Denison Mines Corp.
Wheeler River Operation

Environmental Code of Practice

Document # 36

Version # 2

April 2025

Approval for Use

Version	Date	Description of Activities	Author	Reviewer	Approver
1	January 2024	Draft for CNSC Review			
2	April 2025	Response to CNSC Information Request	Ecometrix	J. Switzer, S. Benson, R.Nagel	J. Switzer

Revision History

Version	Date	Description of Revision
1	January 2024	Draft for CNSC Review
2	April 2025	Response to CNSC Information Request

Table of Contents

Tables

Acronyms and Abbreviations

Term	Definition
CNSC	Canadian Nuclear Safety Commission
COPC	Constituent of Potential Concern
CSA	Canadian Standards Association
DWWTP	Domestic Wastewater Treatment Plant
ECOP	Environmental Code of Practice
ERA	Environmental Risk Assessment
IWWTP	Industrial Wastewater Treatment Plant
MDMER	Metal and Diamond Mining Effluent Regulations
TDS	Total Dissolved Solids

1 Introduction

1.1 Background and Purpose

This *Environmental Code of Practice* (ECOP) supports the *Environmental Management Program* for the Wheeler River Operation (the Operation). The ECOP supports the *Effluent and Emissions Monitoring Plan* and is directly connected to the monitoring discussed in that Plan.

The ECOP defines action levels for selected nuclear and hazardous substances and physical stressors that if exceeded would indicate a potential loss of control of the *Environmental Management Program*. The ECOP also defines administrative levels that are internal levels to provide an early warning that an action level may be exceeded if certain actions are not taken. Reaching and exceeding an administrative level does not imply a loss of control.

The ECOP meets the requirements of Section 4 of the Canadian Nuclear Safety Commission (CNSC) *Uranium Mines and Mills Regulations*, and REGDOC-2.9.2, *Controlling Releases to the Environment* (*draft*).

1.2 Scope

The ECOP applies to treated effluent at the final point of release from the Industrial Wastewater Treatment Plant (IWWTP) to the environment. The ECOP applies only once effluent is being released from the Wheeler River Operation. During construction, no treated effluent is expected to be released to the aquatic environment; however, there may be a need to sample and release precipitation and/or storm water collected in the ponds during the construction phase (for more information see Section 4.2 of the *Effluent and Emissions Monitoring Plan)*. It is anticipated that minimal effluent will be released during the commissioning phase of the Operation, as well as the anticipated regular releases during operations and decommissioning.

The nuclear and hazardous substances are consistent with those identified in the *Effluent and Emissions Monitoring Plan*. Physical parameters of the effluent such as flow are also included.

The ECOP does not apply to point source and fugitive emissions to air since they are addressed through the Saskatchewan provincial permitting process.

This ECOP describes administrative levels and action levels, for environmental protection, pertaining to routine operational and environmental monitoring at the Operation. As such, commitments made pertaining to special investigations and research programs, outside of the bounds of regular monitoring, are not within the scope of this document.

The action levels and administrative levels presented in this ECOP will be subject to review based on operating experience and revised as required throughout the life of the Operation.

2 Methodology

2.1 Administrative and Action Level Development

The administrative and action levels in this ECOP are developed following the guidance in Canadian Standards Association (CSA) N288.8-17, *Establishing and implementing action levels for releases to the environment from nuclear facilities*.

The methodology for developing action levels and administrative levels follows Clause 6.2 of CSA N288.8-17 which includes:

a) Determine the contaminants, physical stressors, and final discharge points where action levels are required;

b) Identify applicable authorized release limits (also known as the licence release limit in REGDOC 2.9.2);

c) For each final discharge point and contaminant or physical stressor, identify release values from known historical or potential loss of control events;

d) Identify which approach will be adopted for development of each action level; and

e) Develop the proposed action levels.

Since the Wheeler River Operation is a new proposed facility, the prospective approach in Clause 7 of N288.8-17 is followed to develop the proposed action levels.

a) Determine the upper value of normal operational release;

b) Apply a factor on upper value of normal operational release to determine the action level;

c) Compare action level to authorized release limit (also known as the licence release limit in REGDOC 2.9.2); and

d) Compare the action level to release values from potential loss of control events.

2.2 Mitigation Measures and Corrective Actions

Follow-up actions are required upon exceedance of an administrative level or action level. This document prescribes a general approach in this regard; however, specifics will depend on the nature of the situation and should be commensurate with the potential impacts. The principal steps for follow-up action include some, or all the following:

- Issuance of a non-conformance and an investigation to determine cause and effect;
- A response to mitigate potential effects;
- Determination of corrective and preventative actions; and
- Notification and reporting to regulatory agencies (for action level exceedances only).

3 Administrative and Action Levels

This section describes the administrative and action levels according to the methodology described in Section 2.

3.1 Final Discharge Points and Constituents of Potential Concern

As indicated in the *Effluent and Emissions Monitoring Plan*, there will be three effluent monitoring and release ponds, each with a composite liner and a capacity for 3,300 m^3 of water. The effluent monitoring and release ponds will primarily receive treated water from the on-site domestic wastewater treatment plant (DWWTP) and three-stage industrial wastewater treatment plant (IWWTP), but may also receive excess water from the process water pond, IWWTP precipitate pond, and wellfield runoff pond.

Effluent will be released to Whitefish Lake (LA-5) via a discharge line with a diffuser at the end to promote effluent mixing within the lake. Effluent will be released at an expected average discharge rate of 36.5 m^3/h. The assessed maximum upper bound discharge rate is 81 m^3/h. The final discharge point is the Effluent Monitoring and Release Pond.

Administrative and Action levels are developed for the constituents of potential concern (COPCs) identified in the environmental risk assessment (ERA) based on effluent releases. Not all COPCs identified in the ERA require action levels. Radionuclides were included in the ERA for public interest and not due to exceeding a screening level. As such, only Ra-226 (a Metal and Diamond Mining Effluent Regulation (MDMER) parameter) is included for development of action levels. Additionally, total dissolved solids (TDS) are not identified as a health risk and does not require an action level.

The COPCs for which administrative levels and action levels have been developed are shown in Table 3-1. The reasonable upper bound treated effluent quality, which is considered the upper value of normal operational release is consistent with Table 3-2 in the ERA (Appendix 10-A of the EIS).

3.2 Licence Release Limits

Licence release limits for the COPCs are being developed. Denison is committed to ensuring that all administrative levels and action levels will be below the licence release limits.

3.3 User Defined Factor

As per CSA N288.8 Section 7.3.3, a user-defined factor shall be assigned to the upper value of normal operational release, ensuring that the action level will identify potential loss of control events. No specific loss of control events have been identified; therefore, the intent is to identify a factor that will result in an action level that ensures the licence release limit is not exceeded.

For administrative levels, a factor of 1.5 was applied on the upper value of normal. For action levels, a factor of 2 was applied on the upper value of normal.

Administrative levels and action levels can be refined as part of the commissioning phase of the project prior to operation.

Table 3-1: Preliminary Administrative and Action Levels for Effluent Monitoring and Release Pond

COPC	Units	Upper Value of Normal	Administrative Level	Action Level
Arsenic	mg/L	0.006	0.009	0.012
Cadmium	mg/L	0.0018	0.0022	0.0027
Chromium	mg/L	0.025	0.0375	0.05
Cobalt	mg/L	0.0027	0.00405	0.0054
Copper	mg/L	0.0222	0.0333	0.0444
Molybdenum	mg/L	2.5	3.75	5
Selenium	mg/L	0.0419	0.0628	0.0838
Uranium	mg/L	0.057	0.0855	0.114
Zinc	mg/L	0.042	0.063	0.084
Chloride	mg/L	600	900	1200
Sulphate	mg/L	3920	5880	7840
Radium-226	Bq/L	0.15	0.225	0.3
Flow	m^3/hr	36.500	54.75	73

Note: Concentrations are represented as monthly mean concentrations measured in all composite or grab samples as defined in the *Effluent and Emissions Monitoring Plan.*

4 Mitigation Measures and Corrective Actions

4.1 Mitigation Measures and Corrective Actions

Mitigation measures and corrective actions are required in the event of an action level or administrative level exceedance. However, different actions may be needed for action levels and administrative levels (see Table 4-1).

Administrative level exceedances require that the cause of the exceedance be investigated and appropriate actions taken. Consideration will be given to the magnitude and duration of the exceedance in determining appropriate action to be taken.

Action level exceedance require that mitigation measures and corrective and preventive actions be employed, as appropriate to restore acceptable conditions and regain control. Follow-up requirements may vary significantly from case to case.

In some instances, the actions to be taken may identify the need for a temporary action level.

Table 4-1: Steps to Follow to Identify Mitigation Measures and Corrective Actions

Administrative Level	Action Level
1. Continue with release to the environment, if ongoing; 2. Confirm whether exceedance is valid; 3. Conduct an investigation to determine the cause; 4. Monitor for potential trends; and 5. Identify possible actions, initiate if practical.	1. Do not proceed with release to the environment, if ongoing; 2. Confirm whether exceedance is valid; 3. Conduct an investigation to determine the cause; 4. Identify and take action commensurate with level of risk to restore the effectiveness of the environmental protection program; and 5. Initiate preventive actions, if identified.

5 Notification and Reporting

Notification of administrative and action level exceedances will be made to the appropriate department head and the Environment Group, by the group responsible for performing the monitoring. Administrative level exceedances do not require regulatory reporting since they do not indicate a loss of control.

5.1 Exceeding an Administrative Level

The Environment Group will notify appropriate Denison employees when an administrative level is exceeded. No regulatory reporting is required; however, administrative level exceedances will be identified in the annual report.

Employees responsible for conducting internal investigations of the administrative level exceedance will be notified so that an investigation can be initiated, and findings implemented.

5.2 Exceeding an Action Level

The Environment Group will notify the regulatory agencies (i.e., CNSC) of any action level exceedance within 24 hours of detection. This is a requirement of the *Radiation Protection Regulations*.

In addition, a written report will be prepared and submitted to the regulatory agencies within 21 days. The report will include a discussion of the mitigating measures and immediate corrective and preventative actions taken in response to the exceedance. Further reports will be prepared when necessary to describe remedial actions requiring a greater time frame to implement. Additionally, action level exceedances will be documented in the appropriate environmental quarterly and/or annual report.

6 References

6.1 Internal

Document Number	Document Name
	Environmental Management Program
	Effluent and Emissions Monitoring Plan

6.2 External

Canadian Nuclear Safety Commission (CNSC). Draft under development. Controlling Releases to the Environment. REGDOC 2.9.2.

Canadian Standards Association (CSA). 2017. Establishing and implementing action levels for releases to the environment from nuclear facilities. N288.8-17.

Ecometrix Incorporated (Ecometrix). 2022. Appendix 10-A: Environmental Risk Assessment for Wheeler River. Technical Support Document.

Uranium Mines and Mills Regulations, SOR/2000-206