

# Appendix 11-E

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Water Mitigation Technology  
Readiness Review



## MEMO

To	Dave Bains, MSc (Director Project Development, NWP Coal) Karyn Lewis (Manager Regulatory Affairs, NWP Coal)
From	Monique Simair, PhD, RPBio, EP (CEO and Principal Scientist, Maven)
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Client	NWP Coal Ltd.
Project	Crown Mountain Coking Coal
Subject	Water Mitigation Technology Readiness
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NWP Coal Ltd. (NWP) is developing the Crown Mountain Coking Coal (CMCC) Project (the Project), located near Sparwood, British Columbia (BC). As part of the development of this Project, NWP will be resubmitting an updated Application/Environmental Impact Statement (EIS) to the Impact Assessment Agency of Canada (IAAC), followed by submission of the provincial Application for an Environmental Assessment Certificate (EAC) to the Environmental Assessment Office (EAO) (NWP Coal Canada Ltd., 2023). As is typical, the submission of the EIS has resulted in Information Requests (IRs) from reviewers. This memo is written with consideration of information requests that focus on the Technology Readiness Levels (TRL) of the mitigations proposed to protect water quality in the Project. Maven has not been involved in the development of the CMCC EIS application, but has reviewed sections relevant to this IR. Information about the EIS guideline and the IRs under consideration in this memo are copied below:

### Requirement of EIS Guideline:

- Where mitigation measures are proposed to be implemented for which there is little experience or for which there is some question as to their effectiveness, the potential risks and effects to the environment should those measures not be effective will be clearly and concisely described, and, where appropriate, contingency measures should be identified.

### Round 1 Conformity IR:

- The indicated page range does not clearly identify the potential risks and effects to the environment should novel mitigation measures not be effective (i.e., saturated rock fill). Additionally, it does not identify specific and proven contingency measures for selenium management should the planned mitigation measures be ineffective. Provide this information in the EIS.

### Round 2 Conformity IR:

- The management plans do not include the effects to the environment should the novel mitigation measures not be effective. This requirement was not met for experimental technologies within the Site Water Management Plan (e.g., the Mine Rock Storage Facility). Also, a Technology Readiness Assessment (TRA) in accordance with BC's TRA guidelines for the Mine Rock Storage Facility was not included in the EIS (in either Chapter 2, Appendix 3-B or Chapter

33). Understanding the technological readiness of key mitigation measures is important for understanding the degree of uncertainty associated with predicted environmental effects of the Project.

Assessment of TRLs for water quality mitigations is a relatively new requirement for developing major mining projects in the province of British Columbia. The TRA guidance was released by the Ministry of Energy, Mines, and Low Carbon Innovation (EMLI) and the Ministry of Environment and Climate Change Strategy (ENV) in August 2022 to assess TRLs for site-specific mine water treatment technology implementation (BC EMLI ENV, 2022). According to the TRL Assessment Guidance Document, “TRL-7 technologies may be acceptable to fulfill the information requirements for EAC applications and Mines Act (MA) and/or Environmental Management Act (EMA) planning processes” (BC EMLI ENV, 2022). The EAC application is performed after the EIS and there is no specific TRL guidance provided for the development of an EIS for the IAAC.

The Project’s strategy for surface water management includes many mitigations and best practices. These are described in detail in Chapters 33 and 11 of the EIS. Based on our review, it appears that source control mitigations have been put in place wherever possible and are also incorporated into the water quality model. The mitigations reflect current and emerging best practices in mine water management and source control. These include long-standing standard best practices such as dust mitigation and subaqueous disposal of mine rock to prevent oxidation. It is our opinion that the source control and mitigation measures proposed to reduce adverse effects on surface water quality are generally accepted, understood, and proven to effectively reduce environmental effects related to surface water quality.

The mitigations proposed by NWP for the Project go beyond current standard best practices. The Project implements an emerging best practice of constructing a Mine Rock Storage Facility (MRSF) with a layering approach that prevents ingress of oxygen thereby decreasing oxidation and minimizing the release of constituents such as selenium. While this approach comes at a significant cost to the construction of the MRSF, it adheres to the best practices principle of preventing contamination rather than treating it. In principle, mitigations that improve water quality through source control are also the best practices to minimize opportunities for wildlife to interact with contaminants.

This newer MRSF layering technology application has been successfully demonstrated at other mine sites. Additionally, there is a large-scale demonstration underway at another coal mine near the Project, which could be considered an analogous site. However, the TRL of passive and semi-passive mitigation technologies such as this are more difficult to assess due to the site-specific considerations necessary (Simair and Dhoonmoon, 2022). The MRSF layering technology is expected to be generally a TRL-6 to TRL-8 depending on the project and application of the technology. For the CMCC Project, the proposed MRSF layering technology is expected to be a TRL-7. We use the wording ‘expected’ here as the TRL will be determined through the TRA process once the project reaches that stage.

The projected water quality for the Project was modelled in two ways. One with a successful application of the MRSF technology, and one with a failed application of the MRSF technology. This addresses the IR concern of including effects to the environment should the technology not be successful. At this EIS stage, it is expected that the MRSF layer approach will be sufficiently matured through additional TRLs prior to implementation. For the purposes of the EIS and EAC applications, it is therefore expected that the MRSF technology will effectively address water quality concerns without requiring any further mitigation measures (i.e., the successful application model scenario). However, it is also recognized that the new MRSF technology may not be successful in its development and implementation. The TRA occurs in a stage of permitting after receipt the EAC. The TRA ensures that uncertainties with water quality mitigations and treatment technologies are assessed, documented, and addressed by implementing appropriate TRL mitigations for the proposed stages of the project. The TRA guidance document states that “the TRL required for Mines Act (MA) and/or Environmental Management Act

(EMA) applications are higher than that required for Environmental Assessment Certificate (EAC) applications under the Environmental Assessment Act (EA) or MA and/or EMA planning processes" (BC EMLI ENV, 2022).

At the stage of applying for the MA and EMA Permits, all discharge points must be screened for constituents of potential concern (COPCs). Any discharge point with COPCs that are predicted to be in exceedance of 80% of the applicable water quality guideline must go through a Best Achievable Technology (BAT) assessment. Therefore, if at this future stage of permitting, there are predicted exceedances of the COPCs and the TRL of the MRSF is not deemed to be sufficient, other mitigations would be considered either as supplemental or replacement to the MRSF layering approach.

Please contact me if you have any questions.

<Original signed by>

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## References

British Columbia (BC) Ministry of Energy, Mines and Low Carbon Innovation (EMLI), and Ministry of Environment and Climate Change Strategy (ENV). (2022). Technology Readiness Assessment. Interim Technical Guidance. Version 02.00. [https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/min-21\\_interim\\_guidance\\_on\\_technology\\_readiness\\_assessment.pdf](https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/min-21_interim_guidance_on_technology_readiness_assessment.pdf)

NWP Coal Canada Ltd. (2023). Application for an Environmental Assessment Certificate / Environmental Impact Statement for Crown Mountain Coking Coal Project.

Simair, M. C., and Dhoonmoon, C. (2022). Considering Technology Readiness Levels in Advancing Mine Water Treatment Technologies. British Columbia Mine Reclamation Symposium. doi:<https://dx.doi.org/10.14288/1.0421794>.