more than six years of collaboration with leading selenium scientific experts and the Lake Koocanusa Monitoring and Research Working Group that included public meetings, data collection and a peer-reviewed monitoring report” Montana Department of Environmental Quality, “Board of Environmental Review Adopts Selenium Water Quality Standards for Lake Koocanusa and the

The EPA has not been the only critic of BC's retrograde regulatory efforts. In 2016 the BC Auditor General critiqued the implementation of Ministerial Order 113 as flawed from the start. M113¹⁰² required Teck to develop the Water Quality Plan,¹⁰³ Teck developed the Plan, and then Permit 107517 was issued to put the limits proposed in the Plan into a legal permit.¹⁰⁴ Supposedly, these 2014 measures were taken to implement the Ministerial Order's stated goal of *reversing pollution trends*.¹⁰⁵ However, the BC Auditor General criticized the 2014 measures as fundamentally flawed from the start:

The Area-Based Management Permit was meant to reflect the ministerial order of stabilizing and reducing selenium. We therefore expected the levels of selenium set in the permit to reflect the order. Instead, we found that the permit levels of selenium for most areas exceed the known historical levels in the Elk Valley[.] . . .

Kootenai River" *DEQ Press Releases* (14 December 2020), online: *DEQ Press Releases* <<http://deq.mt.gov/Public/PressRelease/board-of-environmental-review-adopts-selenium-water-quality-standards-for-lake-kooocanusa-and-the-kootenai-river>> [https://perma.cc/4MTZ-KVES]. The tighter Montana standards were approved by the US EPA in February 2021. Letter from Judy Bloom to Steven Ruffatto (25 February 2021) at 2 [unpublished, archived with the University of Victoria Environmental Law Centre, this letter can be found at Appendix page 187, with this pinpoint at Appendix page 188]. Once again, Canadian authorities lag significantly behind. Christopher Mebane and Christian Schmidt, "Selenium and mercury in the Kootenai River, Montana and Idaho, 2018-2019" *United States Geological Survey* (20 September 2019), online: *United States Geological Survey* <<https://doi.org/10.5066/P9YVVV7R>>.

¹⁰² *Province of British Columbia Order of the Minister of Environment Section 89, Environmental Management Act Ministerial Order No M113*, 15 April 2013, MO No 113, at Schedule A, online (pdf): *BC Laws* <https://www.bclaws.gov.bc.ca/civix/document/id/mo/hmo/m0113_2013> [https://perma.cc/2XES-FLCR].

¹⁰³ Letter from Hon. Mary Polak to Marcia Smith (18 November 2014), online (pdf): <https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/area-based-man-plan/211287-abmp_approval_letter_nov18-2014.pdf> [https://perma.cc/H85Z-NS47].

¹⁰⁴ Environmental Monitoring Committee, "Permit 107517 Environmental Monitoring Committee 2019 Public Report" (2019) at 7, online (pdf): *Teck* <<https://www.teck.com/media/2019-EMC.pdf>> [https://perma.cc/9YFS-SJCX].

¹⁰⁵ In April 2013, the BC Minister of Environment issued Ministerial Order No. M113, which required Teck to develop an area-based management plan and identify the actions it would take to manage water quality downstream of its five coal mines. The substances of concern in that order were selenium, nitrate, sulphate, cadmium, and calcite. *Province of British Columbia Order of the Minister of Environment Section 89, Environmental Management Act Ministerial Order No M113*, 15 April 2013, MO No 113, online (pdf): *BC Laws* <https://www.bclaws.gov.bc.ca/civix/document/id/mo/hmo/m0113_2013> [https://perma.cc/2XES-FLCR]. Teck developed a proposed *Elk Valley Water Quality Plan*, and the Minister approved it in 2014. The Elk Valley Water Quality Plan sets out targets (limits) for the concentration of selenium, sulphate, nitrate, and cadmium in surface water at seven specific locations— called Order Stations—in the Elk Valley and in the Kooocanusa Reservoir. That Plan also has targets for calcite in influenced streams. Teck Resources, "Elk Valley Water Quality Plan," at 2 and 8-2, online (pdf): *Teck* <https://www.teck.com/media/2015-Water-elk_valley_water_quality_plan_T3.2.3.2.pdf> [Accessed 15 March 2021]. The Environmental Monitoring Committee's 2019 report clarifies the relationship between the plan and the 2019 MoE permit:

Following the approval of the Elk Valley Water Quality Plan, the Ministry of Environment issued Permit 107517—often called the Elk Valley Permit. Many of the actions and commitments described in the Elk Valley Water Quality Plan were made legal requirements by this permit, including the target concentrations for water quality. Teck must meet all the requirements in this permit.

Permit 107517 does not replace any of the permits previously issued to each of the mine operations. It is regionally focused and adds another layer of legal requirements for Teck.

Environmental Monitoring Committee, "Permit 107517 Environmental Monitoring Committee 2019 Public Report" (2019) at 7, online (pdf): *Teck* <<https://www.teck.com/media/2019-EMC.pdf>> [https://perma.cc/9YFS-SJCX].

The selenium levels allowed in the permit for 2023 still range from being 10 to 30 times the ministry's aquatic guidelines of 2 micrograms of selenium per litre of water[.]

...

According to the EPA, the selenium levels contemplated by the B.C. government will result in an increase in selenium in the area, not a stabilization or reversal of levels, as was promised in the ministerial order issued in 2013.¹⁰⁶

[emphasis added]

The BC Auditor General also pointed out that the selenium levels permitted by the Area-Based Management Permit were inconsistent with the precautionary principle. She pointedly noted:

*The proposed targets over the next seven years show a reduction in selenium, but are still significantly higher than current concentrations creating a high risk of further environmental impacts. . . . Selenium from both historical mining activities and the ongoing expansion is likely to continue to impact the environment far into the future.*¹⁰⁷

Political Override of Environmental Decisions

To make matters worse, provincial politicians overrode civil servants to approve risky coal mine expansions that release more selenium. In 2016 the BC Auditor General criticized the provincial cabinet for the way it overrode line officials and approved the Line Creek Coal Mine Phase II expansion in 2013.

The Auditor General noted:

*This approved expansion of [Line Creek coal] mining operations creates a risk of further decline of this species [Westslope Cutthroat Trout]*¹⁰⁸

Critically, she pointed out that Ministry of Environment officials had refused to give approval – because Ministry of Environment scientists (taking the same view as the US EPA) believed the selenium levels allowed did not protect the environment.¹⁰⁹ She recommended changes to

¹⁰⁶ Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 101-102, online (pdf): *BC Auditor*

<<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>>.

¹⁰⁷ Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 10, online (pdf): *BC Auditor*

<<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>>.

¹⁰⁸ Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 95, online (pdf): *BC Auditor*

<<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>>

[<https://perma.cc/AVD2-UB9B>].

¹⁰⁹ Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 95 and 99, online (pdf): *BC Auditor* Unsurprisingly, Teck, BC and Ktunaxa are still negotiating how Teck is going to handle water pollution from this expansion (even though mining started years ago) through the Line Creek Operations Dry Creek Structured Decision Making

ensure that such political overrides be publicly disclosed, with release of reasons for the political override.

A cynic might summarize the sorry provincial track record in this way: We had totally inadequate provincial standards for many years – which were replaced in 2013 by somewhat less inadequate standards. This was followed by a wholesale provincial failure to actually enforce the new inadequate standards. This was exacerbated at least once by politicians overriding the judgment of provincial government scientists in order to greenlight yet another new major coal operation that threatened Westslope Cutthroat Trout.

And all of this is in the context of a pollution problem that is not short-term – indeed, it may well last for centuries. As the BC Auditor General noted, selenium and other pollutants will continue to flow from waste rock dumps “far into the future”. It is important to note some Roman and Medieval mines in Europe are still polluting watersheds hundreds of years after opening.¹¹⁰ Currently, there is no plan to deal with the likely problem of perpetual pollution, other than extraordinarily expensive water treatment – which is not credibly operational in 100 years or more.¹¹¹

Yet in the face of all this, government is even now entertaining four new coal mine proposals in the Elk Valley. Such ongoing expansion will likely lock in higher long-term pollution levels for generations to come.

Before further coal mine expansion is contemplated, Canadians need to know the answer to two simple questions:

- Where have Environment Canada and Fisheries and Oceans Canada been, while federally-protected fisheries were being destroyed in the Elk Valley?
- And what assurance do we have that history will not be repeated?

process.<<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [<https://perma.cc/AVD2-UB9B>].

¹¹⁰For example, the *Global Acid Rock Drainage Guide* cites a mine in Spain created in the Roman era that still actively releases such drainage <http://www.gardguide.com/index.php?title=Summary>. Similarly, a mine in the United Kingdom that has been releasing such drainage for 2,000 years is described at: <http://sciencelearn.org.nz/News-Events/Latest-News/News-Archive/2009-Newsarchive/Environmental-best-practice-mining>. Ancient Scandinavian mines also continue to pollute ecosystems there. See, for example: Per Angelstam, “Learning About the History of Landscape Use for the Future: Consequences for Ecological and Social Systems in Swedish Bergslagen,” (*Ambio* March 10, 2013) online: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3593034/>.

¹¹¹ See section 7 below for more discussion of why it is problematic to rely upon the short-term solution of water treatment for a long-term pollution problem.

6. The Central Problem: Federal Delay in Utilizing *Fisheries Act* Powers

In light of the colossal provincial failure to protect fish and the environment, what has the federal government done to protect the fish of the Elk Valley from the relentless increase of lethal selenium? We submit that the inadequate provincial permitting standards and enforcement decisions would not have been so disastrous, if federal agencies had done their job.

Massive damage might have been avoided if federal agencies had not abdicated to provincial agencies. Section 36(3) of the *Fisheries Act* mandates Environment Canada and Fisheries and Oceans Canada to stop the deposition of deleterious substances into waters frequented by fish. Why did it take until this year for federal agencies to prosecute under this power? Why did the federal agencies fail to act long ago – *e.g.*, to fully use the *Fisheries Act* to prosecute pollution, order remediation, and otherwise require a cleanup?¹¹²

As you will see in the discussion below, repeated breaches of the already-lax provincial permits have not only met little enforcement action from the Province, but also little consequence from the federal authorities charged with protection of fish and the environment.

Just why has the federal government not acted more assertively? And was this forbearance in the public interest? Your office needs to investigate:

- The many credible complaints about the insufficiency of *federal* response;
- What more *federal* agencies could have done to respond;
- Exactly how *federal* response can improve going forward;
- New questions that arise as a result of the terribly belated *fisheries act* enforcement of March 2021; and
- In light of the proposed massive expansion of new coal mining, what assurance is there that expanded new coal mining will be regulated better in the future?

The people of Canada deserve to know – so that future environmental tragedies can be avoided in the Elk Valley and elsewhere.

Below is a discussion of apparent federal shortcomings that need to be examined.

Delayed Prosecutions

A key federal power is the power of Environment and Climate Change Canada to prosecute pollution under the *Fisheries Act*. Yet, federal action on this has been remarkably sparse and tardy,

¹¹² For example, section 36(3) of the *Fisheries Act*, and its prohibition against depositing deleterious substances into waters frequented by fish. *Fisheries Act*, RSC 1985, c F-14, s 36(3), online: <https://laws-lois.justice.gc.ca/eng/acts/f-14/FullText.html> [https://perma.cc/4LL3-MABQ].

in light of the growing environmental disaster – and the grossly inadequate response of the provincial government.

Under s. 36(3) of the *Fisheries Act*, the federal government has authority to prosecute a company that is exceeding provincial permit limits for pollution discharge.¹¹³ Section 36(3) broadly prohibits any deposition of deleterious substances into water frequented by fish.¹¹⁴ And, for years Elk Valley coal mines have released selenium and other pollution, often exceeding the already lenient provincially-permitted levels.¹¹⁵ However, just as regularly, federal authorities declined to use s. 36(3) for this chronic selenium pollution problem until this year.

Finally, on March 26, 2021 Teck Coal Limited plead guilty to section 36(3) offences that occurred nine years before – in 2012. Teck was fined \$60 million for their 2012 violations – which occurred on each and every day of that year. As part of the plea bargain the Crown dropped approved Crown charges for pollution that had occurred from 2009-2011 and from 2013-2019.¹¹⁶

The question for you is simple: Why did it take so long for the Government of Canada to prosecute for these many years of pollution? And would the Elk Valley be a far healthier place if Government had acted earlier?

In light of the profound impacts on the fish that Canada is mandated to protect, your offices need to investigate the federal track record. We know from the recent decision in *R. v. Teck Coal Ltd.* that Teck was violating s. 36 of the *Fisheries Act* on a daily basis (at least in 2012). We also know that, for example, between 2016 and 2020, Teck Resources exceeded its BC regional permit 107517 effluent limits numerous times – without consequence from either BC or Canada for the vast majority of exceedances.¹¹⁷ For the most part, Canadian federal fisheries prosecutors have been content with such impotent measures as simply putting Teck “on notice” for potential *Fisheries Act* charges that might someday be laid.¹¹⁸

¹¹³ *Fisheries Act*, RSC 1985, c F-14, s 36(3), online: <https://laws-lois.justice.gc.ca/eng/acts/f-14/FullText.html> [https://perma.cc/4LL3-MABQ].

¹¹⁴ *Fisheries Act*, RSC 1985, c F-14, s 36(3), online: <https://laws-lois.justice.gc.ca/eng/acts/f-14/FullText.html> [https://perma.cc/4LL3-MABQ].

¹¹⁵ See above and below discussions of Teck’s failures to be in keeping within permit and water quality levels.

¹¹⁶ *Regina v. Teck Coal Limited*, 2021 BCPC 118 (CanLII) March 26, 2021, *Reasons for Sentence* of Judge Dohm, Provincial Court of BC, Cranbrook Registry, File No. 35390-1, paragraphs 1, 14, 22. See: <https://www.canlii.org/en/bc/bcpc/doc/2021/2021bcpc118/2021bcpc118.html?autocompleteStr=R%20v%20Teck%20Coal%20Limi&autocompletePos=1>

¹¹⁷ Environmental Monitoring Committee, “Permit 107517 Environmental Monitoring Committee 2019 Public Report” (2019) at 15, 17, online (pdf): *Teck* <<https://www.teck.com/media/2019-EMC.pdf>> [https://perma.cc/9YFS-SJX]; Carla Fraser, Michael Moore, and Ryan Hill, “Permit 107517 Annual Water Quality Monitoring Report” (29 March 2019), online (pdf): *Teck* <<https://www.teck.com/media/Elk-Valley-Water-Quality-2018-Annual-Report.pdf>> [Accessed 18 March 2021]; Carla Fraser, Mariah Arnold, and Michael Moore, “Permit 107517 Annual Water Quality Monitoring Report” (31 March 2018), online (pdf): *Teck* <[https://www.teck.com/media/Permit-107517-Annual-Water-Quality-Monitoring-Report,2017-\(March-31,2018\).pdf](https://www.teck.com/media/Permit-107517-Annual-Water-Quality-Monitoring-Report,2017-(March-31,2018).pdf)>. For information on the sparse enforcement actions, see our discussion below.

¹¹⁸ Judith Lavoie, “Teck warned of federal charges under the Fisheries Act, financial documents reveal,” *The Narwhal* (10 December 2018), online: *The Narwhal* <<https://thenarwhal.ca/teck-warned-of-federal-charges-under-the-fisheries-act-financial-documents-reveal/>>.

Two years ago, a Yale University School of Environment publication stated:

*according to company reports, Teck exceeded the selenium limits laid out in the plan [permit] six times in 2016 and another 20 times in 2017.*¹¹⁹

A review of Teck's annual reports on surface water quality, showed that Teck only reached 96% compliance with the lenient provincial permit in 2019¹²⁰ and 88.5% in 2018.¹²¹ In other words, there appeared to be 11.5% non-compliance in 2018,¹²² and 4% non-compliance in 2019.¹²³ While the company usually met provincial permit limits at the seven required order stations, they fell short of 100% compliance in 2017 and 2018.¹²⁴

Yet in spite of the devastating chronic pollution, prior to this year, there had been only one major federal *Fisheries Act* prosecution for Teck Elk Valley mine pollution – and that one did not deal with the massive chronic selenium and calcite pollution problem, but with a single one-off event. [In 2014, 74 fish – including two species of special concern¹²⁵ Bull Trout and Westslope Cutthroat Trout – were found dead near the Line Creek operations. The die off occurred after high levels of nitrite, ammonia, hydrogen sulfide, and phosphorous were unintentionally discharged into the water during commissioning of a water treatment plant.¹²⁶]

¹¹⁹ Chloe Williams, "From Canadian Coal Mines, Toxic Pollution That Knows No Borders," *Yale Environment 360* (1 April 2019), online: *Yale Environment 360* <<https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders>> [https://perma.cc/VD2J-YRDT].

¹²⁰ Permit 107517 Environmental Monitoring Committee, "2020 Public Meeting Posters," (2020) at 2, online (pdf): *Teck* <<https://www.teck.com/media/2020-EMC.pdf>> [https://perma.cc/YDT3-K5BV].

¹²¹ Carla Fraser, Mariah Arnold, and Michael Moore, "Permit 107517 Annual Water Quality Monitoring Report" (31 March 2018) at 1, online (pdf): *Teck* <[https://www.teck.com/media/Permit-107517-Annual-Water-Quality-Monitoring-Report,2017-\(March-31,2018\).pdf](https://www.teck.com/media/Permit-107517-Annual-Water-Quality-Monitoring-Report,2017-(March-31,2018).pdf)>.

¹²² Carla Fraser, Mariah Arnold, and Michael Moore, "Permit 107517 Annual Water Quality Monitoring Report" (31 March 2018) at 1, online (pdf): *Teck* <[https://www.teck.com/media/Permit-107517-Annual-Water-Quality-Monitoring-Report,2017-\(March-31,2018\).pdf](https://www.teck.com/media/Permit-107517-Annual-Water-Quality-Monitoring-Report,2017-(March-31,2018).pdf)>.

¹²³ Permit 107517 Environmental Monitoring Committee, "2020 Public Meeting Posters," (2020) at 2, online (pdf): *Teck* <<https://www.teck.com/media/2020-EMC.pdf>> [https://perma.cc/YDT3-K5BV].

Also see Carla Fraser, Colleen Mooney, and Ryan Hill, "Permit 107517: Annual Water Quality Monitoring Report" (31 March 2020), online (pdf): *Teck* <https://www.teck.com/media/01_Annual-WQ-Report-2019_w-Cover-Page.pdf> [Accessed 15 March 2021].

¹²⁴ Carla Fraser, Michael Moore & Ryan Hill, "Permit 107517 Annual Water Quality Monitoring Report" (29 March 2019), online (pdf): *Teck* <<https://www.teck.com/media/Elk-Valley-Water-Quality-2018-Annual-Report.pdf>>. Carla Fraser, Mariah Arnold & Michael Moore, "Permit 107517 Annual Water Quality Monitoring Report" (31 March 2018), online (pdf): *Teck* <[https://www.teck.com/media/Permit-107517-Annual-Water-Quality-Monitoring-Report,2017-\(March-31,2018\).pdf](https://www.teck.com/media/Permit-107517-Annual-Water-Quality-Monitoring-Report,2017-(March-31,2018).pdf)>.

¹²⁵ *List of Wildlife Species at Risk* being Schedule 1 of the *Species at Risk Act*, SC 2002, c 29, Schedule 1 (*List of Wildlife Species at Risk*) online: <<https://laws.justice.gc.ca/eng/acts/S-15.3/page-17.html#h-435647>> [https://perma.cc/N3RN-WP3J].

¹²⁶ Tyrell Worrall, Patti Orr, and Shari Weech, "Line Creek Local Aquatic Effects Monitoring Program (LAEMP) Report, 2016" (May 2017) at 38, 56, online (pdf): *Teck* <[https://www.teck.com/media/Line-Creek-Local-Aquatic-Effects-Monitoring-Program-\(LAEMP\)-2016.pdf](https://www.teck.com/media/Line-Creek-Local-Aquatic-Effects-Monitoring-Program-(LAEMP)-2016.pdf)> [https://perma.cc/Y658-6FLQ].

Carla Fraser, Mariah Arnold, and Michael Moore, "Permit 107517 Annual Water Quality Monitoring Report" (31 March 2018) at 3, online (pdf): *Teck* <[https://www.teck.com/media/Permit-107517-Annual-Water-Quality-Monitoring-Report,2017-\(March-31,2018\).pdf](https://www.teck.com/media/Permit-107517-Annual-Water-Quality-Monitoring-Report,2017-(March-31,2018).pdf)> [Accessed 18 March 2021].

Teck was fined \$1.4 million for this incident in 2017. <<https://ec.gc.ca/alef-ewe/default.asp?lang=En&n=C574EED8-1>> <<https://www.cbc.ca/news/canada/british-columbia/teck-fisheries-fine-1.4342934>>

Serious questions arise about why the federal government had not filed pollution charges about the central chronic pollution problem long before this year. Prior to this year's \$60 million conviction, why had Environment Canada not done more to address the massive chronic mine pollution of the watershed with selenium and calcite¹²⁷ which have long posed a mortal threat to fish¹²⁸?

- Since 1995 it has been known that coal mining was mobilizing selenium into the Fording River.¹²⁹ A 1998 provincial government study reported selenium levels above toxic effect thresholds in the Elk Valley, and stated there might be effects on Westslope Cutthroat Trout.¹³⁰
- Prior to 2009, Teck Coal was aware that selenium and calcite could be environmentally harmful.¹³¹
- Since 2014, Environment Canada possessed the Dr. Lemly report done for the agency – which urgently warned of selenium's alarming risk to fish in the Elk Valley.

Yet until this year Environment Canada did little to avoid that risk, other than such finger-wagging exercises as putting Teck on “notice” of potential charges.

A question arises: Were charges long withheld as part of some agreement with the company and the province to clean up the selenium problem? If so, just where is that effective cleanup? What went wrong with that strategy?

Or was there a federal strategy?

Lack of Fisheries Act Remedial Orders?

“Teck Coal Limited: Conviction Information for 2010-10-05,” online: *Environmental Offenders Registry* <<https://environmental-protection.canada.ca/offenders-registry/Home/Record?RefNumber=198>> [https://perma.cc/B4UD-U7FP]

¹²⁷ Such as calcite.

¹²⁸ Calcite pollution has a very direct impact on fish habitat, causing concretion of streambeds, which damages spawning habitat and food sources. See Regina v. Teck Coal Limited, 2021 BCPC 118 (CanLII) March 26, 2021, *Reasons for Sentence* of Judge Dohm, Provincial Court of BC, Cranbrook Registry, File No. 35390-1, paragraph 10. See: <<https://www.canlii.org/en/bc/bcpc/doc/2021/2021bcpc118/2021bcpc118.html?autocompleteStr=R%20v%20Teck%20Coal%20Limi&autocompletePos=1>>

¹²⁹ Regina v. Teck Coal Limited, 2021 BCPC 118 (CanLII) March 26, 2021, *Reasons for Sentence* of Judge Dohm, Provincial Court of BC, Cranbrook Registry, File No. 35390-1, paragraph 11. See: <<https://www.canlii.org/en/bc/bcpc/doc/2021/2021bcpc118/2021bcpc118.html?autocompleteStr=R%20v%20Teck%20Coal%20Limi&autocompletePos=1>>

¹³⁰ McDonald, Leslie and Strosher, Mark, “Selenium Mobilization from Surface Coal Mining in the Elk River Bessin, British Columbia” Ministry of Environment, Cranbrook, BC, September 1998. <https://a100.gov.bc.ca/pub/acat/documents/r12589/1seleniumelk_1205347116802_8e248a68ce5980fb2667bdb4930a251fb186e4d5b0b.pdf>

¹³¹ Regina v. Teck Coal Limited, 2021 BCPC 118 (CanLII) March 26, 2021, *Reasons for Sentence* of Judge Dohm, Provincial Court of BC, Cranbrook Registry, File No. 35390-1, paragraphs 11 and 14. See: <<https://www.canlii.org/en/bc/bcpc/doc/2021/2021bcpc118/2021bcpc118.html?autocompleteStr=R%20v%20Teck%20Coal%20Limi&autocompletePos=1>>

In addition to the lack of prosecutions, similar questions arise about why the federal government did not use other powers to address the problem – for example, by issuing remediation orders. When a violation of section 36(3) of the *Fisheries Act* is likely, the Minister is empowered to demand information from the company, and then order modifications to the work, undertaking or activity.¹³² Investigation needs to be done on the history of whether federal authorities have used such legal tools in the Elk Valley. We are only aware of a single such initiative, which was extraordinarily late, and deeply flawed:

More than six years after Environment Canada received the alarming findings in the Lemly report, they finally issued a 2020 Direction under the *Fisheries Act* to require Teck to take certain steps intended to reduce the danger to fish in the upper Fording River.¹³³ Unfortunately, this Direction has been criticized as profoundly insufficient – with deferred long deadlines, and largely repeat requirements already set out under provincial permits.

Of the 11 measures that Teck was directed to undertake by Environment Canada in 2020:

- One is the reactivation of a previously built project;
- Three are water treatment facilities that Teck is already required by provincial permit to construct (two of these Teck has already indicated will not be completed on time);¹³⁴
- Three are plans or studies with no on-the-ground component;
- One is a requirement to put in place already required fish barriers; and
- One is a requirement for already planned calcite treatment.

This left only two measures in the 2020 Direction that require the company to undertake on-the-ground efforts to reduce pollution, both small trials. These are:

- A small trial of a waste rock dump cover, to be installed by 2031; and
- Development of one spoil of many in “such a way as to promote the development of suboxic zones to attenuate selenium” by 2027.¹³⁵

In short, the Direction will have no immediate significant impact on pollution levels and will, over the next decade, only require the company to undertake small trials of changes that may have an impact if adopted in the long term – presumably a decade or more in the future. These trials are

¹³² Section 40 of the Act makes a violation of section 36(3) an offence. And when a section 40 offence is likely to be committed, section 37(1) empowers the Minister to demand information from persons carrying on activities that are likely to deposit a deleterious substance. After reviewing the information, if the Minister believes that a section 40 offence is likely, the Minister is empowered by section 37(2) to issue an order to require modifications or additions to the work, undertaking or activity – after giving the person a reasonable opportunity to make representations. *Fisheries Act*, RSC 1985, c F-14, s 40, 36(3), 37(1), 37(2).

¹³³ See “Measures to be taken” excerpt from the Environment Canada Direction. See Appendix at p. 282. The criticism cited has been made by Lars Sander-Green.

¹³⁴ The Greenhills treatment facilities is planned by Teck for five years later than the Direction orders and at 2/3 of the capacity. Full operation of the Fording River North treatment facilities is planned for a year later than the Direction orders.

Teck, “Water Treatment Facilities to 2031,” online: Teck <https://www.teck.com/media/INT-019.2021.02_EVWQP_graphs_02_WEB.png>

¹³⁵ See “Measures to be taken” excerpt from the Environment Canada Direction. See Appendix at p. 282.

undoubtedly necessary – but given the urgent need to reduce selenium pollution, the timelines in this long-overdue federal Direction do not reflect the true urgency of the situation.

Lack of Serious Federal Engagement in Setting a Binational Selenium Standard at Lake Koocanusa

Other questions arise about the federal government’s failure to meaningfully engage in setting selenium limits in the cross-border Lake Koocanusa. In February 2021, the EPA approved Montana’s new, stringent .8 ug/Litre selenium limits for this lake – a level far more stringent than BC’s permit targets of 2.0 ug/Litre for the lake. This followed six years of failed efforts by Montana and the US to convince British Columbia to establish a common stringent bi-national water standard (based on science conducted in the cross-border process.)¹³⁶

Questions have been raised about Canadian federal agencies’ apparent lack of commitment to this process. They were invited to participate in transboundary meetings on tightening the standards, but it is reported that it appeared that Ottawa was not significantly involved, beyond attending some meetings. It has been argued that Environment Canada appears to have largely avoided these processes and has been conspicuously absent from the transboundary process – even though many US federal agencies have actively participated and taken the lead in research and modelling (including the EPA, US Geological Survey, US Fish & Wildlife Service, and US Army Corps of Engineers). Environment Canada has reportedly been remarkably absent in recent years when

¹³⁶ Montana’s Department of Environmental Quality tried to work with the BC Ministry of Environment and Climate Change Strategy over the past 6 years to develop a bilateral selenium standard for Lake Koocanusa. Montana set a proposed limit of 0.8 µg/L, 1.2 µg/L below Teck’s current unenforceable permit target of 2.0 ug/L, and 0.7 µg/L below the current federal limit for lakes set by the EPA. Myla Kelly and Lauren Sullivan, “Establishing Selenium Standards for Lake Koocanusa and Kootenai River that Protect Aquatic Life” (24 September 2020), online (pdf): *Montana Department of Environmental Quality* <https://deq.mt.gov/Portals/112/DEQAdmin/BER/Documents/AGENDA/DEQ_SMS.pdf> [<https://perma.cc/3FFB-HDYS>]. However, despite over six years of collaboration on this limit, BC failed to select a proposed water quality objective for selenium for Lake Koocanusa. British Columbia Ministry of Environment and Climate Change Strategy, “B.C.’s response on establishing a selenium-level objective for Lake Koocanusa” *BC Gov News* (28 September 2020), online: *BC Gov News* <<https://news.gov.bc.ca/releases/2020ENV0058-001855>> [<https://perma.cc/KTB7-ZQA5>]. Frustrated with a lack of Canadian movement toward establishing a binational standard, Montana passed the proposed standard in December of 2020 without BC’s support – based on the findings of peer-reviewed scientific reports. In making this decision, the Montana Board cited “more than six years of collaboration with leading selenium scientific experts and the Lake Koocanusa Monitoring and Research Working Group that included public meetings, data collection and a peer-reviewed monitoring report” Montana Department of Environmental Quality, “Board of Environmental Review Adopts Selenium Water Quality Standards for Lake Koocanusa and the Kootenai River” *DEQ Press Releases* (14 December 2020), online: *DEQ Press Releases* <<http://deq.mt.gov/Public/PressRelease/board-of-environmental-review-adopts-selenium-water-quality-standards-for-lake-koocanusa-and-the-kootenai-river>> [<https://perma.cc/4MTZ-KVES>]. The tighter Montana standards were approved by the US EPA in February 2021. Letter from Judy Bloom to Steven Ruffatto (25 February 2021) at 2 [unpublished, archived with the University of Victoria Environmental Law Centre, this letter can be found at Appendix page 187, with this pinpoint at Appendix page 188]. Once again, Canadian authorities lag significantly behind. Christopher Mebane and Christian Schmidt, “Selenium and mercury in the Kootenai River, Montana and Idaho, 2018-2019” *United States Geological Survey* (20 September 2019), online: *United States Geological Survey* <<https://doi.org/10.5066/P9YYVV7R>>.

the real work of this process occurred.¹³⁷ This raises the question: Why did Environment Canada not proactively participate in the transboundary process when US federal agencies did?

It is ironic that the US has acted forcefully in response to less dangerous levels of selenium than those found upstream in Canada's upper Fording River and the Elk Valley – the actual source of the pollution. Canada's comparative inaction in addressing its own far-more-serious problem must be investigated.

In sum, grave questions arise about why Environment Canada (and Fisheries and Oceans Canada) has failed to take more effective action – through prosecution, enforcement, statutory orders, or otherwise – to reverse the relentlessly unfolding environmental catastrophe in the Elk Valley.

As you will see below, Environment Canada will likely point to excuses such as:

- The Province's action in requiring Teck to construct water treatment facilities; and
- The long-promised federal *Coal Mining Effluent Regulations*.¹³⁸

The sections below discuss how neither initiative was an adequate substitute for proactive federal action to stop destructive pollution under the *Fisheries Act*.

¹³⁷ Federal officials were noticeable by their absence at critical meetings held to set the Kooconusa limit. Personal communication, Lars Sander-Green, Wildsight, May 2021.

¹³⁸ These are discussed later in this report, but for further information on them, see Government of Canada, "Signal Check: Proposed *Coal Mining Effluent Regulations*," (2018), online (pdf): <<https://awc-wpac.ca/wp-content/uploads/2019/01/Coal-Mining-Effluent-Signal-Check-Fall-2018-v3.pdf>> [Accessed 18 March 2021]; Environment and Climate Change Canada, "Update – Proposed Coal Mining Effluent Regulations: Technical Information Sessions," (February 2020) at slide 22 [unpublished, archived at the University of Victoria Environmental Law Centre]. See Appendix page 138 for this pinpoint; and Government of Canada, "Forward Regulatory Plan 2019 to 2021, Environment and Climate Change Canada, chapter 3," (1 April 2019), online: *Government of Canada* <<https://www.canada.ca/en/environment-climate-change/corporate/transparency/acts-regulations/forward-regulatory-plan/2019-2021/fisheries-act.html>> [Accessed 18 March 2021].

7. Delayed and Inadequate Water Treatment

It might be argued that federal prosecution and remediation orders were withheld because of Teck's agreement to establish water treatment plants under the Water Quality Plan. However, as will be shown below, the Elk Valley water treatment program has been highly flawed. Could the federal government have done more to avoid the flaws in that program – flaws that now threaten the watershed?

Important questions arise about whether the federal government should have done more earlier – to ensure that water treatment facilities addressed mine pollution. As demonstrated by the 2020 Environment Canada Directive discussed above, Environment Canada clearly has had jurisdiction to make such orders regarding treatment facilities.

More fundamentally, short-term water treatment facilities are not the full answer to this long-term pollution problem. Thus, questions arise about why other, more holistic and preventative approaches were not also implemented.¹³⁹ The profound shortcomings of the promised water treatment approach documented below raise critical questions about federal agencies' wisdom in suspending enforcement of the *Fisheries Act* for many years. There are lessons here that may be useful to the federal government in other pollution situations, going forward.

Water Treatment – A Flawed Excuse for Increased Coal Mining

In 2013 the BC Ministry of Environment required Teck via ministerial order to develop a water quality management plan – a plan which was approved in the summer of 2014.¹⁴⁰ The original plan for short term water management was to build 7.5 million litre/day water treatment capacity in an active water treatment facility (AWTF) at the West Line Creek mine by 2014 and an additional 20 million litre/day capacity at an AWTF at the Fording River mine by 2018.¹⁴¹ An additional 30 million

¹³⁹ Water treatment plants are essentially a short-term solution, since it is improbable that the company will be available to operate and pay for treatment plants centuries into the future. In addition, the plants can only treat a portion of the waste rock. See Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at pp. 10 and 95 for a discussion of the long-term liability of taxpayers to pay for long-term treatment, and other limitations on the water treatment approach. Online (pdf): *BC Auditor* <<https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf>> [https://perma.cc/AVD2-UB9B].

¹⁴⁰ Province of British Columbia, "Area Based Management Plan: Elk Valley - submitted by Teck Coal Limited", online: *Province of British Columbia* <<https://www2.gov.bc.ca/gov/content/environment/waste-management/industrial-waste/mining-smelting/teck-area-based-management-plan>>

¹⁴¹ Province of British Columbia, Waste discharge permit 107517 (11 March 2021) at 10, available online by searching at <<https://j200.gov.bc.ca/pub/ams/Default.aspx?PossePresentation=DocumentSearch>>

litres/day capacity was to be built at the Elkview mines by 2020, through a combination of AWTF and diversions.¹⁴²

However, this original plan schedule has not been implemented.¹⁴³ Indeed, Teck promised treatment and downstream selenium reductions based on technology that was not mature – and in fact needed years of further testing and development.¹⁴⁴

As of December 2020, the West Line Creek active water treatment facility was the only treatment plant fully running.¹⁴⁵ Thus, the judge in the March 2021 *Fisheries Act* prosecution noted that just 7.5 million litres of water treatment capacity was established.¹⁴⁶ The 20 million litre Fording River AWTF has been long delayed and is now set to be operational at some point in 2021.¹⁴⁷ Furthermore, the Elkview mine water treatment has changed fundamentally – with 20 million litre/day capacity now operational in a questionable water treatment technology called Saturated Rock Fill (SRF) that has replaced the previously-required water treatment plant for 30 million litres.¹⁴⁸

To summarize, the original water treatment quality plan approved by cabinet in 2014 was to have 57.5 million litres/day treatment capacity across three mines by 2020.¹⁴⁹ That has not been

¹⁴² Province of British Columbia, Waste discharge permit 107517 (11 March 2021) at 10, available online by searching at <<https://j200.gov.bc.ca/pub/ams/Default.aspx?PossePresentation=DocumentSearch>>

¹⁴³ Complicating factors included that the fact that a more bioavailable form of selenium issue was discovered at the first AWTF, construction delays, the COVID pandemic, etc.)

¹⁴⁴ The West Line Creek AWTF was originally planned for 2014 and then started operation in 2016, but after multiple issues including the death of fish downstream in 2014 and the discovery that speciation was increasing toxicity directly downstream in 2017, it was not fully operational until late 2018.

Under their discharge permit, Teck was required to construct and commission the Fording River South AWTF by the end of 2018, but it is still under construction. They were required to complete a 30m litre/day AWTF at Elkview by the end of 2020, but they only completed a 10m litre/day SRF by this date and added an additional 10m litre/day capacity in 2021, for a total of 2/3 of the required treatment capacity. They are required to complete a 15m litre/day AWTF at Fording River North by the end of 2022, but have indicated they will instead complete a 7m litre/day SRF in 2021, with an expansion in 2023. Teck's future plans for additional treatment at Elkview, Greenhills are also 3-5 years behind permit requirements.

Teck, "West Line Creek Active Water Treatment Facility Restarts" (4 October 2018), online (pdf): Teck <<https://www.teck.com/media/West-Line-Creek-Active-Water-Treatment-Facility-October-4-2018.pdf>> and Province of British Columbia, Waste discharge permit 107517 (11 March 2021) at 10, available online by searching at <<https://j200.gov.bc.ca/pub/ams/Default.aspx?PossePresentation=DocumentSearch>> and

Teck, "Water Treatment Facilities to 2031", online: Teck <https://www.teck.com/media/INT-019.2021.02_EVWQP_graphs_02_WEB.png>

¹⁴⁵ Teck, "Water Treatment Facilities to 2031", online: Teck <https://www.teck.com/media/INT-019.2021.02_EVWQP_graphs_02_WEB.png>

¹⁴⁶ ¹⁴⁶ Regina v. Teck Coal Limited, 2021 BCPC 118 (CanLII) March 26, 2021, *Reasons for Sentence* of Judge Dohm, Provincial Court of BC, Cranbrook Registry, File No. 35390-1, paragraph 15(6). See: <https://www.canlii.org/en/bc/bcpc/doc/2021/2021bcpc118/2021bcpc118.html?autocompleteStr=R%20v%20Teck%20C%20oal%20Limi&autocompletePos=1>

¹⁴⁷ Teck, "Water Treatment Facilities to 2031", online: Teck <https://www.teck.com/media/INT-019.2021.02_EVWQP_graphs_02_WEB.png>

¹⁴⁸ Teck, "Water Treatment Facilities to 2031", online: Teck <https://www.teck.com/media/INT-019.2021.02_EVWQP_graphs_02_WEB.png>

¹⁴⁹ Teck, "Elk Valley Water Quality Plan" (22 July 2014) at xv, 8-2, online (pdf): Teck <https://www.teck.com/media/2015-Water-elk_valley_water_quality_plan_T3.2.3.2.pdf> [<https://perma.cc/F3BF-P2D8>].

achieved. Currently only 7.5 million litres of AWTF is operational; another 20 million litres of AWTF will belatedly be added this year; and now 20 million litres will be treated instead with an unproven technology replacing the previously-required water treatment plant.¹⁵⁰

In other words, by the end of 2021 only 47.5 million litres/day total capacity is now planned, instead of 57.5 million litres. And fully 20 million litres/day of that reduced treatment capacity will now be in a saturated rock fill (SRF) technology¹⁵¹ that the US Environmental Protection Agency has seriously questioned.

SRF is a technology commissioned by Teck, and an early pilot program in 2016 showed promise of removing 90-95% of selenium from wastewater. Teck continues to claim that this technology works well.¹⁵² However, the US EPA has expressed serious concerns that the SRF process may not be an adequate replacement for the promised water treatment facilities. The EPA has objected that SRF should not be hurriedly used to replace the long-promised water treatment processes, until it is proven at scale in the long term.¹⁵³

Furthermore, it should be noted that even the original water quality treatment plan that has been vitiated was fundamentally weak from the outset. It contained ludicrously lenient selenium water quality targets downstream of the mines. The Province set targets for discharge of selenium that are *far in excess of Water Quality Guidelines*.

For example, the Elkview SRF is governed by a downstream limit for selenium in Michel Creek that is *fourteen times* the BC Water Quality Guidelines for aquatic life and wildlife. The Michel Creek limit is nearly *three times* the BC Water Quality Guideline for drinking water. Furthermore, the SRF discharges into Erickson Creek, a tributary of Michel Creek, which has no selenium limit at all.¹⁵⁴ Similarly, the Fording River South AWTF is governed by a limit for selenium downstream in the upper Fording River that is *42 times the BC Water Quality Guidelines for aquatic life and wildlife*.

¹⁵⁰ Teck, "Water Treatment Facilities to 2031", online: Teck <https://www.teck.com/media/INT-019.2021.02_EVWQP_graphs_02_WEB.png>

¹⁵¹ Teck, "Water Quality in the Elk Valley" (Last visited 10 March 2021), online: Teck <<https://www.teck.com/responsibility/sustainability-topics/water/water-quality-in-the-elk-valley/>> [https://perma.cc/KBN2-JX7L].

¹⁵² Liz Karbasheski, Rob Klein, and Shannon Shaw, "Removing Selenium and Nitrate using Saturated Rock Fills: From Concept to Full-Scale Operation," online: <<http://bc-mlard.ca/files/presentations/2019-23-KLEIN-ETAL-removing-selenium-nitrate-saturated-fill.pdf>> [https://perma.cc/RPV3-Y6G2]. Also see: <https://www.teck.com/news/news-releases/2021/teck-doubles-water-treatment-capacity-at-elkview-operations>

¹⁵³ EPA Regional Administrators of Regions 8 and 10 wrote, "Given the information gaps and uncertainties EPA would be very concerned if proposed new or expanded mining operations, including the Castle Project, plan to rely solely on SRF. Until SRF is demonstrated to be fully effective on a large scale and long-term basis, EPA believes these projects need to include AWTFs as well as pursue SRF where feasible" Letter from Gregory Sopkin to Fazil Mihar and Kevin Jardine (3 November 2020) (Re: Follow Up on EPA Request for Consultation) [unpublished, archived at the University of Victoria Environmental Law Centre]. This letter can be found on appendix page 26. This pinpoint can be found on appendix page 27; Also see Letter from Ayn Schmit to Regina Wright (3 November 2020) (Re: Castle Project) [unpublished, archived at the University of Victoria Environmental Law Centre]. This letter can be found at appendix page 13 and this pinpoint can be found at appendix page 22.

¹⁵⁴ The current limit for the Michel Creek, approximately 15km downstream of the Elkview SRF, is 29µg/L monthly average selenium. Province of British Columbia, Waste discharge permit 107517 (11 March 2021) at 10, available online by searching at <<https://j200.gov.bc.ca/pub/ams/Default.aspx?PossePresentation=DocumentSearch>>

The Fording River South limit is more than *eight times the BC Water Quality Guideline* for drinking water.¹⁵⁵

There is another critical point to note about BC's promised Water Treatment Plan. The Water Treatment Plan was originally premised on an *underestimate* of the actual selenium threat. It was premised on the principle that BC should aim for a level of **2.0µg/L** of selenium in Lake Koocanusa. However, more recent modeling has shown that that assumed level will not keep fish safe. In order to keep fish safe, that assumed level must be reduced to the far lower 0.8µg/L – the limit recently legislated by the State of Montana and the US EPA after years of collaborative cross-border research.¹⁵⁶ As discussed, British Columbia has thus far refused to act in concert with the US governments on setting that more appropriate stringent standard.

Finally, there is a fundamental flaw in relying upon water treatment as a silver bullet. Science shows that the water treatment approach to mine pollution is fundamentally short-sighted and not a long-term solution. Note that Roman and medieval mines continue to pollute today, centuries later.¹⁵⁷ Selenium pollution is likely to continue to flow from the waste rock dumps at high levels for centuries or longer. Elk Valley water treatment – with billions in capital costs and annual operating, maintenance and replacement costs running about \$100 million per year – is simply not an appropriate long term solution.¹⁵⁸ Yet, there is no alternative long-term plan to deal with the perpetual water pollution problem.

Worse, there continues to be an enormous shortfall – over \$500 million – in company security/bonding to protect taxpayers from liability.¹⁵⁹ As the BC Auditor General commented in her scathing 2016 report:

*...six water treatment facilities in the Elk Valley... creates a future economic liability for government to monitor these facilities in perpetuity and ensure that they are maintained.*¹⁶⁰

¹⁵⁵ The current limit for the upper Fording River, approximately 5km downstream of the Fording AWTF, is 85µg/L monthly average selenium. Province of British Columbia, Waste discharge permit 107517 (11 March 2021) at 6, available online by searching at <https://j200.gov.bc.ca/pub/ams/Default.aspx?PossePresentation=DocumentSearch>

¹⁵⁶ Letter from Judy Bloom, US EPA, Region 8, to Steven Ruffatto, Chair, Montana Board of Environmental Review, Montana Department of Environmental Quality "EPA's action on Montana's Revised Selenium Criteria for Lake Koocanusa and the Kootenai River" February 25, 2021

¹⁵⁷ "Request for Establishment of a Judicial Commission of Public Inquiry to Rectify and Improve BC Mining Regulation", Calvin Sandborn and Kristy Broadhead, Received by the Honourable Christy Clark (9 March 2017) (Victoria, BC) at p. 7. Available at www.elc.uvic.ca

¹⁵⁸ Annual costs of water treatment of over \$100 million annually are reported in: Teck 2020 Annual Information Form, February 17, 2021 pp. 40-42 <https://www.teck.com/media/2021-AIF.pdf>

¹⁵⁹ As of the end of 2019, the security posted for Teck's Elk Valley mines falls \$513 million short of government's estimate of reclamation liability for those mines. Security posted by the company is \$891,410,000, short of the estimated liability of 1,404,810,000. *Chief Inspector of Mines 2019 Annual Report*, British Columbia Ministry of Energy, Mines and Low Carbon Innovation, p. 16. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/health-and-safety/ci-annual-reports/112869_2019_ci_annual_rpt.pdf It is worth noting that even the 1.405 billion liability estimate is likely low for actual reclamation and long term water treatment – in light of the \$100 million annual cost of water treatments plus capital costs (see above).

¹⁶⁰ Carol Bellringer (Auditor General of British Columbia), *Audit of Compliance and Enforcement in the Mining Sector*, (May 2016) at 10, online (pdf): *BC Auditor* <https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf> [<https://perma.cc/AVD2-UB9B>]

Two fundamental questions arise:

To what extent did Environment Canada and Fisheries and Oceans Canada rely upon the impractical, unworkable and short-term Provincial water treatment solution to deal with the Elk Valley selenium catastrophe?

And if they did, why?

8. New Federal Regulations – Again, Far Too Little and Far Too Late

For years, Ottawa has warded off demands for action by promising new coal pollution regulations. However, such regulations are not only long-overdue – they are also remarkably weak for the Elk Valley. Meanwhile, the promise of future regulations has been a convenient excuse for not taking action with a legal provision readily available for decades – the pollution prohibition in section 36 of the *Fisheries Act*.

Federal officials would likely argue that the federal abdication from environmental enforcement in the Elk Valley was part of a larger strategy to deal with the problem long-term, with things like the proposed federal *Coal Mining Effluent Regulations*.¹⁶¹

These *Coal Mining Effluent Regulations* (CMER) have been in production since 2017 and may come into law in 2021 or 2022¹⁶² (maybe later, as ECCC has indicated more time may be taken for further consultation).¹⁶³ However, it turns out that these new federal regulations are likely to perpetuate the problem – and will do little to address the harm done by regulatory failures in recent years. Under the proposed regulations, existing mines in Canada would be subject to monthly selenium concentration limits of 10 micrograms per litre.¹⁶⁴ However, under industry pressure, the initially strong proposed regulations have been weakened to provide a specific – and less stringent – approach for the “five existing mountain mines in the Elk Valley[.]”¹⁶⁵

As a result, under the currently proposed CMER, the mines which need regulation most would not be subject to the same limits as the rest of the industry. Instead, Teck’s current Elk Valley mines would get a free pass to continue to pollute at current levels for three years in order to establish a baseline, after which they would be limited to the highest monthly “mean” in that baseline for the next three years.¹⁶⁶ Six years after the CMER come into force, Teck would be required to lower

¹⁶¹ Government of Canada, “Forward Regulatory Plan 2019 to 2021, Environment and Climate Change Canada, chapter 3,” (1 April 2019), online: *Government of Canada* <<https://www.canada.ca/en/environment-climate-change/corporate/transparency/acts-regulations/forward-regulatory-plan/2019-2021/fisheries-act.html>> [Accessed 18 March 2021].

¹⁶² Government of Canada, “Signal Check: Proposed *Coal Mining Effluent Regulations*,” (2018), online (pdf): <<https://awc-wpac.ca/wp-content/uploads/2019/01/Coal-Mining-Effluent-Signal-Check-Fall-2018-v3.pdf>> [Accessed 18 March 2021].

¹⁶³ Statement from Samantha Bayard, spokesperson for Environment and Climate Change Canada in Ainslie Cruickshank, “As mining waste leaches into B.C. waters, experts worry new rules will be too little, too late,” *The Narwhal* (28 April 2021), online: *The Narwhal* <<https://thenarwhal.ca/elk-valley-bc-coal-mining-pollution-rules/>>

¹⁶⁴ Government of Canada, “Signal Check: Proposed *Coal Mining Effluent Regulations*,” (2018) at 2 online (pdf): <<https://awc-wpac.ca/wp-content/uploads/2019/01/Coal-Mining-Effluent-Signal-Check-Fall-2018-v3.pdf>> [Accessed 18 March 2021].

¹⁶⁵ Environment and Climate Change Canada, “Update – Proposed Coal Mining Effluent Regulations: Technical Information Sessions,” (February 2020) at slide 22 [unpublished, archived at the University of Victoria Environmental Law Centre]. See Appendix page 137 and following for this pinpoint.

¹⁶⁶ Environment and Climate Change Canada, “Update – Proposed Coal Mining Effluent Regulations: Technical Information Sessions,” (February 2020) at slide 22 [unpublished, archived at the University of Victoria Environmental Law Centre]. See Appendix pages 144 and 138-147 for this pinpoint

their monthly average selenium concentration limit to whichever is lower of either 50 micrograms per litre, or 20% reduction from the baseline for the following 10 years. After those ten years, the limit would reduce to the lower of 40 micrograms per litre, or a 36% reduction from baseline.¹⁶⁷

Thus, if the current CMER proposed rules come into effect in late 2022, **sixteen years later** (2038) Teck's existing mines could still be able to pollute at:

- Four times the BC water quality guidelines for drinking water;
- Four times the limit for new coal mines in Canada; and
- Twenty times the BC guidelines for aquatic life and wildlife (depending on measured baseline pollution levels).¹⁶⁸

Clearly, if Environment Canada delayed prosecutions because they were relying upon strong new coal mining effluent regulations to solve the pollution problem, they appear to have been profoundly misguided. This situation appears to be an egregious failure of the ECCC's mandate, which includes the "preservation and enhancement the quality of the natural environment, including water . . ." and "the enforcement of rules and regulations"¹⁶⁹

Again, the situation needs to be investigated.

¹⁶⁷ Environment and Climate Change Canada, "Update – Proposed Coal Mining Effluent Regulations: Technical Information Sessions," (February 2020) at slide 29. [unpublished, archived at the University of Victoria Environmental Law Centre]. See Appendix page 145 for this pinpoint; Also see Letter from Randy Christensen and Daniel Cheater to Hon. Jonathan Wilkinson (23 June 2020) (Re: Request for Designation of the Castle Project under s. 19(1) of the Schedule to the Physical Activities Regulations and s. 9(1) of the Impact Assessment Act) at 28 [unpublished, archived at the University of Victoria Environmental Law Centre]. See appendix page 79 for this pinpoint.

¹⁶⁸ The guidelines set limits of 10 ug/l for drinking water and 2.0 ug/l for aquatic life and wildlife. See British Columbia Ministry of Environment, *Ambient Water Quality Guidelines for Selenium*, (April 2014) at 4, online (pdf): *BC Government* <https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/bc_moe_se_wqg.pdf> [https://perma.cc/VVZ4-KNTL]. Also, see Teck, "Elk Valley Water Quality Plan" (22 July 2014) at 8-3, online (pdf): *Teck* <https://www.teck.com/media/2015-Water-elk_valley_water_quality_plan_T3.2.3.2.pdf> [https://perma.cc/F3BF-P2D8];

¹⁶⁹ Environment and Climate Change Canada, "Environment and Climate Change Canada's Mandate" (19 October 2020), online: *Government of Canada* <<https://www.canada.ca/en/environment-climate-change/corporate/mandate.html>> [https://perma.cc/9PV8-K49Y].

9. Conclusion

The grossly negligent regulation of coal mining in the Elk Valley exposes deep flaws in Canadian environmental regulation. The dying fish populations and poisoned watershed have exposed the abject state of both provincial and federal environmental regulation. The coal mining there has produced massive environmental impacts in two countries – impacts that will not be rectified for decades to come, if ever.

Unbelievably, even though current impacts are not being adequately addressed, massive new *additional coal mining* projects are now proposed. Many new Elk Valley coal mine projects are now proposed for development – and have begun federal Impact Assessment and provincial Environmental Assessment processes.¹⁷⁰

¹⁷⁰ There are four major projects proposed in the Elk Valley, including Teck's Fording River Castle Mine Extension. The others consist of Crown Mountain (proposed by NWP Coal Canada Limited, owned by Australian company Jameson Resources Limited & New Zealand company Bathurst Resources Ltd), Bingay (proposed by Centermount Coal Limited), and Michel Coal (proposed by North Coal Limited, a wholly owned subsidiary of Australian resource development company North Coal Pty Ltd). See British Columbia Environmental Assessment Office, "List of Projects" (last visited 11 March 2021), online: *British Columbia EPIC* <<https://projects.eao.gov.bc.ca/projects-list;currentPage=1;pageSize=100;sortBy=-datePosted;type=Mines;region=Kootenay;ms=1615495971038>> [https://perma.cc/S34H-LPX8]; Also see: Phil McLachlan, "Elkford residents concerned about Bingay" *The Free Press*, (26 January 2018), online: <<https://www.thefreepress.ca/news/elkford-residents-concerned-about-bingay/>> [https://perma.cc/Q2C2-MFDW]; Also see "Overview" (last visited 11 March 2021), online: *Jameson Resources Limited* <<http://www.jamesonresources.com.au/index.php/projects/crown-mountain/overview>> [https://perma.cc/FW5B-UQ3P]. Note that there is also the proposed re-opening of the Tent Mountain mine, which is mostly in Alberta but will include a few years of mining in BC. See: <<https://iaac-aeic.gc.ca/050/evaluations/proj/81436>>.

More Details:

Fording River Castle Mine Extension: Extension of the Fording River operation by Teck. Currently in "Early Engagement".

- Estimated Lifespan: into 2070s
- Estimated Footprint: 2550ha
- Estimated Output: 350 million tonnes
- <https://projects.eao.gov.bc.ca/p/5e31dc4462cdea0021d974b4/project-details;currentPage=1;pageSize=10;sortBy=-datePosted;ms=1615495283148>

Crown Mountain Coking Coal: Open pit metallurgical coal mine proposed by NWP Coal Canada Limited. Currently in "Pre-Application".

- Owned by Australian company Jameson Resources Limited and New Zealand company Bathurst Resources Limited
 - <http://www.jamesonresources.com.au/index.php/projects/crown-mountain/overview>
- Estimated Lifespan: 16 years
- Estimated Footprint: 1100 ha
- Estimated Output: 59.2 million tonnes
- <https://projects.eao.gov.bc.ca/p/588511f9aaecd9001b828bf0/project-details;currentPage=1;pageSize=10;sortBy=-datePosted;ms=1615496427173>

Bingay Main Coal: Surface and underground mine proposed by Centermount Coal Limited. Currently in "Pre-Application".

- Centermount is 55% owned by a private Canadian company with the remaining 45% owned by two private Chinese shareholders.
 - <https://www.thefreepress.ca/news/elkford-residents-concerned-about-bingay/>
- Estimated Lifespan: not mentioned

Indeed, the Impact Assessment Agency of Canada is currently considering three additional mines in the Elk Valley, proposed by other companies, that would produce 156 million tonnes of coal over 13-20+ years, plus Teck's massive Castle mine proposal, that would produce approximately 350 million tonnes of coal, extending into the 2070s.¹⁷¹ Teck's Line Creek and Elkview mines are already permitted for mining to continue for years, adding additional millions of tonnes. In total, one expert estimates that proposed and permitted future mining would exceed the total production of coal from the Elk Valley since open pit mining began in the 1970s. He estimates that this coal mining could produce more selenium, calcite and other pollutant leaching waste rock than is currently found in the Elk Valley, potentially more than doubling long term pollution levels.¹⁷²

New mining approvals cannot be allowed — until after you have examined how Canada can avoid the kind of regulatory failure that occurred in the Elk Valley over the last two decades. We must learn from history. Canada must learn from the regulatory fiasco in the Elk Valley. It is critically important that you investigate whether the people of Canada can now safely entrust the regulation of yet more massive Elk Valley mines to the protection of Environment and Climate Change Canada. Such an investigation will likely yield useful lessons for the broader federal regulatory system.

In addition, an analysis needs to be done to examine whether the federal and provincial governments should even *consider* approving any new Elk Valley mining at this point. The pollution from the current coal mines is causing grievous damage, and there is no credible plan to deal adequately with even *current mine pollution*. Modern water treatment and other mitigation measures are touted, but they only deal with a very small portion of the current overall selenium pollution problem — and will likely be unable to reduce Lake Koocanusa to the levels now set by Montana and the US Environmental Protection Agency.¹⁷³ Promised new federal *Coal Mining Effluent Regulations* promise to be inadequate.

-
- Estimated Footprint: not mentioned
 - Estimated Output: 2 million tonnes per year
 - <https://projects.eao.gov.bc.ca/p/588511c6aaecd9001b8257f1/project-details;currentPage=1;pageSize=10;sortBy=-datePosted;ms=1615495205614>

Michel Coal: Proposed by North Coal Limited. Currently in "Pre-Application."

- North Coal Limited is owned by North Coal Pty Ltd, a private Australian company.
 - <https://projects.eao.gov.bc.ca/p/58851215aaecd9001b82a8d3/project-details;currentPage=1;pageSize=10;sortBy=-datePosted;ms=1615494688245>
- Estimated Lifespan: 25 years
- Estimated Footprint: 1424 ha
- Estimated Output: 87.4 million tonnes

<https://projects.eao.gov.bc.ca/p/58851215aaecd9001b82a8d3/project-details;currentPage=1;pageSize=10;sortBy=-datePosted;ms=1615494688245>

¹⁷¹ See footnote above for the proposed mine volumes.

¹⁷² Personal communication, Lars Sander-Green, Wildsight, May 2021.

¹⁷³ Personal communication, Lars Sander-Green, Wildsight, May 2021.

In sum, we ask you to initiate the inquiry and examination requested to address whether the actions of Environment Canada and Fisheries and Oceans Canada:

- Met the objectives of the agencies' Sustainable Development Strategies;¹⁷⁴
- Demonstrated progress towards sustainable development;¹⁷⁵
- Operated efficiently and effectively;¹⁷⁶ and
- Are of such fundamental importance that they should be brought to the attention of Parliament.¹⁷⁷

We ask you to focus on the lessons that government can learn from the Elk Valley regulatory failure. How can such regulatory mistakes be avoided elsewhere in Canada — in all the places where the people of Canada trust Environment Canada and Fisheries and Oceans Canada to protect fish and waters? Broad lessons can be learned that can improve the environmental regulatory system of the federal government.

In addition, an inquiry can shed light on two pressing immediate questions regarding the Elk Valley:

- Should seriously polluting Elk Valley coal mining be expanded *before* current ongoing egregious pollution is credibly dealt with?¹⁷⁸
- Shouldn't current problems in the Elk Valley be dealt with first?

An examination by your offices can provide useful answers to these vital questions. Therefore, we ask you to initiate the inquiry and examination requested.

¹⁷⁴ As per s. 23(1) of the *Auditor General Act*.

¹⁷⁵ As per s. 21.1 of the *Auditor General Act*.

¹⁷⁶ As per s. 7(2) of the *Auditor General Act*.

¹⁷⁷ As per s. 23(2) of the *Auditor General Act*.

¹⁷⁸ It appears that Teck Resources plans to expand its mining operations in the Elk Valley (See Letter from Brad Smith (Idaho Conservation League) to Fraser Ross (30 October 2020) (Re: Initial Project Description and request to designate a federal review panel for to Castle Project) at 1 [unpublished, archived at the University of Victoria Environmental Law Centre]. This letter and corresponding footnote can be found at appendix page 48) before it has fulfilled its obligations to treat effluent water from its current mine operations, even as new contaminants, such as Nickel and Calcite, are becoming increasingly problematic for fish populations in the watershed. See Letter from Randy Christensen and Daniel Cheater to Hon. Jonathan Wilkinson (23 June 2020) (Re: Request for Designation of the Castle Project under s. 19(1) of the Schedule to the Physical Activities Regulations and s. 9(1) of the Impact Assessment Act) at 18 [unpublished, archived at the University of Victoria Environmental Law Centre]. This letter can be found at appendix page 52 and this pinpoint can be found at appendix 69.



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**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8**

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FEB - 4 2020

The Honorable George Heyman
Minister of Environment and Climate Change Strategy
Room 112 Parliament Buildings
Victoria, BC V8V 1X4

The Honorable Bruce Ralston
Minister of Energy, Mines and Petroleum Resources
Room 137 Parliament Buildings
Victoria, BC V8V 1X4

Dear Minister Heyman and Minister Ralston:

We are writing to follow up on our letter of July 22, 2019, which conveyed the U.S. Government's concerns regarding the lack of opportunity for the Environmental Protection Agency (EPA) and other U.S. Kootenai watershed stakeholders to be involved and offer input during the development of Teck Resources' Implementation Plan Adjustment (IPA). Teck released the final Elk Valley Water Quality Plan 2019 IPA on November 14, 2019.

New information that has recently become available has further heightened the EPA's ongoing concerns regarding water quality in Lake Kooconusa and the Kootenai watershed. First, the results of a recent study sponsored by the primary U.S. federal water quality science agencies (U.S. Geological Survey and EPA) indicate that the Kootenai River downstream of Libby Dam is being affected by pollutants from Elk Valley mines. The study provides validated information that is concerning to U.S. agencies and our state and tribal partners, and additional study may confirm and expand these troubling findings.

We are also very concerned that the November 2019 IPA indicates that prior to the commissioning of both the Fording River South and Elkview Operations Active Water Treatment Facilities (AWTFs) scheduled for 2023, "selenium and nitrate concentrations are predicted to be seasonally above Site Performance Objectives" at multiple stations including in Lake Kooconusa. The EPA is concerned about this projection and finds it unacceptable that the province has accepted an IPA that will allow continued seasonal exceedances of water quality objectives into the future, particularly given that it is already seven years since Ministerial Order M113 set a goal to "stabilize and reverse increasing trends in water contaminant concentrations" in the Elk River Valley. To enable the EPA to better understand the basis for these increased projected exceedances, we respectfully request that your ministries share technical reports and modeling results for predicted pollutant loading in the

Elk River and Lake Koochanusa, as well as appropriate ministerial review and approval documents for the updated water quality model and IPA.

Adding to our concerns, the EPA understands that Teck no longer intends to implement the recently released IPA. Presentations from the B.C. Ministry of Environment and Climate Change Strategy and Teck Resources during the November Lake Koochanusa Monitoring and Research Working Group meetings indicated that Teck intends to move away from advanced water treatment and will instead rely on in-situ Saturated Rock Fill (SRF) treatment technology in the future.

Given that modeling results show U.S. and Canadian waters will continue to be adversely impacted by pollutants from Elk Valley mines, this proposed change has significant implications and raises serious concerns for the U.S. Government including federal agencies responsible for monitoring and protecting water quality. We believe it is critical that U.S. federal agencies could have the opportunity to evaluate the effectiveness of this new proposed mitigation approach by reviewing the available evaluation and documentation of the results of SRF deployment conducted to date by Teck Resources and their consultants. As such, we respectfully request that the ministries provide the following information to the EPA to enable review by U.S. experts:

- Reports on performance evaluation of SRF by Teck consultants;
- Reports from any independent expert reviews of SRF performance that have been conducted;
- Reports that summarize SRF operational details and results;
- Copies of permit applications associated with implementation of SRF pilot or full-scale construction;
- Water quality data on influent and effluent from existing SRF activities; and
- Modeling reports and results for SRF operations.

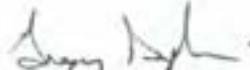
An evaluation of the available information and data on SRF technology by U.S. experts will help ensure that questions and concerns from downstream agencies and officials are considered and addressed as Teck prepares to advance SRF implementation. We conveyed our interest in doing an independent review during a meeting with Teck representatives on January 30. We believe sharing this information is consistent with the consultation process required for Plan implementation in Ministerial Order M113, Schedule C, Section C. An independent review could help facilitate U.S. stakeholder confidence in the effectiveness of this new approach and build upon the collaboration established between our agencies. We very much value our ongoing collaboration with your teams, and we look forward to working with you and your staff to receive access to the requested information as we collectively seek to ensure the waters and fisheries in our shared jurisdictions remain healthy for current and future generations. Our points of contact for this request are Ayn Schmit, 303-312-6220 or schmit.ayn@epa.gov and Patty McGrath, 206-553-6113 or mcgrath.patricia@epa.gov. Please feel free to contact Greg Sopkin with any questions or concerns regarding our request and

thank you again for your Ministries' continued commitment to transparency and engagement on matters affecting U.S. waters.

Sincerely,



W.C. McIntosh
Assistant Administrator
Office of International and
Tribal Affairs



Gregory Sopkin
Regional Administrator
EPA Region 8



Chris Hladick
Regional Administrator
EPA Region 10

cc: Shaun McGrath, Director, Montana Department of Environmental Quality
Ron Trahan, Chairman, Confederated Salish and Kootenai Tribes
Gary Aitken, Jr., Chairman, Kootenai Tribe of Idaho
Catherine Stewart, Acting Assistant Deputy Minister, Environment and Climate
Change Canada, International Affairs Branch
Sylvain Fabi, Executive Director, U.S. Transboundary Affairs Division, Global
Affairs Canada
Laura Lochman, Director, Office of Canadian Affairs, U.S. Department of State
Bobbi Plecas, Deputy Minister, Intergovernmental Relations Secretariat, Office of
B.C. Premier John Horgan



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Ref: 8MO

OCT 14 2014

The Honourable Mary Polak
Minister of Environment
P.O. Box 9047
Stn Prov Govt
Victoria, British Columbia
V8W 9E2
CANADA

Re: Teck Coal Limited Elk Valley Water Quality Plan (EVWQP)

Dear Ms. Polak:

The U.S. Environmental Protection Agency (EPA), representing the U.S. Government, was invited in July 2013 to participate in a Technical Advisory Committee (TAC) to assist Teck Coal Limited (Teck) in developing an Area Based Management Plan for the Elk River Valley. This invitation stemmed from our previous involvement in reviews of an Environmental Assessment for expansion of metallurgical coal mining at the Line Creek mine and our requests for a more comprehensive watershed study on the water quality effects anticipated from expansion at all five of Teck's mines in the Elk River Valley. The U.S. lead technical advisor on the TAC was Dr. David Naftz, U.S. Geological Survey, Wyoming-Montana Water Science Center, with backup from Mr. Jason Gildea, EPA, Montana Office. As part of our unique government-to-government relationship with federally recognized tribes, the EPA also invited the Confederated Salish and Kootenai Tribes (CSKT) to participate in an observer status. The Tribes were represented by Mr. Rich Janssen and Ms. Erin Sexton, Tribal Consultant.

On behalf of the participants in the TAC, we want to extend our thank you to the British Columbia government for inviting us to participate in the EVWQP process. Our participation helped us to better understand the science used by Teck in their biological and hydrological assessments for the Elk River Valley and Lake Koochanusa, and provided clarification of the B.C. government's assessment, permitting and oversight responsibilities. The EPA believes that the TAC process and resulting EVWQP is an important first step to improving water quality in the Elk River and Lake Koochanusa, and we applaud the Ministry of Environment and Teck for the work completed to date. The water quality problems that we are jointly facing are complex and unique, and we can solve them only through collaboration and open dialogue.

While the EPA agrees with many parts of the EVWQP, we continue to have concerns regarding three major components of the Lake Koochanusa analysis: selenium targets, nitrate targets, and assimilative capacity. These concerns are further explained below.

Selenium

The Ministerial Order #M113 and the EVWQP set a 2 µg/L selenium target for Lake Koochanusa, which is based on a B.C. province-wide guideline to protect aquatic life. The EPA believes that this target is inappropriate for Lake Koochanusa for two reasons. First, Lake Koochanusa is a large, stratified reservoir with unique aquatic life and selenium dynamics. Proper science should be conducted (as done in the Elk River Valley) to determine a site-specific selenium target that is representative of the unique conditions found in the reservoir. Second, the 2 µg/L target is higher than current average selenium concentrations in the reservoir and represents an increase from baseline conditions. The EPA agrees with the Ministerial Order, which directs Teck to *stabilize and reverse increasing trends in water contaminant concentrations*, instead of allowing for an almost two-fold increase in concentrations in the reservoir. In response to these concerns, the EPA proposes that B.C. set a short-term selenium target for the reservoir that is equal to the existing conditions, and establish a long-term target after additional science can identify an appropriate site-specific target.

Nitrogen

The nitrate targets presented in the EVWQP were developed to prevent direct impacts from nitrate toxicity. The EPA believes that secondary impacts, such as eutrophication in both the reservoir and downstream in the Kootenai River, should be considered in setting nitrate targets. For example, Montana has set a total nitrogen criterion of 0.275 mg/L for wadeable streams in the Northern Rockies ecoregion. This target was designed to prevent harm to beneficial uses from eutrophication. While applicable only to wadeable streams (and not lakes/reservoirs), the target illustrates that an appropriate protective target is likely an order of magnitude less than the 3 mg/L nitrate target currently proposed for the reservoir. The EPA proposes that B.C. set a short-term nitrate target for the reservoir that is equal to the existing conditions, and establish a long-term target after additional science can identify an appropriate site-specific target that protects aquatic life from both direct and secondary impacts.

Assimilative Capacity

As currently written, the EVWQP sets targets in Lake Koochanusa and then allows for B.C. to meet these targets just upstream of the U.S.-Canadian border. This approach does not allow for any additional loads or assimilative capacity on the U.S. side of the border. Additional dialog is needed to establish targets that are protective throughout the reservoir, and then to establish compliance points that allow for both countries to have capacity to meet those targets.

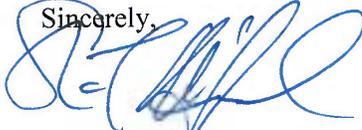
Establishment of a Bi-National Watershed Group

These concerns were fully documented in our comments at various stages of the EVWQP TAC process. As an initial response, the B.C. Ministry of Environment discussed with the EPA and the Montana Department of Environmental Quality the establishment of a bi-national, government-to-government process to conduct future monitoring and analyses to address the remaining questions around current conditions, coordinate on the correct water quality targets in Lake Koochanusa, and assure long-term protection from mine expansions and potential loading of selenium and nitrogen. We strongly concur with this proposal and request that these requirements be included in the final approved EVWQP. We also request that a clear formal approach be outlined among all the parties, including our tribal partners. This agreement outline should include, but not be limited to, cost sharing, data sharing, and management of future research.

Confederated Salish and Kootenai Tribes' Interests

With this letter I am enclosing correspondence we received from Ronald Trahan, Chairman, CSKT Tribal Council. As noted by the Tribal Council, there are additional issues that were not addressed in the EVWQP, such as protection of threatened and endangered species. The U.S. Fish and Wildlife Service also has questions remaining about protection of migratory birds. Tribal and other U.S. agency concerns should be discussed as part of the proposed bi-national assessments in Lake Kooconusa.

We look forward to continuing the good start that has been made at protecting water quality and water resources in the Lake Kooconusa watershed.

Sincerely,


Shaun L. McGrath
Regional Administrator

Enclosure

cc: Governor Steve Bullock, State of Montana
Tracy Stone-Manning, Montana Department of Environmental Quality
Ron Trahan, Chairman, CSKT
Holly Herald, Environment Canada
Bill Green, Ktunaxa
Jane Nishida, EPA Office of International and Tribal Affairs
Lynne Platt, U.S. Consul General, Vancouver, Canada
Sue Saarnio, U.S. Department of State, Bureau of Western Hemisphere Affairs



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

International & Tribal Affairs

President David McGovern
Impact Assessment Agency of Canada
160 Elgin Street
Ottawa, Ontario K1A 0H3

Re: Input on the Proposed Castle Project

Dear President McGovern:

The U.S. EPA received information from the B.C. Environmental Assessment Office (EAO) related to Teck's proposed Castle Project (April 9, 2020 letter from Todd Goodsell, EAO to Gregory Sopkin, EPA), including notification of the Early Engagement phase of the provincial environmental assessment for the project. This letter is to request that you exercise your discretionary authority under subsection 9(1) of the Impact Assessment Act and designate the Castle Project, thereby requiring the completion of a federal impact assessment prior to project approval and construction. We believe that this project is exceptional for the reasons described below and therefore warrants a federal assessment. In developing this request, we are following the process recommendations for designation requests found in the Impact Assessment Agency of Canada (IAAC) *Operational Guide for Designating a Project under the Impact Assessment Act (the Operational Guide)*.

According to the Castle Initial Project Description, April 2020 (IPD), the purpose of the Castle Project is to extend the life of Teck's Fording River Operations, near Elkford B.C., by many decades. The project includes new open pit mines, waste rock disposal sites, and water management and treatment facilities. The proposed project disturbance area would cover 4,100 ha, in addition to the currently active areas of the Fording River Operations. Teck proposes that the project commence construction in 2023 and operations in 2026, with a coal production rate of up to 10 million metric tonnes of coal/year. Drainages and discharges from the project would be to the Fording River, or tributaries of the Fording River, which flows into the Elk River. The Elk River discharges to transboundary Koochanusa Reservoir approximately 100 km downstream.

EPA has reviewed the request for designation from the Confederated Salish and Kootenai Tribal Chairwoman and the Kootenai Tribe of Idaho Chairman and the letter from Director of the Montana Department of Environmental Quality. Both the Tribes and the state of Montana raised concerns with the project in light of existing impacts and requested that a federal assessment be completed. Given the scope of the proposed Castle Project and potential for downstream water quality impacts, EPA shares many of the state and tribal concerns regarding the potential impact of the project. We discussed our concerns you, EPA Region 10 Regional Administrator, Chris Hladick, EPA Region 8 Regional Administrator, Greg Sopkin, and myself on June 11, 2020.

EPA believes that the Castle Project may cause adverse effects and should be subject to federal impact assessment based on the following factors (as outlined by the guiding questions in the *Operational Guide*).

- The project is near a threshold set in the Project List. Under the *Physical Activities* regulations, an expansion of an existing coal mine would become a designated project under the Impact Assessment Act if the expansion would result in an increase in the area of mining operations of 50% or more and the total coal production capacity would be 5000 t/day or more after the expansion. The Castle Project could result in 27,400 t/day of coal, which is significantly greater than the 5000 t/day threshold

We note that three other proposed coal projects in the Elk Valley (Bingay, Michael Coal, and Crown Mountain) are undergoing concurrent federal and provincial environmental assessments. The EPA is participating in these assessments. These projects are much smaller in scale and production rate as compared to the Castle Project. Disturbance areas for these projects range from 1157 ha to 2588 ha and coal production rates from 5400 t/day to 11,000 t/day.

- The project involves a new technology. According to the IPD, Teck has not committed to a water treatment technology for the Castle Project and is considering implementing saturated rockfill technology (SRF) to treat contact water that is predicted to be contaminated with selenium and nitrates resulting from mining and waste rock disposal operations. Teck has proposed SRF technology at some of its existing coal mines in the Elk Valley but has not yet implemented SRF on full scale over multiple years to demonstrate that it would be successful. EPA has concerns with the unproven implementability and effectiveness of SRF at full scale over the long time periods (decades of operation and post-closure) that would be required. We have expressed concerns with this technology and requested information from B.C. related to SRF technology. While we hope that this technology will prove effective, it has not been demonstrated that it will achieve selenium water quality objectives and standards.
- The project has the potential to cause adverse effects, including impacts to the environment both inside and outside of Canada. The proposed Castle Project is located approximately 100 km upstream of Lake Koocanusa. Direct and cumulative impacts from coal mining in the Elk Valley have resulted in documented impacts to Lake Koocanusa and the Kootenai River water quality, fish, and fish habitat in the U.S. EPA is concerned that new projects will increase pollutant loading to Lake Koocanusa and the Kootenai River. ECCC and IAAC are aware of these concerns through our ongoing conversations and input from EPA during our reviews of other proposed coal mines in the Elk Valley, including the projects noted above. EPA is also concerned about impacts to aquatic resources in B.C that are under federal jurisdiction and could extend to downstream Lake Koocanusa resources, including the recent declines in cutthroat trout populations in the Fording River near the proposed mine site, previous fish kills in Line Creek, and ongoing Canadian federal investigations related to impacts to aquatic life in the Elk River valley.

In summary, EPA believes that a federal impact assessment is warranted for the Castle project because the project: (1) is near the Physical Activities threshold; (2) involves a new technology that is unproven at the proposed project scale; (3) has the potential to impact aquatic resources under Canadian federal jurisdiction; and, (4) has the potential to cause adverse direct and cumulative impacts on U.S. waters and aquatic resources given the proximity to the border and ongoing pollution from existing and historic coal mines in the Elk Valley. We respectfully request that you designate the Castle Project accordingly. In

addition, we respectfully request that EPA and other affected U.S. stakeholders (including tribes) be afforded the opportunity to comment at appropriate points during the federal impact assessment process. Thank you for your consideration of this request.

Our point of contact for this request is Ayn Schmit (Region 8) at 303-312-6220 or Schmit.Ayn@epa.gov and Patty McGrath (Region 10) at 206-553-6113 or Mcgrath.Patricia@epa.gov. Please feel free to contact Greg Sopkin with any questions or concerns regarding our request.

Sincerely,



W.C. McIntosh
Assistant Administrator
International and Tribal Affairs

Cc:

Shaun McGrath, Director, MT DEQ
Shelly Fyant, Chairwoman, Confederated Salish and Kootenai Tribes
Gary Aitken, Jr. Chairman, Kootenai Tribe of Idaho
Laura Lockman, US Department of State
Courtney Hoover, US Department of Interior
Scott Bailey, B.C. Environmental Assessment Office

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November 3, 2020

Regina Wright
Regional Director, Pacific and Yukon
Impact Assessment Agency of Canada
Via email:
regina.wright@canada.ca

Dear Ms. Wright:

This letter provides input from the U.S. Environmental Protection Agency (EPA) to the Impact Assessment Agency of Canada (IAAC) related to the Castle Project, an expansion of Teck Coal Limited's (Teck) Fording River Operations coal mine in British Columbia (BC). The Project is located approximately 130 kilometers north of the U.S. border. IAAC specifically requested public comment and input on Teck's Initial Project Description (IPD) and IAAC's What We've Heard Summary of issues raised during the Castle Project federal designation process and BC's environmental assessment process.

EPA previously reviewed Teck's Castle Project IPD during the BC Environmental Assessment Office's (EAO) early engagement process. Comments that we submitted to EAO in June 2020 are enclosed with this letter. For this public comment period, we reviewed the new IPD materials developed by Teck for the federal impact assessment process, including the IPD Summary and the IPD Addendum. Our comments and recommendations related to these documents are enclosed. We request that our comments and recommendations be considered in development of the Detailed Project Description and in the impact assessment process.

We understand that the What We've Heard document summarizes the issues raised to date that will be used by IAAC for Teck to respond to in the next step of the federal impact assessment process. We appreciate that the What We've Heard document reflects most of the concerns that we have raised to BC during early engagement and to IAAC in our June 23, 2020 letter regarding federal designation. There are several areas where we offer additional input and clarification on issues related to cumulative effects, fish and fish habitat, reclamation, and transboundary effects.

We greatly appreciate IAAC's decision to designate the project for federal impact assessment under the *Impact Assessment Act* and that the federal impact assessment processes will evaluate effects to U.S. waters, including Lake Kococanusa and the Kootenai River. EPA looks forward to participating in the federal process and continuing our involvement in the provincial process. EPA's primary point of contact for the Castle Project will be Patty McGrath, Mining

Advisor, EPA Region 10, and secondary point of contact Carolyn Gleason, National Environmental Policy Act (NEPA) Branch, Region 8.

Patty McGrath
Mining Advisor, EPA Region 10
1200 Sixth Avenue, MS 14-D12
Seattle, WA 98101
mcgrath.patricia@epa.gov
(206) 553-6113

Carolyn Gleason
NEPA Branch, EPA Region 8 (ORA-N)
1595 Wynkoop Street
Denver, CO 80202
gleason.carolyn@epa.gov
(303) 312-6641

Please include both Patty and Carolyn on future correspondence related to the Castle Project. Feel free to contact myself at schmit.ayn@epa.gov or 303-312-6220 or Patty McGrath with questions regarding this letter.

Sincerely,

Ayn Schmit
Water Policy Advisor

Enclosure

**Enclosure to EPA November 3, 2020 Letter to IAAC
EPA Input and Recommendations on Castle Project Initial Project Description and
What We've Heard Documents**

Castle Project, Initial Project Description (IPD) Summary, Teck, October 2020

Project timeline and duration of potential impacts: The project mine life includes approximately two years of construction and “several decades” of operations, including reclamation and closure (IPD Summary, Section 6). This timeline does not appear to consider the likelihood of long-term post-closure water treatment and monitoring. We recommend that the Detailed Project Description include a more exact estimate of the duration (number of years) for each: operations, reclamation and closure, and long-term post-closure activities. This will enable a clear understanding of the duration of potential impacts from this project and timeframes over which mitigation would be required.

Level of detail associated with waste and water management plans and reclamation and closure plan: The IPD Summary (Section 11) states that the scope and methods for the assessment will include consideration of “mitigation measures to eliminate, reduce, control, or offset any potential adverse effects of the Project...” However, only general information is provided in the IPD documents regarding how wastes and mine impacted water would be managed during operations, reclamation, and post-closure to minimize potential effects of the Project. We recommend that the Detailed Project Description of waste and water management mitigation measures and plans be developed with a sufficient level of detail for all phases of the Project (operations, reclamation and closure, post-closure) in order to meaningfully evaluate the effectiveness of the plans and mitigation measures to eliminate, reduce, or control potential adverse effects.

Castle Project. Initial Project Description in accordance with Schedule 1 of the *Impact Assessment Act* Information and Management of Time Limits Regulations, Teck, October 2020

Provincial IPD published in April 2020: EPA’s comments (dated June 10, 2020) submitted to the BC EAO on Teck’s IPD are attached.

IPD Addendum, BC regional processes for evaluating water quality effects: The IPD Addendum (Part E, Section 11) states that potential water quality effects of the project will be evaluated by linking the project “...into regional initiatives, including the 2020 Regional Water Quality Model Update and the regional mitigation planning process (e.g., the process that lead to the development of the 2019 Implementation Plan Adjustment...)” The IPD Addendum goes on to state that these regional processes include participation from technical experts in the U.S. We have two concerns related to these statements.

First, we are concerned with relying solely on regional processes such as the Implementation Plan Adjustment (IPA) and the Regional Water Quality Model to determine potential water quality effects of the Castle Project. The IPA delayed timelines for construction of planned water treatment and the IPA does not appear to represent Teck's current plans for water management and treatment via implementation of both active water treatment and saturated rockfill (SRF). We agree with IAAC's Analysis Report (August 19, 2020) which noted uncertain effectiveness of Teck's Elk Valley Water Quality Plan due to lack of compliance with certain water quality parameters and difficulties in implementing effective water treatment mitigation measures. If the water quality effects analysis relies on regional processes, plans, and models, then we recommend that these be updated to be representative of current Project plans and environmental conditions. In addition, we recommend that the impact assessment include independent technical review of environmental modeling that provides the basis for water quality predictions used to evaluate potential effects to transboundary waters.

Second, we are concerned with the statement that regional processes include participation from U.S. technical experts. EPA was allowed the opportunity to provide comments on the original Elk Valley Water Quality Plan (2014) and the initial water quality modeling efforts, but was not afforded the opportunity to meaningfully participate in or comment on updates to the model or Plan. We have expressed concerns about this to BC. We recommend that the statement in the IPD Addendum regarding participation of U.S. technical experts be adjusted for accuracy.

Geographic extent of effects: The IPD Addendum (Part F, Section 12) states that the geographic extent of potential impacts to water quality is not anticipated to extend beyond the boundaries of BC because appropriate mitigation will be included as part of the Project or within the regional mitigation planning process to manage impacts to water quality. The IPD has not provided sufficient detail to support this conclusion and we recommend that the federal impact assessment evaluate the effectiveness of Project mitigation measures and regional processes in order to determine the geographic extent of potential effects. We agree with IAAC's Analysis Report that the Project may cause adverse direct and cumulative effects to the U.S. We recommend that the federal impact assessment include Lake Kococanusa and the Kootenai River in Montana and Idaho. EPA notes that the State of Idaho recently listed (and EPA approved) the Kootenai River as impaired due to selenium on its Clean Water Act section 303(d) list.

Indigenous Peoples: We appreciate that the IPD Addendum (Part E, Section 13) recognizes the Confederated Salish and Kootenai Tribes (CSKT) and Kootenai Tribe of Idaho (KTOI). However, the IPD does not describe engagement undertaken to date or how potential effects to these tribes and tribal resources will directly or indirectly be assessed. We recommend that the federal impact assessment process include meaningful engagement with CSKT and KTOI and evaluation of impacts to tribal resources.

What We've Heard: Issues Raised to Date on the Castle Project, IAAC, October 14, 2020

The issues summarized in this document reflect most of the input submitted by EPA to the BC EAO during early engagement and to IAAC in our letter regarding federal designation. We have

the following additional comments and clarifications on the “Issues Previously Raised” table and we request that IAAC consider and evaluate this input in the federal impact assessment.

Cumulative Effects: In addition to the potential for long-term and cumulative effects to fish and fish habitat listed in the issue summary table, EPA is concerned about cumulative effects on water quality in Lake Koocanusa and the Kootenai River.

Fish and Fish Habitat: The second bullet under the Fish and Fish Habitat issues summary mentions US EPA thresholds. We recommend that State of Montana and State of Idaho thresholds also be considered in comparing predicted Project effects to water quality and fish in these states.

Reclamation: We offer three recommendations related to the reclamation issues summary. First, the length of time for reclamation and long-term post-closure should be clearly described. Second, the reclamation plans, including any need for long-term water treatment should be described in sufficient detail to allow a meaningful analysis of its effectiveness at preventing impacts to U.S. waters. Finally, the estimated cost of financial assurance required by BC for the Castle Project should be disclosed along with an evaluation of its sufficiency to cover reclamation and long-term water treatment costs.

Transboundary Effects: The issue summary states, “Transboundary effects in the United States (U.S.) and traditional Tribal territory of U.S. Tribes including elevated selenium and impacts to aquatic resources in the Elk River, Koocanusa Reservoir, the Kootenai River, and the Kootenai watershed in Idaho and Montana.” We appreciate that IAAC is considering a broad geographic scope for evaluation of potential effects in the U.S., including territories of U.S. tribes and states of Montana and Idaho. In addition to selenium, we request that the potential for elevated nitrates and assessment of effects also be included in the issue summary. We also recommend that both concentration changes and loading changes be evaluated.

McGrath, Patricia

From: Gildea, Jason
Sent: Friday, June 26, 2020 8:35 AM
To: Rodgers, Matthew EAO:EX
Cc: Schmit, Ayn; McGrath, Patricia; McLaughlin, Julianne; Todd.Goodsell@gov.bc.ca; Alex.Denis@gov.bc.ca
Subject: RE: Castle Project EA: next steps for technical advisors
Attachments: 20200610 Castle IPD Comment Tracker_EPA.xlsx

Hi Matt,
Please find attached EPA's comments on the Castle IPD. Thank you,
Jason

Jason Gildea
Hydrologist, EPA Region 8
10 West 15th Street, Suite 3200
Helena, MT 59626
(406)457-5028
Gildea.Jason@epa.gov

From: Rodgers, Matthew EAO:EX <Matthew.Rodgers@gov.bc.ca>
Sent: Wednesday, June 10, 2020 11:29 AM
To: Al.Hodaly@canada.ca; Denis, Alex EAO:EX <Alex.Denis@gov.bc.ca>; Kalischuk, Andrea FLNR:EX <Andrea.Kalischuk@gov.bc.ca>; Craig, Andrew EMPR:EX <Andrew.Craig@gov.bc.ca>; Schmit, Ayn <Schmit.Ayn@epa.gov>; Bailey, Brenda EMPR:EX <Brenda.Bailey@gov.bc.ca>; Heron-Herbert, Brian ENV:EX <Brian.HeronHerbert@gov.bc.ca>; Chelsey.Cameron@canada.ca; christie.spry@canada.ca; erin.sexton@umontana.edu; gordon.moseley@interiorhealth.ca; hc.ia-ei.sc@canada.ca; Narynski, Heather M EMPR:EX <Heather.Narynski@gov.bc.ca>; HBE@interiorhealth.ca; Teske, Irene FLNR:EX <Irene.Teske@gov.bc.ca>; Gildea, Jason <Gildea.Jason@epa.gov>; Carmody-Fallows, Jeanien ENV:EX <Jeanien.CarmodyFallows@gov.bc.ca>; Andrews, Jennifer L FLNR:EX <Jennifer.L.Andrews@gov.bc.ca>; jjohnston@elkford.ca; Zavediuk, Jillian EAO:EX <Jillian.Zavediuk@gov.bc.ca>; Fairweather, Karen ENV:EX <Karen.Fairweather@gov.bc.ca>; kmorris@ktunaxa.org; Kenneth.law@canada.ca; Murphy, Kristen E FLNR:EX <Kristen.Murphy@gov.bc.ca>; kyle.terry@gov.bc.ca; Benson, Landon EMPR:EX <Landon.Benson@gov.bc.ca>; Murphy, Liz B EMPR:EX <Liz.Murphy@gov.bc.ca>; Saigeon, Lyle FLNR:EX <Lyle.Saigeon@gov.bc.ca>; Rodgers, Matthew EAO:EX <Matthew.Rodgers@gov.bc.ca>; michael.boronowski@fernie.ca; Williston, Patrick ENV:EX <Patrick.Williston@gov.bc.ca>; McGrath, Patricia <mcgrath.patricia@epa.gov>; Paula.smith2@canada.ca; Richard.Janssen@cskt.org; Alloisio, Sarah ENV:EX <Sarah.Alloisio@gov.bc.ca>; sgoodeve@sparwood.ca; stomlin@rdek.bc.ca; tmelcer@elkford.ca; Goodsell, Todd EAO:EX <Todd.Goodsell@gov.bc.ca>
Subject: Castle Project EA: next steps for technical advisors

Good morning Castle Project technical advisors,

Thank you to those who attended the June 4th Castle technical advisor meeting. As outlined in the presentation from the meeting (attached), technical advisors play a vital role in the environmental assessment (EA) review process by providing technical expertise and advice in their area of expertise. During the Castle EA, technical advisors are responsible for providing input on key issues and interests, baseline studies and modeling plans, and key EA documents.

During the current Early Engagement phase of the Castle EA, technical advisors are responsible for reviewing and providing input on Teck Coal Limited's Initial Project Description (IPD) to help inform development of their Detailed Project Description (DPD). To that end the EAO is requesting your input on the Castle IPD, which was approved by the EAO on April 8, 2020 and is available on the EAO's website at: [Castle IPD](#).

Thanks to those who have confirmed their organization's technical advisor representative for the Castle EA. The EAO has compiled a list of technical advisors (attached) with those who have confirmed they will be participating in the Castle EA review.

ACTIONS REQUESTED

- 1) Please review the following sections of the Castle IPD per your/your organization's area of expertise and provide your comments to me by Thursday, June 25, 2020.** Comments can be submitted in a memo, in the body of an email or in the attached comment tracking table.

We are seeking your input on the following items:

- **Project Design**
 - Please review Section 3.4.2 (pages 14-35) of the IPD.
 - Many components and activities remain flexible as described by Teck in the IPD. This is your opportunity to review the preliminary project design and provide input to Teck for consideration as the project design progresses. We are especially interested in your identification of opportunities for "mitigation by design" to reduce or eliminate potential interactions or impacts to biophysical, socio-economic or cultural values.
 - Please comment on any additional design considerations Teck should be aware of (e.g. sensitive areas, etc.) and include questions that should be contemplated for the DPD.
- **Key Issues**
 - For Indigenous Nations: please review the Indigenous Interests Section of the IPD (Table 17 on pages 49-50) and identify if you have additional interests that you wish to have considered.
 - Please review the Regional Environmental Challenges (Section 6.1.3) to identify additional challenges not listed.
 - Please identify any additional issues you wish to have considered and listed in the DPD to inform Process Planning, which will include the Application Information Requirements.
- **Project-Environment Interactions**
 - Please review Table 24 (pages 76-79) of the IPD.
 - Inform the EAO if there are any additional interactions not currently listed.
- **List of Permits and Land Use Plans**
 - Please review Table 15 (page 31) and Table 23 (page 74) of the IPD, respectively.
 - Inform the EAO if there are additional permitting requirements.
 - Inform if there are additional land use plans or regional initiatives that should be considered.

- 2) Please review the attached list of Technical Advisors and advise the EAO of any changes or additions by June 25, 2020.**

Lastly, the EAO will issue draft summary meeting notes from the June 4th technical advisor meeting to attendees early next for your review comment. Once finalized, the summary meeting notes will be posted to the EAO's website.

As always, please get in touch with anyone from the EAO Castle team (myself, Todd Goodsell – Todd.Goodsell@gov.bc.ca, or Alex Denis – Alex.Denis@gov.bc.ca) if you have any questions or require additional information or clarification.

Thanks,

Matt.

MATT RODGERS

Project Assessment Officer
Environmental Assessment Office
Government of British Columbia
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 [Twitter.com/BC_EAO](https://twitter.com/BC_EAO)



The EAO respectfully acknowledges that it carries out its work on the traditional territories of Indigenous nations throughout British Columbia.

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Date: June 10, 2020

Castle Project

Item	Date	Name	Organization	Section of IPD	Comment
		P. McGrath	US EPA	3.4.2.2, Table 3	The post-closure duration is not specified in the table, but instead is stated as being dependent upon requirements for future monitoring, water treatment, and land-use. Based on other similar operations in the Elk Valley that are expected to require water treatment and monitoring into perpetuity, we recommend that the IPD be more transparent in this regard and the likely need for long-term post-closure water treatment.
		P. McGrath	US EPA	3.4.2.6	In order to fully consider waste rock storage options, please provide the rate at which waste rock would be mined on an annual basis and the total amount of waste rock that would be produced. We understand that these are estimates since the pit shell design has not been developed, but estimates are provided for the amount of coal that would be mined and the quantity estimates are essential to the evaluation of waste rock storage location options and configurations.
		P. McGrath	US EPA	3.4.2.6	The IPD identifies and evaluates location options for waste rock storage (Table 7), but does not consider options for waste rock management or waste rock storage facility design. We recommend that the IPD identify options for waste rock management that evaluates the possibility for segregating waste rock susceptible to selenium leaching from non-metal leaching waste rock and evaluates more protective storage options for the leachable waste rock (liners, caps, covers).

P. McGrath	US EPA	3.4.2.7	<p>The IPD identifies water that comes into contact with waste rock and pit walls as mine-influenced water. Water that comes into contact with tailings is also mine-influenced water and since the Castle Project includes new tailings slurry ponds, we recommend that tailings be included in the list of sources of mine-influenced water.</p>
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P. McGrath	US EPA	3.4.2.7, Table 8	<p>Table 8 identifies the water quality source control measures being considered for selenium and nitrates. An additional measure that should be considered is the use of clean water diversions to divert clean surface water and precipitation from surrounding areas around the open pit and waste rock storage areas. Surface water diversions are commonly used at mining operations to minimize the amount of water that comes into contact with mined material, which subsequently reduces the amount of contaminated water requiring collection and treatment.</p>
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P. McGrath	US EPA	3.4.2.7, Table 9	<p>Table 9 describes some of the considerations associated with saturated rock fill (SRF) technology. An additional consideration is that SRF has not been implemented and shown to be successful at a full-scale operation. We recommend that this consideration be included in Table 9 and we agree with the table identifying that active water treatment is also being evaluated.</p>
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P. McGrath	US EPA	3.4.2.8	<p>This section describes the volume percentages of the tailings. We recommend that the annual and total volume be provided since this information will assist with evaluation of tailings storage options.</p>
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P. McGrath	US EPA	3.4.2	<p>The Project Description section focusses on project design options during mining operations. We recommend that reclamation and closure options also be developed. Development of a reclamation and closure plan and consideration of alternative closure techniques upfront can be critical factor in operational project design if the "design for closure" approach is followed. In addition, it is not clear whether concurrent reclamation is an aspect of the Project. Recommend that options for reclamation and closure and options for concurrent reclamation during mining be developed to minimize areas where water can come into contact with waste rock.</p>
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P. McGrath	US EPA	10, Table 24	<p>One of the issues/potential effects under "Hydrology and Water Quality" is "Changes in water quality in streams and rivers resulting from release of selenium and other water quality constituents..." This issue/potential effect should be expanded to include potential changes in Lake Koocanusa and Kootenai River</p>
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P. McGrath	US EPA	10, Table 24	<p>One of the potential mitigations for changes in water quality is to "integrate water management into reclamation and closure planning." We agree that this is important. In addition, we recommend that the IPD recognize that financial assurance that is adequate to fully cover reclamation and closure, including water management, is a critical aspect to ensure that mitigations are implemented.</p>
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8

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Phone 800-227-8917
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JUL 22 2019

Mark Zacharias
Deputy Minister of Environment and Climate Change Strategy
PO Box 9339 Stn. Prov. Govt.
Victoria, BC V8W 9M1

Dear Mr. Zacharias:

We are writing to offer input from the U.S. Environmental Protection Agency (EPA) Region 8 and Region 10 on the publicly available Implementation Plan Adjustment Summary (IPA Summary) dated February 2019 prepared by Teck Coal Resources, Ltd (Teck). The Plan Adjustment updates the actions and strategies that Teck is proposing to use to meet water quality objectives for the Elk River watershed and transboundary Lake Kootenawa. The EPA's interest in this matter is in protecting downstream waters in the U.S. from adverse impacts of mining discharges. In communicating the EPA's input to you, we also want to acknowledge the positive relationships that have been developed over the past two years between our staff. We appreciate the Ministry's clear commitment to maintaining active communication with the EPA.

Considering the importance of this issue to U.S. interests, we had anticipated that the Ministry would provide an opportunity for U.S. federal agencies, Tribes and other interested stakeholders to offer input on the full draft Implementation Plan Adjustments. Nevertheless, we wanted to take the opportunity to offer our input on the Summary now given that we understand the IPA may be finalized soon.

The EPA appreciates that the Implementation Plan is being adjusted to ensure that water quality will be protected throughout the Elk River Valley and in Lake Kootenawa. Given the previous challenges at the West Line Creek Treatment Plant and delays in building additional treatment plants, however, the EPA remains concerned about the ability of Teck's proposed active water treatment to reduce pollutants and meet water quality objectives in Lake Kootenawa. These concerns were previously raised in a January 2018 letter from Jane Nishida of EPA's Office of International and Tribal Affairs.

In addition to our concerns regarding the treatment challenges encountered at the West Line Creek plant, the treatment technology has not been demonstrated to be effective at the large scale that is discussed in the IPA Summary. The Summary indicates that the Fording River North Active Water Treatment Plant will be five times larger than the pilot plant at West Line Creek, and that sixteen treatment plants or plant expansions will be needed rather than the nine previously proposed. Given past issues and future challenges in scaling up the technology, the EPA is concerned that it will be difficult for Teck to successfully implement the proposal outlined in the IPA Summary and meet water quality objectives into the future. The EPA notes that selenium water column concentrations continue to increase in the Elk River despite B.C.'s Ministerial Order #M113 (signed in 2014) that has a stated goal to "stabilize and reverse increasing trends in water contaminant concentrations in the short-term".

Additionally, the IPA Summary does not discuss the U.S. portion of Lake Kootenawa, and only references meeting B.C. water quality objectives at the B.C. Order Station. The EPA recommends that

the Implementation Plan Adjustments and the IPA Summary consider impacts and address ~~them~~ ~~throughout~~ throughout Lake Kootenawa, rather than just in the B.C. portion of the reservoir. Finally, ~~without~~ reviewing the full IPA, the EPA is unable to more fully assess whether the proposed approach is adequate, reasonable and clearly supported by representative data and analysis.

We look forward to our continued collaboration with the Ministry on transboundary water quality concerns in the Kootenai watershed. Recent discussions and agreements on transboundary monitoring in Lake Kootenawa are a positive outcome from our ongoing dialogue. We hope that we can build upon this relationship and communication to provide enhanced opportunities for EPA and other U.S. stakeholder engagement in these critical decisions affecting water quality in the U.S. Should you have questions, please feel free to contact Greg at 303-312-6170 or have your staff contact Ayn Schmit at 303-312-6220 or scmit.ayn@epa.gov.

Sincerely,

Gregory Sopsin
Regional Administrator
EPA Region 8


Chris Hladick
Regional Administrator
EPA Region 10

Cc: Chad McIntosh, EPA Assistant Administrator for International and Tribal Affairs
Shawn McGrath, Director, Montana Department of Environmental Quality
Ron Trahan, Chairman, Confederated Salish and Kootenai Tribes
Gary Aitken, Jr., Chairman, Kootenai Tribe of Idaho

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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November 3, 2020

Mr. Fazil Mihlar
Deputy Minister of Energy, Mines and Petroleum Resources
Via email:
Fazil.Mihlar@gov.bc.ca

Mr. Kevin Jardine
Deputy Minister of Environment and Climate Change Strategies
Via email:
Kevin.Jardine@gov.bc.ca

Dear Deputy Minister Mihlar and Deputy Minister Jardine:

I am writing to follow up on the United States Environmental Protection Agency's (EPA) February 4, 2020 request for consultation, where we requested information and data needed for the United States to conduct an independent expert review of saturated rock fill (SRF) technology proposed for use by Teck Resources (Teck) for its coal mining operations in the Elk Valley in British Columbia (B.C.). We appreciate that your offices have provided information for our review in response to our February 4 request and that Teck has provided some information directly to EPA. EPA was assisted in reviewing this information by mine water treatment and geochemistry experts from EPA's Office of Research and Development and the U.S. Geological Survey. This letter provides EPA's input to the British Columbia Ministry of Energy, Mines and Petroleum Resources (EMPR) and Ministry of Environment and Climate Change Strategies (ENV) on SRF technology and Teck's proposed plans to implement this technology as the primary water treatment technology for its Elk Valley operations. The letter also includes EPA requests for specific future consultation and coordination with B.C.

SRF Technology Review

We appreciate B.C.'s efforts to share information with EPA over the past several months and acknowledge that we have received at least partial, or in some cases redacted, information related to each of the items outlined in our February 4 request for consultation. Meetings with EMPR, ENV, and Teck during our review have been helpful to us in interpreting the information. The U.S. experts have reviewed the information supplied to EPA, and their full review is provided in the enclosure to this letter. The review concludes that SRF technology has the potential for treating selenium-contaminated mine water, but that it is premature to reach conclusions about its long-term viability. Key information gaps include uncertainty about the forms of sequestered selenium, lack of a robust biogeochemical model for the treatment process, lack of understanding of the hydrology where SRF would be implemented, and lack of details related to SRF closure plans. The enclosure describes these concerns in more detail and provides recommendations.

Implementation of SRF at the Elk Valley Coal Operations

EPA anticipates that the uncertainties discussed above and in the enclosed report will take multiple years to address in order to fully demonstrate the long-term effectiveness of the Elkview Operation SRF facility. Recognizing the varied topography, mining footprint and hydrology and geochemistry across other Elk Valley operations, it will take additional time to assess and demonstrate SRF viability beyond Elkview. As a result, EPA urges B.C. to continue to require implementation of tank-based Active Water Treatment Facilities (AWTF) as set forth in both the Initial Implementation Plan (IIP) associated with Teck's Mines Act permit and in the Implementation Plan Adjustment (IPA) released to the public in November 2019. We note that EMPR's September 19, 2019 letter to Teck stated that the 2019 IPA is not accepted as a modification to the IIP and that EMPR expects Teck to meet the objectives and timelines in the IIP. Given the lengthy timeline to confidently resolve the operational and closure uncertainties associated with SRF, continued implementation of AWTF as specified in the IIP will support timely progress on selenium reductions in the watershed by treating mine impacted waters that are not currently being effectively treated, and provide the necessary water quality protection to boundary waters until SRF technology can be proven effective at scale in the Elk River Valley locations where it is under consideration.

Given the information gaps and uncertainties EPA would be very concerned if proposed new or expanded mining operations, including the Castle Project, plan to rely solely on SRF. Until SRF is demonstrated to be fully effective on a large scale and long-term basis, EPA believes these projects need to incorporate AWTFs as well as pursue SRF where feasible.

Ongoing Consultation on SRF and Adjustment of the Implementation Plan

Considering the importance of addressing the significant questions and resolving the data gaps identified by U.S. experts, EPA requests that consultation with U.S. agencies continue as Teck plans and implements the EVO Phase 2 SRF project and conducts additional research studies on SRF technology. We request that results of further testing of the Elkview Operation SRF Phase 2 project be fully disclosed so that technology effectiveness and potential for impacts to U.S. waters can be determined. In addition, we request the opportunity to provide input on future Mines Act and Environmental Management Act permits or authorizations involving sites in transboundary watersheds that entail further implementation of SRF technology upstream of and potentially impacting U.S. waters. To ensure this ongoing dialogue, we request semiannual meetings with EMPR and ENV to discuss the progress and effectiveness of SRF technology implementation and research and development efforts aimed at addressing information gaps and uncertainties identified in our SRF technology review.

Additionally, EPA requests that BC require the IIP to be adjusted as soon as feasible to reflect Teck's plans to construct SRF treatment at Elk Valley operations. Noting the inconsistencies between the IIP, the 2019 IPA and Teck's public statements concerning water treatment, EPA believes an updated IPA would help alleviate the confusion brought about by these inconsistencies and provide clarity to U.S. stakeholders about the intended path for stabilizing and reversing selenium and other mine-related pollutants entering U.S. waters. As we have previously requested, EPA asks that U.S. stakeholders be given the opportunity to provide input on a draft IPA, as well as on the updated water quality model that supports and informs the Implementation Plan. Enhanced coordination, clarity and transparency as new information is developed will help to build confidence that water quality standards will be met in shared transboundary waters and downstream impacted waters such as the Kootenai River, whether through broad SRF deployment or otherwise.

We appreciate the province's continued commitment to working constructively with the United States to address the impacts of BC mining operations on U.S. waters and communities. Should you have questions regarding EPA's input on SRF technology planned for implementation in the Elk River Valley, please contact me or have your staff contact Ayn Schmit at schmit.ayn@epa.gov or 303-312-6220.

Sincerely,

Gregory Sopkin
Regional Administrator

Enclosure

Cc: Meera Bawa, Regulatory Affairs Lead, Teck Resources
Laura Lochman, Director, Office of Canadian Affairs, U.S. Department of State
Evelyne Coulombe, Director, U.S. Transboundary Affairs Division, Global Affairs Canada
Courtney Hoover, U.S. Department of Interior
Shaun McGrath, Director, Montana DEQ
Shelly Fyant, Chairwoman, Confederated Salish and Kootenai Tribes
Gary Aitken, Jr, Chairman, Kootenai Tribe of Idaho
Chris Hladick, U.S. EPA Region 10 Administrator
Chad McIntosh, U.S. EPA Assistant Administrator, Office of International and Tribal Affairs

**Enclosure to EPA October 2020 Letter to BC EMPR and ENV
Input and Recommendations on Implementation of SRF in the Elk River Valley, BC**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
and
UNITED STATES GEOLOGICAL SURVEY

October 5, 2020

MEMORANDUM

SUBJECT: U.S. Technical Expert Assistance with Reviewing Mine Remediation Technology Request and ORD Regional Decision Support Request (Evaluating water treatment technologies to mitigate transboundary impacts of coal mining in the Elk Valley, British Columbia, on Lake Koochanusa (MT) and the Kootenai River (MT & ID))

FROM: Barbara Butler, PhD., Environmental Engineer
U.S. EPA ORD
Center for Environmental Solutions & Emergency Response
Land Remediation & Technology Division
Cincinnati, OH 45268

Robert Seal, Ph.D., Research Geologist
U.S. Geological Survey
Geology, Energy and Minerals Science Center
Reston, VA 20192

TO: Ayn Schmit, Water Policy Advisor, EPA Region 8, Denver, CO
Patty McGrath, Mining Advisor, EPA Region 10, Seattle, WA

To address the fifth task in the ORD Regional Decision Support Request received January 10, 2020 and as discussed in the July 29th meeting, Bob Seal and I are providing the summary review comments found below that address the feasibility of the saturated rock fill (SRF) technology for long-term selenium mitigation, effectiveness of long-term mitigation of impacts to U.S. waters, identification of “best” practices for operations, risk identification, and management and response, and the persisting data gaps, due in part to limited transparency on the part of Teck Resources. The limited transparency has made a rigorous review difficult.

In general, we feel that the SRF technology has potential for treating selenium in mine drainage, but it is premature to reach any conclusions about its long-term viability. Preliminary testing by Teck Resources has shown success in previous short-term trials in both the laboratory and field, but currently available information (redacted from Teck’s reports or not) is insufficient to allow conclusions on its likelihood for long-term success, more widespread use in the Elk Valley, or stability of sequestered selenium after closure. The high-level gaps that we feel exist currently include uncertainty about the forms of sequestered selenium, a lack of a robust quantitative biogeochemical model for the treatment process, a lack of understanding the hydrology of the system, and a lack of details related to closure and post closure. In the absence of this knowledge, it is impossible to predict long-term behavior of the selenium within the SRF. Briefly, our rationale for each follows:

Uncertainty in selenium speciation: Without understanding the actual chemical forms of selenium in the SRF, it is impossible to predict how stable that selenium will be under changing conditions in the future, such as changing flow paths, increases or decreases in reagents (methanol, phosphoric acid), or Teck's proposed "starvation" of the biofilms at closure. Information derived from Teck's laboratory studies is useful but is not a replacement for information from the field pilot test.

Lack of a robust quantitative biogeochemical model: A robust, quantitative biogeochemical model would form that basis of treatment predictions for scaling up, deployment in other locations, and for closure. At present, the approach seems to be driven by a proxy metric of 1 mg/L or less of dissolved iron as "acceptable" selenium and nitrate removal. Teck's approach is to tweak the methanol dosing to get that result and then hope for the best. The treatment process attempts to balance numerous oxidation and reduction reactions involving selenium, nitrogen, sulfur, iron, and carbon species, all of which operate at independent reaction rates. Changing remediation conditions from the status quo, either at the current site or a new site, may present challenges in re-establishing an acceptable balance among these reactions.

Lack of understanding of the hydrology of the SRF: A clear understanding of the groundwater and surface water budget of the pilot test was not demonstrated. More importantly, the bromide tracer test clearly indicates that only a very small volume of the current treatment cell is actively participating. Estimates of treatment capacity assume that the whole volume of fill will be available for treatment, but this has not been demonstrated in the reports reviewed. Without a rigorous, well constrained hydrologic model of the current SRF, it will be impossible to accurately predict the effects of increased injection and pumping rates needed for evaluation of a biogeochemical treatment model. A robust hydrologic model and water balance are essential for predicting longevity of the system and ensuring that contaminated water does not escape the system.

Details of closure plans are lacking: The details of water management are essential for understanding the stability of the system at closure. The transition from active treatment to closure, which would involve elimination of the reductant (methanol) and nutrients represents a major perturbation to the environment surrounding the sequestered selenium. The details of water management strategies such as capping, diversion, water table elevation, and expected groundwater and surface-water chemistry entering the SRF are critical for predicting environmental conditions post-closure.

Based on comments made by Teck and its consultants during our video briefing on May 12, 2020, we are under the impression that Teck is conducting laboratory studies to address many of these identified deficiencies in knowledge regarding the mechanisms for selenium sequestration. We hope that those coupled with additional field studies will lead to a better understanding of the longer-term capability of the SRF for treating and retaining sequestered selenium.

The accompanying report expands on the points raised above. It predominantly is focused on the broader scale uncertainties that exist. Previous responses from Teck to EPA comments have focused on single questions/comments rather than considering them in aggregate to address broader concerns. A more detailed review of the SRF technology will require both greater transparency from Teck, new insights from their planned studies, and possibly the execution of additional studies.

If you have any questions regarding this final report, please do not hesitate to contact us at your convenience.

Copy: Jason Gildea
Lisa Kusnierz
Julianne McLaughlin

SUMMARY COMMENTS REPORT

The points below are based on review of information shared by Teck Resources and their consultants in the first half of 2020 for the saturated rock fill (SRF) technology at the Elkview operations in Elk Valley, BC and on a literature review of the SRF technology (or similarly described saturated mining pits backfilled with coal waste rock) using Google and Google Scholar. Shared materials reviewed were:

- Presentation "Removing Selenium and Nitrate Using Saturated Rock Fills: From Concept to Full-Scale Operation" <http://bc-mlard.ca/files/presentations/2019-23-KLEIN-ETAL-removing-selenium-nitrate-saturated-fill.pdf>
- 2019 Implementation Plan Adjustment – Annex J – Alternative Treatment Mitigation Plan <https://www.teck.com/responsibility/sustainability-topics/water/water-quality-in-the-elk-valley/news-and-publications/>
- Report of the Independent Peer Review Panel Full Scale Trial F2 SRF (March 4, 2019)
- May 12, 2020 Presentation and Slide Deck: *Teck Presentation on Water Quality Management & Saturated Rock Fill Technology*
- Operations Application – Elkview Operations Saturated Rock Fill Phase 2 – Redacted Version (EVO-015-03_SRFPhase2_Ops_Appln_Rev02 – Redacted)
- Teck – F2 Saturated Rock Fill Full Scale Trial Performance Report – Confidential and Proprietary (EVOSRF FST Performance Report – Redacted)
- Teck Coal Ltd - EVO SRF Phase 2 Project - Response to US EPA comments on the EVO SRF Phase 2 Project Commissioning and Operations Application, August 21, 2020

FEASIBILITY OF THE SRF TECHNOLOGY FOR LONG-TERM SELENIUM/NITRATE MITIGATION

The Saturated Rock Fill (SRF) technology at Elkview Operations has potential for treating selenium and has shown success in the previous, relatively short-term trials; however, information provided to date currently is inadequate for reaching a conclusion on its likelihood for long-term success or more widespread use in the Elk Valley, BC. The information is also inadequate for prediction of its behavior at eventual closure. Even with provision of currently redacted information, it is impossible to determine long-term mitigation potential for the SRF technology in the absence of data identifying the forms and locations within the SRF of selenium sequestered to allow an assessment of its stability within the SRF over time, with anticipated perturbations to the system (e.g., influx of oxygenated groundwater and oxygenated atmospheric precipitation), and after closure. There are no long-term field studies of any other SRFs or similar backfilled pits in the literature, and only few short-term lab and small-scale field studies. There are some studies of pit lakes (that contain waste materials) that have been treated biologically, such as Sweetwater Pit Lake in Wyoming, Beal Mountain Mine in Montana, and Island Copper in British Columbia, but there is no recent literature documenting current conditions at any of these sites and only the first two specifically addressed selenium. Therefore, there also is insufficient information in literature to extrapolate the performance of the SRF technology over the long-term. It is anticipated that current and future lab work, as described in the Elkview Operations Application and during the video conference of May 12, 2020 with Teck and its consultants, and evaluation of the Phase 2 expansion of the SRF may provide additional understanding and insight into the long-term performance of this technology.

High Level Data Gaps

Hydrology

The ability to predict the long-term efficacy of SRFs in treating selenium- and nitrate-bearing drainage is predicated on a detailed understanding of the hydrology and water budget of the site in terms of the physical hydrology of surface water and groundwater, their interactions, and their seasonal variations under current

SUMMARY COMMENTS REPORT

operating conditions, expanded operating conditions, and at closure. At present, the understanding of the hydrologic setting of the SRF is limited primarily to the areas of injection and extraction in the Phase 1 pilot. Additional well locations were redacted in the Phase 2 application and there is no clear indication that the groundwater flow within the SRF or around the SRF is adequately understood. Without monitoring wells downgradient of the pit, it is difficult to have confidence that there is no discharge of selenium to the environment that may have originated from the pit or from waste rock near the pit. Additionally, in the Phase 1 pilot, it is not clear that the extraction wells are fully representative of the treated water.

It is not clear if a groundwater and surface water budget for the pilot exists. More importantly, their bromide tracer test in Phase 1 clearly indicated that only a very small volume of the current treatment cell is actively participating due to the buoyancy of the injected water. The estimate of treatment capacity for scale up and for longevity assumes that the whole volume of fill will be available for treatment, but this has not demonstrated in the documents reviewed.

For Phase 2, the well field capacity is stated to be doubled with the assumption that this will allow a doubling of the flow rate (from 10,000 m³/day to 20,000 m³/day) to be treated with the same results observed in the pilot and that the hydraulic retention time (HRT) will be similar to that observed for the Phase 1 pilot. The hydraulic retention time (HRT) is important due to known disequilibrium among multiple oxidation/reduction reactions (N, Se, C, Fe, and possibly S) that are occurring with each having their own rate-limiting step within multiple steps. How the added flow at additional wells will influence the overall flow and reactions occurring within the system is unknown.

It appears that there is limited understanding of the biogeochemical conditions in the SRF away from the limited zone of active treatment. Without a rigorous, constrained hydrologic model of the current SRF, it will be impossible to accurately predict the effects of increased injection and pumping rates needed for evaluation of a biogeochemical treatment model. A robust hydrologic model is essential for predicting longevity of the system, particularly under the ambient conditions expected at closure.

Mechanisms and form of sequestered selenium

The general conceptual framework for the reduction of selenate and nitrate in the SRF appears to be valid based on the promising results from the Phase 1 pilot. However, a rigorous understanding of the disequilibrium reactions will be critical for scaling up treatment, predicting long-term behavior, and deploying this technology elsewhere in Teck's Elk Valley mining operations. The lack of understanding of the actual form or forms of selenium in the saturated rock fill makes it impossible to predict short term to long term performance, including under the closure scenario or under changing conditions during operations in the future, such as changing flow paths, increases or decreases in nutrients added (methanol, phosphoric acid), and other perturbations to the system, such as influx of oxygen from precipitation or groundwater inflows.

Reports have discussed sorption site consumption with respect to longevity; yet, the reports also have indicated that Teck does not expect sorption to be occurring due to the reduced conditions; this reflects the current lack of knowledge of the mechanisms for removal within the SRF. If conditions are not sufficiently reducing to reductively dissolve ferric oxyhydroxides, sorption of selenite to those existing solids remains a potential mechanism; however, if the redox potential is low enough to dissolve existing ferric precipitates, any previously sorbed selenite would be released. Iron concentrations are higher in row 2 monitoring wells than in row 1 monitoring wells during most of the sampling times. This suggests that there are different reactions occurring over that distance than what are occurring between the injection wells and the 1st row of monitoring wells. Targeting selenium reduction without crossing into iron reduction is difficult with the selenate to selenite redox

SUMMARY COMMENTS REPORT

potential being slightly higher than ferric to ferrous iron. Teck is using a 1 mg/L release of iron in the monitoring wells as a measure to identify when to alter nutrient and carbon additions in the injection wells to control redox conditions; however, there is indication at the extraction wells that redox conditions within the SRF may have reached more reducing conditions amenable to more reduced forms of selenium. Because of these differences and unknowns, relying on a dissolved iron concentration for making decisions for controlling redox conditions may be misleading.

In discussing longevity, Teck acknowledges that it is assumed and that there is no current direct evidence for the nature of selenium removal products. The information on selenium speciation is based on benchtop experiments. Teck acknowledges that remaining uncertainties, such as reversibility, unknown mechanisms, potential for formation of organo-selenium species, and release of trace metals are operational risks and risks to longevity, although reports also state Teck expects the selenium removal products would be stable under saturated suboxic conditions.

Closure plan and widespread use

Details of closure plans are lacking. Teck suggested that they would starve the biofilms at closure. If the selenium is being sequestered within the biofilms, it seems likely that the biofilms would release their selenium as they die. They suggested that the density stratification of the water column would help stabilize the redox state of the water column; however, tracer studies in the pilot test indicated that treatment is occurring only in the shallow top portion of the SRF, which would be most vulnerable to fluctuations in water level and atmospheric oxygen in dry periods. The Phase 2 application indicates that there should be a water cover over the SRF in closure (in response to EPA's comment, Teck replied they are committed to a water cover "over the zone of selenium sequestration"); however, it is uncertain if the depth of the water would eliminate potential oxygen infiltration to all waste rock in the fill. The details of water management and capping are lacking but essential for understanding the stability of the system at closure. The Peer Review panel concluded that active dosing of carbon during operation was necessary, likely due to there being insufficient labile carbon existing in the waste rock to support microbial populations to reduce the nitrate and selenate. In the absence of providing a carbon source for microbial reduction of selenate within the SRF, it is not clear how any remobilization in closure or post-closure would be managed. The panel suggested in their review of the pilot that even without carbon addition, the saturated rock would keep selenium stable for the long-term; however, it is not clear how this can be known in the absence of knowledge about the form of sequestered selenium within the SRF.

With respect to wide-spread use of the SRF technology, the literature review found multiple studies of SRFs or similar saturated rock filled pits providing some useful recommendations. Several of the studies recommended that these systems be purposefully designed for hydraulic control (e.g., Jensen et al., 2018; Mayer and Yost, 2017; Deen et al., 2018) and Mayer and Yost (2017) made the point that dump placement is more heterogeneous than pre-testing homogeneous models suggested. Jensen et al. (2018) also made the point that coal wastes alone are unable to achieve and maintain suboxic conditions in the saturated zone and Deen et al. (2018) recommended additional research be conducted on the necessary design and management for developing and maintaining anoxic conditions within the saturated zone. Martin and Stockwell (2018) concluded that selenium bioremediation will be site-specific, and dependent on factors such as pit shell morphometry, permeability, climate and water balance, dump size and construction methods, and waste rock properties (grain size distribution, organic content, and mineralogy). Claridge et al. (2012) stated that saturated zones are not commercially proven in western Canada and that they will require a thorough understanding of both hydrogeological and geological conditions on a site-specific basis. These studies all support the concept that these systems should be designed and built for this specific application (on a site-specific basis) rather than simply using pits that are already filled.

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EFFECTIVENESS FOR LONG-TERM MITIGATION OF IMPACTS TO U.S. WATERS

Documents and materials reviewed to date have not provided a direct link to expected water quality in U.S. waters from treatment of selenium by the SRF technology in the Elk River Valley. The closest information provided in Teck's recent application in Section 6.2.2.2.2 (text on Page 246 and graph on Page 250) is for the location in the Canadian portion of the Koocanusa Reservoir south of the Elk River (RG_DSELK; E300230). The application states that the Application Case shows an increase in Se concentrations under average and low flow conditions, as compared to the currently permitted case, but that there are no projected exceedances of compliance limits of performance objectives. The figure on page 250 shows values post 2021 that are below the site performance objective. There are no projected concentrations provided for the other four monitoring locations indicated in their Koocanusa Water Quality Report for 2018 (most recent on <https://www.teck.com/responsibility/sustainability-topics/water/water-quality-in-the-elk-valley/research-and-monitoring-reports/>).

It is recommended that the selenium cycle be monitored on the U.S. side of the border to quantify the selenium concentration and load coming from the Canadian side to help identify any changes (positive or negative) resulting from increased use of SRF technology. Ideally, this would include monthly water-quality sampling, minimally over the annual cycle to include discharge from the dam, and influent from major watersheds on the U.S. side of the border. Water column profiles once or twice a year would be informative. Sediment sampling at strategic locations would also be useful. It would be useful to continue this monitoring for multiple years, but the number of sampling sites and sampling times could be pared down to lower costs but maintain value.

Water quality results for the monitoring locations in the Elk River on the Canadian side of the Koocanusa Reservoir should be made available for assessing whether any changes observed on the U.S. side are attributable to Teck's operations. Ideally these data should be made available as close to real time as possible rather than in annual reports that are not recent.

IDENTIFICATION OF BEST PRACTICES FOR OPERATIONS AND RISK IDENTIFICATION, MANAGEMENT AND RESPONSE

The term "best practices" for environmental management and remediation is generally reserved for approaches for which a wealth of experience in both the laboratory and field are available and recommendations represent consensus views among multiple stakeholders. In the case of treating selenium- and nitrate-bearing drainage using SRF technology, the wealth of experience is lacking. "Saturated Rock Fill" is a generic term describing the physical aspects of the treatment system with limited insight into the actual biogeochemical processes facilitating treatment. Further, overall experience treating selenium-rich drainage is less common than various approaches to treat environmental problems such as acid mine drainage. Therefore, any attempt to identify "best practices" is premature. Instead, this section identifies topics that should receive continued attention. The panel employed by Teck to review the Phase 1 trial identified several risks that are reasonable and would be expected to be common to any biological treatment of selenium: longevity, reversibility and remobilization of Se, preferential flow diminishing capacity, effects of higher flow rates, variable influent concentrations, selenium speciation, nitrite, bromate toxicity from use as tracer, trace metal remobilization, control on effluent WQ, biofouling, and conditions in closure and post-closure. In addition to these risks, there is a risk for potential oxidation of any reduced selenium in the effluent pond water that might be released to the stream and oxidize.

An approach for mitigating risks of oxygen infiltration to any type of system needing to remain suboxic to anoxic is to use a cap or cover. If a water cover is used, it must be deep enough to ensure that the surface of the zone

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containing sequestered selenium remains anoxic. A strategy for minimizing the amount of atmospheric precipitation infiltrating into a pit is to use a cap or cover along with ditches or other diversions around the material to avoid run-on water.

Although SRF is a non-specific term and the current design/operation for the Elkview operations may differ from other similar coal mining backfilled saturated pits, several recommendations for identifying and reducing risks in saturated backfilled pits identified in the literature include the following:

- “Backfilling waste rock in a planned way that would facilitate hydraulic control of mine water passing through the in-situ bioreactors in the open pits” (Jensen et al., 2018 – referred to the backfilled pit as a “saturated in-situ anaerobic bioreactor”);
- Martin and Stockwell (2018) stated that selenium bioremediation would be site-specific and depend on: “pit shell morphometry, permeability, climate and water balance, dump size and construction methods, and waste rock properties (grain size distribution, organic content, and mineralogy)” when discussing an SRF;
- Claridge et al. (2012) stated that saturated zones are not commercially proven in western Canada and that they will require a thorough understanding of both hydrogeological and geological conditions on a site-specific basis; and
- Continual recording of ORP, DO, and other parameters to assure sustained anoxic conditions to prevent reversal of selenium attenuation (SRK, 2016 – saturated zone).

Other suggestions that would be common to any biological treatment system for selenium include:

- A backup treatment plan in case of SRF performance decline or failure over time for which mitigation measures (such as changes in nutrient or carbon amounts, decreases in influent flow rates, recirculation) are unsuccessful;
- Reassessment of the microbial community and inoculation of influent water with selenate reducers or an alternate carbon source to enhance dissimilatory selenate reduction;
- Monitoring of groundwater downgradient from the SRF and monitoring of surface water that may have groundwater discharge;
 - Groundwater containing selenium from the SRF may emerge in streams at distance from the SRF;
 - A good understanding of groundwater and surface water interactions in the area is essential; a rigorous water balance is critical.
- Regular monitoring of effluent water quality to monitor performance for selenium and to determine if there are any other elements released from leaching of the waste rock or that were sorbed to reductively dissolved ferric precipitates that would need secondary treatment;
- Selenium speciation and WET testing of pond effluent water and at other monitoring locations downstream to assure no toxic forms of any constituents resulting from treatment are being discharged.

RESULTS WE WOULD LIKE TO SEE FROM LABORATORY TESTING AND FIELD PERFORMANCE MONITORING

Based on our review of the provided documents, we feel that the basic conceptual model that describes the removal of selenium and nitrate from mine drainage in the SRF is sound. Most of our current questions focus on either applying results from experiments done under controlled conditions in the lab to field conditions, or the need for rigorous biochemical and hydrologic models to facilitate the prediction of longer-term performance and behavior, including post-closure.

SUMMARY COMMENTS REPORT

Temperature influences reaction rates. This raises the following questions. What is the temperature of the laboratory testing as compared to the temperature in the zone(s) where reactions are expected to be occurring in the SRF? Is there any observed influence of temperature on the field observations during different seasons?

The conditions in the field may differ from those in the laboratory columns. It would be useful to understand how the conditions in the laboratory columns, which are showing selenium removal as precipitation of elemental selenium, correlate with the conditions observed in the SRF. Eh, pH, and temperature all will influence the multiple redox reactions and the subsequent form of reduced products.

Nitrate is known to oxidize reduced forms of selenium and also pyrite. Currently it is assumed that nitrate is reduced prior to the selenium, but this is not known for certain. Has the timing of nitrate reduction versus selenium reduction been examined in the laboratory or observed in the field? Has any interaction of nitrate and reduced forms of selenium been observed or tested in the laboratory? Some discussion has suggested synergistic interactions between nitrate and selenium; what is the nature of those relationships, and can they be quantified? The supply of nitrate is expected to be depleted before that of selenium. What are the implications of this evolution to the efficacy of the SRF in treating selenium?

Phosphorus is known to compete for sorption onto iron and manganese oxides and oxyhydroxides. Has this potential been examined in the laboratory?

We would like to see water quality data from the field system from injection, monitoring, and extraction wells, to include parameters (pH, Eh, DO), flow rates, as well as concentrations of nitrate, total and dissolved (with speciation) concentrations of selenium, and concentrations of other elements that may originate from reductive dissolution processes within the SRF. Because flow paths through the system may differ for sets of injection and monitoring wells as related to the extraction wells, it would be most useful to see results on each of the wells rather than an average across them. A figure of the well layout (currently redacted from reports) also would be helpful to understand the system.

Are feedback loops among redox couples (synergistic and antagonistic) being investigated in laboratory studies? Results from these studies would be useful. How well do laboratory observations explain field conditions?

We would like to know the forms of sequestered selenium in the SRF.

- We would like to see results from the laboratory testing of the biomass for whether it is sequestering selenium (uptake into cells, sorption to cells, or entrapment within the biomass) and how the selenium behaves with death of the biomass to occur at closure.
- We would like to see data from analysis of cores taken within the SRF to identify the form of selenium and where/how it is being retained.
- Fine-grained elemental selenium is stated in Section 3 of the application to be the predominant form of selenium in the laboratory columns. Previous information provided did not include characteristics of the SRF materials, such as their composition, or the size of the pore spaces for movement of finely grained or colloidal particles. Is the potential for mobility of the elemental selenium through pore spaces between waste rock, or plugging of pore spaces by elemental selenium in the SRF being investigated in the laboratory? Understanding how elemental selenium, if confirmed to be the form present within the SRF, would behave within the SRF after formation is important in understanding long-term performance.

SUMMARY COMMENTS REPORT

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KTUNAXA
NATION



Hon. Rex Tillerson
U.S. Secretary of State
U.S. Department of State
2201 C Street NW
Washington, DC 20520
USA

April 24, 2017

Hon. Chrystia Freeland
Canadian Minister of Foreign Affairs
125 Sussex Drive
Ottawa, ON, Canada
K1A 0G2

Dear Mr. Tillerson and Ms. Freeland,

We write to you as the united Councils of the Ktunaxa Nation, a transboundary Nation, whose Territory precedes the establishment of the Canada-U.S. boundary. We the Councils of the Confederated Salish and Kootenai Tribes (CSKT), the Kootenai Tribe of Idaho (KTOI) and the Ktunaxa Nation Council (KNC) have agreed independently, and jointly to request that the governments of the United States and Canada urgently address the matter of legacy, current and future impacts in the transboundary Elk/Kootenai watersheds, resulting from all sources of effects, including large-scale open pit coal mining in the Elk River of British Columbia.

Specifically, the Councils request that you create a transboundary framework that ensures equal representation across the international boundary, amongst governing entities, including Tribes/First Nations, provincial, state and federal jurisdictions. To be effective, this framework must include mechanisms for regulatory oversight, enforcement, and a scientifically robust international assessment of impact and risk with respect to water quality, fish and wildlife, and to traditional cultural values, species of cultural importance and human health.

The current, and only existing process, led by the Province of B.C. and the State of Montana, is not a sufficient mechanism to address the environmental, ecological, human health, cultural and traditional values and concerns of the transboundary Ktunaxa Nation. The BC-MT process is limited to the Koocanusa Reservoir and exclusively focused on setting a site-specific water quality standard for one mine contaminant (selenium) in the reservoir. While we support this process, it is limited and grossly insufficient, and we seek a separate, objective, federal led, international agreement with enforceable, binding protections, financial assurances and a committed financial framework for assessing current condition and future foreseeable impacts. Our detailed concerns are outlined in the attached memo.

The Councils of the Ktunaxa Nation are unified in requesting your attention to this matter, specifically that you intervene to protect our cultural, treaty and indigenous lands, and provide for representation of the Ktunaxa Nation and its three constituent governments.

Thank you for your attention to this important issue,



Chairperson, Ktunaxa Nation Council
7825 Mission Rd, Cranbrook BC, V1C 7E5



Chairperson, Kootenai Tribe of Idaho
PO Box 1269, Bonner's Ferry, ID 83805



Chairperson, Confederated Salish and Kootenai Tribes
PO Box 278, Pablo, MT 59778

cc

Caroline Caza, Regional Director General for Environment and Climate Change Canada
Greg Lemermeyer, Deputy Director, Global Affairs Canada
The Hon. Christy Clark, Premier of British Columbia
The Hon. Mary Polak, BC Minister of the Environment
Mark Zacharias, Assistant Deputy Minister, Environmental Protection, BC MOE
Jennifer McGuire, Executive Director, BC MOE
Michael Sokal, Impact Assessment Biologist, Environmental Protection, BC MOE
The Hon. Mr. Wayne Stetski, MP – Kootenay-Columbia

Christian Baxter, Director of Environmental Performance, Teck Resources Limited

The Hon. Steve Bullock, Governor of Montana

The Hon. C.L. "Butch" Otter, Governor of Idaho

Mike Cooney, Lieutenant Governor for the State of Montana

The Hon. Steve Daines, US Senator for Montana

The Hon. Jon Tester, US Senator for Montana

The Hon. Michael Crapo, US Senator for Idaho

The Hon. James Risch, US Senator for Idaho

The Hon. Raul Labrador, US House of Representatives for Idaho

The Hon. Ryan Zinke, U.S. Department of the Interior

Tracy Strog-Munzing, Chief of Staff for Governor of Montana

Tom Livers, Director of the Department of Environmental Quality

Eric Urban, Water Quality Planning Bureau Chief, Montana DEQ

Jing Nishida, Acting Assistant Administrator, Office of International and Tribal Affairs,

US EPA

Deborah Thomas, Action Regional Administrator, Region 8, US EPA



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NATION



Transboundary Kootenai Watershed Memo

The Councils of the Confederated Salish and Kootenai Tribes (CSKT), the Kootenai Tribe of Idaho (KTOI) and the Ktunaxa Nation Council (KNC) have agreed independently, and jointly to request that the governments of the United States and Canada urgently address the matter of legacy, current and future impacts in the transboundary Elk/Kootenai watersheds, resulting from industrial inputs, including large-scale open pit coal mining in the Elk River of British Columbia.

Impacts in the Elk/Kootenai River are a significant problem that is currently impacting First Nation, tribal, federal, provincial and state resources, and threatens increased future contamination to transboundary waters, fish, wildlife, human health and our overall economies.

We are also jointly concerned about the impacts to species of cultural importance to our Nation within the watershed, including impacts to transboundary Grizzly bears (the Northern Continental Divide population is under consideration for de-listing and the Elk and Flathead populations have recently experienced steep declines in abundance), Westslope cutthroat trout, Bull trout, Burbot and the Kootenai River White Sturgeon.

Matters of urgent concern to us include: 1) Elevated selenium concentrations (above BC MOE and US EPA guidelines) in tissues of several fish species within the Kootenai Reservoir, 2) An almost two-fold increase in ambient Kootenai River nitrate concentrations below Libby Dam since 2005, 3) The absence of federal leadership that honors Tribal trust authority and fiduciary responsibilities to First Nations, addresses current impacts, and addresses the legacy of mining impacts in this watershed, 4) The challenges with the Line Creek active water treatment facility to treat mining constituents and mitigate risks to water quality and aquatic life, 5) The advancement of three non-Teck coal mines in the Elk River Valley, in addition to provincially permitted mine expansions for four of the existing Teck mines, and 6) The recent charges brought against Teck Coal Ltd. for the mortality of 74 Westslope cutthroat trout, in Line Creek, downstream of the Line Creek active water treatment facility.

Additionally, the international agreement must be designed to achieve the following:

1. Oversee an international assessment of impacts and risks to transboundary fish and wildlife;
2. Examine and report on the existing environmental conditions (i.e., State of the Environment) in the Elk and Kootenai River Basins;
3. Explicitly address cumulative impacts in the transboundary Elk/Kootenai watershed, particularly cumulative impacts to endangered fish and wildlife populations, including the Kootenai River white sturgeon, a species that is proven to be the most sensitive to selenium;
4. Explicitly address traditional cultural values and species of cultural importance;
5. Establish research and long-term monitoring priorities that comprehensively address the fate and transport of contaminants, nutrient loading, and any unforeseen impacts to fish and wildlife within the watershed;
6. Explicitly address risks to human health: contaminants draining from the mines are known to bioaccumulate and pose a threat to human health through consumption and traditional consumption;
7. Explicitly address assurances for bonding, mitigation and proponent accountability, and the federal regulatory oversight to ensure the protection and restoration of the Elk/Kootenai Watershed, from the Elk River in British Columbia, through Montana, Idaho, and back to Kootenay Lake in British Columbia.

We herein request immediate action from the respective federal governments to address the short-term threats posed by mine expansions, active leaching of contamination into the ecosystem, and the long-term consequences of legacy impacts from industrial inputs in this watershed, across water quality, fish, wildlife and traditional cultural uses by our Nation.



30 October, 2020

The Honourable Jonathan Wilkinson, P.C., M.P.
Minister of Environment and Climate Change
Ottawa, ON K1A 0H3
Sent by Email to: Jonathan.Wilkinson@parl.gc.ca
& EC.MINISTRE-MINISTER.EC@CANADA.CA
Cc: Fraser.Ross@canada.ca

Cc: Impact Assessment Agency of Canada
22nd Floor, Place Bell
160 Elgin Street
Ottawa, ON K1A 0H3
Sent by email to: Katherine.Zmuda@canada.ca

Comments submitted online at Project Homepage
<https://iaac-aeic.gc.ca/050/evaluations/proj/80702?culture=en-CA>

RE: First Comments Regarding Teck Coal Limited's Initial Project Description for the Castle Project

Dear Minister Wilkinson:

These comments provide the initial joint comments by the Confederated Salish and Kootenai Tribes ("CSKT") and the Kootenai Tribe of Idaho ("KTOI") (collectively "Tribal Councils") regarding the Ministry of Environment and Climate Change ("ECCC") assessment of Teck Coal Limited's ("Teck") Initial Project Description ("IPD") for the proposed Castle Mine Project ("Project").

Thank you very much for the notification regarding the acceptance of the IPD and the invitation to provide comments on the impacts the proposed Project will have on our people and resources.

The Tribal Councils represent constituent governments of the transboundary Ktunaxa Nation and work closely with our counterparts at the Ktunaxa Nation Council in the northern portion of

Ktunaxa Territory in British Columbia. The Project will likely pose great additional risk to Ktunaxa Territory resources on both sides of the international boundary. For that reason and others, we appreciate and support your decision to pursue a Federal review of this mine “expansion”.

Given the unique nature of the Project, the scale of the mine expansion proposed, and the matter of extra-territorial impacts beyond the Province of British Columbia and Canada, we respectfully request that you refer this impact assessment to a review panel. Assessment of the Project via review panel is appropriate given the documentation of adverse impacts from existing mines, including impacts to water quality and fish in downstream United States, Indigenous Nation and State jurisdictions.

We therefore submit the following important new information to help inform your consideration of the Project.

1. The State of Montana has initiated the process for adoption of a site-specific selenium standard for the transboundary Koocanusa Reservoir at the international boundary, based on over five years of data collection and development of a peer-reviewed, site-specific model by the U.S. Geological Survey. There are several relevant developments related to Montana’s adoption of a site-specific standard for Koocanusa Reservoir:
 - Koocanusa Reservoir is currently considered impaired due the impacts of selenium inputs into the reservoir from the Elk Valley mines in British Columbia.
 - Given the concerns regarding the sensitivity of certain species of fish in Koocanusa Reservoir, and other species in the aquatic food web, the State of Montana is recommending a standard of 0.8 ug/L at the international boundary, which is 1.2 ug/L less than the current Site Performance Objective in the Elk Valley Water Quality Plan.
 - The impact assessment process for the proposed “Fording River Operations Castle Project” must take into consideration the intent of the State of Montana to adopt a conservative and protective criteria at the international boundary in Koocanusa Reservoir, and the current data showing that selenium concentrations at the international boundary already exceed the proposed standard (average monthly concentrations of 1.1 ug/L).
2. The State of Idaho, in consultation with the United States Environmental Protection Agency (“USEPA”), is initiating the process to list the Kootenai River under the Clean Water Act, as impaired due to selenium impacts to fish and water quality in the Kootenai River:
 - The Kootenai River is critical habitat for the endangered Kootenai River white sturgeon, which are the most sensitive species of fish in the database regarding vulnerability to impacts from selenium bioaccumulation.
 - In addition to the sturgeon, burbot, culturally important to the Ktunaxa Nation, have been functionally extirpated from the Reservoir. Limited data collected by the Kootenai Tribe of Idaho show that burbot in the mainstem Kootenai River in

Idaho are accumulating selenium at rates that are known to cause significant adverse physiological effects on other fish species.

- Data for mountain white fish in the Kootenai River in 2018 and 2019 exceed the USEPA egg-ovary threshold for selenium, of 15.1 mg/kg dw.
3. We remain concerned about the lack of information regarding the impacts of selenium bioaccumulation in Koocanusa Reservoir, the Kootenai/y River, and Kootenay Lake with respect to harvesting of fish for food and the potential for associated risk to human health.
 4. Teck has failed to meet the conditions set forth in 2013 in B.C. Ministerial Order M113, specifically, to *stabilize and reverse* increasing trends in water contaminant concentrations.
 - We note with concern that the Provincial Water Quality Guideline for Protection of Aquatic Life is 2.0 ug/L, and that data for selenium levels in the Fording River are close to 200 ug/L on a monthly average. Selenium levels in both the Elk and Fording Rivers have exceeded the Provincial guideline for protection of aquatic life for as long as records have been kept.
 - In addition, for the last several years in winter months, selenium has exceeded 2 ug/L at the Order Station at the international boundary in Koocanusa Reservoir. We have already noted above the process underway in Montana to adopt a site-specific selenium standard of 0.8 ug/L at the international boundary.

Given the information outlined above, we are disappointed and concerned with mischaracterizations in Teck's Initial Project Description that "the geographic extent of impacts to water quality will therefore be limited and is not anticipated to extend beyond the boundaries of B.C."

This is simply not true.

The last five years of data collected in Koocanusa Reservoir by multiple governmental agencies and industry entities, *including Teck itself*, clearly demonstrate that selenium impacts are already occurring to water quality, fish, and other aquatic life in the Reservoir and in the Kootenai/y River downstream. Likewise, the IPD excludes the CSKT and KTOI from Indigenous Nations that may be affected by the Project (pg 151), despite data collected by Federal, State and Indigenous governments and industry entities demonstrating and documenting selenium degradation of waters south of the international boundary.

In addition to the misinformation provided by Teck regarding the limited geographic extent of mining impacts in Montana and Idaho, we call your attention to several additional recent instances of fact distortion perpetuated recently by Teck:

- Teck appears to be attempting to unduly influence the process underway in the State of Montana to adopt a site-specific selenium criteria for Koocanusa Reservoir by falsely claiming disagreement amongst the committee of experts that have been working for five years to develop a protective criteria. Four out of five members recommended a criteria at or below 0.9 ug/L (0.6-0.9), whereas Teck's representative was the *sole* committee member to recommend 1.5 ug/L.

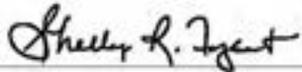
- Likewise, Teck has made claims unsupported by credible data that the selenium trends are decreasing downstream of the mines, whereas data from 1987 – 2020 show clear increasing trends of selenium, with exceedance above Provincial water quality standards beginning in 1992.
- Additionally, Teck is making vague claims about the volume of wastewater treated in its active wastewater treatment facilities. We note that no data has been made publicly available to support these claims. In addition, mitigation technologies that require the company to operate them in perpetuity are unproven and, therefore, unacceptable.

The lack of scientific credibility and verification of Teck's claims require a Federal review panel, with Canadian and U.S. Federal, Indigenous Nation and State participation, and independent scientific verification of all data.

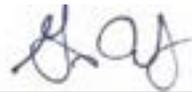
Thank you for your continued commitment to a robust and transparent evaluation of the potential impacts of the Castle Project, including a comprehensive evaluation of extra-territorial impacts to U.S. and Indigenous Nation waters and fish. We remain concerned about the unresolved issues of long-term monitoring, assessment of damages and enforcement of protective environmental standards important to our sovereign, cultural and treaty waters, species, and resources.

We look forward to working with your agency to protect water quality for Canadian, United States and Indigenous Nation resources and citizens.

Sincerely,



Shelly Fyant
Confederated Salish and Kootenai Tribes
Chairwoman



Gary Aitken, Jr.
Kootenai Tribe of Idaho
Chairman



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October 30, 2020

Subject: Initial Project Description and request to designate a federal review panel for the Castle Project

Dear Mr. Ross:

I am writing on behalf of the Idaho Conservation League (ICL) to comment on the Initial Project Description for the Castle Project. ICL has been Idaho's leading voice for conservation since 1973. As Idaho's largest state-based conservation organization, we represent over 30,000 supporters, many of whom have a deep personal interest in protecting human health and the environment. The Idaho Conservation League works to protect these values through public education, outreach, advocacy and policy development.

Teck Coal Limited proposes to expand its existing Fording River Mining Operations onto the adjacent Castle Mountain site. Teck anticipates that its existing Fording River Mining operations will be exhausted by the mid 2020s unless the Castle Project is approved. The Castle Project would extend the lifespan of Teck's Fording River operations for "several" decades. The project is being reviewed under the BC Environmental Assessment Act (EAA) and the federal Impact Assessment Act (IAA). ICL appreciates the decision to undertake federal review as the existing and proposed coal mining operations in the Elk River Valley affect water quality and fisheries in Lake Kootenai and the Kootenai River below Libby Dam in the United States.

In 1972, the United States Congress passed the Clean Water Act (CWA). The purpose of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" through the reduction and eventual elimination of the discharge of pollutants into those waters. 33 U.S.C. § 1251(a). In addition, the CWA establishes an "interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife." *Id.* at § 1251(a)(2).

To meet these goals, the law requires the establishment of water quality standards. Water quality standards are promulgated by the states and establish the desired condition of each waterway within the state's regulatory jurisdiction. 33 U.S.C. § 1313(a). Water quality standards under the CWA are

required to include three elements: (1) one or more designated “uses” of that waterway; (2) water quality “criteria” specifying the amount of various pollutants that may be present in those waters and still protect the designated uses, expressed in numerical concentration limits and narrative form; and (3) an antidegradation policy (with implementation methods) to protect all existing uses. 33 U.S.C. §§ 1313(c)(2), 1313(d)(4)(B); 40 C.F.R. Part 131, Subpart B.

The designated beneficial uses of the Kootenai River in Idaho include primary contact recreation, cold water aquatic life, and salmonid spawning. Section 303(d) of the CWA requires all states to identify and prioritize water bodies that do not meet water quality standards. For those water bodies on the § 303(d) list, Idaho must develop water quality improvement plans, called total maximum daily loads (TMDLs). TMDLs specify the pollutant load reductions needed in order for those water bodies to achieve water quality standards.

In the absence of site-specific water quality standards for selenium, the State of Idaho applies the U.S. Environmental Protection Agency’s (EPA) national water quality standards. The EPA’s chronic criterion for the protection of aquatic life requires that the concentration of selenium in fish eggs and ovaries is not to exceed 15.1 mg/kg dry weight (IDAPA 58.01.02.210.01a, Table 1 footnote I). The egg-ovary criterion element supersedes any whole-body, muscle, or water column criterion element. The comparison to the egg-ovary criterion element requires a sample of at least five individuals of the same species from the water quality assessment unit (AU).

In 2018, three mountain white fish were sampled in the canyon reach (AU ID17010104PN029_08 (USGS Site KR9)) of the Kootenai River in Idaho, just downstream from the Montana border. Selenium egg-ovary concentrations ranged from 15.4 to 24.8 mg/kg dry weight. However, as mentioned above, EPA requires at least five samples for comparison to the egg-ovary criterion. So in 2019, nine mountain white fish were sampled from this AU by the U.S. Geological Survey and the Kootenai Tribe of Idaho. Selenium egg-ovary concentrations ranged from 17 to 26.3 mg/kg dry weight, with an average concentration of 20.4 mg/kg dry weight, which exceeds the selenium egg-ovary criterion.

Given these data for egg-ovary selenium concentrations in mountain whitefish, and additional data demonstrating that the source of the selenium is the Teck Coal Elk Valley mines in Canada, the Idaho Department of Environmental Quality (IDEQ) added selenium as a cause of impairment to the cold water aquatic life beneficial use for AU ID17010104PN031_08, which is reflected in IDEQ’s 2018/2020 Integrated Report. The other three AUs in the Kootenai River in Idaho may also exceed the selenium criterion and given the need for more data, federal, state and Tribal agencies are prioritizing the remaining Kootenai River AU’s for data collection in 2021.

The listing of AU ID17010104PN031_08 as impaired by selenium pollution will require the calculation of a Total Maximum Daily Load (TMDL) to reduce selenium pollution in this reach and achieve water quality standards that protect cold water aquatic life. A TMDL is a legally enforceable quantitative limit on the loading of a particular contaminant in a water body. Since the Kootenai River in Idaho is downstream from the State of Montana, Idaho will likely assign a selenium load allocation to Montana. The State of Montana will only be able to meet its selenium load allocation through adoption of its own site-specific water quality standards for selenium. Furthermore, because none of the selenium pollution in the Kootenai Watershed originates from within the U.S., achievement of U.S. water quality standards for selenium will require cooperation from the Province of British Columbia and the Federal Government of Canada. While cooperation is the goal, jurisdiction of international waters lies with the U.S. and

Canadian federal governments, and the U.S. can act to enforce its water quality standards on its northern neighbors through the Boundary Waters Treaty of 1909.

It is also important to note that governments in the U.S. (federal, tribal or state) have the authority to bring charges against governments and/or companies in Canada for damages incurred on federal, state or tribal lands, from pollutant sources originating in Canada. Precedence for this was set in the ruling of *Pakootas v. Teck Cominco Metals, Ltd.* (Teck), which found Teck liable under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Reduction of selenium pollution in the Kootenai Watershed is also vital to fish recovery programs in the United States. Enacted in 1973, the purpose of the U.S. Endangered Species Act (ESA) is to “provide a program for the conservation of...endangered species and threatened species” and to “provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved.” 16 U.S.C. § 1531(b). The ESA defines “endangered species” as “any species which is in danger of extinction throughout all or a significant portion of its range.” Id. § 1532(6). A “threatened species” is “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” Id. § 1532(20). The term “species” is defined to include “any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature.” Id. § 1532(16). Federal agencies in the U.S. are required to use “all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to...the Act are no longer necessary.” Id. § 1532(3).

The Kootenai River white sturgeon (*Acipenser transmontanus*) is 1 of 18 land-locked populations of white sturgeon known to occur in western North America. Kootenai sturgeon occur in Idaho, Montana, and British Columbia, Canada, and are restricted to approximately 167.7 river miles extending from Kootenai Falls, Montana, downstream through Kootenay Lake to Corra Linn Dam at the outflow from Kootenay Lake in British Columbia. Kootenai sturgeon migrate from Kootenay Lake into the Kootenai River in Idaho and Montana to spawn. The population has declined from approximately 7,000 white sturgeon in the late 1970s to fewer than 500 fish in 2005. Kootenai River white sturgeon were listed as endangered in 1994 by the U.S. Fish and Wildlife Service, and a Recovery Plan for Kootenai River white sturgeon was approved in 2019. The Kootenai Tribe of Idaho (KTOI) plays a significant role in Kootenai River white sturgeon recovery. Among other recovery actions, KTOI operates a sturgeon hatchery and is restoring several river reaches to improve habitat.

Burbot (*Lota lota*) are endemic to the Kootenai River, where they once provided an important winter fishery to indigenous people. This fishery and that of Kootenay Lake in British Columbia may have been the most robust burbot fisheries in North America. Facing possible extinction and listing under the ESA, a conservation strategy was prepared to outline the measures necessary to recover burbot. Thanks in large part to KTOI, burbot are rebounding in the Kootenai River system. In fact, for the first time in years, a sport fishing season was allowed in 2019.

Increasing concentrations of selenium in the Kootenai River threaten to undermine these recovery efforts. As we have seen, some fish populations in the Fording River and Elk River have already been affected by selenium pollution from coal mines in the Elk River Valley. High selenium levels have resulted in physical deformities, reduced viability of eggs, and even population crashes. If selenium levels in the Kootenai River downstream of Libby Dam continue to increase, similar impacts are

predictable and perhaps inevitable over time, for the white sturgeon, burbot and other culturally and economically important fish species.

It is our position that the Castle Project and any other proposed coal mine expansions in the Elk River Valley should be denied. The Castle Project would extend the lifespan of Teck's Fording River operations for "several" decades and further enlarge the footprint of mining in the Elk River Valley from which selenium pollution originates. Coal mines in the Elk River Valley are expected to bleed selenium pollution into the watershed for 700 to 1,000 years--long after Teck is done mining. Current efforts should prioritize regulatory mechanisms for bringing the legacy and on-going selenium pollution under control. The existing data for selenium impacts in the Kootenai River raises important questions about Teck's liability. We respectfully request that consideration of potential existing liabilities be weighed heavily as the review process is initiated for a project that will increase both the scope and scale of the mine contamination.

With respect to the impact assessment process, ICL urges the Impact Assessment Agency to designate a federal review panel for the Castle Project. An independent, federal review panel is needed to ensure that experts in applicable fields are commissioned to provide an objective review of the project. Canadians and Americans alike deserve to know that the process will be objective, thorough, transparent, and non-exclusive. We hope that you will approve our request to designate a federal review panel and continue to welcome the participation of U.S. citizens and indigenous nations in this process. Thank you for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Brad Smith".

Brad Smith
North Idaho Director



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June 23, 2020

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Dear Minister Wilkinson,

Re: Request for Designation of the Castle Project under s. 19(a) of the Schedule to the Physical Activities Regulations and s. 9(1) of the Impact Assessment Act

1. INTRODUCTION

We write on behalf of Wildsight Society (“Wildsight”) regarding a proposed expansion to a metallurgical coal mine in the Elk Valley of British Columbia. Teck Resources Limited (“Teck”) recently proposed a major expansion to their Fording River Operations mine (the “Castle Project”).

Wildsight submits that the Castle Project is a prescribed project pursuant to s. 19(a) of the Schedule to the *Physical Activities Regulations*, SOR/2019-285 (the “*Regulations*”), and in the alternative, that it warrants designation under s. 9(1) of the *Impact Assessment Act*, SC 2019, c 28, s 1 (the “*IAA*”).

The grounds for this request are that:

1. The Castle Project is an expansion of an existing coal mine that would increase the size of the area of mining operations by more than 50%, exceeding the threshold for prescribed projects under the *Regulations*; and
2. Alternatively, if the threshold under the *Regulations* is not clearly exceeded, the size and potential adverse impacts of the Castle Project warrant designation of this project under s. 9(1) of the *IAA*, as the project:
 - a. either exceeds or is near a threshold set out in the Project List;
 - b. is near an environmentally sensitive location;
 - c. involves the use of new technologies; and

- d. will impact areas of federal jurisdiction that may only be properly managed through federal impact assessment.

Given that the Castle Project either exceeds the allowable increase in area of mining operations or is very close to the threshold, the well-documented environmental impact of related projects in this area, adverse impacts to fish and fish habitat, effects on at-risk species such as westslope cutthroat trout, and the transboundary impacts of this project, it is essential that the Minister designate this project and conduct a full impact assessment.

2. BACKGROUND

a. Fording River Operations

The Castle Project is a proposed expansion to Teck's Fording River Operations ("FRO") coal mine in the Elk Valley; constituting a new open pit operation relying partially on the existing facilities of FRO.

FRO is located 29 kilometers northeast of Elkford, in southeastern British Columbia. It is one of four metallurgical coal mines in the area operated by Teck. FRO began operations in 1971, and as such pre-dates both provincial and federal environmental assessment laws. FRO presently has two operating areas, Eagle and Swift. The Castle Project would be the third operating area, named after the Castle Mountain where it is situated. As stated by Teck, the purpose of the Castle Expansion "is to extend the lifespan of FRO by many decades."¹

The first major expansion, the Swift operating area, was first proposed in 2011. The extension was to extend the overall life of Teck's FRO operations by approximately 23 years and begin construction in late 2015. A provincial environmental assessment certificate ("EAC") was issued for Swift in 2015.

The Swift extension did not undergo federal environmental assessment. The CEA Agency originally determined that an environmental assessment would be required: "On March 23, 2012, it was determined that an environmental assessment was required in relation to the project because Fisheries and Oceans Canada considered taking action in relation to subsection 35(2) of the Fisheries Act."²

However, following the implementation of the *Canadian Environmental Assessment Act, 2012* ("CEAA 2012"), this decision was reversed: "On July 6, 2012, the new *Canadian Environmental Assessment Act, 2012* came into force which replaced the former *Canadian Environmental Assessment Act*. As a result, there is no longer a requirement to complete the environmental assessment of this project."³ This decision was made by the federal government for 492 projects at the same time, including the FRO Swift Expansion.⁴

¹ Teck Coal Limited, "Initial Project Description: Castle Project" (March 2020), online:

https://www.projects.eao.gov.bc.ca/api/public/document/5ede866ae321f30021a8ed3c/download/CASTLE_IPD_Final.pdf, [Castle Initial Project Description] at 6.

² CEA Agency, "Archived - Fording River Operations Swift Coal Mine Expansion", online: <https://iaac-aeic.gc.ca/052/details-eng.cfm?pid=67115>.

³ *Ibid.*

⁴ Larry Pynn, "Feds walk away from environmental assessments on almost 500 projects in B.C." (22 August 2012), *Vancouver Sun*, online:

<http://www.vancouversun.com/technology/Feds+walk+away+from+environmental+assessments+almost+projects/7125419/story.html>.

As a result, no part of FRO has been subject to federal assessment.

b. Coal Mine Expansions under the IAA

The *Regulations* set out what designated projects require an impact assessment. Designated mine expansions are defined based on physical impact, production capacity, and area of active operations, as set out in the Schedule for the *Regulations*.

In section 19 of the Schedule, certain expansions of existing mines are set out as designated projects. For existing coal mines, expansions that result in an increase in the “area of mining operations of 50% or more and the total coal production capacity would be 5 000 t/day or more after the expansion” are considered designated projects requiring assessment.⁵

“Area of mining operations” is a defined term in the *Regulations*: “the area at ground level occupied by any open pit or underground workings, mill complex or storage area for overburden, waste rock, tailings or ore.”⁶

c. Teck’s calculation of footprint for the Castle Project

In Teck’s Initial Project Description for the Castle Project, provided to the BC EAO, it was determined that provincial environmental assessment would be required. Relying on the provincial threshold for prescribed projects, which is dependent on area not previously permitted for disturbance, Teck estimated a “possible disturbance of 2,550 ha of land not previously permitted for disturbance and an increase of the area of mine operations of 36.5%.”⁷ Teck acknowledged in the Initial Project Description that the exact footprint of the Castle Project was still unknown: “Since the Project is still conceptual, Teck has not determined the exact footprint for the Project.”⁸

Teck concluded that a provincial environmental assessment would likely be required: “the Project does not meet the percentage change threshold under Section 3 [of the BC regulations], but does meet the total area threshold under Section 4. This means that the Project will require a provincial environmental assessment.”⁹

Teck stated in their Initial Project Description to the BC EAO that the threshold for federal impact assessment was likely not met under the *IAA*:¹⁰

“Teck is in communication with the Impact Assessment Agency of Canada about the Project. Teck’s current understanding is that the Project does not meet the thresholds under Section 19(a) of the *Physical Activities Regulations* (SOR/2019-285) and the Project does not automatically require an assessment under the *Impact Assessment Act* (SC 2019, c 28).”

Communication between the Agency and Teck reveals how this determination was made. In a letter to the Agency, Teck described that certain components of the Castle Project and existing FRO would be included within the area of mining operations, while other facilities would not be included. Teck’s analysis was based on guidance from the Agency following a conference call:

⁵ [Physical Activities Regulations, SOR/2019-285](#) [*Physical Activities Regulations*] at s 19 of the Schedule.

⁶ *Physical Activities Regulations*, supra note 5 at s 1(1).

⁷ Castle Initial Project Description, supra note 1 at 40.

⁸ Castle Initial Project Description, supra note 1 at 40.

⁹ Castle Initial Project Description, supra note 1 at 40.

¹⁰ Castle Initial Project Description, supra note 1 at 43.

“The conference call between IAAC and Teck on February 10, 2020 and subsequent email exchange provided clarity on IAAC’s request and the approach Teck should use to respond.”¹¹

According to the Agency’s own information request to Teck, an excerpt of which was included in Teck’s response:

“Depending on project-specific circumstances, [the calculation of the area of mining operations] may include components of the existing mine that are under construction, constructed but not in operation, in operation, in the process of being decommissioned, or in care and maintenance. It may also include components for which regulatory approvals have been issued but construction has not yet started.”¹²

Teck determined the following facilities should be included under the definition:

- Pit (area where ore or waste rock is being mined);
- Mill complex and ore storage (area where ore is being stored, handled, and processed);
- Soil storage (area for soil stockpiles prior to use during reclamation – qualifies as overburden storage under the *Regulations*);
- Waste rock storage (area where rock that is mined to access the ore is stored);
- Tailings storage (area where fine materials washed off of the ore in the mill complex is stored); and
- Interim reclamation sites (area where soil and vegetation have been placed, but that might be repurposed for additional use as an area of mine operations).

Teck excluded all other components of the existing project and proposed expansion: “Any part of FRO or the Project that is not within one of the subcategories does not count as part of the area of mine operations under the *Regulations* and was not included in the calculations.”

¹¹ Teck Coal Limited, “Letter to the IAAC – Castle Project” (27 February 2020) [Letter from Teck to the Agency], attached as Appendix A.

¹² *Ibid.*

Based on these components, the following area of mining operations was calculated:

Table 1 Fording River Operations Area of Mine Operations based on *Physical Activities Regulations*

Fording River Operations	In-Use (Constructed) (ha)	Permitted (Not constructed) (ha)	Total (ha)
Pit	630	220	850
Mill Complex and ore storage	60	-	60
Soil Storage	30	-	30
Waste Rock Storage	2,970	1,010	3,980
Tailings Storage	120	-	120
Interim Reclamation	590	-	590
Total	4,400	1,230	5,630

Table 2 Castle Project Area of Mine Operations based on *Physical Activities Regulations*

Castle Project	Proposed (new) (ha)
Pit	1,520
Mill Complex and ore storage	-
Soil Storage	140
Waste Rock Storage	350
Tailings Storage	-
Interim Reclamation	-
Total	2010

As the existing footprint was stated to be 5,630 ha, and the expansion to be 2010 ha, Teck determined that the expansion would solely be an increase of 35.7%, falling below the 50% threshold and not requiring a federal impact assessment.

As can be seen in the tables above, two of the components that were included by Teck as part of the existing footprint area were 1,230 ha of areas of the existing FRO that are "permitted (not constructed)", and 590 ha of interim reclamation sites – areas where some reclamation had occurred, but may later be repurposed for additional use.

d. The Agency's Determination

Relying on the figures provided by Teck, the Agency determined the expansion will not be subject to a federal assessment under the IAA:

"Under the Act, a proponent is to determine if its proposed project is described in the Regulations ... The Agency reviewed the information you have provided that the physical works associated with the Project would increase the area of mining operations by an additional 35.7 percent, and that the expansion would have a total production capacity of 27 400 tonnes per day. The Project, as proposed and described in the material provided,

would be below the threshold described in the Regulations. As a result, it is the Agency's view that this proposed project would not be a designated project under the Regulations."¹³

This determination was based on acceptance of the figures as provided by Teck, and implicitly an acceptance of Teck's interpretation of what components fall under the definition of "area of mining operations."

3. ANALYSIS

a. The Castle Project is a prescribed project under the Regulations

Wildsight submits that there are significant issues with Teck's submissions on their existing footprints. Teck's calculations on the existing area of mining operations, at a minimum, lacks sufficient explanation and support, and is likely incorrect. It is Wildsight's view that the Castle Project should be considered a prescribed project under the *Regulations*. At a minimum, there are significant uncertainties around the calculation of area of mining operations as provided by Teck, and Agency should reconsider its determination of April 3, 2020 on this basis.

As described previously, whether a coal mine expansion is prescribed under the *Regulations* depends on whether there has been at least a 50% increase to the area of mining operations. In order to determine whether an expansion surpasses this threshold, the proponent of the expansion must provide accurate calculations of the area for both the existing facilities and for the proposed expansion.

If a proponent overstates the area of existing operations, then a large expansion can proceed without review. Similarly, a minor expansion to a small existing facility may exceed the 50% threshold. Where a proposed expansion is close to the 50% threshold, as with the Castle Project, it is critical to assess the accuracy of the provided existing footprint and expansion footprint as provided by Teck.

Wildsight submits that there are three ways Teck's submissions either do not conform to the definition of "area of mining operations" or are not supported on the information Teck submitted. Specifically, the Agency should reconsider their determination on three bases:

- 1 Teck has included interim reclamation sites as part of the area of existing operations, increasing the size of active operations to allow for the Castle Project to avoid review;
- 2 Teck has also included components of the existing mine "permitted (not constructed)", without providing particulars about planned development, again increasing the existing footprint; and
- 3 The final footprint of both the existing FRO and the Castle Project is conceptually uncertain, and discrepancies between the figures provided to the BC EAO and to the Agency are currently unaccounted for.

These three issues within Teck's submissions are discussed in detail in this section. Each issue requires further investigation by the Agency and information from Teck. Given these significant uncertainties around the size of both the existing facility and proposed expansion, the Agency

¹³ Impact Assessment Agency of Canada, "Letter to Teck Coal – Castle Project" (3 April 2020), attached as Appendix B.

should err on the side of caution and find the Castle Project to be a designated project under the *IAA*. Based on the apparent deficiencies in the information provided by Teck, the Castle Project may exceed the threshold for reviewable mining expansions under the *Regulations* and indeed be a prescribed project for the purposes of the *IAA*.

i. *Interim Reclamation Sites*

In their submissions to the Agency, Teck has included 590 ha of interim reclamation sites as part of the existing footprint: “area where soil and vegetation have been placed, but that might be repurposed for additional use as an area of mine operations.”¹⁴

Reclamation has been an ongoing process for the existing FRO and is a requirement through Teck’s provincial *Mines Act* permit (Permit C-3). To fulfill this requirement with the provincial regulator, Teck regularly submits reports describing the status of present and future planned reclamation. Teck recently submitted a 2019 Annual Reclamation Report (the “Reclamation Report”) where the area of existing operations for FRO was described, along with the area of reclaimed sites.

In the Reclamation Report, Teck describes the total area of reclaimed sites, as well as their long-term plan for progressive reclamation as operations continue:

Currently ~14% of the site’s disturbance area (4,956.37 ha) has been classified as reclaimed (685.58 ha). Much of the remainder of the site is generally active and therefore is unavailable for reclamation. However, progressive reclamation is planned to occur throughout the stages of active mining and closure. Progressive reclamation is focused on portions of the disturbance that are no longer necessary for the immediate operating requirements of the site.¹⁵

Teck went on in the Reclamation Report to describe the purpose and intention behind reclamation:¹⁶

Reclamation of the post-mining environment will re-establish basic ecological processes through relatively simple plant communities, but it could take decades to centuries to re-establish the complexity of ecosystems such as mature or old growth forests. Nonetheless, the overriding objective for all reclamation treatments is to promote NPI by establishing diverse ecosystems and habitats that will persist and continue to promote succession toward desired mid to late seral stages over time ... Reclamation will be scheduled in areas where mining and operations are complete and not planned for any future mining activities.

The clear intention behind Teck’s reclamation activity is on long-term re-establishment of ecosystems in areas not planned for future operations. Reclaimed areas do not fall under the definition of area of mining operations

Categorizing reclaimed sites as “interim” allows Teck to fulfill their obligations to the provincial regulator, while simultaneously taking advantage of a larger existing footprint to avoid assessment of the Castle Project. The characterization to the Agency that these sites may later be

¹⁴ Letter from Teck to the Agency, *supra* note 11.

¹⁵ Teck Coal Limited, “Fording River Operations 2019 Annual Reclamation Report” (31 March 2020) [Reclamation Report] at i. Excerpts of the Reclamation Report are attached as Appendix C.

¹⁶ Reclamation Report, *supra* note 15 at 4-5.

re-purposed for operations is not consistent with the characterization of sites as reclaimed to the provincial regulator.

Before the Agency can accept the figures as provided by Teck, clear delineation between sites permanently reclaimed (a total of 685.58 ha as stated to the province) and sites that may later be repurposed for active operations (an alleged 590 ha included as part of the existing footprint) should be required.

Whether these interim sites may be characterized as active area of mining operations should be scrutinized in detail by the Agency before these figures as provided are accepted. The Agency should be hesitant to accept such submissions that allow for a larger existing footprint. Reliance on reclaimed sites as potential area for future operations would allow proponents to significantly increase the original footprint, allowing for major expansions to escape review. This is doubly true for existing projects that have not yet been subject to federal assessment.

ii. *Permitted (not constructed) Areas*

Teck has also included 1,230 ha as part of the existing FRO footprint that has been permitted, but not yet constructed. The inclusion of components permitted but not yet constructed appears to be in response to the Agency's request to include "components for which regulatory approvals have been issued but construction has not yet started." These two categories are not necessarily the same. The Agency should not accept inclusion of areas planned for construction without specific details on future expansion, as the inclusion of this component would also allow for significant increases to the calculation of the existing footprint.

It is unclear how Teck is defining "permitted area" where future construction may occur. Teck may be relying on provincial regulatory approvals for FRO, such as through the *Mines Act*. However, permits under the *Mines Act* are often significantly larger than the actual footprint of the projects, and should not be used to calculate existing area. The federal definition of the "area of mining operations" under the *Regulations* is designed to capture the area of actual facilities, not the theoretical limit of operations as defined by the permitted area.

Again, "area of mining operations" is defined as "the area at ground level occupied by any open-pit or underground workings, mill complex or storage area for overburden, waste rock, tailings or ore" (*emphasis added*).

When this definition was first added in 2013 under the predecessor to the present *Regulations*, the *Regulations Designating Physical Activities*,¹⁷ the explanation for the addition of this definition was included through a Regulatory Impact Statement: "The entries for all expansions would be adjusted to use a consistent approach that specifies an increase of 50% or more in the size of the facility and that the resulting facility must meet or exceed the threshold size for a new facility of that type."¹⁸

¹⁷ Note: This definition was originally "area of mine operations", rather than "area of mining operations", however the content of the definition was the same.

¹⁸ Canadian Environmental Assessment Agency, "Regulatory Impact Analysis Statement" (2013), online: https://www.firstpeopleslaw.com/database/files/library/Regulations_Amending_the_Regulations_Designating_Physical_Activities.pdf.

Additionally, within the Regulatory Impact Statement it was stated that “entries for mine expansions would be modified to relate the size of the expansion to an increase in the area of disturbance rather than referring only to production capacity”¹⁹ (*emphasis added*).

This explanatory note provides clarity on the purpose behind the addition of this definition. The use of the word “facility” appears to capture the actual components of the mine, and not the entire permitted area that could potentially be used for later expansion. Additionally, the addition of an area threshold was designed to capture increases in the area of disturbance for mining expansions; area not intended for facilities or disturbance should not be captured under this definition.

The Agency should be hesitant to accept Teck’s figures about planned construction without detailed information about future operations. The definition of area of mining operations refers to the area occupied by present facilities, not to area theoretically reserved for eventual construction. Allowing proponents to rely on the larger permitted area, without explanation of planned development, would significantly increase the area of existing operations, allowing much larger mining expansions to escape review and undermining the purpose of the thresholds within the *Regulations*.

The Agency should be wary to allow this interpretation of the definition of the “area of mining operations” due to the precedent it would set for future major expansions to mining projects in Canada.

iii. *Teck’s proposed expansion is conceptual*

As noted above, Teck’s proposed expansion is conceptual, meaning that a precise determination of the percentage increase cannot be undertaken. Given the questionability of the inclusion of some of the components, the ultimate footprint of the expansion could be determinative of whether the Castle Project constitutes a designated project.

For example, slight variation to the area of existing components permitted but not yet constructed would lead to the expansion surpassing the 50% threshold. Any changes to the conceptual footprint of the Castle Project would then make the requirement for assessment determinative.

Teck has already noted the uncertainty around anticipated area for the Castle Project. In the Initial Project Description to the BC EAO, Teck acknowledged the eventual footprint was still unknown: “Since the Project is still conceptual, Teck has not determined the exact footprint for the Project.”²⁰

There are also discrepancies between Teck’s submissions on the expansion footprint to the BC EAO as compared to the footprint provided to the Agency. The area of the Castle Project was stated to be 2,550 ha to the province (based on the area disturbed by the project outside of previously permitted areas), and 2,010 ha to the Agency (based on the area of certain categories of facilities). The difference in these two footprints is 540 ha. Additionally, the two maps provided to the BC EAO and the Agency are quite different, as there appears to be additional area included along the east and south edges of the proposed footprint.²¹

¹⁹ *Ibid.*

²⁰ Castle Initial Project Description, *supra* note 1 at 40.

²¹ See Castle Initial Project Description, *supra* note 1 at 42, and Letter from Teck to the Agency, *supra* note 11 at 6.

In Teck's submission to the Agency on the footprint of the Castle Project, Teck acknowledged that certain components were excluded: "Any part of FRO or the Project that is not within one of the subcategories does not count as part of the area of mine operations under the *Regulations* and was not included in the calculations."²² While a list of included subcategories was provided to the Agency, the precise list of excluded facilities was not. At least 540 ha of disturbed area was unaccounted for in Teck's submission to the Agency.

Given the conceptual uncertainty around the expansion footprint of the Castle Project, a lack of precise information provided on what facilities were excluded from calculation as provided to the Agency, and the potential errors in calculation of the existing FRO footprint, it is essential that the Agency re-assess the figures as provided by Teck to determine whether the Castle Project will constitute a larger than 50% increase in the area of mining operations.

The Agency has dealt with uncertainty about conceptual expansions for previous determinations around whether a mine expansion is a proposed project. On a recent determination regarding an expansion to the Vista Coal Mine in Alberta, the Agency relied on a range of estimated footprints as changes were anticipated to both existing operations and the proposed expansion: "Using proponent information, the Agency calculated that the Project would result in an increase in the area of mining operations between 42.7 to 49.4 percent, depending on how future anticipated changes to the Phase I footprint are considered in calculations."²³ The same uncertainty around existing and proposed footprint is present with the Castle Project – if the range of potential expansion is over the threshold of 50%, the Agency should proceed on the basis of caution when determining if the expansion is a prescribed project under the *Regulations*.

Both interim reclamation sites and permitted but not yet constructed areas should arguably not be considered as part of the area of existing operations. If these two components are to be included, more information from Teck is required to determine the extent of reclamation and the intended use for each of these areas.

If these two components were not included within the existing area of mining operations, the existing area of FRO would be 3,810 ha, rather than 5,630 ha. The increase in the area of mining operations would then be 2,010 ha/3,810 ha = a 52.76% increase. The Castle Project would therefore be a designated project under the *Regulations* and would require assessment under the *IAA*.

Given these significant uncertainties, it is our submission that the Agency should reconsider their determination that the Castle Project is not a designated project under the *Regulations*. At the very least, further information from Teck is required before their figures can be accepted as determinative. To accept Teck's submissions, without further information and analysis, would be an error. The Castle Project may indeed constitute a larger than 50% increase in the area of mining operations, and therefore require assessment under the *IAA*.

b. The Castle Project should be designated pursuant to section 9(1) of the IAA

²² Letter from Teck to the Agency, *supra* note 11.

²³ Impact Assessment Agency of Canada, "Analysis Report: Whether to Designate the Coalspur Mine Ltd. Vista Coal Mine Phase II Project in Alberta" (December 2019), online: <https://iaac-aeic.gc.ca/050/documents/p80341/133221E.pdf>.

In the alternative, if the Castle Project is found not to exceed the threshold for prescribed projects under the *Regulations*, the Minister should designate the project pursuant to section 9(1) of the *IAA*.

A full impact assessment of the Castle Project is necessary for several reasons, as the project:

- either exceeds or is near a threshold set out in the Project List;
- is near an environmentally sensitive location;
- involves the use of new technologies; and
- will cause significant adverse impacts to areas of federal jurisdiction, impacts which have not yet been adequately addressed through other legislative and regulatory mechanisms, including:
 - impacts to fish, fish habitat, and other aquatic species;
 - impacts to terrestrial species at risk;
 - impacts to migratory birds;
 - impacts to federal lands;
 - international and interprovincial impacts;
 - cumulative impacts within the Elk Valley; and
 - greenhouse gas emissions that may impact Canada’s ability to meet its commitments in respect of climate change.

Each of these considerations is discussed in detail in this section.

i. *Proximity to a Threshold in the Project List*

As discussed in the previous section, if the Castle Project does not exceed the threshold for expansions to coal mines, it is very close to the threshold that would require federal assessment. Uncertainty around the figures as provided by Teck for the existing FRO footprint, as well as the conceptual uncertainty around the size of the expansion, indicate that the proposed project will be very close to the threshold if it is not as surpassed.

Once fully operational, the Castle Project would be the largest coal mine in Canada by annual coal production volume. FRO is currently the largest coal mine in Canada, with an annual production of 7.9 million tonnes (MT) in 2019 and a planned annual production rate of 10 MT.²⁴ Once Castle becomes the primary operation site for FRO by the early 2030s, the expansion alone will be the largest coal mine in Canada by production.

Despite the Castle Project being an expansion to an existing mine, the project’s annual production will be larger than the combined production of three new mines in the Elk Valley currently in the federal assessment process, and the disturbance footprint of the project is roughly equivalent to these three proposed mines.²⁵

²⁴ Reclamation Report, *supra* note 15 at 11, and Castle Initial Project Description, *supra* note 1 at 15. See also Teck Resources Limited, “2019 Annual Report” (26 February 2020) online: <https://www.teck.com/media/2019-Annual-Report.pdf> [Teck 2019 Annual Report].

²⁵ These three mines are the [Michel Coal Project proposed by North Coal Ltd.](#): 2.3-4MT/year production, 87.4 MT total production, and 1424 ha of disturbance reported to the Agency; the [Crown Mountain Coking Coal Project proposed by NWP Coal Canada Ltd.](#): 3.7 MT/year production, 56 MT total production, and approximately 1100 ha of reported disturbance; and the [Bingay Main Coal Project proposed by Centermount Coal Limited](#): 1 MT/year

Additionally, the historical lack of assessment for both the original mine and related projects in the area by the same proponent, and well-documented adverse environmental impacts in the Elk Valley, require the Castle Project to be assessed before further development can occur in the area. As stated previously, no part of FRO has been assessed federally, as the original mine pre-dates provincial and federal environmental assessment laws, and the Swift expansion was determined not to require assessment after the passing of CEAA 2012,²⁶ despite initially being designated in 2011.²⁷

The Swift expansion increased the area of mining operations of the Fording River mine by roughly 27-38% (depending on components included in the area of mining operations as detailed above) and will continue to be mined until the early 2030s.²⁸

In fact, none of the metallurgical coal operations in the Elk Valley have been subject to federal assessment. Major expansions at Teck's nearby Elkview and Line Creek mines, for decades of additional mining each, were also approved without federal assessment in 2016 and 2013 respectively.

Extensive coal mining has already taken place at the Fording River mine, the adjacent Greenhills mine and other nearby Elk Valley mines, now covering a permitted area of more than 150 square kilometers and an estimated 2020 production output of 24 MT of coal,²⁹ without any federal impact assessment having taken place.

The failure to assess any of the coal operations in the Elk Valley raises serious concerns around the cumulative impacts of these operations. Additionally, the well documented issues with selenium pollution, the adverse impacts of this pollution on areas of federal jurisdiction, and the failure of the federal government to consider the success of proposed mitigation strategies to address these adverse impacts, raises serious concerns. Each of these issues is discussed in detail further on in this letter.

ii. *Proximity to Environmentally Sensitive Location*

The project is located adjacent to the heavily-polluted upper Fording River, where a recent population crash saw adult westslope cutthroat trout ("WCT") reduced by 93%. Polluted water from waste rock storage at the Castle mine would flow primarily into the upper Fording River.

The upper Fording River flows into the Elk River and then into Lake Koocanusa, where significant impacts on fish are being investigated as part of the joint B.C.-Montana Lake Koocanusa process. Any increase in water pollution flowing into the upper Fording River may

production, 13 MT of total production, and 420 ha of disturbance. In total, these three projects would have an annual 7-8.7 MT/year production, 156.4 MT total production, and approximately 2944 ha of disturbance. Information about these projects is based on information provided by the proponents to the Canadian Impact Assessment Registry.

²⁶ See Pynn, *supra* note 4.

²⁷ See CEA Agency, "Archived - Fording River Operations Swift Coal Mine Expansion", online: <https://iaac-aeic.gc.ca/052/details-eng.cfm?pid=67115>.

²⁸ Estimate based on the figures and maps in Teck Coal Limited, "Fording River Operations Swift Project Environmental Assessment Certificate Application: Section A3 — Project Description" (November 2014), online: <https://projects.eao.gov.bc.ca/api/public/document/58868f56e036fb0105768100/download/Section%20A%20-%20A3%20Project%20Description.pdf> [Swift Project Description] at A3-3 and A3-4, as well as the figures in Teck Coal Limited, "Annual Reclamation Report 2014: Fording River Operations" (31 March 2015), online: <https://mines.empr.gov.bc.ca/api/document/5ba3bd5d225898003c82d86c/fetch> at vi and 1.

²⁹ Teck 2019 Annual Report, *supra* note 24 at 10.

cause significant additional adverse environmental effects in the Fording and Elk Rivers as well as Lake Kootenai and the Kootenai/Kootenay River downstream.

In addition to impacting these waterways and the aquatic species within, the project would be located in grizzly bear and wolverine habitat, threatening connectivity for these species. It would destroy a significant area of high-elevation grassland habitat for Rocky Mountain bighorn sheep. The specific potential adverse impacts of the Castle Project on water, fish, other aquatic species, and terrestrial species, are discussed further on in this letter.

iii. *Use of New Technologies*

Teck has proposed the use of technologies for the Castle Project that are either new or untested. The Initial Project Description for the project considers the use of several strategies to control and mitigate water pollution: source control, Active Water Treatment Facilities (“AWTF”), Saturated Rock Fill (“SRF”) and in-situ treatment.

While these options are apparently all on the table, Teck’s public statements are clear about their intention to use SRF as their primary method, especially in presentations given by Teck and BC Ministry of Environment at the Lake Kootenai Monitoring and Research Working Group meetings in November. Teck has indicated that the Fording River South AWTF facility currently under construction will be their last, and all future treatment will be done with SRFs.³⁰

The SRF technology is unproven, having only been trialed at scale since 2018 at Elkview mine. Data about the effectiveness of this technology is not public. However, as described in the next section, Teck has applied for a permit to discharge significant levels of selenium and nitrate from the SRF, indicating that it is not as effective as they have publicly claimed. A federal assessment is crucial to establish the effectiveness and appropriateness of the new SRF technology to the water pollution problem.

Even AWTF is a relatively new technology and far from proven. Teck currently operates one AWTF facility at their Line Creek mine and another is under construction at the Fording River mine. The existing facility was initially brought online in 2014, but soon released significant water pollution that killed fish downstream, resulting in a \$1.4M fine under the *Fisheries Act*.³¹

More recently, in 2018, the facility was shut down for approximately a year after it was discovered that speciation of selenium in the biological treatment process was releasing selenium downstream in a more bio-available form, increasing the effective risk for fish and aquatic life directly downstream. Because of these issues, the Fording River South AWTF, originally scheduled to be operating by the end of 2018, is now three years behind the schedule in the Elk Valley Water Quality Plan and still not active. As described in the next section, a recent permit application indicates the AWTF would discharge significant levels of selenium. Given the significant issues with the AWTF technology, the potential use of this new technology in the

³⁰ Teck 2019 Annual Report, *supra* note 24 at 13. Teck stated that their “current plan is that the Fording River AWTF will be the last full-scale AWTF and that future treatment facilities will be SRFs.”

³¹ Environmental Offenders Registry, “Teck Coal Limited - conviction information for 2017-10-05” (5 November 2017), online: <https://environmental-protection.canada.ca/offenders-registry/Home/Record?RefNumber=198> [Line Creek AWTF Fine]. ECCC laid 3 charges under section 36(3) of the *Fisheries Act* (deposit of a deleterious substance) against Teck following the death of 74 fish in Line Creek, including 52 Bull Trout and 22 Cutthroat Trout. Teck pled guilty to the three offences and was sentenced to a penalty of \$1,425,000.

proposed project should also be evaluated in a federal assessment, especially if it is intended as a backup for an unproven SRF.

For both AWTF and SRF, little information has been made publicly available. Teck has claimed the details of these technologies are confidential business information. Both of these technologies are highly complex, relying on biological processes. Past provincial environmental assessments have not attempted any significant evaluation of the technology.

Recently, Teck has been using anti-scaling additives to rivers for control of calcification. This practice has not been assessed in an environmental assessment for a project in the Elk Valley.

Similarly, source control has only been used in limited cases by Teck in the Elk Valley to date and detailed information on its effectiveness has not been made public. This would include clean water diversions, waste rock dump layering techniques, capping of waste rock dumps and so on. Source control would also include attempts to reduce nitrates by lining holes drilled for blasting before placing explosives, a process Teck is working on, but for which the effectiveness has not yet been quantified.³² In situ treatment appears to be largely theoretical. All of these options should be evaluated, if they will be used in the project, in the public sphere, through the federal assessment process.

Additionally, Teck proposes “the use of new and innovative technologies where they are technically and economically feasible” in the project,³³ which could include other new technologies, including potential treatment for nickel water pollution,³⁴ or treatment for sulphate water pollution which the company is currently piloting in the Elk Valley.³⁵ The company recently referred to “25 research and development projects underway” related to water quality³⁶ including a new type of water treatment technology called Gravel Bed Bioreactors.³⁷

When any of these technologies are being relied upon to protect fish and water quality downstream, assessment of these technologies is critical.

iv. Impacts to Areas of Federal Jurisdiction

Fish, Fish Habitat and other Aquatic Species

Selenium leaching from waste rock dumps associated with open-pit coal mine operations has created an ongoing environmental crisis in the Elk Valley, causing devastating effects on fish and fish habitat. Despite this situation worsening over time, none of Teck’s existing coal mines have been subject to federal assessment. It is critical that the Castle Project be assessed to

³² Teck Coal Limited, “Elk Valley Water Quality Plan 2019 Implementation Plan Adjustment” (31 July 2019), online: <https://www.teck.com/media/Elk-Valley-Water-Quality-Plan%E2%80%93Implementation-Plan-Adjustment.pdf> [EVWQP 2019 Implementation Plan Adjustment] at 14.

³³ Castle Initial Project Description, *supra* note 1 at 12.

³⁴ Castle Initial Project Description, *supra* note 1 at 56.

³⁵ EVWQP 2019 Implementation Plan Adjustment, *supra* note 32 at 81.

³⁶ Marcia Smith (Senior vice-president, sustainability and external affairs, Teck Resources), “Letter to the Editor” (18 May 2020), *The Globe & Mail*, online: <https://www.theglobeandmail.com/opinion/letters/article-may-18-the-new-normal-seems-to-be-that-debt-doesnt-matter-readers/>.

³⁷ Elk River Alliance, “ERA Questions & Teck Responses re: Teck 2019 IPA Adjustment” (18 April 2019), online: https://www.elkriveralliance.ca/era_qs_teck_2019_ipa.

determine the extent of additional selenium pollution from the project, and the impact to vulnerable fish populations in the area.

Selenium pollution levels in the Fording River, Elk River, Koocanusa Reservoir and Kootenai/Kootenay River continue to increase, despite Teck's commitments to reduce these pollution levels under 2014's Elk Valley Water Quality Plan (the "EVWQP") and the associated provincial permits. Selenium pollution has already had significant adverse effects on fish, including westslope cutthroat trout ("WCT") and bull trout.

Not only are fish and fish habitat the responsibility of the federal government under section 91(12) of the *Constitution Act, 1867*, WCT are listed as a species of Special Concern on Schedule 1 of the federal *Species at Risk Act* ("SARA").³⁸

Effects on fish and fish habitat from the Castle Project are likely to be significant. A 2012-2014 investigation and subsequent report by Environment and Climate Change Canada [the "2014 ECCC Report"] found significant impacts to WCT from selenium pollution, including the loss of more than half of the reproductive capacity of WCT in the upper Fording River and an increasing pollution trend that threatened the survival of the isolated upper Fording population and significant risk for WCT downstream in the Elk River.³⁹

In addition to the impacts on WCT in the upper Fording River and to many species in Lake Koocanusa and downstream in the Kootenai/Kootenay River, there are or could be significant cumulative effects from the existing and proposed coal mines in the Elk Valley on fish populations in the Elk River itself, including WCT, bull trout, mountain whitefish and smaller species.

The 2014 ECCC Report also touches on the Elk River WCT population, concluding that effects on reproduction could be significant and noting numerous reports of deformities.⁴⁰ However, as the majority of the Elk River is outside of ongoing monitoring study areas for the current mines, significantly less research has been done on the Elk River and resident fish populations. A very popular catch and release recreational fishery also takes place on the Elk River for WCT and bull trout, likely leading to cumulative impacts in combination with mine effects and water quality issues from logging.⁴¹

Despite significant effort on research and development over the last decade, Teck has yet to find mitigation strategies to substantially address the long-term effects of selenium pollution flowing into the Fording River and the Elk Valley watershed. Standard design features or mitigation measures as proposed do not address the adverse effects of selenium pollution in the long term.

While there is still a great deal of uncertainty about the time scale of the selenium leaching problem from waste rock dumps at Elk Valley coal mines, it is generally considered to continue

³⁸ *Species at Risk Act, SC 2002, c 29* [SARA] at Schedule 1.

³⁹ Dr. Dennis Lemly, "Review of Environment Canada's Teck Coal Environmental Assessment and Evaluation of Selenium Toxicity Tests on Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia" (25 September 2014), online:

https://www.teck.com/media/2014-Water-review_environment_canada-T3.2.3.2.1.pdf [Lemly Report] at 57-59.

⁴⁰ Lemly Report, *supra* note 39 at 54-56.

⁴¹ The Elk Valley is home to large Private Managed Forest Land holdings, unlike most of BC where forestry takes place primarily on Crown land. The logging regulations on private managed forest, including on downstream water quality impacts, are much weaker than for logging on crown land.

for a very long time. No reduction of selenium pollution levels has been detected in water flowing from existing waste rock dumps, despite no new waste rock added to some for more than three decades.⁴² On this basis, water quality modeling in the Elk Valley assumes the rate of selenium leaching is proportional to the amount of waste rock, with no decay term over time.⁴³ Similar data shows sulphate pollution is expected to continue over a comparable time scale.⁴⁴

One study found they could not measure any depletion of selenium from an Elk Valley waste rock dump after 30 years, and estimated that less than 1% of the total selenium in the rock leached out over 30 years.⁴⁵ Some experts have assumed selenium pollution will continue for centuries,⁴⁶ but longer time scales are also consistent given the limited data available. Estimates of time scales for selenium and other pollutant leaching from waste rock dumps for the Castle Project must be undertaken as part of a federal assessment.

Two pollution reduction technologies proposed by Teck for the Castle Project, active water treatment and saturated rock fills, are both active pollution reduction technologies that require constant management. Neither are appropriate solutions to the long-term selenium water pollution problem in the Elk Valley which will persist for centuries or longer. It is simply not reasonable to assume that Teck will be operating these treatment facilities, which will cost on the order of \$100 million per year operate,⁴⁷ for any significant period of time beyond the end of mining operations. No solutions implemented or even proposed would significantly mitigate long-term pollution from the Castle Project. Any reduction of water pollution levels due to treatment would only mask long-term impacts, which would return once treatment is inevitably discontinued.

We note that Teck plans for water treatment to continue for an “indefinite period after mining operations end.”⁴⁸ Teck has never made public any plans for pollution mitigation beyond water treatment, leading us to believe that the company does not have any appropriately long-term plans to mitigate the pollution problem. Recent provincial EAs for Teck mine expansions in the Elk Valley have not considered the full timescale of the selenium leaching problem.

⁴² Teck Resources Limited, “Elk Valley Water Quality Plan: Annex D.4 Geochemical Source Term Inputs and Methods for the Elk Valley Water Quality Planning Model” (June 2014), online: https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/mining-smelt-energy/area-based-man-plan/annexes/d4_geochemical_source_term_inputs_methods.pdf at 37.

⁴³ *Ibid* at 42.

⁴⁴ *Ibid* at 37.

⁴⁵ Hendry et al., “Reservoirs of Selenium in Coal Waste Rock: Elk Valley, British Columbia, Canada” (3 June 2015), *Environmental Science & Technology*, online:

https://www.hendrygeosciences.com/uploads/1/8/0/6/18060125/hendry_et_al_2015_es_t_proof_abf11.pdf at E.

⁴⁶ A. Dennis Lemly, “Environmental hazard assessment of Benga Mining’s proposed Grassy Mountain Coal Project” (25 March 2019), *Environmental Science & Technology*, online: <https://aeic-iaac.gc.ca/050/documents/p80101/132193E.pdf> at 110.

⁴⁷ Teck 2019 Annual Report, *supra* note 30 at 13. The report also indicates an estimated long-term operating cost of \$3 per tonne and annual production of roughly 24 million tonnes, leading to an estimate of \$72 million annually. However, the report states that current operating costs are \$31 million (\$1.30 per tonne) with only two small facilities in operation and 14 or more additional facilities are planned. This estimate appears to be highly optimistic and the true cost may be hundreds of millions annually.

⁴⁸ Teck 2019 Annual Report, *supra* note 30 at 13.

An assessment of the proponent's plans to manage the selenium pollution problem over the appropriate timescale must be evaluated through federal assessment, in order for the impacts on fish and fish habitat to be properly considered and addressed.

Despite Teck's apparent plans for water treatment, their recent Elk Valley Water Quality Plan 2019 Implementation Plan Adjustment [the "EVWQP 2019 Implementation Plan Adjustment"] anticipates water pollution levels far above those considered safe for fish. Even with water treatment in place, Teck anticipates monthly average selenium levels in the Fording River of up to 60 micrograms/litre ($\mu\text{g}/\text{l}$) indefinitely directly downstream of the Fording River mine,⁴⁹ while the BC Water Quality Guideline for protection of aquatic life is $2\mu\text{g}/\text{l}$ and the corresponding CCME guideline is $1\mu\text{g}/\text{l}$. The Castle project would add additional selenium pollution to the upper Fording River, further increasing selenium levels at this site and downstream.

Source control is also contemplated in Teck's Initial Project Description for the BC EAO. While clean water diversions have been tested at operating Teck mines, continued increases in pollution levels indicate these are not very effective. Other options like capping of waste rock or layered waste rock dump construction techniques have not been tested, despite many years of discussion from Teck. Teck's public statements have not indicated that source control is a significant part of their selenium mitigation strategy in the Elk Valley at existing mines.

Nitrate pollution is also a significant threat to fish and other aquatic life downstream of Teck's mines. While nitrate pollution only flows from waste rock dumps over a timescale of decades after mining ends, even with planned treatment in place, nitrate levels are expected to be above BC Water Quality Guidelines and CCME guidelines for decades.⁵⁰

Recent permit amendment applications from Teck indicate their treatment facilities are not working as well as the company has indicated or planned. An application for expansion of Teck's Elkview saturated rock fill requests a monthly average selenium discharge limit of $41\mu\text{g}/\text{l}$ and a nitrate limit of $8\text{mg}/\text{l}$, while an application for the under-construction Fording River South AWTF requests a selenium discharge limit of $37\mu\text{g}/\text{l}$, both with allowable 50% acute toxicity of daphnia magna and rainbow trout.⁵¹ These pollution limits not only pose clear danger to fish and other aquatic life, but they are far higher than Teck has indicated publicly (the company has repeatedly claimed "near-complete removal of selenium and nitrate" for their Elkview SRF)⁵² or

⁴⁹ EVWQP 2019 Implementation Plan Adjustment, *supra* note 32 at 64.

⁵⁰ EVWQP 2019 Implementation Plan Adjustment, *supra* note 32 at 58

⁵¹ See Teck Social Responsibility Office, "Environmental Protection Notice—Notice of Filing: Teck Coal Ltd Fording River Operations: Active Water Treatment Facility—South" (23 January 2020), online: https://www.teck.com/media/Public_notification_AWTF.pdf [Fording River AWTF Notice] and Teck Social Responsibility Office, "Environmental Protection Notice: Notice of Filing: Teck Coal Ltd Elkview Operations: Saturated Rock Fill—Phase 2" (11 June 2020, The Fernie Free Press, online: https://www.thefreepress.ca/editions/?iid=i20200611040009934&&headline=VGhIEZyZWUgUHJlc3MsIEp1bmUgMTEsIDlwMjA=&&doc_id=200611110848-ac346b20324f342d21962637235f7ae1 [Elkview SRF Notice] at A15.

⁵² See for example Teck Resources Limited, "Taking Inspiration from Nature: Innovative and Efficient Water Treatment with Saturated Rock Fill Technology" (11 March 2020), online: <https://www.teck.com/news/stories/2020/taking-inspiration-from-nature-innovative-and-efficient-water-treatment-with-saturated-rock-fill-technology>.

has planned for in the past (the original EVWQP planned for 20µg/l selenium and 3mg/l nitrate discharge limits from the Line Creek AWTF).⁵³

Additionally, other water pollutants threaten fish and aquatic life including calcite, sulphate, cadmium and nickel. While anti-scaling agents are currently being added to polluted rivers to mitigate some of the effects of calcite, which causes cementation of riverbeds with impacts on fish reproduction and food supply, this is also not a long-term solution appropriate to the problem. There are currently no mitigations in place for sulphate, which has exceeded provincial limits under the EVWQP, and nickel, a pollutant that has only recently come to light.

With all of these pollutants expected to leach from waste rock for the long term and continue devastation to resident fish populations, it is clear that long-term solutions are needed. It is crucial for a federal assessment not only to investigate adverse effects due to these pollutants, but also the inevitable cumulative effects from multiple pollutants affecting fish and aquatic life.

Additionally, destruction of fish habitat is a significant concern with the Castle Project, as the project will cover a significant portion of Kilmarnock Creek with waste rock. While Kilmarnock Creek cannot be reached by WCT from the upper Fording River due to a few kilometres being buried by water rock dumps just above the Fording confluence, there remains a population of WCT in Kilmarnock Creek above the mine,⁵⁴ and the tributary has been identified as a significant past spawning tributary of the Fording River.⁵⁵ Loss of the remaining lower, meandering portion of Kilmarnock Creek to waste rock dumps as anticipated in the Castle project is likely to have severe impacts on this population of WCT. Many tributaries of the upper Fording River have already been lost to mining or related water pollution, with significant cumulative impacts on WCT.

Finally, western toad, a species of special concern under *SARA*, are found in the area.⁵⁶ Little is known about the impact on this species,⁵⁷ but effects of water pollution on tadpoles is possible.⁵⁸

Terrestrial Wildlife and Species at Risk

⁵³ Ministry of Environment and Climate Change Strategy, “Permit #107517 Under the Provisions of the *Environmental Management Act*” (amended 25 August 2018), attached as Appendix D [BC Waste Discharge Authorization 107517].

⁵⁴ Westslope Fisheries Ltd., “Upper Fording River Westslope Cutthroat Trout Population Assessment and Telemetry Project, Final Report” (December 2016), online: [https://www.teck.com/media/Upper-Fording-River-Westslope-Cutthroat-Trout-Population-Assessment-and-Telemetry-Project,-Final-Report-\(December-2016\).pdf](https://www.teck.com/media/Upper-Fording-River-Westslope-Cutthroat-Trout-Population-Assessment-and-Telemetry-Project,-Final-Report-(December-2016).pdf) at 10. This report was prepared for Teck by Westslope Fisheries Ltd.

⁵⁵ Minnow Environmental Inc., “Data Report for the Tributary Evaluation Program (DRAFT)” (June 2016), online: <https://www.teck.com/media/Data-Report-for-the-Tributary-Evaluation-Program.pdf> [Minnow Report] at 49. This report was prepared for Teck by Minnow Environmental Inc.

⁵⁶ Minnow Report, supra note 55 at 50.

⁵⁷ Golder Associates Ltd., “Selenium Bioaccumulation Model 2017 Update Report” (30 January 2018), online: <https://www.teck.com/media/Selenium-Bioaccumulation-Model-2017-Update.pdf> at 1-2.

⁵⁸ Cadmium is known to reduce growth: COSEWIC, “COSEWIC Assessment and Status Report on the Western Toad 2012”, online: www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/western-toad-2012.html at 19. Additionally, selenium may reduce growth per ECCC & Health Canada, “Screening Assessment: Selenium and its compounds” (December 2017), online: <https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/screening-assessment-selenium.html> at 32.

The Castle Project will also result in significant potential adverse effects on terrestrial wildlife. Several of these terrestrial species are federal species of special concern under *SARA*, including grizzly bears and wolverines.

With three existing coal mines in the immediate area (FRO, Greenhills, Line Creek) and other existing and proposed mines along the important Rocky Mountain connectivity corridor, there is significant concern that connectivity for wide-ranging species like grizzly bears and wolverines could be impaired through the addition of the Castle Project to an area where significant large-scale destruction of habitat has already taken place.

In the long-term, it is unclear to what degree remediation efforts can restore this mountainous habitat, both because much of the mountain is removed in the mining process and because remediation efforts to date in the Elk Valley have not shown much success in restoring fully functioning ecosystems, a very challenging task when starting from an open-pit mine or waste rock dump. Federal assessment is a necessity before additional projects are added to this area.

Dr. Clayton Lamb, Liber Ero Fellow, University of British Columbia-Okanagan of the South Rockies Grizzly Bear Project wrote:⁵⁹

“The Continental divide region is a key connectivity corridor for large carnivores. The Chauncey, Kilmarnock, and Brownie drainages offer a travel corridor for carnivores travelling north-south along the BC Rockies. Most grizzly bears tend to avoid the active mine footprint in the Fording and Greenhills area, and the Continental divide itself is often too steep to traverse and cross, leaving Chauncey and Kilmarnock as alternative routes for animals to circumvent the current mine footprint.”

The Castle Project may cut off this travel corridor, particularly due to the use of the Kilmarnock Valley as a waste rock dump. In this case, grizzlies would be left only with the options of steep terrain along or over the Continental Divide, travelling over a mine area or travelling along the bottom of the Elk Valley. This could further limit connectivity in an area where other mines, recreational use (particularly on the Alberta side of the Rockies) and logging are already limiting habitat availability.

The loss of wolverine habitat and connectivity is another serious concern. Dr. Anthony Clevenger, WTI-Montana State University, who has conducted extensive research and tracking of wolverines in the Southern Rockies,⁶⁰ said:

“The Continental Divide is essentially the last continental life line for wolverines (and grizzly bears) connecting the two most important protected areas and source populations for wolverines: Banff-Kootenay National Parks and Waterton Lakes National Park / Glacier National Park in Montana. Our research has shown this is a critically important area for female wolverines, with detections highly constricted along the Continental Divide. Keeping female wolverines on the landscape and in the population is needed to keep the population viable over the long term. The Castle mine expansion threatens that

⁵⁹ Correspondence between Wildsight and Dr. Clayton Lamb.

⁶⁰ Clevenger et al., “Mapping the Wolverine Way: Understanding landscape and human effects on wolverine abundance, distribution and connectivity in the Canadian Crown of the Continent (CCoC) ecosystem: 2016 Summary Report” (June 2016), online: <https://www.wolverinewatch.org/wp-content/uploads/2015/05/2016-WolverineAnnualReport.pdf> at 14. This research indicates wolverines in close proximity to the project area

viability by fragmenting the population into two distinct subpopulations and will limit movement and genetic interchange in this important core refuge area in the Canadian Rockies.”⁶¹

The project area also includes more than three square kilometres of rare high-elevation grasslands, which are critical winter habitat for Rocky Mountain bighorn sheep. These sheep have already lost 28% of their high-elevation grassland habitat in the Elk Valley due primarily to coal mining.⁶² This habitat may also be used by American badgers, a SARA-listed endangered species.⁶³ This grassland ecosystem could likely not be re-created at the end of mine life, not only because of the difficulties inherent in establishing a rare and sensitive grassland ecosystem, but also because the project area may no longer include these high-elevation areas. Despite many decades of mining in high-elevation grasslands that are bighorn sheep habitat at FRO, Teck only began a trial of high-elevation grassland replanting in 2019,⁶⁴ so it is unknown if this kind of restoration is even possible.

The high-elevation mountain slopes of the project area are also home to whitebark pine, a SARA-listed endangered species. The project area is within the proposed designated critical habitat for whitebark pine.⁶⁵ Any whitebark pine within the Castle Project’s footprint would be removed; Teck has already removed significant amounts of whitebark pine in the Elk Valley.⁶⁶ Within the footprint the species may never recover due to the reduction of elevation due to mining, leaving little area of sufficient elevation for whitebark pine,⁶⁷ difficult growing conditions on mined areas, and the threat of white pine blister rust, which seedlings and young trees are most susceptible to,⁶⁸ as well as the 60-year period needed before the trees can reproduce.⁶⁹ Teck has a program to replant whitebark pine, however no information is available publicly about the

⁶¹ Correspondence between Wildsight and Dr. Anthony P. Clevenger, WTI-Montana State University.

⁶² Poole et al., “Kootenay Region Bighorn Sheep Management Plan – Draft for discussion”, online: <https://www.ferniergc.com/documents/Kootenay%20BHS%20Draft%20mgmt%20plan%20%2023Apr19.pdf> at 16. Prepared for the BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development.

⁶³ SARA, *supra* note 38.

⁶⁴ Teck Resources Limited, “Biodiversity and Reclamation”, online: <https://www.teck.com/responsibility/approach-to-responsibility/sustainability-report-disclosure-portal/material-topics/biodiversity-and-reclamation/> at Table 34.

⁶⁵ Environment and Climate Change Canada, “Recovery Strategy for the Whitebark Pine (*Pinus albicaulis*) in Canada [Proposed]” (2017), online: https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/rs_whitebark_pine_e_proposed.pdf [Recovery Strategy for the Whitebark Pine].

⁶⁶ Teck logged more than 1231 cubic metres of whitebark pine in the Elk Valley between 2012 and 2018. See Ben Parfitt, “B.C. allows logging, mining companies to cut down thousands of endangered trees” (10 June 2019), *The Narwhal*, online: <https://thenarwhal.ca/b-c-allows-logging-mining-companies-to-cut-down-thousands-of-endangered-trees/>.

⁶⁷ The elevation range of whitebark pine is down to approximately 1700m in southern B.C.: see Recovery Strategy for the Whitebark Pine, *supra* note 65 at 4. Teck has not provided any information about the final elevation of reclaimed areas, however the map of coal seam elevations (Castle Initial Project Description, *supra* note 1 at 20) and the most recent pit map of the Castle Project provided by Teck (Letter from Teck to the Agency, *supra* note 11) suggest there could be little area above 1700 m remaining after mining, depending on pit depth and potential waste rock backfill into the pit.

⁶⁸ U.S. Forest Service, “High Elevation White Pines: White Pine Blister Rust”, online: <https://www.fs.fed.us/rm/highelevationwhitepines/Threats/blister-rust-threat.htm>.

⁶⁹ Recovery Strategy for the Whitebark Pine, *supra* note 65 at vii.

success of this program in establishing this slow-growing, sensitive and long-lived species on mined areas or waste rock dumps.

Additional endangered *SARA*-listed species may be found in the project area including Williamson's sapsucker, little brown myotis and northern myotis, as well as a number of threatened bird and amphibian species. It is unknown if any planned reclamation or other mitigation efforts would address impacts on these species.

In general, Teck's efforts to date in the Elk Valley have not demonstrated, at least in a publicly-available form, that full reclamation of waste rock dumps, mine pits or other areas is feasible. The potential significant impacts on *SARA*-protected species both during mining and post-closure alone warrant federal assessment. A federal assessment should review reclamation efforts to date and reclamation plans for Castle, both in general and with a focus on high-elevation grasslands for bighorn sheep, whitebark pine and other species.

We also note a long-standing promise from Teck for a net positive impact ("NPI") on biodiversity.⁷⁰ Despite years of discussion on this subject, it does not appear that NPI has any effect on current mine operations and it is unclear what effect, if any, it would have on future operations.⁷¹

Migratory Birds

There are many migratory birds that use the area that may be impacted by the proposed mine, which would include waterways in Canada and the US.

Of particular concern are species that use aquatic environments in rivers and lakes downstream of the mine, where the cumulative effects of mining in the Elk and Kootenay/Kootenai watersheds are significant. Specifically, species that feed on fish, fish eggs, and aquatic invertebrates, where significant levels of selenium and other pollutants are found, are at the greatest risk.

Two examples of these species include spotted sandpipers and American dippers. Previous studies have raised concerns about both these species,⁷² and ongoing work at ECCC on American dippers has found elevated levels of selenium in dippers and their eggs,⁷³ though the impact of these selenium levels is still under study and little is known about the long-term implications on populations. Other potential migratory species of concern due to their aquatic diet include, but are not limited to, northern waterthrush, varied thrush, harlequin duck and Canada goose.

⁷⁰ Wildsight's internal records indicate this discussion has been ongoing since at least as early as 2013.

⁷¹ Teck's 2019 Sustainability Report indicates they only plan to have biodiversity plans in place five years in the future: Teck Resources Limited, "2019 Sustainability Report" (March 2020), online: <https://www.teck.com/media/2019-Sustainability-Report.pdf>.

⁷² For example, Teck's consultant, Minnow Environmental Inc., found egg selenium above the generally accepted adverse effects threshold for a significant number of samples, particularly those found in areas with high selenium levels in water and benthic macroinvertebrates. See Minnow Environmental Inc. "Evaluation of selenium sensitivity of spotted sandpipers breeding in the Elk River watershed of southeastern British Columbia" (February 2016), online: [https://www.teck.com/media/Evaluation-of-selenium-sensitivity-of-spotted-sandpipers-breeding-in-the-Elk-River-watershed-of-southeastern-British-Columbia,-2013-2014-\(February-2016\).pdf](https://www.teck.com/media/Evaluation-of-selenium-sensitivity-of-spotted-sandpipers-breeding-in-the-Elk-River-watershed-of-southeastern-British-Columbia,-2013-2014-(February-2016).pdf).

⁷³ "A Canary in a Coal Mine: The American dipper as a bio-indicator of selenium contamination in the Elk Valley", presentation by Helmi Hess of work by Helmi Hess, Christine Bishop, John Elliott, Kathy Martin, ECCC & UBC (November 27, 2017).

Impacts on Federal Lands

While the closest national park is located approximately 70km from the project, this distance is along the Rocky Mountains, an important connectivity corridor from Waterton-Glacier International Peace Park in Alberta and Montana and the Rocky Mountain parks complex for wide-ranging wildlife including grizzly bears and wolverines. Further damage to this connectivity link could have long-term implications for wildlife populations within the Rocky Mountain National Parks.

Interprovincial and International Impacts

The Castle Project would send water pollution downstream from the upper Fording River into the Elk River, which then flows into the international Kootenai Reservoir and into the US Kootenai River, which returns to Canada as the Kootenay River in Creston. This cumulative water pollution would impact fish populations in the Kootenai Reservoir, including in the US part of the reservoir, a subject under investigation in the B.C.-Montana Kootenai process. It also has the potential to impact fish downstream in the Kootenai River, including endangered white sturgeon, the subject of significant recovery efforts by US First Nations.

In Kootenai Reservoir, which is shared between Canada and the US, there is, as noted below, an ongoing process looking at the impact of selenium pollution on fish. In this lentic environment, significant accumulation of selenium in fish tissue and eggs/ovaries has been found in many species. There is also significant concern that selenium can take years to reach equilibrium in fish tissue for species at the top of the aquatic food chain in lentic systems like the Kootenai Reservoir,⁷⁴ not to mention that population-level impacts can develop slowly, and thus that future impacts may be more significant than those currently observed.

Some of the species of most concern include burbot, redbelt shiner, peamouth chub, northern pikeminnow, longnose sucker, mountain whitefish and westslope cutthroat trout.⁷⁵ All of these species and others have been found with selenium concentrations above BC Water Quality Guidelines and/or EPA Criteria in tissue and/or eggs. Elevated levels of other pollutants have also been found in the reservoir, especially nitrates, however less study has been done on their impacts or cumulative impacts of multiple pollutants. There is no doubt that there are effects on fish in the US portion of the Kootenai Reservoir,⁷⁶ but these transboundary environmental impacts have never been studied through provincial environmental assessment.

⁷⁴ There is need for study of this question in Kootenai Reservoir specifically, but studies from other systems have found lag times in the range of 1-4 years between changes in selenium loading input and peaks in selenium found in fish tissue at the top of the food chain, for example in a smaller lentic system in John U. Crutchfield Jr, "Recovery of a power plant cooling reservoir ecosystem from selenium bioaccumulation" (1 September 2000), *Environmental Science & Policy*, online: <https://www.sciencedirect.com/science/article/abs/pii/S1462901100000423> at S153; and in a lotic system in William N. Beckon, "A method for improving predictive modeling by taking into account lag time: Example of selenium bioaccumulation in a flowing system" (July 2016), *Aquatic Toxicology*, online: <https://www.sciencedirect.com/science/article/abs/pii/S0166445X16301230> at 175.

⁷⁵ A preliminary compilation of fish tissue and egg/ovary data is available online: <http://lakekootenaiconservation.pbworks.com/w/file/139586697/2020-04-14%20%20Fish%20Criteria%20Table.xlsx>.

⁷⁶ In fact, USGS data often shows greater selenium concentrations in sediment and particulate matter at the south end of the reservoir than at the international border. See Presser, T.S., et al., "USGS Measurements of Dissolved and Suspended Particulate Material Selenium in Lake Kootenai in the Vicinity of Libby Dam (MT), 2015-2017" (2018), *U.S. Geological Survey*, online: <https://www.sciencebase.gov/catalog/item/5b0446b6e4b0d8682b96311a>.

White sturgeon in the upper Kootenay/Kootenai River are listed as endangered under *SARA* and under the US *Endangered Species Act*. This population of sturgeon, which suffer from reproductive failures likely related to changes in flows associated with Libby Dam, spawns only in the US portion of the river, near Bonner's Ferry in Idaho, but overwinter in the Creston area in Canada. They are found as far upstream as the Libby Dam, the outlet of Lake Koocanusa in Montana. Studies are ongoing to evaluate the effects of present and future selenium pollution levels on white sturgeon, which has not been considered in any provincial environmental assessment of coal mining in the Elk Valley.

Other fish species may also suffer adverse effects in the Kootenai/Kootenay River, though relatively little is presently known about these effects. Elevated selenium levels are found in the Kootenai/Kootenay River, with relatively constant water selenium levels from Libby Dam through the length of the Kootenai River back into Canada at Creston. Throughout this roughly 200km length of river, various fish species have been found with significant selenium concentrations in tissue or eggs, including mountain whitefish, northern pikeminnow, redbreasted shiner and slimy sculpin, all of which have been found with selenium concentrations above BC Water Quality Guidelines and/or EPA Criteria.⁷⁷ Westslope cutthroat trout, rainbow trout and other species have been found with selenium tissue levels near BC's Water Quality Guideline. Though only limited data is currently available, these high tissue concentrations have been found throughout the length of the United States' Kootenai River. There are also concerns about burbot in the Kootenai River as the species has been seen to be a high accumulator of selenium in Lake Koocanusa.

These impacts have been of significant concern in the United States and have been the subject of correspondence and conflict between B.C./Canada and the States of Montana and Idaho, the US EPA, Fish & Wildlife Service, and USGS, US First Nations including the Confederated Salish & Kootenai Tribes and the Kootenai Tribe of Idaho, and all US federal senators from Montana and Idaho.⁷⁸

In recent years, there has been concern from both sides of the border about possible violation of the Boundary Water Treaty of 1909,⁷⁹ which prohibits pollution of shared waterways,⁸⁰ and the need for an International Joint Commission reference to resolve the cumulative transboundary water pollution issue due to the Elk Valley coal mines.

⁷⁷ Mebane, C.A., and Schmidt, C.G., Selenium and mercury in the Kootenai River, Montana and Idaho, 2018-2019" (2019), *U.S. Geological Survey*, online: <https://www.sciencebase.gov/catalog/item/5d6d38efe4b0c4f70cf62b74>. Note that there is no CCME guideline for selenium in fish tissue.

⁷⁸ Sarah Cox, "U.S. senators to Horgan: clean up B.C.'s mining mess" (13 June 2019), *The Narwhal*, online: <https://thenarwhal.ca/u-s-senators-to-horgan-clean-up-b-c-s-mining-mess/>.

⁷⁹ For example, concerns have come from US IJC Commissioners and the BC Auditor General: see "Letter from Lana Pollack, Chair U.S. Section and Rick Moy, Commissioner, U.S. Section to Cynthia Kierscht, Director, Office of Canadian Affairs, U.S. State Department" (20 June 2018), online:

<https://www.scribd.com/document/383221661/US-IJC-Commissioners-Letter-to-Dept-of-State-on-Selenium-Report>; and BC Auditor General, "An Audit of Compliance and Enforcement in the Mining Sector" (May 2016), online: <https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC%20Mining%20Report%20FINAL.pdf> [BC Audit of the Mining Sector] at 10.

⁸⁰ *Treaty Between the United Kingdom and the United States of America Concerning Boundary Waters and Questions Arising Along the Boundary Between Canada and the USA* (1909), online: <https://www.treaty-accord.gc.ca/text-texte.aspx?id=100420>, at article IV.

B.C. environmental assessments for past mine expansions have not and cannot properly consider impacts downstream of the US border, which includes not only the US portion of the Kooconusa Reservoir and the US Kootenai River, but also the Canadian Kootenay River around Creston. A federal assessment is clearly needed to evaluate these transboundary impacts. Additionally, federal assessment is required to ensure Canada does not violate (or further violate) the longstanding Boundary Waters Treaty.

The Castle Project is also located approximately 5 km from the BC-Alberta border. Effects on terrestrial wildlife, as discussed above, would be geographically broad and would include impacts on species that travel widely along the important Rocky Mountain wildlife corridor, especially grizzly bears and wolverines. For these species, this area of the Rocky Mountains is an important connectivity link for wildlife travelling from Glacier National Park in Montana and even Yellowstone National Park to the Canadian Rocky Mountain parks complex and beyond. The Crown of the Continent Region, as the area around the proposed mine is called, is an important connectivity link in the Yellowstone to Yukon corridor and increasing fragmentation of this landscape threatens the long-term viability of species that rely on the corridor, including grizzly bears and wolverines.

Potential for Cumulative Impacts

There are five existing large coal mines in the Elk Valley, all owned by Teck, and four of these continue to extract coal and dump waste rock, resulting in increasing water pollution levels and further destruction of wildlife habitat. Significant expansions for roughly 12-25 years of mining are already permitted at three of these mines (Fording River, Line Creek and Elkview). Three additional coal mines in the Elk Valley are in the EA process, which would also increase cumulative impacts. Teck's expansion plans for their Greenhills mine, adjacent to Fording River and the Castle expansion have not been made public, but their most recent quarterly report notes expansion plans for Greenhills as well as Elkview.⁸¹ It is unknown if expansion of the Greenhills mine or the Elkview mine would require a federal assessment. Federal assessment of further expansion through the Castle Project is crucial to consider the cumulative impacts of all current mines, ongoing expansion and potential future mining projects in the Elk Valley.

The presence of multiple adjacent mines and other mines in the immediate area, totaling more than 150 square kilometres of permitted mining, has significant impacts on connectivity for species like wolverines and grizzly bears, while bighorn sheep have already lost a significant portion of their important winter high-elevation grassland habitat in the Elk Valley to mining. Cumulative effects are also possible due to logging in the Elk Valley, where private ownership of forest lands has resulted in significant clearcutting in recent years, and the impact of motorized recreation, especially on the Alberta side of the Continental Divide.

Greenhouse Gas Emissions

The potential greenhouse gas ("GHG") emissions associated with the Castle Project may hinder the Government of Canada's ability to meet its commitments in respect of climate change, including Canada's 2030 emissions targets and forecasts.

⁸¹ Teck Resources Limited, "News Release: Teck Reports Unaudited First Quarter Results for 2020" (20 April 2020), online: <https://www.teck.com/media/Q1-2020-NR-Quarterly.pdf> at 12.

Teck estimates that total emissions from the Castle Project will be equal to current emissions at FRO, with an estimated total of 0.67 million tonnes CO₂ equivalent at full production.⁸² These emissions are made up of CO₂ from fuel used in mining operations (primarily diesel for heavy equipment and natural gas for drying of coal) and of fugitive methane emissions found within the coal formations, which make up nearly half of total emissions. Teck also anticipates additional initial methane from opening up the new Castle pit.⁸³

Along with the estimated emissions for the project being significant, there are also uncertainties around emissions that critically need to be assessed.

Fugitive methane emissions from coal mining are poorly quantified, as emissions from Elk Valley coal mines are estimated based on data from a coal mine elsewhere in the province.⁸⁴ It is well known that fugitive methane from coal mines varies widely, and there is some evidence that methane emissions from coal mines in the upper Elk Valley exceed the provincial average.⁸⁵

The global warming potential of methane also varies greatly depending on the timescale considered. A shorter timescale for warming effects would be warranted when considering methane emissions from the project decades into the future, when global warming will be much more advanced.⁸⁶ Federal assessment is necessary to evaluate the climate impacts of the project given the poor current understanding of fugitive methane emissions.

Given Canada's commitment to a 30% reduction from 2005 GHG emissions by 2030, the project may well hinder Canada's ability to meet its 2030 commitments under the Paris Agreement. Additionally, as the Castle Project is anticipated to operate for several decades, project emissions would also significantly hinder Canada's commitment to net-zero emissions by 2050.

Teck has made two recent statements indicating they will be carbon neutral by 2050 and will reduce carbon intensity by 33% by 2030.⁸⁷ However, the company has not made public any details on how it will meet these goals. Given the major needs for energy in mountaintop-removal coal mining, currently mostly supplied by diesel and natural gas, plus the significant contribution of fugitive methane to total emissions, it is unclear how Teck could meet these commitments. In the Initial Project Description for the Castle Project, Teck did not provide any plans to reduce its current emissions by an amount that is consistent with Canada's 2030 target. A federal impact assessment should require Teck to provide detailed plans to reduce their carbon

⁸² Castle Initial Project Description, *supra* note 1 at 38.

⁸³ Castle Initial Project Description, *supra* note 1 at 37.

⁸⁴ ECCC, "2019 National Inventory Report 1990-2017: Greenhouse Gas Sources and Sinks in Canada" (2019), online: http://publications.gc.ca/collections/collection_2019/eccc/En81-4-1-2017-eng.pdf at 40.

⁸⁵ Based on high emissions from upper Elk Valley coal storage piles shown in Western Climate Initiative, "Final Essential Requirements of Mandatory Reporting, Amended for Canadian Harmonization" (17 December 2010), online: <https://www2.gov.bc.ca/assets/gov/environment/climate-change/ind/quantification/wci-2011.pdf> at Table 100-1.

⁸⁶ The above emissions estimate is based on a global warming potential of 25 for methane (i.e. methane is 25 times as potent as carbon dioxide). Current IPCC global warming potentials for methane are 28 over 100 years and 84 over 20 years, not including climate-carbon feedbacks. See Intergovernmental Panel on Climate Change, "Synthesis Report: Climate Change 2014" (2014), online: <https://www.ipcc.ch/report/ar5/syr/>.

⁸⁷ Teck Resources Limited, "News Release: Teck Announces 33% Carbon Reduction Target and Updated Sustainability Strategy" (12 March 2020), online: <https://www.teck.com/news/news-releases/2020/teck-announces-33-carbon-reduction-target-and-updated-sustainability-strategy>.

emissions in line with their commitments and Canada’s commitments, and then to fully evaluate the effectiveness of these plans as proposed.

Teck has also stated that their steelmaking coal “has among the lowest carbon intensities in the world”.⁸⁸ The company has not provided any information to back up this statement, but we note that the high degree of uncertainty in fugitive methane emissions and the significant transportation emissions associated with bringing Elk Valley coal to market, primarily in Asia, compared to other major producers, especially Australia, cast doubt on this assertion.

Additionally, steelmaking coal, when burned in the steelmaking process, is a major source of carbon emissions, accounting for 5% of total worldwide emissions. It is clear that to reduce the impact of global climate change, these steelmaking emissions will need to be drastically reduced. Fortunately, natural gas and electricity based steelmaking processes are already in use around the world today, with significantly lower carbon emissions than coal-based steelmaking. Partially hydrogen-based steelmaking is already possible and fully renewable hydrogen-based steelmaking is being developed at pilot facilities.⁸⁹

The total emissions from Teck’s Elk Valley coal mines, including end use of the coal, are approximately 66 MT annually, slightly more than all emissions in the province of B.C.⁹⁰ The Castle Project would account for roughly one third of these emissions. Federal assessment should evaluate the overall carbon impact of the project, including end use, especially as the project is intended operate for several decades, at which point global emissions must be significantly reduced to avoid catastrophic climate change with devastating impacts across Canada.

v. Inadequacy of other Legislative and Regulatory Mechanisms

Unfortunately, the various regulatory mechanisms already in place in the Elk Valley have not adequately managed adverse effects from existing mines and will not manage adverse effects for Castle. Despite regulatory mechanisms on both the federal and provincial levels, increases in water pollution and adverse effects on fish have been ongoing and worsening downstream of Teck’s Elk Valley mines.

Recent adverse impacts from these projects include the loss of 93% of the isolated adult WCT population in the upper Fording River,⁹¹ directly downstream of the proposed expansion, and the

⁸⁸ Marcia Smith (Senior Vice President, Sustainability and External Affairs, Teck Resources Limited), “Letter to the Editor: Teck committed to support transition to low-carbon economy” (2 June 2020), online: <https://www.eknow.ca/regions/elk-valley/teck-committed-to-support-transition-to-low-carbon-economy/>.

⁸⁹ A detailed article on this issue with sources is available on Wildsight’s website: Lars Sander-Green, “Do We Really Need Coal to Make Steel?” (1 June 2020), online: <https://wildsight.ca/blog/2020/06/01/do-we-really-need-steelmaking-coal/>.

⁹⁰ *Ibid.* The figure of 66 MT was arrived at using the 24 MT of coal exported annually from the Elk Valley, subtracting 28% for non-carbon content in the coal (both moisture and other elements), and subtracting 1% for carbon that ends up in the steel. Carbon dioxide is 3.67 times the mass of carbon itself, so we estimate a rough total of 63 MT, not including extraction and transport emissions of roughly 3 MT. BC’s total emissions in 2017 were 64.5 MT CO₂e according to the province: See Environmental Reporting BC, “Trends in Greenhouse Gas Emissions in B.C. (1990-2017)” (2019), online: <http://www.env.gov.bc.ca/soe/indicators/sustainability/ghg-emissions.html>.

⁹¹ Westslope Fisheries Ltd., “Upper Fording River Westslope Cutthroat Trout Population Monitoring Project: 2019” (March 2020), online: https://www.teck.com/media/UFR_WCT_Monitor_Final_Report_April_9_2020.pdf at ii.

recent loss of 96% of juvenile WCT in Harmer Creek,⁹² downstream of the recently approved Baldy Ridge expansion of the Elkview mine.

Federal impact assessment is critical to address the inadequacies in the present legislative scheme and to properly address the impact of the proposed expansion.

Federal Legislative and Regulatory Mechanisms

On the federal level, the *Fisheries Act* prohibition on depositing deleterious substances into waters frequented by fish certainly applies in the Elk Valley. However, despite the 2014 ECCC Report finding significant impacts on WCT from selenium pollution,⁹³ as detailed in the section describing impacts to fish and fish habitat, no enforcement action has been taken by ECCC.⁹⁴ Since 2014, pollution levels have continued to increase significantly. Currently, the *Fisheries Act* is not being used to manage these adverse impacts to fish and fish habitat. Teck has publicly conceded that “We cannot operate our Elk Valley coal mines in compliance with the *Fisheries Act* and its current associated regulations.”⁹⁵

ECCC has also been developing the *Coal Mining Effluent Regulations* (the “*CMER*”) under the *Fisheries Act*, which would presumably apply to this project. While still under development, the regulations as proposed would limit selenium and nitrate water pollution from the Castle Project. ECCC has indicated that the *CMER* will be brought into force in fall 2021 or early 2022;⁹⁶ likely during the impact assessment process for the Castle Project should it be designated. Federal assessment is required to evaluate if the project would be compatible with the *CMER*.

For new mines and new mine expansions in the Elk Valley, the *CMER* would limit direct effluent discharge, rather than regulating pollution limits in downstream rivers as is the provincial regulatory approach. Teck has requested selenium discharge limits for their Fording River South AWTF and Elkview SRF trial approximately four times higher than would be allowed under the draft *CMER*.⁹⁷

⁹² Teck Resources Limited, “Responsible Mining in the Elk Valley”, online: <https://www.teck.com/responsibility/sustainability-topics/water/water-quality-in-the-elk-valley/>, under the ‘Monitoring’ tab.

⁹³ Lemly Report, *supra* note 39 at 57-59

⁹⁴ Note: ECCC did issue a fine related to a fish kill at the Line Creek AWTF, a separate issue. See Line Creek AWTF Fine, *supra* note 31.

⁹⁵ Teck Resources Limited, “Annual Information Form” (February 26, 2020), online: <https://www.teck.com/media/2020-AIF.pdf> at 80.

⁹⁶ ECCC, “Update – Proposed Coal Mining Effluent Regulations, Technical Information Sessions” (February 2020), online: <https://www.scribd.com/document/456414693/Environment-Canada-Coal-Mining-Effluent-Regulations-Draft-2020> [February 2020 *CMER* Updates] at 34. ECCC indicates Canada Gazette I publication in Fall 2020 and final publication in Canada Gazette II in Fall 2021. A more recent email from ECCC on April 27, 2020 indicates Canada Gazette I publication will be delayed to early 2021 due to coronavirus, but does not indicate any change of schedule for final publication.

⁹⁷ The ECCC has indicated a monthly average selenium discharge limit for a mine expansion with a new mining area and a new waste rock pile in the Elk Valley of 10µg/L, while the limit for a new mine would be 5µg/L: February 2020 *CMER* Updates, *supra* note 90, at 14 and 32.

Teck has recently requested a permit limit of 37µg/L monthly average selenium discharge for the Fording River South AWTF and a permit limit of 41µg/L monthly average selenium discharge for the Elkview SRF Phase II: see Fording River AWTF Notice and Elkview SRF Notice, *supra* note 51.

If the Castle Project were to rely on SRF to reduce selenium pollution levels, or indeed AWTF, it would not meet *CMER* limits that will be in place once the expansion is operational in 2026.

The *CMER* would also regulate water pollution limits in waterways directly downstream of existing mines, including in the upper Fording River for Fording River Operations and Greenhills Operations as well as downstream in the Elk River for all of their mines. The Castle Project will add additional water pollution to the upper Fording River and the Elk River. Given Teck's publicly stated plans in the EVWQP 2019 Implementation Plan Adjustment, Teck would not meet the currently proposed regulatory limits in the *CMER* for their existing mines,⁹⁸ including the Fording River and Greenhills mines, in the Fording River and downstream in the Elk River – even without additional water pollution from the Castle Project or additional expansions in the Elk Valley.

It is crucial that a federal assessment ensure Teck's plans are in line with the *CMER*, which a provincial assessment is unlikely to do. Without a strong assessment of Teck's ability to meet future obligations under *CMER*, it is likely that those obligations would not be met.

Additionally, as discussed in a previous section of this request, the *Species at Risk Act* has inadequately addressed impacts to several federally-protected species that will be impacted by this project, including WCT and grizzly populations, plus endangered whitebark pine. Federal impact assessment is required to fully determine the potential impacts on these species.

Provincial Legislative and Regulatory Mechanisms - Aquatic

Provincially, B.C. has a water quality guideline of 2µg/L for protection of aquatic life for selenium in fresh water.⁹⁹ However, levels up to 65 times this guideline have been approved in the Fording River at the Fording River Mine under the EVWQP,¹⁰⁰ and associated permits and many levels far above 2µg/L have been permitted in the Elk Valley.

⁹⁸ The ECCC has indicated that the *CMER* would establish a baseline of the monthly average over years 2 and 3 after promulgation. Six years after promulgation (starting in 2027), the monthly average limit would be set at 20% less than the baseline and a further 10 years later (starting in 2037), the monthly average limit would be set at 36% less than the baseline. See February 2020 *CMER* Updates, *supra* note 90, at 27.

Teck's EVWQP 2019 Implementation Plan Adjustment anticipates selenium concentrations at the FRO Compliance Point of approximately 50µg/L for 2022-3, leading to a monthly average limit of 40µg/L in 2027 and 32µg/L in 2037. For 2027-2036, Teck predicts peak selenium annually between 50-59µg/L with levels above 40µg/L for the majority of the year in all years. For 2037 to the end of modeling in 2053, Teck predicts peak selenium annually between 32-59µg/L with levels above 32µg/L for the majority of the year in most years. As a result, FRO would be significantly out of compliance with *CMER* selenium limits indefinitely. See EVWQP 2019 Implementation Plan Adjustment, *supra* note 32 at 64.

Selenium levels would therefore be above *CMER* limits at other compliance points downstream in the Fording and Elk Rivers, most notably in the Fording at the next mine downstream, Greenhills (up to double the limit) and in the Elk River downstream of the Fording River (upstream of Grave Creek). Nitrate would also be above limits in some years in both the Fording and Elk Rivers, most notably in the Fording at Greenhills. Note also that Teck's above predictions rely on 12 additional water treatment facilities entering operation between 2022 and 2040.

Additionally, the draft *CMER* anticipates further changes to selenium limits beyond 2046, based on monitoring of fish populations. See ECCC, "Signal Check: Proposed Coal Mining Effluent Regulations" (2018), online: <https://awc-wpac.ca/wp-content/uploads/2019/01/Coal-Mining-Effluent-Signal-Check-Fall-2018-v3.pdf> at 31.

⁹⁹ BC Ministry of the Environment, "Ambient Water Quality Guidelines for Selenium Technical Report Update" (April 2014), online: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/bc_moe_se_wqg.pdf at 164.

¹⁰⁰ BC Waste Discharge Authorization 107517, *supra* note 53 at 2.1.1 for Fording River Compliance Point.

By Ministerial Order, the EVWQP was to immediately begin to stabilize concentrations of pollutants and to reduce pollutant concentrations in the medium-term.¹⁰¹ However, neither of these has taken place as pollutant concentrations downstream of the mines have continued to increase since that time.

In a 2016 report by the BC Auditor General, it was stated that it “is not clear how [the EVWQP’s] high selenium levels will meet government’s objective to protect the health of aquatic ecosystems, groundwater and humans in the Elk Valley.”¹⁰² Even with these very high permitted selenium levels, actual selenium levels have increased above permitted levels and remained high seasonally for years, not only in the Fording River, but also in the Elk River and in the transboundary Koochanusa Reservoir.

While some enforcement action from B.C. has taken place on issues related to acute water pollution issues, there have been no fines or other enforcement action to date for these long-term, repeated pollution limit exceedances. Meanwhile, Teck’s EVWQP 2019 Implementation Plan Adjustment shows planned exceedances of permitted limits for many years into the future.

It remains unclear what the province may do with regard to permitting the changes indicated in the EVWQP 2019 Implementation Plan Adjustment and/or enforcing the continued lack of compliance with current limits, though experience to date suggests the province will at least tacitly accept this increased pollution, if they do not simply accept it formally. Clearly, the EVWQP and associated permits are not adequately managing adverse effects in the Elk Valley and will not adequately manage adverse effects of this proposed mine expansion.

The 2016 BC Auditor General report illustrates the failure of the provincial regulatory process.¹⁰³ Ministry of Environment staff concluded that they could not approve permits for Teck’s Line Creek mine expansion due to risk to fish and the aquatic environment, specifically citing the risk to SARA-listed WCT and potential violation of the Boundary Waters Treaty. However, Cabinet granted the permit regardless.

Similar issues arose when the Ministry issued permits for the Baldy Ridge expansion and the Fording River Swift expansion, despite rising pollution levels in the watershed, and severe effects of the expansions on fish habitat (in the case of Swift) and the addition of significant selenium to Harmer Creek (in the case of Baldy Ridge). It is likely that a chilling effect from the Cabinet decision to override Ministry staff has prevented the Ministry from appropriate regulatory action. It is very likely that the same will occur with the Castle Project; it is widely expected that BC will approve the project.

In general, the Auditor General identified that both the BC Ministry of Mines and Ministry of Environment suffered from weak permitting, compliance and enforcement related to mines.¹⁰⁴ In particular, she identified shortcomings with respect to regulatory oversight of the Elk Valley mines, stating that “[the Ministry of Environment] has not publicly disclosed the risks associated

¹⁰¹ Minister of Environment, “Ministerial Order No. M113 under Section 89 of the *Environmental Management Act*” (15 April 2013), online: https://web.archive.org/web/20181109215044/http://www.bclaws.ca/civix/document/id/mo/mo/2013_m113 at 6.

¹⁰² BC Audit of the Mining Sector, *supra* note 79 at 101.

¹⁰³ *Ibid* at 95.

¹⁰⁴ *Ibid* at 6-7.

with permitting coal mines in the Elk Valley”.¹⁰⁵ These shortcomings have not been significantly addressed in general or with respect to the Elk Valley.

B.C. and Montana have attempted to establish a shared water quality standard for the Koochanusa Reservoir through the Lake Koochanusa Monitoring and Research Working Group. While a shared standard is planned to be adopted by both governments by the end of 2020, it is unclear how such a standard will be met by Teck or enforced by the province.

The current EVWQP limit for Koochanusa is 2µg/L, while the shared standard is widely expected to be 1.3 or 1.5µg/L, based on extensive research on selenium in fish tissue and eggs/ovaries in the reservoir. In recent years, selenium levels in the Koochanusa Reservoir have been, at times, above 3µg/L and Teck’s EVWQP 2019 Implementation Plan Adjustment anticipates selenium levels likely above 1.5µg/L for a number of years and in dry years above 1.5µg/L indefinitely (again, before considering additional pollution due to Castle or additional mining). Note that in the long-term, if ongoing water treatment were discontinued, selenium levels in Lake Koochanusa would be expected to reach to even higher levels than those recorded to date. It is not clear how the Koochanusa process will in fact manage these potential adverse effects in the reservoir.

Provincial Legislative and Regulatory Mechanisms - General

B.C.’s mine reclamation bonding system is failing to ensure funds are available for long-term cleanup of the Elk Valley coal mines including the proposed Castle Project. While Teck’s reclamation cost estimate, accepted by the province, is \$1.4 billion, the province holds less than \$0.9 billion in reclamation security from Teck.¹⁰⁶

The estimate of \$1.4 billion is clearly too low as Teck has already spent hundreds of millions of dollars on water treatment, but has only completed one of over a dozen planned water treatment facilities, with plans to spend \$1 billion by 2024. It is clear that \$0.9 or \$1.4 billion is insufficient for long-term water treatment to last indefinitely. Meanwhile, Teck reclaims an insignificant area of their mines each year relative to the newly disturbed area,¹⁰⁷ so the eventual terrestrial reclamation costs will be very significant. B.C.’s reclamation bonding system requires mines to estimate their own reclamation liability and does not make any information about reclamation plans and cost estimates public, making it impossible for others to evaluate these plans or estimates. It is clear that B.C.’s reclamation bonding system does not create proper incentives for long-term clean up and in fact may allow mining that would not proceed if full environmental costs were accounted for up front, which puts fish and wildlife at risk in the long term.

As for cumulative effects, Teck often points to their involvement in the Elk Valley Cumulative Effects Management Framework (the “CEMF”). While the CEMF has resulted in some data

¹⁰⁵ *Ibid* at 9-10.

¹⁰⁶ According to the most recent figures available in Chief Inspector of Mines, “2018 Annual Report” online: https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/health-and-safety/ci-annual-reports/2018_ci_annual_rpt.pdf at 18.

¹⁰⁷ For example, no areas have been revegetated at the Fording River mine in the last three years according to the 2017, 2018 and 2019 Annual Mine Permit Reports for Teck’s Fording River Operations. Over the same period the company reclaimed less than 100 hectares compared to new disturbance of more than 3000 hectares across all of their operations globally, of which the Elk Valley is approximately half. See Teck Resources Limited, “Biodiversity and Reclamation”, online: <https://www.teck.com/responsibility/approach-to-responsibility/sustainability-report-disclosure-portal/material-topics/biodiversity-and-reclamation/>.

gathering in the Elk Valley, it does not in any way manage cumulative effects. Currently, the CEMF has no direct regulatory impact and it is unclear whether it will have a regulatory role. The assessment was completed some time ago, however Teck and another resource company involved refused to sign on to the CEMF, leaving it in limbo since 2018. Furthermore, the CEMF has been designed to largely ignore the cumulative impacts of coal mining, as the assessment report selects the aquatic environment as a valued component but ignores the impacts of water pollution, instead choosing to focus on logging, resource roads and other factors.¹⁰⁸

Federally-protected terrestrial species have also not been adequately protected through provincial management. Regarding protection of grizzly bears from cumulative impacts and especially loss of connectivity, provincial measures have been weak. In 2017, the BC Auditor General completed an audit of grizzly bear management and found that “there has been little effort to address the issue of connectivity for grizzly bears or to provide wildlife corridors and safe transition areas for those populations in the south”¹⁰⁹ of the province, concluding the province did not have an “adequate management framework for grizzly bears.”¹¹⁰ Little has changed since that time.

Wolverines also suffer from a lack of protection of habitat and connectivity. The provincial wolverine management plan dates from 1989. Whitebark pine has no provincial management strategy and continues to be harvested in significant volumes in the Elk Valley.¹¹¹

Provincial Environmental Assessment

B.C. will likely carry out an assessment of environmental effects of the project. However, provincial assessment will not adequately cover the international issues related to the Kootenai Reservoir and the Kootenai River, the need to protect fish and fish habitat, or the impact of the federal *Coal Mining Effluent Regulations* on the project.

Additionally, the cumulative impacts of the proposed project alongside five existing mines within the same watershed, which include significant approved but not yet constructed mining areas, and three additional proposed mines in the EA process, have not been properly considered in past provincial assessments and will not be considered in the provincial assessment for Castle.

Recent provincial assessments have relied on the EVWQP to manage cumulative impacts. However, the plan is not suited for this task as it allows high pollution levels with weak justifications, considers pollutants individually, and therefore fails to consider cumulative impacts of multiple pollutants and destruction of fish habitat. Many pollution limits in the plan will continue to be surpassed according to Teck’s EVWQP 2019 Implementation Plan Adjustment, with no enforcement action taken by the provincial government to date.

Past provincial EA processes have not adequately addressed these issues, including the Fording River Swift expansion, Line Creek Phase II and Elkview Baldy Ridge expansion, as can be seen

¹⁰⁸ Elk Valley Cumulative Effects Management Framework (EV-CEMF) Working Group, “Elk Valley Cumulative Effects Assessment and Management Report” (December 2018), online:

https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/cumulative-effects/final_elk_valley_ceam_12122018.pdf.

¹⁰⁹ BC Auditor General, “An Independent Audit of Grizzly Bear Management” (24 October 2017), online:

<https://www.bcauditor.com/pubs/2017/independent-audit-grizzly-bear-management> at 9.

¹¹⁰ *Ibid* at 25.

¹¹¹ Ben Parfitt, “Thousands of B.C.’s endangered whitebark pine logged on private land” (5 September 2019), *The Narwhal*, online: <https://thenarwhal.ca/thousands-of-b-c-s-endangered-whitebark-pine-logged-on-private-land/>.

in rising pollution levels and in the growing cumulative impacts on fish and habitat immediately downstream of the mines and in Koochanusa Reservoir.

Existing provincial and federal legislative and regulatory provisions have failed to address the impacts from Teck's mines in the Elk Valley. Federal assessment of the Castle Project is critical to evaluate Teck's proposed plans and mitigation strategies to address further effects, and to address the cumulative impacts of development within this area.

4. CONCLUSION

For the reasons set out in this letter, Wildsight submits that the Castle Project exceeds the 50% allowable increase for expansions to coal mines before they are considered designated projects under s. 19(a) of the Schedule to the *Regulations*, and as such is a prescribed project.

Additionally, the numerous potential adverse effects to areas of federal jurisdiction resulting from the Castle Project warrant designation under s. 9(1) of the *IAA*. The Castle Project as proposed will significantly worsen the environmental crisis present in the Elk Valley and downstream, increasing impacts to fish and fish habitat, federally-protected terrestrial species, transboundary pollution issues and hindering Canada's ability to meet its GHG emission targets in respect of climate change. Existing legislative and regulatory mechanisms have failed to address these impacts individually or to consider them on a cumulative basis. Federal assessment of the Castle Project is essential to critically evaluate Teck's proposed mitigation measures and plans to address these long-term adverse impacts.

On the basis of the above information, we request that the Minister or the Agency find the Castle Project is a designated project pursuant to s. 19(a) of the Schedule to the *Regulations*, or alternatively, that the Minister designate the Expansion Phase for impact assessment under s. 9(1) of the *IAA*.

Sincerely,

Randy Christensen
<Original signed by>

Daniel Cheater
<Original signed by>

Barrister & Solicitor

Barrister & Solicitor

Encls.

*cc. Fraser Ross
Impact Assessment Agency
Fraser.ross@canada.ca*

*Wildsight Society
Lars Sander-Green
lars@wildsight.ca*

Appendix A

 Impact Assessment Agency of Canada Agence d'évaluation d'impact du Canada
Pacific and Yukon Region Région du Pacifique et du Yukon
757 West Hastings Street 757 rue Hastings Ouest
Suite 210A bureau 210A
Vancouver BC V6C 3M2 Vancouver (C-B) V6C 3M2

April 3, 2020

David Baines
Senior Lead, Regulatory Approvals
Teck Coal Ltd.
421 Pine Avenue, Bag 2000
Sparwood BC V0B 2G0

Dear Mr. Baines:

RE: Castle Project

Thank you for contacting the Impact Assessment Agency of Canada (the Agency) regarding the proposed Castle Project (the Project). Teck Coal Ltd. (the proponent) provided the Agency with a draft Initial Project Description on January 16, 2020, to assist the Agency in providing its view as to whether the proposed project was likely to be described in the *Physical Activities Regulations* (the Regulations) made pursuant to the *Impact Assessment Act* (the Act). You provided additional information to support the Agency's analysis on February 27, 2020.

Under the Act, a proponent is to determine if its proposed project is described in the Regulations. The Regulations identify the physical activities that constitute designated projects that may require an impact assessment. The Agency reviewed the information you have provided that the physical works associated with the Project would increase the area of mining operations by an additional 35.7 percent, and that the expansion would have a total production capacity of 27 400 tonnes per day. The Project, as proposed and described in the material provided, would be below the threshold described in the Regulations. As a result, it is the Agency's view that this proposed project would not be a designated project under the Regulations.

We note that it is anticipated that the Project will undergo more detailed design work. Should the proposal be modified such that the Project that is proposed meets the description of a physical activity listed in the Regulations, you (as the proponent) will be required to submit an Initial Project Description to the Agency.

.../2

We would further note that for physical activities not described in the Regulations, there is the possibility that the Minister of Environment and Climate Change (the Minister), on request, or on his or her own initiative, could designate a project for an impact assessment under section 9 (1) of the Act if the Minister is of the opinion that the carrying out of the Project may cause adverse effects within federal jurisdiction or adverse direct or incidental effects, or if public concern related to those effects warrants that designation.

Please note that in proceeding with the Project, the proponent may still be required to obtain or seek amendment to other federal regulatory permits, authorizations and/or licences.

Further information regarding the Act and the Regulations is available on the Agency's website at www.canada.ca/iaac. In addition, please do not hesitate to contact me at 778-951-5106 or via email at Stefan.Crampton@canada.ca should you have any questions regarding this matter.

Sincerely,

<Original signed by>

Stefan Crampton
Project Manager
Pacific and Yukon Region

c.c.: Todd Goodsell, British Columbia Environmental Assessment Office
Katherine Morris, Ktunaxa Nation Council

Appendix B



Teck Coal Limited
Fording River Operations
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Elkford, B.C. Canada V0B 1H0

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www.teck.com

February 27, 2020

Stefan Crampton
Project Manager
Pacific Yukon Region
Impact Assessment Agency of Canada
757 W Hastings St Suite 210A
Vancouver, BC V6C 3M2

Dear Stefan,

Reference: IAAC Information Request for Fording River Operations Castle Project – Calculation of Change in Area of Mine Operations

Thank you for the opportunity to provide the Impact Assessment Agency of Canada (IAAC) with additional information about the Castle Project (the Project) as per your request by email dated February 4, 2020. The conference call between IAAC and Teck on February 10, 2020 and subsequent email exchange provided clarity on IAAC's request and the approach Teck should use to respond. The requested revised calculation determined that the Project would result in an approximately 36% change in area of mine operations for the existing mine (Fording River Operations or FRO).

IAAC Information Request:

The Physical Activities Regulations (the Regulations) define the term “area of mining operations” as “the area at ground level occupied by any open-pit or underground workings, mill complex or storage area for overburden, waste rock, tailings or ore”. The calculation of increase in area of mining operations must look at the change in area of these components only. Depending on project-specific circumstances, this may include components of the existing mine that are under construction, constructed but not in operation, in operation, in the process of being decommissioned, or in care and maintenance. It may also include components for which regulatory approvals have been issued but construction has not yet started.

Provide revised calculations for increase in area of mining operations associated with the Project, utilizing only the components captured by the definition in the Regulations (see above). To calculate the increase in the area of mining operations, determine the area occupied by the components of the existing mine that are listed in the definition, determine the area of mining operations that would result from the proposed expansion, and then compare the two to estimate the percentage increase. The areas should be calculated on a two-dimensional basis.

It may be useful to tabulate the size of each of these components for the existing mine, and compare them to the size of the components that meet this definition associated with the Castle Project, to provide clarity in these calculations.

Teck Response:

Teck has calculated the increase in area of mining operations associated with the Project using a classification based on the definition in the *Regulations*. The classification includes three categories for parts of the mine that are:

- in use (constructed),
- permitted (not constructed), and
- proposed (new).

The classification includes subcategories based on specific mine components including:

- Pit (area where ore or waste rock is being mined)
- Mill complex and ore storage (area where ore is being stored, handled, and processed)
- Soil storage (area for soil stockpiles prior to use during reclamation – qualifies as overburden storage under the *Regulations*)
- Waste rock storage (area where rock that is mined to access the ore is stored)
- Tailings storage (area where fine materials washed off of the ore in the mill complex is stored)
- Interim reclamation (area where soil and vegetation have been placed, but that might be repurposed for additional use as an area of mine operations)

Any part of FRO or the Project that is not within one of the subcategories does not count as part of the area of mine operations under the *Regulations* and was not included in the calculations.

All parts of FRO (Appendix 1) were classified into categories and subcategories based on their current use or on their permitted use if no construction had occurred there. Parts of the mine that have a future permitted use, but are currently in use for another purpose were classified using their current use. Fording River Operations has a long history of mining and many areas of mine operations have been repurposed for new activities. For example, many areas that once were a mine pit are now used for waste rock storage.

The parts of the Project were classified using Teck's current understanding of the Project. The Project is still conceptual, but is based on one pit with waste rock likely being placed into FRO¹ or backfilling the Project pit. Some waste rock would be stored between FRO and the Project. Tailings storage would not require any new area. Instead it would be stored within FRO or the Project itself (i.e. part of pit backfilling). The Project would not require any new area for a Mill or for interim reclamation.

The area of mine operations for the Fording River Operations was calculated to be 5,630 ha including 4,400 ha of in use area of mine operations and 1,230 ha of permitted but not constructed area (Table 1). The area of mine operations for the Project was calculated to be 2,010 ha (Table 2).

¹ Project waste rock would only be placed in portions of FRO classified as 'area of mine operations' under the *Regulations*.

The percent change in project area is approximately 36% (2,010 ha / 5,630 ha = 35.7%) which is below the threshold in Item 19(a) in the Schedule to the *Regulations*:

“The expansion of an existing mine, mill, quarry or sand or gravel pit in one of the following circumstances: in the case of an existing coal mine, if the expansion would result in an increase in the area of mining operations of 50% or more and the total production capacity would be 5 000 t/day or more after the expansion”.

Table 1 Fording River Operations Area of Mine Operations based on *Physical Activities Regulations*

Fording River Operations	In-Use (Constructed) (ha)	Permitted (Not constructed) (ha)	Total (ha)
Pit	630	220	850
Mill Complex and ore storage	60	-	60
Soil Storage	30	-	30
Waste Rock Storage	2,970	1,010	3,980
Tailings Storage	120	-	120
Interim Reclamation	590	-	590
Total	4,400	1,230	5,630

Table 2 Castle Project Area of Mine Operations based on *Physical Activities Regulations*

Castle Project	Proposed (new) (ha)
Pit	1,520
Mill Complex and ore storage	-
Soil Storage	140
Waste Rock Storage	350
Tailings Storage	-
Interim Reclamation	-
Total	2010

Thank you for your consideration. If you require further information, or would like to schedule a meeting regarding this matter, please contact Dave Baines, at +1.250.425.8465 or david.baines@teck.com.

Sincerely,

<Original signed by>

Dave Baines
Senior Regulatory Approvals Lead, Environment and Social Responsibility
Teck

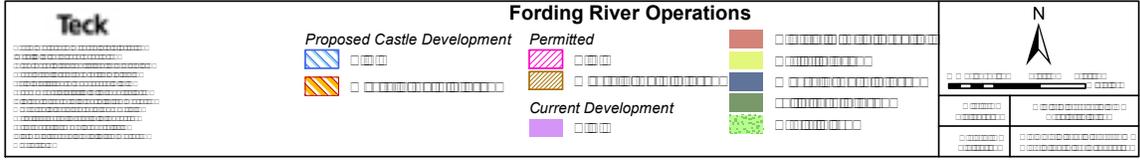
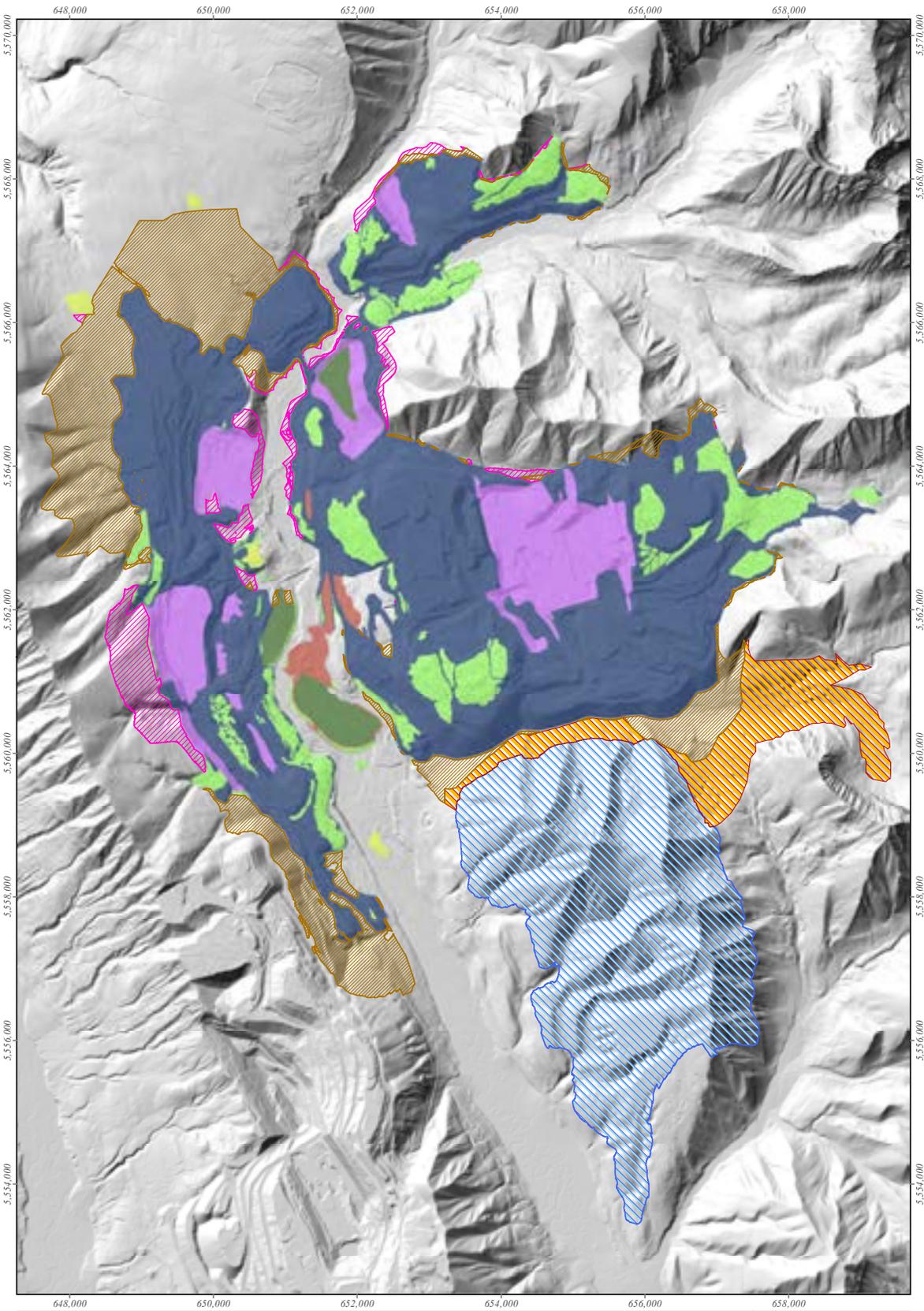


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Appendix 1:

Fording River Operations and Castle Project Area of Mine Operations
classification map based on *Physical Activities Regulations*



Annual Mine Permit Report for 2019

Fording River Operations

March 31st, 2020 – Submitted April 8th, 2020



Teck

Executive Summary

This report describes the various activities and management programs carried out during the 2019 calendar year as they relate to the requirements within the Health, Safety and Reclamation Code for Mines in British Columbia; as well as site specific requirements detailed in the Ministry of Energy, Mines and Petroleum Resources (EMPR) Mine's Act Permits C-3. This report summarizes completed mining, environmental protection, and reclamation activities to December 31, 2019 and describes the proposed reclamation activities and development in the future as outlined in the annual reclamation report format requirements.

The 2019 reclamation program at Fording River Operations (FRO) consisted of contouring 3.8 ha, site preparation of 27.7 ha, and planting 350,720 seedlings over an area of 76.9 ha. This planting occurred at various locations in the Henretta area as well as around Fording River riparian areas. There was 1.1 ha of soil placement in the Henretta area; the placement volume was approximately 3,300 m³. Seeding occurred at Henretta and the soil stockpile areas to mitigate erosion and to limit the establishment of invasive plants. A comprehensive invasive plant management program was conducted at FRO in 2019, with a focus on gathering inventory data in areas that had no previous inventory information or in areas where existing information was outdated. Treatment of priority areas was also a goal in 2019. The majority of invasive plant treatment work was conducted at existing reclaimed areas, sediment ponds, soil stockpiles, and areas near the South Tailings Pond, Office Complex, Lake Mountain Creek, Clode Pond and Henretta Ridge. A total of 50.3 ha of soil salvage operations occurred at two general areas: North Swift Spoil development and South Swift Spoil development. In 2019, a total of 249,153 m³ was salvaged and sent to stockpiles for future use in reclamation treatments. Progressive reclamation is focused on portions of the disturbance area that are no longer necessary for the immediate operating requirements of the site.

Fording River Operations has an extensive reclamation program supported by various operationally focused management plans intended on delivering effective reclamation treatments. Our Biodiversity Program guides our reclamation efforts and reclamation research as we work to achieve a net positive impact on biodiversity in areas affected by our activities.

In 2019, a major focus of Teck's Applied R&D program was execution of the *In situ* Water Treatment program which included the development of the FRO Eagle 4 SRF, and planning for a trial of a gravel bed bioreactor.

Fording River Operation's current operations are focused on Eagle Mountain Pits on the east side of the operation, as well as the Swift and Lake Mountain pit areas on the west side of the operation. Current operating areas are expected to provide economic coal resources at FRO until approximately 2040.

Moving forward, Fording River Operations will continue to manage, promote and maintain a robust reclamation program to further establish and enhance long term progressive reclamation activities now and into the future. Currently ~14% of the site's disturbance area (4,956.37 ha) has been classified as reclaimed (685.58 ha). Much of the remainder of the site is generally active and therefore is unavailable for reclamation. However, progressive reclamation is planned to occur throughout the stages of active mining and closure. Progressive reclamation is focused on portions of the disturbance that are no longer necessary for the immediate operating requirements of the site. The process for assigning areas available for reclamation considers the current permitted mine plan, the conceptual life of mine plan and the

operational requirements for an active mining operation. Refer to Table 2-1 for a summary of disturbed, reclaimed and exempt areas.

1. Introduction

1.1. Overview

Teck Coal Limited's (Teck) Fording River Operations (FRO) is located within the front ranges of the southern Canadian Rocky Mountains, approximately 29 kilometers northeast from the community of Elkford, British Columbia. The FRO property consists of 7 Coal Leases (17,336 ha), 11 Coal Licenses (2,849 ha) and 15 Crown Grants (2,968 ha) for a total of 23,153 ha of which 6,933 ha have been permitted for mining related activities.

The mine property is situated within the asserted traditional territory of the Ktunaxa Nation. Ecologically, using the BC Biogeoclimatic Ecosystem Classification (BEC) system the mine is located within two biogeoclimatic zones, the Engelmann Spruce-Subalpine Fir (ESSF) and Montane Spruce (MS), and the majority of areas occur in four subzones; ESSFdk1, ESSFdk2, ESSFdkw, and MSdw in areas with an elevation range of 1600m-2250m. Additional BEC subzones include the ESSFdkp, and a minor component of MSdk.

Mining operations at FRO commenced in 1971, with the primary focus on producing steelmaking coal, although a small amount of thermal coal is also produced. The current annual production capacities of the mine and preparation plant are approximately 10 million tonnes of clean coal.

In 2019, production mining occurred in Swift and Eagle Mountain. In the current Life of Mine plan, Eagle Mountain will be mined continuously up to approximately 2026, at which point mining will be complete. The Swift coal reserves (estimated at 170 million metric tonnes of clean coal) will be mined continuously until approximately 2040.

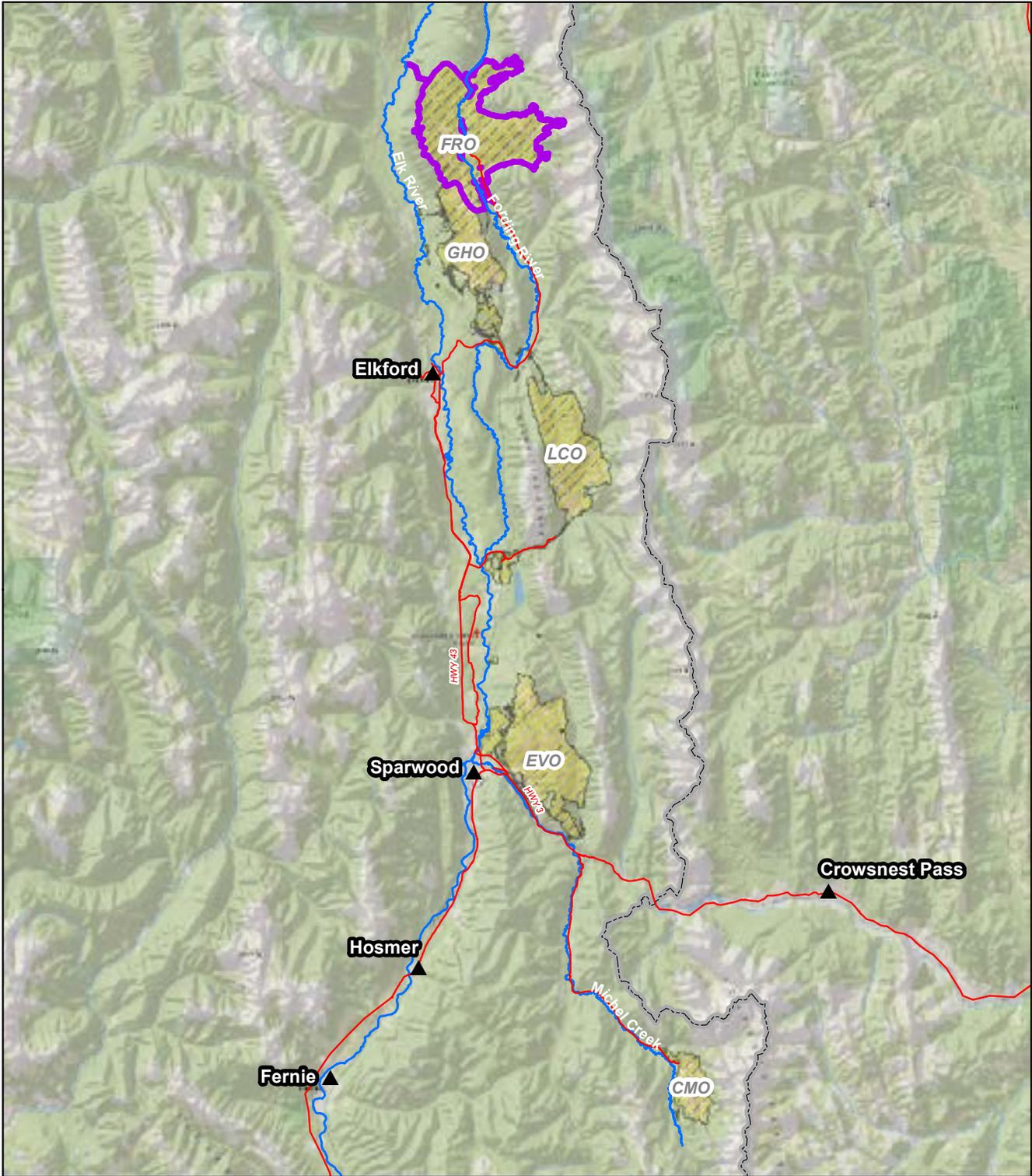
Based on the 2019 conceptual Life of Mine (LOM) plan, the FRO reserves in Eagle Mountain, Swift, Henretta, Turnbull and Castle would support mining to 2069.

FRO uses many management plans to determine and implement mitigations associated with mining; regional management plans include:

- **Grizzly Bear Denning Management Plan:** The focus of the Grizzly Bear Denning Management Plan is to implement management activities and procedures that reduce the likelihood of interactions with grizzly bears during the active denning period. This includes defining high potential grizzly bear denning habitat through a Habitat Sustainability Index (HSI), defining actions and methods to further refine the identification of grizzly bear denning sites and ensuring sites develop management actions in the event of locating a grizzly bear den in an active or imminently active mining area.
- **Invasive Plant Management Plan:** The focus of the Invasive Plant Management Plan is to detail the manner in which our operations within the Elk Valley will act to identify infestations, reduce the spread of noxious weeds/invasive plants, mitigate their impacts where present, and control populations with the goal of containment, reduction, and eradication where feasible.
- **Species Management Plans:** The completion of the technical guidance for designing mitigation strategies for rare and at-risk plants and wildlife led to the development of six species management plans in 2016. These species-level action plans outline mitigation measures, using the biodiversity mitigation hierarchy, which demonstrates how the operation will work to achieve

Net Positive Impact (NPI) for that species. Included in these plans is information about the ecology and distribution of the species, mitigation strategies and metrics to measure implementation success. The management plans specific to FRO include American badger, Gillette's checkerspot, and whitebark pine.

- **Soil Salvage Management Plan:** The Plan presents the management approach to soil salvage activities so that a consistent and logical approach is followed to developing site-specific soil salvage plans. A key function of the Plan is to guide soil salvage activities to ensure that mitigations are included for erosion and sediment control, soil compaction and admixing that may occur during operations.
- **Teck's Bird Guidance:** The objective of this document is to provide a framework that integrates bird biodiversity conservation for application at Teck's operations. The intent is to assist Teck management, site supervisors, consultants and contractors, and anyone overseeing or conducting activities that could impact birds or bird habitat at Teck sites by reducing the risk of impacts to birds and their habitats through the mitigation hierarchy. This document applies throughout the year to birds that are specifically listed in applicable regulations or are species cited as being of specific conservation concern.
- **Teck's Fish and Herptile Salvage Operations Guidance Document:** The objective of this document is to provide guidance to Teck Management, site supervisors, consultants and contractors and anyone overseeing or conducting activities that could impact fish and/or herptiles (amphibians and reptiles) or their habitat at Teck sites. This document helps to ensure safety and environmental risks associated with projects are identified, mitigated, and managed and provides guidance for planning, implementation and reporting for projects involving fish and herptile salvage and relocation.
- **Elk Valley Water Quality Plan (EVWQP):** This Plan is intended to address increasing selenium and nitrate water concentrations, assess and track levels of sulphate and cadmium, while at the same time allowing for continued sustainable mining within the watershed. The EVWQP also lays out a strategy to address calcite formation associated with historical and current mining activities. Permit 107517 issued under the Environmental Management Act (EMA) takes an area based approach to authorizing and managing water quality constituents of interest (CI) originating from current and historical mining activities in the Elk Valley. To do so, requires an extensive surface water monitoring program that includes authorized discharges, receiving environment and other sampling sites, eight authorized discharge Compliance Points, and seven Order Stations for which Site Performance Objectives (SPO) have been established. These permitted sampling locations are used to evaluate compliance, and overall effectiveness of the EVWQP.



<p>Teck</p> <p>The maps and map data are provided 'as is' without any guarantee, representation, condition or warranty of any kind, either express, implied, or statutory. Teck Resources Limited assumes no liability with respect to any reliance the user places in the maps and map data, and the user assumes the entire risk as to the truth, accuracy, currency, or completeness of the information contained in the maps and map data.</p>	<p>Elk Valley Overview</p>		
	<p>▲ Communities</p> <p>— Highway</p> <p>— River</p>	<p>— State - Province Boundaries</p> <p>— Mine Permit Boundaries</p> <p>— Fording River Operations</p>	
	<p>DATE: 3/31/2020</p> <p>SCALE: 1:425,000</p>	<p>MINE OPERATION: Fording River Operations</p> <p>COORDINATE SYSTEM: NAD 1983 UTM Zone 11N</p>	

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1.2. Reclamation Objective

As part of our sustainability strategy, biodiversity has been defined as a key focus area at all our operations. At Teck, we are working to achieve a Net Positive Impact (NPI) on biodiversity in areas affected by our activities. This vision is a critical component of reclamation and closure planning for FRO and will, in part, guide the development of reclamation prescriptions to support closure objectives.

Our NPI commitment applies to ecosystems, critical landscape functions, and Ecosystem and Biodiversity Elements (EBEs), prioritized with input from regulators and communities of interest. The EBEs may include populations, species, ecosystem services, and sites with high irreplaceability and/or vulnerability such as culturally important sites. The specific EBEs that have been identified for FRO are tracked through the Biodiversity Management Plan Workbook.

A Biodiversity Management Plan (BMP) provides an overview of the various actions, planning processes, and plans that together, represent a Teck operation's plan to work to achieve NPI. The BMP for FRO will evolve over time reflecting improved understanding of impacts and the effectiveness of mitigation actions. Although the individual components of FRO's BMP may change over time, the high-level approach to work to achieve NPI adopted by our operation will remain relatively consistent.

The reclamation program component of the Biodiversity Program is based on a philosophy of ecological rehabilitation, resulting in pre- and post-mining landscapes that have similar ecological characteristics and function, but this does not imply that they will be the same (Cooke & Johnson, 2010). Our reclamation philosophy for FRO is focused on establishing geotechnically stable landscapes with appropriate drainage and water quality that support a mosaic of ecosystems to provide the widest range of options for the future (National Research Council, 1981).

Our approach to reclamation planning is evolving in line with the NPI commitment. Post-mine disturbance ecosystem mapping is conducted by integrating knowledge of post-closure material characteristics and landform topography to estimate soil moisture and nutrient regimes, and to derive slope and aspect-based modifiers. Post-mine disturbance ecosystems are expected to be similar to ecosystems found in the region, though distribution will change to account for existing material characteristics, new landforms, slopes and aspects. We believe that by reclaiming disturbed land to stable, functioning, locally appropriate ecosystems that can reasonably be expected to thrive on a specific landform or location, a variety of end land use objectives can also be met. Please see section 4.1 for more detailed information on end land use objectives.

Reclamation of the post-mining environment will re-establish basic ecological processes through relatively simple plant communities, but it could take decades to centuries to re-establish the complexity of ecosystems such as mature or old growth forests. Nonetheless, the overriding objective for all reclamation treatments is to promote NPI by establishing diverse ecosystems and habitats that will persist and continue to promote succession toward desired mid to late seral stages over time. Accomplishing this objective will require adhering to basic ecological principles, along with the application of specific treatments and treatment combinations that are effective and consistently successful. This functional approach to reclamation is appropriate because it aims at establishing desirable physical, chemical, and biological processes (Smyth & Deardon, 1998).

Progressive reclamation is planned to occur throughout the stages of active mining and closure. Reclamation will be scheduled in areas where mining and operations are complete and not planned for

any future mining activities. The process for assigning areas available for reclamation considers the current permitted mine plan, the conceptual life of mine plan and the operational requirements for an active mining operation.

The general planning sequence for reclamation activities is to conduct contouring and/or site preparation activities once an area is available followed by a spring or fall revegetation program; depending on the area, reclamation activities (i.e. site preparation, soil placement, fencing, surveys and sampling, seed collection, seedling propagation and planting, etc.) could span 3-7 years. Updates to vegetation prescriptions have increased the planting densities as well as species selection which could result in extending planting programs over multiple years to meet the required numbers and assemblages in a planned ecosystem. Due to the differences in the elevation and aspect range specific to areas planted within a given year, seeding is generally planned for a fall application in the year following planting so that germination can begin immediately following snow melt in the spring; timing of this melt often differs between sites. Due to the variable rate of germination between seed lots and species, fertilizer is generally planned to be applied in the spring after the fall seeding to maximize the effectiveness of the fertilizer treatment. Germination will be confirmed prior to applying fertilizer and delayed if necessary.

2. Mining Program

The required Surface Development Map including mines act permit boundary, disturbed areas, mine components/facilities, waste disposal locations and soil stockpiles at a scale of 1:10,000 will be submitted digitally in Appendix 1.

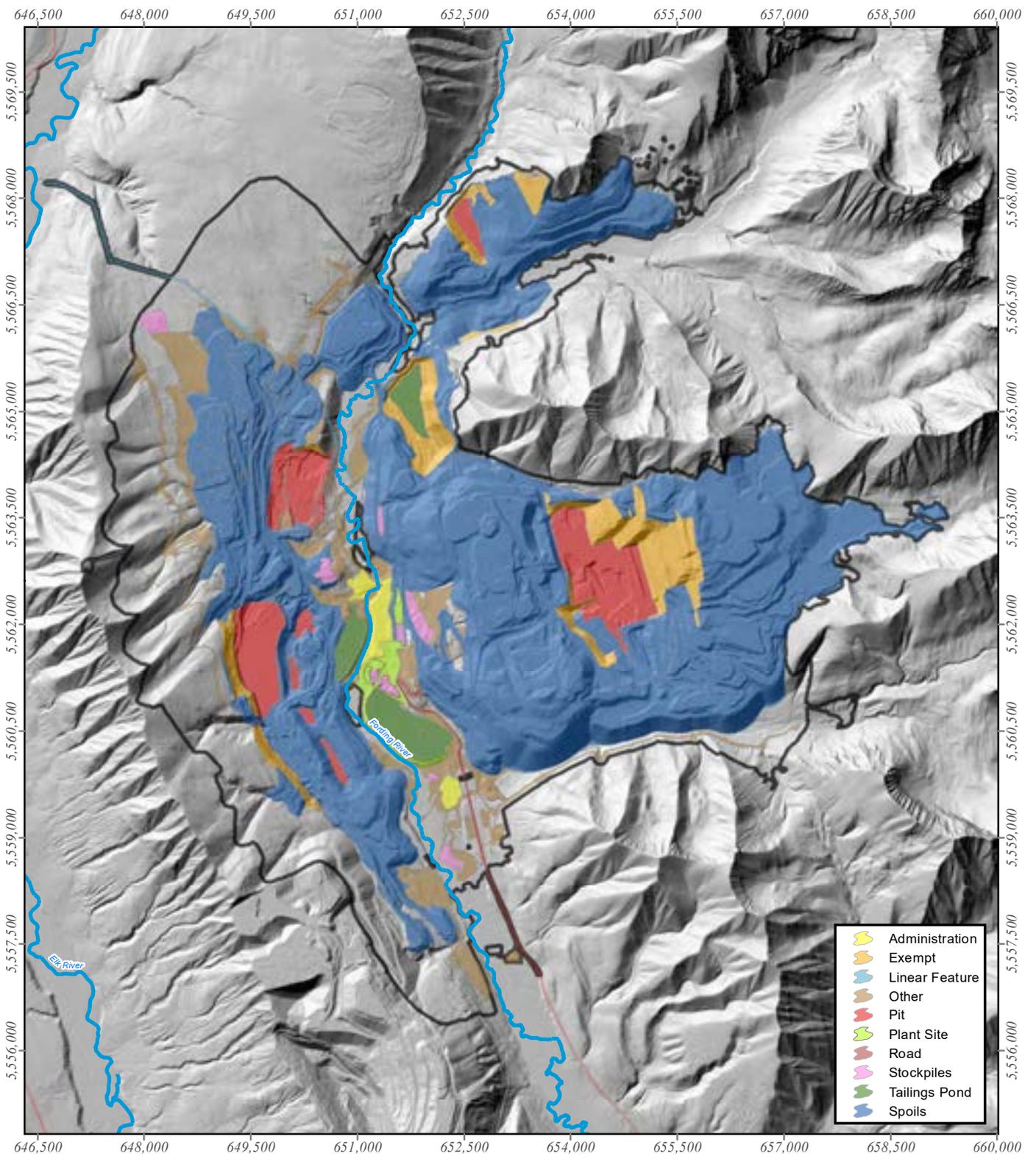
2.1. Surface Development to Date

Total surface development at FRO is 4,956 ha with a total of 686 ha reclaimed. Table 2-1 is a summary of the disturbed and reclaimed areas at FRO up to December 31, 2019. The volume of waste rock to date is 3.2 billion BCM, all placed within the operating area of FRO. Approximately 8.1 million BCM of coarse coal rejects has been placed in active and completed dumps to date.

Areas disturbed within the exempt category is composed of a 310 ha of highwall and footwall from current and completed pit development. Areas reported as seeded and planted in Table 2-1, are the area for which each of these activities have been completed. The area reported within the re-vegetated category may include one or both of these treatments. Areas will be reported as re-vegetated based on EMPR guidance in the general information requirements for Table 1 as “supported vegetation that will lead to the designated land use objective for at least one year”. A decrease from 2018 of 12.6 ha in the re-vegetated category primarily occurred from pit and spoil development activities which removed areas previously reclaimed. Stockpiles in Table 2-1 refer to coal and soil stockpiles.

Table 2-1 Summary of Disturbed and Reclaimed Areas

	Area Disturbed		Area Recontoured		Area Seeded		Area Planted		Area Fertilized		Area Revegetated	
	2019	Total	2019	Total	2019	Total	2019	Total	2019	Total	2019	Total
Administration	0.0	51.0	0.0	2.5	0.0	2.3	0.0	2.5	0.0	0.0	0.0	3.7
Waste Dump	51.9	3512.4	3.8	898.9	14.0	1020.8	60.4	756.3	0.0	542.8	0.0	575.9
Stockpiles	1.2	47.6	0.0	1.8	20.7	45.6	0.0	4.0	0.0	1.2	0.0	1.6
Tailings Pond	0.0	122.4	0.0	1.3	0.0	18.9	0.0	0.0	0.0	3.6	0.0	2.4
Road	0.0	20.8	0.0	0.5	0.0	1.7	0.0	0.8	0.0	0.5	0.0	2.6
Pit	2.7	352.2	0.0	12.2	0.0	25.8	0.0	16.0	0.0	0.0	0.0	0.0
Linear	0.0	26.5	0.0	0.0	0.0	3.1	0.0	1.2	0.0	1.1	0.0	16.1
Exempt	0.0	310.4	0.0	7.2	0.0	22.7	0.5	4.8	0.0	2.0	0.0	1.9
Other	87.9	459.6	0.0	16.8	0.8	202.6	16.0	34.1	0.0	92.1	0.0	73.9
Plant Site	0.0	45.1	0.0	7.1	0.0	14.7	0.0	4.2	0.0	11.1	0.0	7.1
Total	143.6	4956.4	3.8	948.2	37.2	1358.2	76.2	823.9	0	654.6	0	685.6



<p>The maps and map data are provided 'as is' without any guarantee, representation, condition or warranty of any kind, either express, implied, or statutory. Teck Resources Limited assumes no liability with respect to any reliance the user places in the maps and map data, and the user assumes the entire risk as to the truth, accuracy, currency, or completeness of the information contained in the maps and map data.</p>		Surface Development to Date		<p>0 350 700 1,400 2,100 Meters</p>
		Stream Paved Road C-3	<p>DATE: 4/1/2020</p> <p>SCALE: 1:70,000</p>	

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2.2. Current Life of Mine Plan

The Life of Mine (LOM) Plan represents a 21-year period from 2019 to 2040 and details the mining sequence for the current proven and permitted reserves. The overall plan mines the existing, permitted reserves in Eagle Mountain, Henretta and Swift mining areas.

In 2019, production mining was split between Swift and Eagle Mountain. In the current Life of Mine plan, Swift will be mined continuously until 2040, being the only active phase from 2026 to 2037. Swift phases 1-3 and Lake Mountain, formerly known as Lago Pit, are the main mining areas until 2024 at which time Swift 4 will begin. Lake Mountain Pit is accelerated to allow for completion in 2021 enabling backfilling opportunities. Swift South Spoil is the main dumping location for Swift 2 North while Swift North Spoils and Lake Mountain backfill remain the main dumping location for all other Swift phases. Eagle Mountain will be mined continuously up to 2026 at which point mining will be complete. The Eagle mining sequence offers backfilling opportunities into Eagle 4 and Eagle 6. Henretta mining will commence in 2038 and be complete along with Swift Pit in 2040. Fording River will continue to evaluate future mining areas adjacent to Eagle Mountain, including Turnbull and Castle Mountain as well as additional mining potential in Eagle Mountain.

2.3. Surface Development in the Past Year

Production waste mining and spoiling was conducted in both Eagle Mountain and Swift in 2019. Waste volumes (both waste and rehandle mined) are identified in Table 2-2 and Table 2-3. Table 2-2 indicates volume of spoil material placed, by drainage, from both mining areas. Table 2-2 also identifies the volume of coarse coal rejects produced. All coarse coal reject in 2019 reported to Eagle 4 South Backfill CCFR Spoil, with a total of 1.7MBCM placed. (Table 2-2).

A total of 108.8 MBCM of material (waste and raw coal) was mined in 2019, all from Eagle and Swift. This includes 99.6MBCM of waste, and 8.6MBCM of raw coal. The FRO plant processed a total of 8.0M tonnes of clean coal (Table 2-3), with 0.6M tonnes of clean coal being produced for the Greenhills Operation (GHO).

For reference, the required Table 4 Monthly Custom Milling Production has not been included as it does not apply to coal mining operations.

Table 2-2 Quantities of waste rock, tailings, low grade ore, coarse reject and other mine waste

Name of Drainage	Acid Generating Waste (MBCM)		Potentially Acid Generating Waste (MBCM)		Non- Acid Generating Waste (MBCM)		Total Waste (MBCM)	
	2019	Total	2019	Total	2019	Total	2019	Total
Henretta Creek					0	178	0	178
Clode Creek				2	16	502	16	504
Eagle 6 Pit					12	91	12	91
Eagle Pond					0	136	0	136
South Tailings Pond					0	61	0	61
Kilmarnock Creek					20	1,176	20	1,176
Post Ponds					6	71	6	71
Lake Mountain Creek			0.004	0.004	35	129	35	129
Liverpool Ponds (swift Pit)					6	200	6	200
Swift Creek/ Cataract Creek					4	58	4	58
Total			0.004	2.004	100	2,603	100	2,605
Low Grade Ore/ Coarse Reject/ Other Mine Waste								
CCR					2	7	2	7
Total						7		7

Table 2-3 Monthly Mining and Milling Production

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Mining Production (bcm)													
Total Waste (bcm)	8,988,045	7,969,040	8,086,571	7,929,105	9,320,710	8,006,174	7,976,486	7,649,538	8,427,917	8,507,978	8,516,388	8,253,341	99,630,292
Total Coal (bcm)	798,246	703,929	758,914	822,218	835,996	603,107	758,303	813,772	731,697	632,079	660,478	1,068,375	9,187,114
Mining Total (bcm)	9,786,291	8,672,968	8,845,485	8,751,322	10,156,705	8,608,281	8,734,789	8,463,311	9,159,614	9,140,057	9,176,866	9,321,716	108,817,406
Milling Production (Clean tonnes)													
FRO Coal Processed (mtcc)	61,1198	688,863	652,397	732,322	729,302	514,979	740,513	702,670	570,468	581,471	559,758	799,435	7,883,376
GHO Coal Processed (mtcc)	52,417	20,635	57,904	52,201	37,320	29,390	26,644	46,178	72,360	113,176	69,467	16,870	594,562
Milling Total (mtcc)	663,615	709,498	710,301	784,523	766,622	544,369	767,157	748,848	642,828	694,647	629,225	816,305	8,477,938
Milling Capacity	44,000	Raw tonnes per day											

2.4. Surface Development Projected Over the Next Five Years

Over the next 5 years, production mining will occur in both Swift and Eagle Mountain. Swift mining will be focused in Swift 1, 2N and 2S and Lake Mountain for these five years. Waste is scheduled to go the Swift North and South spoils during this time. In order to spoil onto the Swift South Spoil, a toe berm is required. In 2019, a portion of this toe berm was constructed, after which a small portion of the north end of the Swift South Spoil was utilized. Swift South and North spoils will continue to be primary dumping locations, along with Lake Mountain Backfill. Eagle Mountain mining will continue in established mining areas. Waste from Eagle will be backfilled into completed pits, as well as the Kilmarnock Valley. In addition, options for Turnbull West Pit (TBW) are currently being explored, this pit is a pushback to the previously completed Turnbull South Pit (TBS). TBW is projected to increase the FRO disturbance footprint by approximately 100ha. Spoiling locations for that area would consist of the Clode Creek area, Swift North Spoil, existing Eagle spoils and backfilling of TBS.

Appendix D



August 25, 2018
Authorization Number: 107517

Tracking Number: 371604

REGISTERED MAIL

Teck Coal Limited
3300-550 Burrard ST
Vancouver, BC V6C 0B3

Dear Permittee:

Enclosed is Amended Permit 107517 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the permit. An annual fee will be determined according to the Permit Fees Regulation.

This permit does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the permittee. This permit is issued pursuant to the provisions of the *Environmental Management Act* to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the permittee to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Administration of this permit will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Plans, data and reports pertinent to the permit are to be submitted by email or electronic transfer to the Director, designated Officer, or as further instructed.

Environmental Protection
Division

Ministry of Environment

205 Industrial Road G
Cranbrook BC V1C 7G5

Mining Operations
Telephone: (250) 489-8540
Facsimile: (250) 489-8506

107517

page 2

Date: August 25, 2018

Yours truly,

<Original signed by>

Douglas J. Hill, P.Eng.
for Director, *Environmental Management Act*

Enclosure



**MINISTRY OF ENVIRONMENT AND
CLIMATE CHANGE STRATEGY**

PERMIT

107517

Under the Provisions of the Environmental Management Act

Teck Coal Limited

**3300-550 Burrard ST
Vancouver, BC V6C 0B3**

is authorized to discharge effluent to the land and water from five coal mine sites located within the Elk Valley near Elkford and Sparwood, British Columbia, subject to the terms and conditions listed below. Contravention of any of these conditions is a violation of the *Environmental Management Act* and may lead to prosecution.

The terms and conditions included in this permit are intended to supplement the commitments and processes contained in the Elk Valley Area Based Management Plan approved November 18, 2014. Should any conflict exist between this permit and the Elk Valley Area Based Management Plan, the permit requirements take precedence.

1. DEFINITIONS AND GLOSSARY

Unless otherwise defined, all terms used in this permit are defined as in the Elk Valley Area Based Management Plan (ABMP), approved November 18, 2014. The ABMP is also referred to as the Elk Valley Water Quality Plan.

ABMP: Elk Valley Area Based Management Plan or the Elk Valley Water Quality Plan or EVWQP.

AMP: Adaptive Management Plan

AWTF: Active Water Treatment Facility

BCWQG FWAL: British Columbia Water Quality Guideline for Fresh Water Aquatic Life

CMO: Coal Mountain Operations as described in the latest approved Mines Act Permit C-84

Compliance Point: an effluent monitoring location specified in the permit at which discharge limits apply

Date issued: November 19, 2014
Date amended: August 25, 2018
(most recent)

<Original signed by>

Douglas J. Hill, P.Eng.
for Director, *Environmental Management Act*

Constituents of Interest: an element or ionic compound that may pose a threat to ecological or human health when present at sufficient concentrations including selenium (Se), cadmium (Cd), nitrate (NO₃) and sulphate (SO₄).

Designated Area: a portion of southeastern British Columbia that contains the Elk Valley Watershed and the portion of Koochanusa Reservoir within Canada, and is geographically defined by Ministerial Order M113 (references to the Elk Valley are references to the Designated Area)

Elk Valley Area Based Management Plan: Teck Coal Limited was required under Section 89 of the Environmental Management Act, to prepare an Area Based Management Plan. The Elk Valley Water Quality Plan (EVWQP) was approved by the BC Minister of Environment on November 18, 2014.

EMC: Environmental Monitoring Committee

ENV: Ministry of Environment and Climate Change Strategy

EVO: Elkview Operations as described in the latest approved Mines Act Permit C-2

FRO: Fording River Operations as described in the latest approved Mines Act Permit C-3

GHO: Greenhills Operations as described in the latest approved Mines Act Permit C-137

LAEMP: Local Aquatic Effects Monitoring Program

LCO: Line Creek Operations as described in the latest approved Mines Act Permit C-129

Order (the): Ministerial Order number M113, which was the directive issued by the B.C. Minister of Environment in April 2013 requiring Teck Coal Limited to develop the Elk Valley Area Based Management Plan.

Order station: a monitoring location specified by the Order to monitor water quality in the Designated Area, at which site performance objectives apply

RAEMP: Regional Aquatic Effects Monitoring Program

Regulatory Document: any document submitted to the Director as required by this permit

SPO: Site Performance Objective

WLC: West Line Creek

Date issued:	November 19, 2014	<Original signed by>
Date amended: (most recent)	August 25, 2018	Douglas J. Hill, P.Eng. for Director, <i>Environmental Management Act</i>

2. AUTHORIZED DISCHARGES (COMPLIANCE POINTS)

The compliance points in this Section correspond to locations where all or most of the point and non-point discharges from a mine site or portions of a mine site are expected to accumulate. These accumulated discharges are subject to the limits.

For Sections 2.1 to 2.5, the limits are expressed as monthly average concentrations as well as specified daily maximums. The monthly average concentration is defined as the average of all samples collected in a calendar month at the sample location. For months where only one result is collected, that result shall be compared to both the monthly average and daily maximum limits.

2.1. FORDING RIVER OPERATIONS - FORDING RIVER COMPLIANCE POINT

This section applies to effluent from Teck Coal Limited mine operations (Fording River Operations and the Greenhills Operations into the Fording River watershed) upstream of FRO Compliance Point (EMS E300071). The FRO Compliance Point (EMS E300071) is located approximately 525 m downstream of Cataract Creek as shown in Appendix 1.

2.1.1. The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE			
PARAMTERS	Immediately	By Dec. 31, 2019	By Dec. 31, 2023
Total selenium (µg/L)	130	90	61
Nitrate as N (mg/L)	27	19	13
Sulphate (mg/L)	580	620	650

2.1.2. The characteristic of the effluent at the compliance point must not exceed the following daily maximums:

DAILY MAXIMUM			
PARAMETERS	Immediately	By Dec. 31, 2019	By Dec. 31, 2023
Total selenium (µg/L)	155	106	71
Nitrate as N (mg/L)	32.5	23	15

Date issued: November 19, 2014
Date amended: August 25, 2018
(most recent)

<Original signed by>

Douglas J. Hill, P.Eng.
for Director, *Environmental Management Act*

- 2.1.3. The authorized works include tailings impoundments, sedimentation and infiltration ponds, diversions, ditches, pipelines and pumping, sewage treatment plants, and related appurtenances.

2.2. GREENHILLS OPERATIONS – FORDING RIVER COMPLIANCE POINT

This section applies to effluent from Teck Coal Limited mine operations (Fording River Operations, Greenhill Operations and Line Creek Operations) upstream of GHO Fording River Compliance Point (EMS 0200378). The GHO Fording River Compliance Point (EMS 0200378) is located 205 m downstream of Greenhills Creek as shown in Appendix 1.

- 2.2.1. The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE			
PARAMETERS	Immediately	By Dec. 31, 2019	By Dec. 31, 2023
Total selenium (µg/L)	80	63	57
Nitrate as N (mg/L)	20	14	11

- 2.2.2. The characteristics of the effluent at the compliance point must not exceed the following daily maximums:

DAILY MAXIMUM			
PARAMETERS	Immediately	By Dec. 31, 2019	By Dec. 31, 2023
Total selenium (µg/L)	100	78	62
Nitrate as N (mg/L)	29	17	15

- 2.2.3. The authorized works include tailings impoundments, sedimentation and infiltration ponds, diversions, sewage treatment plants, and related appurtenances.

2.3. GREENHILLS OPERATIONS – ELK RIVER COMPLIANCE POINT

This section applies to effluent from Teck Coal Limited mine operations (Greenhills Operations into the Elk River watershed) upstream of GHO Elk River Compliance Point (EMS 300090). The GHO Elk River Compliance Point (EMS 300090) is located 220 m downstream of Thompson Creek as shown in Appendix 1.

- 2.3.1. The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

Date issued: November 19, 2014
 Date amended: August 25, 2018
 (most recent)

<Original signed by>

Douglas J. Hill, P.Eng.
 for Director, *Environmental Management Act*

MONTHLY AVERAGE		
PARAMETERS	Immediately	By Dec. 31, 2027
Total selenium (µg/L)	15	8
Nitrate as N (mg/L)	3	3

2.3.2. The authorized works include tailings impoundments, sedimentation and infiltration ponds, diversions, sewage treatment plants and related appurtenances.

2.4. LINE CREEK OPERATIONS – LINE CREEK COMPLIANCE POINT

This section applies to effluent from Teck Coal Limited mine operations (Line Creek Operations into the Line Creek Watershed) above LCO Compliance Point (EMS E297110). The LCO Compliance Point (EMS E297110) is located approximately 1500 m downstream of the West Line Creek Active Water Treatment Facility (WLC AWTF) outfall as shown in Appendix 1

2.4.1. The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE			
PARAMETERS	Immediately	By Dec. 31, 2015	By Dec. 31, 2033
Total selenium (µg/L)	80	50	29
Nitrate as N (mg/L)	14	7	3

2.4.2. The characteristics of the effluent at the compliance point must not exceed the following daily maximums:

DAILY MAXIMUM			
PARAMETERS	Immediately	By Dec. 31, 2015	By Dec. 31, 2033
Total selenium (µg/L)	95	58	33
Nitrate as N (mg/L)	20	9	4

2.4.3. The authorized works include tailings impoundments, sedimentation and infiltration ponds, diversions, sewage treatment plants, and related appurtenances.

2.5. ELKVIEW OPERATIONS – HARMER CREEK COMPLIANCE POINT

This section applies to effluent from Teck Coal Limited mine operations (Elkview Operations into the Harmer Creek watershed) above EVO Harmer Compliance Point (EMS E102682). The EVO Harmer Compliance Point (EMS E102682) is located at the Harmer Spillway as shown in Appendix 1.

Date issued: November 19, 2014
Date amended: August 25, 2018
(most recent)

<Original signed by>

Douglas J. Hill, P.Eng.
for Director, *Environmental Management Act*

2.5.1. The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE			
PARAMETERS	Immediately	By Dec. 31, 2017	By Dec. 31, 2021
Total selenium (µg/L)	45	57 (interim) ¹	Requires Development ¹
Nitrate as N (mg/L)	4	16	8
Sulphate (mg/L)	300	380	450

¹ The limits for total selenium are determined following the process outlined in Section 2.7.1. Establishment of the limits requires written approval by the Director.

2.5.2. The authorized works include sedimentation and infiltration ponds, tailings impoundments, diversions, sewage treatment plants, and related appurtenances.

2.6. ELKVIEW OPERATIONS – MICHEL CREEK COMPLIANCE POINT

This section applies to effluent from Teck Coal mine operations (Elkview Operations into the Michel Creek watershed) above EVO Michel Creek Compliance Point (EMS E300091). The EVO Michel Creek Compliance Point (EMS E300091) is located at the Highway 3 bridge over Michel Creek as shown in Appendix 1.

2.6.1. The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

MONTHLY AVERAGE			
PARAMETERS	Immediately	By Dec. 31, 2021	By Dec. 31, 2025
Total selenium (µg/L)	28	20	19
Nitrate as N (mg/L)	6	6	6

2.6.2. The authorized works include sedimentation and infiltration ponds, tailings impoundments, diversions, sewage treatment plants, and related appurtenances.

2.7. COAL MOUNTAIN OPERATIONS (CMO)

This section applies to effluent from Teck Coal Limited mine operations (Coal Mountain Operations) above CMO Compliance Point (EMS E258937). The CMO Compliance Point (EMS E258937) is located 50 m upstream of Andy Goode Creek as shown in Appendix 1.

Date issued: November 19, 2014
 Date amended: August 25, 2018
 (most recent)

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 for Director, *Environmental Management Act*

2.7.1. The characteristics of the effluent at the compliance point must not exceed the following monthly average limits:

PARAMETERS	Immediately
Total selenium (µg/L)	19
Nitrate as N (mg/L)	5
Sulphate (mg/L)	500

2.7.2. The authorized works include sedimentation and infiltration ponds, diversions, sewage treatment plant, and related appurtenances.

2.8. WEST LINE CREEK ACTIVE WATER TREATMENT FACILITY

This section applies to the discharge of effluent from the West Line Creek Active Water Treatment Facility (WLC AWTF) Phase 1 to Line Creek. The site reference number for this discharge is E291569 as shown in Appendix 1.

2.8.1. The maximum authorized rate of discharge is 8,300 cubic meters per day.

2.8.2. The characteristics of the discharge at the treated effluent outlet of the WLC AWTF must not exceed:

PARAMETER	LIMIT
Ammonia	1.0 mg/L
Biological Oxygen Demand	25 mg/L
pH Range	6.5-8.5
Nitrate	3.0 mg/L
Total Phosphorus	0.3 mg/L
Total Selenium	0.02 mg/L, Monthly Average
Total Suspended Solids	10.0 mg/L

2.8.3. The authorized works are West Line Creek intake structure and pipeline, active water treatment plant, the advanced oxidation process facility, combined Line Creek intake and outfall structure and pipeline, leachate influent from biosolids residual management facility, buffer pond, buffer pond overflow spillway and wet pond, and groundwater diversion, and related appurtenances.

2.8.4. The location of the facilities from which the discharge originates and the location of the point of discharge is District Lot 6772, District Lot 4588, Kootenay Land District.

Date issued: November 19, 2014
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2.9. RE-EVALUATION OF LIMITS

2.9.1. EVO Harmer Compliance Point Selenium Evaluation

The interim limit for selenium of 57 ug/L effective December 31, 2017 is confirmed.

A proposed timeframe and long term limit for total selenium must be re-submitted for consideration and approval by the Director no later than December 31, 2018. The re-submission must include a proposed monthly average total selenium at the EVO Harmer Compliance Point (EMS E102682) appropriate to meet the intentions of the approved Elk Valley Water Quality Plan, and must consider and address the following:

- 1) The comments provided by the EMC in the input table dated June 12, 2015 and the Ktunaxa Nation Council (KNC) in their letter dated January 25, 2016;
- 2) Information derived from the Tributary Evaluation Program;
- 3) The results from updated water quality modelling due October 31, 2017 as per section 10.9;
- 4) An assessment of means to exclude fish from sediment ponds in general and the Harmer Dry Creek Sediment Ponds in particular. Methodology for exclusion should be evaluated by the Elk Valley Fish and Fish Habitat Committee; and
- 5) Clarification regarding how Teck has modified the BRE mine plan to reduce selenium loadings at the Harmer compliance point.

Date issued: November 19, 2014
Date amended: August 25, 2018
(most recent)

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for Director, *Environmental Management Act*

UPDATE – PROPOSED COAL MINING EFFLUENT REGULATIONS

Technical Information Sessions
February 2020



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Overview

- Current Status
- Regulatory Overview
- Key Provisions for all Mines
- Key Provisions for Mines under the General Approach
- Key Provisions for Mines under the Alternative Approach
- Next Steps
- Open Discussion

A presentation on Environmental Effects Monitoring will follow.

Current Status

- Three rounds of engagement/consultations have occurred:
 - January 2017 – presented initial *Proposed Regulatory Framework for Coal Mining*
 - November 2017 – more detailed *Proposed Approach for Coal Mining Effluent Regulations* presented that considered comments received
 - Fall 2018 – presented update on current thinking on key issues:
 - Signal Check: Proposed Coal Mining Effluent Regulations
 - CMER EEM – Key areas considered for change from Nov. 2017 consultation document
 - Written comments received have been considered in refining the proposed approach
 - Purpose of this presentation is to provide information on the regulatory proposal and on the next steps
-

Regulatory Overview

- Two-pronged approach:
 1. **General approach** for mines with effluent discharged through Final Discharge Points (FDPs)
 2. **Alternative approach only** for existing mountain mines in the Elk Valley, British Columbia
 - Mines with effluent from FDPs and non-point sources (diffuse)

Change:

- Alternative approach would only apply to existing mountain mines in the Elk Valley, BC
- Objective for alternative approach was for it to apply where significant and long-standing practices has created legacy issues where it is not practical to collect all effluent, and where significant long-term impacts to the aquatic environment have occurred – these conditions only exist in the Elk Valley, BC
- Other existing mountain mines would be subject to the general approach

Key Provisions for All Mines



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Application

- Regulations would apply to any coal mine that deposits effluent to water frequented by fish
- Would exclude:
 - Exploration projects
 - under 100,000 tonnes of coal production for testing purposes only
 - Mines that ceased coal production prior to January 1, 2012, unless they resume operations

Change:

- Removed the 50 m³/day threshold – allows for any operating coal mines that deposits (discharges) effluent to be captured regardless of size
- Would include mines under care and maintenance since 2012 – these mines may re-open and discharge effluent

Authority to deposit deleterious substances

- Three substances would be prescribed as deleterious substances:
 - Selenium
 - Nitrate
 - Suspended Solids
- Effluent quality standards would apply to these substances
- Effluent must also be not acutely lethal

Mine Waste Disposal Areas

Change:

- Provisions will not be included for an authorization to deposit a deleterious substance into water frequented by fish for a coal mine waste disposal area (tailings impoundment area).
- Coal mines are not analogous to metal or diamond mines where water frequented by fish is used as a tailings impoundment area for the confined deposit of mine waste and tailings to prevent oxidization. ECCC is not aware of any coal mine that is planning the subaqueous storage of mine waste.
- Authorization will still be required from the Minister of Fisheries and Oceans Canada under Section 35 of the *Fisheries Act* for any coal mining related work, undertaking or activity that results in the harmful alteration, disruption or destruction of fish habitat.

Analytical Requirements

- Suspended solids, selenium and nitrate concentrations would need to be determined by a laboratory accredited
 - under the International Organization for Standardization standard ISO/IEC 17025, or
 - under the *Environment Quality Act*, CQLR, c. Q-2; and

Public Information and Review of Regulations

- Any information submitted under these regulations could be made public

Review of Regulations

ECCC intends to review the Regulations 10 years after promulgation. In reviewing the Regulations, ECCC will consider factors such as EEM results, effluent monitoring data and advancements in mitigation measures to assess the effectiveness and appropriateness of compliance limits, particularly selenium limits under the alternative approach.

Key Provisions under the General Approach



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Application

- The General Approach would apply to coal mines other than existing mountain mines located in the Elk Valley, BC
- Excludes recognized reclaimed areas of coal mines

Effluent Quality Standards

- Starting 3 years after promulgation, deposits from final discharge points (FDP) would be authorized if effluent:
 - meets limits for selenium, nitrate and suspended solids;
 - is not acutely lethal; and
 - is within a pH range of 6-9.5
 - Different limits for « new » mines and « existing » mines would apply
 - New mines include:
 - mines that first start operating 3 years after promulgation of the regulations, and
 - mines that ceased operating prior to January 1, 2012, and re-open after the three-year window
 - Mines would be prohibited from diluting effluent prior to deposit through an FDP
 - can't combine non-contact or diverted water with effluent resulting in diluting effluent prior to deposit through FDP
-

Effluent Quality Standards cont'd

- Limits and requirements with respect to pH and acute lethality would take effect 3 years after promulgation, when mines would gain the authority to deposit

Deleterious Substance	Unit	Existing Mines		New Mines	
		Maximum Monthly Mean Concentration	Maximum Grab Sample Concentration	Maximum Monthly Mean Concentration	Maximum Grab Sample Concentration
Suspended Solids	mg/L	≤ 35	≤ 70	≤ 35	≤ 70
Total Selenium	µg/L	≤ 10	≤ 20	≤ 5	≤ 10
Total Nitrate	mg/L, as nitrogen	≤ 10	≤ 20	≤ 5	≤ 10

Suspended Solids Exception

- Grab sample limits for SS would increase to 2000 mg/L during and within 24 hours after an exceptional precipitation event
- An exceptional precipitation event is:
 - For existing mines: a 1-in-10-year, 24-hour precipitation event
 - For new mines: a 1-in-25-year, 24-hour precipitation event
- To determine if an event is exceptional, the amount of rainfall would need to be measured using an on-site precipitation gauge and compared to ECCC's Intensity-Duration-Frequency (IDF) data from the closest station
 - ECCC publishes tables and graphs for short-duration rainfall IDF statistics across Canada: https://climate.weather.gc.ca/prods_servs/engineering_e.html

Changes:

- Limit of 2000 mg/L would apply during an exceptional event
- More stringent trigger (1-in-25 year) would apply for new mines
- Exception is limited to 24 hours after the event

Monitoring Requirements

- For the first three years, quarterly sampling and testing for selenium, nitrate and SS would be required – as part of effluent characterization for Environmental Effects Monitoring
- Frequencies would be as follows thereafter:

Parameter	Minimum Frequency
Selenium and Nitrate	Weekly - quarterly if 10% below limit for 12 consecutive months, additionally, in the case of nitrate, explosive cannot have been used in the preceding 12 months
SS	Weekly
pH	Weekly
Acute Lethality on Fish and Invertebrate Species*	Monthly - If failed, conduct effluent characterization and test twice a month until 3 consecutive passes - If passed for 12 consecutive months, reduced to quarterly
Flow rate	Weekly or continuously

*Effluent from mines would need to be non-acutely lethal to rainbow trout and *Daphnia magna*. For mines discharging saline effluent to marine environment, the use of Three-spined stickle back in place of rainbow trout and *Acartia tonsa* in place of *Daphnia magna*

Special Provisions for No-Production and Low Flow (<50 m³/day) Mines

- If a mine ceases coal production or had an annual average daily volume of effluent less than 50 m³ in the previous calendar year, minimum testing frequency would be reduced to quarterly for all parameters
- Quarterly mean limits for deleterious substances that are equal to the monthly mean limits would apply
- Increased frequency provisions would continue to apply in the case of acute lethality

Change:

- Intent is to reduce administrative burden in the case where effluent is expected to be relatively constant (mines on care and maintenance) and where mines have low flows (expected to be small mines).

Reporting Requirements

- Identifying information (within 60 days of promulgation) including:
 - Company and contact person information
 - Mine description including planned new areas, locations of fish-frequented waters, descriptions of treatment systems
 - Whether coal mine is producing coal or not
 - Information with respect to FDPs (within 60 days of promulgation) including:
 - FDP name, description and location
 - Name and description of the receiving waterbody
 - Description of area of the mine that generates effluent deposited through the FDP
 - Quarterly reports of all tests and monitoring conducted under the CMER in the preceding quarter
 - First quarterly report would need to be provided 45 days at the end of the first quarter after promulgation
-

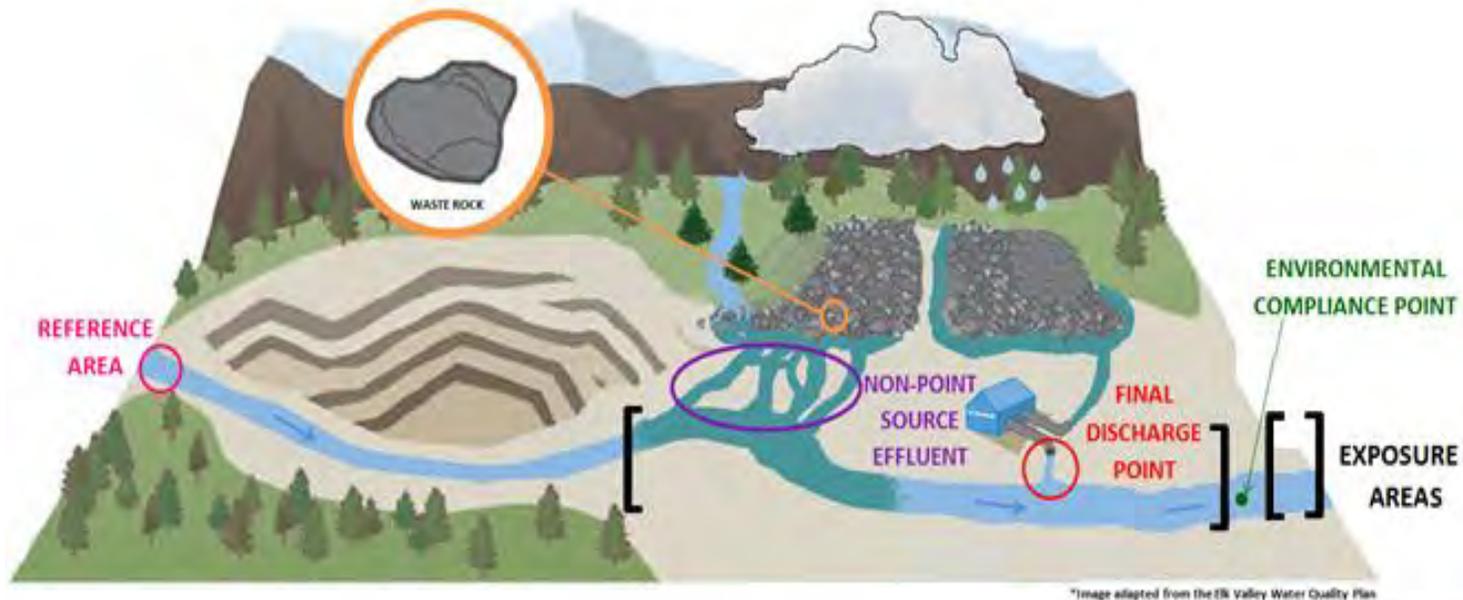
Recognized Reclaimed Areas

- The owner of a mine under the general approach could apply to have a mine or an area of a mine recognized as reclaimed by the Minister of the Environment
- Once the mine or area of the mine is recognized as reclaimed, it would lose its authority to deposit and would no longer be required to be monitored and reported on

Recognized Reclaimed Areas cont'd

- Criteria to be recognized as reclaimed would include:
 - Coal production and storage ceased at least 6 years prior to the application
 - Effluent from other parts of the mine does not contact the area
 - All provincial/territorial/federal requirements for establishing the area as reclaimed have been met
 - Reclamation activities to prevent the weathering and mobilization of deleterious substances within the area were completed at least 3 years prior to application
 - Effluent quality standards at FDPs within the area were met for 3 consecutive years prior to the application, where applicable
 - If applicable, has conducted an EEM biological monitoring study
-

Key Provisions under the Alternative Approach



Note that Environmental Effects Monitoring (EEM) would need to be conducted on two exposure areas, one upstream of each ECP and one downstream – to be discussed further in EEM presentation.

Alternative Approach: Overview

- Would apply to five existing mountain mines in the Elk Valley in southeastern BC
- Would require that effluent from existing areas currently discharged through FDPs:
 - Continue to be discharged through FDPs, i.e., keep collecting the effluent already collected
 - Monitor for selenium, nitrate, SS and flow
 - Meet SS limits, pH and acute lethality requirements (same as under general approach)
- Would set receiver-based limits for Nitrate, Selenium, and SS at Environmental Compliance Points (ECPs)
- Expansions would be required to collect effluent and deposit through an FDP. Limits for existing mines under the general approach would apply.
- Non-point source effluent would not be authorized to be deposited downstream of ECPs
- Authority to deposit would take effect 3 years after promulgation, at the same time as effluent quality standards at FDPs and ECPs

Change: Re-introduction of SS limits at ECPs relative to background point measurements.

Proposed Criteria for Locating Environmental Compliance Points

- The combination of all of a mine's ECPs would need to account for all effluent from a mine in each designated waterbody into which the mine discharges
 - Proposed designated waterbodies are the Fording River, the Elk River, Michel Creek and Harmer Creek
- An ECP would need to be within 200 m downstream from the mine's last effluent entry point into the designated waterbody (FPD or non-point source)
- ECP locations would need to allow for year-round sampling and flow measurement
- Mines depositing in the same area of a designated water body could establish joint ECPs with shared liability

Criteria adjusted to reflect the current proposal to limit the alternative approach to the Elk Valley.

Background Points

- A Background Point would need to be established for each ECP
- Location would need to:
 - be within 200 m upstream of where effluent from a mine associated with the ECP is deposited in the designated waterbody
 - allow for year-round sampling and flow measurement
- Would establish selenium, nitrate and SS concentration and pH measurements prior to a mine depositing effluent
- SS limits at ECPs would be determined relative to background point measurements

Application for ECPs and Background Points cont'd

- The owner of a mine would be required to submit to the Minister of the Environment proposed ECP and Background Point locations and supporting information within 4 months of the coming into force of the regulations
- If all criteria in the application are met, a notice of acceptance would be issued within 1 year of promulgation

Application for ECPs and Background Points

- Application for ECPs and background points would include:
 - Mine identifying information
 - Details of each proposed ECP including name, location, details of how the ECP meets the criteria, description of effluent sources, pathways and deposit locations, etc.
 - Details of each proposed background point including name, associated ECP, location, description, receiving waterbody, etc.
 - Information on all existing monitoring sites for which information is reported to the province
- Information must be prepared and signed by qualified professionals and certified by the owner or operator

Determining Baseline Performance at ECPs

- Baseline performance for selenium and nitrate concentrations would be determined during years 2 and 3 after promulgation
- Weekly concentration measurements would be gathered to determine monthly and 24-month means
- Limits for selenium and nitrate would be based on the 24-month mean performance during the baseline period

Phase-in of Standards at ECPs

- Beginning 3 years following promulgation, the following effluent quality standards would have to be met at each ECP

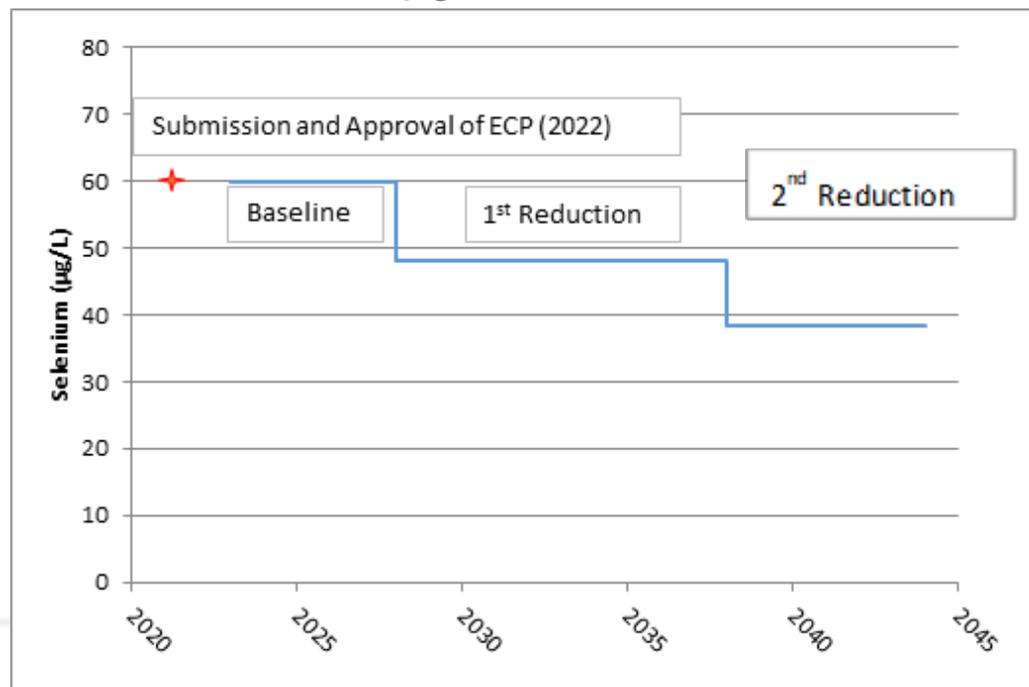
Deleterious Substance	Basis	Limit - Starting 3 years after promulgation	Limit - Starting 6 years after promulgation	Limit - Starting 16 years after promulgation
SS	Grab sample	≤25 % above background levels	≤10 % above background levels	≤10% above background levels
Selenium*	Monthly Average	Highest monthly mean measured during baseline	Lower of 50 µg/L or 20% reduction from baseline	Lower of 40 µg/L or 36% reduction from baseline
	Maximum (grab sample)	Twice the monthly mean	Twice the monthly average	Twice the monthly mean limit
Nitrate, measured as N*	Monthly Average	Highest monthly mean measured during baseline	Lower of 16 mg-N/L or 20% reduction from baseline	Lower of 12.8 mg/L or 36% reduction from baseline
	Maximum (grab sample)	Twice the monthly mean limit	Twice the monthly mean limit	Twice the monthly mean limit
pH	pH at each ECP must be equal to or greater than 6.5 but less than or equal to 9 at all times			

*Monthly mean for selenium and nitrate concentrations would not be required to go below 2 µg/L and 3 mg-N/L respectively.

Phase-in of Standards (cont'd)

Example of phase-in approach in the case where a mine is currently at 60 $\mu\text{g/L}$ at its ECP, assuming CMER promulgation in 2021:

- 1st reduction / limit: 48.0 $\mu\text{g/L}$ in 2027
- 2nd reduction / limit: 38.4 $\mu\text{g/L}$ in 2037



ECP and Background Point Monitoring

- ECPs and background points would be defined as cross-sectional areas of a waterbody rather than a single point
 - When identifying ECPs and background points, coordinates would be provided for either side of the cross section and would need to be marked
 - Samples would need to be taken within 25% of the centre of the width of the waterbody and within a metre of the cross-section
 - Flow rates at ECPs and background points would need to be measured beginning one year after promulgation using one of two methods:
 - Measuring flow rate or volume of water passing through the cross-section using a flow measurement system
 - Equipment would need to be calibrated and maintained annually and be accurate to within 15%
- OR
- Measuring the stage of the waterbody and applying a stage-flow relationship
 - Would need to be accurate to within 5mm and reference to at least 3 benchmarks
 - Equipment would need to be calibrated at least once per year
 - Stage-flow relation would need to be accurate to within 15%
 - Would need to be verified by taking manual flow rate measurements 3 times annually

- ECP no longer a single point – provides flexibility for seasonal changes
- Option for determining flow rate using a stage-flow relation added

ECP and Background Point Monitoring (cont'd)

- Weekly sampling and testing for selenium, nitrate, suspended solids and pH would be required at ECP and background points
 - There would be no reduced frequency provisions
- Background point samples would need to be collected within 4 hours of samples collected at the ECP
- Flow rate would need to be determined weekly at the time the sample is collected or continuously
- Acute lethality test would not be required at the ECP or background point
 - All effluent from the mines would be required to not be acutely lethal but monitoring for acute lethality would only be required at FDPs

Expansions

- The Minister of the Environment would need to be notified 60 days prior to commencing an expansion
 - Description of the expansion including a site plan would need to be provided
- Effluent from expansions would need to:
 - be collected and deposited through an FDP
 - meet standards and monitoring requirements for existing mines under the general approach
- An expansion could become a recognized reclaimed area if it meets the criteria

An **expansion** is intended as new areas of the coal mine associated with new coal processing facilities, new coal storage facilities, new areas used for surface or subsurface extraction, new waste storage facilities – not connected to such existing areas of the mine.

Example:

- 1) A new waste rock pile would be an expansion
- 2) Waste rock placed on an existing pile would not be an expansion

Reporting Requirements

- In addition to the reporting requirements under the general approach:
 - Identifying information would identify any planned expansions and the estimated timelines for those expansions
 - FDP information would specify whether an FDP is designed to deposit effluent from an Expansion or if it is located downstream of the last ECP
 - Monitoring reports would include concentration, pH and flow measurements from ECPs and background points
-

NEXT STEPS

Fall 2020

- Publish proposed regulations in *Canada Gazette*, Part I
- Formal 60-day comment period

Fall 2021

- Target to publish final *Coal Mining Effluent Regulations* in *Canada Gazette*, Part II



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ANNEX 1 – EXAMPLE OF ECCC IDF DATA

SPARWOOD

BC 1157630

Latitude: 49 45'N Longitude: 114 53'W Elevation/Altitude: 1137 m

Table 2a : Return Period Rainfall Amounts (mm)

Duration/Durée	2	5	10	25	50	100	#Years
	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	Années
5 min	3.0	4.5	5.6	6.9	7.9	8.8	35
10 min	4.0	6.2	7.7	9.5	10.8	12.2	35
15 min	4.8	7.3	8.9	10.9	12.5	14.0	35
30 min	6.3	9.1	10.9	13.3	15.0	16.8	35
1 h	8.2	11.1	13.0	15.3	17.1	18.9	36
2 h	10.7	13.4	15.1	17.4	19.1	20.7	35
6 h	17.1	22.2	25.5	29.8	32.9	36.0	33
12 h	23.0	33.5	40.5	49.3	55.8	62.3	33
24 h	28.6	40.6	48.5	58.6	66.0	73.4	35



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Westslope Cutthroat Trout – Evaluation of Cause –

Abundances of Westslope Cutthroat Trout declined significantly between fall 2017 and fall 2019. An evaluation of cause process was initiated to understand the most likely causes of the decline with that process concluding in late 2020.

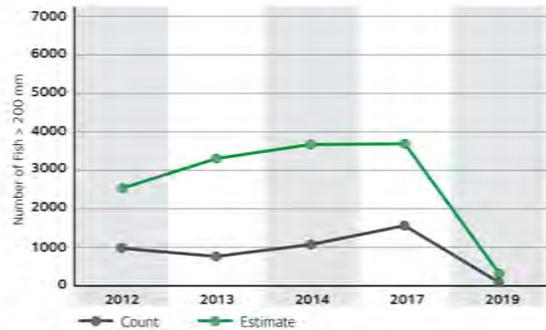


Figure a. Adult Westslope Cutthroat Trout snorkel counts and associated population estimates for the Upper Fording River. From Cope, S. 2020. Upper Fording River Westslope Cutthroat Trout Population Monitoring Project.

The Issue

Westslope Cutthroat Trout is the only fish species in the Fording River upstream of Josephine Falls. The species is Listed as Special Concern in BC. Monitoring in fall of 2019 (Figure a) found that abundance of adults and sub-adults had declined significantly from previous sampling in 2017. Teck immediately implemented an evaluation of cause process to determine likely causes. Follow-up monitoring in 2020 has confirmed the low counts.

Impact Hypotheses

The study team (which includes Teck and several subject-matter experts) has identified a number of potential causes of the population decline (Figure b). The potential causes include those related to mining (e.g., fish handling, ramping and channel dewatering, calcite, water quality, coal dust in sediment), those that may be more natural (e.g., climate related variations in water temperature and flow volumes,

infectious disease, predation), and those that may be human-activity related but just not mining (e.g., poaching). The study team is considering the individual and combined effects of these various potential causes.

The Evaluation of Cause Process

The evaluation of cause is the process used to investigate, evaluate, and report on the reasons for the Westslope Cutthroat Trout population decline. The process, which is led by Teck and several external subject-matter experts, has had input from government representatives and an independent scientist through various committees. The subject-matter experts are developing individual reports on each of the potential stressors and impact hypotheses (see Figure b). The evaluation of cause process is anticipated to conclude in late 2020 and final reports of findings are expected to be available early 2021.

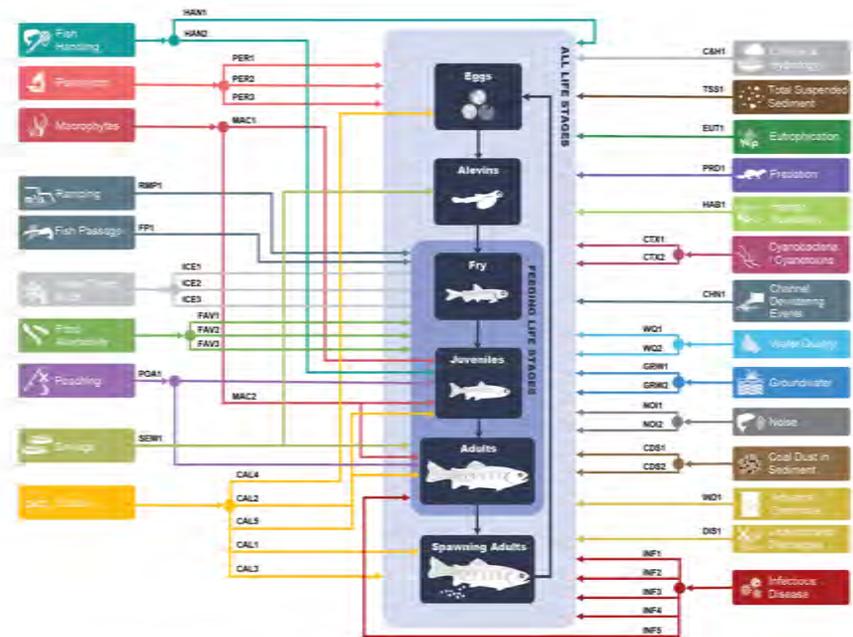


Figure b. Proposed impact hypotheses to be considered in the evaluation of cause process.

Ongoing Monitoring and Analysis

The study team (which includes Teck and several external subject-matter experts) has enhanced the monitoring of the WCT population in the upper Fording River with activities such as: (1) remote operated vehicle surveys of Henretta Lake; (2) spawning surveys (completed in May); (3) snorkel surveys (completed in July and September); (4) angling survey (August); (5) recruitment survey (September); (6) continued operation of PIT tag arrays to track fish movements.

A population model is being developed and it will support the evaluation of cause process, as well as anticipated mitigation and restoration activities.



Figure c. Snorkeler counting fish.

Adaptive Management

Teck's Adaptive Management Plan (AMP) and related annual reports outline the activities to reduce key uncertainties (KUs): what has been learned, and the next steps for reducing KUs and evaluating management questions (MQs).

The AMP response framework outlines the process for notification, confirmation, investigation, and adjustments to monitoring and management. Teck takes when triggers or unexpected conditions are identified.

Current and long-term continuous improvement goals were collaboratively developed by Teck and KWC.

Adaptive management is a systematic, rigorous approach to environmental management that recognizes learning about key uncertainties while simultaneously striving to meet multiple management objectives, and adapt management actions from what is learned (Figure 1).

Teck's water quality adaptive management plan (WAMP) is structured around six management questions (MQs):

- MQ1:** Will water quality limits and site performance objectives be met for selenium, nitrate, sulfate and cadmium?
- MQ2:** Will the aquatic ecosystem be protected by meeting the long-term site performance objectives?
- MQ3:** Are the combinations of methods for controlling selenium, nitrate, sulfate and cadmium collectively, the WQs address Teck's regulatory requirements and the environmental management objectives of the Elk Valley Water Quality Plan. For example, MQ 5 is shown in Figure 2.

Teck's water quality limits and site performance objectives are consistent with expectations?

MQ4: Does monitoring indicate that noise-related changes in aquatic ecosystem conditions are consistent with expectations?

MQ5: Is water quality being managed to be protective of human health?

Collectively, the WQs address Teck's regulatory requirements and the environmental management objectives of the Elk Valley Water Quality Plan. For example, MQ 5 is shown in Figure 2.

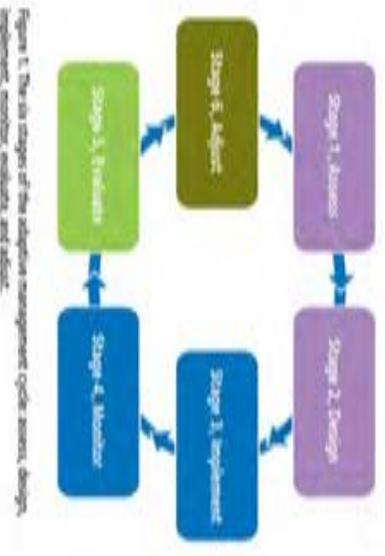


Figure 1. The six stages of the adaptive management cycle: assess, design, implement, monitor, evaluate, and adjust.

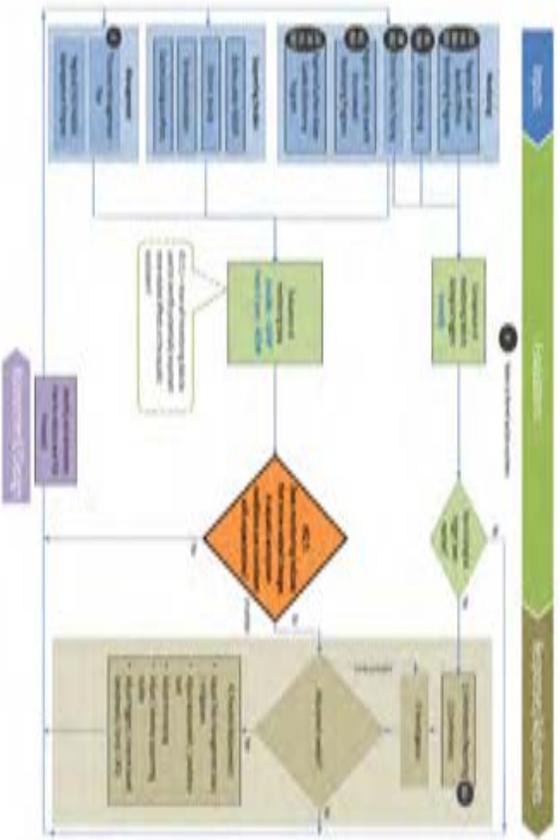


Figure 2. Adaptive management process flow diagram for re-evaluating management question (MQ) 5.

Continuous Improvement

In 2016, Teck and the Kwanan Nation Council (KWC) developed continuous improvement goals for each management question. The activities Teck undertook in 2019 to meet these continuous improvement goals can be grouped into three categories:

- improvements in water quality conditions
- improvements in understanding water quality and ecological conditions
- improvements in water quality management



Teck and KWC also worked together to develop several data-driven metrics for measuring progress on the continuous improvement goals. These metrics were shared with the EMC for input and refinement.

The Environmental Monitoring Committee

Why does this committee exist?

The Environmental Monitoring Committee (also called the EMCC) is required by Permit 1025307. The permit was issued to Teck in November 2014 by the BC Ministry of Environment under the Environmental Management Act.

What does this committee do?

The purpose of the EMCC is to strengthen Teck's aquatic environment monitoring program required under Permit 1025307. The committee does this by reviewing Teck's monitoring submissions that are required by the permit and providing technical advice and indigenous knowledge advice.

Who sits on this committee?

In 2019 and 2020, there were nine members on the EMCC:

- one independent aquatic scientist
- two representatives from the BC Ministry of Environment
- one representative from the BC Ministry of Energy & Mines
- one representative from the BC Inspector Health Authority
- two representatives from the Burnaby Nefton Council
- one representative from Teck



Figure 2. Permit 1025307 boundaries.

Groundwater Monitoring Programs

Groundwater monitoring programs are conducted to understand how mine-related substances are influencing aquifers close to mining operations. Mine-related substances can infiltrate the ground from mine sources, can reach aquifers in the valley bottom that are sources of drinking water, and can influence surface water that interacts with these aquifers. Surface water influenced by mine-related substances can also interact with the groundwater. The study areas are identified in the Regional Groundwater Monitoring Program; these areas have been identified as important to understand regional groundwater pathways of mine-related substances. Groundwater quality is compared to screening criteria based on mine-related substances: fluorine, sulphate, dissolved cadmium, and dissolved selenium.

The Sparwood Area Supporting Study was conducted in 2019 to improve understanding of surface water influence on drinking water wells in Sparwood.

The 2019 groundwater evaluations enhanced Teck's understanding of groundwater transport pathways of mine-related substances and results were similar to previous years.



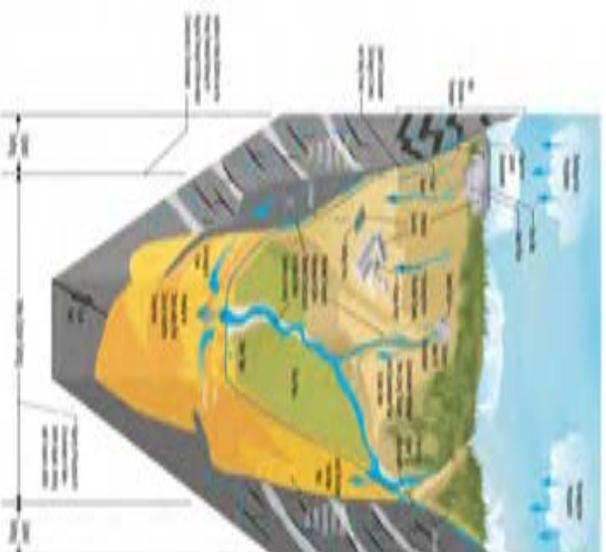
17 new monitoring wells were drilled in 2019 to fill gaps in the regional monitoring network to better understand groundwater in the Elk Valley. 16 wells are anticipated to be drilled in 2020.

Site-Specific Groundwater Monitoring Programs: monitoring for each of the five operations to identify and monitor mine-related substances in groundwater and associated transport pathways.

Regional Groundwater Monitoring Program: monitoring in 12 study areas to understand potential regional groundwater and associated pathways of mine-related substances.

Drinking Water Sampling Program: Teck samples private and municipal drinking water wells to assess against British Columbia Approved Drinking Water Quality Guidelines for mine-related substances. To request to have your well sampled under the program, please contact Teck's Social Responsibility office toll-free at 1-855-806-6854.

For more information on Teck's 2019 annual reports have a look at our Sustainable Practices Report. Learn more about our water quality and the 4th, 6th, 9th, and 10th reporting periods.



Groundwater Working Group (GWC)

The Groundwater Working Group (GWC) supports the Environmental Monitoring Committee with hydrogeology expertise. Membership of the group includes representatives from Teck Coal Limited, the Natural Hazard Council, Ministry of Environment and Climate Change Strategy, interior health, and external consultants (qualified professionals). The GWC helps steer the continual development of Teck's groundwater monitoring programs.

Figure 1: Pathways for mining influences on groundwater.

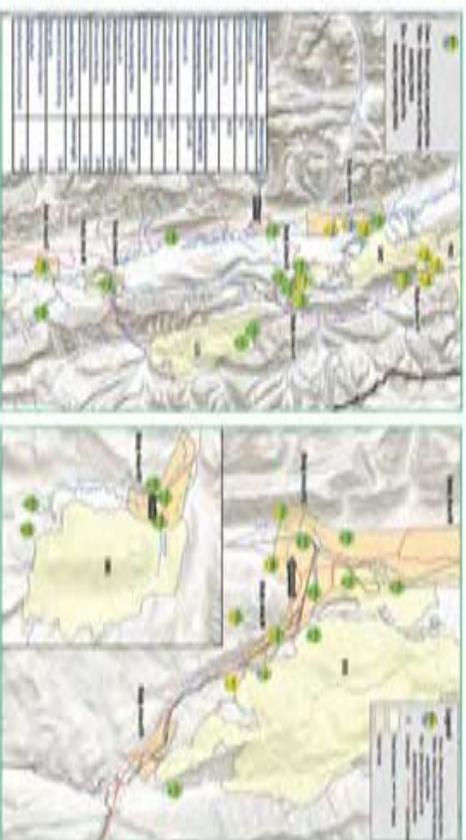


Figure 2: Groundwater results Sparwood 2019.

Human Health Risk Assessment

AN HHRQA IS REQUIRED BY PERMIT 1075017

It is a collaborative effort between Kwantlen Nation Council, BC Interior Health Authority, BC Ministry of Environment, Tech.

The work underway for this HHRQA is inclusive, grounded, and reciprocal.

A human health risk assessment (HHRQA) determines the potential risks to human health posed by certain substances. It considers how toxic the substance is, how much of the substance humans are exposed to, and how often.

This risk assessment will focus on mining-related substances found in the eastern sediment, fish, wild geese, and wild game in the EA Valley.

This risk assessment will evaluate the risk to human health based on the diet of valley residents and the Kwantlen practice of *saluk* (eaten, barling well).

This risk assessment will help us which mining-related substances in the EA Valley could be a concern for human health and should be investigated more closely.

With respect to fish consumption, the BC Ministry of Environment and the BC Ministry of Health recommend the following screening values to protect human health (see page 156 in [http://www2.gov.bc.ca/gov/content/industry/energy-and-water/water/waterquality/water-quality-guidelines/assessment/ingestion_moc_ja_smg.pdf](#)):

- high fish intake: 13 µg/g dw
- moderate fish intake: 14.5 µg/g dw
- low fish intake: 75 µg/g dw

However, exceeding a screening value only means that a detailed evaluation of human health risk should be conducted. To adequately assess human health risk in an area, all exposure pathways must be evaluated. This is what the EA Valley work will do. There are no fish consumption advisories in place for the EA Valley at this time.



2015 - A work plan for a human health risk assessment was reviewed by the EIOC and approved by EML.

2016 - Wild food samples donated by EIOC for analysis.
- A human health risk assessment was completed and reviewed by the EIOC.
- EIOC members concerned that potential health risks to Kwantlen citizens were not adequately addressed.

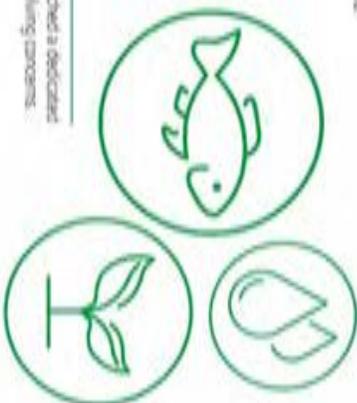
2017 - Wild food samples donated by EIOC for analysis.

2018 - Tech, EIOC, EML, and DNV launched a dedicated workshop committed to resolving concerns.

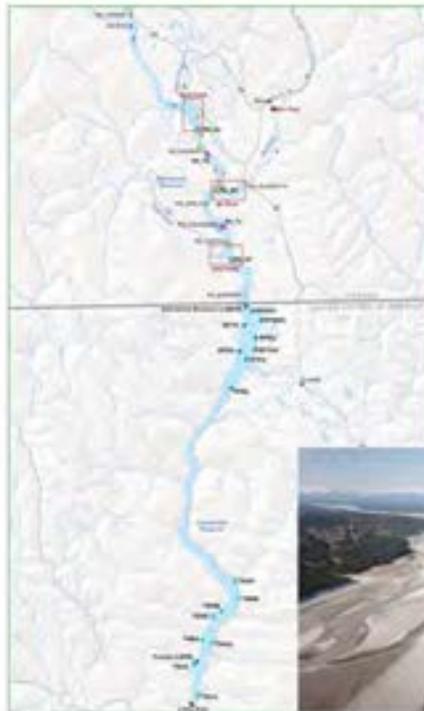
2019 - Workshop members worked to increase their collective understanding of the technical aspects of human health risk assessments in general, and the unique challenges of this risk assessment in particular.
- EIOC launched an expanded diet study to understand preferred consumption rates of Kwantlen citizens.
- Tech launched a wild game sample donation program for local hunters.
- Wild food samples donated by EIOC and local hunters for analysis.

2020 - Workshop members collaborate on the various inputs to the risk assessment by sharing knowledge, expertise, and resources.
- EIOC worked with Kwantlen citizens to develop a conceptual site model that reflects Kwantlen litewag.
- EIOC completed the Kwantlen Diet Study Expansion.
- Wild food samples donated by EIOC for analysis.
- Tech re-launched its wild game sample donation program for local hunters.

2021 - An updated human health risk assessment is expected to be completed and submitted to DNV by mid-year.



Koocanusa Reservoir Monitoring



The Koocanusa Reservoir, created by the Libby Dam in Montana (Figure a), straddles the border between Canada and the United States and lies within the Kootenai Territory. The reservoir was created by damming the Kootenay River in the 1970s.

Sediment Quality

Concentrations of a number of metals and PMs were significantly higher downstream of the Elk River compared to upstream and elevated above screening levels; however, no substances exceeded Severe Effects Levels. These trends are similar to previous years.

Figure a. Map of the Koocanusa Reservoir and photo of typical spring conditions at NS_2581A.



Water Quality

Concentrations of order constituents (cadmium, nitrate, selenium, and sulphate) in Koocanusa Reservoir met the permitted limits at the order station, NS_2581A (EAT: E3002303 in 2019 (Figure b).

Concentrations of other parameters of potential concern were all below provincial water quality guidelines with one exception of zinc during fresher.



Figure b. Daily and monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations recorded at the order station (E3002303) in 2019.

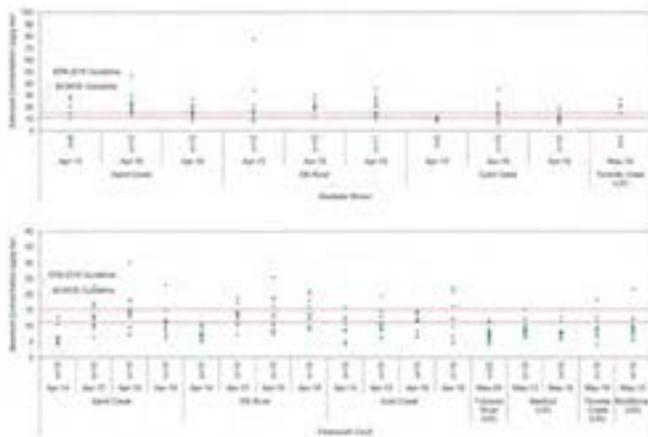


Figure c. Concentration of selenium in ovaries of the Redside Shiner and Peamouth Chub; red lines denote relevant benchmarks for the protection of aquatic life (i.e., fish reproduction).



Order constituents met permitted limits in Koocanusa Reservoir in 2019.

Concentrations of selenium in fish muscle and ovaries were comparable to previous years.



Figure d. Redside Shiner

Fish

Selenium concentrations in fish muscle samples were within previously measured ranges. Mean concentrations of selenium in fish ovaries of the Redside Shiner and Peamouth Chub were above the provincial guideline for the protection of aquatic life in 2019 (Figure c) with individual fish of other species also above all benchmarks (i.e., Northern Pike/minnow, 11 of 92 or 12%).

In addition, a single Westslope Cutthroat Trout was above the provincial egg/larval threshold. Concentrations in Redside Shiner, Peamouth Chub, and Northern Pike/minnow, however, were similar upstream and downstream of the Elk River. Results from 2019 sampling suggest that ovary maturation is an important factor in interpreting selenium concentrations with concentrations decreasing as ovaries mature. Future monitoring will include this metric to support interpretation.

To assess the potential for adverse effects on the Redside Shiner due to benchmark exceedances in ovaries, a Redside Shiner recruitment study began in 2019. Results to date suggest that abundances are lower downstream of the Elk River compared to upstream; however, high proportions of young of year were found in both areas, indicating recruitment (i.e., successful reproduction).

Other studies to assess the potential for adverse effects on fish reproduction due to selenium exposure include selenium sensitivity studies for the Redside Shiner and Northern Pike/minnow. Results to date for the Redside Shiner study indicate these

fish are relatively tolerant to selenium exposure, while the results of the Northern Pike/minnow work suggest that observed concentrations in ovaries decline as eggs mature—understanding the concentrations in mature eggs is an important next step for assessing their sensitivity. Additional reporting on these studies will be provided in 2020 and 2021, respectively.

What's next?

The current BC provincial guideline for selenium in water is 2 µg/L, while the US national criteria for selenium in water is 1.5 µg/L in lake systems. Since site-specific factors can influence the applicability of provincial or national guidelines, BC ENR and Montana DEQ are developing a site-specific selenium objective for Koocanusa by the end of 2020. ENR and DEQ, working with many other partners and stakeholders, have collected and compiled data for the reservoir over the last five years to inform the development of the site-specific objective. BC and Montana will continue to share current information and results, and to meet with partners, stakeholders, and the public through engagement and consultation forums, such as the Koocanusa Reservoir Monitoring and Research Working Group.

You can access BC's 2019 annual reports here: <https://www25.gov.bc.ca/gov/content/industry/energy-environment/water-quality-the-ec-collaborative-and-monitoring-reports/>

Local Aquatic Effects Monitoring

Local aquatic effects programs (LAEMPs) assess site-specific conditions by monitoring on a more frequent and localized basis than the Regional Aquatic Effects Monitoring Program (RAEMP).

A LAEMP is initiated in response to local-area effects, uncertainties in the potential for effects at a local level, or change in water management (e.g., operation of a water treatment facility).

Monitoring occurs as required until sufficient data have been collected to address the study questions; concerns no longer exist; or relevant monitoring can be incorporated into the RAEMP.

Fording River Operations

Objective is to assess the before and after conditions associated with the active water treatment in the Fording River.

- Active water treatment facility delayed in 2021.
- Nitrate concentrations were above the Level 1 and 2 benchmarks at most monitoring monitoring stations in the Fording River.
- Continued decrease in nitrates within the same 4.1m section of the Fording River as previous years, plus a new decline in specific biotic invertebrates, including mayflies, in the upper watershed.
- Specific cause of mayfly decline still under investigation. Both habitat- and mixing-related factors appear to be important; the degree to which habitat variations are attributed to mixing continues to be a question that EMAC members are interested in understanding.
- Surveys were conducted to delineate areas of the Fording River that dry during low-flow periods. Drying alone was unlikely to impact summer biotic invertebrate communities.

Greenhills Operations

Objective is to assess conditions within a localized area, downstream of the QED west spill re-employment and Dangle Pit extension.

- Focus is on the ES River side Channel, which reaches annually when the ES River reaches base flow levels.
- Mine-influenced tributaries flowing into the side channel show elevated and increasing concentrations of various mine-related constituents.
- Some side channel pools are fed by groundwater, seeps, and other sources, and are used by juvenile fish for overwintering.
- One section of the side channel requires wetted year-round due to flow from Thompson Creek and shows elevated concentrations of mine-related constituents.
- Impact on biota is minimal at this time.
- Sampling program was reduced to delineate areas in 2020 to focus on riparian uncertainties.

Coal Mountain Operations

Objective is to assess the cause of changes to biotic invertebrate communities and the chronic toxicity test results.

- This is the first reporting year for the Coal Mountain Operations LAEMP.
- Water management (i.e., pit dewatering) strongly affects water quality.
- The biotic invertebrate community is impacted in Cotton Creek and in-year stream Michel Creek.
- There is significant and increasing calcite formation in Cotton Creek. Calcite is low in Michel Creek with a decrease in 2019 compared to historical values.
- Michel is the likely cause of effects to the biotic invertebrate community based on toxicity test results to date.
- Tech identified that the BC Water Quality Guideline for Michel was not protective of biotic invertebrates. Tech proactively developed an interim screening value to support model treatment considerations, and BC is working on updating its water quality guideline for Michel.



Figure 2: A stonefly

Line Creek--Dry Creek Operations

Objective is to assess the potential effects of Phase II Project of LTD on Dry Creek, Once Creek, and Dismal Creek.

- Nitrate is exceeding effects benchmarks and is expected to surpass the Level 3 benchmark (SOS effects) during 2020. This increase occurred sooner than projected.
- Nitrate effects are being confirmed by chronic toxicity test results.
- Selenium tissue concentrations are elevated in biotic invertebrates and fish, and are highest in the vicinity of the sediment pond discharge channel; however, the biotic invertebrate community has not changed.
- Selenium bioaccumulation and fluxes to sediment ponds was investigated in 2020.
- Consequently, a system of the sediment ponds was completed, which is expected to reduce selenium concentration in biotic invertebrates and fish.
- Dry Creek is currently under a structured decision-making (SDM) process to develop a water management plan. The SDM process is a regulatory process outside the scope of the Environmental Monitoring Committee (EMC) that will eventually be integrated with Permit 1025117.



Figure 3: A caddisfly

Line Creek Operations

Objective is to assess the conditions downstream of the active water treatment facility.

- Addition of the advanced oxidation process (AOP) to the active water treatment facility has reduced selenium in biotic invertebrates and fish tissue to pre-treatment concentrations for biota.
- Almost all tissue concentrations were below the Level 1 benchmark in Line Creek.
- Nutrient concentrations and productivity have not increased with water treatment.
- There has been no significant impact of the treatment process on dissolved oxygen, water temperature, or other water quality parameters.



Figure 4: A mayfly

This document is the final 2023 annual report for the Regional Aquatic Effects Monitoring Program (RAEMP). For more information, visit <https://www2.gov.bc.ca/gov/industry/monitoring/raemp>.

Regional Aquatic Effects Monitoring Program

Results from the Regional Aquatic Effects Monitoring Program (RAEMP) indicate that there are mine-related influences on water quality, benthic invertebrates, and benthic invertebrate endpoints, most of which are within the range of what is expected.



The general objective of the RAEMP is to monitor, assess, and interpret indicators of aquatic ecosystem condition related to mine operations, and to inform adaptive management. Specific objectives of the RAEMP were framed as questions to guide data analysis and interpretation, and were developed collaboratively with the EMAC. The questions of the 2018 to 2020 RAEMP include:

Has there been a change in condition since previous monitoring cycles with respect to fish and benthic invertebrate population/community indicators, water quality, sediment quality, cadmium, and/or those selenium concentrations? Changes in condition since previous monitoring cycles were observed throughout the SA River watershed at all endpoints for which data were available; however, most unexpected changes related primarily to benthic invertebrate metrics. Most effects to BIC were observed in relative abundance metrics (example - % EPT). Total abundance metrics and faunal richness tended to be within site-specific normal ranges except in more highly mine-influenced tributaries (see Figure 4).

Were any identified changes unexpected (i.e., inconsistent with model predictions or general expectations)?

Yes—the selenium in benthic invertebrate tissue concentrations at 100 Dry Creek, Greenville Creek, Thompson Creek, Hornor Creek, Grass Creek, and Bode Creek were higher than expected.

Does the weight of evidence indicate the unexpected changes are mine-related?

In most cases, yes. However, there are challenges in separating mine-related impacts from other-related effects. A lot of work was done in the cycle to better understand habitat effects—see the grey boxes in Figure 5.

What does the weight of evidence indicate about current or future ecosystem conditions in each management unit and regionally, considering the observed type, magnitude, spatial extent, and/or rate of change?

At a regional scale, the upper Frying Pan (AUR) flows the greatest magnitude and spatial extent of change due to declines in BCT populations and changes in benthic invertebrate communities. There are localized changes in some MAs and changes in benthic invertebrate community in AUSA (Wolver Creek downstream of QAD) which are thought to be related to silt.



Figure 1. Abundance of Benthic Invertebrates in AUSA 2007 to 2018.

Figure 2. Percent EPT of Benthic Invertebrates in AUSA 2007 to 2018.

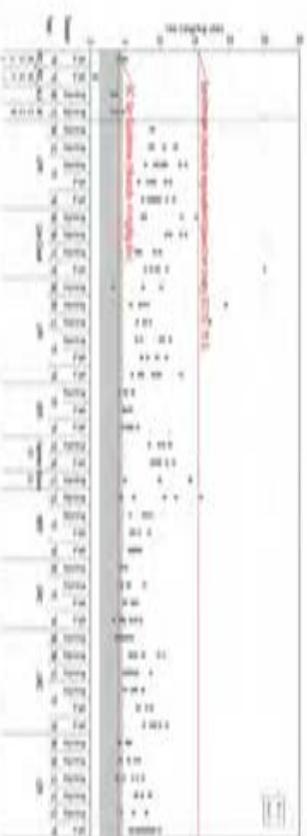


Figure 3. Selenium Concentrations in Benthic Organisms from Water Samples Collected in Lake Superior, 2008 to 2018.



Figure 4. Selenium Concentrations in Mountain Yellowlegs Collected in October 2018.

Additional studies were added to the RAEMP in 2018 through 2020 to support regional understanding where the EMAC had identified gaps. Reports for the following studies will be included in the RAEMP report and will be available on Next's website once they are finalized (early 2021):

- Columbia Spotted Frog Selenium Toxicity Study
- Nutrient Study
- Belted Snipe Selenium Toxicity Study
- Mountain Yellowlegs Selenium Toxicity Study
- Sediment Toxicity Supporting Study
- Aquatic Area Supporting Study (including an Amphibian Occurrence and Distribution Study)

Surface Water Quality

The chemistry of mine-influenced waters in the Elk Valley is generally well understood.

Key uncertainties remain about the impacts related to nickel concentrations and about places such as wetlands and sedimentation ponds with organo-selenium—forms of selenium that can rapidly enter the food chain.

In 2018, selenium, nitrate, and sulfate continued to increase in specific locations such as the outlet of Corder Pond and Line Creek Operations Dry Creek (Figure 4).

Four acute toxicity test failures were reported in 2018.

- One water flea test failure was reported at Corder Creek and the cause was attributed to cadmium precipitation on the test subjects.
- Three rainbow trout test failures were associated with flocculent dosing problems in Corder Creek sedimentation pond.



Figure 3. A water flea (Daphnia magna)



Figure 4. A rainbow trout fry

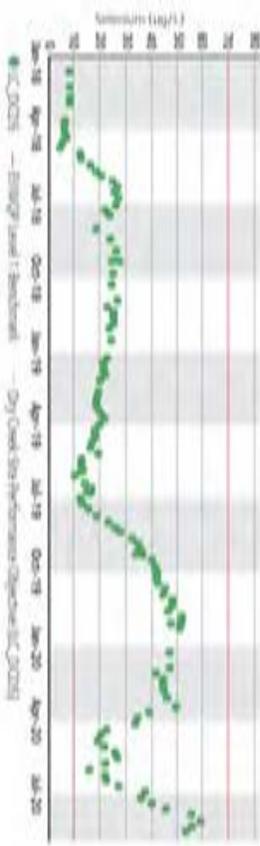


Figure 5. 2020 Dry Creek total selenium concentrations January 2018 to August 2020

You can access Tech's 2018 Annual Report here: <https://www.tech.com/resources/2018-annual-report>
<https://www.tech.com/resources/2018-annual-report>

In 2019, the Fording River Operations compliance point (FQ, FQ27) continued to show non-compliance of selenium (Figure 6), nitrate, and sulfate. The chemistry of the Fording River at the location is complicated by the presence of mine-influenced Corder Creek and a seasonal lack of mixing within the mainstem.

Despite acute water treatment, the Line Creek Operations compliance point (JC, J.C.DCS341) continues to demonstrate regular nitrate non-compliance (Figure 6). There were two selenium non-compliance at the Line Creek Operations compliance point in 2019, but these occurred when the water treatment facility was temporarily shut down for maintenance and repair.



Figure 6. Selenium concentrations at the Fording River Operations compliance point in 2019.

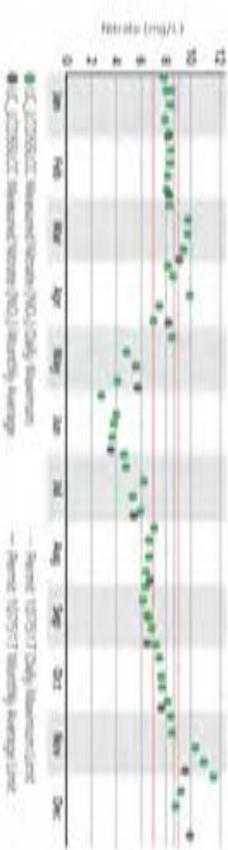


Figure 7. Nitrate concentrations at the Line Creek Operations compliance point in 2019.

Tech is required to monitor water quality at 102 locations in the Elk Valley and in Kootenai Reservoir. These locations include 8 compliance points and 7 order stations.

In 2019, water quality at order stations met permit limits 100% of the time and at compliance points 56% of the time.

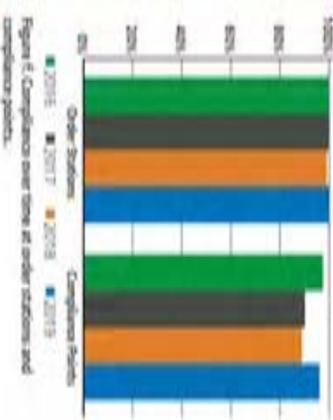


Figure 8. Compliance over time at order stations and compliance points.

Tributary Management Plan

The Tributary Management Plan is intended to support protection and rehabilitation of tributaries in the Elk Valley.

The Tributary Management Plan is intended to guide Teck's environmental management of tributaries and their approach to mine planning. The overall goal of the Tributary Management Plan was developed with the EMC and is as follows:

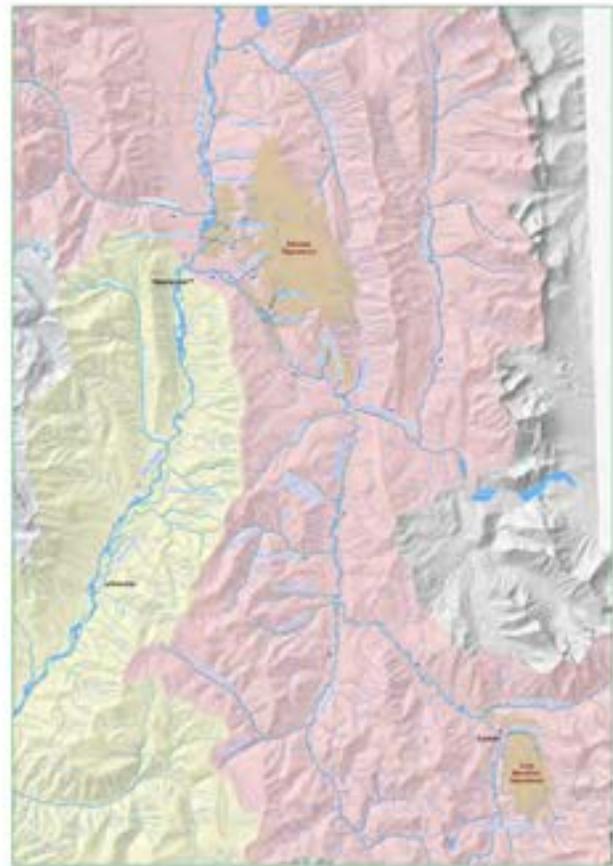
To protect and rehabilitate tributaries of the Elk River watershed on a priority and feasibility basis to benefit fish, aquatic-dependent wildlife, and vegetation, recognizing biological, social, and economic values, and Abenaki worldviews.

All the tributaries that flow into the Fording River, Michel Creek, and the Elk River are included in the plan. The mainstem of the Fording River, Michel Creek, and the Elk River are not considered to be tributaries and are managed according to the EVWQP and Permit 107517.



Teck has been developing the Tributary Management Plan with the EMC since 2016, and submitted the first plan in 2017. This plan was accepted by the Director in February 2018 with conditions for the 2018 plan. EMC discussion and advice on the 2018 plan reflected differing perspectives.

The EMC helped guide the development of the TMP Prioritization Tool—a set of metrics which can be used to help guide Teck's management decisions regarding tributaries.



The 2018 update of the Tributary Management Plan was submitted to the Director of ENR on February 26, 2018. The 2018 TMP was not accepted for reasons laid out in a decision letter (dated December 23, 2019) which directed Teck to complete a number of revisions and updates to the TMP.

recent monitoring data. Much of the discussion focused around the Fording River (MUT) where tributary habitat has been lost to mining and lost connectivity in the past 50 years. The tool outputs also indicated that MUT tributaries were of high priority for protection regionally.

The EMC continued to discuss the TMP in 2019 and reviewed the updated prioritization tool with more

The 2019 Tributary Management Plan was submitted July 31, 2020.

Objective	Metric	Metric Type	Score Definition
Sub-Objective: Habitat quantity			
Fish habitat connectivity (number of fish passes)	Scoring metric	0 = no habitat passes in relation to the greatest potential length of connected fish habitat; 1 = stream; 2 = culvert; 3 = culverted habitat for Stream 1; 4 = new potential culverted habitat for all streams 1-3	
Total current stream length (stream km)	Scoring metric	0 = no stream; 1 = stream length in relation to the greatest potential stream length in a catchment; 2 = stream length for Stream 1; 3 = new stream length for all streams 1-3	
Current riparian habitat amount (km² of riparian habitat)	Scoring metric	0 = no riparian habitat; 1 = riparian habitat in relation to the 80% of stream length on both sides that is buffered with riparian habitat; 2 = riparian habitat for Stream 1; 3 = riparian habitat for all streams 1-3	
Current wetland habitat presence	Flag metric	0 = no wetland habitat present within the tributary catchment; 1 = wetland habitat is present or associated with the tributary catchment	
Total historical fish habitat (km² of fish habitat)	Information metric	0 = continuous value of the length of fish habitat available in 1980s	
Total historical stream length (stream km)	Information metric	0 = continuous value of the stream length available in 1980s	
Historical current stream length with potential flow (km² of fish habitat)	Information metric	0 = continuous value ranging from 0-100% to reflect current conditions within the system	
Percentage historical stream length with potential flow (km² of fish habitat)	Information metric	0 = continuous value ranging from 0-100% to reflect historical (pre-disturbance) conditions within the system	
Current number of riparian habitat patches (km² of fish habitat)	Information metric	0 = continuous value of the number of discrete patches of riparian habitat present within the catchment	
Sub-Objective: Habitat quality—water chemistry			
Current current (CDD) for water quality constituents (Dissolved Solids, Nitrate, Sulfate, Dissolved Cadmium, Dissolved Lead)	Scoring metric	0 = no current (CDD) for water quality constituents; 1 = maximum monthly measured current value for Dissolved Solids, Nitrate, Sulfate, and Dissolved Cadmium; 2 = a value of 1.0 or greater of 3.0 or greater, if the HQ value is < 1.0, then the following formula was applied: $\text{Particle Score} = \frac{\text{Maximum monthly HQ for Stream 1} / \text{Maximum monthly HQ for all streams 1-3}}$	
Current current (CDD) for water quality constituents (CDD of fish habitat)	Scoring metric	0 = no current (CDD) for water quality constituents; 1 = maximum monthly measured current value for Dissolved Solids, Nitrate, Sulfate, and Dissolved Cadmium; 2 = a value of 1.0 or greater of 3.0 or greater, if the HQ value is < 1.0, then the following formula was applied: $\text{Particle Score} = \frac{\text{Current CDD of fish habitat} / \text{Maximum monthly HQ for all streams 1-3}}$	
Water quality sampling locations used to sample stream water (km² of fish habitat)	Flag metric	0 = no water quality data were collected from multiple stations within the tributary; 1 = water quality data were collected from a single station within the tributary or were estimated based on reference stream conditions	
Water quality sampling data availability used for current (CDD of fish habitat)	Flag metric	0 = no water quality data were collected for one month or more of the year and/or provided information regarding temporal variability within a tributary or were estimated based on reference stream conditions	

Table 1. Example of some of the criteria used in the prioritization tool.

Tributary Catchment Name	Tributary Section	Station	Final (M1) Score	Substrate for Final (M1) Score	M1 Rank (Final Score)	M2 Adjusted (M1) Rank	M3 Adjusted (M1) Rank	EMC Category	M1 Adjusted (M1) Rank	M2 Adjusted (M1) Rank
Potential protection options (unimpacted tributary sections)										
Fording River	201 km of tributary section	Protection	1	Highly priority stream based on large size of tributary	1	1	1	Category 1	1	1
Cherry Creek	102.4 km of tributary section	Protection	2	Large tributary site with high riparian potential following barrier removal	4	3	2	Category 2	4	3
Hemlock Creek	63.9 km of tributary section	Protection	3	Important overwintering habitat in Hemlock Lake	6	5	4	Category 3	6	5
Upstream Fording River	18.8 km of tributary section	Protection	4	Remotely located before upstream Fording River since barrier exists possible overwintering habitat	8	8	8	Category 4	8	8
1023rd	20.5 km of tributary section	Protection	5	Single site with high riparian potential to other low tributary sections	10	10	10	Category 5	10	10
Potential rehabilitation options (impacted tributary sections and unimpacted tributary sections with anthropogenic barriers)										
Hemlock Creek	6.7 km within mine footprint	Connectivity Rehabilitation	1	Provides improved passage for multiple (M1) life stages to important fish overwintering habitat in Hemlock Lake	1	1	2	Category 1	1	1
Cherry Creek	Barrier to affected tributary	Connectivity Rehabilitation	2	Provides improved passage for multiple (M1) life stages to unimpacted habitat	3	3	3	Category 1	3	3
Hemlock Creek	6.7 km within mine footprint	Habitat Rehabilitation	3	Provides improvements to important overwintering habitat in Hemlock Lake and riparian habitat	5	5	4	Category 1	5	5
Van Road	0.7 km within mine footprint	Habitat Rehabilitation	4	Provides improvements to overwintering, spawning and juvenile rearing habitat and riparian habitat	6	6	6	Category 1	6	6
Cherry Creek	22.8 km downstream of mine footprint	Water Quality Rehabilitation (Quality Management)	5	Provides improvements to spawning and rearing habitat in lower section, with potential improvements to biological value in upper section	10	4	10	Category 2	10	1

Table 2. Summary of 2018 ranks for the upper Fording River watershed (MUT).

Elk Valley Water Quality Plan Progress

Teck has made significant progress towards achieving the objectives of the Elk Valley Water Quality Plan, along with approaches to address the management of sediment and other sediment related issues including: in-the-EIA study.

Our goal is to stabilize and ensure the trend of sediment and water sediment to ensure the ongoing health of the watershed, while at the same time allowing for continued sustainable mining in the region.

Our first water treatment facility is successfully treating 25 million litres of water per day at our Lyle Creek operation and we are seeing reductions in sediment and other concentrations downstream. We are applying what we have learned to build a 20-million litres per day facility at our Fording River operation which is under construction and scheduled to be completed in 2023.

Our first sediment rock 30-body has been successfully treating up to 10 million litres of mine effluent water per day at our Elbow River Operations, achieving near-complete removal of sediment and silica. We are working now to double treatment capacity at the Elbow River treatment rock fill to 20-million litres per day.

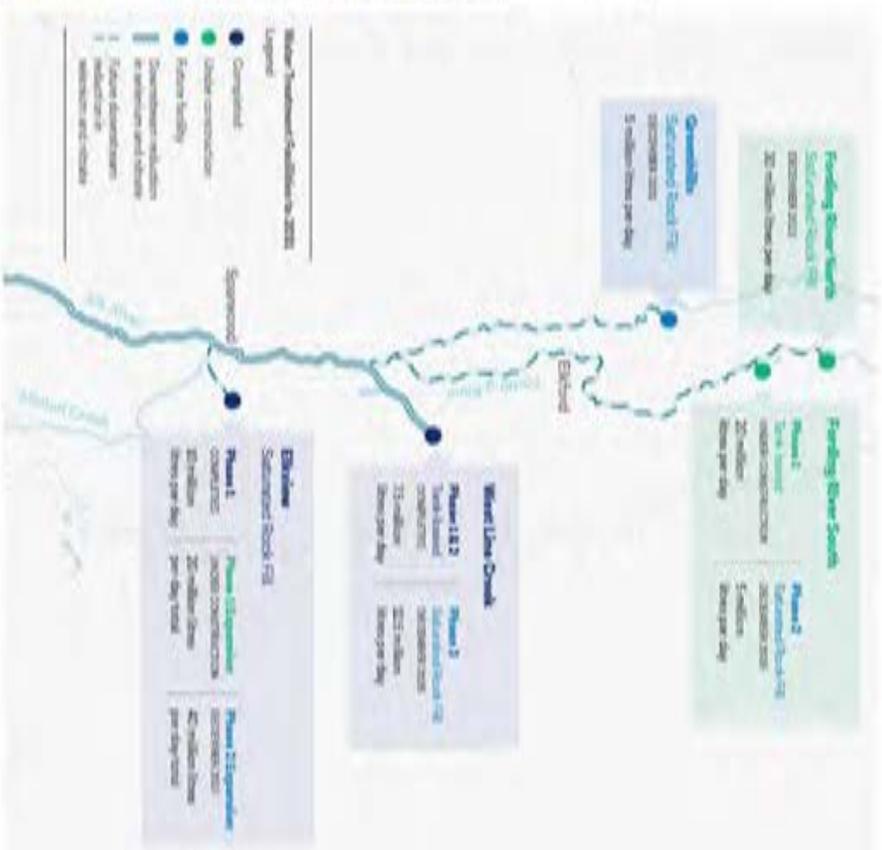
In 2023, we expect to have capacity to treat up to 425 million litres per day and anticipate further significant reductions of sediment and silica at the Fording River and Elbow River sites on line.

Minerals reduction

Our comprehensive research and development program led to the development of a new silica precipitation technology that uses fewer than present technologies with silica flows coming in contact with water. Teck has fully implemented the majority of pilot trials and continues to show that we will significantly reduce silica at the source and improve product water quality.



Fording River Operation Active Water Treatment Facility currently under construction, will have capacity to treat nearly 20-million litres per day.



FIELD

Teck's approach to sustainability includes a comprehensive research and development program that has led to the development of cutting-edge technologies including:

- Sediment Rock Fill technology to treat mine impacted water
- The development of a new silica precipitation technology that uses fewer than present technologies with silica flows coming in contact with water

Teck has more than 25 research and development projects underway, including the advancement of smaller in-situ water treatment facilities that can be built closer to where treatment is needed.

For more information, visit teck.com/sustainability

ENVI 5001 - Assignment 4

***Mining in British Columbia: An Analysis of Amendments
Affecting Water from 2000 to 2020***

Submitted to:

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December 6, 2020

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INTRODUCTION

The mineral mining industry in British Columbia (BC) has had a long, prosperous, and oftentimes contentious history within the province. BC ranks third in the nation for mineral production value, with 2018 values of \$9.7 billion (Natural Resources Canada, 2019). The mineral mining sector accounts for approximately 2% of the province's jobs, employing over 39,000 people in 2018 (Statistics Canada, 2020). However, economic prosperity relies on environmental stability, bolstered by government enforcement of adequate environmental regulations and cooperation on behalf of mining corporations. Outdated mining laws that have failed to evolve with environmental and societal norms have brought BC's treatment of the mining industry into question (Skuce, 2017). With an abundance of freshwater across the province that supports iconic species such as salmon, it is especially important to examine the impacts of mining on water systems. This concern has been raised by various groups such as Northern Confluence, an initiative based in Northwestern BC dedicated to conserving salmon watersheds, which has prompted the necessity for research into approved mines under the BC *Environmental Assessment Act (EAA)* with respect to amendments made that directly or indirectly impact water.

Mines approved for operation in BC must undergo an environmental assessment process as outlined in their applicable *EAA (EAA, 2002)*. When a project is approved by the BC Environmental Assessment Office (BCEAO), the proponent receives an Environmental Assessment Certificate (EAC) that allows the proponent to commence project activities (*EAA, 2002*). However, after the environmental assessment process has been completed, a certificate holder (e.g., the proponent) is eligible to apply for amendments requesting for an addition or removal of conditions to or from the EAC. In these situations, an amendment application is prepared by the certificate holder which states the reasons for amending the certificate. The application is then sent to the BCEAO, along with a prescribed fee, which varies based on amendment type (*EAA, 2002*). The amendment application is assigned one of the following types: simple, typical, or complex (British Columbia Environmental Assessment Office [BCEAO], 2016a). The degree of review for each type of amendment differs, where simple amendments such as name changes or certificate transfers do not involve public consultation, working group engagement, or Indigenous groups. A typical amendment is categorized as a "material but limited change to the project," in which guidelines state that public consultation may be required (BCEAO, 2016a). A complex amendment is categorized as a "material change to the processes and outputs of a facility with potential for significant adverse effects," in which Aboriginal and/or public consultation is required (BCEAO, 2016a). Once submitted to the BCEAO, the executive director and minister within the BCEAO has three options: 1) amend the environmental assessment certificate, adding or removing certificate conditions, 2) refuse amendment the certificate, or 3) request further information for the amendment application (*EAA, 2002*).

Research into this domain has been largely motivated by the failure observed at the Mount Polley Gold and Copper mine in BC which took place in August of 2014. The tailings impoundment failure released approximately 25 million cubic metres of water and slurry into three nearby waterbodies over the course of three days (Byrne et al., 2015). The sheer volume of tailings released caused one creek channel to expand from 2 metres to over 25 metres and increased water levels by 1.7 metres (Byrne et al., 2015) The effects of this disaster were felt through the

deterioration of the province's water systems, loss of wildlife habitat, and damage to culturally significant areas (First Nations Health Authority [FNHA], 2016). The full extent of repercussions from the breach are still not fully realized and are expected to be felt in perpetuity (FNHA, 2016). Ultimately, it was found that the Ministry of Energy and Mines (MEM) did not ensure that the tailings dams were designed or operated in accordance with the approved initial plan (Auditor General of British Columbia [AGBC], 2016). The collapse prompted an audit by the BC Auditor General (2016), who found that MEM permitted continuation of Mount Polley mining operations in addition to approving amendments to the original project certificate. This failure demonstrated by both the proponent and the BC government to follow and enforce regulations invoked an interest in investigating additional BC mining projects, specifically to complete an analysis of proposed amendments with respect to water for BC mines over the past 20 years.

Understanding the connection between the BCEAO and mining corporations is vital in determining adherence to environmental regulations. The BCEAO holds the power to determine the fate of projects and their relevant stakeholders such as proponents, First Nations, and the general public. While the *EAA* thoroughly outlines the steps of the EA process, there are fewer details outlining the amendment process, leading to questioning if amendments are subject to equivalent public, scientific, and legal scrutiny compared to the EA process. Due to the lack of clear, specific steps for categorizing amendment applications and amending EACs, concerns regarding transparency and decision making by the BCEAO have arisen. To date, there have not been any comprehensive studies researching how often amendments occur to mining project certificates that affect water in BC, thus there is a lack of knowledge in this area. Valued components (VCs) such as water are imperative for maintaining ecological integrity yet are often subject to degradation at the expense of mineral exploitation. Therefore, to uncover these concerns and better understand these complex relationships, the following research question was conceived:

Of the mines approved under the BC Environmental Assessment Act in the last 20 years, how many received amendments after approval to remove or add conditions, and how do these amendments directly or indirectly impact water?

For the purpose of this study, the scope of research was narrowed to primarily consider impacts to water – however, this does not discount the lasting effects of mining on social, economic, health, and all other biophysical VCs, which have historically had disproportionate impacts to Indigenous populations in British Columbia.

METHODS

To conduct an analysis into the number of mines approved under the BC *EAA* in the last 20 years, the BC Environmental Assessment Office Project Information Centre (EPIC) website was thoroughly examined. Research was conducted at <https://www.projects.eao.gov.bc.ca/>.

Within the EPIC website is a registry listing all projects reviewed under the BC *EAA* and their relevant information and documentation. To determine the number of mines approved in the last 20 years, the start date was chosen to be January 1, 2000, and an end date of November 6, 2020 - the date in which the research question was chosen. This timeframe was selected as it met the outlined criteria set out in the initial research goal in conjunction with Northern Confluence.

The ‘Project Type’ filter used was ‘Mines’, and the ‘EA Decision’ filters used were ‘Certificate Issued (2002)’ and ‘Certificate Issued (2018)’ to filter out projects that were not approved. There were no options listed to include certificates issued prior to 2002.

The results for mines approved under the BC *EAA* were transferred into a spreadsheet to perform further analysis. Columns were created to categorize specific parts of each mining project (See Appendix). The spreadsheet was used to create Figure 1, showing the total number of approved mines, the number of mines that received any amendments, and the number of mines that received amendments affecting water. The following details were compiled for each mining project:

- Project name
- Proponent
- Amendment(s) (Y/N)
- Amendment(s) directly affecting water (Y/N)
- Amendment(s) indirectly affecting water (Y/N)
- Certificate issued date
- Applicable *EAA* (1996, 2002, or 2018)

To ensure consistent research that conformed with existing BC regulations, definitions for key words were selected. Water quality was defined as “a term used to describe the chemical, physical and biological characteristics of water, usually in respect to its suitability for a particular purpose” (Government of British Columbia, 2020). To categorize effects to water, the following definitions outlined in the EAO’s *2020 Effects Assessment Policy* were used (Government of British Columbia, 2020):

- *Direct effect*: results of a cause-and-effect relationship between the project and a component of the biophysical or human environment.
- *Indirect effect*: a result from a change that a project may cause that is often one step removed (secondary) from a project’s activities due to complex relationships among components.
- *Negative effect*: a result that is identified as undesirable or adverse by participants in the EA including Indigenous nations, government agencies, the technical advisory committee, any community advisory committee, the public, or the proponent involved in an EA process. Also referred to as an adverse effect.
- *Positive effect*: a result that is considered desirable or beneficial by participants in the EA including Indigenous nations, government agencies, the technical advisory committee, any community advisory committee, the public, or the proponent.

For the purposes and scope of this research paper, the definition of ‘components of the biophysical environment’ in relation to studied effects was limited to water. Potential impacts to water were broken down into three categories: 1) surface water quality, 2) surface water quantity, and 3) independent variables. From these categories, components were broken down into the following subsections:

Surface Water Quality:

- Effluent discharge
- Sedimentation

Surface Water Quantity:

- Diversion
- Extraction
- Retainment

Independent Variables:

- Groundwater extraction
- Acid rock precipitation
- Aquatic life and habitat

Project activities were classified as water-use activities outlined in the *BC Water Sustainability Act* (2014), under the section titled ‘License, Diversion, and Use of Water – Use of Water’. Mining activities included any physical act during construction, operation and/or decommissioning of the project. Some examples of activities impacting water encountered during examination of amendment documents were as follows:

- Diversion of or transfer between watercourses or aquifers (e.g., reroute of creeks)
- Construction of water diversion or retainment infrastructure (e.g., dam, trench)
- Construction of new well or other water extracting methods
- Extracting or storing surface, groundwater, or snowmelt for mining or domestic purposes
- Discharging effluent into a waterbody, watercourse, or groundwater aquifer
- Clearing of wetland or watershed for mining purposes
- Disturbance to aquatic life, habitat, or vegetation (e.g., destruction of wetlands)
- Surface stockpiling or sub-aqueous storing of acid generating rock
- Construction of project supporting infrastructure (e.g., water crossing, transmission line, hauling road)
- Land clearing or pit excavation within a watershed
- Increase of sediment discharge into water due to project activities (e.g., blasting)
- Changes in mine production rates

If an amendment requested the removal or addition of conditions relating to any of the above scenarios or definitions and would result in direct or indirect impacts to water, the amendment was categorized in Figure 2.

An analysis was completed to determine whether there were connections between the approval of amendments affecting water and political parties in power. The number of amendments to water and average time elapsed between their application and approval dates were examined for both the Liberals and NDP, the two parties that held office during the research period. To determine these figures, the amendment application and approval dates were first examined. Once noted, they were then compared to the dates in which the Liberal or NDP governments were in power to determine the party involved throughout the decision process. In two cases, the dates

in which an amendment was requested and subsequently approved spanned between the two political parties. These two amendments were excluded from this analysis as they would not satisfy the research criteria. The dates were then examined to determine the time elapsed between application and approval. This was completed by inputting the dates into an online calculator, which then processed the duration of time in days. The number of days was averaged for the Liberal and NDP governments as well as an average for both parties combined. The longest and shortest elapsed times for amendment approval was also observed for each political party.

To compile data that was specific to water, documents from the BC EPIC website were opened and reviewed for relevant information. Due to the nature of this document search, all amendment documents for mining projects with certificates issued since 2000 that had amendments were reviewed. The year of every amendment approval was recorded and displayed in Figure 3, separated by all amendments and only those specific to water. An additional aspect of analysis during research was to study the use of language throughout both amendment application and assessment documents from mining proponents and the BCEAO. The documents were assessed through the perspective of a non-specialist in mining to determine how clear, concise, descriptive, and understandable the information provided for each amendment was. Additionally, the accuracy and usefulness of the BC EPIC webpage was also assessed and described.

RESULTS

Mining Project Amendments Affecting Water

From January 1, 2000, to November 6, 2020, 23 mines were approved by the BCEAO with each mine receiving an EAC. It is important to note that 22 of the 23 mines were approved in accordance with the *2002 EAA*, with only one mine being approved under the *1996 EAA*. None of the mines were issued an EAC under the *2018 EAA* within our research timeline. Of the 23 mines that received an EAC, 15 proponents applied for amendments to alter their original EAC. Of the 15 applicants, 14 received amendment approvals, of which 11 were deemed to directly or indirectly affect water (Fig. 1).

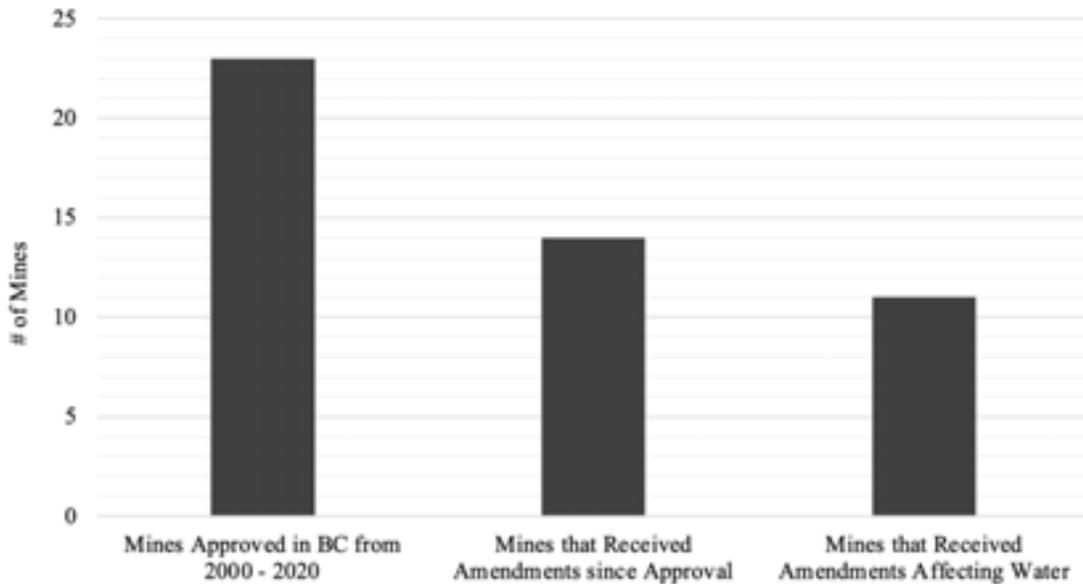


Figure 1 - Amendment Analysis for Approved Mines in BC (2000 – 2020)

The total number of amendment applications submitted by the 15 mining project proponents from 2000 to 2020 was 47. Amendment applications included EAC ownership transfers, EAC language or statement changes, and major or minor changes to the physical project itself. Among the 47 amendment applications filed, 18 of those documents resulted in project changes that had direct or indirect effects on water. These water-related amendments across 11 different mining projects were categorized by negative effects on water per project, as shown in Figure 2.

Mining in British Columbia: An Analysis of Amendments Affecting Water from 2000 to 2020

Project Name	Surface Water Quality		Surface Water Quantity			Independent Variables		
	Effluent Discharge	Setback	Diversion	Emission	Reclamation	Groundwater Emission	Acid Rock Drainage	Aquatic Life and Habitat
Bancroft Gold Mine	●			●		●	●	●
Baldy Mine		○	○					○
Fraser River Operations South		●					●	○
Kootenay West Mine			○			●		○
Line Creek Operations Phase II							●	○
Mt. Milligan Copper-Gold			●	●	●	●		○
Murray River Coal Mine		○	○					○
Prosperity Gold-Copper	●	●	●	●		●	●	●
Red Cross Property Copper-Gold Mine	○	●	●	●		○		○
Taseqanik District Mine		●	○					●
Wolverine Coal Mine	●		●	●		●	●	

● = Direct impact ○ = Indirect impact ●● = Both direct and indirect impact

Figure 2 - Direct and Indirect Impacts of Amendments per Mine, Categorized by Negative Effects on Water

While all effects outlined in Figure 2 could be categorized as both direct or indirect based on the outlined definitions (see ‘Methods’), proposed amendments that led or would lead to acid rock drainage were solely categorized as a direct effect due to its associated severe and long-lasting effects. This acidic runoff can further dissolve heavy metals such as selenium, lead, and mercury, which can contaminate hydrologic systems and cause adverse effects on aquatic life (Michalski, 2011). While the impacts of acid rock drainage are not felt immediately, the process can continue for hundreds to thousands of years until the sulphide minerals are fully consumed (Earthworks, 2020). Therefore, acid rock drainage has been given special consideration in this research paper.

Political Parties & Temporal Trends of Amendment Approvals

Two provincial political parties were in power over the course of the observed 20-year time span. As these parties differ in their agendas and policies, it is important to analyze these changes as they relate to both mine permits and amendment approvals.

From 2000-2001 the New Democratic Party (NDP), a progressive left-leaning political party, held office and mandated decisions under the BCEAO (The Canadian Encyclopedia, 2017). In 2001 there was a shift in power, resulting in the more moderate Liberal party taking office (The Canadian Encyclopedia, 2017). The Liberals held office under two different premiers until 2017, at which time the NDP once again gained control (The Canadian Encyclopedia, 2017). During these shifts in power, the Liberals held power for roughly 16 years while the NDP held power for roughly four years. Over their tenures in office, 19 of the 23 mines approved were green lit by the Liberals, while the remaining four were approved by the NDP.

The amendments that had a direct or indirect impact on water underwent further analysis to determine if their approvals were related to the political party in power at the time of approval. The time elapsed between amendment application dates and their subsequent approval dates were reviewed and calculated into averages (Table 1).

Table 1 - Analysis of Duration of Amendment Approvals Across Political Parties

Political Party	Number of Amendments Sampled	Average Amendment Approval (Days)	Longest Time Elapsed for Amendment Approval (Days)	Shortest Time Elapsed for Amendment Approval (Days)
Liberal	8	200	364	31
NDP	8	202	502	6
Both Parties	16	201	502	6

The findings illustrated in Table 1 vary in their significance. The difference in average elapsed time between amendment applications and approvals was insignificant – however, the NDP was in office during the approval of the same number of amendments relating to water as the Liberal party, despite being in office for only 20% of the 20-year period assessed.

Of the 47 amendment applications submitted, all but one amendment was approved by the BCEAO, with the corresponding years of amendment approval shown in Figure 3. Noticeably, there were no amendments approved between 2000 and 2005, a varied level of amendment approval for mining projects between 2006 and 2015, and a spike in amendment approvals beginning in 2016.

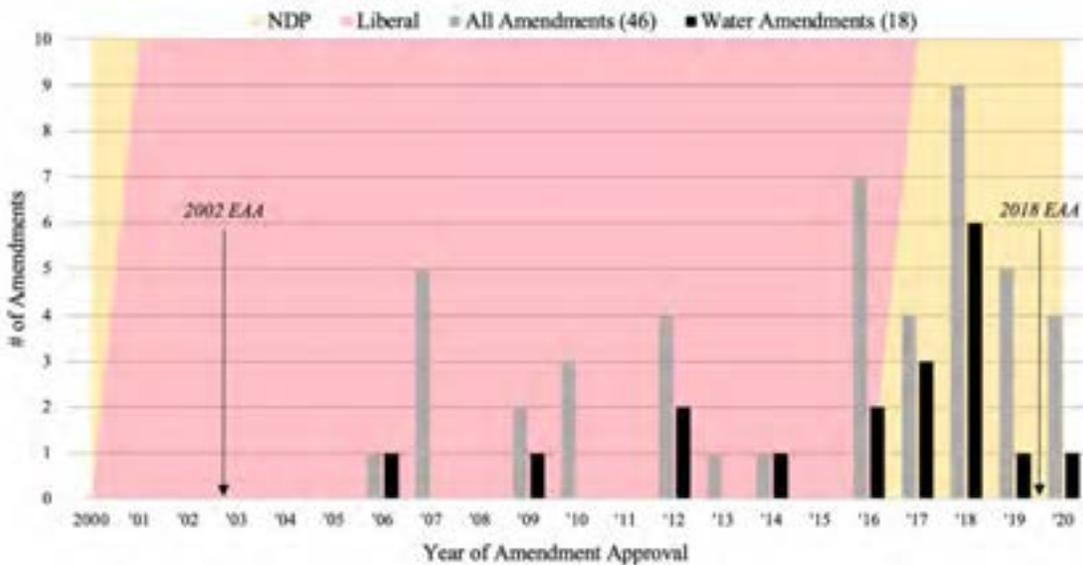


Figure 3 - Amendment Approvals per Year for BC Mines Issued Certificates

Levels of Detail, Use of Language, and Organization of Amendment Documents

A major concern with the BC EPIC registry was the improper categorization of project amendments for various mining projects. The EPIC website had an ‘amendments’ tab for projects with amendment documents, however this category was often missing important files that were only listed in the general ‘documents’ tab. For example, for amendments specific to the Wolverine Coal Mine, when the ‘amendments’ tab was used to sort the information, 28 documents were produced, categorized as either amendment packages, decision materials, tracking tables, third party reviews, or proponent amendment applications. However, when the word ‘amendment’ was searched as a keyword in the ‘documents’ tab, 39 documents were returned. These include other categories such as application materials, information requirements, public consultation plans, procedural letters, meeting notes, and submission comments. Additionally, further inconsistencies were found throughout the EPIC website such as non-standardized document titles. Many of the mining projects had several amendments, yet some applications or assessments were missing amendment numbers in their document titles.

Furthermore, the use of language in project amendment documents was generally inconsistent, vague, and non-quantitative in nature. This trend was continuous between proponent amendment applications and the subsequent BCEAO assessment reports of these applications. Both types of documents provided broad overviews of the criteria that was added, removed, or

amended to the EAC. However, there was a lack in numerical information to reinforce claims and decisions made by proponent or BCEAO. Examples of these language trends are exhibited in Table 2. Phrases within the table are italicized to emphasize parts of each quote that demonstrate a poor level of detail or lack of quantitative information.

Table 2 - Examples of Level of Detail or Quantitative Information in Amendment Documents

Category	Exemplar	Source
Acid Rock Drainage	“Ministry of Environment (ENV) agrees that the proposed amendment is <i>unlikely to negatively affect the receiving environment beyond what has already been assessed</i> ... ENV noted that this comment is contingent on: the waste rock proposed to be deposited in the Swift Project already being accounted for in the Elk Valley Water Quality Plan modelling as indicated by Teck; the Fording River Operation South Active Water Treatment Facility being <i>operational on schedule</i> ; and <i>water quality predictions not declining as a result of the model update</i> ”	BCEAO, 2017
Effluent Discharge	“ENV is of the opinion that the <i>proposed increases in concentrations of antimony, ammonia and arsenic</i> will not negatively affect the aquatic resources in Brucejack Creek and the environment downstream.”	BCEAO, 2018a
Diversion	“[The proponent] <i>will finalize the specific design features of the east diversion</i> during the EMA permit amendment process and any residual concerns of ENV will be addressed at that time.”	BCEAO, 2016b
Aquatic Life and Habitat	“The outcomes of the permitting process cannot be known at this time, and there is <i>residual uncertainty</i> around the ability to protect Lake Whitefish eggs given <i>information limitations...</i> ”	BCEAO, 2018b
Effluent Discharge & Aquatic Life and Habitat	“Impacts to fish and fish habitat may occur via changes in <i>loading of deleterious materials (i.e., dissolved metals, ions)</i> that effect aquatic productivity or fish survival. Toxic effects to aquatic biota that result from changes to surface and groundwater quality consider both <i>potential effects from mining</i> as well as haul truck accidents along the Kootenay FSR that lead to accidental spills of <i>contaminants.</i> ”	Vast Resource Solutions, 2020

Effluent Discharge	“While no exceedances of water quality guidelines are predicted for Beece Creek, a <i>number of elements are predicted to exceed guidelines</i> for the non-fish bearing Wasp Lake in the absence of mitigation. Continued pumping of water from the south embankment seepage collection pond to the tailings storage facility in closure <i>could be conducted if required</i> to avoid impacts on water quality in Wasp Lake.”	Tasenko Mines Limited, 2017
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An example of non-standardized language that was used in BCEAO project amendment documents would be the clarification between material and non-material amendments. In the 2002 and 2018 BC EAA, amendment types such as material or non-material were not specifically defined. Amendment #1 for the Murray River Coal project was classified as a “non-material amendment,” yet there were six physical project changes that were amended to the certificate conditions including the addition of new stockpiles for unsuitable materials, the realignment of a water discharge pipeline, and the relocation of a creek crossing (BCEAO, 2018c). Some of the reasons given to justify that this amendment was non-material in nature were that the changes were “largely within the assessment footprint area,” “no concerns [were] raised by First Nations groups regarding the proposed changes,” and “potential adverse effects” were addressed in the original EA certificate approval (BCEAO, 2018c). The word ‘non-material’ is defined as ‘not of a physical nature’ (Merriam-Webster, n.d.) - therefore, it is unusual that this term would be used in an amendment assessment document that outlines physical changes to the mining project.

DISCUSSION

The research results provided findings that spanned across several topics of discussion. First, the primary research results found that over 60% of mining projects which were issued certificates between 2000 and 2020 subsequently received some form of amendment to their certificate following the preliminary environmental assessment process as per the BC EAA. Of the mines that received amendments, nearly 80% of them received amendments that directly or indirectly affected water through allowable physical changes to the project. Second, amendments that affected water were analyzed to determine if the time span between amendment application and approval was correlated with the BC provincial government that held office, in which no direct correspondences were found. Amendments for the same group of mining projects were broken down by year of approval to determine if any temporal trends occurred, which showed zero amendments approved between 2000 – 2005, a varied level of approval between 2006 – 2016, and a spike in approvals from 2016 – 2018. Lastly, the effectiveness of amendment-specific document searches on the BC EPIC website was studied, demonstrating various issues with organization and inconsistency. A lack of non-quantitative information, non-standardized language, and poor levels of detail in amendment documents were common throughout amendment documents from mines with certificates issued since 2000.

It is the responsibility of the BCEAO to ensure that mines constructed within the province are designed, built, operated, and reclaimed to an acceptable standard (AGBC, 2016). However, with 60% of projects receiving amendments in the past 20 years, it may be difficult to ensure that the same environmental considerations are given in the amendment process as the initial EAC

assessment. While industry is responsible for the construction and maintenance of the sites indefinitely, if a project proponent becomes insolvent during a mine's operating life, taxpayers will bear the entire cost of the site's cleanup (Canada's Ecofiscal Commission [CEC], 2018). The Auditor General of British Columbia (2016) predicts that 10% of all major mines in the province will require water treatment facilities in the future. One example of taxpayers bearing this burden is the Prosperity Gold-Copper mine which is currently undergoing its third proposal. This 5-year review process is a cost assumed by taxpayers through the salaries of EAO members. From 2010 to 2015, taxpayers were liable for more than \$1.2 billion in environmental reclamation costs, while figures pertaining to environmental reclamation costs beyond the 2015 year are no longer available by provincial mandate (UBCIC, 2016).

Mining Project Amendments Affecting Water

Analysis of the BC EPIC website returned 23 approved mine projects within the chosen time frame. Of these total projects, 14 projects requested and/or received amendments to their original EAC. The total number of amendments requested by proponents was 47 of which 46 were granted approval. Of the 47 total amendments, 18 amendments had potential direct or indirect impacts on water.

The large number of mining project amendments being approved raises concerns regarding the stringency of the issued EAC, as well as the amendment application and review process. As stated in both the 2002 and 2018 *EAA*, "any amendment made or condition attached to an environmental assessment certificate is conclusively deemed to be part of the certificate, whether contained in or attached to it or contained in a separate document." This living document characteristic to the EAC raises concerns in that an original EAC can evolve throughout a project's lifecycle, while carrying the risk of drifting away from the initially set out conditions in the EAC. Considering that only one out of the 47 amendment applications was rejected, this suggests that there is a high probability that a proponent can make future changes to the EAC. Although it may not be the intention of proponents to put forward an initial EAC application with the objective of making future amendments, this brings into question proponents' abilities to predict future uncertainties that could require project amendments. For example, in the case of the Mt. Milligan Copper-Gold project, the proponent held the following four water-use permits to operate their milling facility: surface water usage from King Richard Creek, use of direct precipitation onto the project area, water extraction from Meadows Creek water supply pond, and recycled tailings water from the tailings storage facility (TSF) (Stantec Consulting Ltd., 2020). Following a bathymetric survey of the TSF, the proponent determined that water volumes were critically low; forcing the proponent to shut down the milling facility. To address the issue, the proponent put forward their application for amendment #3 to allow surface water withdrawals from Phillip Lake and the Meadows Creek freshet, which was subsequently approved by the BCEAO. A year later in 2019, the project continued to experience water volume shortages, leading to further applications of amendments #4 through #7 to allow surface and ground water withdrawal for milling operations until November 2021 (Stantec Consulting Ltd., 2020). The proponent is currently conducting studies and investigations to find other viable water supply sources for the duration of the project. Clearly, the proponent did not take water shortage possibilities into account during the original EAC application, leading to multiple amendments requiring water extraction from the immediate environment.

A ‘Guidance for Certificate Holders’ document was published in December of 2016 that outlined the general project amendment assessment process by the BCEAO, however information regarding the overall amendment process could not be found prior to this date (BCEAO, 2016a). Both the 2002 and 2018 *EAA* provide broad descriptions for amending an EAC, but they provide minimal specific information for how amendment applications are actually assessed. It is also stated in the guidance document that the “EAO has considerable flexibility about the structure and design of the application review process,” most often for typical amendments (BCEAO, 2016a). This process has proven to be inconsistent and oftentimes vague in its phrasing while lacking key quantitative data.

Key concerns about this system of amendment review process with regards to mining projects are the lack of explicit categorization in BCEAO amendment assessment documents and lack of sound reasoning for amendment categorization. Although many amendment assessments were explicitly categorized as simple, typical, or complex - various others were not. Additionally, amendments that caused relatively substantial physical changes to the project were categorized as “typical” instead of complex. For example, amendment #6 of the Wolverine Coal Mine was approved by the BCEAO (2020), allowing the proponent to conduct “early works” such as land clearing, soil removal, and soil overburden storage in 34.6 hectares of area outside of the original project area stated in the EAC. This amendment was approved “in order to efficiently sequence future construction activities in the event that the Wolverine Mine amendment #7 is approved,” which is currently undergoing review (BCEAO, 2020). The approval of amendment #7 would allow Wolverine Mine to expand, opening another pit for ore extraction, and install subsequent infrastructure. Despite the BCEAO stating in the review that the proposed “early works” area would lie outside of the Wolverine project footprint and has the potential to result in adverse effects, it was categorized as a typical amendment instead of a complex amendment (BCEAO, 2020). For reference, a typical amendment is categorized by the BCEAO as a “material but limited change to the project” (BCEAO, 2016a). Although working group sessions were held by EAO members and Indigenous participants, there was no public comment period held prior to the approval of amendment #6. There is a lack of clear, articulate, enforceable guidelines for amendment review processes and considerable variability for what is constituted as typical versus complex amendments.

Political Parties & Temporal Trends of Amendment Approvals

Given that the BCEAO is a provincial government agency, it is important to consider the implications of exchanges in power between political parties. As the decision-maker responsible for assessing the social, environmental, and economic impacts of proposed projects prior to their development, consideration must be made for the differing agendas of politicians as it relates to provincial environmental protections within the mining sector.

The BC government plays a dual role in resource development (Heisler & Markey, 2012). They provide millions of dollars in the forms of grants, infrastructure, and marketing to uphold the resource development sector, while at the same time regulating the industry through taxation and environmental protections (Heisler & Markey, 2012). Groups such as Mining Watch Canada advocating for greater levels of independence between the mining sector and government have

criticized the BC government over its close ties to the industry (Plourde et al., 2017). According to an analysis conducted by CBC News in 2017, mining companies in BC donated over \$4.7 million to the BC Liberal Party between 2005 and 2015, with mining giant Teck Resources donating over half the total amount (Plourde et al., 2017). Additionally, while the BC Liberals were in power from 2001 to 2017, departments with science-based mandates were dramatically reduced, making it the smallest public sector per capita across all Canadian provinces (Evidence for Democracy, 2017). This has led to a new era of outsourcing science-based tasks to external professionals, a phenomenon referred to as professional reliance (Evidence for Democracy, 2017). This brings into question the autonomy of the BCEAO which may be cause for further research of mining in BC, expanding upon both the scope of amendment types as well as the time scale for analysis.

The analysis of amendment approvals per year for BC mines that were issued certificates between 2000 and 2020 resulted in a high for amendment approvals in 2018, with nine amendments approved which affected water. This is a particularly interesting finding as a revised BC *EAA* was assented on November 27, 2018, and later enacted on December 16, 2019 (Government of British Columbia, 2018), which may be linked to the influx of amendment applications prior to the introduction of revised legislation. The process for amending an EAC is outlined briefly in both the 2002 and 2018 BC *EAA*s, but there were additional steps required by the BCEAO when the legislation was updated. With the enactment of the 2018 *EAA*, the chief executive was required to “seek to achieve, with respect to the amendment, consensus with participating Indigenous nations” and “be satisfied that the applicable person, board, tribunal or agency referred to in that subsection sought to achieve, with respect to the amendment, consensus with participating Indigenous nations” (*EAA*, 2018). This added an additional step for proponents and the BCEAO to consider when applying for and assessing amendments for mining project EACs, which may cost money and time. Although these added conditions are not conclusive evidence, they may contribute towards an explanation for the spike in amendments approved between 2016 and 2018, directly before the 2018 *EAA* was enacted.

Levels of Detail, Use of Language, and Organization of Amendment Documents

The information infrastructure of the EPIC website offers both promise and peril – promise in the form of easy access to a vast array of information, and peril in the form of improper categorization and omission of pertinent documents. The EPIC website provides a sufficient ability for categorization, however, ensuring that this categorization is properly utilized in the aggregate is not well enforced. Additionally, due to the varied nature of amendment proposals and their affiliated documentation, information outlining the amendment process is important in understanding what amendment applications have been submitted by each project proponent and what the process was between the application, assessment, and final decision by the BCEAO.

Improper categorization of project-specific documents has caused further concerns regarding the possibility of documents being left off the registry or placed in incorrect or inappropriate locations on the BC EPIC website. This could have much broader implications than a single research study, as members of the public or enforcement agencies are not able to hold mining proponents or the BCEAO accountable for conditions being met if the correct information is not provided or is inaccurate. Particularly because thousands of documents exist on the EPIC

website, information that is not properly categorized can be exceptionally difficult to locate. An issue with some of the document titles was the omission of the amendment numbers associated with the corresponding certificate. For example, the BCEAO (2017) assessment of Amendment #2 for Mt. Milligan Copper-Gold was listed on the EPIC website as “Amendment Assessment Report for the Mt. Milligan Copper Gold Project dated March 3, 2017.” This could have easily been confused with the assessment of amendment #1 for the same project as it had the exact same title with a similar date.

The most significant problem that plagued most amendment documents pertaining to BC mining projects was the vague and non-quantitative nature of dialogue throughout these amendment files. Examples of this trend are shown in Table 2, however there were numerous other instances throughout the document review that this issue was encountered. For example, an amendment was approved to allow greater above ground stockpiling of acid-generating waste rock at the Fording River – Swift Project, in which the Ministry of Environment offered a response that stated the “proposed amendment is unlikely to negatively affect the receiving environment beyond what has already been assessed [for the EAC]” (BCEAO, 2017). However, the department cited that this statement was conditional on a water treatment facility being installed at the site “on schedule” and water quality predictions not declining as a result of this installation (BCEAO, 2017). The specific information regarding when the water treatment plant was supposed to be installed was not provided in the amendment, and penalties associated with failure to abide by this condition were also not listed. The proponent, Teck Resources, plans to have an operational water treatment plant at the Swift Project beginning in 2021 even though this amendment application was approved in 2017 (Teck Resources, 2020), with conditions that the water treatment facility be operational by 2018, as outlined in in Teck’s Elk Valley Water Quality Plan (2015).

The second quote shown in Table 2 was listed as rationale for amending the Brucejack Gold Mine project EAC to increase the allowable levels of antimony, ammonia, and arsenic concentrations in mining effluent from the mine (BCEAO, 2018a). The BCEAO increased this threshold to an unknown level, as no quantitative information was provided in the amendment document. A very similar scenario was seen in the amendment application for the New Prosperity Mine project, in which a “number of elements are predicted to exceed guidelines” in effluent discharge into the fishless Wasp Lake (Tasenko Mines Ltd., 2017). The specific elements, quantity of these elements, and guideline concentration thresholds are not listed in the proponent’s application. This again brings forth concerns with information transparency between mining proponents and the BCEAO. If these quantitative guidelines are not listed for public view in the amendment documents, it makes it much more difficult for the public to hold the proponent accountable for meeting those required targets.

Due to the nature of the research question, the limited scope, and data availability, the research was largely based on qualitative research methods. The focus on qualitative data stemmed from the salient theme of project proponents failing to include appropriate quantitative data, an omission that led to significant obstacles in finding any trends within numerical information listed in amendment applications and subsequent assessment documents (e.g., heavy metal concentrations in mining effluent). It is the responsibility of the BCEAO to ensure the use of specific quantitative data to allow for thorough examination of proposed amendments and their environmental impact. Moving forward in the environmental assessment process, it is

recommended that the BC government ensures both proposals and amendments are written in enforceable language with quantitative analysis provided. To develop enforceable language, the government could work with the Ministry of Justice to develop regulatory language that includes measurable criteria, such as thresholds and timing, to be implemented in all future mining permits and amendments as suggested by the AGBC (2016).

Study Limitations and Recommendations for Further Research

Limiting factors for the research conducted in this paper were time, resource accessibility, and lack of previous research studies on this topic. Given a greater timespan, it would have been beneficial in expanding the research to consider the comprehensive toll that mining has within the province and considering each VC both individually and as whole. However, to conduct a comprehensive study that considers all these effects, a longer period for research would be required. Given the complexity of the topic, having additional resources for collecting data through experts in this field would also greatly assist in data analysis. Although guidance was provided by knowledgeable contacts who study the environmental impacts of mining projects, having greater supervision during data categorization and presentation would have been an asset. There are various organizations in BC that explore effects of the mining industry on the environment. However, there are currently no available scholarly studies examining the efficiency of amendments at the provincial or federal level. Given the absence of any predisposing research in this field, the evaluation of public, scientific, and legal scrutiny is uncharted territory. This lack of pre-generated research led to time-specific barriers as all data collection was primary data.

It is recommended that future iterations of research into this subject allocate additional time to examine amendments not only affecting water, but also those which affect other VCs including social, economic, health, and all other biophysical components. In addition, as the research performed solely considered mines approved under the BC *EAA*, mines approved in the province under federal legislation were not examined. It is recommended that future researchers expand their scope to include these mining projects as their impacts contribute to the overall cumulative effects from mines in BC.

Future consideration of transboundary risks is also suggested to better understand connections between neighbouring jurisdictions such as Alaska, Montana, Yukon, and Alberta. As many of BC's watersheds have rivers that flow across borders into nearby provinces, territories, and states, the impacts of mining in BC may be felt elsewhere. Monitoring stations operating in rivers near Teck Resources' mines in the Elk River watershed, a water system that ultimately flows into the state of Montana, have reported levels of selenium 50 times the recommended concentrations for aquatic health (Weber, 2020). This has prompted the U.S. Environmental Protection Agency to demand that the BC provincial government provide data and explanations as to why mining companies such as Teck Resources are allowed to exceed guidelines for toxic heavy metals (Weber, 2020). Upstream mines in Canada pose a risk to the economies, waters, and well-being of downstream jurisdictions such as the United States, a country already faced with weakening federal environmental regulations (Sexton et al., 2020). This underscores the importance of analyzing transboundary risks to encourage governments to uphold their shared obligations to protect transboundary waters as outlined in the Boundary Waters Treaty of 1909

(Sexton et al., 2020; International Joint Commission, 2016), fostering mutually concerted efforts to protect water sources from the impacts of mining.

Conclusion

The BCEAO plays a critical role in governing accurate, science-based decision-making that adheres with the environmental regulations written into law. The EA process is designed to maintain ecological integrity in BC in the face of resource exploitation from mining activities, yet these regulations have been shown to be weakened through subsequent amendments that diminish the very environmental protections that are meant to be enforced. This has significantly increased risks to components of water, which have been disproportionately affected by project amendments. The research results have shown that amendment processes have allowed proponents to submit project changes and have virtually any application approved. Therefore, because of this seemingly streamlined process between amendment application and approval, there may be a lack of incentive for mining proponents to have high standards for project planning and development during the initial environmental assessment required for their EAC. Inconsistent use of language, poor levels of detail, and non-quantitative information in amendment documents brings into question the amendment process and its rigor. Inappropriate categorization and omission of critical project-related documentation on the BC EPIC registry, a platform intended to promote transparency of pertinent information for the general public, gives rise to inefficiencies that tarnish its effectiveness and validity.

The BC EA process is not singularly underpinned by proponents, but rather is upheld by the clarity of communication to decision-makers and the broader stakeholder community. Given that clean water is imperative to maintaining the stability of ecosystems and protecting the health of the public, the BCEAO and project proponents must be held to a higher standard in ensuring the EA process is not diminished by recurring amendments which have negative repercussions on various subcomponents of water.

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APPENDIX

Table 3 – BC Mining Projects with Certificates Issued Between 2000 – 2020

Project Name	Proponent	Certificate Issued Date	EAA Legislation	Amendment (Y/N)	Amendment Directly Affecting Water Quality (Y/N)	Amendment Indirectly Affecting Water Quality (Y/N)
Brucejack Gold Mine	Pretium Resources Inc.	March 26, 2015	2002 EAA	Y	Y	Y
Brule Mine	Conuma Coal Resources Ltd.	July 4, 2006	2002 EAA	Y	Y	N
Fording River Operations Swift	Teck Coal Ltd.	September 15, 2010	2002 EAA	Y	N	Y
Galore Creek Copper-Gold-Silver	Galore Creek Mining Corp.	February 16, 2007	2002 EAA	Y	N	N
Kemess Underground	AuRico Metals Incorporated	March 13, 2017	2002 EAA	Y	N	N
Kitsault Mine	Avanti Kitsault Mine Ltd.	March 18, 2013	2002 EAA	Y	N	N
Kootenay West Mine	CertainTeed Mining Corp.	January 25, 2018	2002 EAA	Y	N	Y
KSM	KSM Mining ULC	July 29, 2014	2002 EAA	Y	N	N
Line Creek Operations Phase II	Teck Coal Ltd.	September 25, 2013	2002 EAA	Y	N	Y
Mt. Milligan Copper-Gold	Thompson Creek Metals Company	March 16, 2009	2002 EAA	Y	Y	Y
Murray River Coal	HD Mining International Ltd.	October 1, 2015	2002 EAA	Y	Y	Y
Prosperity Gold-Copper	Taseko Mines Ltd.	January 14, 2010	2002 EAA	Y	Y	Y
Red Chris Porphyry Copper-Gold Mine	Newcrest Red Chris Mining Ltd.	August 24, 2005	2002 EAA	Y	N	Y
Tulsequah Chief Mine	Chieftain Metal Ltd.	December 12, 2002	1996 EAA	Y	Y	Y
Wolverine Coal Mine	Conuma Coal Resources Ltd.	January 14, 2005	2002 EAA	Y	Y	Y
Baldy Ridge Extension	Teck Coal Ltd.	September 19, 2016	2002 EAA	N	N	N
Blackwater Gold	BW Gold Inc.	June 21, 2019	2002 EAA	N	N	N
Burnco Aggregate	Burnco Rock Products Ltd.	March 18, 2018	2002 EAA	N	N	N

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Giscome Quarry and Lime Plant	Graymont Western Canada Inc.	December 14, 2016	2002 EAA	N	N	N
Orca Sand and Gravel	Orca Sand and Gravel Ltd.	July 14, 2005	2002 EAA	N	N	N
Red Mountain Underground Gold	IDM Mining Ltd.	October 5, 2018	2002 EAA	N	N	N
Roman Coal Mine	Peace River Coal Inc.	December 14, 2012	2002 EAA	N	N	N
Swamp Point Aggregate Mine	Ascot Resources Ltd.	June 21, 2006	2002 EAA	N	N	N



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February 25, 2021

Ref: 8WP-CWQ

Steven Ruffatto
Chair, Montana Board of Environmental Review
Montana Department of Environmental Quality
Metcalf Building, 1520 East Sixth Avenue
P.O. Box 200901
Helena, Montana 59620-0901

Subject: EPA's action on Montana's Revised Selenium Criteria for Lake Koocanusa and the Kootenai River (ARM 17.30.632 & ARM 17.30.602(32))

Dear Mr. Ruffatto:

The U.S. Environmental Protection Agency (EPA) has completed its review of Montana's revised water quality standards (WQS) and is approving the Administrative Rules of Montana (ARM) 17.30.632 and 17.30.602(32) as described in the enclosure to this letter. Receipt of the submission on December 28, 2020, initiated EPA's review of the revised WQS pursuant to Section 303(c) of the Clean Water Act (CWA) and the implementing federal WQS regulation (40 C.F.R. Part 131). The submission included: (1) the revised WQS adopted by the Board of Environmental Review on December 11, 2020 now codified at ARM 17.30.632 and 17.30.602(32); (2) rulemaking documents including a Technical Support Document, public notices, public comments, and response to comments; (3) transcript of the public hearing on November 5, 2020; and (4) Special Assistant Attorney General's certification that the WQS were duly adopted pursuant to state law. Although the new and revised rules took effect under state law on December 25, 2020, the EPA's approval under CWA Section 303(c) is required before the WQS are effective for CWA purposes.

Clean Water Act Review Requirements

CWA section 303(c)(2), requires states and authorized Indian tribes¹ to submit new or revised WQS to EPA for review. EPA is required to review and approve, or disapprove, the submitted standards. Pursuant to CWA § 303(c)(3), if EPA determines that any standard is not consistent with the applicable requirements of the Act, the Agency shall, no later than the ninetieth day after the date of submission, notify the state or authorized tribe and specify the changes to meet the requirements. If such changes are not adopted by the state or authorized tribe within ninety days after the date of notification, EPA is to promptly propose and then promulgate such standard pursuant to CWA section 303(c)(4). The Region's

¹ CWA section 518(e) specifically authorizes EPA to treat eligible Indian tribes in the same manner as states for purposes of CWA section 303. *See also* 40 C.F.R. § 131.8.

goal has been, and will continue to be, to work closely with states and authorized tribes throughout the water quality standards development process to ensure that statutory and regulatory requirements are clear. Pursuant to 40 C.F.R. § 131.21(c), new or revised state standards submitted to EPA after May 30, 2000, are not effective for CWA purposes until approved by EPA.

Today’s Action

Montana adopted revised selenium criteria for the protection of the Class B-1 designated uses² for the portions of Lake Koocanusa and the Kootenai River (summarized in Table 1) in Montana. 40 C.F.R. § 131.11 describes the regulatory requirements for water quality criteria. Today’s action addresses submitted changes to ARM 17.30.602(32) and 17.30.632 that include new or revised WQS requiring EPA’s review and action under CWA section 303(c). EPA is approving ARM 17.30.602(32) and 17.30.632, except for portions of ARM 17.30.632(4) and 17.30.632(6) that EPA has determined are not new or revised WQS requiring EPA action pursuant to CWA section 303(c). The rationale for EPA’s decisions is in the enclosure.

Selenium criteria adopted by Montana for Lake Koocanusa and the Kootenai River

Media Type	Fish Tissue		Water Column
Criterion Element	Egg/Ovary	Whole Body or Muscle	Monthly Average Exposure
Magnitude	15.1 mg/kg dw	Whole Body 8.5 mg/kg dw Muscle 11.3 mg/kg dw	Lake Koocanusa 0.8 µg/L Kootenai River 3.1 µg/L
Duration	Instantaneous measurement	Instantaneous measurement	30 days
Frequency	Not to be exceeded	Not to be exceeded	Shall not be exceeded more than once in three years, on average

Endangered Species Act Requirements

EPA’s approval of Montana’s revised selenium criteria submitted on December 28, 2020 is in compliance with the Endangered Species Act (ESA), 16 U.S.C. § 1536 *et seq.* Under Section 7(a)(2) of the ESA, EPA must ensure that its approval of these modifications to Montana’s WQS is not likely to jeopardize the continued existence of threatened and endangered species or result in the destruction or adverse modification of designated critical habitat of such species. EPA initiated consultation with the US Fish and Wildlife Service (USFWS) regarding the potential effects of this action on April 28, 2020 via an email sent to Jacob Martin, Assistant Field Supervisor, Montana Ecological Services Field Office. EPA kept the USFWS apprised of the state’s development of the criteria throughout 2020. EPA sent a final Biological Evaluation to the USFWS on February 18, 2021. EPA received a letter from the USFWS on February 25, 2021 concurring with EPA’s determination that approval of Montana’s revised water quality standards for selenium “may affect, but is not likely to adversely affect” either the bull trout and its designated critical habitat or the white sturgeon within the action area.

² Class B-1 includes the following designated uses: drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. See ARM 17.30.609 and ARM 17.30.623.

Indian Country

EPA's approval of Montana's submitted WQS does not extend to Indian country as defined in 18 U.S.C. §1151. Indian country generally includes (1) lands within the exterior boundaries of the following Indian reservations located within Montana: the Blackfeet Indian Reservation, the Crow Indian Reservation, the Flathead Reservation, the Fort Belknap Reservation, the Fort Peck Indian Reservation, the Northern Cheyenne Indian Reservation, and the Rocky Boy's Reservation; (2) any land held in trust by the United States for an Indian tribe; and (3) any other areas that are "Indian country" within the meaning of 18 U.S.C. §1151. Today's action is not intended as an action to approve or disapprove WQS for waters within Indian country. EPA, or eligible Indian tribes, as appropriate, retain responsibilities under CWA section 303 in Indian country.

Conclusion

EPA commends Montana for collaborating with multiple stakeholders for over five years to develop a site-specific selenium water column element for Lake Koocanusa consistent with the approaches recommended by EPA for developing site-specific selenium criteria. The adoption of fish tissue criterion elements for Lake Koocanusa as well as fish tissue elements and a water column criterion element for the Kootenai River that are the same as the current EPA recommended selenium criterion elements are also important improvements. We thank Montana for your work to protect and improve these waters and look forward to continued partnership in this watershed. If you have any questions, please contact Tonya Fish on my staff at fish.tonya@epa.gov.

Sincerely,

Judy Bloom
Manager, Clean Water Branch

Enclosure

Rationale for the EPA’s Approval of Revised Selenium Criteria for Lake Koocanusa and the Kootenai River (ARM 17.30.632 and ARM 17.30.602(32))

Water quality standards (WQS) include: (1) designated uses; (2) water quality criteria that support the designated uses; (3) antidegradation requirements; and optional general policies. 40 C.F.R. Part 131. At issue in this action are water quality criteria for selenium adopted by Montana for the protection of the Class B-1 designated uses³ in Lake Koocanusa and the Kootenai River (ARM 17.30.632 and ARM 17.30.602(32)).⁴

1. Clean Water Act and 40 C.F.R. Part 131 Requirements Relevant to Water Quality Criteria

Clean Water Act (CWA) section 101(a)(2) establishes as a national goal the achievement of water quality that provides for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water. CWA section 304(a)(1) requires EPA to develop and publish and, from time to time, revise national recommended criteria for protection of water quality and human health that accurately reflect the latest scientific knowledge. Water quality criteria developed under CWA section 304(a) are based solely on data and scientific judgments on the relationship between pollutant concentrations and environmental and human health effects. CWA section 304(a) criteria do not reflect consideration of economic impacts or the technological feasibility of meeting pollutant concentrations in ambient water.

EPA uses Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses (1985) (commonly referred to as the “1985 Guidelines” or “Aquatic Life Guidelines” and hereafter referred to in this document as “Aquatic Life Guidelines”) to derive 304(a) criteria recommendations to protect aquatic life from the effects of toxic pollutants. These Aquatic Life Guidelines describe an objective way to estimate the highest concentration of a substance in water that will not present a significant risk to the aquatic organisms in the water. This EPA method relies primarily on acute and chronic laboratory toxicity data for aquatic organisms from eight taxonomic groups reflecting the distribution of aquatic organisms’ taxa that are intended to be protected by water quality criteria.

EPA’s WQS regulation at 40 C.F.R. Part 131 interprets and implements CWA sections 101(a)(2) and 303(c). 40 C.F.R. § 131.11(a)(1) requires that water quality criteria adopted by states and authorized tribes⁵ “be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use.” For waters with multiple use designations, the criteria must support the most sensitive use. Designated uses are those uses specified in WQS for each water body or segment whether or not they are being attained (40 C.F.R. § 131.3(f)). In other words, designated uses establish the environmental objectives for each water body (*e.g.*, aquatic life, recreation, drinking water, agriculture,

³ Class B-1 includes the following designated uses: drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. See ARM 17.30.609 and ARM 17.30.623.

⁴ See www.mtrules.org/gateway/Subchapterhome.asp?scn=17%2E30.6.

⁵ CWA section 518(e) specifically authorizes the EPA to treat eligible Indian tribes in the same manner as states for purposes of CWA section 303. See also 40 C.F.R. § 131.8.

etc.). Numeric criteria may be based on EPA's CWA section 304(a) guidance, CWA section 304(a) guidance modified to reflect site-specific conditions, or other scientifically defensible methods (40 C.F.R. § 131.11(b)). CWA section 510 and EPA's CWA implementing regulations allow states to adopt water quality standards that are more stringent than may be strictly necessary under federal law.⁶

2. Background

Montana's revised selenium criteria are applicable to the surface waters of Lake Koocanusa and the Kootenai River within Lincoln County, Montana. The Kootenay River (note different spelling in British Columbia) originates in southeast British Columbia and flows south into Montana near the town of Eureka. The river is impounded by Libby Dam, creating Lake Koocanusa. Downstream of Libby Dam, the Kootenai River flows west into Idaho and then north into British Columbia, forming Kootenay Lake (see Figure 1).

Selenium is an essential micronutrient and low levels of selenium in the diet are required for normal cellular function in almost all animals. However, selenium at amounts not much above the required nutritional levels can have toxic effects on aquatic life and aquatic-dependent wildlife, making it one of the most toxic of the biologically essential elements. Egg-laying vertebrates have a lower tolerance for selenium than do mammals, and the transition from levels of selenium that are biologically essential to those that are toxic for these species occurs across a relatively narrow range of exposure concentrations. Elevated selenium levels above what is nutritionally required in fish and other wildlife inhibit normal growth and reduce reproductive success through effects that lower embryo survival, most notably teratogenesis (i.e., embryo/larval deformities). The deformities associated with exposure to elevated selenium in fish may include skeletal, craniofacial, and fin deformities, and various forms of edema that result in mortality. Elevated selenium exposure in birds can reduce reproductive success including decreased fertility, reduced egg hatchability (embryo mortality), and increased incidence of deformities in embryos.

Scientific studies indicate that selenium toxicity to aquatic life and aquatic-dependent wildlife is driven by diet (i.e., the consumption of selenium contaminated prey) rather than by direct exposure to dissolved selenium in the water column. Unlike other bioaccumulative contaminants such as mercury, the single largest step in selenium accumulation in aquatic environments occurs at the base of the food web where algae and other microorganisms accumulate selenium from water. The vulnerability of a species to selenium toxicity is determined by a number of factors in addition to the amount of contaminated prey consumed. A species' sensitivity to selenium, its population status, and the duration, timing and life stage of exposure are all factors to consider. In addition, the hydrologic conditions and water chemistry of a water body affect bioaccumulation; in general, slow-moving, calm waters or lentic waters enhance

⁶ See 40 C.F.R. 131.4(a) ("As recognized by section 510 of the Clean Water Act, States may develop water quality standards more stringent than required by this regulation."); see also *City of Albuquerque v. Browner*, 97 F.3d 415, 423 (10th Cir. 1996) (noting "states' inherent right to impose standards or limits that are more stringent than those imposed by the federal government").

the production of bioavailable forms of selenium (selenite), while faster-moving waters or lotic waters limit selenium uptake given the rapid movement and predominant form of selenium (selenate).⁷

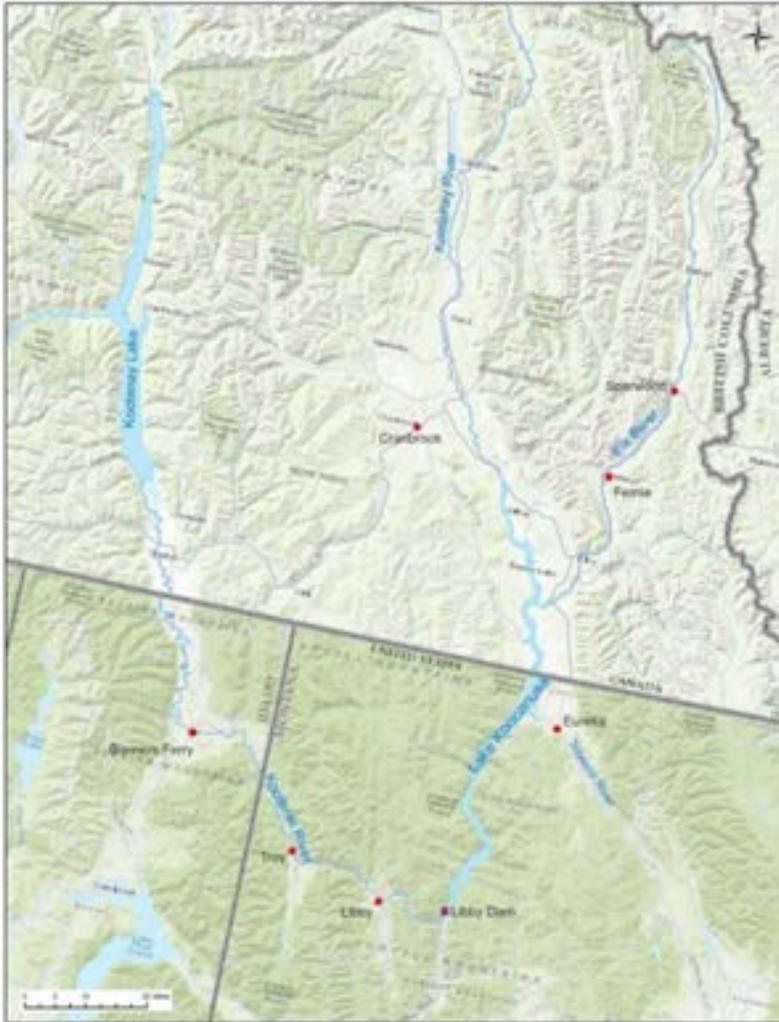


Figure. 1 Map of Lake Kootcanusa and the Kootenai River

3. EPA Recommended Selenium Criterion

EPA’s national recommended water quality criterion for selenium (EPA 2016),⁸ developed by EPA in accordance with CWA section 304(a), provides recommendations to states and authorized tribes to establish WQS pursuant to the CWA. EPA 2016 recommends states/authorized tribes adopt one selenium criterion composed of four criterion elements: two fish tissue criterion elements (egg/ovary and whole body and/or muscle) and two water column criterion elements (30-day average and intermittent exposure). The water column criterion elements are further refined into values for lentic

⁷ Excerpt from 83 Fed. Reg. 64063 (December 13, 2018).

⁸ See www.epa.gov/wqc/aquatic-life-criterion-selenium.

waters (e.g., lakes/reservoirs) and lotic waters (e.g., streams/rivers) because selenium bioaccumulates differently in these two water body types. Adopting all four criterion elements ensures protection when fish tissue data are unavailable (See Table 1 below).

Table 1. Summary of EPA’s Freshwater Selenium Ambient Chronic Water Quality Criterion for Protection of Aquatic Life.

Media Type	Fish Tissue ¹		Water Column ⁴	
Criterion Element	Egg/Ovary ²	Fish Whole Body or Muscle ³	Monthly Average Exposure	Intermittent Exposure ⁵
Magnitude	15.1 mg/kg dw	8.5 mg/kg dw whole body or 11.3 mg/kg dw muscle (skinless, boneless filet)	1.5 µg/L in lentic aquatic systems 3.1 µg/L in lotic aquatic systems	$WQC_{int} = \frac{WQC_{30-day} - C_{bkgrnd}(1 - f_{int})}{f_{int}}$
Duration	Instantaneous measurement ⁶	Instantaneous measurement ⁶	30 days	Number of days/month with an elevated concentration
Frequency	Not to be exceeded	Not to be exceeded	Not more than once in three years on average	Not more than once in three years on average

1. Fish tissue elements are expressed as steady-state.
2. Egg/Ovary supersedes any whole body, muscle, or water column element when fish egg/ovary concentrations are measured.
3. Fish whole body or muscle tissue supersedes water column element when both fish tissue and water concentrations are measured.
4. Water column values are based on dissolved total selenium in water and are derived from fish tissue values via bioaccumulation. Water column values are the applicable criterion element in the absence of steady-state fish tissue measurements.
5. Where WQC30-day is the water column monthly element, for either a lentic or lotic waters; C_{bkgrnd} is the average background selenium concentration, and f_{int} is the fraction of any 30-day period during which elevated selenium concentrations occur, with f_{int} assigned a value ≥ 0.033 (corresponding to 1 day).
6. Fish tissue data provide instantaneous point measurements that reflect integrative accumulation of selenium over time and space in fish population(s) at a given site.

EPA recognizes selenium bioaccumulation potential depends on the structure of the food web, hydrology, and several biogeochemical factors that characterize a particular aquatic system. Therefore, site-specific water column criterion element values may be necessary at aquatic sites with high selenium bioaccumulation to ensure adequate protection of aquatic life. In its CWA section 304(a) criterion, EPA

provided two methods⁹ for translating the recommended fish tissue criterion elements into site-specific water column criterion elements:

- Mechanistic model – uses scientific knowledge of aquatic system food webs to establish a relationship between the concentration of selenium in the water column and the concentration of selenium in fish tissue. EPA worked with the United States Geological Survey (USGS) to derive a translation equation utilizing a mechanistic model of bioaccumulation previously published in peer-reviewed scientific literature to derive recommended water column criterion elements.
- Empirical Bioaccumulation Factor (BAF) model – uses direct measurement of selenium concentrations in both the water column and fish tissue to calculate the ratio of the two concentrations. The ratio (BAF) can then be used to estimate the target concentration of selenium in the water column as related to the target fish tissue criterion element.

4. Montana’s Revised Selenium Criteria for Lake Koocanusa and the Kootenai River

Montana adopted revised selenium criteria to protect Class B-1 designated uses in Lake Koocanusa and the Kootenai River that are consistent with the recommendations in EPA 2016 for fish tissue and water column criterion elements (summarized in Table 2). For the Kootenai River, Montana adopted the EPA 2016 recommended water column criterion element for lotic waters. For Lake Koocanusa, Montana used the EPA 2016 recommended mechanistic model method for translating the recommended fish tissue criterion elements into a site-specific water column criterion element. The selenium criteria in Department Circular DEQ-7 of 5 µg/L (chronic) and 20 µg/L (acute) continue to apply for CWA purposes for the rest of Montana.¹⁰

Table 2. Selenium criteria adopted by Montana for Lake Koocanusa and the Kootenai River

Media Type	Fish Tissue		Water Column
Criterion Element	Egg/Ovary	Whole Body or Muscle	Monthly Average Exposure
Magnitude	15.1 mg/kg dw	Whole Body 8.5 mg/kg dw Muscle 11.3 mg/kg dw	Lake Koocanusa 0.8 µg/L Kootenai River 3.1 µg/L
Duration	Instantaneous measurement	Instantaneous measurement	30 days
Frequency	Not to be exceeded	Not to be exceeded	Shall not be exceeded more than once in three years, on average

The egg/ovary criterion element supersedes the whole body or muscle criterion element. The fish tissue criterion elements supersede the water column elements only when the water bodies are in steady state (see section 5.2).

⁹ Appendix K provides recommendations and examples for developing site-specific selenium criteria at www.epa.gov/sites/production/files/2016-07/documents/aquatic_life_awqc_for_selenium_-_freshwater_2016.pdf.

¹⁰ See deq.mt.gov/Portals/112/Water/WQP/Standards/PDF/DEQ7/DEQ-7.pdf.

5. EPA Analysis and Rationale for Approval

5.1 Selenium Criteria

40 C.F.R. § 131.11(a)(1) requires that water quality criteria adopted by states and authorized tribes “be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use.”¹¹ For waters with multiple use designations, the criteria must support the most sensitive use. For the reasons discussed below, EPA has concluded that Montana’s revised selenium criteria are both supported by a sound scientific rationale and based on EPA’s 304(a) national recommended criteria as permitted by 40 C.F.R. 131.11(b)(1).

5.1.1 Protection of Designated Uses

Both Lake Koocanusa and the Kootenai River are designated Class B-1, which includes the following designated uses: drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.¹² Montana determined in *Derivation of a Site-Specific Water Column Selenium Standard for Lake Koocanusa* (MT TSD)¹³ that the most sensitive designated use for selenium is growth and propagation of salmonid fishes and associated aquatic life (see MT TSD sections 1.31, 2.3.5 and 3.6).

EPA’s CWA section 304(a) recommended selenium criteria for the protection of human health are 170 µg/L (consumption of water + organism) and 4200 µg/L (consumption of organism only),¹⁴ and are much less stringent than the CWA section 304(a) recommended water column criterion element for the protection of aquatic life in EPA 2016 of 1.5 µg/L (lentic) and 3.1 µg/L (lotic) (See Table 1). Montana adopted the Maximum Contaminant Level established by EPA under the Safe Drinking Water Act of 50 µg/L for the protection of human health¹⁵ (see Department Circular DEQ-7), which is less stringent than the EPA 2016 water column criterion element. Therefore, selenium criteria adopted by states/authorized tribes that protect aquatic life are expected to also protect humans.

¹¹ For the reasons explained herein, EPA has concluded that the state’s water quality standard submission is supported by a sound scientific rationale. EPA notes that its charge under federal law is to review state water quality criteria submissions only to ensure that sound science shows they are protective of the designated use, not to determine whether the precise value selected by the state is the most scientifically rigorous number possible. EPA’s regulations at 40 C.F.R. 131.4(a) expressly preserve states’ right to “develop water quality standards more stringent than required.” Accordingly, once EPA has determined that sound scientific rationale shows that a state submission is protective of the designated use, its role under the cooperative federalism framework of the CWA is not to second guess the state’s scientific analysis. See *City of Albuquerque v. Browner*, 97 F.3d 415, 426 (10th Cir. 1996) (“If the proposed standards are more stringent than necessary to comply with the Clean Water Act’s requirements, the EPA may approve the standards without reviewing the scientific support for the standards”); *Ctr. for Regulatory Reasonableness v. United States Env’tl. Prot. Agency*, No. CV 16-1435, 2019 WL 1440303, at *10 (D.D.C. Mar. 31, 2019) (“States are expressly empowered to adopt criteria substantially below any hypothetical ‘impairment threshold’”).

¹² See ARM 17.30.609 and ARM 17.30.623.

¹³ See deq.mt.gov/Portals/112/Water/WQP/Standards/Koocanusa/TSD_Lake%20Koocanusa_Sep2020_Final.pdf.

¹⁴ See www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table.

¹⁵ See www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations.

Analyses conducted for the derivation of EPA 2016 concluded that available data indicates fish are more sensitive to selenium than amphibians, aquatic invertebrates, and plants. The EPA 2016 criterion is based on reproductive effects on fish and this is expected to also protect the less sensitive taxa in the aquatic community.

In addition, EPA completed a review of scientific literature related to the toxicity of selenium to aquatic-dependent wildlife, of which aquatic-dependent birds were determined to be the most sensitive taxa. EPA concluded that since the translated water column values for aquatic-dependent wildlife are equal or extremely close to EPA's 2016 selenium water column criterion elements, the EPA's 2016 selenium water column elements would also protect aquatic-dependent wildlife.¹⁶

In summary, EPA agrees with DEQ's identification of growth and propagation of salmonid fishes and associated aquatic life as the most sensitive designated use for Lake Koocanusa and the Kootenai River.

5.1.2 Sound Scientific Rationale

EPA criteria recommendations consist of three components: (1) magnitude - how much of a pollutant (or pollutant parameter such as toxicity), expressed as a concentration, is allowable; (2) duration - the period of time (averaging period) over which the instream concentration is averaged for comparison with criteria magnitudes (limits the duration of concentrations above the criteria magnitudes); and (3) frequency - how often criteria can be exceeded.¹⁷ EPA 2016 recommends states/authorized tribes adopt one selenium criterion composed of four criterion elements: two fish tissue criterion elements (egg/ovary and whole body and/or muscle) and two water column criterion elements (30-day average and intermittent exposure).

5.1.2.1 Magnitude

Fish Tissue Criterion Elements

EPA developed a chronic criterion reflective of the reproductive effects of selenium concentrations on fish species, consistent with consensus recommendations of expert panels and with peer review and public comments on draft criteria. Based on the available dietary exposure data from lab studies and field exposures, the egg/ovary criterion element concentration is 15.1 milligrams selenium per kilogram dry weight (mg Se/kg dw) based primarily on 17 reproductive studies representing 12 fish species (10 fish genera). EPA applied the sensitivity distribution concepts from the *U.S. EPA Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and their Uses*¹⁸ to derive the national selenium criterion. The Lake Koocanusa fish assemblage is represented in the EPA 2016 selenium toxicity database by quantitative reproductive toxicity values for 3 of 10 fish

¹⁶ See *Aquatic Life and Aquatic-Dependent Wildlife Selenium Water Quality Criterion for Freshwaters of California* (Part 4), at www.epa.gov/sites/production/files/2019-03/documents/ca_statewide_se_tsd_508_compliant.pdf.

¹⁷ See *Technical Support Document for Water Quality-based Toxics Control* (Section 2.2.1) at www3.epa.gov/npdes/pubs/owm0264.pdf.

¹⁸ See www.epa.gov/wqc/guidelines-deriving-numerical-national-water-quality-criteria-protection-aquatic-organisms-and.

genera (13 fish species) that reside in Lake Koocanusa (Dolly Varden (surrogate for bull trout), rainbow trout, and Westslope cutthroat trout), and 1 genera (that resides in the Montana portion of the Kootenai River (white sturgeon). Although white sturgeon, the most sensitive species in the EPA 2016 dataset, do not reside in Lake Koocanusa, per 40 C.F.R. § 131.10(b), the criteria for Lake Koocanusa must provide for the attainment and maintenance of the WQS in the Kootenai River. Also, qualitative species or genus surrogate level tissue values for an additional 5 species (mountain whitefish, kokanee, largescale and longnose sucker, and reidside shiner), were considered in the derivation process, leaving only 4 of 13 species unrepresented in the toxicity database. One of the important principles for site-specific criteria development established by the Selenium Technical Subcommittee during that process was that all fish species without toxicity data should be considered equally sensitive to the white sturgeon. Therefore, the white sturgeon tissue values would be applicable to the burbot, northern pikeminnow, peamouth chub, and yellow perch. The fish genera present in the Kootenai River are similarly represented by EPA's 2016 dataset, with a majority of the species in the river represented by either quantitative data for the specific species or qualitative data for species or genus level surrogates, and all fish species without toxicity data considered equally sensitive to the white sturgeon.

Selenium concentrations measured either in fish whole body or muscle tissue in non-reproductive studies (typically evaluating juvenile growth and survival), were available for 8 genera. Several studies measured whole body and muscle concentrations in reproductive studies concurrent with measurements in egg or ovary tissues resulting in directly measured chronic values for 2 genera. Whole body and muscle criterion elements were derived using these directly measured tissue concentration data, or by applying conversion factors (*CF*) to egg or ovary concentrations to derive species-specific whole body or muscle tissue concentrations. Then the sensitivity distribution concept was applied to distributions of whole body and muscle tissue concentrations to derive the whole body (8.5 mg Se/kg dw) and muscle (11.3 mg Se/kg dw) criterion elements. EPA determined that the egg/ovary criterion element was most relevant to the toxic manifestations of selenium in fish resulting in a hierarchal application of the tissue criterion where the egg/ovary criterion supersedes the whole body or muscle tissue criterion when fish egg/ovary concentrations are measured at a site.

Montana's revised selenium criteria in ARM 17.30.632 include fish tissue criterion elements that are the same as the recommended magnitudes in EPA 2016 for both Lake Koocanusa and the Kootenai River: egg/ovary 15.1 mg/kg dw, muscle 11.3 mg/kg dw, and whole body 8.5 mg/kg dw. EPA 2016 provides the basis for EPA's approval of these criterion elements.

Water Column Criterion Element for the Kootenai River

The water column criterion element (30-day average) that Montana adopted for the Kootenai River is the same as the recommended water column value in EPA 2016: 3.1 µg/L total dissolved selenium for lotic waters. EPA 2016 provides the basis for EPA's approval of this criterion element

Water Column Criterion Element for Lake Koocanusa

The site-specific water column criterion element for Lake Koocanusa was developed through a five year collaboration between DEQ and British Columbia Ministry of Environment and Climate Change Strategy (BC-ENV). The Lake Koocanusa Monitoring and Research Working Group and a Selenium

Technical Subcommittee were established to coordinate this work. Presser and Naftz (2020)¹⁹ and the companion data release²⁰ that includes a comprehensive set of site-specific data compiled from public databases (Federal, State, and Provincial) and reports by Teck Coal Ltd., provided the foundational selenium modeling for both DEQ and BC-ENV to use to develop a protective water column criterion element for Lake Koocanusa that both Montana and British Columbia could then adopt through their respective regulatory processes.

For Montana, the culmination of this work was the adoption of the water column criterion element (30-day average) for Lake Koocanusa (0.8 µg/L total dissolved selenium). As described in more detail below, this criterion element was derived consistent with the mechanistic model method in EPA 2016 for translating the recommended fish tissue criterion elements into site-specific water column criterion elements.

The mechanistic model approach uses scientific knowledge of the bioaccumulation dynamics and aquatic food webs of a site to establish a relationship between the concentration of selenium in the water column and the concentration of selenium in fish tissue. Selenium dissolved in surface water enters aquatic food webs by assimilating into trophic level 1 primary producer organisms (e.g., algae) or adsorption to other biotic (e.g., detritus) and abiotic (e.g., sediment) particulate material. Organic particulate material is consumed by trophic level 2 organisms (usually aquatic invertebrates, but also some fish species that are herbivores/detritivores) resulting in the accumulation of selenium in the tissues of those organisms. Trophic level 2 organisms are then consumed by trophic level 3 organisms (typically fishes) resulting in accumulation of selenium in the tissues of those fish (and so on up the food web). The transfer of selenium up the food web can be characterized by a number of parameters and modeled with an equation. An enrichment factor (*EF*) characterizes the assimilation of dissolved selenium into the base of the food web by quantifying the partitioning of selenium between the dissolved and particulate state. Bioaccumulation of selenium from one trophic level to the next is quantified by a trophic transfer factor (*TTF*). A conversion factor (*CF*), which establishes the ratio of selenium concentrations between different fish tissues, may also be used if the fish tissue being modeled is muscle or egg/ovary rather than whole body. These parameters are used in the mechanistic model with a target protective fish tissue selenium concentration (e.g., egg/ovary 15.1 mg/kg dw, muscle 11.3 mg/kg dw, or whole body 8.5 mg/kg dw), to derive a selenium water column criterion element that will ensure the protective fish tissue criterion element is met and will therefore be protective of the site-specific ecosystem.

EPA 2016 describes six steps for deriving a site-specific water column criterion element from the selenium egg/ovary criterion element using EPA's mechanistic model approach. Following is a summary of how the work of Presser and Naftz (2020) and additional work by Montana is consistent with the six steps.

¹⁹ Presser, T.S., and Naftz, D.L., 2020, Understanding and documenting the scientific basis of selenium ecological protection in support of site-specific guidelines development for Lake Koocanusa, Montana, U.S.A., and British Columbia, Canada: U.S. Geological Survey Open-File Report 2020–1098, 40 p., doi.org/ 10.3133/ ofr20201098.

²⁰ See Presser, T.S., and Naftz, D.L., 2020, Selenium concentrations in food webs of Lake Koocanusa in the vicinity of Libby Dam (Montana) and the Elk River (British Columbia) as the basis for applying ecosystem-scale modeling, 2008–2018: U.S. Geological Survey data release, doi.org/10.5066/P9VXYSNZ.

1) Identify the appropriate target fish species.

The overall goal of Presser and Naftz (2020) was to provide an ecosystem-scale model that illustrates the site-specific range of potential selenium exposure and bioaccumulation that can inform the basis for regulatory decision-making by Montana and British Columbia. Therefore, they did not select one target fish species and instead provided generalized food webs based on fish species present that could be further refined by the respective governments. Presser and Naftz (2020) used available Lake Koochanusa data including fish species abundance and fish catches to identify fish species present. Based on recommendations from the Selenium Technical Subcommittee, twelve species of fish were considered as potential target species for the modeling: bull trout, burbot, kokanee, longnose sucker, largescale sucker, mountain whitefish, northern pikeminnow, peamouth chub, rainbow trout (wild strain), redbside shiner, Westslope cutthroat trout, and yellow perch. Species-specific dietary data summarized as percentage of taxa-specific invertebrate biomass, recent selenium concentrations for invertebrate taxa in 2018, and a study of the contents of the stomachs of fish species caught in 2017 were used to assign each fish species to a generalized food-web category to reduce the number of modeling scenarios. Two generalized food-web categories were identified and modeled: an invertebrate to fish model (IFM) and a trophic fish model (TFM). The IFM is based on fish consuming only invertebrates (i.e., zooplankton and/or insects) and protects a community of rainbow trout, Westslope cutthroat trout, redbside shiner, longnose sucker, peamouth chub, largescale sucker, mountain whitefish, and kokanee. The TFM is based on forage fish (trophic level 3 (TL3)) consuming invertebrates and predator fish (trophic level 4 (TL4)) consuming forage fish and protects a community of bull trout, burbot, and northern pikeminnow.

In general, EPA recommends selecting fish species in the aquatic system with the greatest selenium sensitivity and bioaccumulation potential. Presser and Naftz (2020) provided a qualitative vulnerability ranking for Lake Koochanusa fish species. The most vulnerable species include the redbside shiner, peamouth chub, and northern pikeminnow based on sensitivity and burbot based on its demersal feeding and winter spawning period. Given this, Montana followed the recommendation of the Selenium Technical Subcommittee to use the more conservative TFM model food web for protection of potentially sensitive piscivorous species and species of cultural importance (see MT TSD section 5.1.3).

2) Model the food web of the targeted fish species.

Presser and Naftz (2020) used available Lake Koochanusa data including dietary metrics for fish and invertebrate taxa in fish stomachs to develop two primary food web models: IFM and TFM. Montana selected the TFM for modeling the water column value. Montana then selected the version of this model that resulted in the greatest bioaccumulation potential. This was the model that represents TL4 fish consuming 100% TL3 fish which consume 100% aquatic insects (chironomids).

- 3) Identify appropriate trophic transfer factor (*TTF*) values by either:
 - a. selecting the appropriate *TTF* values from a list of EPA 2016-derived values, or
 - b. deriving *TTF* values from other existing data, or
 - c. deriving *TTF* values by conducting additional studies, or
 - d. extrapolating *TTF* values from existing values.

Following option b and Presser and Naftz (2020), Montana used previously published laboratory-derived *TTFs* from Presser and Luoma (2010)²¹: 2.8 (aquatic insects), 1.5 (zooplankton), and 1.1 (fish). The mean “all insect” *TTF* (2.8) that Presser and Naftz (2020) used to model Lake Koochanusa is composed of: mayfly, caddisfly, crane fly, stonefly, damselfly, corixid (waterboatman), and chironomid (midge). The zooplankton *TTF* reflects a zooplankton composite and the fish *TTF* is the mean of all fish species included in Presser and Luoma (2010). These *TTFs* are not identical to those that EPA used in EPA 2016 but are close in magnitude to those in EPA 2016 and scientifically defensible. Montana did not use site-specific *TTFs* due to data limitations identified in Presser and Naftz (2020).

- 4) Determine the appropriate value of *EF* (enrichment factor) by either:
 - a. deriving a site-specific *EF* value from current field measurements, or
 - b. deriving an appropriate *EF* value from older existing data, or
 - c. extrapolating from *EF* values of similar waters.

Montana derived site-specific *EF* values from field measurements (option a above). Presser and Naftz (2020) and Montana used the term K_d instead of *EF* to describe the relationship between selenium concentrations in particulate and dissolved phases. EPA 2016 indicates that the K_d (or *EF*) is the most influential model parameter and therefore the most critical element for which to use site-specific data. Available data included a robust dataset of 87 matched samples for particulate and dissolved selenium collected over multiple years (2015-2019), seasons, and water depths. Rather than selecting a single representative value from the K_d dataset to use in the model, Presser and Naftz (2020) present each K_d calculation as an independent scenario (n=87), resulting in 87 predicted dissolved selenium concentrations for each model scenario. Montana used this distribution of K_d 's and resulting dissolved selenium concentrations to derive their water column criterion element.

- 5) Determine the appropriate *CF* (conversion factor) value by either:
 - a. selecting the appropriate *CF* value from a list of EPA 2016-derived values, or
 - b. deriving a *CF* value from other existing data, or
 - c. deriving a *CF* value by conducting additional studies, or
 - d. extrapolating a *CF* value from existing values.

²¹ Presser, T.S., and Luoma, S.N., 2010, A methodology for ecosystem-scale modeling of selenium: Integrated Environmental Assessment and Management, v. 6, no. 4, p. 685–710, doi.org/ 10.1002/ ieam.101.

A conversion factor (*CF*) quantifies the relationship between the concentration of selenium in the eggs and/or ovaries and the concentration of selenium in the whole body or muscle tissues of fish. Montana used EPA’s whole body tissue guideline (8.5 mg/kg dw) in their modeling, therefore no *CF* was needed.

6) Translate the applicable fish tissue element into a site-specific water concentration value.

To derive a site-specific water column criterion element for Lake Koocanusa that is protective of the chosen fish tissue criterion elements, Montana used the mechanistic model to translate the whole body fish tissue criterion element into a water column criterion element using the following equation:

$$C_{\text{water column criterion element}} = \frac{C_{\text{whole body criterion element}}}{TTF^{\text{composite}} \times (K_d/1000) \times \text{SPM \% bioavailability}}$$

- $C_{\text{water column criterion element}}$ = translated site-specific water column criterion element (µg/L),
- $C_{\text{whole body criterion element}}$ = whole body fish tissue criterion element (µg/g),
- $TTF^{\text{composite}}$ = product of the trophic transfer factor (TTF) values in each trophic level of the food web of the target fish model (no units of measurement),
- K_d = environmental partitioning factor (L/g),
- $\text{SPM \% bioavailability}$ = percent bioavailability of suspended particulate matter

Montana used the following values to populate the equation:

- $C_{\text{whole body criterion element}}$ = 8.5 µg/g,
- $TTF^{\text{composite}}$ = $TTF^{\text{TL4Fish}} \times TTF^{\text{TL3Fish}} \times TTF^{\text{aquatic insects}} = 1.1 \times 1.1 \times 2.8 = 3.39$
- K_d = 75th percentile of distribution
- $\text{SPM \% bioavailability}$ = 60%

The use of these values results in a water column criterion element of 0.8 µg/L. Although this criterion element is more stringent than the recommended water column criterion element for lentic aquatic systems in EPA 2016 (1.5 µg/L), based on the state’s technical documentation included in its submission, summarized above, EPA concludes that it is supported by a sound scientific rationale.²²

As Montana adopted the EPA 2016 recommended fish tissue criterion elements, the whole body criterion element that was used in this translation was the value of 8.5 µg/g dw. The $TTF^{\text{composite}}$ used in this translation was calculated using the TFM and fish and invertebrate $TTFs$ from Presser and Luoma 2010. As presented in step 3 above, the use of existing $TTFs$ is an approach recommend in EPA 2016.

As presented in Presser and Naftz (2020), Montana also included a bioavailability factor for suspended particulate matter in the model, which reflects the bioavailability of selenium from particulate matter to organisms in the ecosystem. In validation runs of the model, Presser and Naftz (2020) showed that a

²² As noted above, the possibility that this criterion element may be more stringent than necessary to protect the designated use would not provide a valid legal justification under Section 303(c) of the CWA or EPA’s implementing regulations for disapproval. See 40 C.F.R. 131.4(a).

60% bioavailability factor better represented the measured invertebrate and zooplankton selenium concentration in Lake Koocanusa than a 100% bioavailability factor.

Lastly, Montana selected the 75th percentile of the K_d distribution for the translation. This is a conservative K_d value protective of a majority of the scenarios observed in Lake Koocanusa.

Intermittent Criterion Element

In addition to the monthly exposure water column criterion element discussed above, EPA 2016 includes a recommended intermittent exposure water column criterion element. Montana did not adopt an intermittent exposure water column criterion element for either Lake Koocanusa or the Kootenai River. The state's rationale in the response to comments is "The intermittent exposure element is unnecessary because MPDES [Montana Pollutant Discharge Elimination System] rules do not differentiate between intermittent and continuous discharges for purposes of developing water quality-based effluent limits. When calculating the reasonable potential for a discharger to cause or contribute to an exceedance of a water quality standard, DEQ methods treat continuous and intermittent dischargers the same."²³ The MPDES program uses the maximum effluent concentration during the period of record to evaluate reasonable potential for a discharge to cause or contribute to an exceedance of a water quality standard.²⁴ EPA concludes Montana's approach will protect the applicable designated uses without the intermittent exposure water column criterion element. EPA notes that there are currently no public or private entities discharging to the Kootenai River or Lake Koocanusa with MPDES permit effluent limits for selenium.²⁵

5.1.2.2. Duration

EPA's recommended duration for the water criterion elements is 30 days. EPA 2016 provides a detailed analysis for the derivation of a 30-day averaging period. This differs from typical criteria averaging periods based on EPA's 1985 Guidelines, where the basis for the criterion averaging period is a time period less than or equal to the "characteristic time," which describes the toxic speed of action due to direct waterborne toxicity of metals. The derivation of the averaging period for the selenium water column concentration was based on the kinetics of bioaccumulation and depuration rates for different trophic levels. The duration for Montana's water column criterion elements for Lake Koocanusa and the Kootenai River is specified as "30-day average" in ARM 17.30.632(7), which is consistent with EPA 2016.

EPA's recommended duration for the fish tissue criterion elements is instantaneous because fish tissue data provide point measurements that reflect integrative accumulation of selenium over time and space in the fish populations(s) at a given site. The fish reflect bioaccumulation of selenium that has already occurred and reflect the extended exposure to selenium in the water body. The duration for Montana's fish tissue criterion elements for Lake Koocanusa and the Kootenai River is specified as "instantaneous" in ARM 17.30.632(6), which is consistent with EPA 2016.

²³ Notice of Amendment and Adoption p. 2394, response to comment #186.

²⁴ September 4, 2020 email from Myla Kelly to Tonya Fish.

²⁵ Notice of Amendment and Adoption p. 2343, response to comment #26.

5.1.2.3 Frequency

The recommended frequency in EPA 2016 of once in three years on average is based on the ability of an aquatic ecosystem to recover when pollutant impacts are associated exclusively with water column exposure.²⁶ The frequency for Montana’s water column criterion elements for Lake Kooconusa and the Kootenai River is specified as “shall not be exceeded more than once in three years, on average” in ARM 17.30.632(7), which is consistent with EPA’s recommendations in the 1985 Guidelines for water column criteria and in EPA 2016.

The recommended frequency of exceedance in EPA 2016 for the fish tissue criterion elements of the selenium criterion is “not to exceed.” Selenium is a bioaccumulative pollutant; therefore, elevated levels in various ecological compartments (e.g., biota, surficial sediments) require a long period to decrease, and the associated aquatic community requires a long time to recover following reduction or removal of an elevated selenium exposure to a given system. As selenium is bioaccumulative and the pathway for exposure is through the food web, the typical criteria return frequency of once in three years on average is not appropriate for selenium in fish tissue as this could lead to sustained ecological impacts. As fish tissue has a much longer recovery time than water column concentrations, a frequency of “not to exceed” is appropriate for the tissue criterion element. The frequency for Montana’s fish tissue criterion elements for Lake Kooconusa and the Kootenai River is specified as “not to exceed” in ARM 17.30.632(6), which is consistent with EPA 2016.

5.2 Definition of Steady State and Criteria Element Hierarchy

Montana adopted ARM 17.30.602(32) and added this definition:

"Steady state" means, for the purposes of ARM 17.30.632, conditions whereby there are no activities resulting in new, increasing, or changing selenium loads to the lake or river aquatic ecosystem, and selenium concentrations in fish living in the aquatic ecosystem have stabilized.

EPA 2016 does not include a definition of “steady state,” but does recommend fish tissue elements of the selenium criterion supersede water column elements under steady state conditions because the selenium concentrations in fish tissues are a more sensitive and reliable indicator of the negative effects of selenium in aquatic life. EPA 2016 also states that fish tissue concentrations do not fully represent potential effects on fish and the aquatic ecosystem in areas with new selenium inputs:

“New inputs are defined as new activities resulting in selenium being released into a lentic or lotic waterbody. New inputs will likely result in increased selenium in the food web, likely resulting in increased bioaccumulation of selenium in fish over a period of time until the new or increased selenium release achieves a quasi-‘steady state’ balance within the food web. EPA estimates that concentrations of selenium fish tissue will not

²⁶ See *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (1985 Guidelines) at www.epa.gov/sites/production/files/2016-02/documents/guidelines-water-quality-criteria.pdf.

represent a ‘steady state’ for several months in lotic systems, and longer time periods (e.g., two to three years) in lentic systems, depending upon the hydrodynamics of a given system such as the location of the selenium input related to the shape and internal circulation of the waterbody, particularly in reservoirs with multiple riverine inputs, hydraulic residence time, and the particular food web. Estimates of steady state under new or increased selenium input situations are expected to be site dependent, so local information should be used to better refine these estimates for a particular waterbody. Thus, EPA recommends that fish tissue concentration not override water column concentration in these situations until these periods of time have passed in lotic and lentic systems, respectively, or steady state conditions can be estimated.” (EPA 2016 pp. 101-102).

Consistent with this, EPA 2016’s Table 1 (also Table 1 of this enclosure) footnotes 1 and 4 specify that the fish tissue elements are expressed as steady-state and water column values are the applicable criterion element in the absence of steady-state condition fish tissue data.

The language above from EPA 2016 was intended to address the scenario where fish tissue data are not exceeding those criterion elements, but the water column data are exceeding that element. However, another scenario DEQ raised in discussions with EPA is how to address the situation where fish tissue data are exceeding those criterion elements, but the water column data are not. EPA advised that in that scenario, EPA would still consider the water body impaired.²⁷ In other words, if a water body is not in steady-state, it is considered impaired if either the fish tissue or water column elements are exceeded. As a result, Montana adopted the following language in ARM 17.30.632(2): “When the aquatic ecosystem is in steady state and selenium data is available for both fish tissue and the water column, the fish tissue standards supersede the water column standard. When the aquatic ecosystem is in non-steady state, both the fish tissue and water column standards apply.” ARM 17.30.632(3) specifies that Lake Koocanusa and the Kootenai River are in non-steady state and the Department will reassess the status triennially and amend the rule if necessary.

EPA concludes that the definition of “steady state” in ARM 17.30.602(32), the criteria element hierarchy in ARM 17.30.632(2), and the statement in ARM 17.30.632(3) that Lake Koocanusa and the Kootenai River are not in steady state are consistent with EPA 2016.

5.3 Protection of Downstream Waters

40 C.F.R. § 131.10(b) requires that criteria provide for the attainment and maintenance of the WQS of downstream waters. Montana addressed this in section 6.2 of the MT TSD. The Kootenai River is downstream of Lake Koocanusa. The fish tissue criterion elements are the same for both water bodies: egg/ovary 15.1 mg/kg dw, muscle 11.3 mg/kg dw, and whole body 8.5 mg/kg dw. Lake Koocanusa’s water column criterion element of 0.8 µg/L is more stringent than the water column criterion element of

²⁷ See September 2, 2020 email from Tonya Fish to Lauren Sullivan.

3.1 µg/L in the Kootenai River. Fish tissue and water column criterion elements are the same for the Kootenai River in Montana and the downstream segment of the Kootenai River in Idaho.²⁸

Based on the information above, EPA concludes Montana’s revised selenium criteria will provide for the attainment and maintenance of downstream uses.

5.4 EPA’s Action

Based on the information above, EPA approves the revised selenium criteria in ARM 17.30.632 because they are “based on sound scientific rationale and ... contain sufficient parameters or constituents to protect the designated use” as required by 40 C.F.R. § 131.11. The selenium criteria also provide for the attainment and maintenance of the WQS of downstream waters consistent with 40 C.F.R. § 131.10(b). In addition, EPA approves the definition of “steady state” in ARM 17.30.602(32) because it informs application of the revised criteria consistent with 40 C.F.R. § 131.11. As with all WQS, these provisions are subject to state review at least every three years pursuant to 40 C.F.R. § 131.20(a).

Today’s action is limited to waters under Montana’s jurisdiction and Montana’s revised WQS that apply to Lake Koocanusa from the US-Canada international boundary to the Libby Dam as specified in ARM 17.30.632(6) and 7(a). EPA remains committed to continued collaboration with Montana, British Columbia, the Confederated Salish and Kootenai Tribes, Kootenai Tribe of Idaho, First Nations, and other interested parties.

6.0 Provisions That EPA Has Determined Are Not WQS

EPA has determined the following provisions are not WQS:²⁹

- In ARM 17.30.632(4): “Permit conditions and limits developed from the water column standards comply with the fish tissue standards.” This language does not describe a desired ambient condition of a waterbody to support a particular designated use. Rather, these statements provide information related to permit conditions.
- ARM 17.30.632(5): “No person may violate the numeric water quality standards in (6) and (7).” This language does not describe a desired ambient condition of a waterbody to support a particular designated use. Rather, these statements provide information related to criteria implementation.
- In ARM 17.30.632(6): “Fish tissue sample results shall be reported as a single value representing an average of individual fish samples or a composite sample, each option requiring a minimum number of five individuals from the same species.” This language does not describe a desired ambient condition of a waterbody to support a particular designated use. Rather, these statements provide information related to sampling and monitoring for compliance with the criteria. The state has flexibility in how it interprets discrete fish samples, and it is reasonable to apply the

²⁸ See IDAPA 58.01.02.210.01 at adminrules.idaho.gov/rules/current/58/580102.pdf.

²⁹ See *What is a New or Revised Water Quality Standard Under CWA 303(c)(3)? Frequently Asked Questions* at www.epa.gov/sites/production/files/2014-11/documents/cwa303faq.pdf.

instantaneous fish tissue elements to a composite sample or average of individuals of the same species, as adopted by MT.

7.0 Conclusion

EPA commends Montana for collaborating with multiple stakeholders for over five years to develop a site-specific selenium water column element for Lake Koocanusa consistent with the approaches recommended by EPA for developing site-specific selenium criteria. The adoption of fish tissue criterion elements for Lake Koocanusa as well as fish tissue elements and a water column criterion element for the Kootenai River that are the same as the current EPA recommended selenium criterion elements are also important improvements. The adopted criteria are based on sound science including robust site-specific data for Lake Koocanusa showing that they protect the applicable designated uses of Lake Koocanusa and the Kootenai River.

File No: 35390-1
Registry: Cranbrook

In the Provincial Court of British Columbia

REGINA

v.

TECK COAL LIMITED

REASONS FOR SENTENCE
OF
THE HONOURABLE ASSOCIATE CHIEF JUDGE P. DOHM
(via videoconference)

COPY

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Place of Hearing:

Fernie, B.C.

Date of Judgment:

March 26, 2021

Introduction

[1] THE COURT: Teck Coal Limited has pled guilty today to two offences under s. 40(2) of the *Fisheries Act*, R.S.C. 1985, c. F-14. Both offences are for unlawfully depositing a deleterious substance, specifically coal mine waste rock leachate, into water frequented by fish, contrary to s. 36(3) of the *Act*. One offence is in relation to the Fording River and the other offence is in relation to Clode Pond. Both offences cover the entire year of 2012.

Circumstances

[2] Teck Coal operates steelmaking coal mines in the Elk Valley in southeastern British Columbia where coal mining has been occurring since 1898. The two Teck Coal mines where these charges occurred are the Fording River mine and the Greenhills mine, which have been operating since 1971 and 1981 respectively. Teck Coal is an indirect subsidiary of Teck Resources Limited, which acquired full ownership of these two mines in 2008. Teck Coal employs thousands of people, most of whom live in the communities near the mines, specifically Elkford, Sparwood, Fernie and Crowsnest Pass.

[3] The Fording River located near Elkford flows to the Elk River, which runs through Elkford, Sparwood and Fernie to its outlet, the Kootenay River at Lake Kooconusa, which spans the Canada and United States border. The reach of the 70-kilometre long Fording River located north of Josephine Falls is referred to as the Upper Fording River, which is 57.5 kilometres long. Water affected by the Fording River mine and the east slopes of the Greenhills mine flows into the tributaries of the Upper Fording River and from there into the Upper Fording River itself. Water from

the west slopes of the Greenhills mine flows into the Elk River.

[4] Westslope Cutthroat trout is a fish “species of concern” both provincially and federally. It is the only native trout throughout much of Canada. It is the only fish species known to inhabit the Upper Fording River and its tributaries. Josephine Falls, as a natural barrier to upstream fish, has protected the Westslope Cutthroat trout population in the Upper Fording River from hybridization with non-native Rainbow trout resident in the Fording River below the falls. As a result, the Westslope Cutthroat trout in the Upper Fording River is one of the limited group of populations that have been identified as genetically pure, making it an important population for the Westslope Cutthroat trout conservation.

[5] In 1971, Clode Settling Ponds were constructed to minimize sediment deposits in the Fording River associated with Teck Coal's mining activities. These ponds were built according to permits issued to Teck Coal and were not intended to be fish habitat. However, Westslope Cutthroat trout did move between the Fording River and the Clode Settling Ponds through a creek running between them. In 2004, Teck Coal took measures to exclude fish from the Clode Settling Ponds, but those measures were not wholly effective nor well maintained, so the Westslope Cutthroat trout were able to access the Clode Settling Ponds.

[6] In 2012, officers from Environment and Climate Change Canada identified that the fish barriers were not effective, such that throughout 2012 fish frequently made their way into Clode Settling Ponds. In 2014, Teck Coal repaired and improved the fish barrier between the Fording River and the Clode Settling Ponds.

[7] Coal mining at the Fording River and Greenhills mines requires the removal

of large quantities of waste rock in order to reach underground seams of coal. This waste rock is stored in piles known as waste rock piles, which become substantial over time. In the Upper Fording River area, there are numerous waste rock piles over 100 metres high with a surface area in excess of 100 hectares. Many of these piles were established prior to Teck Coal's acquisition of these particular mines.

[8] As a result of the removal and exposure of waste rock to precipitation and oxygen, selenium, calcium and other naturally occurring elements found in the waste rock are released, carried in surface or groundwater, and ultimately deposited into a) tributaries and then into the Fording River, b) the Fording River directly, or c) other water bodies within the Elk Valley watershed. How long this process takes depends on a number of factors, but for larger waste rock piles, it can be years.

[9] Selenium is an essential nutrient necessary for cellular function in many organisms, but high levels can be harmful and toxic to the organism, which fish and wildlife consume. High selenium levels in fish tissue can result in harmful effects such as fry that die shortly after hatching and deformities in hatched fry.

[10] Coal mine waste rock also contains dissolved calcium carbonate, which can result in the precipitation of calcite on stream and riverbeds. Although also a naturally occurring process, it is accelerated by the presence of waste rock piles and at certain levels, the precipitation of calcite can change the characteristics of stream beds by binding rock and gravel together to adversely affect fish utilization and the quality of fish habitat.

[11] In 1995, when it was discovered that surface coal mining appeared to be mobilizing soluble selenium into the Fording River, there were approximately 990

million bank cubic metres of waste rock placed in the Fording River and Greenhills mines. That amount had increased to approximately 2.2 billion bank cubic metres by 2008 when Teck Coal increased its ownerships in those mines. By 2011, that amount had increased to 2.5 billion and in 2012 an additional 123 million bank cubic metres of waste rock was placed in the Upper Fording River watershed as part of the Fording River and Greenhills operations.

[12] The release of selenium and calcium carbonate waste rock requires long-term, adaptively managed solutions that are regionally focused because it affects the Elk Valley watershed downstream from the waste rock piles. Understanding the release of selenium and designing measures to prevent and treat it have been studied for years by experts, including study and research funded by Teck Coal, which has also created its own research and development group to study the issue and find solutions on both a regional and long-term basis.

[13] In 2012, when Environment and Climate Change Canada conducted multi-week Westslope Cutthroat trout sampling and testing, they discovered that a certain number of fish had selenium concentrations in the range associated with adverse effects in both the main Clode Settling Pond and between the main Clode Settling Pond and the Upper Fording River. They also observed calcite deposits in the Fording River and in tributaries supporting the habitat of the Upper Fording River Westslope Cutthroat trout population.

[14] Teck Coal was aware selenium and calcite could be environmentally harmful prior to 2009. Teck Coal acknowledges that it committed the two offences charged by permitting the deposit of a deleterious substance, specifically coal mine waste

rock leachate, into the Fording River and the main Clode Settling Pond, which was water frequented by fish, continuously throughout the period January 1 to December 31, 2012. Teck Coal admits that in 2012, it did not exercise all due diligence to prevent, or have in place a comprehensive plan to address, the deposit of that deleterious substance into those waters.

[15] Since 2012, Teck Coal has taken significant steps and made substantial improvements to address the release of selenium, calcite and other constituents from the waste rock in order to reduce their presence in the Elk Valley watershed. Some of these include the following:

- 1) The creation of an independent expert panel to provide advice and assistance for producing a strategic plan for the sustainable management of selenium at the Elk Valley coal mines. This plan included the Valley-Wide Selenium Management Action Plan, which at the time of its creation, contemplated that managing future selenium release would require approximately 3.9 billion dollars in capital spending over 75 years.

- 2) As a result of an environment ministerial order, Teck Coal created the Elk Valley Water Quality Plan that was approved by the minister in 2014. This 20-year plan resulted from a consultation process that involved regulators including Environment and Climate Change Canada, the Ktunaxa Nation, scientists, local governments, U.S. government representatives, environmental groups, other coal companies, community members and other stakeholders. Under this

plan, Teck Coal agreed to design, construct and operate a series of active water treatment facilities and it has committed to conducting ongoing monitoring programs covering water quality, groundwater and local and regional aquatic effects, together with environmental studies.

3) Since 2012, Teck Coal has increased its efforts and corresponding spending to address water quality in the Elk Valley. From 2011 to the end of 2020, it has spent almost one billion dollars on water quality-related measures and its water quality plan contemplates spending over 2.2 billion dollars in the next 10 years.

4) Teck Coal has commissioned and contributed to important selenium research including significantly advancing the development of “saturated rock fill technology” for treating water.

5) In 2012, Teck Coal commissioned a multi-year study of the Upper Fording River Westslope Cutthroat trout population.

6) At the end of last year, Teck Coal agreed to implement 11 measures resulting from a directive issued by Darin Conroy, an officer with Environment and Climate Change Canada and an inspector appointed under the *Fisheries Act*, to improve water quality and prevent calcite deposition in the Elk Valley in waters affected by the Fording River and Greenhills mines. As a result of that direction and various permits issued under the Elk Valley Water Quality Plan, Teck Coal plans to, and is required to, implement significant additional water treatment capacity over the next three years including the commissioning of two

further facilities, which will bring total water treatment capacity to 47.5 million litres per day from the present capacity of 7.5 million litres per day. Teck Coal is also planning to construct another saturated rockfill facility, which by the end of 2022, will increase total water treatment capacity to 77.5 million litres per day. This tenfold increase in treatment capacity over the next three years will materially reduce selenium and nitrate going into the Elk Valley watershed.

Community Impact

[16] The Elk and Fording River valleys are the traditional territory of the Ktunaxa Nation. They have provided a community impact statement read out today by Vickie Thomas, the operational director of the Ktunaxa Nation Council Lands Sector. The statement identifies the "Ktunaxa philosophy of stewardship of the land and the water, is the recognition that we are part of the land, and that our connectedness to it requires that we have respect for all living things as anything that affects one, affects everything else. Ktunaxa believe that they must care for all living things, and in doing so we must ensure that the water is clean and pure as it is the giver of life. We also believe that we must ensure that the land is properly stewarded, which translates to 'our people care for the land, the land cares for our people'."

[17] As for the impacts of selenium and calcite, the statement identifies the compromising of water quality, concerns about the quality and safety of the fish and for Ktunaxa consuming them, and contamination of fish, impairing their historical fishing rights.

[18] The statement attaches a beautiful, informative, coloured illustration of

Ktunaxa “lifeways” drawn by Darcy Luke and Marisa Phillips, two talented Ktunaxa artists. It symbolizes “ ‘Ktunaxa being Ktunaxa on the land’, and the tangible and intangible connection between the land, the water and all living things. This interconnectedness means nothing in isolation; for example, if the water is impacted- so in turn is everything else.”

Position of the Parties

[19] When Teck Coal committed these offences in 2012, the maximum financial penalty that could be imposed was 1 million dollars but the *Fisheries Act* provides that each day an offence is committed constitutes a separate offence.

[20] Counsel have jointly recommended the imposition of a total monetary payment of 60 million dollars. That equates to approximately \$80,000 per day for every day of 2012.

Decision

[21] In support of this recommended sentence, counsel have pointed out specific facts and made a number of submissions, including the following:

[22] First, Teck Coal has committed serious violations of the *Fisheries Act* in that they involve multiple deposit dates over an entire year. However, at the same time, Teck Coal regularly reported the rates and constituents of the deposits to the authorities prior to and during the offence period, so the deposits were not deceptively or surreptitiously committed. Also, the joint submission recognizes the negotiated agreement between Teck Coal and the Public Prosecution Service of Canada that the charges would be limited to the year 2012 rather than the 2009 to

2019 timeframe that had initially been approved by the Crown.

[23] Second, there has been very serious damage and harm from the selenium and calcite arising from the waste rock piles. That is apparent from the selenium found in the tissues of some of the Westslope Cutthroat trout in the range associated with “adverse effects” and the observations of the precipitation of calcite binding rocks and gravel together, which can adversely affect fish utilization and the quality of fish habitat. In addition, harm was caused in the Upper Fording River, which has unique conservation concerns arising from the genetically pure Westslope Cutthroat trout in that location, and those fish are a species of concern both provincially and federally. There is also the harm identified by the Ktunaxa Nation in their traditional territory. All this harm and damage is an admitted aggravating factor.

[24] Third, by its early guilty pleas, Teck Coal has accepted responsibility for its conduct, and in doing so, it has saved years of court time that would have been required for what would have been a very detailed, technical and complex prosecution. I agree with counsel that this is a significant mitigating fact.

[25] Fourth, Teck Coal has made significant efforts and spent some substantial sums to address the adverse effects caused by the waste rock from its mines. Those efforts and sums predate the offences and have continued and increased considerably after them in order to comply with permit and direction requirements. In particular, Teck Coal has made lasting commitments to address and improve water quality in the Elk Valley watershed and those commitments will continue in the future.

[26] Fifth, at the time of these offences, Teck Coal did not have any prior

conviction record, and it was cooperative throughout the investigation of these offences including providing substantial documentary, witness, and expert evidence beyond what was obtained by the investigators. Since 2012, Teck Coal has incurred two new infractions under the *Environmental Management Act* for which it also took responsibility. These subsequent offences are not aggravating facts, but they have some limited relevance to assessing deterrence.

[27] Sixth, the extensive materials provided by Teck Coal and its indirect parent company, Teck Resources Limited, establish it is of good corporate character. That has been recognized in prior decisions of this court (*R. v. Teck Coal Limited*, Cranbrook Registry 32307-1, October 5, 2017, and *R. v. Teck Coal Limited and Maxam Explosives Inc.*, Cranbrook Registry 31839-1, May 8, 2017) and there is good reason for that. It is apparent by the many acts and financial contributions it has made to benefit communities and causes locally, nationally and internationally. It is consistently recognized as one of the most sustainable and socially responsible corporations in Canada and the world. The presence today of senior officials from Teck Coal indicates not just putting a face to the company, but also to reflect the seriousness Teck Coal attaches to this matter and its remorse for its actions. The company has offered a formal apology for these offences and there is genuine remorse. Teck Coal's core values include being environmentally responsible and its extensive efforts and sums support that. Teck Coal has also supported initiatives with indigenous peoples including most recently signing a joint management agreement with the Ktunaxa Nation for the conservation of more than 700 hectares of land purchased by Teck Resources in 2013. Under the agreement, the Ktunaxa

Nation and Teck Resources agree to jointly manage the land for conservation purposes, protecting significant fish and wildlife habitat.

[28] Seventh, the fine and payment orders are substantial to meet the important sentencing considerations of deterrence and denunciation in environmental cases but Teck Coal does have the ability to pay the amounts submitted.

[29] The law requires me to accept the joint submission on sentencing unless it would bring the administration of justice into disrepute and is contrary to the public interest. “Rejection denotes a submission so unhinged from the circumstances of the offence and of the offender that its acceptance would lead reasonable and informed persons, aware of all the relevant circumstances, including the importance of promoting certainty in resolution discussions, to believe that a proper functioning of the justice system had broken down. This is an undeniably high threshold” (*R. v. Anthony-Cook*, 2016 SCC 43 at para. 34).

[30] In my view, that threshold cannot possibly be met in this case. When I consider all the circumstances and the submissions of counsel, I find the joint submission is not contrary to the public interest, nor would it bring the administration of justice into disrepute. It recognizes the aggravating and mitigating facts, satisfies the principles of sentencing particularly in relation to environmental offences (*R. v. Terroco Industries Ltd.*, 2005 ABCA 141, and *R. v. Brown*, 2010 BCCA 225), and it is consistent with other cases provided by the parties in support of the position they have taken. The fines and payment order are significant to reflect the nature of the offending behaviour, the harm caused and the need to address the sentencing principles of deterrence and denunciation. I am satisfied the penalties to be

imposed will be a significant deterrent for Teck Coal. At the same time, the joint submission gives weight to the efforts and sums Teck Coal has taken and will continue to take to make the necessary changes to address the environmental concerns arising from the deposit of waste rock from their mines. The joint submission is the product of very experienced counsel engaging in many, many hours of resolution discussions to resolve what would have most likely been the largest environmental trial in Canadian history, quite possibly lasting years and consuming hundreds of days of valuable court time.

[31] I find the joint submission to be a fit and appropriate sentence in all the circumstances. Accordingly, I make the following orders:

[32] Teck Coal Limited is to pay a total monetary payment of 60 million dollars of which:

On Count 1, one million dollars (\$1,000,000) shall be paid as a fine pursuant to s. 40(2) of the *Fisheries Act*, R.S.C. 1985, C. F-14 (the “Count 1 Fine”)

On Count 1, 29 million dollars (\$29,000,000) shall be paid pursuant to s. 79.2(f) of the *Fisheries Act*, R.S.C. 1985, C. F-14 to the “Receiver General of Canada in trust to the Environmental Damages Fund” for the purpose of conservation and protection of fish and fish habitat (the “Count 1 EDF Payment”).

On Count 2, one million dollars (\$1,000,000) shall be paid as a fine pursuant to s. 40(2) of the *Fisheries Act*, R.S.C. 1985, C. F-14 (the

“Count 2 Fine”)

On Count 2, 29 million dollars (\$29,000,000) shall be paid pursuant to s. 79.2(f) of the *Fisheries Act*, R.S.C. 1985, C. F-14 to the “Receiver General of Canada in trust to the Environmental Damages Fund” for the purposes of conservation and protection of fish and fish habitat (the “Count 2 EDF Payment”).

[33] I also recommend that:

A portion of the Count 1 EDF Payment and/or the Count 2 EDF Payment be allocated to one or more First Nations in the Kootenay Region of British Columbia to be used for projects designed to enhance, restore or conserve fish or fish habitat;

A portion of the Count 1 EDF Payment and/or the Count 2 EDF Payment be allocated to one or more First Nations in Canada outside the Kootenay Region to be used for projects designed to enhance, restore or conserve fish or fish habitat.

A portion of the Count 1 EDF Payment and/or the Count 2 EDF Payment be allocated to one or more Canadian schools, colleges, education institutions or universities to be used for research, development, or studies related to the understanding of issues related to the enhancement, conservation, or restoration of fish or fish habitat;

The remaining portion of the Count 1 EDF Payment and the Count 2 EDF Payment be used for projects designed to enhance, restore or conserve fish

or fish habitat in British Columbia.

[34] I further order that Teck Coal Limited pay the Count 1 Fine, the Count 2 Fine, the Count 1 EDF Payment, and the Count 2 EDF Payment by March 26, 2022 and deliver them to the Clerk of the Court of the Provincial Court of British Columbia with the later of these two payments to be paid out in accordance with the terms of this Order.

[35] I will end these reasons with the following concluding message of encouragement and guidance from the Ktunaxa Nation community impact statement directed I feel specifically to Teck Coal:

Steps toward reconciling with Ktunaxa can be achieved through the concept of 'giving back to the land'. In the Elk Valley coal mining context, 'giving back' suggests a powerful drive towards monitoring of ongoing and future impacts, restoration of ecology and culture relationships, and rigorous stewardship.

[36] The efforts and sums Teck Coal has put forth to date and will be required to continue to do so in the future, including the recent agreement they reached with the Ktunaxa Nation for the large land conservation, provide hope and confidence that Teck Coal has heard this message loud and clear, and will continue to be an environmentally responsible corporate citizen in the future.

[37] Lastly, thank you counsel for your exceptional work not just today but in coming to a fair and reasonable resolution of a very difficult and challenging set of circumstances. The Court greatly appreciates all your efforts.

(REASONS FOR SENTENCE CONCLUDED)

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videoconference:**

**A. Nathanson
R. Peck, Q.C.
C. Deynaka
B. Gilbride**

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Cranbrook, B.C.
March 26, 2021

(VIDEOCONFERENCE COMMENCES)
(JUDGE DOHM IN REMOTE LOCATION)
(CNSL A. CLARKSON, A. SWITZER, A. NATHANSON,
B. GILBRIDE, R. PECK, AND C. DEYNAKA IN
REMOTE LOCATIONS)

THE CLERK: Your Honour, we're now on the record.

We're calling the matter of Teck Coal Limited.

THE COURT: Thank you.

CNSL A. CLARKSON: Yes, Your Honour, it's Alexander
Clarkson. My last name is spelled C-l-a-r-k-s-o-
n. It's first initial A. With me is Adrienne
Switzer, my co-counsel. Her last name is spelled
S-w-i-t-z-e-r. We're Crown Counsels for the
Federal Crown.

THE COURT: Thank you.

CNSL A. NATHANSON: Your Honour, we have a number of
counsel present for Teck Coal. My name is
Nathanson, N-a-t-h-a-n-s-o-n, initials A.I. With
me in Vancouver is Bridget Gilbride, G-i-l-b-r-i-
d-e. This is obviously not in order of
precedence, I apologize. Mr. Peck is here. He's
also co-counsel for Teck Coal. And finally in a
separate screen, Your Honour, we have Christine
Deynaka, D-e-y-n-a-k-a. Ms. Deynaka is also
counsel for Teck Coal. Thank you, Your Honour.

THE COURT: [Indiscernible] Mr. Clarkson, there's two
other individuals you should probably identify at
this point that I see on the screen.

CNSL A. CLARKSON: Yes, thank you. There's Darren
Conway [phonetic] there in the greens, an
investigator with Environment and Climate Change
Canada. Vickie Thomas is identified also on your
screen. She's with the Knutaxa Nation Council.

THE COURT: Thank you.

CNSL A. CLARKSON: Your Honour, before the court today
to enter guilty pleas and have a sentencing
hearing on Information 35390. These are charges
by indictment. In terms of a schedule for today,
I expect firstly guilty pleas to be entered on
both counts. Secondly, we have the agreed
statement of facts to present [indiscernible].
Thirdly, I expect there to be a community impact

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1 statement that's going to be read by Ms. Thomas.
2 And then fourthly, counsel have submissions. I
3 expect that the total of the hearing will take us
4 to the lunch break and that should be more than
5 enough time in terms of getting through the facts
6 and counsels' submissions, so with that said, I'll
7 turn it over to my friends to enter guilty pleas.

8 THE COURT: Thank you.

9 CNSL A. NATHANSON: Your Honour, it's been agreed with
10 Mr. Peck that I would deal with this, so on behalf
11 of Teck Coal we waive reading of the Information
12 35390 and enter pleas of guilty to Counts 1 and 2
13 in the Information.

14 THE COURT: It goes without saying, Mr. Nathanson, that
15 those are voluntary pleas and no one's forcing the
16 corporation to enter those guilty pleas?

17 CNSL A. NATHANSON: Correct, Your Honour.

18 THE COURT: Thank you. Pleas are recorded, Madam
19 Clerk, to Counts 1 and 2.

20 THE CLERK: Yes, Your Honour.

21 CNSL A. CLARKSON: Moving to sentence, Your Honour,
22 maybe I'll first thing I'll do is deal with the
23 exhibits. I expect [indiscernible] for the first
24 exhibit to be the agreed statement of facts.
25 [Indiscernible] that document and counsel agree by
26 consent that this can be marked as Exhibit 1.

27 THE COURT: Thank you. Exhibit number 1, Madam Clerk,
28 is the agreed statement of facts.

29

30 **EXHIBIT 1 (on Sentence): Agreed Statement of**
31 **Facts**

32

33 THE CLERK: Thank you, Your Honour.

34 CNSL A. CLARKSON: Exhibit 2, Your Honour, by consent
35 is a document that also Madam Clerk has. It's
36 entitled "Book of Documents of Teck Coal Limited."

37 THE COURT: Exhibit number 2, Madam Clerk.

38 THE CLERK: Thank you, Your Honour.

39

40 **EXHIBIT 2 (on Sentence): Book of Documents**
41 **of Teck Coal Limited**

42

43 CNSL A. CLARKSON: Then the third and final exhibit,
44 Your Honour, by consent is a community impact
45 statement. Madam Clerk may have two separate
46 documents there. They could be appended together.
47 So there should be a five-page letter from the

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1 Ktunaxa as well [indiscernible] cover sheet from
2 the *Criminal Code* form. [Indiscernible] appended
3 together and be marked as Exhibit 3, please.
4 THE COURT: Exhibit 3, Madam Clerk.
5 THE CLERK: Thank you, Your Honour.
6

7 **EXHIBIT 3 (on Sentence): FORM 34.3 Community**
8 **Impact Statement**
9

10 CNSL A. CLARKSON: So turning to Exhibit 1, the agreed
11 statement of facts, Your Honour, I expect the
12 joint submission to be presented to you to be a
13 very significant one, and the agreed statement of
14 facts certainly underline that position. The
15 joint position is driven largely by the unique
16 circumstances of this case, so I do intend to
17 spend some time with the facts. My practice is to
18 read the [indiscernible] especially
19 [indiscernible]. But do stop me if you've already
20 read it and you do not need me to go any further.

21 Also I would say there's a lot of
22 [indiscernible] information in the agreed
23 statement of facts, so if you have any questions
24 about what I'm reading, please interrupt.

25 THE COURT: Mr. Clarkson, I've read the -- all the
26 materials that have been provided by counsel
27 including the agreed statement of facts, so I will
28 leave it to you as to read in what you think you
29 feel you should read in.

30 CNSL A. CLARKSON: All right. Well, [indiscernible]
31 I'll read -- I'll focus more on the offences and
32 the deposits and some of the investigation leading
33 up to the deposit. I'll leave it to my friends
34 then to highlight some of the post-offence conduct
35 in their submissions.

36 So this may go without saying, but what I'm
37 reading -- what I'm going to read here today is
38 going to be selections from the agreed statement
39 of facts, certainly the document itself, Exhibit
40 1. The words in the document are the agreed facts
41 [indiscernible].

42 THE COURT: Thank you.

43 CNSL A. CLARKSON: So turning to Exhibit 1, I'm going
44 to start with the Fording River itself, the
45 environment, the westslope cutthroat trout
46 population in the local area that's relevant to
47 this case, which starts at paragraph 12. So it

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1 says here that the Fording River is located in
2 Elkford and flows to the Elk River. The Elk River
3 watershed which includes the main stem of the
4 river and many of its tributaries including the
5 Fording River [indiscernible] 4,450 square
6 kilometres. The Elk River runs through the
7 communities of Elkford, Sparwood and Fernie to its
8 outlet, the river, at Lake Kooacanusa, which spans
9 the Canada/US border. Lake Kooacanusa is a
10 reservoir [indiscernible] by the Libby Dam located
11 on the Kootenay River. It is also, as it is
12 called in the United States, in Montana, about
13 eight kilometres downstream of the border between
14 Canada and the United States.

15 The Fording River is approximately 70
16 kilometres in length. The [indiscernible] of the
17 Fording River located north of Josephine Falls is
18 referred to as the upper Fording River. And the
19 upper Fording River [indiscernible] kilometres in
20 length.

21 Water affected by the Fording mine and the
22 east slopes of the Greenhills mine flows into the
23 tributaries of the upper Fording River and from
24 there into the upper Fording River itself, but
25 water from the west slopes of the Greenhills mine
26 flows into the Elk River.

27 The Elk Valley watershed is appendix C to the
28 agreed statement of facts. Throughout 2012, the
29 Fording River was [indiscernible] by fish. I'll
30 highlight paragraph 17, 'cause this is part of my
31 written submission as well that westslope
32 cutthroat trout are the only fish species known to
33 inhabit the upper Fording River and its
34 tributaries. The westslope cutthroat trout is a
35 provincially blue list species, which is a species
36 of concern. It's also a federal species of
37 concern in the *Species at Risk Act* and one of the
38 first [indiscernible] to recolonize Western Canada
39 following [indiscernible]. It's the only native
40 trout throughout much of the Canadian range. Is
41 often the only native trout throughout much of the
42 Canadian range. In Canada, the remaining
43 westslope cutthroat trout distribution is in
44 southwestern Alberta and southeastern British
45 Columbia.

46 Another relevant portion I'll highlight is
47 that Josephine Falls is a natural barrier to

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1 [indiscernible] movement [indiscernible] protected
2 the westslope cutthroat trout population in the
3 upper Fording River from hybridization with non-
4 native rainbow trout resident in the Fording River
5 below the falls. So as a direct result, the
6 westslope cutthroat trout in the upper Fording
7 River is one of the [indiscernible] populations
8 that have been identified as genetically pure,
9 making it an important population for westslope
10 cutthroat trout conservation.

11 [Indiscernible] relevant to deleterious
12 deposits [indiscernible]. So the Clode Settling
13 Ponds are two settling ponds built in 1971 in
14 order to minimize selenium deposits in the Fording
15 River associated with Teck Coal's mine activities.
16 Those settling ponds were built in accordance with
17 permits issued to Teck Coal under the
18 *Environmental Management Act* and were not intended
19 to be fish habitat. However, the westslope
20 cutthroat trout moved between the Fording River
21 and the Clode Settling Ponds through a creek
22 connecting them, and are attached as -- image of
23 them are attached in appendix B.

24 Beginning in 2004, Teck Coal took measures to
25 exclude the fish from the Clode Settling Ponds to
26 prevent movement of fish between the Fording River
27 and the Clode Settling Ponds. However, those
28 measures were not wholly effective at times.
29 [Indiscernible] not well maintained and Westslope
30 cutthroat trout from the Fording River were able
31 to access the Clode settling Ponds. So in 2012
32 Environment and Climate Change Canada officers
33 identified that the exclusion barriers
34 [indiscernible]. As a result throughout 2012 the
35 Clode Settling Ponds were [indiscernible] by fish.
36 In 2014 Teck Coal repaired and improved the fish
37 barrier between the Fording River and the Clode
38 Settling Ponds.

39 Moving to the deposits, which [indiscernible]
40 underline the offences in this case, both Counts 1
41 and 2, [indiscernible] understand how selenium and
42 calcite are released, which are the main
43 constituents of interest in this case. We start
44 at paragraph 24 of Exhibit 1 here. As part of
45 their operations and in order to reach underground
46 seams of steelmaking coal, the Fording and
47 Greenhills mines would move large quantities of

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1 waste rock [indiscernible] then placed in piles
2 within and adjacent to the mining area -- to the
3 mining areas. These piles are referred to as
4 waste rock piles [indiscernible] spoils. As a
5 result of the removal, exposure of waste rock to
6 precipitation and oxygen, selenium and calcium and
7 other naturally occurring elements found in the
8 waste rock are released. [Indiscernible] deposit
9 into tributaries and into the Fording River. The
10 Fording River [indiscernible] and other water
11 bodies within the Elk Valley watershed. And the
12 scale of the spoils in the upper Fording River are
13 substantial. There are numerous spoils over a
14 hundred metres high within the service area over a
15 hundred hectares. The location of many of the
16 spoils was established prior to Teck Coal's
17 acquisition of the Fording and Greenhills
18 Operations. The length of time it takes for water
19 [indiscernible] in the spoils depending on a
20 number of factors, but can take years, especially
21 [indiscernible].

22 Central to this case is an understanding or
23 at least an outline of how selenium and calcite
24 can be deleterious. So that [indiscernible]
25 paragraph 28. Selenium is an essential nutrient,
26 meaning trace amounts are necessary for cellular
27 function many organisms. Selenium can be harmful
28 when, due to sufficiently high exposure, it builds
29 up in an organism's tissues beyond levels required
30 to maintain normal functions to a level that is
31 toxic. Selenium toxicity occurs when selenium is
32 taken up by organisms [indiscernible] which are
33 bacteria, algae and fungi, as well as plants,
34 which is phytoplankton [indiscernible]. These
35 organisms transform the selenium in water to an
36 organic form of selenium in their tissues. The
37 organic selenium in these organisms is then taken
38 up by wildlife or fish that eats them.

39 Selenium concentrations in fish tissue can
40 result in harmful, [indiscernible] effects to the
41 fish, which is to say harms that occur through
42 maternal transfer of selenium into fish eggs.
43 Examples of harmful teratogenic effects include
44 non-viable fry, that's to say fry that die shortly
45 after hatching; and deformities in hatched fry,
46 for example, cranial and facial deformities,
47 spinal deformities and [indiscernible].

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1 In addition to selenium coal mine waste rock
2 leachate contains dissolved calcium and carbonate
3 which can result in the precipitation of calcite
4 on stream and river bottoms. [Indiscernible]
5 selenium, this is a naturally-occurring process,
6 but it's accelerated by the presence of waste rock
7 piles. When it reaches a certain level of
8 precipitation, the calcite can change the
9 characteristics of stream beds by binding the
10 gravels and rocks together. This adversely
11 affects the fish utilization and the quality of
12 fish habitat.

13 Approximately 990 million bank cubic metres
14 of waste rock have been placed in the Fording and
15 Greenhills mines prior to the discovery a surface
16 coal mine appeared to be mobilizing soluble
17 selenium into the Fording River in 1995. By the
18 end of 2008 when Teck Coal increased its ownership
19 interest in the Fording and Greenhills mines there
20 was approximately 2.2 billion bank cubic metres of
21 [indiscernible] placed in the upper Fording River
22 watershed from these mines, and by the end of
23 [indiscernible] was 2.5 [indiscernible]. In 2012
24 approximately an additional hundred and twenty-
25 three million [indiscernible/rapid speech] waste
26 rock was placed in the upper Fording River
27 watershed [indiscernible] Fording and Greenhills
28 mine operations.

29 Regarding the issues with treating or
30 preventing selenium at paragraph 32, the release
31 of selenium and calcium carbonate has among other
32 things [indiscernible] aspect, affecting the Elk
33 Valley watershed downstream of waste rock piles.
34 As a result, Teck Coal's efforts have been
35 regionally focused. The release of selenium and
36 calcium carbonate from waste rock has also -- also
37 has [indiscernible] long-term aspect requiring
38 [indiscernible] long-term [indiscernible]
39 solutions.

40 Understanding that the mechanism of selenium
41 release in the Elk Valley and [indiscernible]
42 measures to prevent or treat selenium release have
43 been the subject of study for many years by
44 academics and industry experts including study and
45 research funded by Teck Coal. Teck Coal has also
46 created its own research development group to
47 study the issue and design solutions. The focus

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1 of this work has both a regional and long-term
2 aspect in order to address the issues caused by
3 selenium release and calcite deposition in the
4 future.

5 I'll also read the next few paragraphs along
6 with the Environment Canada -- Environment and
7 Climate Change Canada investigation which pertains
8 to the determination of deleteriousness. Then
9 I'll just take some extracts from some of the
10 post-offence measures and the Environment Canada
11 direction that was issued in October of 2020. But
12 turning back to paragraph 35 through 40 of Exhibit
13 1, which deal with the finding of deleteriousness
14 by investigators, in 2012, Environment and Climate
15 Change Canada officers conducted a multi-week
16 westslope cutthroat trout sampling the upper
17 Fording River watershed. Among other things, they
18 collected muscle and [indiscernible] samples from
19 westslope cutthroat trout [indiscernible]
20 downstream of waste rock piles [indiscernible].
21 They then measured the selenium concentration in
22 those samples and sampling showed a certain number
23 of individuals captured between main Clode
24 Settling Pond and the upper Fording River had
25 selenium concentrations in the range associated
26 with adverse effects, and a certain number of
27 individuals captured from main Clode Settling Pond
28 also had selenium concentrations in the range
29 associated with adverse effects.

30 In 2012, Environment and Climate Change
31 Canada officers also observed calcite deposits in
32 the Fording River adjacent to [indiscernible] and
33 Cataract Creek meets the Fording River. In
34 parentheses I'll just add here
35 [indiscernible/rapid speech] Fording River
36 watershed. Calcite deposits were also observed in
37 tributaries [indiscernible] the habitat of the
38 upper Fording River westslope cutthroat trout
39 population.

40 Prior to 2009, Teck Coal was aware selenium
41 and calcite could be environmentally harmful. In
42 2012, the period of time covered by the
43 indictment, Teck Coal did not exercise all due
44 diligence to prevent the deposit of coal mining
45 waste rock leaching into the Fording River and
46 main Clode Settling Pond. In 2012, Teck Coal did
47 not have in place a comprehensive plan to address

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1 the deposit of coal mining waste rock leachate.
2 The selenium concentrations in the upper Fording
3 River and main Clode Settling Pond were increasing
4 in the seven years leading to the end of 2012. In
5 2012, the concentrations in the Fording River
6 ranged between [indiscernible] per litre and 90
7 micrograms per year. Selenium concentrations
8 discharged from the main Clode Settling Pond in
9 2012 ranged from 28 micrograms per year and a
10 hundred and seventy-seven micrograms per year. In
11 2012, the concentration of selenium in the upper
12 Fording River upstream of the Fording and
13 Greenhills Operations was less than one microgram
14 per litre.

15 The coal mine waste rock leachate is the
16 deleterious substance within the meaning of s.
17 36(3) of the *Fisheries Act*. The release of coal
18 mine waste rock leachate is continuous and
19 resulted in deposit of deleterious substance to
20 the Fording River and to the main Clode Settling
21 Pond on each day and including January 1st, 2012
22 to December 31st, 2012 inclusive.

23 [Indiscernible] the deposit of a deleterious
24 substance coal mine waste rock leachate to the
25 Fording River and main Clode Settling Pond which
26 was water frequented by fish continuously
27 throughout the period January 1st, 2012 to
28 December 31st, 2012 Teck Coal committed the
29 offences charged in the indictment.

30 Now [indiscernible] bulk of the
31 [indiscernible] of Exhibit 1 [indiscernible] Your
32 Honour, deal with a large number of post-offence
33 measures that Teck Coal undertook and large
34 amounts of expenditures that they have spent and
35 continue to spend to address selenium and calcite
36 deposits. I expect my friends will highlight many
37 of these things. Does go on for about four pages,
38 so I'm not going to read from this. I will pick
39 some things that are most relevant to our
40 submissions later on.

41 I won't be making submissions about the size
42 of Teck Coal, which is at paragraph 58 of the
43 agreed statement of facts. Teck Coal is among
44 Canada's largest mining companies. Its revenues
45 depend on global market prices for steelmaking
46 coal which is subject to significant fluctuations.
47 In 2012, Teck Coal's revenues were 5.647 million

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1 dollars.

2 THE COURT: My paragraph says 4.647.

3 CNSL A. CLARKSON: Sorry, 4.647, thank you.

4 THE COURT: Okay.

5 CNSL A. CLARKSON: I will read also from paragraph 65
6 through to 73. It deals with a direction and also
7 some of the post-offence measures in these
8 matters. So in 2012 Teck Coal commissioned a
9 multi-year study of the upper Fording River
10 westslope cutthroat trout population. The study
11 entitled, "The westslope cutthroat trout
12 population assessment and [indiscernible]
13 project." It was completed by Westslope Fisheries
14 Limited in partnership with the Canadian
15 [indiscernible] under the guidance and direction
16 [indiscernible]. As reported in Teck's Elk Valley
17 water quality plan, in 2014 the upper Fording
18 River westslope cutthroat trout population was
19 estimated at approximately 3,000 adults. The 2017
20 population survey conducted as part of the ongoing
21 [indiscernible/cutting out] year study by
22 Westslope Fisheries Limited estimated the highest
23 juvenile and adult westslope cutthroat trout
24 population in all the years surveyed. In October
25 of 2019 survey conducted by Westslope Fisheries
26 Limited estimated a decline of approximately 90
27 percent. In the upper Fording River westslope
28 cutthroat trout population [indiscernible]
29 population estimated in the 2017 survey results,
30 the estimated population was stable or increasing
31 in each of the previous years surveyed, so 2013,
32 '14, '15 and '17.

33 Teck Coal has [indiscernible] a committee to
34 investigate the cause of the population decline.
35 That investigation is ongoing. [Indiscernible]
36 here to some of my submissions later on is
37 paragraph 69 of the agreed statement of facts
38 where it says [as read in]:
39

40 On October 29th, 2020, Environment and
41 Climate Change Canada officer Darren Conroy
42 who's an inspector appointed under the
43 *Fisheries Act* issued a direction in
44 accordance with s. [indiscernible] (7.1) of
45 the *Fisheries Act* to Teck Coal. This
46 direction was issued following discussions
47 between the inspector and Teck Coal.

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1 The direction sets out 11 measures to be taken to
2 improve water quality and prevent calcite
3 deposition in the Elk Valley in waters affected by
4 the Fording and Greenhills mines. Eleven measures
5 are attached to the -- Exhibit 1 here as appendix
6 G. Similarly, the [indiscernible] under the
7 *Environmental Management Act* and as set out in the
8 Elk Valley water quality plan direction requires
9 [indiscernible] of the water treatment facilities
10 to remove selenium before it reaches the upper
11 Fording River. It also sets out requirements with
12 respect to water management such as the
13 [indiscernible] mine planning, fish monitoring and
14 [indiscernible] prevention measures as well as
15 [indiscernible] by December 31st, 2030 of a
16 geosynthetic [indiscernible] trial in the
17 Greenhills creek drainage. [Indiscernible] cost
18 measures [indiscernible] above what Teck Coal was
19 already undertaking [indiscernible] permits issued
20 under the *Environmental Management Act*. It's
21 primarily estimated to be 350 or 400 million
22 dollars over a 10-year period. The measures
23 required by the direction are expected to reduce
24 selenium concentrations, reduce calcite
25 precipitation and improve water quality
26 [indiscernible] further protect westslope
27 cutthroat trout population in the upper Fording
28 River. [Indiscernible/rapid speech] continue to
29 advance understanding of -- advance the
30 understanding of long term and potentially
31 beneficial mitigation solutions.

32 On November 5th, 2020 Teck Coal wrote to the
33 inspector advising that it would be moving to
34 implement [indiscernible]. The direction further
35 sets out measures to address or mitigate the
36 problem of selenium release and calcite deposition
37 in the Fording River and Elk Valley watershed
38 going forward.

39 At paragraphs 74 and 75, Teck Coal plans to
40 implement in the [indiscernible] direction require
41 significant additional treatment capacity over the
42 next three years including the Elkview Phase 2
43 saturated rock fill, which is currently in the
44 commissioning phase. The Fording River south
45 active water treatment facility is scheduled to
46 commence commissioning in 2021, so this year.
47 Capital cost of this facility along with

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1 [indiscernible] is estimated to be approximately
2 470 million dollars. [Indiscernible] operating at
3 full capacity, these two facilities will bring the
4 total water treatment capacity up to 47.5 million
5 litres per day and the current -- from the current
6 capacity of 7.5 million litres per day, materially
7 reducing selenium and nitrate [indiscernible] in
8 the Elk Valley watershed including the Fording
9 River. Teck Coal's plan has called for the
10 construction of a further saturated rock fill
11 facility at Fording River north by December 2022.
12 Increasing [indiscernible] treatment capacity to
13 77.5 million litres per day, resulting in an
14 expected tenfold increase in the treating capacity
15 in the next three years.

16 Teck Coal provided significant cooperation in
17 the investigation of the offences including the
18 voluntary provision and [indiscernible]
19 documentary witness and expert evidence in
20 addition to what was already obtained by
21 investigators.

22 So that's what I'll read, Your Honour, from
23 the agreed statement of facts. Unless Your Honour
24 has any questions, I'm going to turn it over to
25 Vickie Thomas to present the community impact
26 statement.

27 THE COURT: Thank you. Go ahead, Ms. Thomas.

28 VICKIE THOMAS: Thank you, Your Honour.

29

30 [SPEAKING IN FOREIGN LANGUAGE FROM 9:58:50 TO
31 9:59:27 A.M.]

32

33 I will now -- good morning, I'm Vickie Thomas. I
34 am with the Knutaxa Nation Council. My role is
35 the Operational Director of the Knutaxa Lands
36 Resources Sector. I will now read our community
37 impact statement. [As read in]:

38

39 The community impact statement of the Knutaxa
40 Nation Council regarding *Fisheries Act*
41 charges and Teck Coal Limited, March 22nd,
42 2021. The Knutaxa Nation Council provides
43 this community impact statement to the court
44 pursuant to s. 722.2 of the *Criminal Code*.
45 It identifies in a general way the harms and
46 losses suffered by the Knutaxa Nation from
47 the deposition by Teck Coal Limited the

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1 selenium -- of selenium and calcite pollution
2 into fish-bearing waters within
3 [indiscernible/foreign language] Knutaxa. To
4 assist the court in appreciating the KNC
5 submission, it provides a brief overview of
6 the nature of the Knutaxa Nation's connection
7 to and rights within the affected area.
8
9 The Knutaxa Nation maintains and asserts
10 unextinguished Knutaxa title and rights to
11 all [indiscernible/Foreign language] Knutaxa
12 including the Elk and River valleys -- Elk
13 and Fording River Valleys since time
14 immemorial. The Knutaxa Nation includes the
15 four Knutaxa communities of
16 [indiscernible/foreign language],
17 [indiscernible/foreign language],
18 [indiscernible/foreign language] and
19 [indiscernible/foreign language] as well as
20 all Knutaxa citizens living outside those
21 communities. Within Knutaxa law and oral
22 tradition, [indiscernible/foreign language]
23 Knutaxa is divided into traditional land
24 districts. Traditional land districts play
25 an important and historic and contemporary
26 role in Knutaxa land governance and resource
27 management. The Fording and Elk Rivers are
28 located in the Knutaxa districts of
29 [indiscernible/foreign language] and
30 [indiscernible/foreign language]. The
31 Knutaxa community of [indiscernible/foreign
32 language] is located at [indiscernible] near
33 the confluence of the Elk and Kootenay Rivers
34 and the Koocanusa reservoir. There has been
35 more than a century of efforts by non-Knutaxa
36 individuals and companies to extract
37 [indiscernible/foreign language] from
38 [indiscernible/foreign language]. The area
39 of [indiscernible/foreign language], a
40 district with several other coal mines
41 already in operation, is more affected by
42 this history than any other part of
43 [indiscernible/foreign language]. In more
44 recent times, the area is well known by
45 Knutaxa not only for the richness of its fish
46 and game, but also for the associated
47 restrictions due to the presence of

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1 [indiscernible/foreign language] and
2 extensive coal mining.
3
4 Despite the impacts of land alienation and
5 industrial use of land in
6 [indiscernible/foreign language], Knutaxa
7 elders and [indiscernible] continue to
8 actively use and occupy the valleys and
9 surrounding mountains as a location to
10 practice Knutaxa aboriginal rights. Land use
11 occupancy [indiscernible] conducted by 2010
12 and 2013 indicate that while Knutaxa use of
13 [indiscernible/foreign language] is impaired
14 by industrial footprints and concerns
15 regarding contaminants, these areas continue
16 to be widely valued and used by Knutaxa.
17 Knutaxa citizens continue to hunt and
18 practice [indiscernible/rapid speech] rights
19 in the upper Fording area. The majority of
20 land users interviewed indicated that their
21 parents' generation used the Elk and Fording
22 valleys regularly, but they personally were
23 less familiar with the upper Fording valley
24 due to the intensity of industrial
25 development, the difficulty of accessing
26 areas through existing mines, concerns
27 regarding water [indiscernible] pollutants
28 from coal mines and a general sense of not
29 feeling welcome because of industrial
30 alienation associated with the mining
31 industry.
32
33 The Knutaxa holds and exercises management
34 authority over the lands and resources of
35 [indiscernible/foreign language] Knutaxa. Of
36 particular relevance to the issue of selenium
37 and calcite contamination of
38 [indiscernible/foreign language], Knutaxa
39 stewardship laws emphasize the
40 interconnectedness of [indiscernible/foreign
41 language] and the need to care for
42 [indiscernible/foreign language], to support
43 all forms of life and both tangible and
44 intangible cultural resources. This
45 relationship has been previously described by
46 the KNC as follows:
47

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1 The Knutaxa have occupied our territory since
2 time immemorial and we have deep spiritual,
3 cultural, social and socioeconomic
4 connections to [indiscernible/foreign
5 language] without our territory. Our
6 relation to [indiscernible] -- our
7 relationship to [indiscernible/foreign
8 language] is supported by our oral histories
9 and our teachings. The creation story
10 follows the waterways within our territory
11 highlighting the importance of the Columbia
12 and Kootenay Rivers, both being central to
13 our world view. We were created in
14 interdependence [indiscernible/foreign
15 language] and were given covenants by the
16 Creator to protect, honour and celebrate what
17 the Creator has given us. [Foreign language]
18 the Knutaxa word the law is given to us by
19 the Creator which speaks to why we were put
20 on [foreign language]. [Foreign language]
21 gives us the resources to survive, and in
22 return we must protect and overuse [foreign
23 language].

24
25 [Foreign language] is grounded in the fact
26 that we are -- that all things are connected
27 and must be kept in balance. It is the
28 foundation of our spirituality. The Knutaxa
29 philosophy of stewardship of [foreign
30 language] is the recognition that we are a
31 part of [foreign language] and our
32 connectedness to it requires that we have
33 respect for [foreign language] as anything
34 that affects one affects everything else.
35 Knutaxa believe that we are -- that we must
36 care for [foreign language] or all living
37 things. In doing so, we must ensure that
38 [foreign language] is clean and pure as it is
39 the giver of life. We also believe that we
40 must ensure that the land is properly
41 stewarded.

42
43 [Foreign language] which translates to, "our
44 people care for the land, the land cares for
45 our people." The intent of the attached
46 illustration that we marked Exhibit 3 is to
47 visually represent Knutaxa life ways within

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1 [foreign language]. This image is a product
2 of Knutaxa community participatory research
3 drawn by two Knutaxa artists, Darcy Luke
4 [phonetic] and Marissa Phillips [phonetic].
5 It is meant to symbolize the Knutaxa being --
6 it's meant to symbolize the Knutaxa being
7 Knutaxa on the land and a tangible/intangible
8 connection between [foreign language] and
9 [foreign language]. This interconnectedness
10 means nothing is in isolation. For example,
11 if [foreign language] is impacted, so in turn
12 is everything else.
13

14 [Foreign language] is fundamental to the
15 [foreign language] creation story and is
16 understood by Knutaxa [indiscernible] to be a
17 basis for [foreign language] within [foreign
18 language]. Rivers, streams, lakes and
19 riparian areas provide essential habitat for
20 [foreign language] and many [foreign
21 language] and [foreign language] the Knutaxa
22 harvesters rely on. Responsible stewardship
23 of [foreign language] is critical component
24 of Knutaxa responsibility to [foreign
25 language]. The Knutaxa trails, harvesting
26 areas and cultural use areas are often
27 orientated along streams, rivers and lakes
28 within [foreign language] and access to
29 [foreign language] is essential to the
30 ability of Knutaxa citizens to spend time on
31 the land, especially when travelling or
32 hunting for extended periods in remote areas.
33

34 The [indiscernible] fish habitat are critical
35 to the maintenance of Knutaxa rights,
36 interests and practices for ecological
37 cultural subsistence and commercial values,
38 particularly in light of the historical
39 [indiscernible] from the upper Columbia.
40 Fish and aquatic species are [indiscernible]
41 harvested by Knutaxa in [foreign language]
42 and surrounding region include [foreign
43 language]. The pollution of waterways in
44 [foreign language] affects the Knutaxa in
45 many ways. At one level, the ability to
46 drink confidently from the mountain stream is
47 an aspect of Knutaxa rights that all inter-

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1 generations should enjoy. Our confidence in
2 the [foreign language] is compromised
3 portions of the Fording and Elk Rivers due to
4 the presence of contaminants that have been
5 released by coal mining activities. Water
6 quality must be managed so that future
7 generations of the Knutaxa can re-establish
8 and maintain a living connection to [foreign
9 language]. It is integral to achieving our
10 vision of Knutaxa being Knutaxa on the land.

11
12 Knutaxa perceptions of contamination in fish
13 is already apparent [foreign language]
14 practice of rights on the Elk and Fording
15 Rivers including avoidance of these areas for
16 fishing. Knowing that fish habitat is
17 impacted by these polluted waters leads to
18 concern for the safety of all fish as well as
19 for Knutaxa consuming them. The result is in
20 alienation of our people from our lands,
21 waters and cultural practices. From a
22 Knutaxa perspective, considerably overall
23 disturbance of [foreign language] within
24 [foreign language] the threshold of adverse
25 effects on the exercise of Knutaxa rights has
26 likely already been surpassed in the region.
27 Important links between Knutaxa language,
28 health, culture and land use are maintained
29 through the confident practice of hunting,
30 fishing and gathering [indiscernible]
31 locations. While Knutaxa citizens currently
32 fish the Elk River as a continuation of
33 historic practice, we acknowledge that the
34 level -- the existing levels of mining in
35 [foreign language] have resulted in adverse
36 effects on wild foods, particularly fish.
37 These perceptions of contamination of fish
38 are limiting to Knutaxa practice of rights.

39
40 Ensuring that a [foreign language] are
41 healthy and thriving is extremely important
42 to Knutaxa as it allows us to not only
43 continue to practice our rights, but to also
44 ensure the transmission of knowledge to
45 future generations and to uphold our
46 stewardship responsibilities within our
47 homeland.

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1 In conclusion, [foreign language] includes
2 the concept of only taking what you need.
3 This concept, as well as other components of
4 [foreign language] is applicable to everyone
5 who seeks to live in [foreign language].
6 Steps towards reconciling with [foreign
7 language] can be achieved through the concept
8 of giving back to the land. In the Elk
9 Valley coal mining context, giving back
10 suggests a powerful drive towards monitoring
11 of ongoing and future [indiscernible]
12 restoration of ecological -- ecology and
13 cultural relationships and river stewardship
14 [foreign language].

15 THE COURT: Thank you, Ms. Thomas. I appreciate you
16 reading the statement and for the words contained
17 in it. Thank you.

18

19 **SUBMISSIONS ON SENTENCE FOR FEDERAL CROWN BY CNSL A.**
20 **CLARKSON:**

21

22 CNSL A. CLARKSON: It's the Crown speaking again.
23 Moving to the joint submission to present to Your
24 Honour, before I turn to my written submission,
25 I'll just present the joint submissions containing
26 the draft order that was sent to Your Honour.
27 Does Your Honour have that?

28 THE COURT: I do not.

29 CNSL A. CLARKSON: Oh, you do not, okay. Well, I think
30 in -- while I'm going over it, maybe I could ask
31 my friends to maybe try to send that again. I
32 think it was emailed this morning to
33 [indiscernible] the court registry. I'll go over
34 it now --

35 THE COURT: Oh, hang on. [Indiscernible] this morning
36 I didn't receive it. I will look at it now.

37 CNSL A. CLARKSON: Okay.

38 THE COURT: Okay, thank you.

39 CNSL A. CLARKSON: All right. So I'll just summarize
40 it here on the record. Obviously, it's the words
41 of the order that [indiscernible]. Just as a
42 brief outline, the joint position is a total
43 monetary penalty of 60 million dollars. That's
44 the [indiscernible] between the two counts as
45 follows: a one-million dollar traditional fine on
46 each count, so a total of two-million dollar
47 traditional fine on this Information by

Submissions on Sentence for Federal Crown by Cnsl A. Clarkson

1 indictment. In addition to 29 million dollars
2 paid by way of a monetary order
3 [indiscernible/rapid speech] something called the
4 Environmental Damages Fund on each count, so for a
5 total EDF monetary payment of 58 million dollars.
6 [Indiscernible] the 2 million dollar traditional
7 fine plus the 58 million dollar EDF payment comes
8 to a total penalty of 60 million dollars.

9 I'll talk a bit more about the EDF later in
10 my submissions, but the order also contains a
11 recommendation to the EDF about how that money
12 should be allocated. I'm not going to get in --
13 I'm not going to read from the order. It's the
14 words of the order that prevail, but just in
15 summary, the order recommends that a portion of
16 the 58 million be allocated to First -- one or
17 more First Nations in the Kootenay River -- or the
18 Kootenay area. A portion be allocated to one or
19 more First Nations outside of the Kootenay area,
20 so in Canada generally. A portion be allocated to
21 educational institutions in Canada and that the
22 remaining, whatever's remaining it is allocated
23 for fish and fish habitat, conservation and
24 protection in British Columbia. So all of the
25 money must be used for the purposes of fish and
26 fish habitat conservation projects essentially.
27 There's a recommendation in the order about how
28 EDF should use the money. Ultimately, the
29 discretion rests with EDF in terms of the
30 allocation of the exact amounts in the projects
31 that they fund. This is something that the EDF
32 does full time is assess projects to fund for the
33 purposes of environmental protection, but EDF
34 gives priority to recommendations, so that's why
35 we've included recommendations in the order.

36 Turning to the Crown's written submission, so
37 the Crown submits that this joint submission
38 satisfies the principles and purposes of
39 sentencing, in particular to the principles and
40 purposes of sentencing that are specific to
41 environmental offences. This is a joint
42 submission, so my submissions are quite brief, but
43 certainly if Your Honour has any questions about
44 the law or the factors to be applied I'm more than
45 happy to answer [indiscernible]. In brief, not
46 only the principles and purposes of sentencing
47 meant by a joint submission, but this joint

Submissions on Sentence for Federal Crown by Cnsl A. Clarkson

1 submission is the result of, as my friends go on
2 to say in their written material, experience
3 [indiscernible] very, very, very extensive
4 resolution discussions.

5 A significant part of the resolution
6 agreement is set out in paragraph 3 of the Crown's
7 submissions and I'll read it into the record,
8 because it is important. I'll just pull it up
9 here. So the charge is -- Information by
10 indictment contains two charges for two water
11 bodies between a period of January 1st, 2012 and
12 December 31st, 2012. Part of the resolution
13 agreement is at paragraphs 3 and 4 of the Crown's
14 written submission, and I'll read this. So the
15 Crown had approved charges that would've been in a
16 10-count indictment against Teck Coal, which is
17 contained in a document titled, "Approved
18 Charges," which is now marked in Exhibit 2. It's
19 in tab 1 [indiscernible]. I won't go there
20 because [indiscernible]. That indictment would've
21 charged offences contrary to ss. 36(3) and 40(2)
22 of the *Fisheries Act* alleging that between January
23 1st, 2009 and November 30th, 2019 Teck Coal
24 deposited or permitted the deposit of a
25 deleterious substance, to wit, Teck -- coal mining
26 waste rock leachate into the Fording River and
27 nine other water bodies in the upper Fording River
28 watershed affected by Teck Coal's Fording River
29 and Greenhills Operations mines. Under the
30 *Fisheries Act*, each day a contravention is
31 committed or continued is a separate offence. As
32 a result of the joint submission reached and after
33 resolution discussion between the Public
34 Prosecution Service of Canada and Teck Coal, Teck
35 Coal has agreed to plead guilty, and as we've
36 heard this morning has pleaded guilty, to offences
37 contained in the two-count indictment, so that's
38 indictment 35390-1.

39 Relating to deposits to the Fording River and
40 main Clode Settling Pond for the period of January
41 1st, 2012 to December 31st, 2012, the Crown has
42 agreed that it will not proceed on balance of the
43 charges contained in the document, which again is
44 the document behind tab 1 in Exhibit 2. With the
45 court's acceptance of the joint submission those
46 matters finally resolved. So that's part -- an
47 important part of the joint -- the resolution

Submissions on Sentence for Federal Crown by Cnsl A. Clarkson

1 agreement that was reached in this case.

2 I'll turn to the statutory sentencing range,
3 and I can just summarize this in one sentence,
4 which is that in 2012 the statutory sentencing
5 range was -- well, there was no minimum fine, and
6 a maximum fine was 1 million dollars per day for
7 offences by indictment, which is what we
8 proceeded -- how we proceeded in this case. So
9 each day is a separate offence and the maximum
10 fine per day is 1 million dollars.

11 There was an amendment to the *Act*, an
12 important amendment to the *Act* increasing the fine
13 amount, but those amendments don't apply in this
14 case, as we're dealing with 2012 offences and the
15 amendments were in two thousand
16 [indiscernible/voice dropped].

17 Turning to the five environmental sentencing
18 principles from *Terroco*, the Crown submits that
19 the balancing of these five factors supports the
20 joint submission in this case. Beginning with the
21 first factor, which is culpability, I submit, Your
22 Honour, that in a contested sentencing hearing it
23 is common for the court to try and place the
24 culpability in [indiscernible] spectrum from
25 what's sometimes called near miss negligence, old
26 *mens rea*. But I agree with my friends' written
27 submission in this case, it's an exercise that's
28 not necessary because this is a joint submission.
29 We submit that the sentence certainly meets the
30 public interest test from *Anthony-Cook*.

31 In addition, Teck Coal has quite fairly
32 acknowledged in the agreed statement of facts that
33 prior to 2009 Teck Coal was aware that selenium
34 and calcite could be environmentally harmful. And
35 at the same time the Crown acknowledges that Teck
36 Coal did not deposit the leachate in a
37 surreptitious or deceptive manner. Indeed, the
38 concentrations of various constituents in the
39 leachate were regularly reported to the
40 authorities. So that's all I'll say about
41 culpability.

42 Moving to the second *Terroco* principle is
43 prior records, or the second *Terroco* factor, prior
44 records [indiscernible] with the authorities.
45 This is a mitigating factor in this case. Teck
46 Coal had no prior conviction record at the time of
47 the offences, which is mitigating. Teck Coal does

Submissions on Sentence for Federal Crown by Cnsl A. Clarkson

1 have a conviction record of subsequent offences
2 which is set out in the agreed statement of facts.
3 Subsequent offences are not aggravating factors,
4 but may be relevant to assessing deterrence.

5 Thirdly, the third *Terroco* factor is Teck's
6 acceptance of responsibility and remorse. This is
7 a very significant factor in this case, and it's
8 certainly the factor that influenced the Crown in
9 agreeing to the lower sentence than it might
10 otherwise have agreed to. Teck Coal has entered
11 guilty pleas and accepted responsibility at the
12 earliest possible point in these court
13 proceedings, and this has obviated the need for a
14 very lengthy trial. Furthermore, as set out in
15 the agreed statement of facts, Teck Coal has spent
16 substantial sums on water quality measures and
17 will continue to spend substantial sums
18 [indiscernible] requirements in the Federal
19 *Fisheries Act*. Again, what it intends to spend
20 and what it has spent is set out in detail in the
21 agreed statement of facts. In one sentence
22 certainly the facts indicate a company that's
23 taking deposit of selenium and calcite quite
24 serious.

25 Turning to the [indiscernible] factor, which
26 is an important factor at least from the Crown's
27 point of view, this is an aggravating factor and
28 quite a serious one in the Crown's submission.
29 The unique harms in this case and the very long
30 offending period involving two different water
31 bodies require a high penalty, and certainly
32 require the penalty that we're seeking here in the
33 joint submission. The effects of selenium
34 toxicity are very serious. As you've heard, they
35 cause deformity and outright mortality in fish
36 fry. And similarly, calcite precipitation is
37 unique and causes serious harm, having the
38 potential to essentially concrete a part of the
39 riverbed, so binding gravels and rocks together.
40 Companies, it may go without saying, must take all
41 reasonable measures to prevent such deleterious
42 deposits before they occur.

43 To add to this, these offences were occurring
44 in an environment with serious conservation
45 concerns and Your Honour's heard in the agreed
46 statement of facts that westslope cutthroat trout
47 is a species generally in Canada that are a

Submissions on Sentence for Federal Crown by Cnsl A. Clarkson

1 species of concern, but the particular westslope
2 cutthroat trout population in these specific water
3 bodies are of particular conservation concern
4 given that they have a unique -- very unique
5 geography which has preserved their genetic
6 purity.

7 The fifth and final factor I submit also
8 supports the penalty sought here. The court noted
9 in *Terroco* that a key component of sentences
10 imposed for breaches of environmental protection
11 statutes should be specific in general deterrence.
12 As Your Honour [indiscernible] the *Fisheries Act*
13 is regulatory legislation is designed to protect
14 and preserve valuable resource and any
15 contravention of it must be taken seriously. The
16 predominant sentencing consideration must be
17 deterrence both specifically of the accused and
18 generally in other members of the public. In my
19 submission, my written submission I say that
20 general deterrence is particularly important in
21 the context of the larger resource extraction
22 industry here. Canada's waters may be affected by
23 the pollution of significant volume and
24 deleteriousness by such industries. A sentence
25 [indiscernible/cutting out] adequate to encourage
26 the implementation system -- to encourage
27 [indiscernible/rapid speech] system to prevent
28 deleterious deposits from occurring in the first
29 place. There is an important role for significant
30 and general deterrent sentences in this context.
31 [Indiscernible/rapid speech] factor it's also
32 important to consider the revenue of the company,
33 which I've read into the record earlier. The
34 revenues generally in the industry are also
35 relevant in assessing whether the fine imposed
36 would have a deterrent impact. With Teck Coal and
37 with some other mining companies the revenues
38 certainly are in the billions of dollars, but a
39 60-million-dollar penalty, taking all the factors
40 together, is still a significant deterrent in
41 terms of the penalty, and even in the context of
42 comprehensive [indiscernible].

43 The next part of my submission deals with
44 [indiscernible] and I've only included one case
45 really because every case is different and I'm
46 just not sure there's much to be gained by going
47 through the differences between each case. I've

Submissions on Sentence for Federal Crown by Cnsl A. Clarkson

1 included a case called Bloom Lake, which is a case
2 involving multiple deleterious deposits from a
3 mine. It's a case from Quebec from 2014. Bloom
4 Lake involves a total penalty of 7.5 million
5 dollars, which is the highest total penalty that
6 had been imposed under the *Fisheries Act*. I won't
7 go through it in detail. And again, like any
8 case, it has similar factors in some respects and
9 different factors in others, but suffice to say
10 that in the case before Your Honour the 60 million
11 dollar fine works out to a penalty of about
12 \$80,000 per offence day, so there's total of 730
13 offence days, and so if the 60 million dollars is
14 divided by that, you get \$80,000 per offence day.
15 And if you look into the details of Bloom Lake,
16 the penalty in that case broke down to in some
17 days a few thousand dollars per offence day, in
18 other days \$300,000 per offence day. That may be
19 an overly [indiscernible] way of looking at it,
20 but just looking at it from a bird's eye view,
21 certainly the total monetary payment in this case
22 is sufficient to meet the principles and purposes
23 of sentencing. It's the largest ever total
24 monetary payment imposed for offences under the
25 *Fisheries Act*, this 65 -- sorry, this 60-million-
26 dollar penalty would be. The significant impact
27 of both the penalty and the direction certainly
28 [indiscernible] higher earning entities
29 [indiscernible] certainly lower earning entities
30 that there are serious consequences to depositing
31 deleterious amounts of selenium and calcite.

32 The last thing I'll say, Your Honour, is just
33 turning to the Environmental Damages Fund in the
34 order that's put forward for Your Honour's
35 consideration. So as I said earlier, the joint
36 position includes a 58-million-dollar payment to
37 this fund and recommends that portions of it be
38 allocated to particular groups. All monies sent
39 to the Environmental Damages Fund to be used for
40 conservation purposes. This is a specific purpose
41 [indiscernible] administered by Environment and
42 Climate Change Canada. The ultimate discretion to
43 allocate the funds [indiscernible] the EDF, but
44 they give priority to recommendations so that's,
45 as I said before, this is why we've included
46 recommendations in the order.

47 The statutory authority for ordering payment

Submissions on Sentence for Federal Crown by Cnsl A. Clarkson

1 to the Environmental Damages Fund is found in s.
2 79.2(f) of the *Fisheries Act* and both the Crown
3 and Teck Coal agree that the prerequisites to s.
4 79.2(f) [indiscernible]. Both parties support
5 such an order.
6 The last thing I'll say, and this may go
7 without saying, is that there's no victim fine
8 surcharge in this matter, so the 60-million-dollar
9 total penalty would be the total amount. Those
10 are the Crown's submissions, subject to any
11 questions from the court.
12 THE COURT: Oh, thank you, Mr. Clarkson.
13 CNSL A. CLARKSON: Thank you.
14 THE COURT: Mr. Peck or Mr. Nathanson, did you want to
15 take a break before your submissions?
16 CNSL A. NATHANSON: Sorry, Your Honour, Mr. Peck is
17 going to begin, and yes, if it's convenient, I
18 think a break might be in order, Your Honour.
19 THE COURT: Thank you, 15, 20 minutes. Thank you.
20 UNIDENTIFIED SPEAKER: Thank you.

21
22 (PROCEEDINGS ADJOURNED FOR MORNING RECESS)
23 (PROCEEDINGS RECONVENED)
24

25 THE CLERK: Order in court. Your Honour, we're now
26 back on the record. We're returning to the matter
27 of Regina versus Teck Coal Limited.
28 THE COURT: Thank you. Go ahead, Mr. Peck.
29

SUBMISSIONS ON SENTENCE FOR ACCUSED BY MR. PECK:

30
31
32 CNSL R. PECK: [Indiscernible]
33 THE COURT: [Indiscernible] let me up my volume a bit.
34 Go ahead, try now, Mr. Peck.
35 CNSL R. PECK: Can you hear me now [indiscernible]?
36 THE COURT: Bit of an echo.
37 CNSL R. PECK: [Indiscernible].
38 THE COURT: Go ahead, try now.
39 CNSL R. PECK: Yes. And Andrew, can you hear me?
40 CNSL A. NATHANSON: [No response].
41 CNSL R. PECK: Well, I can proceed then.
42 THE COURT: Yes, go ahead.
43 CNSL R. PECK: Thank you. This is a very unique
44 situation that [indiscernible]. [Indiscernible]
45 bit of an overview [indiscernible] some of the
46 aggravating and [indiscernible] mitigating
47 factors. If you, Your Honour, require any

Submissions on Sentence for Accused by Mr. Peck

1 additional [indiscernible]. And so I need to put
2 this case into its proper context. The
3 investigation in this matter -- Your Honour, am I
4 not being heard?

5 THE COURT: There's a bit of an echo.

6 CNSL R. PECK: Let me see [indiscernible] I'll get our
7 tech person quickly.

8 THE COURT: Thank you. I see everybody else is muted,
9 so that helps.

10 CNSL R. PECK: I have our tech person here. So you say
11 there's a bit of an echo on my end?

12 THE COURT: It seems better now.

13 CNSL R. PECK: Is it better now?

14 THE COURT: It's much better now.

15 CNSL R. PECK: All right, good. Well, let's -- we
16 better going as long as it lasts. All right,
17 thank you. So I want to put this into context,
18 Your Honour. This -- what is happening in this
19 court today is the result of first of all an
20 investigation that [indiscernible] a decade, and
21 as my learned friend Mr. Clarkson said very, very
22 extensive discussions among I would say
23 responsible counsel trying to resolve a difficult
24 situation, and the result [indiscernible] from Mr.
25 Clarkson and the [indiscernible] guilty pleas to
26 the two counts.

27 As you heard from Mr. Clarkson, each of these
28 offences carries a very significant penalty and
29 [indiscernible] the consideration of the
30 [indiscernible] offence aspect of s. 78.1 of the
31 statute. You should know that had this
32 prosecution taken [indiscernible] in its original
33 form the information put before you
34 [indiscernible] had this matter gone to trial,
35 this would have become probably largest
36 environmental trial in Canadian history. It
37 would've likely lasted several years, and
38 literally hundreds [indiscernible].
39 [Indiscernible] the first point I want to make is
40 that the resolution reached by [indiscernible]
41 result in a massive saving of not only court
42 resources but public [indiscernible]. It also
43 [indiscernible] a powerful remorse on the part of
44 Teck Coal, and I don't say that lightly, and you
45 should know that present today are several of
46 Teck's senior representatives [indiscernible]
47 senior vice president of coal operations, Richard

Submissions on Sentence for Accused by Mr. Peck

1 [indiscernible], the Fording River mine
2 [indiscernible] manager who's in fact the CEO who
3 has very significant personal and statutory
4 responsibility, [indiscernible] who is the senior
5 vice president, commercial and legal affairs, and
6 [indiscernible] of Teck Resources, director
7 [indiscernible]. And these are very -- obviously
8 very senior responsible representatives of
9 [indiscernible].

10 THE COURT: [Indiscernible] Mr. Peck frozen.
11 CNSL R. PECK: [Indiscernible]. I have been
12 [indiscernible/cutting out] to convey to the court
13 on behalf of these individuals and the company a
14 simple but important [indiscernible].
15 [Indiscernible] Teck Coal [indiscernible]. It is
16 common ground between us and the Crown that there
17 is a strong public interest in the protection of
18 the environment and fishery [indiscernible]. I
19 will come back to talking about the character of
20 Teck as a corporate citizen. [Indiscernible]
21 quite remarkable, but I think that there can be no
22 hesitation [indiscernible] should be there no
23 hesitation [indiscernible/cutting out] conducting
24 its business in an environmentally responsible
25 [indiscernible] is part of [indiscernible] core
26 value. Actions in 2012 fell below the
27 [indiscernible] standard and fell below
28 [indiscernible] standard. [Indiscernible] and Mr.
29 Nathanson will touch on some aspects of this, it
30 has striven over the past years to do just that.

31 We have put before you [indiscernible] in our
32 written submissions and our book of documents a
33 number of points. I don't ask you to
34 [indiscernible] in the book of documents. I
35 discuss them because it will be brief what I have
36 to say about each of them, but at paragraph 9 in
37 our written submissions has a series of
38 subparagraphs that I want [indiscernible] at this
39 point. These are some of the major considerations
40 [indiscernible] in the joint submission
41 [indiscernible]. Firstly, we note that the
42 [indiscernible] failures during a one-year
43 timeframe [indiscernible]. As I mentioned before,
44 each day represents a separate count, in effect, a
45 separate matter within the count. And so as Mr.
46 Clarkson pointed out the -- it comes up to a two-
47 year period which will be roughly 730 daily

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1 offences. [Indiscernible] subparagraph B
2 [indiscernible] that the joint submission
3 addresses the seriousness of harm [indiscernible]
4 recognize the complexity and the joint submission
5 recognizes the complexity of the [indiscernible]
6 selenium release into the water. Mr. Nathanson
7 will touch on some of the matters in subparagraphs
8 9 d) and e). But we also say that the joint
9 submission recognizes the significant and
10 extraordinary effort, I don't say that lightly,
11 that Teck has engaged since 2012 to rectify the
12 problem and this will lead up to the recent
13 direction that was received by Teck
14 [indiscernible].

15 And other considerations [indiscernible] Mr.
16 Clarkson [indiscernible] all the discussions
17 [indiscernible] resolution [indiscernible] between
18 Crown and Teck Coal [indiscernible] various
19 aspects of both sides in terms of the strength of
20 the relevant -- relevant strength of the two cases
21 or the two sides approached their cases, and other
22 matters that I don't think need to be discussed at
23 length, but you should know, and I can say frankly
24 that there have been very frank, detailed,
25 comprehensive discussions. I would go so far as
26 to say virtually unprecedented in volume and
27 length [indiscernible] resolution, all of which
28 goes to [indiscernible] supporting the joint
29 submission.

30 I want to [indiscernible] before I
31 [indiscernible] hand it over [indiscernible] Mr.
32 Nathanson. [Indiscernible] as I said a little
33 earlier on the corporate character of the
34 [indiscernible] corporation. This is covered in
35 pages 5 through 8 of our written submissions and
36 it's also covered in a number of the
37 [indiscernible]. [Indiscernible] these documents
38 as I go through them, but there are a number of
39 very important aspects [indiscernible].
40 [Indiscernible] if you will, Your Honour, the
41 corporate structure. Teck Coal is an indirect
42 subsidiary of Teck Resources Limited and this is a
43 very large Canadian mining company. Teck has
44 operated in the Elk Valley community many, many
45 years, and it generates considerable economic
46 value [indiscernible]. In 2019, Teck Operations
47 [indiscernible] 4.2 billion of economic activity,

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1 which included some 670 million dollars in wages,
2 [indiscernible] greater area.

3 At paragraph 15 of our written submissions,
4 we touch on the fact that Teck is involved in the
5 [indiscernible] it collaborates with the
6 communities in which it operates. Quite apart
7 from paying wages and paying very substantial
8 taxes, it is involved with philanthropic
9 endeavours, and there's nothing small about these
10 efforts that it makes as a corporate citizen and
11 has made over many years. It regularly provides
12 more than two million dollars [indiscernible]
13 community investments in the Elk Valley through a
14 variety of organizations [indiscernible]. It has
15 a longstanding relationship with the local
16 [indiscernible]. It has a supportive
17 [indiscernible] philanthropic [indiscernible] tab
18 4 of the book of documents, [indiscernible] to the
19 COVID-19 pandemic fund, response fund, and it has
20 made the contribution, something in the range of
21 20 million dollars [indiscernible].

22 You'll also see that it has contributed
23 something in the form of [indiscernible] personal
24 protection masks for the health sector and
25 [indiscernible] Canadian Red Cross, UNICEF and
26 other [indiscernible]. And this conduct
27 [indiscernible] international reputation. That's
28 described in paragraph 16. It is consistently
29 recognized as one of the most sustainable and
30 socially responsible corporations in Canada and
31 the world. Quite remarkable. It is listed as one
32 of the world's top 100 sustainable
33 [indiscernible]. So it's not a company that is
34 simply devoted to the bottom line. It is a lot
35 more than that. It makes massive contributions in
36 a variety of ways. It provided 25 million in
37 funding for the construction of the Acute Care
38 Centre of the B.C. Children's Hospital in 2017 to
39 give you an example. It has partnered with UNICEF
40 to provide treatments for children worldwide who
41 are deficient in zinc, which is a necessary
42 nutrient to human health.

43 So what you have I think [indiscernible]
44 before you is a corporate citizen that is
45 [indiscernible] one of a select few
46 [indiscernible] top 100 recognized worldwide.
47 [Indiscernible] standards in this case in 2012 it

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1 has striven and is continuing to strive in a
2 variety of ways, and Mr. Nathanson will touch on
3 this, to remedy this matter and to make sure that
4 it doesn't happen again. [Indiscernible]. And I
5 think with that I can [indiscernible] Mr.
6 Nathanson, Your Honour. Thank you.

7 THE COURT: Thank you, Mr. Peck. Mr. Nathanson.

8
9 **SUBMISSIONS ON SENTENCE FOR ACCUSED BY MR. NATHANSON:**

10
11 CNSL A. NATHANSON: Thank you, Your Honour. Your
12 Honour, for my submissions you will need the
13 written submissions, which I believe you have.

14 THE COURT: Yes.

15 CNSL A. NATHANSON: [Indiscernible] I make very brief
16 references to Exhibits 1 and 2, and also very
17 brief references to [indiscernible] in the joint
18 book of authorities.

19 So I'm at page 8 of the written submissions,
20 paragraph 20. One further -- just a few further
21 points to continue Mr. Peck's theme of corporate
22 character, you'll see in paragraph 20 in the
23 second sentence that Teck Coal, and this goes to
24 the factor of remorse and cooperation with
25 authorities, "Teck Resources, the parent company,
26 voluntarily disclosed the investigation that led
27 to the offences in its public sustainability
28 report in 2019 and elsewhere in its filings
29 [indiscernible]," so before the charges were laid.

30 [Indiscernible] Your Honour, and I won't read
31 this, but we've highlighted certain initiatives
32 that Teck Coal takes to preserve and protect
33 water, fish and fish habitat. And if you look
34 down to paragraph 24 at the bottom of page 8,
35 you'll see a reference to the Elk Valley water
36 quality plan which I'll come back to. But just to
37 give you a sense of some of the things that Teck
38 Coal does [indiscernible] consider a study and
39 monitoring report on the impacts of its operations
40 to the environment. Under [indiscernible] company
41 undertakes regular and extensive monitoring of
42 water, aquatic health and water quality as well as
43 other environmental programs and studies.
44 Monitoring data and analysis is subject to review
45 and input by a committee that has been established
46 [indiscernible] permits called the environmental
47 monitoring committee which includes

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1 representatives of the provincial Ministry of the
2 Environment, the provincial mines ministry, the
3 Knutaxa Nation Council, Interior Health and an
4 independent scientist, all of which is audited by
5 a third party. The program study results, Your
6 Honour, which are massive, they're extensive, are
7 all made public, and this in [indiscernible]
8 community knowledge and understanding, and also
9 contributes not just to the [indiscernible]
10 solutions to these problems, but to the broader
11 scientific inquiry and accelerating
12 [indiscernible] scientific progress and innovation
13 [indiscernible].

14 These effort, Teck Coal's contributions to
15 important selenium and calcite research through
16 making its data available to researchers and
17 through research partnerships which the company
18 funds, universities and consultants in Canada and
19 the U.S. are all referred to in the agreed
20 statement of facts.

21 There's one final point [indiscernible] that
22 I wish to highlight, Your Honour, and that's
23 pointed out at paragraph 25. On January 7th of
24 this year, Teck Resources and the Knutaxa Nation
25 jointly announced signing the joint management
26 agreement for more than 7,000 hectares of land
27 that the company had purchased in 2013 for
28 conservation. This is one of the single largest
29 private sector investments in land conservation in
30 this province's history. And if I could just ask
31 you to turn to tab 9 of Exhibit 2, please, Your
32 Honour?

33 THE COURT: Go ahead.

34 CNSL A. NATHANSON: See here joint press release of
35 January 7 by the Knutaxa Nation and Teck Coal.
36 And you see the second paragraph:

37
38 Under the agreement, the Knutaxa Nation and
39 Teck agree to jointly manage the land for
40 conservation purposes protecting significant
41 fish and wildlife habitat. The Agreement will
42 also support the Ktunaxa Nation Stewardship
43 Principles, and Teck's goal to achieve a net
44 positive impact on biodiversity in the areas
45 where it operates.

46
47 And there's a quotation from Ms. Teneese, who's

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1 the chair of the Knutaxa Nation Council. She
2 says:

3
4 This agreement between the Ktunaxa Nation and
5 Teck solidifies our commitment to protect --
6 And I won't attempt to use the Knutaxa language
7 Ms. Thomas has so eloquently done, but continuing:

8
9 We look forward to working with stakeholders
10 in the region to ensure this unique area will
11 be managed according to principals of respect
12 for the land and all those who live within
13 it.

14
15 Which is similar to what Ms. Thomas explained to
16 us this morning. And then if you go to the
17 [indiscernible] paragraph [indiscernible] where
18 this land is and what it represents:

19
20 Teck's purchase of these lands was one of the
21 single biggest private sector investments in
22 land conservation in B.C. history.

23
24 There's a reference to the 7,150 hectares and you
25 see that that is in the Flathead Townsite,
26 Alexander Creek and Grave Prairie areas. These
27 lands [indiscernible] provide important habitat
28 for species including Grizzly bear, wolverine,
29 badger, elk, lynx, mountain goat, bighorn sheep,
30 westslope cutthroat trout [indiscernible] and bull
31 trout and they hold significant value for local
32 communities.

33 That's a recent and important example that
34 demonstrates the company's [indiscernible].

35 And back to my submissions at the bottom of
36 page 9 and over at page 10. Your Honour, we
37 briefly set out in paragraph 26 the principles
38 that govern the approach to joint submissions from
39 the Supreme Court in the *R. v. Anthony-Cook*. I
40 won't read that, but just to summarize what Your
41 Honour [indiscernible] familiar with these
42 principles [indiscernible] joint submissions from
43 a position of restraint, relevant questions
44 include the critical systemic benefits
45 [indiscernible] joint submissions that Mr. Tack --
46 Mr. Peck [indiscernible] has explained why those
47 are particularly significant in view of this very

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1 unusual case. And the test of course is whether
2 the proposed sentence would bring -- in other
3 words to depart from joint submission the court
4 must conclude that the proposed sentence would
5 bring the administration of justice into disrepute
6 or would otherwise [indiscernible] public
7 interest. The references there are paragraphs 55
8 and 67 of the Supreme Court's decision.

9 Your Honour, Mr. Clarkson has already
10 summarized the relevant statutory framework
11 [indiscernible] page 10 of our submissions. That
12 takes me onto page 11. As you've heard, you're
13 well familiar with the principles in the *Code*, I
14 won't deal with that. And Mr. Clarkson quite
15 correctly said there's a special approach to
16 sentencing for environmental offences and the
17 leading case, the Alberta Court of Appeal's
18 decision in *Terroco Industries* adopted by our
19 Court of Appeal in a case called [indiscernible].

20 The next paragraph is probably pretty
21 obvious, Your Honour, but I'll [indiscernible].
22 Courts recognize that a corporation's character or
23 reputation may be taken into account for
24 sentencing in the same way as the court considers
25 the circumstances of an individual offender. And
26 accordingly, and I'm down to the last three
27 sentences of the paragraph [as read in]:

28
29 The court may consider factors including the
30 nature of the corporation's business, the
31 contributions it makes to the community, the
32 fact that it generates employment and
33 produces work excellence, all of which, in my
34 submissions [indiscernible], the
35 corporations' charitable endeavours and
36 overall environmental commitment are relevant
37 considerations [indiscernible]. Generally,
38 evidence of good corporate character is a
39 mitigating factor and will reduce
40 [indiscernible] penalty.

41
42 [Indiscernible] in summary, Your Honour, taking
43 into account [indiscernible] considerations in our
44 submission, the joint submission is an appropriate
45 disposition. It is in the public interest.
46 [Indiscernible] terms are significant.
47 [Indiscernible] specific and general deterrence as

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1 well as the public interest in the protection of
2 the environment [indiscernible] *Fisheries Act*.
3 The joint submission reflects the presence of
4 mitigating factors, some of which I'll highlight,
5 corporation's overall good corporation character,
6 the remorse shown, remedial measures taken that
7 I'll refer you to and these points were all dealt
8 in our [indiscernible].

9 The mitigating factors that apply are
10 referred to, summarized at paragraph 33 of the
11 brief. The early guilty plea is a significant
12 mitigating factor and the Crown acknowledges that
13 [indiscernible] resources. You've heard of the
14 personal attendance of senior corporate officials
15 here and in prior cases, this over at the top of
16 page 13 of the submissions, this court has
17 recognized that such appearances are very
18 important, demonstrating that the corporations do
19 not appear as faceless entities but are
20 represented by individuals taking responsibility
21 for the corporate actions. [Indiscernible] Mr.
22 Peck has listed those persons who are present, Mr.
23 Whittington, the mine manager, Mr. Steves
24 [phonetic], who you can't see, are in the
25 courtroom in fact in Fernie and Mr. Rozee
26 [phonetic] and Mr. Sharmata [phonetic] are in my
27 office, but not on camera. They're watching this
28 on video.

29 Your Honour, the next factor is the
30 corporation's character. As I've said, good
31 corporate character is mitigating and prior
32 decisions of this court recognize this. And I
33 would ask you to turn just briefly to the book of
34 authorities, Your Honour, tab 18.

35 THE COURT: Go ahead.

36 CNSL A. NATHANSON: Your Honour, these -- this is a
37 judgment of His Honour Judge Doerksen in a case
38 called [indiscernible] Teck Coal and Maxim
39 Resources -- or Maxim [indiscernible], I'm sorry,
40 which [indiscernible] cases that Mr. Clarkson
41 referred you to. Or sorry, that are referred to
42 in the agreed statement of facts. And this --
43 what I'm going to read to you is [indiscernible]
44 submissions if you want the reference at page 6,
45 paragraph 14, but I thought I would briefly show
46 you the judgment. So this is a sentencing under
47 the *Environmental Management Act*, and if you turn

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1 to page 150 in the top right-hand corner, page 6,
2 paragraph 13 of the judgment.

3 THE COURT: Go ahead.

4 CNSL A. NATHANSON: Judge Doerksen is referring to the
5 character of the corporation here, and then
6 beginning in the fourth line finds Teck
7 [indiscernible] Teck Coal in that case [as read
8 in]:
9

10 -- is a very large corporation. I'm
11 satisfied that it is a corporation that has
12 people in it that care about the environment.
13 Corporations of course [indiscernible] and it
14 is [indiscernible] certain rights and
15 responsibilities to. However, there is no
16 singular corporate mind like a human mind.
17 However, we see [indiscernible] and the
18 actions, directors, managers and employees of
19 the corporation the character of that
20 corporation. And I am satisfied that these
21 corporate defendants are both of good
22 character and it was well set out by counsel
23 in the materials that have been filed.
24

25 And then if you turn to the next tab
26 [indiscernible] Your Honour in which case it's
27 page 157 in the top right of the book.

28 THE COURT: Okay, go ahead.

29 CNSL A. NATHANSON: These are reasons for sentence also
30 by Judge Doerksen in 2017 on a *Fisheries Act*
31 matter, and I'm reading from paragraph 11, again
32 addressing the question of corporate character.
33 [As read in]:
34

35 I have no difficulty in finding that Teck
36 Coal Limited is of good corporate character.
37 Its employees live and work in this area and
38 I find it is a corporation that is concerned
39 about the environment and how its operations
40 can and do affect the environment and that it
41 extends --
42

43 Sorry.
44

45 -- expends a considerable amount of its
46 resources in trying to do the best -- its
47 best to minimize the impact of its operations

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1 on the environment. I note its other
2 activities through the parent corporation as
3 well.
4

5 And then he refers to the personal attendance
6 of senior corporate officers in paragraph 12. And
7 the other point I would simply make about this,
8 it's not controversial, Your Honour, that the
9 corporation's of good character generally -- is
10 that those comments from Judge Doerksen are from a
11 judge who lives in the area, in the Elk Valley
12 where the company operates and has its mines. So
13 he's well placed to understand [indiscernible]
14 knowledge generally and to make the
15 [indiscernible] findings [indiscernible].

16 I'm back in my written submission at page 13,
17 Your Honour. [Indiscernible] paragraph d),
18 cooperation with the authorities is a mitigating
19 factor, and I believe Mr. Clarkson referred you to
20 the agreed statement of facts where it's agreed
21 that the company provided significant cooperation
22 in the investigation [indiscernible].

23 If you turn over to page 14, there's a
24 heading, first large heading on the page, Your
25 Honour, the joint submission also reflects other
26 factors. Do you have that?

27 THE COURT: Yes.

28 CNSL A. NATHANSON: So at the same time and on the
29 other side of the scale from the mitigating
30 factors, there are of course the points that Mr.
31 Clarkson has emphasized, the company's size and
32 its ability to pay a fine, the actual harm to fish
33 and environment an aggravating factor, and the
34 sensitivity and importance of the westslope
35 cutthroat trout population in the upper Fording
36 River itself.

37 Your Honour, in the next section which I'm
38 just going to highlight, we also explain why in
39 our respectful submission joint submission
40 reflects considerations that are specific to
41 environmental offences. And so you'll see at the
42 bottom of that -- paragraph 36, I should show you
43 this, so as you've heard, the company acknowledges
44 that the deposit of the leachate in 2012 resulted
45 in actual harm to fish and fish habitat, and this
46 harm was serious, and you'll note that there is a
47 difference between the Clode Settling Pond and the

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1 upper Fording River and Mr. Clarkson told you
2 about how large [indiscernible]. Not in terms of
3 perhaps width or necessarily ultimate volume, but
4 it's a very long river. Clode Settling Pond is a
5 mine settling pond that was, as you've heard,
6 never intended to have fish in it. But turning
7 over to page 15, it's admitted that during the
8 relevant times fish moved between the two water
9 bodies. And so in our respectful submission the
10 penalty for the main Clode pond count, Count 2,
11 reflects some differences, so it's a different
12 body of water. It's smaller, but that is where
13 the much higher selenium concentrations were found
14 in the water and in the fish tissue. So there's
15 countervailing considerations. So at the same
16 time, Your Honour, the penalties, in my
17 submission, for Counts 1 and 2, which are of
18 course the same represents some sense of
19 [indiscernible] breakdown of the total penalty
20 addressing the overall conduct, rather than some
21 finely tuned calibration of the circumstances in
22 each [indiscernible].

23 And of course, overall, the penalty reflects
24 what you've heard from Mr. Peck and Mr. Clarkson
25 the Crown's agreement not to proceed with the
26 [indiscernible] charges [indiscernible] the whole
27 period of January 1st, 2009 to November 30, 2019.
28 And that is, in my submission, a very significant
29 consideration that went into the ultimate terms of
30 the joint submission on both sides.

31 Your Honour, I'm at paragraph [indiscernible]
32 submissions. You -- Mr. Clarkson took you to the
33 admission that the company did not in 2012 have a
34 comprehensive plan in place to address the deposit
35 of coal mine waste rock leachate in the bodies
36 charged, but the circumstances, I'm now reading
37 the second sentence, "can be contrasted that the
38 Elk Valley water quality plan," which you'll hear
39 about in a moment, and other post-offence
40 improvements [indiscernible] in the agreed
41 statement of facts as well as the present
42 circumstances. Teck Coal's long-term investments
43 in technology development and treatment are
44 expected as you've heard to result over the next
45 [indiscernible]. Seventy-seven point five million
46 litres of water every day, and that represents a
47 tenfold increase in treatment capacity and most of

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1 that is expected to be in place by the end of
2 [indiscernible].

3 I'm at paragraph 40, Your Honour. Since the
4 offences in our submission Teck Coal's made
5 significant strides in its efforts to address the
6 effects of coal mine waste rock leachate and
7 working -- and most important of which is the Elk
8 Valley water quality. The working in consultation
9 with regulators [indiscernible] included federal
10 regulators, Environment and Climate Change Canada,
11 and provincial regulators [indiscernible]
12 provincial Ministry of Environment and Climate
13 Change Strategy, the Knutaxa and other
14 [indiscernible] which I'll show you in a moment.
15 Teck Coal created the Elk Valley water quality
16 plan. It is, Your Honour, a detailed,
17 comprehensive 20-year plan intended to stabilize
18 and reduce selenium and other concentrations in
19 the Fording and Elk Rivers. This was a
20 comprehensive plan [indiscernible] at the time of
21 the offences.

22 So if I could ask you to turn to Exhibit 1,
23 which is the agreed statement of facts. And it's
24 appendix F. So I'm just going to -- just
25 highlight a few points from the plan, Your Honour,
26 relatively briefly, so page [indiscernible] cover
27 with the photograph to page 21 in the top right
28 [indiscernible] blue page
29 [indiscernible/overlapping speakers].

30 THE COURT: [Indiscernible/overlapping speakers].
31 CNSL A. NATHANSON: [Indiscernible] summarizes the plan
32 and the creation of the plan, so as the plan
33 explains at the outset [as read in]:

34
35 The Elk Valley water quality plan is
36 developed by Teck [indiscernible] the public,
37 First Nations, government's technical
38 experts --

39
40 -- of which there were many, Your Honour --

41
42 -- and other stakeholders. The purpose of
43 the plan is to identify strategy and
44 implement solutions to address increases in
45 selenium and nitrate water concentrations
46 within the valley --
47

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1 -- that is the Elk Valley.

2
3 And address and track [indiscernible] in
4 waters while at the same time allowing for
5 continued sustainable mining in the
6 [indiscernible] to support the livelihoods
7 and the people that Mr. Peck has referred to.
8 The plan also lays out a strategy to address
9 calcite formation associated [indiscernible]
10 historical and current mining activity. The
11 plan was submitted to the British Columbia
12 Ministry of the Environment for approval on
13 July 22, 2014 and it was approved in November
14 of 2014.

15
16 If Your Honour could turn to page 25 in the
17 top right?

18 THE COURT: Okay.

19 CNSL A. NATHANSON: I'm not going to read this. I'll
20 come back to it, but you'll see just the graphic,
21 the colour graphic at the bottom of the page,
22 that's a pictorial summary of very detailed
23 process that led to the creation of the plan and
24 the consultations, the technical advice that went
25 into the creation of the plan including
26 consultations with the Knutaxa Nation, government
27 and technical experts.

28 If you turn to page [indiscernible] nine in
29 the top right, please. Sorry, just before I --
30 forgive me Your Honour, turn to page 28 and this
31 will save me one page later. This is a summary of
32 the pages [indiscernible] how the plan is
33 organized, and this is basically a summary of the
34 different chapters of the plan and the topics that
35 they address and you'll see that there's a helpful
36 heading why [indiscernible] important. And I
37 won't take you through all this. The plan itself
38 runs to 600-odd pages and then there are
39 appendices that run to thousands of pages, but you
40 can see the kinds of topics that it addresses.
41 There's an introduction which explains the plan
42 and what it is and how it was created. There's an
43 explanation of the regulatory -- provincial and
44 federal regulatory context, consultations and
45 advice that went into the plan, the studies that
46 were done to inform [indiscernible] of the plan
47 and then how, for example, the management options

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1 to address these problems were arrived at
2 [indiscernible]. And then also you see a nine,
3 10, 11, important factors, so [indiscernible]
4 social and economic considerations
5 [indiscernible], the monitoring that's required to
6 see if the mitigation measures are working and how
7 to [indiscernible] and then very significantly and
8 what's called an adaptive management framework,
9 the idea being monitor how the plan is doing, and
10 then respond, and also to bring in the research
11 and development innovations where available so
12 that additional and better and more cost-effective
13 measures can be brought into the plan.

14 If you turn to page 29, again, just briefly,
15 you'll see this summarizes the consultation and
16 technical advice that went into the plan. Close
17 to 700 pieces of science-based advice from a
18 technical advisory committee [indiscernible] three
19 phases of consultation contributed to the plan,
20 and you can see there and I won't read it, the
21 technical advisory committee provided science-
22 based technical advice and it was composed of many
23 representatives of government on the federal and
24 provincial levels and represents just the U.S.
25 government, Montana State government and the
26 Knutaxa National Council as well as an independent
27 scientist.

28 And then you see summaries of some of the
29 consultations, including with members -- local
30 government and members of the community also had
31 their say. This was a very extensive
32 [indiscernible].

33 You could turn then -- I'm nearly done -- to
34 page 47 and 48. Page 47, this is from the
35 introductory paragraph, summarizes the purposes of
36 the plan, which I've already told you about, but
37 you see the reference in the bullets to the
38 environmental management objectives of the plan,
39 two of which are direct relevant this sentencing,
40 Your Honour. So first two environmental
41 management objectives for the protection of
42 aquatic ecosystem health, and then secondly, the
43 management of bioaccumulation of constituents in
44 the receiving environment, including
45 [indiscernible] the uptake of selenium in the
46 [indiscernible] and that's what causes the harm.
47 And those are squarely addressed. Those concerns

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1 are squarely addressed in the objectives of the
2 plan. And under 1.3, the plan management, you
3 just see there again another graph depicting how
4 different stakeholders were able to contribute and
5 offer their perspectives into the preparation of
6 the plan, all which went into Teck's plan
7 [indiscernible] was then submitted to the
8 provincial minister [indiscernible].

9 And then finally, and I think I -- I've
10 covered this, page 48, there are just again I
11 think it's the same kind of list of the many
12 representatives across a wide spectrum of
13 government, federal, provincial, U.S., and groups
14 including First Nations, including the Knutaxa and
15 other First Nations who were [indiscernible].

16 The point of all this, Your Honour,
17 [indiscernible] is that the
18 [indiscernible/background noise] problem of
19 selenium release and calcite deposition is a
20 complex long-term problem. And [indiscernible] it
21 is now since the offences been tackled
22 systematically through substantial efforts and
23 investments. Hundred million dollars spent on
24 research and development to date. An ongoing
25 complicated [indiscernible] with government and
26 First Nations and others seeking new and better
27 solution.

28 Your Honour, [indiscernible] paragraph
29 [indiscernible] page 16. So the following
30 [indiscernible] following the offences and
31 creation of the Elk Valley water quality plan,
32 Teck Coal increased its efforts capacity through a
33 large increasing number of people working on water
34 quality and spending [indiscernible] water quality
35 measures and this is from the agreed statement of
36 facts. The company spent almost a billion dollars
37 from 2011 to the end of 2020. [Indiscernible]
38 call for significant spending on water quality in
39 the billions by 2030. These are, in my
40 submission, massive, long-term investments in
41 addressing the problems of selenium release and
42 calcite deposition.

43 I won't go into this, Your Honour, but
44 paragraph 41 refers to -- which is in the agreed
45 statement of facts -- the collaboration and
46 funding [indiscernible] which has led to
47 innovations like the [indiscernible] seeking

Submissions on Sentence for Accused by Mr. Nathanson

1 viable water treatment and other [indiscernible]
2 solutions to address these problems. And the
3 company also did more mundane things like repair
4 the barriers to ensure that the fish didn't get
5 into the Clode Settling Pond with the higher
6 levels of selenium which is closer to the rock --
7 large waste rock piles [indiscernible] mines.

8 The point of all this is at paragraph 42,
9 Your Honour. These actions demonstrate that the
10 company accepts responsibility for the offences,
11 and despite the technological challenges and very
12 significant spending, is committed to addressing
13 the effects of these deposits.

14 I'm at paragraph 43. I agree with my friend,
15 Mr. Clarkson, that the joint submission is
16 [indiscernible] to specific and general
17 deterrence. The penalty and the amount agreed to
18 imposed under the [indiscernible] offence
19 provisions [indiscernible] Mr. Clarkson's
20 mentioned that now there are minimum penalties
21 [indiscernible] maximum penalties. This is as he
22 said the largest penalty ever imposed under the
23 Act and it's imposed under a prior version of the
24 Act [indiscernible]. That and the resulting
25 [indiscernible] will denounce the offending
26 conduct and serve as [indiscernible] general
27 deterrent. The penalty amount reflects, I think
28 as the Crown acknowledges, the very heavy costs
29 the company has incurred and will continue to
30 incur in implementing remedial steps to address
31 the ongoing issue of selenium release. And, Your
32 Honour, courts recognize that the degree of
33 remorse [indiscernible] specific deterrence which
34 is accordingly a less significant consideration
35 for vendors who, like Teck Coal, take
36 responsibility for their actions and cooperate
37 [indiscernible] authorities [indiscernible] to
38 reference there to the *Terroco* decision of the
39 Alberta Court of Appeal. In my submission, a
40 penalty of this magnitude and the message it sends
41 one doubted -- is undoubtedly meaningful and will
42 secure [indiscernible].

43 For these reasons, I'm taking into account
44 the relevant considerations on sentencing, the
45 circumstances of the offence and the offender. We
46 agree with the Crown, and in my respectful
47 submission, joint submission reflects an

Submissions on Sentence for Accused by Mr. Nathanson

1 appropriate disposition, one that is in the public
2 interest and is a reasonable [indiscernible].
3 Those are my submissions, Your Honour.
4 THE COURT: Thank you, Mr. Nathanson. Mr. Clarkson, do
5 you have any reply?
6 CNSL A. CLARKSON: No, Your Honour.
7 THE COURT: Thank you. If couns -- if everybody can
8 give me about 20, 25 minutes, so if we're back at
9 11:00 a.m. Vancouver time and noon Fernie time
10 I'll be in a position to give a decision.
11 THE CLERK: Yes, Your Honour.
12 THE COURT: Thank you.
13 CNSL A. NATHANSON: Thank you, Your Honour.
14
15 (PROCEEDINGS ADJOURNED)
16 (PROCEEDINGS RECONVENED)
17
18 THE CLERK: Order in court. Your Honour, we're now
19 back on the record. We're returning to the matter
20 of Regina versus Teck Coal Limited.
21 THE COURT: Thank you.
22
23 [REASONS FOR SENTENCE]
24
25 THE COURT: I want to thank counsel for your
26 exceptional work, not just today but in coming to
27 a fair and reasonable resolution of a very
28 difficult and challenging set of circumstances.
29 The court greatly appreciates all your efforts.
30 Anything further, Counsel?
31 CNSL A. CLARKSON: No, Your Honour. Thank you, and I
32 want to thank the court staff as well for all the
33 logistical work in arranging this matter, thank
34 you.
35 THE COURT: Thank you to everybody. Thank you, Madam
36 Clerk.
37 THE CLERK: Thank you, Your Honour.
38
39 (VIDEOCONFERENCE CONCLUDES)
40
41 (PROCEEDINGS CONCLUDED)
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45 Transcriber: L. Janzen
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I hereby certify the foregoing to be a true and accurate transcript of the evidence recorded on a sound recording apparatus, transcribed to the best of my skill and ability.



L. Janzen
Court Transcriber

MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE STRATEGY
ENVIRONMENTAL PROTECTION DIVISION

DETERMINATION OF ADMINISTRATIVE PENALTY

March 8, 2021

File: 2018-17
107517

BY EMAIL: Robin.Sheremeta@teck.com; Christine.Deynaka@teck.com

Teck Coal Limited
Suite 3300, 550 Burrard Street
Vancouver BC V6C 0B3

Attention: Robin Sheremeta and Christine Deynaka

Determination of Administrative Penalty

Further to the Notice Prior to Determination of Administrative Penalty issued to you on March 4, 2020 and, your opportunity to be heard respecting the alleged contraventions, I have now made a Determination in this matter.

After reviewing the information available to me, I have concluded Teck Coal Limited has contravened Section 7.2 of Permit 107517 in respect of which an administrative penalty is being imposed pursuant to section 115 of the *Environmental Management Act* (EMA) and the Administrative Penalties Regulation. The amount of the penalty, reasons for my decision, payment and appeal information are provided in the attached decision document.

If you have any questions with regards to this determination, please contact me at Dan.Bings@gov.bc.ca or (250) 302-3588.

Sincerely,



Daniel P. Bings
For Director, *Environmental Management Act*
Compliance Operations Manager

cc: Kelly Mills, Environmental Protection Officer
Kelly.Mills@gov.bc.ca

Brady Nelles, Director, Compliance and Environmental Enforcement
Brady.Nelles@gov.bc.ca

Erin Robertson, Team Lead, Mining Oversight, Ktunaxa Nation Council
erobertson@ktunaxa.org

AMPSInquiries@gov.bc.ca

PERMRECL@gov.bc.ca

THE CONTRAVENTION**Name of Party:**

Teck Coal Limited

Contravention or Failure:

Section 7.2, Permit 107517 (daphnia toxicity)

**AMOUNT OF ADMINISTRATIVE
PENALTY:****\$120,000.00****Date of Contravention or Failure:**

June 4, 2018

July 5, 2018

May 3, 2019

Director's Summary:

Teck Coal Limited (Teck) was provided a Notice Prior to Determination of Administrative Penalty on March 4, 2020. Teck provided their opportunity to be heard response (OTBH) June 1, 2020. The Ministry shared this OTBH response with the Ktunaxa Nation Council (KNC), who provided comment July 31, 2020. Teck provided a rebuttal to the KNC comments on December 2, 2020.

Reasons for Decision:

I have considered all the information submitted to me, including the written OTBH submission provided by Teck. My evaluation has included a consideration of the matters listed in Section 7(1) of the Administrative Penalties (Environmental Management Act) Regulation, as applicable. Based on this assessment, I offer the following comments:

I have reviewed Teck's OTBH response, the KNC's submissions in response to Teck's OTBH, and Teck's KNC comment rebuttal submission. I appreciate the time and effort that both Teck and the KNC have made in providing these detailed and thoughtful comments. The complexity and breadth of Teck's operations, the impacts thereof, mitigative and remedial efforts, the regulatory instruments and the history involved with this matter cannot be understated.

I would like to preface my reasons for decision by first acknowledging that the rationale in the penalty assessment form (PAF) shared at Notice failed to accurately reflect all issues of

consequence relating to this decision. Rather than update the PAF with redline edits, I have elected to articulate my rationale in this document.

It is most noteworthy that the PAF focused heavily on Teck's arguments respecting the methodology (temperature) of the daphnia toxicity analysis. While this is reflected by the Ministry record, it was by no means Teck's only method of addressing this issue as evidenced in their OTBH submissions. Teck's OTBH spoke at length to Teck's substantial efforts at research and development and the implementation of water treatment technology to address the impacts that this mining development has had in the Elk Valley and to cross-boundary receptors.

Teck's OTBH submissions are significant and speak to the complexity of the water quality management in the Elk Valley, the legacy issues and the substantive efforts underway to reduce ongoing impacts and to perform remedial work. The Valleywide Permit is effectively a regulatory exercise in active adaptive management, the scope and scale of which is unprecedented in British Columbia. Teck asserts that given their efforts, the assignment of a penalty is inappropriate, or that the penalty should be substantially reduced in acknowledgement of Teck's asserted efforts toward addressing the impacts of this mining development.

The KNC submission asserts that the impacts of these contraventions are substantial and acknowledges that Teck is taking steps to address these long standing and significant aquatic impacts. However, the KNC does not believe that Teck has met the test of due diligence and feels that the assignment of a penalty is appropriate in the circumstances.

My review of Teck and KNC's submissions subsequent to the Notice has substantially broadened my understanding of the subject contraventions and of the broader issues at play in this region. The complexity of the technical issues and the history is frankly daunting and the matter of arriving at a reasoned decision accounting for all information available to me has substantially preoccupied my thoughts as I have weighed these considerations. In arriving at my conclusions in this regard, I have elected to focus my considerations upon the specific factors that the Administrative Penalties Regulation directs me to consider. Specifically, Section 7(1) requires me to consider the following factors:

- (a) the nature of the contravention or failure;*
- (b) the real or potential adverse effect of the contravention or failure;*
- (c) any previous contraventions or failures by, administrative penalties imposed on, or orders issued to the following:*
 - (i) the person who is the subject of the determination;*
 - (ii) if the person is an individual, a corporation for which the individual is or was a director, officer or agent;*
 - (iii) if the person is a corporation, an individual who is or was a director, officer or agent of the corporation;*
- (d) whether the contravention or failure was repeated or continuous;*
- (e) whether the contravention or failure was deliberate;*

- (f) any economic benefit derived by the person from the contravention or failure;*
- (g) whether the person exercised due diligence to prevent the contravention or failure;*
- (h) the person's efforts to correct the contravention or failure;*
- (i) the person's efforts to prevent recurrence of the contravention or failure;*
- (j) any other factors that, in the opinion of the director, are relevant.*

In the following discussion I will address each of these factors individually and my conclusions of their application based upon the information before me.

Factor a): Nature of the contravention

The PAF shared at Notice proposed that the subject contraventions were major in nature. Teck submits that they are in fact minor and advances arguments pertaining to the high percentage of samples that passed toxicity requirements in comparison to these three failures. Teck points to the fact that the three subject failures were the only ones in 2019 and that there were no failures in 2020. The KNC rebuts this assertion by arguing against minimizing the severity of these exceedances due to their spatial scope and Teck's otherwise broader high pass rate.

The AMP Handbook provides high level guidance to Ministry staff considering the assignment of administrative penalties. This document informs and guides statutory decision makers but cannot fetter them. Under this guidance, I have the options of minor, moderate or major classification for this factor.

The Daphnia Magna single concentration toxicity tests are used to determine the effects of a single exposure to a substance in a short period of time. Three replicates tests involving a total of 30 daphnids are used, and the higher the percent mortality returned by the analysis, the more toxic the effluent sample. The three failures that occurred showed less than 50% survival in effluent on June 4, 2018, July 5, 2018, and May 3, 2019. On those dates, 90%, 87%, and 77% mortality was found in the test subjects, respectively.

The AMP Handbook cites as examples of major, *"failing to meet key thresholds or values, actions that result in significant pollution, contamination or spills..."*. In reviewing these specific circumstances, I find that the subject contraventions constitute a failure to meet a key threshold or value (toxicity) that has resulted in significant contamination. Accordingly, I find the nature of the contravention to be major.

Factor b): Real or potential adverse effects

The PAF shared at Notice proposed that the subject contraventions had a high effect classification as the toxicity failures are the result of a calcium carbonate precipitation issue that is widespread, threatening to plant and animal health, and cannot be restored easily or within a reasonable time. Teck suggests the effect is low and points to their prioritization of fish bearing streams and the fact that the Cataract Pond sample location is not fish habitat. The KNC comments on impact express concerns about the suggestion that the impact of calcite deposition

and concretion in a watercourse that ultimately reports to fish bearing waters would be classified as having a low impact.

Upon review of the information available to me, I find the effect is real, persistent, widespread, and has occurred for several years. Teck's efforts to address this issue and others in this area are substantial and will be addressed elsewhere in this decision. However, I find that the effect of the subject contraventions is high.

Consideration of factors a) and b) leads to the determination of the base penalty. The AMP Handbook suggests that I assign a penalty of \$30,000.00 or more. Given the circumstances of this decision and the considerable effort and expense Teck is dedicating to resolving the issues in the Elk Valley, I feel that employing the minimum \$30,000.00 base penalty is appropriate.

Factor c): Previous contraventions or failures, administrative penalties imposed or orders issued:

The PAF shared at Notice proposed that the subject compliance history associated with these contraventions was long, consistent and significant, and proposed the assignment of an aggravating factor of ten percent of the base penalty. Teck responded acknowledging the history of toxicity failures and contrasting the amount of failures in comparison to the area wide toxicity passes and a declining trend in failures. The KNC did not offer specific comment on this factor.

Section 7(1)(c) of the Administrative Penalties Regulation (APR) requires me to consider "*any previous contraventions or failures by, administrative penalties imposed on, or orders issued to...*" Teck in this instance. Administrative penalties and orders are statutory decisions. Those issued under a director's authority, pursuant to the *Environmental Management Act*, provide for recourse to appeal via the Environmental Appeal Board (EAB). However, the reference to "previous contraventions or failures" is a category I view as distinct from administrative penalties and orders. The APR defines this category as follows:

"contravention or failure" means

- (a) a contravention of a prescribed provision of the Act or the regulations,*
- (b) a failure to comply with an order under the Act, or*
- (c) a failure to comply with a requirement of a permit or approval issued or given under the Act;*

The Ministry evaluates compliance with these defined requirements by conducting inspections under the established authorities in the *Environmental Management Act*. The inspections are conducted in accordance with Ministry guidance, which include the Ministry's [Compliance Management Framework](#) and the [Compliance and Enforcement Policy and Procedure](#) (C&E Policy). These policy instruments direct an escalating approach to compliance activities and ensure consistency and transparency in the Ministry's compliance evaluations. When the Ministry identifies a contravention or failure to comply with a requirement, the possible outcomes include the escalating options of an advisory of non-compliance, a warning, an administrative penalty referral or a referral to legal investigation. These outcomes are guided by

the Non-Compliance Decision Matrix in the C&E Policy. The determination of the appropriate outcome is a factor of the regulated party's willingness or ability to comply and the actual or potential environmental, human health or safety impacts.

Advisories, warnings, referrals to administrative penalty and investigation referrals are all records of a contravention or failure. The evaluation of these contraventions or failures is fact based and the evidentiary standard is the balance of probability. While advisories and warnings do not include the recourse to appeal, the leadership of the Ministry's Compliance and Environmental Enforcement Section routinely entertains arguments from regulated parties respecting consistency of the outcome with established policy and procedure. When inconsistencies or errors are identified, they are corrected, and the subject inspection report is re-issued. Additionally, individuals who are aggrieved by the ultimate outcome of these reviews have recourse to the Office of the Ombudsperson.

There is a high degree of oversight and quality control of advisories and warnings issued by the Ministry in addition to the availability of options for administrative recourse for regulated parties. Furthermore, the evidence of these contraventions was collected and submitted by Teck. Teck has acknowledged that they have contravened this requirement in correspondence and in their OTBH submission. For the preceding reasons, I am confident on a balance of probabilities basis, that these compliance outcomes are accurate and represent the documentation of a contravention or failure as defined by the APR.

The Ministry record of contraventions with the subject toxicity requirement is illustrated in Table 1 of the PAF shared at Notice. I have included that table below:

Table 1 Summary of *Daphnia magna* toxicity failures

Date	<i>Daphnia magna</i> mortality	Location	Ministry Response
December 30, 2014	53% ¹	Smith Ponds	Warning – IR23085
January 12, 2015	63% ¹	Smith Ponds	
March 3, 2015	73% ¹	Wade Creek	
June 1, 2015	90% ¹	Cataract Creek Ponds	
July 27, 2015	70% ¹	Cataract Creek Ponds	
November 2, 2015	100%	Swift Creek Ponds	Advisory- IR24207
November 10, 2015	100%	Swift Creek Ponds	
December 7, 2015	77%	Cataract Creek Ponds	Advisory – IR25386
February 2, 2016	100%	Dry Creek	Warning – IR26048
February 3, 2016	100%	Cataract Creek Ponds	
February 4, 2016	63%	Smith Ponds	
February 10, 2016	66%	Cataract Creek Ponds	
February 11, 2016	77%	Smith Ponds	
May 10, 2016	100%	Cataract Creek Ponds	Warning – IR30073
May 27, 2016	100%	Cataract Creek Ponds	

August 2, 2016	100%	Cataract Creek Ponds	Warning – IR31410
August 15, 2016	90%	WLC AWTF	
Nov. 15, 2016	100%	Cataract Creek Ponds	Warning – IR52054
March 21, 2017	90%	Cataract Creek Ponds	Warning – IR47577
April 21, 2017	93%	Lake Mountain Ponds	Warning – IR58535
May 8, 2017	100%	Cataract Creek Ponds	
July 10, 2017	100%	WLC AWTF	Warning – IR69226
August 8, 2017	87%	WLC AWTF	
August 8, 2017	67%	Cataract Creek Ponds	
September 18, 2017	100%	WLC AWTF	
November 1, 2017	93%	Swift Creek Ponds	Warning – IR77480
November 1, 2017	100%	Cataract Creek Ponds	
January 9, 2018	63%	Cataract Creek Ponds	Warning - IR84879
June 4, 2018	90%	Cataract Creek Ponds	Referral for Administrative Penalty
July 5, 2018	87%	Cataract Creek Ponds	
May 3, 2019	77%	Cataract Creek Ponds	

¹(mortalities recorded based on lack of all movement and not confirmed through a dissecting microscope)

This history of contraventions of the subject toxicity requirement is extensive. It is acknowledged that the three failures that lead to the administrative penalty referral were the last three failures on record and that Teck is implementing treatment technology to address this matter. However, the table above leads me to a concerning conclusion that merits discussion.

The Ministry’s Compliance Management Framework mandates an escalating approach to repeat contraventions or failures. The history illustrated in the preceding table strongly suggests that the Ministry did not comply with established guidance on compliance escalation in this instance. This comment is not intended to reflect on the actions or decisions of any individual involved in this file. Furthermore, I am unaware of any record which would explain this issue. I do not know or understand why this matter was not the subject of an administrative penalty referral considerably earlier. This aberration from established Ministry policy is noteworthy and speaks to the appropriateness of assigning an aggravating penalty for this factor.

Beyond the history of contraventions or failures addressed above, while Teck has been assessed administrative penalties for discharges associated with other permits in the Elk Valley, this is the first penalty being considered for this permit. On the issue of previous orders issued, as referenced at paragraph 6 of the PAF shared at Notice, “*On April 15, 2013, the Minister of Environment issued Ministerial Order No. M113, which required the development of an Elk Valley Area Based Management Plan to address selenium, cadmium, nitrate, sulphate, and calcite formation issues resulting from mining operations in the Elk Valley.*”

I find that there exist both a history of previous contraventions or failures and of a Minister’s order issued related to this issue. Accordingly, I am assigning an aggravating penalty of ten percent of the base penalty for this factor.

Factor d): Whether contravention or failure was repeated or continuous

The PAF shared at Notice proposed no addition for this factor and proposed that the daily multiplier be applied instead to account for the repeated nature of the contravention. As noted above, the Ministry failed to escalate the compliance response for this issue in accordance with its Compliance Management Framework. In reviewing the KNC comments on Teck's OTBH, I find a reflection of this concern noted in the closing argument on page 5 of their submission as follows:

“Conversely, a failure by ENV to levy an administrative penalty after four years of non-compliance, ten warnings and two advisories would not only be inconsistent with the purposes of EMA, it would also undermine the integrity of the scheme by signalling to polluters that there is no consequence to consistent non-compliance.”

Given the specific circumstances and the history of these contraventions, I find that assigning the daily multiplier is appropriate. I also recognize Teck's substantial and ongoing efforts to address water quality impacts in the Elk Valley, but will address them in subsequent factor considerations.

Factor e): Whether contravention or failure was deliberate

The PAF shared at Notice concluded that Teck was aware of the contravention and that it was therefore deliberate. The Notice emphasized Teck's previous emphasis on the temperature of the analytical method. Teck responded by indicating that these exceedances were not deliberate but occurred despite their efforts to avoid them. The KNC did not provide comment specific to this factor but does express concern over Teck's lack of a current management plan to meet 2024 and 2029 Site Performance Objectives. KNC also opines that Teck has allowed calcite to continue to precipitate in favour of sequestering other mine related metals.

The issue of determining the applicability of this factor can be challenging, since *mens rea* is not required to be established for strict liability offences under the *Environmental Management Act*. Furthermore, the APR expressly defines the subject contraventions as absolute liability offences when administrative penalties are assigned.

It is clear that Teck was aware of the contraventions. In this instance, while Teck has unquestionably invested heavily in identifying and implementing a viable mitigative and remedial solutions for calcification, there is also evidence to indicate that they have placed a lower priority on this issue at this location. Based on that consideration, I find that the contraventions were deliberate and assign an aggravating penalty of ten percent of the base penalty for this factor.

Factor f): Economic benefit derived by the party from the contravention or failure

The PAF shared at Notice concluded that Teck had avoided costs as a result of the contraventions and proposed an aggravating penalty of ten percent of the base penalty. Teck refutes the avoided costs assertion and points to their substantial investment in treatment technology specifically directed at the issue of calcification. The KNC response does not

specifically address this factor, but collectively their response points to Teck's decision-making process that placed the priority for treatment implementation in other areas.

Teck's OTBH addresses the implementation of the Swift-Cataract Water Management Project and the Swift-Cataract Antiscalant Addition Project, with the former scheduled for implementation in 2021 and the latter in 2020. I also appreciate Teck's articulated rationale for prioritizing other watercourses over Cataract Creek. However, this prioritization approach and the Ministry's authorization processes that support it do not preclude the assignment of this factor.

Based upon the information available to me, it appears that avoided costs referenced in the Notice may have been a mischaracterization. Rather, what this situation represents is deferred costs, respecting implementation or treatment technology, and, as referenced in the KNC submission, avoided costs in the form of annual operational costs for the operation of a treatment facility.

The KNC provided a Teck reference indicating the annual operational cost for Greenhills Creek Calcite Management Project was \$100,000. Teck rebuts the \$300,000 installation cost estimate provided by the KNC, indicating that the temporary Swift-Cataract module cost \$1,000,000 with the Swift-Cataract antiscalant addition project costing approximately \$2,500,000. These represent substantial investments by Teck and I appreciate their significance.

Based upon the information available to me, I am assigning a conservative avoided costs penalty addition of \$33,000.00 to the base to address costs avoided from treatment plant operation. This is intended to reflect one year of avoided antiscalant treatment plant operational costs. I have concluded that Teck could have implemented calcite treatment earlier and, as a result, has avoided operational costs.

Factor g): Exercise of due diligence to prevent the contravention or failure

The PAF shared at Notice concluded that there was "*no evidence of the exercise of due diligence in this instance.*" Teck asserts that they have in fact exercised due diligence. The comments offered by the KNC refute Teck's assertion of due diligence.

A finding of due diligence can only be applied as a mitigating factor in an administrative penalty. A finding of the lack of due diligence cannot result in the assignment of an aggravating factor. In order to find for the exercise of due diligence in this specific instance, I would need to be confident that Teck had taken all measures reasonably necessary to avoid these contraventions.

While both Teck and the KNC have spoken to Teck's efforts to correct this issue, I do not find that Teck has met the evidentiary burden for establishing due diligence. While Teck has expended significant effort and expense towards remedying the issue, they did not take all measures reasonably necessary to avoid recurrence of calcite toxicity. Accordingly, I have not assigned a mitigating factor for due diligence.

Factor h): Efforts to correct the contravention or failure

Teck has clearly and demonstrably spent considerable effort and expense on correcting the issue of calcification and its associated toxicity. I encourage Teck to continue with these efforts and find that they warrant the assignment of the reduction of twenty percent reduction of the base penalty.

Factor i): Efforts to prevent reoccurrence of the contravention or failure

Teck has clearly and demonstrably spent considerable effort and expense to prevent reoccurrence of the subject contraventions. Accordingly, I find that these efforts warrant the assignment of a reduction of twenty percent of the base penalty.

Factor j): Other

No variations from the base penalty are proposed for this factor.

Closure

In arriving at the preceding conclusions, Teck's efforts to address the issues in the Elk Valley cannot be understated. They have been and continue to be substantial. At the commencement of my review, my impression was that the primary objective of this administrative penalty was largely one of general deterrence in acknowledgement of Teck's efforts. General deterrence is intended to dissuade other regulated parties from similar contraventions. During my review of the material required for this decision, it has become more apparent to me that there is also an objective of specific deterrence in this instance. Despite Teck's significant efforts to address these major provincial and cross-boundary surface water contamination and aquatic habitat impairment issues, they must maintain a resolute focus on resolving these issues as substantially and swiftly as possible. I appreciate Teck's arguments respecting the regional approach and their prioritization rational in determining treatment implementation and have considered them in this decision.

I was encouraged to read the progress being made in the Elk Valley in the submissions I reviewed during this process. I recognize that the PAF shared at Notice did not address these efforts and although the final quantum of this penalty may not appear to reflect the efforts by Teck to address the Elk Valley issues, I feel it is appropriate given the issues considered and the vast scope and scale of the Elk Valley environmental impacts.

The final penalty calculations are summarized in Table 2 below:

Table 2 – Penalty Calculation Summary

Factors to be considered in penalty calculation	Amount in PAF at Notice	Amount at Determination
Nature of contravention of failure	30,000.00	30,000.00
Actual or potential adverse effect	Included above	Included above
Previous contraventions or failures, AP's imposed or orders issued	+ \$3,000.00 (10% of base)	+ \$3,000.00 (10% of base)
Whether contravention or failure was repeated or continuous	0 (daily multiplier assigned)	0 (daily multiplier assigned)
Whether contravention or failure was deliberate	+ \$3,000.00 (10% of base)	+ \$3,000.00 (10% of base)
Economic benefit derived by the party from the contravention or failure	+ \$3,000.00 (10% of base)	+ \$33,000.00
Exercise of due diligence to prevent the contravention or failure	\$0	\$0
Efforts to correct the contravention or failure	\$0	-\$6,000.00 (20% of base)
Efforts to prevent reoccurrence of the contravention or failure	\$0	-\$6,000.00 (20% of base)
Subtotal	\$39,000.00	\$57,000.00
Subtotal after reduction to APR \$40,000.00 maximum penalty	NA	\$40,000.00
Application of daily multiplier	\$117,000.00	3 X \$40,000.00 = \$120,000.00
Final Penalty	\$117,000.00	\$120,000.00

DUE DATE AND PAYMENT:

Payment of this administrative penalty is due within thirty (30) calendar days after the date of service of this Determination of Administrative Penalty. You will be sent an invoice, to be paid via cheque or money order made **payable to the Minister of Finance**. Payment can be mailed to Business Services at:

Attn: Fees Analyst
 Ministry of Environment and Climate Change Strategy
 PO Box 9377 Stn Prov Govt
 Victoria BC V8W 9M6

Please do not mail cash. A \$30 service fee will be charged for dishonoured payments.

If payment has not been received in the thirty (30) calendar day period, interest will be charged on overdue payments at a rate of 3% + the prime lending rate of the principal banker to the Province per month and the amount payable is recoverable as a debt due to the government. In the event of non-payment you will be ineligible to apply for new or amended authorizations until

payment is received in full. Further, I am authorized by section 18 of the Act to cancel or suspend your current authorization in the event of non-payment and if I decide to do so, you will be notified accordingly.

RIGHT TO APPEAL:

If you disagree with this determination, Division 2 of Part 8 of the *Environmental Management Act* provides for appeal of my decision to the Environmental Appeal Board (EAB). In accordance with the Act and with the Environmental Appeal Board Procedures Regulation, the EAB must receive notice of the appeal no later than 30 calendar days after the date you receive this Determination of Administrative Penalty. The notice must include:

- a. Your name and address and the name of the person, if any, making the request on your behalf;
- b. The address for serving a document to you or the person acting on your behalf;
- c. The grounds for appeal;
- d. A statement of the nature of the order requested; and
- e. The notice of appeal shall be signed by you, or your counsel or agent if any, and be accompanied by a fee of \$25, payable to the Minister for Finance by cheque, money order or bank draft.

The Notice of Appeal form is available online at <http://www.eab.gov.bc.ca/forms.htm>. It should be completed and filed by registered mail or by leaving a copy at the Board office during normal business hours. The street address is 4th Floor, 747 Fort Street, Victoria, BC, and the office is open from 8:30 am – 4:30 pm Monday through Friday, excluding public holidays.

Notice may also be sent by email or fax, provided the original notice of appeal and the appeal fee follows by mail. The mailing address of the EAB is:

Environmental Appeal Board
PO Box 9425 Stn Prov Govt
Victoria BC V8W 9M6

For further information, please consult the Environmental Appeal Board website at <http://www.eab.gov.bc.ca>. If the administrative penalty is appealed to the Environmental Appeal Board and the penalty is upheld, payment is due within 30 calendar days after receiving a copy of the order or decision of the appeal board, or, if the EAB has sent the matter back to the decision maker, within 30 calendar days after a new Determination of Administrative Penalty is served.

Dated this 8th day of March, 2021.

MEASURES TO BE TAKEN

Under the authority given to me pursuant to subsection 38(7.1) of the *Fisheries Act*, I hereby direct the person named above to immediately take all reasonable measures consistent with public safety and with the conservation and protection of fish and fish habitat to prevent the above mentioned occurrence or to counteract, mitigate, or remedy, any adverse effects that result from the above mentioned occurrence or might reasonably be expected to result from it, including:

Water Diversion

1. By December 31, 2021, at Fording River Operations, re-construct and commission, and thereafter maintain and operate the Kilmarnock Creek clean water diversion, with a capacity to divert up to 86,000 m³/day of non-contact water from upstream Kilmarnock Creek (upstream waste rock spoils) around waste rock in the Kilmarnock valley.

Water Treatment

2. By June 30, 2021, at Fording River Operations, complete construction of an Active Water Treatment Facility for selenium removal, and thereafter commission and operate the facility, with influent made up of mine impacted water from Fording River and Greenhills Operations including Kilmarnock Creek, Cataract Creek, and Swift Creek, with a design treatment capacity of at least 20,000 m³ of influent per day.
3. By December 31, 2022, at Fording River Operations, complete construction of selenium treatment processes for selenium removal, and thereafter commission and operate those processes, made up of mine impacted water from sources at Fording River Operations including the Clode Creek drainage, Swift Pit, and the North Spoil area with a design treatment capacity of at least 30,000 m³ of influent per day.
4. By December 31, 2026, at Greenhills Operations, complete construction of selenium treatment processes for selenium removal, and thereafter commission and operate those processes, made up of mine impacted water from the Greenhills Creek drainage, with a design treatment capacity of at least 7,500 m³ of influent per day.
5. By December 31, 2026, at Fording River Operations, develop the Swift North Spoil in such a way as to promote the development of suboxic zones to attenuate selenium.

Mine Planning and Water Management

6. By December 31, 2021, develop a plan to reduce selenium releases from Porter Creek and Eagle Creek into the upper Fording River, and submit the plan to Environment and Climate Change Canada.
7. By December 31, 2021, complete a desk top study of a slow flushing mitigation solution to reduce the impacts of selenium releases on lentic habitats in the upper Fording River oxbows, and submit the study to Environment and Climate Change Canada.

Geosynthetic Cover

8. By December 31, 2030, at the Greenhills Operations mine, conduct a trial by installing a geosynthetic cover over the East Spoil in the Greenhills Creek drainage, covering approximately 200 hectares. By December 31, 2025, an Interim Report on progress made with the installation of the geosynthetic cover at this location shall be submitted to Environment and Climate Change Canada.

Fish Monitoring

9. In 2021, and every third year thereafter, determine the selenium concentration (on a dry weight basis) of muscle samples of 3 adult, egg-bearing, female Westslope Cutthroat Trout from the upper Fording River oxbow side-channel, and 3 adult, egg-bearing, female Westslope Cutthroat Trout from the Clode Flats area (specifically Clode Creek, Grassy Creek, and/or the Exfiltration Ditch), captured during June or July of that year (See *Appendix N: WCT Selenium Muscle Tissue Sampling Locations*). A report on the sampling results shall be submitted to an Environment and Climate Change Canada Enforcement Officer by September 30 of each sampling year, including an explanation if sampling was not successful, despite reasonable efforts.
10. By December 31, 2021, and thereafter, ensure all fish barriers in place are in good working order, to inhibit fish movement past the barrier in usual conditions.

Calcite Prevention

11. By June 30, 2021, calcite deposition prevention measures must be in place for Greenhills Creek and portions of Swift Creek, Cataract Creek and Kilmarnock Creek, such that the measures substantively reduce additional calcite deposition in the upper Fording River from those creeks.

The above measures are in addition to any other federal or provincial laws (including regulations, permits, licences, conditions, etc.)

For greater certainty, Environment and Climate Change Canada is developing regulations under the *Fisheries Act* that will apply to coal mining effluent. Nothing in this Direction is intended, or should be construed, to reduce or replace any obligations that may be developed under these regulations.

United States Senate

June 9, 2021

Antony Blinken
Secretary of State
United States Department of State
2201 C Street NW
Washington, DC 20011

Dear Secretary Blinken:

I am writing to you to request a referral to the International Joint Commission (IJC) concerning the selenium contamination issue in the Kootenai watershed in Montana. For over a decade, selenium from mining operations along the Elk River in Canada has flowed south into Lake Koochanusa and the Kootenai River in Montana. It is critical for the State Department to engage with the Canadian government and the IJC to resolve this critical transboundary water quality issue, as well as any other contaminants of concern associated with these mining operations..

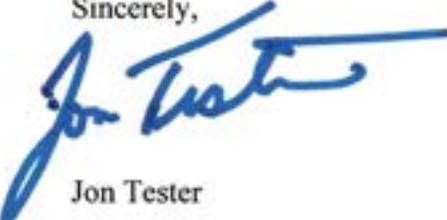
Water quality is the cornerstone of Montana's way of life and our \$7.1 billion outdoor recreation economy. Selenium contamination from mining on the Canadian Elk River poses a direct threat to that way of life, and the region's outdoor recreation economy. For decades, mining operations in Canada have caused elevated selenium levels in the transboundary watershed. Efforts to curb selenium contamination have been unsuccessful, and selenium levels continue to rise. Meanwhile, mining companies are proposing new mines without a tested plan in place to control selenium and other contaminants.

Mining operators in Canada have had a mixed history on preventing selenium contamination in this watershed. In 2017, a water treatment plant at a Canadian mine failed catastrophically, flooding the watershed with a more bioavailable form of selenium, posing an elevated risk to fish populations. Now, those same operators are using new, proprietary water treatment technologies that have not been robustly reviewed by the Environmental Protection Agency to supposedly curb new selenium contamination. State and federal agencies have found elevated selenium levels in fish as far downstream as Idaho and Idaho has declared the Kootenai River an impaired stream. Just last month, the Canadian government issued its largest-ever fine under the Canadian Fisheries Act for violating water quality laws for violations in the Elk River Watershed.

Selenium contamination is a pressing issue for nonfederal stakeholders in the region as well. The Confederated Salish and Kootenai Tribes have long supported an IJC referral to address contamination in their historic fisheries. The State of Montana has worked with the Environmental Protection Agency to issue site-specific selenium standards specifically for this watershed, and in 2005 and 2020, called for an IJC referral as well. Members of the IJC have taken a direct interest in the issue, and are awaiting a formal referral request to begin their review and adjudication process. Montanans have waited for over three decades to see real action curtailing selenium contamination in their water. They shouldn't have to wait any longer.

Thank you for your attention to this pressing issue. I stand ready to help you protect Montana's water quality in any way I can.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jon Tester". The signature is stylized and cursive, with a long horizontal stroke extending to the right.

Jon Tester