2021 OPERATING CARE & MAINTENANCE ANNUAL REPORT

Denison Mines Inc.

Submitted to the

Canadian Nuclear Safety Commission

March 31, 2022

Denison Mines Inc.
1 Horne Walk, Suite 200
Elliot Lake, ON P5A 2A5
Canada

Tel: 705 848-9191
Fax: 705 848-4445

www.denisonmines.com

March 31, 2022

Mr. Ron Stenson, Senior Project Officer
Canadian Nuclear Safety Commission
Wastes and Decommissioning Division
280 Slater Street
PO Box 1046, Station B
Ottawa, Ontario
K1P 5S9

Dear Mr. Stenson:

RE: Denison Mines Inc. 2021 Operating Care and Maintenance Annual Report

Denison Mines Inc. is pleased to submit the Denison Mines Inc. Operating Care and Maintenance Annual Report for 2021. This document has been completed in accordance with: UMDL-Minemill-Denison.01/indf; and UMDL-Minemill-Stanrock.02/indf; and Certificate of Approval (C of A) No. 4-0067-74-766; C of A No. 4-0019-72-006; and C of A No. 4-034-76-006.

Yours truly,

Denison Mines Inc.

Diane Martens

Diane Martens

Director of Closed Mines

Enclosure

Distribution

Elliot Lake Joint Review Group for Denison Mines Closed Sites

Canadian Nuclear Safety Commission Ron Stenson, Senior Project Officer Uranium Mines and Mills Division ron.stenson@canada.ca Tel: 613-995-2624 cc: cnsc.ummd-dmucu.ccsn@canada.ca Mailing address: Canadian Nuclear Safety Commission 280 Slater Street, P.O. Box 1046, Station B Ottawa, ON K1P 5S9	**Ministry of Energy, Northern Development and Mines** Rob Purdon, Mine Rehabilitation Project Manager rob.h.purdon@ontario.ca Tel: 807-631-8519 Mailing address: Ministry of Energy, Northern Development and Mines 435 James Street South, Suite B002 Thunder Bay, ON P7E 6S7
Environment and Climate Change Canada Catalin Obreja Physical Science Officer, Environmental Stewardship Branch catalin.obreja@canada.ca Tel: 416-739-5973 Mailing address: Environment Canada, Environmental Protection Operations 4905 Dufferin Street, 2nd Floor, Office 2S316 Toronto, Ontario M3H 5T4	**Environment and Climate Change Canada** Duck Kim Physical Science Officer, Environmental Stewardship Branch duck.kim@canada.ca Tel: 416-739-5919 Mailing address: Environment Canada, Environmental Protection Operations 4905 Dufferin Street, 2nd Floor, Office 2S311 Toronto, Ontario M3H 5T4
Ministry of the Environment, Conservation and Parks Kirk Crosson, Senior Environmental Officer, Sault Ste Marie Area Office kirk.crosson@ontario.ca Tel: 705-942-6392 Mailing address: Ministry of the Environment, Conservation and Parks 70 Foster Drive, Suite 110 Sault Ste Marie, ON P6A 6V4	**Ministry of the Environment, Conservation and Parks** Ed Snucins Surface Water Specialist, Northern Region ed.snucins@ontario.ca Tel: 705-698-5546 Mailing address: Ministry of the Environment, Conservation and Parks 199 Larch Street, Suite 1201 Sudbury, Ontario P3E 5P9
Ministry of Natural Resources and Forestry Jim Trottier Management Biologist, Blind River Field Office jim.trottier@ontario.ca Tel: 705-356-3018 Mailing address: Ministry of Natural Resources and Forestry 62 Queen Avenue, P.O. Box 190 Blind River, ON P0R 1B0	**Ministry of Natural Resources and Forestry** Megan Becker Lands & Waters Technical Specialist, Sault Ste Marie District megan.becker@ontario.ca Tel: 705-941-5104 Mailing address: Ministry of Natural Resources and Forestry 64 Church Street, Sault Ste. Marie, ON P6A 3H3
Ministry of Labour, Training and Skills Development Pierre Lefebvre District Manager, Timmins pierre.lefebvre@ontario.ca Tel:705-235-1907 Mailing address: Ministry of Labour, Training and Skills Development Ontario Government Complex D Wing 5520 Highway 101 East, P.O. Bag 3050 South Porcupine ON P0N 1H0	**Ministry of Labour, Training and Skills Development** Robert Barclay, Senior Manager Provincial Mining Health and Safety Robert.Barclay@ontario.ca Tel: 705-564-4109? Mailing address: Ministry of Labour, Training and Skills Development Ontario Government Bldg 159 Cedar Street, Sudbury, ON P3E 6A5

Additional Distribution List 2021

City of Elliot Lake Mayor Dan Marchisella City of Elliot Lake d.marchisella@city.elliotlake.on.ca Tel: 705-848-2287 ext 2126 Clerk nbray@elliotlake.ca Mailing address: City of Elliot Lake 45 Hillside Drive North Elliot Lake, ON P5A 1X5	**Elliot Lake Public Library** Mailing address: Elliot Lake Public Library Pearson Plaza 40 Hillside Drive South Elliot Lake, ON P5A 1M7
Serpent River First Nation Chief Brent Bissaillion Chief@serpentriverfn.com Tel: 705-844-2418 Mailing address: Serpent River First Nation 195 Village Road, P.O. Box 14 Cutler, ON P0P 1B0	**Township of the North Shore** Mary Lynn Duguay Clerk-Treasurer municipalclerk@townshipofthenorthshore.ca Tel: 705-849-2213 x 25 Mailing address: Township of the North Shore 1385 Hwy 17, P.O. Box 108 Algoma Mills, ON P0R 1A0
Town of Spanish Pam Lortie CAO/Clerk-Treasurer pamlortie@townofspanish.com Tel: 705-844-2300 Mailing address: Town of Spanish 8 Trunk Road, P.O. Box 70 Spanish, ON P0P 2A0	**Denison Mines Inc.** David Cates dcates@denisonmines.com Tel: 416-979-1991
North Shore Tribal Council Sonya Cloutier Sonya@niigaaniin.com contact@mamaweswen.com Mailing address: Main Office 473 Hwy 17 W Cutler, ON P0P 1B0	

Table of Contents

List of Tables

Table of Appendices

1 ORGANIZATIONAL INFORMATION

1.1 Licencee

DENISON MINES INC.
1100-40 University Avenue
Toronto, Ontario
M5G 1T1

1.2 Board of Directors

Table 1.1 contains the list of names and titles of the Directors of Denison Mines Inc. (Denison) as of December 31, 2021. All persons listed below may be contacted via the licensee address.

Table 1.1 Denison Mines Inc. Directors as of December 31, 2021

Name	Office
David Cates	Director, President and Chief Executive Officer
Gabriel (Mac) McDonald	Director, Executive Vice President and Chief Financial Officer

1.3 List of Officers

Table 1.2 contains the list of names and titles of the Officers of Denison as of December 31, 2021. All persons listed below may be contacted via the licensee address.

Table 1.2 Denison Mines Inc. Officers as of December 31, 2021

Name	Office
David Cates	Director, President and Chief Executive Officer
Gabriel (Mac) McDonald	Director, Executive Vice President and Chief Financial Officer
Amanda Willett	Vice President Legal and Corporate Secretary
Genevieve Good	Director, Internal Audit

2 FINANCIAL GUARANTEES

Federal and Provincial regulations which apply to the care and maintenance programs of Denison in Elliot Lake require mine operators to provide adequate and secure resources to meet current and future responsibilities with respect to mine closure and long-term care and maintenance.

All expenditures are funded through a reclamation trust fund. Denison currently maintains a balance in the trust equivalent to costs to maintain interim suspension status for the period of 2022 to 2027.

3 LICENCE AND MONITORING PROGRAM MODIFICATIONS

Denison Closed Mine Sites in Elliot Lake currently operate and are monitored within the scope of work outlined within a licence regulated by the Federal Canadian Nuclear Safety Commission (CNSC). Currently Denison is the licencee for two Uranium Mine Decommissioning Licences:

1) Denison sites (TMA-1 and TMA-2) UMDL-Minemill-Denison.01/indf; and
2) Stanrock site UMDL-Minemill-Stanrock.02/indf

Sample stations that require monitoring under the Licences include:

1) Stollery Lake Settling Pond Outlet (D-2) for Denison TMA-1;
2) Lower Williams Lake (LWL) Settling Pond Outlet (D-3) for Denison TMA-2; and
3) Orient Lake Polishing Pond Outlet (DS-4) for Stanrock TMA.

Provincially, Denison is the permittee for three Certificate of Approval (C of A) regulated by the Ministry of Environment, Conservation and Parks (MECP):

1) Denison Site TMA-1: C of A No. 4-0019-72-006;
2) Denison Site TMA-2 (Lower Williams): C of A No. 4-034-76-006; and
3) Stanrock Site: C of A No. 4-0067-74-766

There were no changes to any of these documents in 2021. A proposed amendment for C of A Denison TMA-1 remains in progress.

A State of the Environment (SOE) Report for the Serpent River Watershed is jointly produced by Denison and Rio Algom Limited (RAL) every five years. The SOE report includes the monitoring programs for the Serpent River Watershed Monitoring Program (SRWMP), Source Area Monitoring Program (SAMP) and the Tailings Management Area (TMA) Operational Monitoring Program (TOMP). There were approved changes to the SAMP, TOMP and SRWMP in 2019 that included approval from Environment and Climate Change Canada (ECCC) CNSC, Ministry of Labour (MOL), Ministry of Natural Resources and Forestry (MNRF) and Ministry of Northern Development and Mines (MNDM) which were presented in the *Cycle 5 Study Design for the SRWMP, SAMP and TOMP* (Cycle 5 Design Study) (Minnow, 2019). Changes to the SRWMP were presented in the Cycle 5 Study Design (Minnow 2019). A summary of Cycle 5 is available in Appendix I. The Cycle 5 SOE Report was submitted to regulators in March 2021 (Minnow 2021).

4 METHODOLOGY

4.1 Health and Safety

4.1.1 Health and Safety Injury Statistics

Health and safety in the workplace continue to be of great importance to Denison. In 2021, monthly safety meetings and daily line-ups were completed to provide Denison personnel with safety awareness and a forum to raise issues or concerns. Training for job responsibilities was tracked with a training matrix to ensure comprehensive and timely qualifications for work. A Health, Safety, Environment, Community (HSEC) program is additionally in place to provide another avenue for raising concerns. HSEC cards are tracked to completion.

In March 2020, COVID-19 was declared a global pandemic and Canadians were advised to implement safety protocols to limit the spread. Denison responded by developing and implementing standard operating procedures (SOPs) for offices and work sites based on the direction and advice from the Provincial Health Officer (PHO), the Canadian Ministry of Health and the Province of Ontario. The suite of COVID-19 SOPs included *Pandemic workplace procedures Elliot Lake Office*, *Mandatory Use of Mask or Face Covering within Denison Mines Closed Mines Group*, a *Shop COVID-19 SOP* specific to Elliot Lake work tasks as well as a company wide *COVID-19 Pandemic Vaccination Protocol* (October 22, 2021).
The following measures were established for all Elliot Lake locations:

- Office scheduling system to ensure employee distancing and hygiene,
- Provide updated COVID-19 resources to educate employees of symptoms and precautions,
- Adapted work standards to accommodate staff with changes in family and work circumstances,
- Heightened hygiene practices through implementation of procedures and provision of proper face coverings, personal hand sanitizer, and equipment disinfectant,
- Promote and expect employees to stay home to isolate and receive a negative COVID-19 test result before returning to work,
- Provide resources and support for the maintenance of employee mental health,
- Routine conformance checks to ensure continuation of compliance with local, provincial, and federal government regulations and recommendations.

4.1.2 Gamma Dosimetry

Denison has continued to voluntarily participate in the gamma dosimetry program. The program applies to employees whose job responsibilities require them to work in and around the Licenced sites, which include the tailings management areas (TMAs). These workers do not meet the definition of Nuclear Energy Workers (NEWs) in the *Nuclear Safety and Control Act* and the *Radiation Protection Regulations* but for the purposes of the voluntary program are NEWs. The program does not apply to visitors visiting the sites or employees who do not actively work at the Licenced sites; however, sometimes sub-contractors may be issued visitor badges should the work involve specific earthworks projects over an extended period.

The type of gamma dosimetry badges used are Optically Stimulated Luminescence (OSL) dosimeters, which have a wearing period of three months. Badges are issued in the first calendar month of the year and each quarter going forward. Each worker is issued a pre-labelled badge with its own unique dosimeter number that is designated for each worker. At the end of the

wearing period, the dosimeters are sent to the Radiation Protection Bureau (RPB) Health Canada for processing. The RPB will issue a Radiation Exposure Report to Denison's designate who is thereafter responsible for reviewing the information, reporting any anomalies to workers, and maintaining the company records.

4.1.3 Radon Progeny Monitoring

Radon progeny monitoring at all Denison Effluent Treatment Plants (ETPs) is conducted on a quarterly basis, as part of the quarterly health and safety inspections. Radon results are reported in Working Level (WL) units.

Radon level is measured by calculating alpha radiation from radon decay products. The sample is first collected on membrane filters with an air-sampling pump by walking through the entire ETP over a 5-minute period, simulating a normal work routine. The ETP should be ventilated as per routine work practice before the walkthrough. Alpha radiation is measured with an alpha counter between forty to ninety minutes after the sample has been collected. WL is then calculated based on the counts, count duration, sampling duration, sampling flow rate, decay factor, filter self-absorption value, background count, and efficiency factor.

The reportable action limit for radon exposure at all ETPs is 0.1 WL. To ensure radon levels stay below the reportable action limit, an internal investigation limit of 0.05 WL has been established to trigger a response whereby mitigating measures are implemented in order to ensure worker exposure to radon gas is reduced and controlled. Mitigating measures include but are not limited to the purchase of a radon fan and/or posting signage to employ longer ventilation time before ETP work begins.

The gamma and radon data are then used to calculate individual annual dose estimates for Care and Maintenance workers classified as NEWs. A worker dose estimate report is submitted annually to the CNSC under separate cover.

4.2 Water Quality Monitoring Program

4.2.1 TOMP, SAMP and SRWMP

As part of the closure and decommissioning process, an integrated performance monitoring framework had been developed for Denison and RAL sites for water quality monitoring activities through three integrated programs: TOMP, SAMP and SRWMP. These programs have been described in the Cycle 5 Study Design (Minnow, 2019).

4.2.1.1 TMA Operational Monitoring Program (TOMP)

The TOMP was designed to track the performance of the TMAs and generate data used to make decisions for management and compliance of the TMAs. The program included water quality monitoring within the TMA basins and groundwater quality, to reflect the operational and treatment performance. The data collected in the program could be used as references for water quality trends and improvement for Serpent River Watershed receiving environment, however the water quality from Denison and Stanrock TMA sites must comply with the regulatory criteria for the effluents from the treatment plants specified in the licences and C of As (Sample points: D-2, D-3 and DS-4).

4.2.1.2 Source Area Monitoring Program (SAMP)

The SAMP was designed to monitor the nature and quantity of potential contaminants being discharged from the TMAs to the Serpent River Watershed. Some monitoring stations for the SAMP program were also the TOMP effluent stations, and requirements have been harmonized to serve both programs. The data collected in the program could be used as references for water quality trend and performance for the Serpent River Watershed receiving environment.

4.2.1.3 Serpent River Watershed Monitoring Program (SRWMP) State of the Environment Report (SOE)

The SRWMP SOE, produced every five years, was designed to provide an integrated monitoring approach to assess the cumulative effects and watershed-level changes over time, in order to evaluate the recovery of the receiving environment following the implementation of the decommissioning plans. The SRWMP SOE assessed water and sediment chemistry, as well as benthic invertebrate communities in downstream and reference lakes within the watershed. Water quality data collected in the program is compared to the benchmarks established for the SRWMP. The objectives of the SRWMP are:

- Evaluation of cumulative effects of mine discharges on the Serpent River Watershed,
- Evaluation of the effectiveness of mine decommissioning plans, and
- Assessment of long-term trends in environmental quality in the watershed.

An additional SRWMP Water Quality Report is prepared annually to review water quality downstream of the SAMP and TOMP and provides water quality data from watershed monitoring locations from January 1, 2021 through December 31, 2021. The objective of the SRWMP annual data review is to identify anomalous data and evaluate short-term data trends at key locations. Step changes and anomalies are identified in this report by reviewing and compiling the last five years of annual average data for all SRWMP monitoring locations and reviewing the information for any noticeable changes. The 2021 SRWMP report was prepared and submitted under a separate cover (RAL, Denison, 2022). Results are not presented in this annual report, but the report should be read in conjunction with the Denison 2021 Annual OCM report.

4.2.2 Program Requirements

Water quality monitoring requirements and criteria as per the licences were fulfilled through the approved TOMP, SAMP and SRWMP. The water quality monitoring locations in this report made up part of the Serpent River Watershed (SRW), which as outlined above, is a shared watershed with RAL sites and their monitoring locations.

The 2021 TOMP and SAMP followed program requirements specific to the following: sampling locations, frequencies, parameters, and analytical protocols. These requirements have been recommended and approved in the Cycle 5 Study Design (Minnow, 2019). Appendix II in this report provides maps of the sampling stations of the water quality program. Tables in Appendix II provide a brief description of each location, the sampling frequency, and parameters monitored, as required by TOMP and SAMP as well as the C of As and decommissioning licenses as identified in Section 3.

4.2.3 Data Quality Objectives

Targeted Detection Limits (TDL) and Data Quality Objectives (DQOs) for TOMP and SAMP requirements were provided in Table 4.2.2 which were derived from the Cycle 5 Study Design (Minnow, 2019). Laboratory data quality assessment was provided under a separate cover in the *Serpent River Watershed Monitoring Program 2021 Annual Water Quality Report* (RAL, Denison, 2022).

4.2.4 Changes in Analytical Methods

After the closure of the Perdue Laboratory at Laurentian University, formerly the Elliot Lake Research Field Station (ELRFS) at the end of April 2021, samples analyzed for radium-226 were sent to Testmark Laboratories Ltd. After receipt of historically high radium-226 results at multiple locations and a lack of precision in repeat results, an investigation into the laboratory method for radium-226 analysis was conducted. Details of the investigation can be found in Appendix V of this report and in the *2021 SRWMP Annual Report* (RAL; Denison, 2022). Subsequent radium-226 analysis was moved to SGS laboratory beginning October 2021, which utilizes the same Canadian Association for Laboratory Accreditation (CALA) approved methodology for radium-226 analysis as Laurentian University did (Alpha Spectrometry).

There were no other changes to analytical methods in 2021.

4.2.5 Data Screening and Assessment Conventions

Data validation was conducted on TOMP and SAMP water quality data throughout the year. The data validation assessment screening process within the electronic database flagged all data points entered or imported that had values outside a rolling minimum 12 value mean $\pm$ 3 standard deviations. Prior to being accepted in the database, all flagged data was reviewed and validated through a quality assurance process.

As part of the TOMP, field quality assurance and quality control sampling were extended to the groundwater monitoring program in 2006. Data quality assessment involved monthly screening of field duplicate and field blank sample data against TOMP and SAMP DQOs found in Table 4.2.2. Detailed surface water and groundwater quality assurance and quality control (QA/QC) results are included in Appendix III of this report.

Laboratory analyses were contracted to Canadian Association of Laboratory Accreditation (CALA) certified laboratories. Laboratory QA/QC reports were provided under separate cover in the *Serpent River Watershed Monitoring Program 2021 Annual Water Quality Report* (RAL & Denison, 2022).

Denison requested to discontinue the monthly water quality reports on May 21, 2021 and received agreement from the CNSC on May 25, 2021 (e-mail Pandolfi to Ferguson and Stenson). Monthly data validation of flagged data for 2021 can be found in Appendix III.

Annual water quality reporting was designed to be concise and focused on the presentation of data in a standardized format with limited interpretation. Detailed statistical evaluation of water quality trends are included in the *Serpent River Watershed Cycle 5 (2015-2019) State of the Environment Report (SOE)* (Minnow, 2021). Data validation, as documented in Data Validation Procedures, ensured prompt response to upset conditions or unusual results. Appendix IV includes all 2021 monthly average year to date (YTD) results and detailed raw data water quality monitoring results for surface water results and five years of groundwater quality results.

Surface water stations within the TMAs, as well as effluent, seepages, and downstream surface water stations were compared to SRWMP benchmarks for receiving water quality. Mine sources (i.e. TOMP and SAMP stations) were not expected to achieve the benchmarks that were set for the receiving environment, but these comparisons were made to identify potential variables or sources of concern relative to the downstream receiving environment. Therefore, water quality data in this report is compared to benchmarks established for the SRWMP (Minnow, 2019). These benchmarks were based on water quality criteria for the protection of aquatic life or the upper range of background concentrations (except for pH for which the lower background range was relevant). The most recent federal and provincial (Ontario) guideline was used to determine these benchmarks (or British Columbia Ministry of Environment (BCMOE) water quality guidelines were applied if none existed). A dose-base site-specific benchmark for radium-226 was also developed, as per CNSC request (Minnow, 2019 Appendix C). In this report, benchmarks are presented in Table 4.2.2.

Annual loadings from the TMA final discharge were calculated using monthly monitoring results (volume and average concentration) aligning with the Metal and Diamond Mining Effluent Regulations (MDMER) loadings methodology. Daily flow at the ETP was used to calculate monthly discharge volumes (Litres). Monthly average concentrations were multiplied by monthly volumes to produce monthly loads and monthly loads were summed to estimate annual loadings. Annual loadings at the final discharge point were calculated for radium-226 (Million Becquerels) and TSS (kilograms per year) for each effluent treatment plant and presented in Appendix IV.

Table 4.2.2 Water Quality Benchmarks for SRWMP and Data Quality Objectives for TOMP, SAMP and SRWMP

		Assessement Criteria[1]	Data Quality Objectives [2]							
Parameter	**Units**	**Receiving Environment Criteria**	**Targeted Detection Limit**	**Minimum Detectable Difference**	**Field Blank Criteria**	**Laboratory Blank Criteria**	**Field Precision**	**Laboratory Precision**	**Laboratory Spikes**	**Laboratory Accuracy (CRM)**
Field Parameters										
Conductivity	µmho/cm	-	0.1	0.05	-	-	20%	-	-	-
Flow	L/s	-	method	method	-	-	-	-	-	-
pH	pH units		0.1	0.01 or 0.02	-	-	20%	-	-	-
Lake		6.5								
Wetland/stream		5.3								
Laboratory Parameters										
Acidity	mg/L	-	1.0	-	2	2	20%	10%	-	20%
Barium	mg/L	1.0	0.005	-	0.01	0.01	20%	10%	20%	20%
Cobalt	mg/L	0.0025	0.0005	-	0.001	0.001	20%	10%	20%	20%
Iron	mg/L			-	0.04	0.04	20%	10%	20%	20%
Lake		0.76	0.02							
Wetland/stream		2.49	0.02							
Manganese [3]	mg/L	0.841	0.002	-	0.004	0.004	20%	10%	20%	20%
Radium	Bq/L	0.469	0.005	-	0.01	0.01	20%	20%	20%	-
Sulphate [3]	mg/L	128-309	0.1	-	0.2	0.2	20%	10%	20%	20%
TSS	mg/L	-	1	-	2	-	20%	10%	-	20%
Uranium	mg/L	0.0150	0.0005	-	0.001	0.001	20%	10%	20%	20%

Notes:

1. Assessment criteria as per Table S.1, Appendix S, Cycle 5 State of the Environment Report for the SRWMP, SAMP and TOMP (Minnow, 2021)
2. Table 6.2 Cycle 5 Study Design for the SRWMP, SAMP and TOMP (Minnow, 2019)
3. Sulphate and manganese criteria taken from Table S.2, Appendix S, Cycle 5 State of the Environment Report for the SWRMP, SAMP and TOMP (Minnow 2021). Parameters are hardness dependent.

5 RESULTS AND DISCUSSION

5.1 Health and Safety

5.1.1 Health and Safety Injury Statistics

In 2021, health and safety related training and education continued to be an integral part of monthly safety meetings and daily line-ups for care and maintenance workers working at the Denison Closed Mines Operations in Elliot Lake. All care and maintenance workers continued to hold the following certifications and/or had completed the following training: Workplace Hazardous Materials Information System (WHMIS), Cardiopulmonary Resuscitation (CPR) and First Aid certification, as well as the Annual Radiation Safety training. Many workers also completed additional training and certifications to ensure their qualifications for specialty or specific tasks and jobs related to care and maintenance at the Denison Closed Mines Operations in Elliot Lake were current. There were zero medical aids and no lost time accidents were reported in 2021 for employees at the Elliot Lake sites (Table 5.1.1). Additionally, no medical aids or lost time accidents were reported for contractors on site in 2021.

With specific COVID-19 protocols remaining in place for 2021, employees were not permitted in the workplace with COVID-19 symptoms, positive test results, or following close contact with a positive COVID-19 case until return to the workplace was deemed low risk through duration of time, resolution of symptoms, and/or negative test result(s). Employees continued to work safely under public health guidelines and Denison procedures and COVID-19 related absences did not compromise the safe operation of the sites or completion of compliance monitoring.

Table 5.1.1 Health & Safety Injury Statistics

Category	2021		2020		2019	
	Number	Frequency	Number	Frequency	Number	Frequency
Medical Aid	0	0.0	0	0.0	2	0.0
Lost Time	0	0.0	0	0.0	0	0.0
Total	**0**	**0.0**	**0**	**0.0**	**2**	**9.49**
Person-Hours Worked - Denison Employees	**30015**		**39369**		**42147**	

Frequency is Calculated as: Number/Person-hours worked *200,000.

5.1.2 Gamma Dosimetry

Dose reports for gamma dosimetry will be provided to the Canadian Nuclear Safety Commission (CNSC) under separate cover.

5.1.3 Radon Progeny Monitoring

There were no radon progeny action level exceedances in 2021. The action level criteria are specific to the Elliot Lake area as indicated in the Control Limit Registry companion document. Working Levels (WLs) of radon progeny continued to test at levels far below the action level criteria of 0.10 WL for Denison TMA-1 ETP (Table 5.1.3.1), Denison LWL (TMA-2) ETP (Table 5.1.3.2) and for Stanrock ETP (Table 5.1.3.3). Quarterly values for individual ETPs are provided in their respective tables.

Table 5.1.3.1 Denison TMA-1 ETP Radon Progeny Monitoring Results 2021

Quarter	Radon (WL)
1	0.0036
2	0.0014
3	0.0095
4	0.0035

Table 5.1.3.2 Denison LWL ETP Radon Progeny Monitoring Results 2021

Quarter	Radon (WL)
1	0.0099
2	0.0134
3	0.0193
4	0.0082

Table 5.1.3.3 Stanrock ETP Radon Progeny Monitoring Results 2021

Quarter	Radon (WL)
1	0.0237
2	0.0135
3	0.0133
4	0.0139

5.2 Water Quality Monitoring Program

The objective of the annual data review was to identify atypical data and to provide evaluation and short-term annual averages at select locations. Changes and anomalies were identified by reviewing and compiling the last five years of annual average data for all TOMP and SAMP locations. Unusual results were routinely investigated in accordance with the *Water Quality Assessment and Response Plan,* which is included in Appendix A of the most recent SOE Report (Minnow Environmental Inc., 2021).

5.2.1 Surface Water Quality

Appendix III contains detailed QA/QC results compared against DQOs while Appendix IV contains surface water station-specific data reported as monthly averages including annual statistics and comparisons to SRWMP assessment criteria for the receiving environment (4.2.2).

All field blank DQOs were met for all parameters in all samples in 2021.

Although all field blank DQOs were met, there were 16 out of 120 field precision exceedance results which did not meet DQOs in 2021 (Table 5.2.1).

The TSS field precision DQO of 20% was exceeded in 6 out of 12 samples, with a maximum result of 67%. The exceedances were indicative of the lack of precision at low TSS concentrations, ranging between 1 mg/L and 4 mg/L (Appendix III), and did not influence performance monitoring data integrity. The annual average for TSS field precision was above the DQO at 30% (Table 5.2.1).

The radium-226 field precision DQO of 20% was exceeded in 5 out of 12 samples with a maximum result of 75%. The exceedances remained consistent with the variability observed in radium-226 concentrations with each sample taken. However, all results were within values typically observed at this location and all but one of the exceedances occurred at low concentrations (0.019 Bq/L to 0.053 Bq/L) and therefore did not affect the interpretation of radium-226 water quality results. Despite these exceedances, the annual average for total radium-226 was just above the DQO at 27% (Table 5.2.1).

Iron and manganese field precision both exceeded the DQO of 20%; 1 in 12 samples for iron at 30% and 4 in 12 samples for manganese with a maximum of 49%. However, all concentrations were within values typically observed at these locations and the annual averages met the DQO criteria at 8% and 16%, for iron and manganese, respectively (Table 5.2.1).

Table 5.2.1 2021 Surface Water Field Blank and Field Precision Data Summary

	pH	TSS (mg/L)	Hardness (mg/L)	SO4 (mg/L)	Ra(T) Bq/L)	U (mg/L)	Ba (mg/L)	Co (mg/L)	Fe (mg/L)	Mn (mg/L)
Field Blank Statistics										
Count	16	12	6	12	12	12	12	12	12	12
Average	6.1	1	0.5	0.1	<0.006	<0.0005	<0.005	<0.0005	<0.02	<0.002
Max	7.0	2	0.6	0.2	<0.007	<0.0005	<0.005	<0.0005	0.02	<0.002
Min	5.8	1	0.5	0.1	<0.005	<0.0005	<0.005	<0.0005	<0.02	<0.002
Field Blank Exceedances										
DQO Criteria [1]		2	1.0	0.2	0.01	0.001	0.01	0.001	0.04	0.004
# Exceedances		0	0	0	0	0	0	0	0	0
Field Duplicate Statistics										
Count	12	12	12	12	12	12	12	12	12	12
Average	0%	30%	4%	1%	27%	4%	4%	0%	8%	16%
Max	0%	67%	9%	9%	75%	16%	10%	0%	30%	49%
Min	0%	0%	0%	0%	6%	1%	0%	0%	0%	3%
Field Precision Exceedances										
DQO Criteria [1]	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
# Exceedances	0	**6**	0	0	**5**	0	0	0	**1**	**4**

[1] SAMP and TOMP field blank criteria taken from Table 6.2 of the Cycle 5 Study Design for SRWMP, SAMP and TOMP (Minnow, 2019)

Bold Indicates an exceedance of the Blank Criteria

5.2.1.1 DensionTMA-1

Site-specific water quality monitoring at the Denison TMA-1 facility was completed in accordance with TOMP and SAMP design requirements. Water quality data from all the sites of the monitoring programs were compared to SRWMP benchmarks (Table 4.2.2) to demonstrate changing water quality, identify potential variables or sources of concern relative to the downstream receiving environment as well as to monitor compliance discharge criteria as it relates to treatment performance. Mine sources were not expected to meet benchmarks. Detailed water quality results are provided in Appendix IV.

Basin performance of TMA-1 was monitored at the ETP influent station D-1 as part of the TOMP program (Table 5.2.1.1a). Acidity, pH, and cobalt levels were consistent over the past 5 years, where pH remained near neutral to slightly alkaline and acidity and cobalt remained below their respective Targeted Detection Limits (TDL) (Table 5.2.1.1a). Most metal concentrations over the last five years remained below SRWMP benchmarks (Table 4.2.2). Annual uranium concentrations were slightly above the benchmark (0.0150 mg/L) in 2017 and 2018, levels appeared to be on a declining trend, with the lowest annual average measured in 2021. Sulphate concentrations have continued to decline with the lowest average recorded in 2021, as predicted in the 1995 Environmental Impact Statement (DML 1995). Annual average radium-226 levels remained elevated compared to the 50-year post-decommissioning predictions, (i.e., predictions for the year 2050; DML 1995), with no trend observed. The current barium chloride treatment for radium-226 removal remains effective (although consumption has increased) and has maintained radium-226 control downstream in the final discharge at D-2 (Table 5.2.1.1b). Denison has engaged consultants to refine the understanding of radium-226 in the TMA and downstream and examining any potential for treatment efficiencies.

Table 5.2.1.1a Annual Average Concentrations ETP Influent (D-1)

PARAMETER UNITS	Flow (L/s)	ACID mg/L	Hardness mg/L	pH	SO4 mg/L	Ra Bq/L	Ba mg/L	Co mg/L	Fe mg/L	Mn mg/L	U mg/L
2017	53.11	<1	120.6	7.5	78.0	1.764	0.071	<0.0005	0.05	0.013	0.0157
2018	40.87	<1	126.3	7.5	71.0	1.375	0.066	<0.0005	0.12	0.020	0.0166
2019	69.61	<1	123.0	7.7	70.7	1.847	0.049	<0.0005	0.13	0.022	0.0125
2020	81.45	<1	108.7	7.5	57.4	1.715	0.094	<0.0005	0.08	0.028	0.0097
2021	29.85	<1	99.3	7.6	52.2	1.511	0.101	<0.0005	0.07	0.022	0.0075
Annual Summary Statistics											
Average	54.98	<1	115.6	7.6	65.9	1.642	0.076	<0.0005	0.09	0.021	0.0124
Maximum	81.45	<1	126.3	7.7	78.0	1.847	0.101	<0.0005	0.13	0.028	0.0166
Minimum	29.85	<1	99.3	7.5	52.2	1.375	0.049	<0.0005	0.05	0.013	0.0075

Note: Five-year annual average, maximum and minimum statistics

The final point of control at TMA-1 facility was monitored at the Stollery Settling Pond Outlet (station D-2). Review of the annual average concentrations for TOMP and SAMP parameters for the last five years indicated consistently low TSS levels, stable radium-226 concentrations and near neutral pH values; with all compliance parameters meeting their grab sample and monthly mean discharge limits (Table 5.2.1.1.b). In addition, with the exception of uranium, all parameters remained below the SRWMP benchmarks (4.2.2) and cobalt remained close to the TDL. Annual average barium concentrations have increased over the last five years, with the exception of 2021, and can be attributed to the increased barium chloride addition rates required for radium-226 removal upstream in the D-1 influent. The 2021 barium annual concentration is lower but

reflects the reduced operating days in 2021 (134 days) compared to the 2020 operating days (278 days). In 2021, only 4227 kilograms (Kg) of barium chloride reagent was used compared to 15,431 kg in 2020 (Table 5.3.1.2.1). Uranium concentrations are elevated compared to influent concentrations but are generally stable and slightly declining. No toxicity has been observed over the last five years with sub-lethal *Ceriodaphnia dubia* testing, the species most sensitive to uranium concentrations, with the exception of the May 2021 result (discussed further below). Sulphate concentrations are elevated compared to influent water quality concentrations but have been displaying decreasing concentrations over the last five years, as do levels in the influent. (Table 5.2.1.1a). Annual loadings of the compliance parameters radium-226 and TSS are provided in Appendix IV.

Table 5.2.1.1b Final Discharge at Stollery Settling Pond Outlet (D-2)

PARAMETER UNITS	Flow (L/s)	Hardness mg/L	pH	SO4 mg/L	TSS mg/L	Ra Bq/L	Ba mg/L	Co mg/L	Fe mg/L	Mn mg/L	U mg/L
2017	59.23	305.8	7.3	230.8	1	0.123	0.205	0.0006	0.27	0.157	0.0390
2018	40.31	246.5	7.2	189.8	1	0.161	0.266	0.0006	0.27	0.157	0.0304
2019	70.89	236.1	7.2	179.2	1	0.152	0.338	0.0006	0.22	0.201	0.0325
2020	81.69	214.8	7.2	151.3	1	0.163	0.481	0.0006	0.29	0.170	0.0264
2021	39.19	237.4	7.2	163.3	1	0.115	0.284	0.0005	0.28	0.148	0.0281
Annual Summary Statistics											
Average	58.26	248.1	7.2	182.9	1	0.143	0.315	0.0006	0.27	0.167	0.0313
Maximum	81.69	305.8	7.3	230.8	1	0.163	0.481	0.0006	0.29	0.201	0.0390
Minimum	39.19	214.8	7.2	151.3	1	0.115	0.205	0.0005	0.22	0.148	0.0264

Note: Five-year annual average, maximum and minimum statistics

Toxicity was monitored for Denison TMA-1 at the final discharge station D-2 (Stollery Settling Pond Outlet) in order to estimate the potential effect that the effluent might have on biological components. Toxicity sampling was completed semi-annually in 2021 as per SAMP requirements and included the following tests: acute *Daphnia magna* and Rainbow Trout toxicity tests and sub lethal *Ceriodaphnia dubia* toxicity test. In 2021, results confirmed 0% acute mortality/lethality for *Daphnia magna* in the May sampling event, with 3% acute mortality in the November sampling event (within the 10% threshold). Rainbow trout at station D-2 indicated 0% mortality/lethality in both sampling events. A 100% IC_{25} result for *Ceriodaphnia dubia* was achieved in the November sampling event, however, only 22% was achieved in the May testing. Investigation with the laboratory revealed no observed issues with the control population and no mortality was observed in the acute testing with *Daphnia Magna* or Rainbow Trout in 100% effluent. All other parameters were consistent with typical values (Appendix IV).

5.2.1.1.1 Discharge Compliance – Denison TMA-1 Final Discharge

In 2021, TMA-1 effluent quality at the final point of control, D-2, was in compliance with the discharge limits established in the decommissioning licence (Table 5.2.1.1.1).

Table 5.2.1.1.1 2021 TMA-1 Compliance with Discharge Limits at Final Point of Control (D-2)

Month	Samples Required	Number of Times Discharge Limits Were Exceeded					
		pH pH units		TSS mg/L		Ra(T) Bq/L	
		Grab Sample Limit[1]: Upper 9.5 Lower 5.5	Monthly Arithmetic Mean[1]: Upper 9.5 Lower 6.5	Grab Sample Limit[1]: Upper 50 Lower N/A	Monthly Arithmetic Mean[1]: Upper 25 Lower N/A	Grab Sample Limit[1]: Upper 1.11 Lower N/A	Monthly Arithmetic Mean[1]: Upper 0.37 Lower N/A
Jan.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
Feb.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
Mar.	5	0 of 5	0 of 1	0 of 5	0 of 1	0 of 5	0 of 1
Apr.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
May	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
June	5	0 of 5	0 of 1	0 of 5	0 of 1	0 of 5	0 of 1
July	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
Aug.	5	0 of 5	0 of 1	0 of 5	0 of 1	0 of 5	0 of 1
Sept.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
Oct.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
Nov.	5	0 of 5	0 of 1	0 of 5	0 of 1	0 of 5	0 of 1
Dec.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
YTD	52	0 of 52	0 of 12	0 of 52	0 of 12	0 of 52	0 of 12

[1]Limits established in the Licence UMDL-MINEMILL-DENISON.01/indf issued December 15, 2004.

5.2.1.2 Denison Lower Williams Lake (TMA-2)

Site-specific water quality monitoring at the Denison LWL ETP was completed in accordance with TOMP and SAMP requirements. Detailed monthly average results are provided in Appendix IV.

LWL Influent station (D-22) is used to monitor seepage from Dam 1 and is located in a natural wetland area. Review of annual average concentrations for TOMP parameters at this station indicates variability for all parameters. Water quality at D-22 shows near neutral pH values (Table 5.2.1.2a) but does not impact pH levels downstream at the final discharge (Table 5.2.1.2b), values are within the SRWMP benchmark pH limits. Radium-226, uranium, barium, cobalt and sulphate annual concentrations are variable, but all remained below SRWMP benchmarks and sulphate continues to show a generally decreasing trend (Table 5.2.1.2a and Table 4.2.2). Iron and manganese annual concentrations appear elevated but are highly influenced by seasonal spikes generally observed in July during warm, dry weather and low water levels. Iron spikes each year ranged from 4.29 mg/L (2017) to 29.5 mg/L (2020) and manganese spikes each year ranged from 0.379 mg/L (2017) to 4.7 mg/L (2020). However, almost all other iron and manganese concentrations over the last five years remained well below the wetland SRWMP benchmark criteria of 2.49 mg/L (iron) and 0.841 mg/L (manganese). Detailed results for 2021 are provided in Appendix IV of this report and previous results are provided in their respective Annual OCM Reports (Denison, 2017-2020).

Table 5.2.1.2a Denison Lower Williams Lake ETP Influent (D-22)

PARAMETER UNITS	pH	SO4 mg/L	Ra Bq/L	Ba mg/L	Co mg/L	Fe mg/L	Mn mg/L	U mg/L
2017	6.7	72.0	0.171	0.023	<0.0005	1.39	0.186	0.0008
2018	6.7	93.0	0.485	0.041	0.0014	5.24	1.315	0.0019
2019	6.7	59.3	0.250	0.029	0.0006	2.54	0.374	0.0008
2020	6.8	40.5	0.319	0.045	0.0009	7.68	1.265	0.0019
2021	6.8	67.0	0.436	0.067	0.0010	6.78	0.733	0.0011
Annual Summary Statistics								
Average	6.7	66.4	0.332	0.041	0.0010	4.73	0.775	0.0013
Maximum	6.8	93.0	0.485	0.067	0.0014	7.68	1.315	0.0019
Minimum	6.7	40.5	0.171	0.023	0.0006	1.39	0.186	0.0008

Note: Five year annual average, maximum and minimum statistics

The final discharge from LWL is monitored near the Denison Access Road at Station D-3. Review of annual average concentrations for TOMP and SAMP demonstrate stable pH values and consistently low TSS concentrations (Table 5.2.1.2b). The annual average radium-226 concentration has been increasing over the past five years but continues to remain within historical values. These values are not unexpected as increases in radium-226 over time were predicted in the 1995 EIS (DML 1995) due to decreasing sulphate concentrations, also reflected in the Table 5.2.1.2b.

Radium-226 concentrations remain well below the grab sample (1.1 Bq/L) and monthly mean (0.37 Bq/L) discharge limits. Anomalous radium-226 results were reported at D-3 in July and are discussed in further detail in Section 5.2.1.2.1 and Appendix V. Annual average barium

concentrations have increased over the last five years and can be attributed to the increased barium chloride addition rates used for radium-226 removal upstream in the D-22 influent. Although annual radium-226 concentrations have indicated a gradually increasing trend, concentrations are still well below discharge limits and therefore consideration should be given to the amount of barium chloride used for radium-226 removal. The 2021 consumption rates were more than 5 times higher (2021 annual monthly average at 11 mg/L) compared to the previous year (2020 annual monthly average at 2 mg/L) (Table 5.3.2.2.1) to maintain consistent and concentrations well below discharge limits. Overtreatment is resulting in an increase in barium discharge and may not materially reduce potential risks from radium-226 release.

Uranium concentrations at D-3 are higher than the influent uranium concentrations at D-22 (Table 5.2.1.2a) however, this is likely attributed to a 1959 operational spill that impacted Denison Lower Williams Lake (DML 1995).

There is a known and long-standing differential in uranium concentrations prior to the ETP (D-22) and after the ETP (D-3) dating back decades and attributed to an operational spill impacting Denison Lower Williams Lake in 1959 (DML 1995). It was described in the EIS that a quantity of tailings flowed out through the original decant system at Dam 1 and reached a beaver pond (now a settling pond). The spill was remediated between 1976 and 1977. A Hypalon-lined ditch was created to channel the treated effluent from Dam 1 around the vegetated tailings into the settling pond.

Some of the tailings spilled in 1959 are submerged in the settling pond, which is now retained by a sand and gravel dyke constructed in 1981. A relatively small quantity of precipitate has formed in the Hypalon-lined ditch and in the settling pond.

Uranium concentrations at D-3 have decreased over time stabilizing around 2013. There is no specific regulatory limit at D-3 discharge point for uranium concentrations, however comparing with the benchmark of 0.015 mg/L for the receiving environment criteria of the Serpent River Watershed Monitoring Program (SRWMP) (Cycle 4 Study Design, 2014), and the Canadian and Ontario Drinking Water Quality Criteria of 0.02 mg/L (2019), the uranium concentrations at D-3 have been lower than these benchmark and criteria for the past approximately nine years.

Uranium concentrations at D-3 have remained stable and are below levels considered to be toxic to aquatic biota (0.0150 mg/L) (CCME, 2020). Despite some variability, all parameter annual average concentrations consistently meet downstream receiving environment water quality criteria (Table 4.2.2).

Table 5.2.1.2b Lower Williams Final Discharge at Denison Access Road (D-3)

PARAMETER UNITS	Flow (L/s)	Hardness mg/L	pH	SO4 mg/L	TSS mg/L	Ra Bq/L	Ba mg/L	Co mg/L	Fe mg/L	Mn mg/L	U mg/L
2017	15.65	113.8	7.1	68.2	1	0.120	0.228	<0.0005	0.12	0.015	0.0048
2018	6.71	109.7	7.2	65.6	1	0.126	0.282	<0.0005	0.12	0.016	0.0048
2019	11.62	90.3	7.1	53.9	1	0.137	0.321	0.0005	0.21	0.040	0.0038
2020	10.67	83.5	7.1	45.3	1	0.175	0.391	0.0005	0.25	0.047	0.0029
2021	4.72	101.2	7.1	56.6	1	0.221	0.388	0.0005	0.21	0.040	0.0033
Annual Summary Statistics											
Average	9.87	99.7	7.1	57.9	1	0.156	0.322	0.0005	0.18	0.032	0.0039
Maximum	15.65	113.8	7.2	68.2	1	0.221	0.391	0.0005	0.25	0.047	0.0048
Minimum	4.72	83.5	7.1	45.3	1	0.120	0.228	<0.0005	0.12	0.015	0.0029

Note: Five-year annual average, maximum and minimum statistics

5.2.1.2.1 Discharge Compliance – Lower Williams Final Discharge

In 2021, Denison initially reported a total radium-226 monthly mean concentration of 0.505 Bq/L at the Denison Williams Lake Outlet final discharge point (D-3) for the month of July 2021. This concentration was above the monthly mean discharge limit of 0.37 Bq /L as established in the Denison Mines CNSC Licence (UMDL-MINEMILL-DENISON.01/indf) and Ontario Certificate of Approval Industrial Sewage 4-034-76-006 (Appendix V). However, considering the revaluation of July 2021 radium-226 results, LWL effluent quality at the final point of control, D-3, was in compliance with the discharge limits established in the decommissioning licence (Table 5.2.1.2.1).

Due to the use of an alpha counter for radium-226 analysis between May 2021 to October 2021, as noted in Section 4.2.4 above and detailed in Appendix V, higher than historical radium-226 concentrations were recorded and an exceedance of the July monthly mean radium-226 limit at D-3 was reported to regulators on August 18, 2021. The results of the investigation into the exceedance determined that the high radium-226 values were a result of an inappropriate method being used for radium-226 analysis for the water quality at the closed mine sites in Elliot Lake. Repeat analysis of the July 2021 samples, and additional analysis at a second laboratory using alpha spectrometry, provided results consistent with values typically observed. Based on the results of the investigation, the August 18, 2021, station D-3 radium-226 concentration monthly average exceedance is no longer considered to be a regulatory exceedance. Radium-226 samples continue to be sent for analysis by alpha spectrometer to ensure accurate results. Details of the investigation are provided in Appendix V.

Table 5.2.1.2.1 2021 Lower Williams Compliance with Discharge Limits at Final Point of Control (D-3)

Month	Samples Required	Number of Times Discharge Limits Were Exceeded					
		pH pH units		TSS mg/L		Ra(T) Bq/L	
		Grab Sample Limit[1]: Upper 9.5 Lower 5.5	Monthly Arithmetic Mean[1]: Upper 9.5 Lower 6.5	Grab Sample Limit[1]: Upper 50 Lower N/A	Monthly Arithmetic Mean[1]: Upper 25 Lower N/A	Grab Sample Limit[1]: Upper 1.11 Lower N/A	Monthly Arithmetic Mean[1]: Upper 0.37 Lower N/A
Jan.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
Feb.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
Mar.	5	0 of 5	0 of 1	0 of 5	0 of 1	0 of 5	0 of 1
Apr.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
May	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
June	5	0 of 5	0 of 1	0 of 5	0 of 1	0 of 5	0 of 1
July	3	0 of 3	0 of 1	0 of 3	0 of 1	0 of 3	0 of 1
Aug.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
Sept.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
Oct.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
Nov.	5	0 of 5	0 of 1	0 of 5	0 of 1	0 of 5	0 of 1
Dec.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
YTD	50	0 of 50	0 of 12	0 of 50	0 of 12	0 of 50	0 of 12

[1]Limits established in the Licence UMDL-MINEMILL-DENISON.01/indf issued December 15, 2004.

5.2.1.3 Stanrock ETP

Discharge, runoff, and seepage from the Stanrock TMA collects into a small holding pond where the ETP Influent station is monitored. Samples were analysed within the holding pond prior to treatment (DS-2) to closely monitor and make treatment adjustments as required to ensure compliant water quality at the final discharge station (DS-4).

A five-year review of the annual averages at DS-2 confirms this station to have a low pH with a high acid concentration. The annual average concentrations for most parameters at DS-2 appeared to be relatively stable with some slight variability and cobalt and iron indicated a gradually decreasing trend since 2019 (Table 5.2.1.3a). Annual average radium-226 concentrations indicate a slightly increasing trend over the past five years, however, annual averages since 2018 have been heavily influenced by several historic spikes, one that occurred in each year, ranging from 0.730 Bq/L to 0.797 Bq/L, during the hot, dry summer months when water levels are lower. Approximately 83% of all radium-226 results over the last five years are < 0.250 Bq/L and annual averages continue to remain below SRWMP benchmarks (Table 5.2.1.3a). Detailed results for 2021 are provided in Appendix IV of this report and previous results are provided in their respective Annual OCM Reports (Denison, 2017-2020).

Table 5.2.1.3a Stanrock Influent (DS-2)

PARAMETER UNITS	Flow (L/s)	ACID mg/L	pH	SO4 mg/L	Ra Bq/L	Ba mg/L	Co mg/L	Fe mg/L	Mn mg/L	U mg/L
2017	75.87	194	2.8	502.5	0.182	0.018	0.0682	28.80	1.349	0.0270
2018	44.49	231	2.9	595.0	0.231	0.019	0.0787	47.10	2.117	0.0188
2019	64.14	197	2.8	490.0	0.267	0.016	0.0647	33.35	1.305	0.0241
2020	65.76	171	3.1	437.5	0.273	0.019	0.0598	28.38	1.067	0.0150
2021	32.09	175	2.9	467.5	0.265	0.017	0.0551	26.65	1.362	0.0120
Annual Summary Statistics										
Average	56.47	194	2.9	498.5	0.244	0.018	0.0653	32.86	1.440	0.0194
Maximum	75.87	231	3.1	595.0	0.273	0.019	0.0787	47.10	2.117	0.0270
Minimum	32.09	171	2.8	437.5	0.182	0.016	0.0551	26.65	1.067	0.0120

Note: Five year annual average, maximum and minimum statistics

Note: Five-year annual average, maximum and minimum statistics

Water quality at the Stanrock Final Point of Control is monitored at Orient Lake Outlet (DS-4). A review of water quality data at DS-4 for the last five years indicated generally stable pH values and TSS levels, comparable to other final discharge stations, that consistently met the discharge limits set out in the licence (Table 5.2.1.3.1). Annual average sulphate concentrations were consistent with DS-4 final discharge values over the last five years and have displayed a decreasing trend since 2017 (Table 5.2.1.3b). All metal concentrations consistently met receiving environment benchmarks for SRWMP (Table 4.2.2). Radium-226 annual averages continued to remain well below the monthly mean discharge criteria of 0.37 Bq/L set in the decommissioning licence. Results should be interpreted with caution as the 2021 annual average radium-226 results are likely influenced by the inaccuracy of Testmark's analytical methodology for radium-226, which produced values higher than typically observed between April and October 2021. Details of this issue is discussed in Appendix V. Annual average barium concentrations have increased over the last five years and can be attributed to the increased barium chloride addition rates required for radium-226 removal upstream in the DS-2 influent. Annual radium-226

concentrations have indicated a slightly increasing trend over the past five years but concentrations remain well below discharge limits and consideration should be given to the amount of barium chloride used for radium-226 removal. Consumption rates were almost doubled in 2021 (annual monthly average at 0.99 mg/L) compared to the previous year (annual monthly average at 0.58 mg/L) to maintain consistent and relatively low concentrations (Table 5.3.3.2.1). Consideration should be given to barium chloride addition rates as overtreatment is resulting in an increase in barium discharge and may not materially reduce potential risks from radium-226 release.

Table 5.2.1.3b Orient Lake Outlet Stanrock Final Point of Control (DS-4)

PARAMETER UNITS	Flow (L/s)	Hardness mg/L	pH	SO4 mg/L	TSS mg/L	Ra Bq/L	Ba mg/L	Co mg/L	Fe mg/L	Mn mg/L	U mg/L
2017	60.27	331.8	7.2	277.5	1	0.072	0.045	0.0006	0.17	0.044	0.0042
2018	25.58	303.8	7.1	248.3	1	0.081	0.065	0.0006	0.15	0.052	0.0042
2019	42.06	294.7	7.2	251.7	1	0.083	0.060	0.0005	0.14	0.045	0.0046
2020	43.42	279.6	7.0	224.2	1	0.086	0.067	0.0005	0.13	0.040	0.0038
2021	20.42	245.7	7.1	222.5	1	0.128	0.077	< 0.0005	0.09	0.032	0.0050
Annual Summary Statistics											
Average	38.35	291.1	7.1	244.8	1	0.090	0.063	0.0005	0.14	0.043	0.0044
Maximum	60.27	331.8	7.2	277.5	1	0.128	0.077	0.0006	0.17	0.052	0.0050
Minimum	20.42	245.7	7.0	222.5	1	0.072	0.045	< 0.0005	0.09	0.032	0.0038

Note: Five-year annual average, maximum and minimum statistics

Toxicity was monitored for the Stanrock site at the final discharge (DS-4) as per SAMP requirements. In 2021, toxicity testing was done in the spring and fall, and included the same tests that were completed at the Denison TMA-1 final effluent (D-2). Results of the 2021 toxicity tests at DS-4 confirmed 0% acute lethality for both *Daphnia magna* and rainbow trout for both sampling events (Appendix IV). The fall (November) 2021 *Ceriodaphnia* dubia sub-lethal test resulted in an IC_{25} of 0.147%. The fall sample had no effect on survival (LC50 >100% effluent) but did appear to have an effluent dose-response effect on reproduction. Due to laboratory issues, the fall *C. dubia* test was carried out at an alternate qualified laboratory and organisms passed all required test validity criteria. Data and results have been re-checked and verified. Measured parameters in the sample effluent were within typical values and do not indicate a change that could result in toxicity (Appendix IV). Denison will continue to monitor and test the DS-4 discharge and examine results to identify any trends or potential causes. The spring sub-lethal test resulted in a >100% IC_{25} (Appendix IV). Overall, results are indicative of a non-toxic effluent for aquatic life.

As part of an investigation into the surface water quality of an unnamed lake located between the Stanrock site and Quirke Lake, a field sampling program was carried out in the summer of 2021 (email Benson to Crosson, May 20, 2021). Results of this field program will be presented to regulators under separate cover in 2022.

5.2.1.3.1 *Discharge Compliance – Stanrock Final Discharge*

In 2021, Stanrock TMA effluent quality at the final point of control (DS-4), met the discharge criteria established in the decommissioning licence (Table 5.2.1.3.1).

Table 5.2.1.3.1 2021 Stanrock TMA Compliance with Discharge Limits at Final Point of Control (DS-4)

Month	Samples Required	Number of Times Discharge Limits Were Exceeded					
		pH pH units		TSS mg/L		Ra(T) Bq/L	
		Grab Sample Limit[1]: Upper 9.5 Lower 5.5	Monthly Arithmetic Mean[1]: Upper 9.5 Lower 6.5	Grab Sample Limit[1]: Upper 50 Lower N/A	Monthly Arithmetic Mean[1]: Upper 25 Lower N/A	Grab Sample Limit[1]: Upper 1.11 Lower N/A	Monthly Arithmetic Mean[1]: Upper 0.37 Lower N/A
Jan.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
Feb.	4	0 of 5	0 of 1	0 of 5	0 of 1	0 of 5	0 of 1
Mar.	5	0 of 5	0 of 1	0 of 5	0 of 1	0 of 5	0 of 1
Apr.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
May	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
June	5	0 of 5	0 of 1	0 of 5	0 of 1	0 of 5	0 of 1
July	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
Aug.	5	0 of 5	0 of 1	0 of 5	0 of 1	0 of 5	0 of 1
Sept.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
Oct.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
Nov.	5	0 of 5	0 of 1	0 of 5	0 of 1	0 of 5	0 of 1
Dec.	4	0 of 4	0 of 1	0 of 4	0 of 1	0 of 4	0 of 1
YTD	52	0 of 52	0 of 12	0 of 52	0 of 12	0 of 52	0 of 12

[1]Limits established in the Licence UMDL-Minemill-Stanrock.02/indf issued September, 2010.

5.2.2 Groundwater Quality

Field quality assurance and quality control sampling was extended to the groundwater monitoring program in 2006. Detailed groundwater QA/QC results against DQOs are included in Appendix III and groundwater station-specific five-year annual data are included in Appendix IV. The 2021 groundwater field blank and field precision data summary is presented in Table 5.2.2.

The field precision DQO of 20% for sulphate was exceeded in 1 of 3 results at 37%. However, sulphate concentrations at BH91 SG2A were consistent with typical values, along with the other parameters and therefore do not affect interpretation of groundwater quality results. The annual average field precision for sulphate was below the DQO at 12% (Table 5.2.2) mg/L. All other field precision DQO's for all parameters were met in 2021.

There were four field blank results that did not meet their respective DQO's (Table 5.2.2); one for iron and three for acidity.

The iron field blank DQO criteria of 0.04 mg/L was exceeded in 1 of 3 samples at 0.09 mg/L. However, the iron concentration at this location, 98-15A, is much higher at 489.0 mg/L and therefore this does not impact interpretation of groundwater quality results at this location.

The acidity field blank DQO criteria of 2 mg/L was exceeded in all 3 samples, ranging from 3 mg/L to 18 mg/L (Table 5.2.2). This demonstrates some contamination was present in the samples and was likely caused from insufficient rinsing of the equipment with distilled water. However, acidity concentrations at two of the locations (BH91-SG2A and BH98-15A) have much higher concentrations at 2569 mg/L and 1040 mg/L, respectively; With the third location (BH91-DG4B), acidity remained consistent with typical values at <1 mg/L despite the contamination observed in the field blank at 3 mg/L; therefore, none of the exceedances impacted interpretation of groundwater acidity results.

Table 5.2.2 2021 Groundwater Field Blank and Field Precision Data Summary

		pH pH units	SO_4 mg/L	Acidity mg/L	Fe mg/L
Field Blank Statistics					
	Count	3	3	3	3
	Average	6.4	0.1	9	0.04
	Min	6.3	0.1	3	0.01
	Max	6.5	0.1	18	0.09
Field Blank Exceedances					
	DQO Criteria[1]	-	0.2	2	0.04
	# Exceedances	0	0	**3**	1
Field Precision Statistics					
	Count	3	3	3	3
	Average	0%	12%	1%	3%
	Min	0%	37%	3%	3%
	Max	0%	0%	0%	2%
Field Precision Exceedances					
	DQO Criteria[1]	20%	20%	20%	20%
	# Exceedances	0	**1**	0	0

[1]Field criteria taken from Table 6.2 of the Cycle 5 Study Design for SRWMP, SAMP and TOMP (Minnow Environmental Inc., 2019)

Bold indicates an exceedance of the criteria

5.2.2.1 Denison TMA-1 Groundwater Results

Samples could not be collected (no recharge) from monitoring stations BH91 D1A and BH91 D1B, at the east end of TMA-1, downstream of Dam 17 on the North Abutment, in 2021 (Appendix IV). Samples could not be collected at station BH91 D1B in 2018 and 2019 and BH91 D1A in 2019 due to lack of recharge, therefore, the lack of sample collection in 2021 is not unexpected. Of the samples that could be collected over the last five years, sulphate remains elevated with slightly elevated iron and acidity below detection limits in both wells.

Groundwater quality downstream of Dam 17 in the North Valley (BH91 D3A and BH91 D3B) could be characterized by having stable pH values with relatively high acidity, iron, and sulphate concentrations. Concentrations of most measured parameters at these stations were variable over the past five years with acidity in both wells showing a decline. Sulphate and iron concentrations are slightly lower in 2021 compared to 2020 at BH91 D3A and BH91 D3B.

Downstream of Dam 10 (BH91 DG4B) groundwater was characterized by near neutral pH, variable sulphate concentrations, and historically low acidity over the past five years (Appendix IV). Iron concentrations have been low compared to other wells. Acidity in 2021 is similar to previous years after a small increase in 2020.

5.2.2.2 Denison Lower Williams Lake

A review of the last five years of groundwater monitoring results downstream of Dam 1 on the North Ridge (BH91 D9A) indicated relatively stable and near neutral pH levels. Acidity concentrations have generally decreased over the past five years (Appendix IV). Sulphate concentrations are elevated compared to some other GW stations and have been stable over the past five years. Iron concentrations are generally stable and within the range of measured data over the past five years.

5.2.2.3 Stanrock

Groundwater quality was measured at Stanrock downstream of the following dams: Dam A (BH91 SG1A), Dam B (BH98-16A), and Dam C (BH98-15A).

Dam A groundwater was characterized by low pH levels with consistently elevated sulphate, acidity, and iron concentrations (Appendix IV). There are no other discernible trends in the data set.

Dam B groundwater quality was similar to Dam A, with a lower pH and elevated sulphate, acidity and iron concentrations (Appendix IV). There are no other discernible trends in the data set. Groundwater quality monitored downstream of Dam C at BH98 15A indicates depressed pH with consistently high acidity, sulphate and iron, with a possible decreasing trend for iron (Appendix IV). There are no other discernable trend in the data set.

5.2.3 Porewater Quality

Porewater quality at the Stanrock site was monitored upstream of Dam A at the following stations:ST3, which includes four nested wells: ST3 P3 (total depth = 5.94 m), ST3 P5 (total depth = 2.64 m), ST3 P6 (total depth = 11.58 m), and ST3 P8 (total depth = 20.91m), and upstream of Dam D at BH91 SG2A (total depth = 33.31 m), BH91 SG2D (total depth = 4.39 m).

Assessment of the porewater quality data at the above mentioned stations show low pH levels with the lowest value observed at surface (2.64 m), ranging from 3.2 to 3.4, with high acidity, sulphate, and iron concentrations in all wells (Appendix IV). Concentrations of acidity, iron, and sulphate were highest in the deeper wells (i.e. ST3 P6 and ST3 P8), with lower concentrations in the shallower wells (ST3 P3 and ST3 P5).

Samples could not be collected at the monitoring well located downstream of Dam D (BH91 SG2D) over the last five years due to no recharge of the well, however samples were collected at BH91 SG2A with the exception of 2019 due to no recharge in the well. Porewater quality results obtained at this station were generally consistent over the last five years, with elevated concentrations of iron, acidity and sulphate. This is very similar to all other monitoring stations at Stanrock (Appendix IV).

5.3 Site Specific Maintenance and Operations Program

Site-specific program reports are provided in the following sections in accordance with the TOMP and SAMP Annual Reporting Requirements. Each section provides the following information:

- Summary of Tailings Management Area (TMA) Maintenance
- Summary of Effluent Treatment Plant (ETP) Operations

5.3.1 Denison TMA-1

5.3.1.1 TMA Maintenance

Routine inspections and preventative maintenance were performed at the Denison TMA-1 as required. Any equipment that was able to be repaired either on-site or sent out was done so, and anything that was damaged or worn beyond repair was replaced with a new unit. All maintenance was completed to ensure continued efficiency and safe operations on site. Furthermore, proper calibrations of monitoring equipment were conducted on a consistent basis and recorded accordingly.

Additional maintenance activities for Denison TMA-1 site completed in 2021 are as follows:

- The pump head on the barium chemical feed pump was replaced.

5.3.1.2 ETP Operations

The ETP located at the Denison TMA-1 spillway (D-1) operated for 134 days in 2021 (Table 5.3.1.2.1). The ETP treated approximately 941,000,000 L of water, with a monthly average daily plant flow of 81 L/s. A total of 4227 kg of barium chloride was used for radium-226 removal, considerably less than the previous year at 15,431 kg. This reflects the fewer days the plant operated in 2021 compared to the previous year, which was more than double at 278 days. Sodium hydroxide (NaOH) was not utilized for pH neutralization in 2021 because the TMA-1 influent is already neutral to slightly alkaline, ranging from 7.2 to 8.0 and therefore does impact pH downstream at the final discharge at D-2 (Table 5.3.1.2.1). An estimated 1,248,000,000 L was discharged from the final point of control at the Stollery Lake Settling Pond Outlet (D-2). Although the plant only operated for 134 days, discharge at D-2 occurred for 365 days in 2021 (Table 5.3.1.2.1). Annual monthly average daily discharge flow was 40 L/s.

5.3.1.2.1 Operating Summary

In 2021, the TMA-1 ETP operated consistently for 134 days from January to mid-May when it was shut down on May 14 and did not resume operation for the remainder of the year. Siphons were used to draw from the TMA to ensure the pond level remained below spillway elevation as well as to maintain a controlled release of water from TMA-1. This controlled release of water from TMA-1 ensured the maximization of radium-226 settling in the Stollery Lake Settling Pond, especially during times of high precipitation. All obstacles preventing orderly operations were resolved in a timely fashion with no repercussion and were considered to be routine maintenance.

Table 5.3.1.2.1 2021 TMA-1 Effluent Treatment Plant Flow Rates, Operating Days, and Discharge Days

ITEM	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Y.T.D. 2021	Y.T.D. 2020
PLANT OPERATIONS														
Operating Days	31	28	31	30	14	0	0	0	0	0	0	0	134	278
Maximum Daily Plant Flow (L/s D-1)	86	84	106	106	91	0	0	0	0	0	0	0	106	188
Minimum Daily Plant Flow (L/s @ D-1)	34	80	79	90	89	0	0	0	0	0	0	0	0	0
Monthly Average Daily Plant Flow (L/s @ D-1)	53	82	90	97	91	0	0	0	0	0	0	0	81	107
Total Volume Treated (ML)	142	198	241	251	109	0	0	0	0	0	0	0	941	2568
Barium Chloride Consumption														
total kg/month	519	893	1323	1119	373	0	0	0	0	0	0	0	4227	15431
monthly average mg/litre	3.65	4.52	5.48	4.47	3.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.49	6.01
Caustic Soda Consumption														
total kg/month	0	0	0	0	0	0	0	0	0	0	0	0	0	9
monthly average mg/litre	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EFFLUENT														
Discharge Days	31	28	31	30	31	30	31	31	30	31	30	31	365	366
Maximum Daily Discharge Flow (L/s D-2)	81	84	97	104	104	17	14	14	19	27	23	34	104	187
Minimum Daily Discharge Flow (L/s D-2)	44	81	69	84	9	7	7	4	9	19	16	25	4	9
Monthly Average Daily Discharge Flow (L/s D-2)	53	82	86	90	53	10	9	10	16	22	19	28	40	83
Total Volume Discharged (ML)	143	198	231	233	141	26	25	26	41	59	50	76	1248	2609

5.3.2 Denison Lower Williams Lake

5.3.2.1 TMA Maintenance

Routine inspections and preventative maintenance were performed at the Denison Lower Williams Lake site as required. Any equipment that was able to be repaired either on-site or sent out was done so, and anything that was damaged or worn beyond repair was replaced with a new unit. All maintenance was completed to ensure continued efficiency and safe operations on site. Furthermore, proper calibrations of monitoring equipment were conducted on a consistent basis and recorded accordingly. No additional non-routine maintenance was required to be completed.

5.3.2.2 Summary of ETP Operations

The ETP located at the Denison Lower Williams Lake station (D-22) operated for 365 days in 2021 (Table 5.3.1.2.1). The ETP treated approximately 156,000,000 L of water, with a monthly average daily plant flow of 5 L/s. The total amount of barium chloride that was used for radium-226 removal was 1667 kg, more than twice as much used in the previous year (678 kg), suggesting there may be overtreatment. Although annual radium-226 concentrations have indicated a gradually increasing trend, concentrations are still well below discharge limits and therefore consideration should be given to the amount of barium chloride used for radium-226 removal. An estimated 154,000,000 L was discharged from the final point of control (D-3) and took place over 352 days of 2021. Annual monthly average daily discharge flow was 5 L/s (Table 5.3.2.2.1).

5.3.2.2.1 Operating Summary

In 2021, the Denison Lower Williams Lake ETP operated every day of every month. Treatment conditions at LWL were for the sole purpose of controlling radium-226 levels in the effluent. Neutralization treatment has not been required at this site since 2002. Flow to the ETP continued year-round, the treatment plant continued to run all year and discharge occurred on 352 days in 2021.

Table 5.3.2.2.1 2021 Lower Williams Lake ETP Flow Rates, Operating Days, and Discharge Days

ITEM	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Y.T.D. 2021	Y.T.D. 2020
PLANT OPERATIONS														
Operating Days	31	28	31	30	31	30	31	31	30	31	30	31	365	366
Maximum Daily Plant Flow (L/s @ D-3)	4	1	15	12	28	3	3	3	4	10	8	11	28	72
Minimum Daily Plant Flow (L/s @ D-3)	3	1	1	6	2	1	1	1	2	4	2	6	1	1
Monthly Average Daily Plant Flow (L/s @ D-3)	4	1	5	9	11	1	2	2	3	8	5	8	5	11
Total Volume Treated (ML)	9	2	13	23	29	3	5	6	7	21	13	22	156	346
Barium Chloride Consumption														
total kg/month	103	93	103	100	103	100	103	147	200	206	200	208	1667	678
monthly average mg/litre	11.01	38.53	7.71	4.28	3.50	29.78	19.31	24.31	28.03	9.92	14.84	9.41	11	2
Caustic Soda Consumption														
total kg/month	0	0	0	0	0	0	0	0	0	0	0	0	0	0
monthly average mg/litre	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EFFLUENT														
Discharge Days	31	28	31	30	31	30	25	24	30	31	30	31	352	349
Maximum Discharge Flow (L/s @ D-3)	4	1	15	12	28	3	3	3	4	10	8	11	28	72
Minimum Discharge Flow (L/s @ D-3)	3	1	< 1	6	2	1	1	1	2	4	2	6	1	1
Monthly Average Discharge Flow (L/s @ D-3)	4	1	5	9	11	1	2	2	3	8	5	8	5	11
Total Volume Discharged (ML)	9	2	13	23	29	3	4	5	7	21	13	22	154	343

5.3.3 Stanrock TMA

5.3.3.1 TMA Maintenance

Routine inspections and preventative maintenance were performed at the Denison Stanrock TMA site as required. Any equipment that was able to be repaired either on-site or sent out was done so, and anything that was damaged or worn beyond repair was replaced with a new unit. All maintenance was completed to ensure continued efficiency and safe operations on site. Furthermore, proper calibrations of monitoring equipment were conducted on a consistent basis and recorded accordingly.

Additional maintenance to the Denison Stanrock TMA completed in 2021 are as follows:

- As per CNSC recommendations, signage was posted on the ETP building next to the door to ensure it was visible when the door is open,
- Lime pump #2 was repaired due to leaking. The packing, the impeller, and the sleeve on the gland side of the liner were replaced,
- A quick connect system for a portable generator was installed by the electrician,
- A spare pump was installed to replace Pump #3 at the Dam G pumphouse,
- Two new barium chemical feed pumps were sourced.

5.3.3.2 Summary of ETP Operations

The Stanrock ETP operated periodically throughout the year for the purpose of stabilizing pH and radium-226 levels. The ETP, which was monitored at station DS-2, operated a total of 124 days, with an average monthly daily plant flow of 98 L/s. Throughout 2021, an estimated 1,048,000,000 L of water were treated with barium chloride for radium-226 removal and lime addition for neutralization. In 2021, 1043 kg of barium chloride and 106.07 dry tonnes of lime were used at the Stanrock ETP. In total, 664,000,000 L were discharged from the final point of control (DS-4), over a total of 365 days. Monthly average daily discharge flow at DS-4 was 21 L/s for 2021 (Table 5.3.3.2.1).

5.3.3.2.1 Operating Summary

The Stanrock ETP operated as required throughout the year to maintain discharge compliance and control of the Holding Pond water levels. Operating days within each month ranged from 2 - 20 days, operating in all of the 12 months of the reporting year. Most of the operating days were during spring and fall as runoff and rainfall conditions were most often present during these times of the year (Table 5.3.3.2.1). High water levels throughout the spring can cause overflow of Beaver Lake into the Moose Lake Settling Pond. To help neutralize the acidity entering the Moose Lake Settling Pond, caustic soda is dispensed into Orient Creek. This practice was not required in 2021 and no amount of caustic soda was added to Orient Creek.

Table 5.3.3.2.1 2021 Stanrock ETP Flow Rates, Operating Days, and Discharge Days

ITEM	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Y.T.D. 2021	Y.T.D. 2020
PLANT OPERATIONS														
Operating Days	8	7	20	18	11	2	9	6	6	11	6	20	124	183
Maximum Daily Plant Flow (L/s @ DS-2)	122	121	134	126	124	83	118	112	103	115	104	124	134	226
Minimum Daily Plant Flow (L/s @ DS-2)	89	82	80	74	74	58	57	51	38	62	61	86	38	75
Monthly Average Daily Plant Flow (L/s @ DS-2)	106	105	110	99	100	71	82	84	76	91	83	107	98	134
Total Volume Treated (ML)	73	64	189	155	95	12	64	44	39	86	43	185	1048	2114
Barium Chloride Consumption														
total kg/month	48	39	217	169	105	14	78	50	42	96	36	148	1043	1221
monthly average mg/litre	0.66	0.62	1.15	1.09	1.11	1.18	1.22	1.15	1.08	1.12	0.84	0.80	0.99	0.58
Lime Consumption														
total dry tonnes/month	4.56	3.72	19.12	13.16	10.67	1.21	9.57	5.43	5.18	11.65	3.57	18.23	106.07	153.03
monthly average g/litre	0.06	0.06	0.10	0.09	0.11	0.10	0.15	0.12	0.13	0.13	0.08	0.10	0.10	0.07
NEUTRALIZATION														
Lime Consumption														
Beaver Lake total dry tonnes/month	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Site total including ETP Operations	4.56	3.72	19.12	13.16	10.67	1.21	9.57	5.43	5.18	11.65	3.57	18.23	106.07	153.0
EFFLUENT														
Discharge Days	31	28	31	30	31	30	31	31	30	31	30	31	365	366
Maximum Daily Discharge Flow (L/s @ DS-4)	17	13	91	105	91	9	9	25	17	30	21	67	105	232
Minimum Daily Discharge Flow (L/s @ DS-4)	9	6	9	17	9	1	1	6	3	13	6	21	1	1
Monthly Average Daily Discharge Flow (L/s @ DS-4)	12	9	41	51	34	5	4	15	7	20	15	40	21	44
Total Volume Discharged (ML)	32	21	111	132	90	13	10	40	17	54	38	106	664	1399

6 REFERENCES

Minnow Environmental Inc. and Beak International Incorporated, 2001. Serpent River Watershed Monitoring Program – 1999 Study. April 2001.

Minnow Environmental Inc., 2019. The Cycle 5 Study Design for the SRWMP, SAMP and TOMP. Prepared for Rio Algom Limited and Denison Mines Inc. February 2019.

Minnow Environmental Inc., 2021. Serpent River Watershed Cycle 5 (2014 to 2019) State of the Environment Report. Prepared for Rio Algom Limited and Denison Mines Inc. March 2021.

Denison Mines Inc. and Rio Algom Limited. Serpent River Watershed Monitoring Program 2021 Annual Water Quality Report. (Rio Algom Limited and Denison Mines Inc.) March 2021.

Denison Mining Limited (DML). 1995. Environmental Impact Statement (EIS) Decommissioning of the Denison and Stanrock Tailings Management Areas. February 1995.

APPENDIX I
Summary of Cycle 5

Summary of Changes to the Elliot Lake Monitoring Programs (IBMP, TOMP, SAMP, and SRWMP) and Associated Documents[b]

Cycle	Report Title	Year	Period Covered	Descriptions of Changes to the Monitoring Programs within Each Cycle
Cycle 1	Serpent River Watershed Monitoring Program Framework Document	1999	historical monitoring data	**IBMP, TOMP, SAMP, and SRWMP** were developed based on program objectives and existing monitoring data collected over the period of operations and decommissioning.
	In-Basin Monitoring Program Report	1999		
	Serpent River Watershed and In-Basin Monitoring Program – Implementation Document	1999		
	Serpent River Watershed Monitoring Program -1999 Study	2001	1999 to 2000	
	In-Basin Monitoring Program for the Uranium Tailings Areas - 1999 Study	2001		
Cycle 2	Overview of Elliot Lake Monitoring Programs and Source Area Monitoring Program Design	2002	2000 to 2004	**Changes only SRWMP** most associated with optimization after first cycle of program was complete: • monitoring substances reduced to mine indicator parameters (barium, cobalt, DOC, iron, manganese, radium-226, selenium, silver, sulphate and uranium); • addition of two lake reference stations (Summers and Semiwite lakes) and 3 stream reference areas (SR-16, SR-17 and SR-18); • removal of shallow lakes for sediment and benthic sampling (Westner, Grassy, Halfmoom, Upper Cinder and Horne lakes); • removal of some stream sediment and benthic stations (D-15, SC-03 and SR-07); • removal of Depot Lake and Serpent Harbour; addition of May Lake; • the transfer of some SRWMP stations to SAMP or TOMP (N-12, ECA-131, P-11, MPE and Q-23); and • fish health assessment eliminated based on performance, fish community assessment added for McCabe Lake and fish tissue monitoring reduced in scope based on performance.
	TMA Operational Monitoring Program Design (TOMP)	2002		
	Cycle 2 Study Design – Serpent River Watershed and In- Basin Monitoring Programs	2004		
	Serpent River Watershed Monitoring Program: Cycle 2 Interpretive Report	2005		
	Serpent River In-Basin Monitoring Program: Cycle 2 Interpretive Report - 2004 Study	2005		
	Serpent River Watershed State of the Environment	2009		
	Monitoring Framework For Closed Uranium Mines Near Elliot Lake	2009		**IBMP** eliminated based on objectives of program being achieved. **TOMP and SAMP:** • removal of silver, selenium based on performance and removal of conductivity based on redundancy with sulphate; and
	In Basin Monitoring Program, Cycle 3 Study Design	2009		

Cycle 3	Serpent River Watershed Monitoring Program: Cycle 3 Study Design	2009	2005 to 2009	• DOC, hardness and flow added at selected stations. **SRWMP:** • removal of selenium and sliver based on performance; • removal of station SR-12, ELO, SR-09, SR-15, SR-02, SR-03, SR-11, P-01, QL-01 and SR-16 and SR-17 based on performance; • monthly monitoring frequency reduced to quarterly; • sediment and benthic monitoring removed from Whiskey, Evans and Cinder lakes based on redundancy; • depositional streams (Q-20, D-6, SR-06, M-01 and SR-08) based on very high natural variability masking results; and • fishing in McCabe Lake and fish tissue monitoring eliminated based on performance.
	Source Area Monitoring Program Revised Study Design	2009		
	Tailing Management Area Monitoring Program (TOMP) Revised Study Design	2009		
	Serpent River Watershed State of the Environment Report	2011		
Cycle 4	Cycle 4 Study Design For the SRWMP, SAMP and TOMP	2014[a]	2010 to 2014	Minor changes to **TOMP** and **SAMP**. **SRWMP**: • elimination of reference stations SR-05, P-222 and SR-14; • removal of cobalt as substance for monitoring, addition of DOC; • far-field lakes removed from the program (Hough, Pecors, and McCarthy); • removal of Rochester Lake as a sediment and benthic reference area; and • reduction in benthic and sediment sampling to 1/10 years based on measured deposition rates.
	Serpent River Watershed Cycle 4 State of the Environment	2016		
Cycle 5	Cycle 5 Study Design For the SRWMP, SAMP and TOMP	2019	2015 to 2019	**TOMP, SAMP, and SRWMP**: • improved approach to trend analysis of surface water quality using the non-parametric seasonal Kendall test. **SRWMP**: • improved approach to calculate benchmark upper limit of background water quality values have previously been calculated based on the upper 95th percentile of values collect across all five years (rather than annual means); • use of a Serpent River Watershed site-specific dose-based radium-226 benchmark for assessment of water quality; • addition of a lake-specific dose-based radium-226 benchmark for assessment of sediment quality; and • sediment and benthic monitoring removed from Elliot Lake based on improvements in water quality, negligible mine-related sediment toxicity, and gradual improvement in benthic invertebrate communities.
	Serpent River Watershed Cycle 5 State of the Environment	2021		

[a] Study Design was submitted to CNSC and JRG in 2014 but reissued with agency comments in 2016.

Notes: IBMP = In Basin Monitoring Program. TOMP = Tailings Management Area Monitoring Program. SAMP = Source Area Monitoring Program. SRWMP = Serpent River Watershed Monitoring Program.

[b] Table 1.2, Cycle 5 State of the Environment Report, Minnow, 2021

APPENDIX II
Site Maps, Sampling Requirements

Denison Mines Inc.
Denison
SAMPLE LOCATION MAP

Rev. 2011-00
File 3.2.1
March 2011

QUIRKE TMA
373500 E
5151000 N
PANEL MINE RD.
378000 E
5151000 N
Benner Lake
Roman Lake
Denison House Gate
Snowmobile Gate
Fence
Mill Gate 2
Mill Gate 1
YARD #8
Lower Williams Lake Gate
WILLIAMS LAKE TREATMENT PLANT
Dam 1 Gate
SETTLING POND BERM
Spillway
D-3 Flume
D-3
D-22
91-D9A
DAM 1
(UPPER WILLIAMS LAKE)
LOWER WILLIAMS LAKE SETTLING POND
DENISON MINE RD.
DENISON MINE
Barricade
Boulder Barricade
River
(SMITH LAKE)
Weir
TMA 2
Quirke Lake
TMA2 Primary Spillway
(BARREN POND)
DAM 5
Spillway
(POND A)
(DROP BOX POND)
DIVERSION BERM
TMA 2 OUTLET BERM
D-25 Flow Station
D-25
D-18 Flow Station
D-16
TMA1 Spillway
TMA 1 TREATMENT PLANT
D-1 Weir
D-1
D-2 Flume
D-2
Spillway
STOLLERY LAKE SETTLING POND
Stollery Lake
DYKE 8
HWY 108
Boulder Barricade
Old Stollery Culverts
Serpent
Flow Stations
DAM 18
SEE DETAIL
DAM 9
BOUCK TOWNSHIP
(CITY OF ELLIOT LAKE)
91-DG4-A,B
DAM 10
Dunlop Lake
Cinder Lake Gate
LITTLE CINDER LAKE BERM
D-6 Flow Station
Little Cinder Lake
TMA 1
(LONG LAKE)
91-D1-A,B
91-D3-A,B
DAM 16
DAM 17
D-9
D-9 Flow Station
Dam 17 Gate
Cinder Lake
Upper Cinder Lake
373500 E
5148000 N
378000 E
5148000 N
SPANISH AMERICAN TMA
Olive Lake

DETAIL
Propane Tank
Chemical Offload
Mixing Area
Stilling Well
ETP
Reagent Addition Point
V-Notch Weir
D-1 Weir
D-1
Emergency Spillway
Berm
TMA1 Main Spillway

SCALE
0 0.5 1.0 kms

N
W E
S

Legend

- water covered tailings.
- settling ponds.
- surface water sample location.
- groundwater sample location.
- flow direction.
- roads or trails.
- power line.
- flow station or weir.
- pipeline.
- gate.
- wetlands.

Notes

- OBM © Queens Printer for Ontario, 2008.
- Mine structures and property limits were derived from Denison Mines records.
- Mapping export parameters = NAD83 WGS_1984_UTM Zone_17N (Central Meridian = 81°W).
- Contour Interval = 10 metres.

Issued on: _____
Issued by: _____
Denison Responsible Authority

Denison Mines Inc.
Stanrock Site
SAMPLE LOCATION MAP

Rev. 2011-00
March 2011

5148000 N
381000 E

NELSON LAKE QUARRY

Nelson Lake

Main Gate

STANROCK MINE

Canmet Gate

SCALE
0 0.5 kms

N
W E
S

Quellette Lake

Quirke Lake

Dam A Gate

TMA

DAM 'B'

DAM 'A'

DAM 'C'

DAM 'D'

DAM 'G'

DAM 'M'

DAM 'J'

DAM 'L'

DAM 'K'

DAM 'F'

BH98-16A

DS-12 Weir

DS-12

COLLECTION POND PUMP HOUSE

DS-13 Weir

DS-13

ST-3A

ST-3A Weir

SPILLWAY

RUNOFF COLLECTION POND

PUMP HOUSE

DS-16

DS-16 Weir

ST-4

ST-3

ST-1

BH98-15A

BH91-SG2A,D

PN-ST3

HEADPOND

Dam G Pumping Line

Beaver Lake Siphon Line

DS-14

BH91-SG3A,B

BH91-SG1

DS-11

DS-11 Weirs

SPILLWAY Weir

ST-1A Weir

ST-1A

Beaver Lake

HOLDING POND

TREATMENT PLANT

SPILLWAY DS-2

DS-3

DS-5

DS-5 Flume

MOOSE LAKE SETTLING POND

DS-1 Weir

DS-1

SPILLWAY

DS-6 Weir

DS-6

BH98-17A

ORIENT LAKE POLISHING POND

DS-4 Weir

DS-4

OUTLET BERM

Halfmoon Wetland

BERMS

Halfmoon Lake

384000 E
5146000 N

5146000 N
381000 E

STANROCK ROAD

Moose Lake Gate

BUCKLES TOWNSHIP

Legend

- vegetated tailings.
- collection or settling ponds.
- surface water sample location.
- groundwater sample location.
- flow direction.
- roads or trails.
- power line.
- siphon line.
- pipeline.
- wetlands.
- exposed bedrock

Notes

- OBM © Queens Printer for Ontario, 2007.
- Mine structures and property limits were derived from Denison Mines records.
- Mapping export parameters = NAD83 WGS_1984_UTM Zone_17N (Central Meridian = 81°W).

Issued on: _____

Issued by: _____

Denison Responsible Authority

Stanrock C of A
Performance Monitoring

Sampling Station	Location / Description	Coordinates	Purpose	Flow	pH	Conductivity	Sulphate	^{226}Radium (Total)	Acidity	Alkalinity	Hardness	DOC	Iron	SAMP METALS			
														Barium	Cobalt	Manganese	Uranium
DS-11	Seepage of Dam A	N 5146624 E 381977 N 5146692 E 382006	MOE	4	4	4											
DS-12	Seepage of Dam B	N 5147007 E 380926	MOE	4	4	4											
DS-13	Seepage of Dam C	N 5146909 E 381145 N 5146841 E 381158	MOE	4	4	4											
DS-14	Seepage of Dam AD	N 5146658 E 381360	MOE	4	4	4											
DS-18	Halfmoon Lake Outlet	N 5145050 E 383761	MOE	4	4		4	4					4	4	4	4	4
ST-1	Downstream of Dam G	N 5146648 E 380709	MOE		4	4											
ST-1A	Dam J at toe of dam	N 5146524 E 381229	MOE		4	4											
ST-3	Downstream of Dam G	N 5146671 E 380699	MOE		4	4											
ST-3A	Dam G at Toe of Dam	N 5146867 E 380850	MOE		4	4											
ST-4	Within Quirke Lake Delta	N 5146606 E 380354	MOE		4	4	4	4	4	4	4	4	4	4	4	4	4

Denison Groundwater
Performance Monitoring

Sampling Station	Location / Description	Coordinates	Type	Purpose	Elevation	Conductivity	pH	Acidity	Iron
BH91-D1	Dam 17 North Abutment	N 5148801 E 377359	Groundwater (2 wells)	TOMP	2	2	2	2	2
BH91-D3	Dam 17 North Valley, Toe	N 5148649 E 377430	Groundwater (2 wells)	TOMP	2	2	2	2	2
BH91-D9	Dam 1 North Ridge, Toe	N 5150352 E 375379	Groundwater (1 well)	TOMP	1	1	1	1	1
BH91-DG4	Below Dam 10	N 5149006 E 374508	Groundwater (1 well)	TOMP	1	1	1	1	1
BH91-SG2	Upstream of Dam D	N 5146809 E 381477	Porewater (2 wells)	TOMP	2	2	2	2	2
PN-ST3	Upstream of Dam A	N 5146853 E 381897	Porewater (4 wells)	TOMP	4	4	4	4	4
BH91-SG1	Downstream of Dam A	N 5146749 E 382014	Groundwater (1 well)	TOMP	1	1	1	1	1
BH91-SG3	Downstream of Dam D	N 5146669 E 381444	Groundwater (2 wells)	TOMP	2	2	2	2	2
BH98-15	Downstream of Dam C	N 5146851 E 381177	Groundwater (1 well)	TOMP	1	1	1	1	1
BH98-16	Downstream of Dam B	N 5147093 E 380933	Groundwater (1 well)	TOMP	1	1	1	1	1

Denison TOMP/SAMP
Surface Water Performance Monitoring

Sampling Station	Location / Description	Coordinates	Purpose	Elevation	Flow	pH	Conductivity	Sulphate	^{226}Radium (Total)	TSS	Acidity	Hardness	DOC	Iron	SAMP METALS				Toxicity		
															Barium	Cobalt	Manganese	Uranium	Acute *Rainbow Trout*	Acute *Daphnia magna*	Chronic *Ceriodaphnia dubia*
D-1	TMA-1 Overflow	N 5149191 E 375468	TOMP	52	261	261		4	12		4			4	4	4	4	4			
D-2	TMA-1 Stollery Lake Overflow	N 5149421 E 374446	TOMP		261	52			52	52											
D-3	TMA-2 Effluent	N 5150280 E 374485	TOMP		261	52			52	52											
D-22	TMA-2 ETP Influent	N 5150391 E 375169	TOMP			52		4	12					4	4	4	4	4			
D-25	TMA-2 Overflow into TMA-1	N 5149357 E 376357	TOMP			2		2	2		2			2							
DS-1	Stanrock Moose Lake Outlet to Orient Lake	N 5146185 E 383401	TOMP		52	52			4												
DS-2	Stanrock ETP Influent	N 5146416 E 382437	TOMP		261	261		4	12		4			4	4	4	4	4			
DS-3	Stanrock ETP Effluent	N 5146424 E 382483	TOMP			261			12												
DS-4	Stanrock Final Discharge @ Orient Lake Outlet	N 5146327 E 383888	TOMP		52	52			52	52											
DS-5	Orient Creek Discharge into Moose Lake	N 5145956 E 382549	TOMP		4	4	4														
DS-6	Moose Lake Narrows upstream of Dam K	N 5146062 E 383194	TOMP		52	52															
Denison TOMP Sites Sample Subtotal					1256	1153		14	210	156	10			14	12	12	12	12	0	0	0
D-2	TMA-1 Stollery Lake Overflow	N 5149421 E 374446	SAMP		52	52		12	12			12	12	12	12	12	12	12	2	2	2
D-3	TMA-2 Effluent	N 5150280 E 374485	SAMP		52	52		12	12			12	12	12	12	12	12	12			
D-9	Denison TMA-1; Dam 9 Seepage	N 5148462 E 377550	SAMP		4	4		4	4			4	4	4	4	4	4	4			
D-16	Denison TMA-1; Dam 17 Seepage	N 5149244 E 376814	SAMP		4	4		4	4			4	4	4	4	4	4	4			
DS-4	Stanrock Final Discharge @ Orient Lake Outlet	N 5146327 E 383888	SAMP		52	52		12	12			12	12	12	12	12	12	12	2	2	2
DS-16	Stanrock TMA; Quirke Lake Delta	N 5146663 E 380417	SAMP		4	4		4	4			4	4	4	4	4	4	4			
Denison SAMP Sites Sample Subtotal					168	168		48	48	0	0			48	48	48	48	48	4	4	4
Denison Total Samples					1424	1321		62	258	156	10	48	48	62	60	60	60	60	4	4	4
FB	Field Blank							12	12	12		4	4	12	12	12	12	12			
BS	Blind Sample							12	12	12		4	4	12	12	12	12	12			
QA/QC Samples Required based on 2002 operating days.								4.6	19.7	14.4	0.4	5.0	5.0	5.4	5.4	5.4	5.4	5.4			

APPENDIX III
Flagged Data & QA/QC Results

Denison Mines Inc.

SAMP/TOMP Flagged Data
Annual 2021

Location	Analyte	Date	Low	Hi		Result		Comment
DS-4	Ba	2021-01-12	0.007	0.128		0.134	mg/L	Result is a five-year high, but consistent with operational adjustments made upstream at the ETP in response to increased radium concentrations. Result is only slightly above the high flag limit, will continue to monitor at the current monthly frequency.
DS-16	Fe	2021-03-16	0.04	0.10	<	0.02	mg/L	Results are 10-year lows, but only slightly below the low flag limits, will continue to monitor at the current quarterly frequency.
	Mn	2021-03-16	0.008	0.024		0.003	mg/L	
			0	0				
DS-13	pH	2021-04-13	6.1	7.5		4.1		Result is below the low flag limit, confirmed by repeat measurement, but still consistent with historic results. Will continue to monitor at the current quarterly frequency.
			0	0				
D-2	TOXCD	2021-05-25	100	100		22.4	IC25	Result is below the low flag limit. Investigation with the laboratory revealed no observed issues with the control population and no mortality was observed in the acute testing with *Daphnia Magna* or Rainbow Trout in 100% effluent. All other parameters were consistent with typical values. Will continue to monitor at the current semi-annual frequency.
DS-4	DOC	2021-05-25	1.9	2.2		1.3	mg/L	Result is slightly below the low flag limit, but consistent with previous in the last 5 years.

Issued by: Environmental Coordinator

Issued on: January 01, 2020
Expires on: January 01, 2024

Denison Mines Inc.

SAMP/TOMP Flagged Data
Annual 2021

Location	Analyte	Date	Low	Hi		Result		Comment
FBDST	Ra	2021-05-25	0.007	0.008	<	0.005	Bq/L	Result is below the low flag limit, but consistent with a lower laboratory detection limit.
	TSS	2021-05-25	1	1		2	mg/L	Result is slightly above the high flag limit, but consistent with previous values in the last 5 years.
BSDST	TSS	2021-06-08	0	3		4	mg/L	Result is slightly above the high flag limit, but consistent with previous values in the last five years.
D-22	Ra	2021-06-08	0	1.668		1.720	Bq/L	Result is above the high flag limit, but consistent with previous spikes observed in the summer months in the last five years when water levels are low.
D-3	Mn	2021-06-08	0	0.114		0.133	mg/L	Result is slightly above the high flag limit, but consistent with previous values in the last 5 years.
	TSS	2021-06-08	0	3		5	mg/L	Result is above the high flag limit, but consistent with previous values in the last five years during periods of low flow.
DS-4	TSS	2021-06-29	0	2		3	mg/L	Result is slightly above the high flag limit, but consistent with previous values in the last five years during periods of low flow.

Issued by: Environmental Coordinator

Issued on: January 01, 2020
Expires on: January 01, 2024

Denison Mines Inc.

SAMP/TOMP Flagged Data
Annual 2021

Location	Analyte	Date	Low	Hi		Result		Comment
FBDST	Ra	2021-06-08	0.006	0.008	<	0.005	Bq/L	Result is below the low flag limit, but consistent with a lower laboratory detection limit.
D-22	Ra	2021-07-13	0	2.123		2.160	Bq/L	Result is above the high flag limit, but consistent with previous spikes observed in the summer months in the last five years when water levels are low.
D-3	Ra	2021-07-06	0.084	0.317		0.529	Bq/L	Result was a historic high. It could not be repeated due to low sample volume. However, anomalous radium data and a lack of precision in repeat values has been observed at other locations as well since changing to a new Cala approved laboratory after closure of the previous laboratory in April this year. As a result, a QAQC investigation was initiated into the issue.
		2021-07-20	0.084	0.317		0.327	Bq/L	Result is slightly above the high flag limit, but consistent with previous spikes observed during the summer months when flow is low.

Denison Mines Inc.

SAMP/TOMP Flagged Data
Annual 2021

Location	Analyte	Date	Low	Hi		Result		Comment
DS-4	Ra	2021-07-06 2021-07-27	0.000 0.000	0.218 0.218		0.244 0.254	Bq/L Bq/L	Results are historic highs and could not be repeated. Since they are only slightly above the high flag limits and there has been a slight increasing trend in radium concentrations at this location, results were not removed from the data set. However, due to the issues in the laboratory methodology for radium analysis results should be interpreted with caution. An investigation is underway.
FBDST	Ra	2021-07-13	0.005	0.008	<	0.005	Bq/L	Result is below the low flag limit, but consistent with a lower laboratory detection limit.
FBDST	Ra	2021-08-10	0.005	0.009	<	0.005	Bq/L	Result is below the low flag limit, but consistent with a lower laboratory detection limit.
D-2	TSS	2021-10-05	0	3		4		Result is slightly above the high flag limit, but consistent with previous values in the last 5 years.
D-2	TOXDM	2021-11-16	0	0		3.3	%	Result is above the high flag limit but is within the 10% threshold for acute toxicity. No toxicity was observed in *Daphnia Magna* . Additionally, a 100% IC25 result for *Ceriodaphnia dubia* was achieved100% effluent. All other parameters were consistent with typical values.

Issued by: Environmental Coordinator

Issued on: January 01, 2020
Expires on: January 01, 2024

Denison Mines Inc.

SAMP/TOMP Flagged Data
Annual 2021

Location	Analyte	Date	Low	Hi	Result		Comment
D-3	Ra	2021-11-16	0.109	0.268	0.285	Bq/L	Slightly above but still consistent with previous values in the last year.
DS-4	TOXCD	2021-11-16	56.994	135.46	0.147	IC25	Result is below the low flag limit. Due to laboratory issues, the fall C. dubia test was carried out at an alternate qualified laboratory and organisms passed all required test validity criteria. Data and results have been re-checked and verified. Measured parameters in the sample effluent were within typical values and do not indicate a change that could result in toxicity (Table reference). No acute toxicity was observe in the 100% effluent and all other parameters were within typical values.
	U	2021-11-16	0	0.0097	0.0100	mg/L	Result was slightly above the high flag limit, but consistent with previous values in the last two years.
BSDST	U	2021-12-14	0.0099	0.0384	0.0459	mg/L	Result is above the high flag limit, but consistent with previous values in the last two years.
D-2	U	2021-12-14	0.0086	0.0400	0.0427	mg/L	Result is above the high flag limit, but consistent with previous values in the last two years.

Issued by: Environmental Coordinator

Issued on: January 01, 2020
Expires on: January 01, 2024

Denison Mines Inc.

SAMP/TOMP Flagged Data
Annual 2021

Location	Analyte	Date	Low	Hi		Result		Comment
D-3	Ra	2021-12-14	0.106	0.266		0.104	Bq/L	Result is below the low flag limit, but consistent with previous values in the last year.
	SO4	2021-12-14	19.4	82.3		87	mg/L	Result is above the high flag limit, but consistent with previous values in the last two years.
	U	2021-12-14	0	0.0058		0.0080	mg/L	Result is above the high flag limit, but consistent with previous values in the last two years.
DS-16	Fe	2021-12-21	0.0407	0.1061	<	0.02	mg/L	Results are below the low flag limit confirmed by repeat analysis. Will continue to monitor at the current quarterly frequency.
	Mn	2021-12-21	0.007	0.0206		0.004	mg/L	

Issued by: Environmental Coordinator

Issued on: January 01, 2020
Expires on: January 01, 2024

SAMP and TOMP DATA QUALITY REPORTING
Field Blank 2021
Revision 2011-01

Registry: RC8.5.4-02

	Date	pH	DOC mg/L	TSS mg/L	Hardness mg/L as CaCO3	Uranium mg/L	Sulphate mg/L	Radium Bq/L	Barium mg/L	Cobalt mg/L	Iron mg/L	Manganese mg/L
Blank Criteria												
	SAMP [1]	-	1.0	-	1.0	0.001	0.2	0.01	0.01	0.001	0.04	0.004
	TOMP [1]	-	-	2	-	0.001	0.2	0.01	0.01	0.001	0.04	0.004
FBDST	2021.01	6.0		1	< 0.5	< 0.0005	< 0.2	< 0.007	< 0.005	< 0.0005	< 0.02	< 0.002
FBDST2	2021.01	6.0										
FBDST	2021.02	6.0		1	< 0.5	< 0.0005	< 0.2	< 0.007	< 0.005	< 0.0005	< 0.02	< 0.002
FBDST	2021.03	6.0		1		< 0.0005	< 0.1	< 0.007	< 0.005	< 0.0005	< 0.02	< 0.002
FBDST	2021.04	6.0		1		< 0.0005	< 0.1	< 0.007	< 0.005	< 0.0005	< 0.02	< 0.002
FBDST2	2021.04	6.1										
FBDST	2021.05	6.2		2		< 0.0005	< 0.1	< 0.005	< 0.005	< 0.0005	0.02	< 0.002
FBDST	2021.06	6.3		1		< 0.0005	< 0.1	< 0.005	< 0.005	< 0.0005	< 0.02	< 0.002
FBDST	2021.07	6.2		1		< 0.0005	< 0.1	< 0.005	< 0.005	< 0.0005	< 0.02	< 0.002
FBDST2	2021.07	7.0										
FBDST	2021.08	6.1		1		< 0.0005	< 0.1	< 0.005	< 0.005	< 0.0005	< 0.02	< 0.002
FBDST	2021.09	5.9		1	< 0.5	< 0.0005	< 0.1	< 0.005	< 0.005	< 0.0005	< 0.02	< 0.002
FBDST2	2021.10	6.5										
FBDST	2021.10	6.0		1	0.6	< 0.0005	< 0.1	< 0.005	< 0.005	< 0.0005	< 0.02	< 0.002
FBDST	2021.11	5.9		1	< 0.5	< 0.0005	< 0.1	< 0.005	< 0.005	< 0.0005	< 0.02	< 0.002
FBDST	2021.12	5.8		1	0.5	< 0.0005	< 0.1	< 0.005	< 0.005	< 0.0005	< 0.02	< 0.002
Count		16		12	6	12	12	12	12	12	12	12
# Exceedances		0		0	0	0	0	0	0	0	0	0
Average		6.1		1	0.5	< 0.0005	< 0.1	< 0.006	< 0.005	< 0.0005	0.02	< 0.002
Max		7.0		2	0.6	< 0.0005	< 0.2	< 0.007	< 0.005	< 0.0005	0.02	< 0.002
Min		5.8		1	0.5	< 0.0005	< 0.1	< 0.005	< 0.005	< 0.0005	0.02	< 0.002

[1] SAMP and TOMP field blank criteria taken from Table 2.11 State of The Environment Report (SOE) (Minnow, 2011)

Bold Indicates an exceedance of the Blank Criteria

Issued by: Mark Smith, Environmental Manager

Issued on: April 19, 2011
Expires on: April 19, 2016

SAMP and TOMP DATA QUALITY REPORTING
Field Precision 2021
Revision 2011-01

Denison Mines

Location	Date	pH	TSS	DOC	Hardness	Sulphate	Radium (total)	Uranium	Barium	Cobalt	Iron	Manganese
			mg/L	mg/L	mg/L	mg/L	Bq/L	mg/L	mg/L	mg/L	mg/L	mg/L
D-2	2021.01	7.4	1		191.0	140.0	0.117	0.0240	0.380	< 0.0005	0.33	0.155
BSDST		7.4	< 1		191.0	140.0	0.097	0.0244	0.380	< 0.0005	0.33	0.160
variance		0%	0%		0%	0%	19%	2%	0%	0%	0%	3%
D-2	2021.02	7.4	1		193.0	130.0	0.281	0.0199	0.514	< 0.0005	0.38	0.157
BSDST		7.4	1		186.0	120.0	0.298	0.0194	0.506	< 0.0005	0.38	0.152
variance		0%	0%		4%	8%	6%	3%	2%	0%	0%	3%
D-2	2021.03	7.4	2		198.0	110.0	0.200	0.0181	0.586	< 0.0005	0.57	0.142
BSDST		7.4	1		201.0	120.0	0.215	0.0189	0.626	< 0.0005	0.58	0.146
variance		0%	**67%**		2%	9%	7%	4%	7%	0%	2%	3%
D-2	2021.04	7.4	2		192.0	120.0	0.154	0.0197	0.455	0.0005	0.43	0.210
BSDST		7.4	< 1		202.0	120.0	0.208	0.0218	0.462	0.0005	0.46	0.219
variance		0%	**67%**		5%	0%	**30%**	10%	2%	0%	7%	4%
D-2	2021.05	7.1	2		179.0	140.0	0.097	0.0278	0.279	< 0.0005	0.28	0.130
BSDST		7.1	2		186.0	140.0	0.107	0.0237	0.267	< 0.0005	0.25	0.112
variance		0%	0%		4%	0%	10%	16%	4%	0%	11%	15%
D-2	2021.06	7.3	3		255.0	150.0	0.053	0.0276	0.292	< 0.0005	0.19	0.166
BSDST		7.3	4		259.0	150.0	0.056	0.0281	0.280	< 0.0005	0.14	0.101
variance		0%	**29%**		2%	0%	6%	2%	4%	0%	**30%**	**49%**
D-2	2021.07	7.3	1		259.0	170.0	0.038	0.0283	0.188	< 0.0005	0.12	0.134
BSDST		7.3	< 1		248.0	170.0	0.053	0.0281	0.190	< 0.0005	0.11	0.125
variance		0%	0%		4%	0%	**33%**	1%	1%	0%	9%	7%
D-2	2021.08	7.3	2		300.0	180.0	0.041	0.0262	0.151	< 0.0005	0.14	0.104
BSDST		7.3	1		313.0	180.0	0.021	0.0265	0.149	< 0.0005	0.12	0.076
variance		0%	**67%**		4%	0%	**65%**	1%	1%	0%	15%	**31%**
D-2	2021.09	7.1	< 1		253.0	190.0	0.019	0.0304	0.092	< 0.0005	0.13	0.056
BSDST		7.1	1		231.0	190.0	0.042	0.0310	0.088	< 0.0005	0.12	0.043
variance		0%	0%		9%	0%	**75%**	2%	4%	0%	8%	**26%**

Location	Date	pH	TSS	DOC	Hardness	Sulphate	Radium (total)	Uranium	Barium	Cobalt	Iron	Manganese
			mg/L	mg/L	mg/L	mg/L	Bq/L	mg/L	mg/L	mg/L	mg/L	mg/L
D-2	2021.10	7.2	1		279.0	210.0	0.049	0.0341	0.101	< 0.0005	0.27	0.198
BSDST		7.2	1		268.0	210.0	0.033	0.0335	0.091	< 0.0005	0.26	0.128
variance		0%	0%		4%	0%	**39%**	2%	10%	0%	4%	**43%**
D-2	2021.11	7.0	2		283.0	210.0	0.147	0.0389	0.130	< 0.0005	0.30	0.157
BSDST		7.0	1		285.0	210.0	0.125	0.0399	0.132	< 0.0005	0.31	0.162
variance		0%	**67%**		1%	0%	16%	3%	2%	0%	3%	3%
D-2	2021.12	7.0	2		267.0	210.0	0.060	0.0427	0.083	< 0.0005	0.28	0.166
BSDST		7.0	1		282.0	210.0	0.069	0.0459	0.079	< 0.0005	0.29	0.175
variance		0%	**67%**		5%	0%	14%	7%	5%	0%	4%	5%
Count		12	12		12	12	12	12	12	12	12	12
Average		0%	30%		4%	1%	27%	4%	4%	0%	8%	16%
Max		0%	67%	0%	9%	9%	75%	16%	10%	0%	30%	49%
Min		0%	0%	0%	0%	0%	6%	1%	0%	0%	0%	3%
Criteria[1]		20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
# Exceedances		0	**6**		0	0	**5**	0	0	0	**1**	**4**

[1] SAMP and TOMP field blank criteria taken from Table 6.2 of the Cycle 5 Study Design for SRWMP, SAMP and TOMP (Minnow, 2019)

Bold Indicates an exceedance of the field precision criteria

SAMP and TOMP DATA QUALITY REPORTING
2021 Groundwater Field Precision
Revision 2020.01

Registry: RF8.5.4-02

Location	Date	pHF	Sulphate	Acidity	Iron
			mg/L	mg/L	mg/L
98-15A	2021.07	6.1	2600.0	1040.0	489.00
BSD-GW2		6.1	2600.0	1070.0	476.00
variance		0%	0%	3%	3%
BH91 DG4B	2021.08	6.6	730.0	< 1.0	18.80
BSD-GW3		6.6	730.0	< 1.0	18.20
variance		0%	0%	0%	3%
BH91 SG2A	2021.08	6.5	4500.0	2569.0	1540.00
BSD-GW4		6.5	3100.0	2597.0	1570.00
variance		**0%**	**37%**	**1%**	**2%**
Count		3	3	3	3
Average		0%	12%	1%	3%
Min		0%	37%	3%	3%
Max		0%	0%	0%	2%
Criteria1		20%	20%	20%	20%
# Exceedances		0	**1**	0	0

[1] Field criteria taken from Table 6.2 of the Cycle 5 Study Design for SRWMP, SAMP and TOMP (Minnow,

SAMP and TOMP DATA QUALITY REPORTING
2021 Groundwater Field Blank
Revision 2021.01

Report Form: RF8.5.4-01

Date			Acidity	Sulphate	pHF	Iron
			mg/L as CaCO3	mg/L		mg/L
Blank Criteria		TOMP [1]	2	0.1		0.04
2021.07	FBD-GW2		**6.0**	0.1	6.4	**0.09**
2021.08	FBD-GW4		**18.0**	< 0.1	6.5	< 0.02
2021.08	FBD-GW3		**3.0**	< 0.1	6.3	0.01
Count			3	3	3	3
# Exceedances			**3**	0	0	**1**
Average			9.0	0.1	6.4	0.04
Max			18	0.1	6.5	0.09
Min			3	0.1	6.3	0.01

[1] Field criteria taken from Table 6.2 of the Cycle 5 Study Design for SRWMP, SAMP and TOMP (Minnow, 2019)

Bold Indicates an exceedance of the Blank Criteria

APPENDIX IV
Water Quality Results

Summary of Final Effluent Annual Loadings for Compliance Parameters 2021

Annual loadings from the TMA final discharge were calculated using monthly monitoring results (volume and average concentration) aligning with the Metal and Diamond Mining Effluent Regulations (MDMER) loadings methodology. Daily flow at the ETP was used to calculate monthly discharge volumes (Litres). Monthly average concentrations were multiplied by monthly volumes to produce monthly loads and monthly loads were summed to estimate annual loadings. Annual loadings at the final discharge point were calculated for radium-226 (Million Becquerels) and TSS (kilograms per year) for each effluent treatment plant and presented in Appendix IV.

Site	Final Discharge Location	Total Annual Volume (L)	Annual Radium-226 Loadings (MBq)	Annual TSS Loadings Kg/Year
2021				
Denison TMA-1	D-2	1,248,000,000	202	1708
Denison TMA-2	D-3	151,000,000	32	180
Stanrock	DS-4	664,000,000	67	718

Denison TMA-1 (D-2) Monthly Loadings Calculations for Compliance Parameters

DENISON TMA-1 FINAL DISCHARGE (D-2) MONTHLY LOADINGS							
Month	Volume (ML)	Volume (L)	FLOW (L/s)	TSS (mg/L)	TSS (kg/Yr)	Ra-226 (Bq/L)	Ra-266 (MBq)
Jan-21	143	143000000	53.25	1	143	0.141	20.163
Feb-21	198	198000000	81.75	1	198	0.289	57.222
Mar-21	231	231000000	86.2	1	231	0.209	48.279
Apr-21	233	233000000	89.75	2	466	0.160	37.28
May-21	141	141000000	52.75	2	282	0.136	19.176
Jun-21	26	26000000	10.2	2	52	0.073	1.898
Jul-21	25	25000000	9.25	1	25	0.045	1.125
Aug-21	26	26000000	9.8	1	26	0.033	0.858
Sep-21	41	41000000	15.75	1	41	0.037	1.517
Oct-21	59	59000000	22	2	118	0.077	4.543
Nov-21	50	50000000	19.2	1	50	0.124	6.2
Dec-21	76	76000000	28.25	1	76	0.052	3.952
2021 Loadings		**1,248,000,000**			**1708**		**202.213**

Flow: Average monthly flow and volume (L) taken from discharge at D-2

Radium-226 and TSS: Average monthly discharge at D-2

	Entered data
	Calculated data

Denison TMA-2 (D-3) Monthly Loadings Calculations for Compliance Parameters

DENISON TMA-2 FINAL DISCHARGE (D-3) MONTHLY LOADINGS							
Month	**Volume (ML)**	**Volume (L)**	**FLOW (L/s)**	**TSS (mg/L)**	**TSS (kg/Yr)**	**Ra-226 (Bq/L)**	**Ra-226 (MBq)**
Jan-21	9	9000000	4	1	9	0.19	1.71
Feb-21	2	2000000	1	1	2	0.191	0.382
Mar-21	13	13000000	5	1	13	0.162	2.106
Apr-21	23	23000000	9	1	23	0.165	3.795
May-21	29	29000000	11	1	29	0.25	7.25
Jun-21	3	3000000	1	2	6	0.225	0.675
Jul-21	4	4000000	2	1	4	0.371	1.484
Aug-21	5	5000000	2	2	10	0.257	1.285
Sep-21	7	7000000	3	1	7	0.255	1.785
Oct-21	21	21000000	8	2	42	0.235	4.935
Nov-21	13	13000000	5	1	13	0.243	3.159
Dec-21	22	22000000	8	1	22	0.155	3.41
2021 Loadings		**151,000,000**			**180**		**31.976**

Flow: Average monthly flow and volume (L) taken from discharge at D-3

Radium-226 and TSS: Average monthly discharge at D-3

	Entered data
	Calculated data

Stanrock (DS-4) Monthly Loadings Calculations for Compliance Parameters

STANROCK FINAL DISCHARGE (DS-4) MONTHLY LOADINGS							
Month	**Volume (ML)**	**Volume (L)**	**FLOW (L/s)**	**TSS (mg/L)**	**TSS (kg/Yr)**	**Ra-226 (Bq/L)**	**Ra-226 (MBq)**
Jan-21	32	32000000	12	1	32	0.059	1.888
Feb-21	21	21000000	9	1	21	0.064	1.344
Mar-21	111	111000000	41	1	111	0.063	6.993
Apr-21	132	132000000	51	1	132	0.057	7.524
May-21	90	90000000	34	1	90	0.11	9.9
Jun-21	13	13000000	5	1	13	0.15	1.95
Jul-21	10	10000000	4	1	10	0.227	2.27
Aug-21	40	40000000	15	1	40	0.202	8.08
Sep-21	17	17000000	7	1	17	0.176	2.992
Oct-21	54	54000000	20	2	108	0.178	9.612
Nov-21	38	38000000	15	1	38	0.157	5.966
Dec-21	106	106000000	40	1	106	0.084	8.904
2021 Loadings		**664,000,000**			**718**		**67.423**

Flow: Average monthly flow and volume (L) taken from discharge at DS-4

Radium-226 and TSS: Average monthly discharge at DS-4

	Entered data
	Calculated data

2021 Performance Monitoring Results
Monthly Average YTD Results

BSDST

Month	FLOW	pH	SO4	TSS	Ra	Ba	Co	Fe
	L/s		mg/L	mg/L	Bq/L	mg/L	mg/L	mg/L
2021-01	44.00	7.4	140.0	<1	0.097	0.380	<0.0005	0.33
2021-02	84.00	7.4	120.0	1	0.298	0.506	<0.0005	0.38
2021-03	87.00	7.4	120.0	1	0.215	0.626	<0.0005	0.58
2021-04	104.00	7.4	120.0	<1	0.208	0.462	0.0005	0.46
2021-05	9.00	7.1	140.0	2	0.107	0.267	<0.0005	0.25
2021-06	9.00	7.3	150.0	4	0.056	0.280	<0.0005	0.14
2021-07	7.00	7.3	170.0	<1	0.053	0.190	<0.0005	0.11
2021-08	4.00	7.3	180.0	1	0.021	0.149	<0.0005	0.12
2021-09	9.00	7.1	190.0	1	0.042	0.088	<0.0005	0.12
2021-10	21.00	7.2	210.0	1	0.033	0.091	<0.0005	0.26
2021-11	23.00	7.0	210.0	1	0.125	0.132	<0.0005	0.31
2021-12	34.00	7.0	210.0	1	0.069	0.079	<0.0005	0.29
Count	12	12	12	12	12	12	12	12
High	104.00	7.4	210.0	4	0.298	0.626	0.0005	0.58
Low	4.00	7.0	120.0	<1	0.021	0.079	<0.0005	0.11
Mean	36.25	7.2	163.3	1	0.110	0.271	0.0005	0.28
High Limit		8.5	128-429	10	0.469	1.000	0.0025	0.76
Low Limit		6.5						
Lim Ex	0	0	9	0	0	0	0	1
Frequency	0%	0%	75%	0%	0%	0%	0%	8%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	Mn	U
	mg/L	mg/L
2021-01	0.160	0.0244
2021-02	0.152	0.0194
2021-03	0.146	0.0189
2021-04	0.219	0.0218
2021-05	0.112	0.0237
2021-06	0.101	0.0281
2021-07	0.125	0.0281
2021-08	0.076	0.0265
2021-09	0.043	0.0310
2021-10	0.128	0.0335
2021-11	0.162	0.0399
2021-12	0.175	0.0459
Count	12	12
High	0.219	0.0459
Low	0.043	0.0189
Mean	0.133	0.0284
High Limit	0.841	0.0150
Low Limit		
Lim Ex	0	12
Frequency	0%	100%
10x Lim Ex	0	0
Frequency	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

D-1: Denison TMA-1 Overflow (Influent and ETP Operations)

Month	ACID	BaCl2T	ELEV	FLOW	NaOHT	ODays	pH	SO4
	mg/L	kg/month	m	L/s	kg/month	day		mg/L
2021-01	<1	519.10	387.05	53.16	0.00	31	7.7	52.0
2021-02		892.70	386.99	81.64	0.00	28	7.5	
2021-03		1323.30	386.93	90.13	0.00	31	7.5	
2021-04	<1	1119.10	386.91	96.67	0.00	30	7.8	48.0
2021-05		373.00	386.86	40.87	0.00	14	7.9	
2021-06		0.00	386.76	0.00	0.00	0	8.0	
2021-07		0.00	386.75	0.00	0.00	0	7.9	
2021-08		0.00	386.75	0.00	0.00	0	7.2	
2021-09		0.00	386.73	0.00	0.00	0	7.2	
2021-10		0.00	386.78	0.00	0.00	0	7.3	
2021-11		0.00	386.79	0.00	0.00	0		
2021-12		0.00	386.87	0.00	0.00	0		
Count	2	12	52	365	12	12	12	2
High	<1	1323.30	387.06	106.00	0.00	31	8.0	52.0
Low	<1	0.00	386.72	0.00	0.00	0	7.2	48.0
Mean	<1	352.27	386.84	29.85	0.00	11	7.6	50.0
High Limit							8.5	128-429
Low Limit							6.5	
Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	Ra	Ba	Co	Fe	Mn	U
	Bq/L	mg/L	mg/L	mg/L	mg/L	mg/L
2021-01	1.342	0.068	<0.0005	0.05	0.011	0.0087
2021-02	1.673					
2021-03	1.889					
2021-04	1.460	0.061	<0.0005	0.05	0.011	0.0097
2021-05	1.190					
Count	5	2	2	2	2	2
High	1.889	0.068	<0.0005	0.05	0.011	0.0097
Low	1.190	0.061	<0.0005	0.05	0.011	0.0087
Mean	1.511	0.065	<0.0005	0.05	0.011	0.0092
High Limit	0.469	1.000	0.0025	0.76	0.841	0.0150
Low Limit						
Lim Ex	5	0	0	0	0	0
Frequency	100%	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

D-16: Denison TMA-1 Dam 17 Seepage

Month	FLOW	hard	pH	SO4	TOXCD	TOXDM	TOXRT	Ra
	L/s	mg/L		mg/L	IC25	%	%	Bq/L
2021-01	1.00	267.0	6.7	230.0				0.021
2021-05	2.00	185.0	6.5	160.0	100	0	0	0.018
2021-07	0.33	299.0	6.8	250.0				0.050
2021-10	1.10	191.0	6.6	160.0				0.038
Count	4	4	4	4	1	1	1	4
High	2.00	299.0	6.8	250.0	100	0	0	0.050
Low	0.33	185.0	6.5	160.0	100	0	0	0.018
Mean	1.11	235.5	6.7	200.0	100	0	0	0.032
High Limit			8.5	128-429				0.469
Low Limit			6.5					
Lim Ex	0	0	0	4	0	0	0	0
Frequency	0%	0%	0%	100%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	Ba	Co	Fe	Mn	U
	mg/L	mg/L	mg/L	mg/L	mg/L
2021-01	0.033	0.0023	2.63	1.400	<0.0005
2021-05	0.020	<0.0005	0.32	0.163	<0.0005
2021-07	0.033	0.0042	7.78	4.440	<0.0005
2021-10	0.027	0.0023	4.10	2.090	<0.0005
Count	4	4	4	4	4
High	0.033	0.0042	7.78	4.440	<0.0005
Low	0.020	<0.0005	0.32	0.163	<0.0005
Mean	0.028	0.0023	3.71	2.023	<0.0005
High Limit	1.000	0.0025	0.76	0.841	0.0150
Low Limit					
Lim Ex	0	1	3	3	0
Frequency	0%	25%	75%	75%	0%
10x Lim Ex	0	0	1	0	0
Frequency	0%	0%	25%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

D-2: Denison TMA-1 Stollery Lake Settling Pond Outlet (Final Discharge)

Month	DDays	FLOW	hard	pH	SO4	TSS	TOXCD	TOXDM
	day	L/s	mg/L		mg/L	mg/L	IC25	%
2021-01	31	53.25	191.0	7.3	140.0	1		
2021-02	28	81.75	193.0	7.3	130.0	1		
2021-03	31	86.20	198.0	7.2	110.0	1		
2021-04	30	89.75	192.0	7.2	120.0	2		
2021-05	31	52.75	179.0	7.4	140.0	2	22	0
2021-06	30	10.20	255.0	7.2	150.0	2		
2021-07	31	9.25	259.0	7.3	170.0	1		
2021-08	31	9.80	300.0	7.3	180.0	1		
2021-09	30	15.75	253.0	7.1	190.0	1		
2021-10	31	22.00	279.0	7.2	210.0	2		
2021-11	30	19.20	283.0	7.1	210.0	1	100	3
2021-12	31	28.25	267.0	7.1	210.0	1		
Count	12	52	12	52	12	52	2	2
High	31	104.00	300.0	7.5	210.0	4	100	3
Low	28	4.00	179.0	6.8	110.0	<1	22	0
Mean	30	39.19	237.4	7.2	163.3	1	61	2
High Limit				8.5	128-429	10		
Low Limit				6.5				
Lim Ex	0	0	0	0	10	0	0	0
Frequency	0%	0%	0%	0%	83%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	TOXRT	Ra	Ba	Co	Fe	Mn	U
	%	Bq/L	mg/L	mg/L	mg/L	mg/L	mg/L
2021-01		0.141	0.380	<0.0005	0.33	0.155	0.0240
2021-02		0.289	0.514	<0.0005	0.38	0.157	0.0199
2021-03		0.209	0.586	<0.0005	0.57	0.142	0.0181
2021-04		0.160	0.455	0.0005	0.43	0.210	0.0197
2021-05	0	0.136	0.279	<0.0005	0.28	0.130	0.0278
2021-06		0.073	0.292	<0.0005	0.19	0.166	0.0276
2021-07		0.045	0.188	<0.0005	0.12	0.134	0.0283
2021-08		0.033	0.151	<0.0005	0.14	0.104	0.0262
2021-09		0.037	0.092	<0.0005	0.13	0.056	0.0304
2021-10		0.077	0.101	<0.0005	0.27	0.198	0.0341
2021-11	0	0.124	0.130	<0.0005	0.30	0.157	0.0389
2021-12		0.052	0.083	<0.0005	0.28	0.166	0.0427
Count	2	52	12	12	12	12	12
High	0	0.317	0.586	0.0005	0.57	0.210	0.0427
Low	0	0.010	0.083	<0.0005	0.12	0.056	0.0181
Mean	0	0.115	0.271	0.0005	0.28	0.148	0.0281
High Limit		0.469	1.000	0.0025	0.76	0.841	0.0150
Low Limit							
Lim Ex	0	0	0	0	1	0	12
Frequency	0%	0%	0%	0%	8%	0%	100%
10x Lim Ex	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

D-22: Denison TMA-2 ETP (Influent and ETP Operations)

Month	ACID	BaCl2T	ODays	pH	SO4	Ra	Ba	Co
	mg/L	kg/month	day		mg/L	Bq/L	mg/L	mg/L
2021-01	<1	103.20	31	6.6	87.0	0.101	0.050	0.0014
2021-02		93.20	28	6.7		0.374		
2021-03		103.23	31	6.7		0.362		
2021-04	<1	99.90	30	6.9	50.0	0.071	0.016	<0.0005
2021-05		103.00	31	6.9		0.211		
2021-06		100.35	30	6.9		1.720		
2021-07	<1	103.45	31	7.0	74.0	2.160	0.155	0.0016
2021-08		146.50	31	6.8		0.437		
2021-09		199.80	30	6.7		1.330		
2021-10	<1	206.00	31	6.8	57.0	0.141	0.046	<0.0005
2021-11		200.00	30	6.7		0.440		
2021-12		208.00	31	6.7		1.330		
Count	4	12	12	52	4	12	4	4
High	<1	208.00	31	7.1	87.0	2.160	0.155	0.0016
Low	<1	93.20	28	6.5	50.0	0.071	0.016	<0.0005
Mean	<1	138.89	30	6.8	67.0	0.723	0.067	0.0010
High Limit				8.5	128-429	0.469	1.000	0.0025
Low Limit				5.3				
Lim Ex	0	0	0	0	0	4	0	0
Frequency	0%	0%	0%	0%	0%	33%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	Fe	Mn	U
	mg/L	mg/L	mg/L
2021-01	0.90	0.806	<0.0005
2021-04	0.22	0.070	<0.0005
2021-07	25.10	1.820	0.0030
2021-10	0.89	0.235	<0.0005
Count	4	4	4
High	25.10	1.820	0.0030
Low	0.22	0.070	<0.0005
Mean	6.78	0.733	0.0011
High Limit	2.49	0.841	0.0150
Low Limit			
Lim Ex	3	2	0
Frequency	75%	50%	0%
10x Lim Ex	1	0	0
Frequency	25%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

D-25: Denison TMA-2 Overflow into TMA-1

Month	ACID mg/L	pH	SO4 mg/L	Ra Bq/L	Fe mg/L
2021-04	<1	7.6	68.0	0.430	0.20
2021-10	<1	7.3	78.0	0.559	0.12
Count	2	2	2	2	2
High	<1	7.6	78.0	0.559	0.20
Low	<1	7.3	68.0	0.430	0.12
Mean	<1	7.4	73.0	0.495	0.16
High Limit		8.5	128-429	0.469	0.76
Low Limit		6.5			
Lim Ex	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

D-3: Denison TMA-2 Effluent (Final Discharge)

Month	DDays	FLOW	hard	pH	SO4	TSS	Ra	Ba
	day	L/s	mg/L		mg/L	mg/L	Bq/L	mg/L
2021-01	31	3.50	84.4	7.3	48.0	<1	0.190	0.508
2021-02	28	1.00	90.6	7.2	47.0	1	0.191	0.460
2021-03	31	5.00	102.0	7.2	54.0	1	0.162	0.341
2021-04	30	9.00	79.1	7.2	43.0	<1	0.165	0.362
2021-05	31	11.00	98.1	7.2	64.0	1	0.250	0.442
2021-06	30	1.30	35.1	7.0	12.0	2	0.225	0.149
2021-07	25	1.50	105.0	7.2	59.0	1	0.371	0.384
2021-08	24	1.80	150.0	7.2	64.0	2	0.257	0.489
2021-09	30	2.75	119.0	7.0	63.0	1	0.255	0.347
2021-10	31	7.75	119.0	7.1	64.0	2	0.235	0.423
2021-11	30	5.20	95.2	7.0	74.0	1	0.243	0.324
2021-12	31	8.25	137.0	7.1	87.0	1	0.155	0.424
Count	12	52	12	52	12	50	50	12
High	31	28.00	150.0	7.3	87.0	5	0.529	0.508
Low	24	0.00	35.1	6.8	12.0	<1	0.104	0.149
Mean	29	4.72	101.2	7.1	56.6	1	0.221	0.388
High Limit				8.5	128-429	10	0.469	1.000
Low Limit				6.5				
Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	Co	Fe	Mn	U
	mg/L	mg/L	mg/L	mg/L
2021-01	<0.0005	0.23	0.024	0.0024
2021-02	<0.0005	0.20	0.029	0.0031
2021-03	<0.0005	0.13	0.024	0.0041
2021-04	<0.0005	0.09	0.007	0.0013
2021-05	<0.0005	0.06	0.012	0.0025
2021-06	0.0006	0.56	0.133	0.0010
2021-07	<0.0005	0.33	0.076	0.0022
2021-08	<0.0005	0.25	0.052	0.0027
2021-09	<0.0005	0.15	0.044	0.0029
2021-10	<0.0005	0.30	0.047	0.0040
2021-11	<0.0005	0.09	0.015	0.0054
2021-12	<0.0005	0.15	0.021	0.0080
Count	12	12	12	12
High	0.0006	0.56	0.133	0.0080
Low	<0.0005	0.06	0.007	0.0010
Mean	0.0005	0.21	0.040	0.0033
High Limit	0.0025	0.76	0.841	0.0150
Low Limit				
Lim Ex	0	1	0	0
Frequency	0%	8%	0%	0%
10x Lim Ex	0	0	0	0
Frequency	0%	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

D-9: Denison TMA-1 Dam 9 Seepage

Month	FLOW	hard	pH	SO4	TOXCD	TOXDM	TOXRT	Ra
	L/s	mg/L		mg/L	IC25	%	%	Bq/L
2021-01		681.0	7.3	560.0				<0.007
2021-05	2.80	563.0	7.0	400.0	100	0	0	0.007
2021-07	1.70	923.0	7.0	780.0				0.021
2021-10	0.55	487.0	7.0	370.0				0.007
Count	4	4	4	4	1	1	1	4
High	2.80	923.0	7.3	780.0	100	0	0	0.021
Low	0.55	487.0	7.0	370.0	100	0	0	<0.007
Mean	1.68	663.5	7.1	527.5	100	0	0	0.011
High Limit			8.5	128-429				0.469
Low Limit			6.5					
Lim Ex	0	0	0	4	0	0	0	0
Frequency	0%	0%	0%	100%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	Ba	Co	Fe	Mn	U
	mg/L	mg/L	mg/L	mg/L	mg/L
2021-01	0.020	0.0025	0.70	1.560	0.0257
2021-05	0.016	0.0017	0.59	1.120	0.0175
2021-07	0.021	0.0029	0.73	2.060	0.0248
2021-10	0.017	0.0012	0.86	0.948	0.0115
Count	4	4	4	4	4
High	0.021	0.0029	0.86	2.060	0.0257
Low	0.016	0.0012	0.59	0.948	0.0115
Mean	0.019	0.0021	0.72	1.422	0.0199
High Limit	1.000	0.0025	0.76	0.841	0.0150
Low Limit					
Lim Ex	0	1	4	4	3
Frequency	0%	25%	100%	100%	75%
10x Lim Ex	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

DS-1: Stanrock Moose Lake Settling Pond Outlet to Orient Lake Polishing Pond

Month	FLOW L/s	pH	Ra Bq/L
2021-01	10.00	7.3	0.034
2021-02	7.75	7.2	
2021-03	62.00	7.2	
2021-04	94.00	7.3	0.029
2021-05	43.25	7.2	
2021-06	1.40	7.1	
2021-07	2.00	7.2	0.052
2021-08	9.00	7.4	
2021-09	4.00	7.3	
2021-10	13.00	7.4	0.026
2021-11	12.20	7.3	
2021-12	51.00	7.0	
Count	52	52	4
High	214.00	7.8	0.052
Low	0.00	6.9	0.026
Mean	25.44	7.2	0.035
High Limit		8.5	0.469
Low Limit		6.5	
Lim Ex	0	0	0
Frequency	0%	0%	0%
10x Lim Ex	0	0	0
Frequency	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

DS-11: Stanrock Seepage of Dam A

Month	CONDF µmho/cm	FLOW L/s	pH
2021-01	366.2	0.29	6.4
2021-04	332.5	1.10	6.6
2021-07	389.2	0.29	6.9
2021-10	358.4	0.55	6.8
Count	4	4	4
High	389.2	1.10	6.9
Low	332.5	0.29	6.4
Mean	361.6	0.56	6.7
High Limit	69.5		8.5
Low Limit			6.5
Lim Ex	4		01
Frequency	100%	0%	25%
10x Lim Ex	0	0	0
Frequency	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

DS-12: Stanrock Seepage from Dam B

Month	CONDF µmho/cm	FLOW L/s	pH
2021-01	430.3		3.3
2021-04	425.4	1.10	3.4
2021-07	605.0	0.03	3.8
2021-10	356.4	1.00	4.4
Count	4	4	4
High	605.0	1.10	4.4
Low	356.4	0.03	3.3
Mean	454.3	0.71	3.7
High Limit	69.5		8.5
Low Limit			6.5
Lim Ex	4	0	4
Frequency	100%	0%	100%
10x Lim Ex	0	0	0
Frequency	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

DS-13: Stanrock Seepage from Dam C

Month	CONDF µmho/cm	FLOW L/s	pH
2021-01		0.00	
2021-04	525.0	0.19	4.1
2021-07	1039.0	0.03	7.0
2021-10	626.2	0.07	6.4
Count	4	4	4
High	1039.0	0.19	7.0
Low	525.0	0.00	4.1
Mean	730.1	0.07	5.8
High Limit	69.5		8.5
Low Limit			6.5
Lim Ex	3	0	2
Frequency	100%	0%	67%
10x Lim Ex	1	0	0
Frequency	33%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

DS-14: Stanrock Seepage from Dam D

Month	CONDF µmho/cm	FLOW L/s	pH
2021-01		0.00	
2021-04			
2021-07			
Count	3	3	3
High		0.00	
Low		0.00	
Mean		0.00	
High Limit	69.5		8.5
Low Limit			6.5
Lim Ex	0	0	0
Frequency	0%	0%	0%
10x Lim Ex	0	0	0
Frequency	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

DS-16: Stanrock TMA, Seepage from Dam M at Quirke Lake Delta

Month	CONDF µmho/cm	DOC mg/L	FLOW L/s	hard mg/L	pH	SO4 mg/L	Ra Bq/L	Ba mg/L
2021-01			0.00					
2021-02			0.00					
2021-03	55.6	1.8	0.36	37.6	6.9	23.0	<0.007	0.012
2021-04	50.4	2.4	0.05	27.7	6.7	17.0	<0.007	0.012
2021-05	48.9		0.53		6.8			
2021-06			0.00					
2021-07			0.00					
2021-08			0.00					
2021-09			0.00					
2021-10			0.00					
2021-11			0.00					
2021-12	54.9	2.5	0.05	28.2	7.0	17.0	<0.005	0.010
Count	52	3	52	3	52	3	3	3
High	59.2	2.5	2.00	37.6	7.0	23.0	<0.007	0.012
Low	45.1	1.8	0.00	27.7	6.6	17.0	<0.005	0.010
Mean	52.5	2.2	0.09	31.2	6.8	19.0	<0.006	0.011
High Limit	69.5				8.5	128-429	0.469	1.000
Low Limit					6.5			
Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	Co mg/L	Fe mg/L	Mn mg/L	U mg/L
2021-03	<0.0005	<0.02	0.003	<0.0005
2021-04	<0.0005	0.09	0.011	<0.0005
2021-12	<0.0005	<0.02	0.004	<0.0005
Count	3	3	3	3
High	<0.0005	0.09	0.011	<0.0005
Low	<0.0005	<0.02	0.003	<0.0005
Mean	<0.0005	0.04	0.006	<0.0005
High Limit	0.0025	0.76	0.841	0.0150
Low Limit				
Lim Ex	0	0	0	0
Frequency	0%	0%	0%	0%
10x Lim Ex	0	0	0	0
Frequency	0%	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

DS-2: Stanrock ETP Influent

Month	ACID	FLOW	Freeboard(m)	pH	SO4	Ra	Ba	Co
	mg/L	L/s	m		mg/L	Bq/L	mg/L	mg/L
2021-01	144	27.26	1.1748	3.0	420.0	0.204	0.021	0.0450
2021-02		26.25	1.1842	3.6		0.192		
2021-03		70.71	1.1967	2.8		0.203		
2021-04	149	59.67	1.4959	3.0	340.0	0.147	0.010	0.0602
2021-05		32.10	1.6056	2.9		0.083		
2021-06		4.70	1.7050	2.9				
2021-07	210	21.13	1.7225	2.8	560.0		0.017	0.0544
2021-08		16.32	1.7532	2.8		0.777		
2021-09		15.10	1.7100	2.8				
2021-10	197	29.29	1.5362	3.0	550.0		0.020	0.0609
2021-11		16.57	1.5570	2.8		0.311		
2021-12		66.59	1.1538	2.4		0.200		
Count	4	365	358	12	4	11	4	4
High	210	134.00	2.1900	3.6	560.0	0.777	0.021	0.0609
Low	144	0.00	0.5400	2.4	340.0	0.083	0.010	0.0450
Mean	175	32.09	1.4824	2.9	467.5	0.265	0.017	0.0551
High Limit				8.5	128-429	0.469	1.000	0.0025
Low Limit				6.5				
Lim Ex	0	0	0	12	4	0	0	4
Frequency	0%	0%	0%	100%	100%	0%	0%	100%
10x Lim Ex	0	0	0	0	0	0	0	4
Frequency	0%	0%	0%	0%	0%	0%	0%	100%

Month	Fe	Mn	U
	mg/L	mg/L	mg/L
2021-01	33.30	1.430	0.0107
2021-04	31.10	0.829	0.0125
2021-07	20.10	1.450	0.0115
2021-10	22.10	1.740	0.0133
Count	4	4	4
High	33.30	1.740	0.0133
Low	20.10	0.829	0.0107
Mean	26.65	1.362	0.0120
High Limit	0.76	0.841	0.0150
Low Limit			
Lim Ex	4	4	0
Frequency	100%	100%	0%
10x Lim Ex	4	0	0
Frequency	100%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

DS-3: Stanrock pH Probe Control (ETP Operations)

Month	BaCl2T kg/month	CaOT tonnes/mth.	NaOHT kg/month	ODays day	pH
2021-01	47.90	4.60	0.00	8	10.8
2021-02	39.30	3.72	0.00	7	10.8
2021-03	216.97	19.12	0.00	20	10.8
2021-04	169.10	13.16	0.00	18	10.8
2021-05	105.00	10.70	0.00	11	10.9
2021-06	14.35	1.21	0.00	2	10.8
2021-07	77.50	9.57	0.00	9	10.8
2021-08	50.30	5.40	0.00	6	10.8
2021-09	42.30	5.20	0.00	6	11.0
2021-10	96.30	11.70	0.00	11	10.8
2021-11	36.00	4.00	0.00	6	10.9
2021-12	148.00	18.20	0.00	20	10.9
Count	12	12	12	12	342
High	216.97	19.12	0.00	20	11.6
Low	14.35	1.21	0.00	2	10.5
Mean	86.92	8.88	0.00	10	10.8
High Limit					8.5
Low Limit					6.5
Lim Ex	0	0	0	0	7
Frequency	0%	0%	0%	0%	100%
10x Lim Ex	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

DS-4: Stanrock Orient Lake Polishing Pond Outlet (Final Discharge)

Month	DDays	DOC	FLOW	hard	pH	SO4	TSS	TOXCD
	day	mg/L	L/s	mg/L		mg/L	mg/L	IC25
2021-01	31	2.0	12.00	262.0	7.3	220.0	1	
2021-02	28	2.1	8.50	273.0	7.2	230.0	1	
2021-03	31	2.1	41.40	260.0	7.1	230.0	1	
2021-04	30	2.1	51.00	204.0	7.1	160.0	1	
2021-05	31	1.3	33.50	<0.1	7.1	220.0	1	100
2021-06	30	1.2	2.00	308.0	7.0	210.0	1	
2021-07	31	1.3	2.75	296.0	7.0	240.0	1	
2021-08	31	1.8	14.80	268.0	7.2	220.0	1	
2021-09	30	1.6	6.75	266.0	7.2	230.0	1	
2021-10	31	2.1	20.25	277.0	7.4	230.0	2	
2021-11	30	2.3	14.80	260.0	7.2	230.0	1	0
2021-12	31	1.8	39.50	274.0	7.0	250.0	1	
Count	12	12	52	12	52	12	52	2
High	31	2.3	105.00	308.0	7.5	250.0	3	100
Low	28	1.2	0.00	<0.1	6.9	160.0	<1	0
Mean	30	1.8	20.42	245.7	7.1	222.5	1	50
High Limit					8.5	128-429	10	
Low Limit					6.5			
Lim Ex	0	0	0	0	0	12	0	0
Frequency	0%	0%	0%	0%	0%	100%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	TOXDM	TOXRT	Ra	Ba	Co	Fe	Mn	U
	%	%	Bq/L	mg/L	mg/L	mg/L	mg/L	mg/L
2021-01			0.059	0.134	<0.0005	0.13	0.037	0.0021
2021-02			0.064	0.121	<0.0005	0.12	0.041	0.0020
2021-03			0.063	0.112	<0.0005	0.07	0.032	0.0032
2021-04			0.057	0.120	<0.0005	0.18	0.042	0.0015
2021-05	0	0	0.110	<0.005	<0.0005	<0.02	<0.002	<0.0005
2021-06			0.150	0.097	<0.0005	0.03	0.054	0.0017
2021-07			0.227	0.094	<0.0005	0.04	0.051	0.0042
2021-08			0.202	0.060	<0.0005	0.09	0.030	0.0077
2021-09			0.176	0.048	<0.0005	0.05	0.032	0.0081
2021-10			0.178	0.051	<0.0005	0.10	0.022	0.0091
2021-11	0	0	0.157	0.041	<0.0005	0.12	0.020	0.0100
2021-12			0.084	0.039	<0.0005	0.12	0.016	0.0100
Count	2	2	52	12	12	12	12	12
High	0	0	0.254	0.134	<0.0005	0.18	0.054	0.0100
Low	0	0	0.040	<0.005	<0.0005	<0.02	<0.002	<0.0005
Mean	0	0	0.129	0.077	<0.0005	0.09	0.032	0.0050
High Limit			0.469	1.000	0.0025	0.76	0.841	0.0150
Low Limit								
Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

DS-5: Stanrock Orient Creek Discharge into Moose Lake

Month	CONDF µmho/cm	FLOW L/s	Head(ft) ft	pH
2021-01	117.8	<1.00		4.2
2021-04	79.5	10.42	0.3	4.0
2021-07		0.00	0.0	
2021-10	94.9	7.41	0.2	4.2
Count	4	4	3	4
High	117.8	10.42	0.3	4.2
Low	79.5	0.00	0.0	4.0
Mean	97.4	4.71	0.1	4.1
High Limit	69.5			8.5
Low Limit				6.5
Lim Ex	3	0	0	3
Frequency	100%	0%	0%	100%
10x Lim Ex	0	0	0	0
Frequency	0%	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

DS-6: Stanrock Moose Lake Settling Pond Narrows, Upstream of DS-1

Month	FLOW L/s	pH
2021-01	8.50	7.5
2021-02	3.50	7.4
2021-03	66.40	7.2
2021-04	61.50	7.9
2021-05	45.50	7.4
2021-06	0.00	7.8
2021-07	20.50	7.9
2021-08	4.40	8.0
2021-09	0.25	7.8
2021-10	2.00	7.6
2021-11	2.40	7.5
2021-12	57.50	7.0
Count	52	52
High	176.00	8.7
Low	0.00	7.0
Mean	22.37	7.5
High Limit		8.5
Low Limit		6.5
Lim Ex	0	1
Frequency	0%	3%
10x Lim Ex	0	0
Frequency	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

FBDST

Month	pH	SO4 mg/L	TSS mg/L	Ra Bq/L	Ba mg/L	Co mg/L	Fe mg/L	Mn mg/L
2021-01	6.0	<0.2	<1	<0.007	<0.005	<0.0005	<0.02	<0.002
2021-02	6.0	<0.2	<1	<0.007	<0.005	<0.0005	<0.02	<0.002
2021-03	6.0	<0.1	<1	<0.007	<0.005	<0.0005	<0.02	<0.002
2021-04	6.0	<0.1	<1	<0.007	<0.005	<0.0005	<0.02	<0.002
2021-05	6.2	<0.1	2	<0.005	<0.005	<0.0005	0.02	<0.002
2021-06	6.3	<0.1	<1	<0.005	<0.005	<0.0005	<0.02	<0.002
2021-07	6.2	<0.1	<1	<0.005	<0.005	<0.0005	<0.02	<0.002
2021-08	6.1	<0.1	1	<0.005	<0.005	<0.0005	<0.02	<0.002
2021-09	5.9	<0.1	<1	<0.005	<0.005	<0.0005	<0.02	<0.002
2021-10	6.0	<0.1	<1	<0.005	<0.005	<0.0005	<0.02	<0.002
2021-11	5.9	<0.1	<1	<0.005	<0.005	<0.0005	<0.02	<0.002
2021-12	5.8	<0.1	<1	<0.005	<0.005	<0.0005	<0.02	<0.002
Count	12	12	12	12	12	12	12	12
High	6.3	<0.2	2	<0.007	<0.005	<0.0005	<0.02	<0.002
Low	5.8	<0.1	<1	<0.005	<0.005	<0.0005	0.02	<0.002
Mean	6.0	<0.1	1	<0.006	<0.005	<0.0005	0.02	<0.002
High Limit	8.5	128-429	10	0.469	1.000	0.0025	0.76	0.841
Low Limit	6.5							
Lim Ex	12	0	0	0	0	0	0	0
Frequency	100%	0%	0%	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	U mg/L
2021-01	<0.0005
2021-02	<0.0005
2021-03	<0.0005
2021-04	<0.0005
2021-05	<0.0005
2021-06	<0.0005
2021-07	<0.0005
2021-08	<0.0005
2021-09	<0.0005
2021-10	<0.0005
2021-11	<0.0005
2021-12	<0.0005
Count	12
High	<0.0005
Low	<0.0005
Mean	<0.0005
High Limit	0.0150
Low Limit	
Lim Ex	0
Frequency	0%
10x Lim Ex	0
Frequency	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

ST-1: Stanrock Downstream of Dam G

Month	CONDF µmho/cm	pH
2021-01	72.7	5.9
2021-04	52.3	4.3
2021-07		
2021-10	69.5	4.5
Count	4	4
High	72.7	5.9
Low	52.3	4.3
Mean	64.8	4.9
High Limit	69.5	8.5
Low Limit		6.5
Lim Ex	1	3
Frequency	33%	100%
10x Lim Ex	0	0
Frequency	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

ST-1A: Stanrock Seepage from Dam J at Toe of Dam

Month	CONDF µmho/cm	FLOW L/s	pH
2021-01		0.00	
2021-04	86.8	0.01	4.3
2021-07		0.00	
2021-10		0.00	
Count	4	4	4
High	86.8	0.01	4.3
Low	86.8	0.00	4.3
Mean	86.8	0.00	4.3
High Limit	69.5		8.5
Low Limit			6.5
Lim Ex	1	0	1
Frequency	100%	0%	100%
10x Lim Ex	0	0	0
Frequency	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

ST-3: Stanrock Downstream of Dam G

Month	CONDF µmho/cm	pH
2021-01	583.0	2.9
2021-04	574.0	3.3
2021-07	832.0	3.4
2021-10	876.0	3.6
Count	4	4
High	876.0	3.6
Low	574.0	2.9
Mean	716.3	3.3
High Limit	69.5	8.5
Low Limit		6.5
Lim Ex	4	4
Frequency	100%	100%
10x Lim Ex	2	0
Frequency	50%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

ST-3A: Stanrock Dam G Toe of Dam G

Month	CONDF µmho/cm	FLOW L/s	pH
2021-01	946.0	0.11	4.7
2021-04	836.0	0.25	3.7
2021-07	856.0	0.08	3.9
2021-10	896.0	0.10	4.2
Count	4	4	4
High	946.0	0.25	4.7
Low	836.0	0.08	3.7
Mean	883.5	0.14	4.1
High Limit	69.5		8.5
Low Limit			6.5
Lim Ex	4	0	4
Frequency	100%	0%	100%
10x Lim Ex	4	0	0
Frequency	100%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

ST-4

Month	ACID mg/L	ALK mg/L	CONDF µmho/cm	DOC mg/L	hard mg/L	pH	SO4 mg/L	Ra Bq/L
2021-02	<1	7.00	60.1	3.7	38.6	7.2	28.0	0.024
2021-05	<1	7.00	74.6	3.2	36.8	7.0	26.0	0.174
2021-08	<1	10.00	68.4	2.9	35.3	7.0	25.0	0.035
2021-11	<1	10.00	65.1	3.0	28.2	7.0	27.0	0.035
Count	4	4	4	4	4	4	4	4
High	<1	10.00	74.6	3.7	38.6	7.2	28.0	0.174
Low	<1	7.00	60.1	2.9	28.2	7.0	25.0	0.024
Mean	<1	8.50	67.0	3.2	34.7	7.0	26.5	0.067
High Limit			69.5			8.5	128-429	0.469
Low Limit						6.5		
Lim Ex	0	0	1	0	0	0	0	0
Frequency	0%	0%	25%	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	Ba mg/L	Co mg/L	Fe mg/L	Mn mg/L	U mg/L
2021-02	0.045	<0.0005	0.04	0.008	0.0011
2021-05	0.043	<0.0005	0.03	0.005	0.0013
2021-08	0.043	<0.0005	0.04	0.008	0.0011
2021-11	0.042	<0.0005	<0.02	0.004	0.0011
Count	4	4	4	4	4
High	0.045	<0.0005	0.04	0.008	0.0013
Low	0.042	<0.0005	<0.02	0.004	0.0011
Mean	0.043	<0.0005	0.03	0.006	0.0012
High Limit	1.000	0.0025	0.76	0.841	0.0150
Low Limit					
Lim Ex	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

SR-16 Fox Creek @ Hwy 108

Month	DOC	hard	pHF	SO4	Ra	Ba	Co	Fe
	mg/L	mg/L		mg/L	Bq/L	mg/L	mg/L	mg/L
2021-02	11.3	10.8	5.6	0.5	<0.007	0.008	0.0007	1.88
2021-05	8.6	5.0	6.3	0.6	<0.005	<0.005	<0.0005	0.22
2021-08	17.1	7.6	5.8	0.3	<0.005	0.008	0.0007	1.21
2021-11	16.3	6.4	6.0	<1.0	<0.005	0.006	<0.0005	0.44
Count	4	4	4	4	4	4	4	4
High	17.1	10.8	6.3	<1.0	<0.007	0.008	0.0007	1.88
Low	8.6	5.0	5.6	0.3	<0.005	<0.005	<0.0005	0.22
Mean	13.3	7.5	5.9	0.6	<0.005	0.007	0.0006	0.94
High Limit			8.5	128.0	0.469	1.000	0.0025	2.49
Low Limit			5.3					
Lim Ex	0	0	0	0	0	0	0	2
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	Mn	U
	mg/L	mg/L
2021-02	0.059	<0.0005
2021-05	0.010	<0.0005
2021-08	0.050	<0.0005
2021-11	0.024	<0.0005
Count	4	4
High	0.059	<0.0005
Low	0.010	<0.0005
Mean	0.036	<0.0005
High Limit	0.841	0.0150
Low Limit		
Lim Ex	0	0
10x Lim Ex	0	0
Frequency	0%	0%

2021 Performance Monitoring Results
Monthly Average YTD Results

SR-18 Jim Christ Lake Outlet

Month	DOC mg/L	hard mg/L	pHF	SO4 mg/L	Ra Bq/L	Ba mg/L	Fe mg/L	Mn mg/L
2021-05	4.7	9.6	6.8	3.4	0.007	0.046	0.03	0.008
2021-11	5.4	10.0	6.8	3.5	<0.005	0.046	0.11	0.062
Count	2	2	2	2	2	2	2	2
High	5.4	10.0	6.8	3.5	0.007	0.046	0.11	0.062
Low	4.7	9.6	6.8	3.4	<0.005	0.046	0.03	0.008
Mean	5.1	9.8	6.8	3.5	0.006	0.046	0.07	0.035
High Limit	11.0		8.5	128.0	0.469	1.000	0.76	0.841
Low Limit			6.5					
Lim Ex	0	0	0	0	0	0	0	0
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	U mg/L
2021-05	<0.0005
2021-11	<0.0005
Count	2
High	<0.0005
Low	<0.0005
Mean	<0.0005
High Limit	0.0150
Low Limit	
Lim Ex	0
10x Lim Ex	0
Frequency	0%

2021 Performance Monitoring Results
Detailed Results for 2021

BSDST

Date	FLOW	pH	SO4	TSS	Ra	Ba	Co	Fe
	L/s		mg/L	mg/L	Bq/L	mg/L	mg/L	mg/L
2021-01-12	44.00	7.4	140.0	<1	0.097	0.380	<0.0005	0.33
2021-02-02	84.00	7.4	120.0	1	0.298	0.506	<0.0005	0.38
2021-03-09	87.00	7.4	120.0	1	0.215	0.626	<0.0005	0.58
2021-04-13	104.00	7.4	120.0	<1	0.208	0.462	0.0005	0.46
2021-05-25	9.00	7.1	140.0	2	0.107	0.267	<0.0005	0.25
2021-06-08	9.00	7.3	150.0	4	0.056	0.280	<0.0005	0.14
2021-07-13	7.00	7.3	170.0	<1	0.053	0.190	<0.0005	0.11
2021-08-10	4.00	7.3	180.0	1	0.021	0.149	<0.0005	0.12
2021-09-14	9.00	7.1	190.0	1	0.042	0.088	<0.0005	0.12
2021-10-12	21.00	7.2	210.0	1	0.033	0.091	<0.0005	0.26
2021-11-16	23.00	7.0	210.0	1	0.125	0.132	<0.0005	0.31
2021-12-14	34.00	7.0	210.0	1	0.069	0.079	<0.0005	0.29
Count	12	12	12	12	12	12	12	12
High	104.00	7.4	210.0	4	0.298	0.626	0.0005	0.58
Low	4.00	7.0	120.0	<1	0.021	0.079	<0.0005	0.11
Mean	36.25	7.2	163.3	1	0.110	0.271	0.0005	0.28
High Limit		8.5	128-429	10	0.469	1.000	0.0025	0.76
Low Limit		6.5						
Lim Ex	0	0	9	0	0	0	0	1
Frequency	0%	0%	75%	0%	0%	0%	0%	8%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Date	Mn	U
	mg/L	mg/L
2021-01-12	0.160	0.0244
2021-02-02	0.152	0.0194
2021-03-09	0.146	0.0189
2021-04-13	0.219	0.0218
2021-05-25	0.112	0.0237
2021-06-08	0.101	0.0281
2021-07-13	0.125	0.0281
2021-08-10	0.076	0.0265
2021-09-14	0.043	0.0310
2021-10-12	0.128	0.0335
2021-11-16	0.162	0.0399
2021-12-14	0.175	0.0459
Count	12	12
High	0.219	0.0459
Low	0.043	0.0189
Mean	0.133	0.0284
High Limit	0.841	0.0150
Low Limit		
Lim Ex	0	12
Frequency	0%	100%
10x Lim Ex	0	0
Frequency	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

D-1: Denison TMA-1 Overflow (Influent and ETP Operations)

Date	ACID	BaCl2T	ELEV	FLOW	NaOHT	ODays	pH	SO4
	mg/L	kg/month	m	L/s	kg/month	day		mg/L
2021-01-01				36.00				
2021-01-02				36.00				
2021-01-03				36.00				
2021-01-04			387.06	36.00				
2021-01-05				36.00				
2021-01-06				36.00				
2021-01-07				36.00				
2021-01-08				36.00				
2021-01-09				36.00				
2021-01-10				36.00				
2021-01-11				36.00				
2021-01-12	<1		387.05	35.00			7.7	52.0
2021-01-13				35.00				
2021-01-14				35.00				
2021-01-15				35.00				
2021-01-16				36.00				
2021-01-17				36.00				
2021-01-18				35.00				
2021-01-19			387.04	35.00				
2021-01-20				85.00				
2021-01-21				86.00				
2021-01-22				85.00				
2021-01-23				85.00				
2021-01-24				85.00				
2021-01-25				85.00				
2021-01-26			387.03	85.00				
2021-01-27				85.00				
2021-01-28		519.10		34.00	0.00	31		
2021-01-29				85.00				
2021-01-30				85.00				
2021-01-31				85.00				
2021-02-01				82.00				
2021-02-02			387.01	81.00			7.5	
2021-02-03				82.00				
2021-02-04				82.00				
2021-02-05				82.00				
2021-02-06				83.00				
2021-02-07				83.00				
2021-02-08				83.00				
2021-02-09			387.00	83.00				
2021-02-10				83.00				
2021-02-11				84.00				
2021-02-12				83.00				
2021-02-13				80.00				
2021-02-14				80.00				
2021-02-15				80.00				
2021-02-16			386.98	82.00				
2021-02-17				80.00				
2021-02-18				83.00				
2021-02-19				82.00				

2021 Performance Monitoring Results
Detailed Results for 2021

D-1: Denison TMA-1 Overflow (Influent and ETP Operations)

Date	ACID mg/L	BaCl2T kg/month	ELEV m	FLOW L/s	NaOHT kg/month	ODays day	pH	SO4 mg/L
2021-02-20				82.00				
2021-02-21				82.00				
2021-02-22				81.00				
2021-02-23			386.96	82.00				
2021-02-24				81.00				
2021-02-25				80.00				
2021-02-26				80.00				
2021-02-27				80.00				
2021-02-28		892.70		80.00	0.00	28		
2021-03-01				80.00				
2021-03-02			386.95	80.00				
2021-03-03				80.00				
2021-03-04				79.00				
2021-03-05				80.00				
2021-03-06				80.00				
2021-03-07				80.00				
2021-03-08				80.00				
2021-03-09			386.92	82.00			7.5	
2021-03-10				81.00				
2021-03-11				80.00				
2021-03-12				80.00				
2021-03-13				80.00				
2021-03-14				80.00				
2021-03-15				79.00				
2021-03-16			386.93	79.00				
2021-03-17				79.00				
2021-03-18				92.00				
2021-03-19				104.00				
2021-03-20				104.00				
2021-03-21				104.00				
2021-03-22				106.00				
2021-03-23			386.91	104.00				
2021-03-24				104.00				
2021-03-25				104.00				
2021-03-26				102.00				
2021-03-27				104.00				
2021-03-28		1323.30		104.00	0.00	31		
2021-03-29				101.00				
2021-03-30			386.94	102.00				
2021-03-31				100.00				
2021-04-01				99.00				
2021-04-02				99.00				
2021-04-03				99.00				
2021-04-04				99.00				
2021-04-05				98.00				
2021-04-06			386.93	92.00				
2021-04-07				92.00				
2021-04-08				106.00				
2021-04-09				104.00				
2021-04-10				104.00				
2021-04-11				104.00				

2021 Performance Monitoring Results
Detailed Results for 2021

D-1: Denison TMA-1 Overflow (Influent and ETP Operations)

Date	ACID mg/L	BaCl2T kg/month	ELEV m	FLOW L/s	NaOHT kg/month	ODays day	pH	SO4 mg/L
2021-04-12				104.00				
2021-04-13	<1		386.92	102.00			7.8	48.0
2021-04-14				100.00				
2021-04-15				98.00				
2021-04-16				98.00				
2021-04-17				98.00				
2021-04-18				98.00				
2021-04-19				96.00				
2021-04-20			386.90	93.00				
2021-04-21				93.00				
2021-04-22				92.00				
2021-04-23				92.00				
2021-04-24				92.00				
2021-04-25				92.00				
2021-04-26				91.00				
2021-04-27			386.88	90.00				
2021-04-28		1119.10		92.00	0.00	30		
2021-04-29				92.00				
2021-04-30				91.00				
2021-05-01				91.00				
2021-05-02				91.00				
2021-05-03				91.00				
2021-05-04			386.89	91.00				
2021-05-05				91.00				
2021-05-06				90.00				
2021-05-07				91.00				
2021-05-08				90.00				
2021-05-09				90.00				
2021-05-10				91.00				
2021-05-11			386.88	90.00				
2021-05-12				89.00				
2021-05-13				90.00				
2021-05-14				91.00				
2021-05-15				0.00				
2021-05-16				0.00				
2021-05-17				0.00				
2021-05-18			386.83	0.00				
2021-05-19				0.00				
2021-05-20				0.00				
2021-05-21				0.00				
2021-05-22				0.00				
2021-05-23				0.00				
2021-05-24				0.00				
2021-05-25			386.83	0.00			7.9	
2021-05-26				0.00				
2021-05-27				0.00				
2021-05-28		373.00		0.00	0.00	14		
2021-05-29				0.00				
2021-05-30				0.00				
2021-05-31				0.00				
2021-06-01			386.78	0.00				

2021 Performance Monitoring Results
Detailed Results for 2021

D-1: Denison TMA-1 Overflow (Influent and ETP Operations)

Date	ACID mg/L	BaCl2T kg/month	ELEV m	FLOW L/s	NaOHT kg/month	ODays day	pH	SO4 mg/L
2021-06-02				0.00				
2021-06-03				0.00				
2021-06-04				0.00				
2021-06-05				0.00				
2021-06-06				0.00				
2021-06-07				0.00				
2021-06-08			386.75	0.00			8.0	
2021-06-09				0.00				
2021-06-10				0.00				
2021-06-11				0.00				
2021-06-12				0.00				
2021-06-13				0.00				
2021-06-14				0.00				
2021-06-15			386.76	0.00				
2021-06-16				0.00				
2021-06-17				0.00				
2021-06-18				0.00				
2021-06-19				0.00				
2021-06-20				0.00				
2021-06-21				0.00				
2021-06-22			386.74	0.00				
2021-06-23				0.00				
2021-06-24				0.00				
2021-06-25				0.00				
2021-06-26				0.00				
2021-06-27				0.00				
2021-06-28		0.00		0.00	0.00	0		
2021-06-29			386.78	0.00				
2021-06-30				0.00				
2021-07-01				0.00				
2021-07-02				0.00				
2021-07-03				0.00				
2021-07-04				0.00				
2021-07-05				0.00				
2021-07-06			386.76	0.00				
2021-07-07				0.00				
2021-07-08				0.00				
2021-07-09				0.00				
2021-07-10				0.00				
2021-07-11				0.00				
2021-07-12				0.00				
2021-07-13			386.73	0.00			7.9	
2021-07-14				0.00				
2021-07-15				0.00				
2021-07-16				0.00				
2021-07-17				0.00				
2021-07-18				0.00				
2021-07-19				0.00				
2021-07-20			386.75	0.00				
2021-07-21				0.00				
2021-07-22				0.00				

2021 Performance Monitoring Results
Detailed Results for 2021

D-1: Denison TMA-1 Overflow (Influent and ETP Operations)

Date	ACID mg/L	BaCl2T kg/month	ELEV m	FLOW L/s	NaOHT kg/month	ODays day	pH	SO4 mg/L
2021-07-23				0.00				
2021-07-24				0.00				
2021-07-25				0.00				
2021-07-26				0.00				
2021-07-27			386.76	0.00				
2021-07-28		0.00		0.00	0.00	0		
2021-07-29				0.00				
2021-07-30				0.00				
2021-07-31				0.00				
2021-08-01				0.00				
2021-08-02				0.00				
2021-08-03			386.75	0.00				
2021-08-04				0.00				
2021-08-05				0.00				
2021-08-06				0.00				
2021-08-07				0.00				
2021-08-08				0.00				
2021-08-09				0.00				
2021-08-10			386.76	0.00			7.2	
2021-08-11				0.00				
2021-08-12				0.00				
2021-08-13				0.00				
2021-08-14				0.00				
2021-08-15				0.00				
2021-08-16				0.00				
2021-08-17			386.77	0.00				
2021-08-18				0.00				
2021-08-19				0.00				
2021-08-20				0.00				
2021-08-21				0.00				
2021-08-22				0.00				
2021-08-23				0.00				
2021-08-24			386.74	0.00				
2021-08-25				0.00				
2021-08-26				0.00				
2021-08-27				0.00				
2021-08-28		0.00		0.00	0.00	0		
2021-08-29				0.00				
2021-08-30				0.00				
2021-08-31			386.74	0.00				
2021-09-01				0.00				
2021-09-02				0.00				
2021-09-03				0.00				
2021-09-04				0.00				
2021-09-05				0.00				
2021-09-06				0.00				
2021-09-07			386.72	0.00				
2021-09-08				0.00				
2021-09-09				0.00				
2021-09-10				0.00				
2021-09-11				0.00				

2021 Performance Monitoring Results
Detailed Results for 2021

D-1: Denison TMA-1 Overflow (Influent and ETP Operations)

Date	ACID mg/L	BaCl2T kg/month	ELEV m	FLOW L/s	NaOHT kg/month	ODays day	pH	SO4 mg/L
2021-09-12				0.00				
2021-09-13				0.00				
2021-09-14			386.74	0.00			7.2	
2021-09-15				0.00				
2021-09-16				0.00				
2021-09-17				0.00				
2021-09-18				0.00				
2021-09-19				0.00				
2021-09-20				0.00				
2021-09-21			386.73	0.00				
2021-09-22				0.00				
2021-09-23				0.00				
2021-09-24				0.00				
2021-09-25				0.00				
2021-09-26				0.00				
2021-09-27				0.00				
2021-09-28		0.00	386.74	0.00	0.00	0		
2021-09-29				0.00				
2021-09-30				0.00				
2021-10-01				0.00				
2021-10-02				0.00				
2021-10-03				0.00				
2021-10-04				0.00				
2021-10-05			386.74	0.00				
2021-10-06				0.00				
2021-10-07				0.00				
2021-10-08				0.00				
2021-10-09				0.00				
2021-10-10				0.00				
2021-10-11				0.00				
2021-10-12			386.80	0.00			7.3	
2021-10-13				0.00				
2021-10-14				0.00				
2021-10-15				0.00				
2021-10-16				0.00				
2021-10-17				0.00				
2021-10-18				0.00				
2021-10-19			386.80	0.00				
2021-10-20				0.00				
2021-10-21				0.00				
2021-10-22				0.00				
2021-10-23				0.00				
2021-10-24				0.00				
2021-10-25				0.00				
2021-10-26			386.80	0.00				
2021-10-27				0.00				
2021-10-28		0.00		0.00	0.00	0		
2021-10-29				0.00				
2021-10-30				0.00				
2021-10-31				0.00				
2021-11-01			386.78	0.00				

2021 Performance Monitoring Results
Detailed Results for 2021

D-1: Denison TMA-1 Overflow (Influent and ETP Operations)

Date	ACID mg/L	BaCl2T kg/month	ELEV m	FLOW L/s	NaOHT kg/month	ODays day	pH	SO4 mg/L
2021-11-02				0.00				
2021-11-03				0.00				
2021-11-04				0.00				
2021-11-05				0.00				
2021-11-06				0.00				
2021-11-07				0.00				
2021-11-08				0.00				
2021-11-09			386.78	0.00				
2021-11-10				0.00				
2021-11-11				0.00				
2021-11-12				0.00				
2021-11-13				0.00				
2021-11-14				0.00				
2021-11-15				0.00				
2021-11-16			386.79	0.00				
2021-11-17				0.00				
2021-11-18				0.00				
2021-11-19				0.00				
2021-11-20				0.00				
2021-11-21				0.00				
2021-11-22				0.00				
2021-11-23			386.79	0.00				
2021-11-24				0.00				
2021-11-25				0.00				
2021-11-26				0.00				
2021-11-27				0.00				
2021-11-28				0.00				
2021-11-29		0.00		0.00	0.00	0		
2021-11-30			386.80	0.00				
2021-12-01				0.00				
2021-12-02				0.00				
2021-12-03				0.00				
2021-12-04				0.00				
2021-12-05				0.00				
2021-12-06				0.00				
2021-12-07			386.83	0.00				
2021-12-08				0.00				
2021-12-09				0.00				
2021-12-10				0.00				
2021-12-11				0.00				
2021-12-12				0.00				
2021-12-13				0.00				
2021-12-14			386.86	0.00				
2021-12-15				0.00				
2021-12-16				0.00				
2021-12-17				0.00				
2021-12-18				0.00				
2021-12-19				0.00				
2021-12-20				0.00				
2021-12-21			386.88	0.00				
2021-12-22				0.00				

2021 Performance Monitoring Results
Detailed Results for 2021

D-1: Denison TMA-1 Overflow (Influent and ETP Operations)

Date	ACID mg/L	BaCl2T kg/month	ELEV m	FLOW L/s	NaOHT kg/month	ODays day	pH	SO4 mg/L
2021-12-23				0.00				
2021-12-24				0.00				
2021-12-25				0.00				
2021-12-26				0.00				
2021-12-27				0.00				
2021-12-28				0.00				
2021-12-29		0.00	386.91	0.00	0.00	0		
2021-12-30				0.00				
2021-12-31				0.00				
Count	2	12	52	365	12	12	12	2
High	<1	1323.30	387.06	106.00	0.00	31	8.0	52.0
Low	<1	0.00	386.72	0.00	0.00	0	7.2	48.0
Mean	<1	352.27	386.84	29.85	0.00	11	7.6	50.0
High Limit							8.5	128-429
Low Limit							6.5	
Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Date	Ra Bq/L	Ba mg/L	Co mg/L	Fe mg/L	Mn mg/L	U mg/L
2021-01-12	1.342	0.068	<0.0005	0.05	0.011	0.0087
2021-02-02	1.673					
2021-03-09	1.889					
2021-04-13	1.460	0.061	<0.0005	0.05	0.011	0.0097
2021-05-25	1.190					
Count	5	2	2	2	2	2
High	1.889	0.068	<0.0005	0.05	0.011	0.0097
Low	1.190	0.061	<0.0005	0.05	0.011	0.0087
Mean	1.511	0.065	<0.0005	0.05	0.011	0.0092
High Limit	0.469	1.000	0.0025	0.76	0.841	0.0150
Low Limit						
Lim Ex	5	0	0	0	0	0
Frequency	100%	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

D-16: Denison TMA-1 Dam 17 Seepage

Date	FLOW	hard	pH	SO4	TOXCD	TOXDM	TOXRT	Ra
	L/s	mg/L		mg/L	IC25	%	%	Bq/L
2021-01-12	1.00	267.0	6.7	230.0				0.021
2021-05-11	2.00	185.0	6.5	160.0	100	0	0	0.018
2021-07-13	0.33	299.0	6.8	250.0				0.050
2021-10-12	1.10	191.0	6.6	160.0				0.038
Count	4	4	4	4	1	1	1	4
High	2.00	299.0	6.8	250.0	100	0	0	0.050
Low	0.33	185.0	6.5	160.0	100	0	0	0.018
Mean	1.11	235.5	6.7	200.0	100	0	0	0.032
High Limit			8.5	128-429				0.469
Low Limit			6.5					
Lim Ex	0	0	0	4	0	0	0	0
Frequency	0%	0%	0%	100%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Date	Ba	Co	Fe	Mn	U
	mg/L	mg/L	mg/L	mg/L	mg/L
2021-01-12	0.033	0.0023	2.63	1.400	<0.0005
2021-05-11	0.020	<0.0005	0.32	0.163	<0.0005
2021-07-13	0.033	0.0042	7.78	4.440	<0.0005
2021-10-12	0.027	0.0023	4.10	2.090	<0.0005
Count	4	4	4	4	4
High	0.033	0.0042	7.78	4.440	<0.0005
Low	0.020	<0.0005	0.32	0.163	<0.0005
Mean	0.028	0.0023	3.71	2.023	<0.0005
High Limit	1.000	0.0025	0.76	0.841	0.0150
Low Limit					
Lim Ex	0	1	3	3	0
Frequency	0%	25%	75%	75%	0%
10x Lim Ex	0	0	1	0	0
Frequency	0%	0%	25%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

D-2: Denison TMA-1 Stollery Lake Settling Pond Outlet (Final Discharge)

Date	DDays	FLOW	hard	pH	SO4	TSS	TOXCD	TOXDM
	day	L/s	mg/L		mg/L	mg/L	IC25	%
2021-01-04		44.00		7.0		<1		
2021-01-12		44.00	191.0	7.4	140.0	1		
2021-01-19		44.00		7.4		<1		
2021-01-26		81.00		7.3		<1		
2021-01-28	31							
2021-02-02		84.00	193.0	7.4	130.0	1		
2021-02-09		81.00		7.2		<1		
2021-02-16		81.00		7.1		<1		
2021-02-23		81.00		7.4		1		
2021-02-28	28							
2021-03-02		81.00		7.3		1		
2021-03-09		87.00	198.0	7.4	110.0	2		
2021-03-16		69.00		7.3		<1		
2021-03-23		97.00		7.1		2		
2021-03-28	31							
2021-03-30		97.00		7.0		1		
2021-04-06		84.00		7.0		2		
2021-04-13		104.00	192.0	7.4	120.0	2		
2021-04-20		84.00		7.4		1		
2021-04-27		87.00		7.1		<1		
2021-04-28	30							
2021-05-04		104.00		7.5		2		
2021-05-11		81.00		7.4		1		
2021-05-18		17.00		7.5		1		
2021-05-25		9.00	179.0	7.1	140.0	2	22	0
2021-05-28	31							
2021-06-01		7.00		6.8		1		
2021-06-08		9.00	255.0	7.3	150.0	3		
2021-06-15		9.00		7.1		2		
2021-06-22		9.00		7.3		1		
2021-06-28	30							
2021-06-29		17.00		7.4		2		
2021-07-06		7.00		7.4		2		
2021-07-13		7.00	259.0	7.3	170.0	1		
2021-07-20		9.00		7.3		1		
2021-07-27		14.00		7.3		1		
2021-07-28	31							
2021-08-03		12.00		7.4		1		
2021-08-10		4.00	300.0	7.3	180.0	2		
2021-08-17		7.00		7.2		2		
2021-08-24		12.00		7.3		<1		
2021-08-28	31							
2021-08-31		14.00		7.4		<1		
2021-09-07		16.00		7.1		1		
2021-09-14		9.00	253.0	7.1	190.0	<1		
2021-09-21		19.00		7.0		2		
2021-09-28	30	19.00		7.0		<1		
2021-10-05		21.00		7.3		4		
2021-10-12		21.00	279.0	7.2	210.0	1		
2021-10-19		27.00		7.2		1		

2021 Performance Monitoring Results
Detailed Results for 2021

D-2: Denison TMA-1 Stollery Lake Settling Pond Outlet (Final Discharge)

Date	DDays day	FLOW L/s	hard mg/L	pH	SO4 mg/L	TSS mg/L	TOXCD IC25	TOXDM %
2021-10-26		19.00		7.1		1		
2021-10-28	31							
2021-11-01		16.00		7.0		1		
2021-11-09		17.00		7.4		2		
2021-11-16		23.00	283.0	7.0	210.0	2	100	3
2021-11-23		19.00		7.1		1		
2021-11-29	30							
2021-11-30		21.00		7.2		1		
2021-12-07		27.00		7.0		1		
2021-12-14		34.00	267.0	7.0	210.0	2		
2021-12-21		27.00		7.0		1		
2021-12-28	31							
2021-12-29		25.00		7.4		<1		
Count	12	52	12	52	12	52	2	2
High	31	104.00	300.0	7.5	210.0	4	100	3
Low	28	4.00	179.0	6.8	110.0	<1	22	0
Mean	30	39.19	237.4	7.2	163.3	1	61	2
High Limit				8.5	128-429	10		
Low Limit				6.5				
Lim Ex	0	0	0	0	10	0	0	0
Frequency	0%	0%	0%	0%	83%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

D-2: Denison TMA-1 Stollery Lake Settling Pond Outlet (Final Discharge)

Date	TOXRT	Ra	Ba	Co	Fe	Mn	U
	%	Bq/L	mg/L	mg/L	mg/L	mg/L	mg/L
2021-01-04		0.117					
2021-01-12		0.117	0.380	<0.0005	0.33	0.155	0.0240
2021-01-19		0.122					
2021-01-26		0.210					
2021-02-02		0.281	0.514	<0.0005	0.38	0.157	0.0199
2021-02-09		0.317					
2021-02-16		0.283					
2021-02-23		0.275					
2021-03-02		0.190					
2021-03-09		0.200	0.586	<0.0005	0.57	0.142	0.0181
2021-03-16		0.194					
2021-03-23		0.224					
2021-03-30		0.239					
2021-04-06		0.219					
2021-04-13		0.154	0.455	0.0005	0.43	0.210	0.0197
2021-04-20		0.159					
2021-04-27		0.107					
2021-05-04		0.138					
2021-05-11		0.183					
2021-05-18		0.125					
2021-05-25	0	0.097	0.279	<0.0005	0.28	0.130	0.0278
2021-06-01		0.100					
2021-06-08		0.053	0.292	<0.0005	0.19	0.166	0.0276
2021-06-15		0.101					
2021-06-22		0.059					
2021-06-29		0.050					
2021-07-06		0.043					
2021-07-13		0.038	0.188	<0.0005	0.12	0.134	0.0283
2021-07-20		0.057					
2021-07-27		0.042					
2021-08-03		0.032					
2021-08-10		0.041	0.151	<0.0005	0.14	0.104	0.0262
2021-08-17		0.035					
2021-08-24		0.024					
2021-08-31		0.033					
2021-09-07		0.023					
2021-09-14		0.019	0.092	<0.0005	0.13	0.056	0.0304
2021-09-21		0.038					
2021-09-28		0.070					
2021-10-05		0.048					
2021-10-12		0.049	0.101	<0.0005	0.27	0.198	0.0341
2021-10-19							
2021-10-26		0.133					
2021-11-01		0.125					
2021-11-09		0.117					
2021-11-16	0	0.147	0.130	<0.0005	0.30	0.157	0.0389
2021-11-23		0.122					
2021-11-30		0.108					
2021-12-07		0.059					
2021-12-14		0.060	0.083	<0.0005	0.28	0.166	0.0427

2021 Performance Monitoring Results
Detailed Results for 2021

D-2: Denison TMA-1 Stollery Lake Settling Pond Outlet (Final Discharge)

Date	TOXRT	Ra	Ba	Co	Fe	Mn	U
	%	Bq/L	mg/L	mg/L	mg/L	mg/L	mg/L
2021-12-21		0.079					
2021-12-29		0.010					
Count	2	52	12	12	12	12	12
High	0	0.317	0.586	0.0005	0.57	0.210	0.0427
Low	0	0.010	0.083	<0.0005	0.12	0.056	0.0181
Mean	0	0.115	0.271	0.0005	0.28	0.148	0.0281
High Limit		0.469	1.000	0.0025	0.76	0.841	0.0150
Low Limit							
Lim Ex	0	0	0	0	1	0	12
Frequency	0%	0%	0%	0%	8%	0%	100%
10x Lim Ex	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

D-22: Denison TMA-2 ETP (Influent and ETP Operations)

Date	ACID	BaCl2T	ODays	pH	SO4	Ra	Ba	Co
	mg/L	kg/month	day		mg/L	Bq/L	mg/L	mg/L
2021-01-04				6.5				
2021-01-12	<1			6.7	87.0	0.101	0.050	0.0014
2021-01-19				6.7				
2021-01-26				6.7				
2021-01-28		103.20	31					
2021-02-02				6.7		0.374		
2021-02-09				6.6				
2021-02-16				7.0				
2021-02-23				6.6				
2021-02-28		93.20	28					
2021-03-02				6.7				
2021-03-09				6.6		0.362		
2021-03-16				6.6				
2021-03-23				6.8				
2021-03-28		103.23	31					
2021-03-30				6.7				
2021-04-06				6.8				
2021-04-13	<1			6.8	50.0	0.071	0.016	<0.0005
2021-04-20				6.9				
2021-04-27				6.9				
2021-04-28		99.90	30					
2021-05-04				6.9				
2021-05-11				6.9		0.211		
2021-05-18				6.8				
2021-05-25				6.8				
2021-05-28		103.00	31					
2021-06-01				6.8				
2021-06-08				6.8		1.720		
2021-06-15				6.8				
2021-06-22				6.9				
2021-06-28		100.35	30					
2021-06-29				7.1				
2021-07-06				7.1				
2021-07-13	<1			7.0	74.0	2.160	0.155	0.0016
2021-07-20				6.9				
2021-07-27				7.0				
2021-07-28		103.45	31					
2021-08-03				6.9				
2021-08-10				6.8		0.437		
2021-08-17				6.7				
2021-08-24				6.8				
2021-08-28		146.50	31					
2021-08-31				7.0				
2021-09-07				6.7				
2021-09-14				6.8		1.330		
2021-09-21				6.7				
2021-09-28		199.80	30	6.6				
2021-10-05				7.0				
2021-10-12	<1			6.7	57.0	0.141	0.046	<0.0005
2021-10-19				6.8				

2021 Performance Monitoring Results
Detailed Results for 2021

D-22: Denison TMA-2 ETP (Influent and ETP Operations)

Date	ACID mg/L	BaCl2T kg/month	ODays day	pH	SO4 mg/L	Ra Bq/L	Ba mg/L	Co mg/L
2021-10-26				6.7				
2021-10-28		206.00	31					
2021-11-01				6.9				
2021-11-09				6.8		0.440		
2021-11-16				6.5				
2021-11-23				6.6				
2021-11-29		200.00	30					
2021-11-30				6.5				
2021-12-07				6.9				
2021-12-14				6.7		1.330		
2021-12-21				6.5				
2021-12-28		208.00	31					
2021-12-29				6.8				
Count	4	12	12	52	4	12	4	4
High	<1	208.00	31	7.1	87.0	2.160	0.155	0.0016
Low	<1	93.20	28	6.5	50.0	0.071	0.016	<0.0005
Mean	<1	138.89	30	6.8	67.0	0.723	0.067	0.0010
High Limit				8.5	128-429	0.469	1.000	0.0025
Low Limit				5.3				
Lim Ex	0	0	0	0	0	4	0	0
Frequency	0%	0%	0%	0%	0%	33%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Date	Fe mg/L	Mn mg/L	U mg/L
2021-01-12	0.90	0.806	<0.0005
2021-04-13	0.22	0.070	<0.0005
2021-07-13	25.10	1.820	0.0030
2021-10-12	0.89	0.235	<0.0005
Count	4	4	4
High	25.10	1.820	0.0030
Low	0.22	0.070	<0.0005
Mean	6.78	0.733	0.0011
High Limit	2.49	0.841	0.0150
Low Limit			
Lim Ex	3	2	0
Frequency	75%	50%	0%
10x Lim Ex	1	0	0
Frequency	25%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

D-25: Denison TMA-2 Overflow into TMA-1

Date	ACID	pH	SO4	Ra	Fe
	mg/L		mg/L	Bq/L	mg/L
2021-04-13	<1	7.6	68.0	0.430	0.20
2021-10-12	<1	7.3	78.0	0.559	0.12
Count	2	2	2	2	2
High	<1	7.6	78.0	0.559	0.20
Low	<1	7.3	68.0	0.430	0.12
Mean	<1	7.4	73.0	0.495	0.16
High Limit		8.5	128-429	0.469	0.76
Low Limit		6.5			
Lim Ex	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

D-3: Denison TMA-2 Effluent (Final Discharge)

Date	DDays	FLOW	hard	pH	SO4	TSS	Ra	Ba
	day	L/s	mg/L		mg/L	mg/L	Bq/L	mg/L
2021-01-04		4.00		7.1		<1	0.192	
2021-01-12		4.00	84.4	7.3	48.0	<1	0.191	0.508
2021-01-19		3.00		7.3		<1	0.175	
2021-01-26		3.00		7.3		<1	0.200	
2021-01-28	31							
2021-02-02		1.00	90.6	7.3	47.0	1	0.186	0.460
2021-02-09		1.00		7.1		<1	0.196	
2021-02-16		1.00		7.2		1	0.181	
2021-02-23		1.00		7.3		<1	0.200	
2021-02-28	28							
2021-03-02		1.00		7.3		1	0.180	
2021-03-09		<1.00	102.0	7.3	54.0	1	0.174	0.341
2021-03-16		3.00		7.3		<1	0.167	
2021-03-23		5.00		7.1		1	0.170	
2021-03-28	31							
2021-03-30		15.00		7.0		<1	0.119	
2021-04-06		11.00		7.0		<1	0.154	
2021-04-13		7.00	79.1	7.2	43.0	<1	0.146	0.362
2021-04-20		12.00		7.2		<1	0.173	
2021-04-27		6.00		7.2		<1	0.187	
2021-04-28	30							
2021-05-04		28.00		7.2		<1	0.223	
2021-05-11		8.00	98.1	7.2	64.0	<1	0.290	0.442
2021-05-18		2.00		7.2		<1	0.233	
2021-05-25		6.00		7.1		1	0.255	
2021-05-28	31							
2021-06-01		1.00		6.9		1	0.174	
2021-06-08		0.50	35.1	6.8	12.0	5	0.153	0.149
2021-06-15		1.00		7.0		1	0.257	
2021-06-22		3.00		7.2		1	0.271	
2021-06-28	30							
2021-06-29		1.00		7.2		<2	0.270	
2021-07-06		2.00		7.2		1	0.529	
2021-07-13		0.00						
2021-07-20		1.00	105.0	7.2	59.0	1	0.327	0.384
2021-07-27		3.00		7.2		<1	0.256	
2021-07-28	25							
2021-08-03		3.00		7.2		1	0.237	
2021-08-10		2.00	150.0	7.2	64.0	2	0.243	0.489
2021-08-17		1.00		7.1		2	0.288	
2021-08-24		0.00						
2021-08-28	24							
2021-08-31		3.00		7.2		<1	0.260	
2021-09-07		2.00		7.0		1	0.262	
2021-09-14		3.00	119.0	7.0	63.0	<1	0.216	0.347
2021-09-21		2.00		7.0		2	0.308	
2021-09-28	30	4.00		6.9		<1	0.235	
2021-10-05		7.00		7.1		3	0.197	
2021-10-12		10.00	119.0	7.0	64.0	2	0.217	0.423
2021-10-19		10.00		7.1		1		

2021 Performance Monitoring Results
Detailed Results for 2021

D-3: Denison TMA-2 Effluent (Final Discharge)

Date	DDays day	FLOW L/s	hard mg/L	pH	SO4 mg/L	TSS mg/L	Ra Bq/L	Ba mg/L
2021-10-26		4.00		7.1		<1	0.290	
2021-10-28	31							
2021-11-01		4.00		7.0		<1	0.260	
2021-11-09		2.00	95.2	7.1	74.0	2	0.260	0.324
2021-11-16		6.00		7.0		<1	0.285	
2021-11-23		8.00		7.0		1	0.191	
2021-11-29	30							
2021-11-30		6.00		7.0		2	0.219	
2021-12-07		8.00		7.0		1	0.232	
2021-12-14		8.00	137.0	7.0	87.0	1	0.104	0.424
2021-12-21		11.00		7.0		<1	0.172	
2021-12-28	31							
2021-12-29		6.00		7.3		1	0.112	
Count	12	52	12	52	12	50	50	12
High	31	28.00	150.0	7.3	87.0	5	0.529	0.508
Low	24	0.00	35.1	6.8	12.0	<1	0.104	0.149
Mean	29	4.72	101.2	7.1	56.6	1	0.221	0.388
High Limit				8.5	128-429	10	0.469	1.000
Low Limit				6.5				
Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Date	Co mg/L	Fe mg/L	Mn mg/L	U mg/L
2021-01-12	<0.0005	0.23	0.024	0.0024
2021-02-02	<0.0005	0.20	0.029	0.0031
2021-03-09	<0.0005	0.13	0.024	0.0041
2021-04-13	<0.0005	0.09	0.007	0.0013
2021-05-11	<0.0005	0.06	0.012	0.0025
2021-06-08	0.0006	0.56	0.133	0.0010
2021-07-20	<0.0005	0.33	0.076	0.0022
2021-08-10	<0.0005	0.25	0.052	0.0027
2021-09-14	<0.0005	0.15	0.044	0.0029
2021-10-12	<0.0005	0.30	0.047	0.0040
2021-11-09	<0.0005	0.09	0.015	0.0054
2021-12-14	<0.0005	0.15	0.021	0.0080
Count	12	12	12	12
High	0.0006	0.56	0.133	0.0080
Low	<0.0005	0.06	0.007	0.0010
Mean	0.0005	0.21	0.040	0.0033
High Limit	0.0025	0.76	0.841	0.0150
Low Limit				
Lim Ex	0	1	0	0
Frequency	0%	8%	0%	0%
10x Lim Ex	0	0	0	0
Frequency	0%	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

D-9: Denison TMA-1 Dam 9 Seepage

Date	FLOW	hard	pH	SO4	TOXCD	TOXDM	TOXRT	Ra
	L/s	mg/L		mg/L	IC25	%	%	Bq/L
2021-01-12		681.0	7.3	560.0				<0.007
2021-05-11	2.80	563.0	7.0	400.0	100	0	0	0.007
2021-07-13	1.70	923.0	7.0	780.0				0.021
2021-10-12	0.55	487.0	7.0	370.0				0.007
Count	4	4	4	4	1	1	1	4
High	2.80	923.0	7.3	780.0	100	0	0	0.021
Low	0.55	487.0	7.0	370.0	100	0	0	<0.007
Mean	1.68	663.5	7.1	527.5	100	0	0	0.011
High Limit			8.5	128-429				0.469
Low Limit			6.5					
Lim Ex	0	0	0	4	0	0	0	0
Frequency	0%	0%	0%	100%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Date	Ba	Co	Fe	Mn	U
	mg/L	mg/L	mg/L	mg/L	mg/L
2021-01-12	0.020	0.0025	0.70	1.560	0.0257
2021-05-11	0.016	0.0017	0.59	1.120	0.0175
2021-07-13	0.021	0.0029	0.73	2.060	0.0248
2021-10-12	0.017	0.0012	0.86	0.948	0.0115
Count	4	4	4	4	4
High	0.021	0.0029	0.86	2.060	0.0257
Low	0.016	0.0012	0.59	0.948	0.0115
Mean	0.019	0.0021	0.72	1.422	0.0199
High Limit	1.000	0.0025	0.76	0.841	0.0150
Low Limit					
Lim Ex	0	1	4	4	3
Frequency	0%	25%	100%	100%	75%
10x Lim Ex	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

DS-1: Stanrock Moose Lake Settling Pond Outlet to Orient Lake Polishing Pond

Date	FLOW	pH	Ra
	L/s		Bq/L
2021-01-05	11.00	7.1	
2021-01-12	11.00	7.5	0.034
2021-01-19	7.00	7.4	
2021-01-26	11.00	7.4	
2021-02-02	4.00	7.4	
2021-02-09	7.00	7.0	
2021-02-16	4.00	7.1	
2021-02-23	16.00	7.2	
2021-03-02	4.00	7.2	
2021-03-09	7.00	7.3	
2021-03-16	32.00	7.3	
2021-03-23	98.00	7.1	
2021-03-30	169.00	7.0	
2021-04-06	51.00	7.0	
2021-04-13	73.00	7.8	0.029
2021-04-20	38.00	7.2	
2021-04-27	214.00	7.2	
2021-05-04	163.00	7.3	
2021-05-11	4.00	7.2	
2021-05-18	3.00	7.1	
2021-05-25	3.00	7.2	
2021-06-01	1.00	7.0	
2021-06-08	1.00	6.9	
2021-06-15	1.00	6.9	
2021-06-22	0.00	7.3	
2021-06-29	4.00	7.3	
2021-07-06	0.00	7.2	
2021-07-13	0.00	7.1	0.052
2021-07-20	1.00	7.2	
2021-07-27	7.00	7.3	
2021-08-03	11.00	7.4	
2021-08-10	7.00	7.2	
2021-08-17	16.00	7.6	
2021-08-24	4.00	7.3	
2021-08-31	7.00	7.5	
2021-09-07	1.00	7.4	
2021-09-14	1.00	7.2	
2021-09-21	3.00	7.2	
2021-09-28	11.00	7.2	
2021-10-05	4.00	7.4	
2021-10-12	16.00	7.3	0.026
2021-10-19	21.00	7.6	
2021-10-26	11.00	7.3	
2021-11-01	11.00	7.5	
2021-11-09	7.00	7.2	
2021-11-16	16.00	7.1	
2021-11-23	16.00	7.2	
2021-11-30	11.00	7.3	
2021-12-07	32.00	7.0	
2021-12-14	58.00	7.0	

2021 Performance Monitoring Results
Detailed Results for 2021

DS-1: Stanrock Moose Lake Settling Pond Outlet to Orient Lake Polishing Pond

Date	FLOW L/s	pH	Ra Bq/L
2021-12-21	98.00	7.0	
2021-12-29	16.00	7.0	
Count	52	52	4
High	214.00	7.8	0.052
Low	0.00	6.9	0.026
Mean	25.44	7.2	0.035
High Limit		8.5	0.469
Low Limit		6.5	
Lim Ex	0	0	0
Frequency	0%	0%	0%
10x Lim Ex	0	0	0
Frequency	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

DS-11: Stanrock Seepage of Dam A

Date	CONDF µmho/cm	FLOW L/s	pH
2021-01-14	366.2	0.29	6.4
2021-04-13	332.5	1.10	6.6
2021-07-13	389.2	0.29	6.9
2021-10-12	358.4	0.55	6.8
Count	4	4	4
High	389.2	1.10	6.9
Low	332.5	0.29	6.4
Mean	361.6	0.56	6.7
High Limit	69.5		8.5
Low Limit			6.5
Lim Ex	4	0	1
Frequency	100%	0%	25%
10x Lim Ex	0	0	0
Frequency	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

DS-12: Stanrock Seepage from Dam B

Date	CONDF µmho/cm	FLOW L/s	pH
2021-01-14	430.3		3.3
2021-04-13	425.4	1.10	3.4
2021-07-13	605.0	0.03	3.8
2021-10-12	356.4	1.00	4.4
Count	4	4	4
High	605.0	1.10	4.4
Low	356.4	0.03	3.3
Mean	454.3	0.71	3.7
High Limit	69.5		8.5
Low Limit			6.5
Lim Ex	4	0	4
Frequency	100%	0%	100%
10x Lim Ex	0	0	0
Frequency	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

DS-13: Stanrock Seepage from Dam C

Date	CONDF µmho/cm	FLOW L/s	pH
2021-01-14		0.00	
2021-04-13	525.0	0.19	4.1
2021-07-13	1039.0	0.03	7.0
2021-10-12	626.2	0.07	6.4
Count	4	4	4
High	1039.0	0.19	7.0
Low	525.0	0.00	4.1
Mean	730.1	0.07	5.8
High Limit	69.5		8.5
Low Limit			6.5
Lim Ex	3	0	2
Frequency	100%	0%	67%
10x Lim Ex	1	0	0
Frequency	33%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

DS-14: Stanrock Seepage from Dam D

Date	CONDF µmho/cm	FLOW L/s	pH
2021-01-14		0.00	
2021-04-13			
2021-07-13			
Count	3	3	3
High		0.00	
Low		0.00	
Mean		0.00	
High Limit	69.5		8.5
Low Limit			6.5
Lim Ex	0	0	0
Frequency	0%	0%	0%
10x Lim Ex	0	0	0
Frequency	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

DS-16: Stanrock TMA, Seepage from Dam M at Quirke Lake Delta

Date	CONDF	DOC	FLOW	hard	pH	SO4	Ra	Ba
	µmho/cm	mg/L	L/s	mg/L		mg/L	Bq/L	mg/L
2021-01-04								
2021-01-12			0.00					
2021-01-19			0.00					
2021-01-26			0.00					
2021-02-02			0.00					
2021-02-09			0.00					
2021-02-16			0.00					
2021-02-23			0.00					
2021-03-02			0.00					
2021-03-09			0.00					
2021-03-16	50.3	1.8	0.10	37.6	6.7	23.0	<0.007	0.012
2021-03-23	57.3		1.10		7.0			
2021-03-30	59.2		0.60		6.9			
2021-04-06	48.7		0.10		6.8			
2021-04-13	52.0	2.4	0.10	27.7	6.6	17.0	<0.007	0.012
2021-04-20			0.00					
2021-04-27			0.00					
2021-05-04	45.1		2.00		6.9			
2021-05-11	52.7		0.10		6.8			
2021-05-18			0.00					
2021-05-25			0.00					
2021-06-01			0.00					
2021-06-08			0.00					
2021-06-15			0.00					
2021-06-22			0.00					
2021-06-29			0.00					
2021-07-06			0.00					
2021-07-13			0.00					
2021-07-20			0.00					
2021-07-27								
2021-08-03								
2021-08-10			0.00					
2021-08-17			0.00					
2021-08-24								
2021-08-31			0.00					
2021-09-07			0.00					
2021-09-14			0.00					
2021-09-21			0.00					
2021-09-28			0.00					
2021-10-05			0.00					
2021-10-12			0.00					
2021-10-19			0.00					
2021-10-26			0.00					
2021-11-01								
2021-11-09			0.00					
2021-11-16			0.00					
2021-11-23			0.00					
2021-11-30			0.00					
2021-12-07			0.00					
2021-12-14			0.00					

2021 Performance Monitoring Results
Detailed Results for 2021

DS-16: Stanrock TMA, Seepage from Dam M at Quirke Lake Delta

Date	CONDF µmho/cm	DOC mg/L	FLOW L/s	hard mg/L	pH	SO4 mg/L	Ra Bq/L	Ba mg/L
2021-12-21	54.9	2.5	0.20	28.2	7.0	17.0	<0.005	0.010
2021-12-29			0.00					
Count	52	3	52	3	52	3	3	3
High	59.2	2.5	2.00	37.6	7.0	23.0	<0.007	0.012
Low	45.1	1.8	0.00	27.7	6.6	17.0	<0.005	0.010
Mean	52.5	2.2	0.09	31.2	6.8	19.0	<0.006	0.011
High Limit	69.5				8.5	128-429	0.469	1.000
Low Limit					6.5			
Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Date	Co mg/L	Fe mg/L	Mn mg/L	U mg/L
2021-03-16	<0.0005	<0.02	0.003	<0.0005
2021-04-13	<0.0005	0.09	0.011	<0.0005
2021-12-21	<0.0005	<0.02	0.004	<0.0005
Count	3	3	3	3
High	<0.0005	0.09	0.011	<0.0005
Low	<0.0005	<0.02	0.003	<0.0005
Mean	<0.0005	0.04	0.006	<0.0005
High Limit	0.0025	0.76	0.841	0.0150
Low Limit				
Lim Ex	0	0	0	0
Frequency	0%	0%	0%	0%
10x Lim Ex	0	0	0	0
Frequency	0%	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

DS-2: Stanrock ETP Influent

Date	ACID mg/L	FLOW L/s	Freeboard(m) m	pH	SO4 mg/L	Ra Bq/L	Ba mg/L	Co mg/L
2021-01-01		0.00						
2021-01-02		97.00	1.4100					
2021-01-03		0.00						
2021-01-04		0.00	1.2700					
2021-01-05		0.00	1.0700					
2021-01-06		120.00	0.9300					
2021-01-07		92.00	1.5200					
2021-01-08		0.00	1.4100					
2021-01-09		0.00						
2021-01-10		0.00						
2021-01-11		0.00	1.2500					
2021-01-12		0.00	1.1500					
2021-01-13	144	120.00	0.9500	3.0	420.0	0.204	0.021	0.0450
2021-01-14		89.00	1.5800					
2021-01-15		0.00	1.4300					
2021-01-16		0.00						
2021-01-17		0.00						
2021-01-18		0.00	1.2000					
2021-01-19		0.00	1.0400					
2021-01-20		0.00	0.9200					
2021-01-21		122.00	0.8500					
2021-01-22		92.00	1.5200					
2021-01-23		0.00						
2021-01-24		0.00						
2021-01-25		0.00	1.2800					
2021-01-26		0.00	1.1700					
2021-01-27		0.00	1.0400					
2021-01-28		0.00	0.5400					
2021-01-29		113.00	1.1400					
2021-01-30		0.00						
2021-01-31		0.00						
2021-02-01		0.00	1.0800					
2021-02-02		0.00	0.9400					
2021-02-03		121.00	0.8100	3.6		0.192		
2021-02-04		86.00	1.5500					
2021-02-05		0.00	1.3600					
2021-02-06		0.00						
2021-02-07		0.00						
2021-02-08		0.00	1.2100					
2021-02-09		0.00	1.2000					
2021-02-10		0.00	1.0500					
2021-02-11		112.00	1.1900					
2021-02-12		107.00	1.2300					
2021-02-13		0.00						
2021-02-14		0.00						
2021-02-15		0.00						
2021-02-16		0.00	1.0900					
2021-02-17		0.00	0.9100					
2021-02-18		118.00	0.8700					
2021-02-19		82.00	1.6200					

2021 Performance Monitoring Results
Detailed Results for 2021

DS-2: Stanrock ETP Influent

Date	ACID mg/L	FLOW L/s	Freeboard(m) m	pH	SO4 mg/L	Ra Bq/L	Ba mg/L	Co mg/L
2021-02-20		0.00						
2021-02-21		0.00						
2021-02-22		0.00	1.4500					
2021-02-23		0.00	1.3800					
2021-02-24		0.00	1.1800					
2021-02-25		109.00	1.2200					
2021-02-26		0.00	1.1600					
2021-02-27		0.00						
2021-02-28		0.00						
2021-03-01		0.00	0.9400					
2021-03-02		0.00	0.8600					
2021-03-03		122.00	0.8000					
2021-03-04		80.00	1.6100					
2021-03-05		0.00	1.4600					
2021-03-06		0.00						
2021-03-07		0.00						
2021-03-08		0.00	1.3700					
2021-03-09		0.00	1.2200					
2021-03-10		110.00	1.0800	2.8		0.203		
2021-03-11		89.00	1.4700					
2021-03-12		110.00	0.9200					
2021-03-13		110.00						
2021-03-14		100.00						
2021-03-15		83.00	1.6300					
2021-03-16		0.00	1.3200					
2021-03-17		0.00	1.0400					
2021-03-18		123.00	0.8600					
2021-03-19		91.00	1.5200					
2021-03-20		0.00						
2021-03-21		0.00						
2021-03-22		130.00	0.7000					
2021-03-23		115.00						
2021-03-24		111.00						
2021-03-25		130.00						
2021-03-26		134.00						
2021-03-27		125.00						
2021-03-28		115.00						
2021-03-29		108.00						
2021-03-30		95.00	1.5600					
2021-03-31		111.00	1.1800					
2021-04-01		91.00	1.5300					
2021-04-02		0.00						
2021-04-03		0.00						
2021-04-04		0.00						
2021-04-05		126.00	0.8200					
2021-04-06		103.00						
2021-04-07		85.00	1.6700					
2021-04-08		0.00	1.3300					
2021-04-09		120.00	0.9700					
2021-04-10		110.00						
2021-04-11		101.00						

2021 Performance Monitoring Results
Detailed Results for 2021

DS-2: Stanrock ETP Influent

Date	ACID mg/L	FLOW L/s	Freeboard(m) m	pH	SO4 mg/L	Ra Bq/L	Ba mg/L	Co mg/L
2021-04-12		91.00						
2021-04-13	149	82.00	1.7900	3.0	340.0	0.147	0.010	0.0602
2021-04-14		0.00	1.4100					
2021-04-15		115.00	1.1700					
2021-04-16		93.00	1.6100					
2021-04-17		0.00						
2021-04-18		0.00						
2021-04-19		116.00	1.1300					
2021-04-20		95.00						
2021-04-21		74.00	1.8600					
2021-04-22		0.00	1.6800					
2021-04-23		0.00	1.6100					
2021-04-24		0.00						
2021-04-25		0.00						
2021-04-26		0.00	1.4100					
2021-04-27		103.00	1.3200					
2021-04-28		93.00	2.0700					
2021-04-29		98.00						
2021-04-30		94.00	2.0500					
2021-05-01		0.00						
2021-05-02		0.00						
2021-05-03		124.00	0.9200					
2021-05-04		112.00						
2021-05-05		110.00						
2021-05-06		102.00						
2021-05-07		91.00	1.6700					
2021-05-08		0.00						
2021-05-09		0.00						
2021-05-10		0.00	1.2700					
2021-05-11		118.00	1.0600					
2021-05-12		95.00						
2021-05-13		75.00	1.8900					
2021-05-14		0.00	1.7500					
2021-05-15		0.00						
2021-05-16		0.00						
2021-05-17		0.00	1.6000					
2021-05-18		0.00	1.5700					
2021-05-19		94.00	1.4500					
2021-05-20		74.00	1.9300					
2021-05-21		0.00	1.8400					
2021-05-22		0.00						
2021-05-23		0.00						
2021-05-24		0.00						
2021-05-25		0.00	1.7400					
2021-05-26		0.00	1.7300					
2021-05-27		0.00	1.7400	2.9		0.083		
2021-05-28		0.00	1.7700					
2021-05-29		0.00						
2021-05-30		0.00						
2021-05-31		0.00	1.7600					
2021-06-01		0.00	1.7600					

2021 Performance Monitoring Results
Detailed Results for 2021

DS-2: Stanrock ETP Influent

Date	ACID mg/L	FLOW L/s	Freeboard(m) m	pH	SO4 mg/L	Ra Bq/L	Ba mg/L	Co mg/L
2021-06-02		0.00	1.7600					
2021-06-03		0.00	1.7600					
2021-06-04		0.00	1.7600					
2021-06-05		0.00						
2021-06-06		0.00						
2021-06-07		0.00	1.7500					
2021-06-08		0.00	1.7500					
2021-06-09		0.00	1.7400					
2021-06-10		0.00	1.7300					
2021-06-11		0.00	1.6800					
2021-06-12		0.00						
2021-06-13		0.00						
2021-06-14		0.00	1.6300					
2021-06-15		0.00	1.6100					
2021-06-16		0.00	1.6000					
2021-06-17		0.00	1.5900					
2021-06-18		0.00	1.6000					
2021-06-19		0.00						
2021-06-20		0.00						
2021-06-21		83.00	1.5700					
2021-06-22		58.00	2.0300	2.9				
2021-06-23		0.00	2.0300					
2021-06-24		0.00	2.0100					
2021-06-25		0.00	2.0000					
2021-06-26		0.00						
2021-06-27		0.00						
2021-06-28		0.00	1.5300					
2021-06-29		0.00	1.3800					
2021-06-30		0.00	1.2400					
2021-07-01		0.00	1.1100					
2021-07-02		0.00						
2021-07-03		0.00						
2021-07-04		0.00						
2021-07-05		118.00	1.0000					
2021-07-06		95.00						
2021-07-07		63.00	2.0500					
2021-07-08		0.00	2.0300					
2021-07-09		0.00	2.0000					
2021-07-10		0.00						
2021-07-11		0.00						
2021-07-12		0.00	1.9900					
2021-07-13		0.00	2.0000					
2021-07-14		0.00	1.9400					
2021-07-15		74.00	1.7900					
2021-07-16	210	65.00	1.9400	2.8	560.0		0.017	0.0544
2021-07-17		0.00						
2021-07-18		0.00						
2021-07-19		0.00	1.6300					
2021-07-20		83.00	1.6300					
2021-07-21		57.00	2.0500					
2021-07-22		0.00	2.0300					

2021 Performance Monitoring Results
Detailed Results for 2021

DS-2: Stanrock ETP Influent

Date	ACID mg/L	FLOW L/s	Freeboard(m) m	pH	SO4 mg/L	Ra Bq/L	Ba mg/L	Co mg/L
2021-07-23		0.00	2.0200					
2021-07-24		0.00						
2021-07-25		0.00						
2021-07-26		0.00	1.5600					
2021-07-27		0.00	1.3900					
2021-07-28		0.00	1.3100					
2021-07-29		100.00	1.2600					
2021-07-30		0.00	1.7200					
2021-07-31		0.00						
2021-08-01		0.00						
2021-08-02		0.00						
2021-08-03		0.00	1.5200					
2021-08-04		0.00	1.5000					
2021-08-05		0.00	1.4800					
2021-08-06		0.00	1.4800					
2021-08-07		0.00						
2021-08-08		0.00						
2021-08-09		0.00	1.3600					
2021-08-10		105.00	1.2600	2.8		0.777		
2021-08-11		0.00						
2021-08-12		0.00	1.4300					
2021-08-13		112.00						
2021-08-14		100.00						
2021-08-15		62.00						
2021-08-16		0.00	1.8600					
2021-08-17		0.00	1.7900					
2021-08-18		76.00	1.7500					
2021-08-19		51.00	2.1200					
2021-08-20		0.00	2.0400					
2021-08-21		0.00						
2021-08-22		0.00						
2021-08-23		0.00	2.0000					
2021-08-24		0.00	2.0000					
2021-08-25		0.00	2.0000					
2021-08-26		0.00	1.9900					
2021-08-27		0.00	2.0000					
2021-08-28		0.00						
2021-08-29		0.00						
2021-08-30		0.00	1.8800					
2021-08-31		0.00	1.8500					
2021-09-01		0.00	1.8200					
2021-09-02		0.00	1.8100					
2021-09-03		0.00	1.8000					
2021-09-04		0.00						
2021-09-05		0.00						
2021-09-06		0.00						
2021-09-07		72.00	1.7600	2.8				
2021-09-08		38.00	2.1900					
2021-09-09		0.00	2.1400					
2021-09-10		0.00	2.1300					
2021-09-11		0.00						

2021 Performance Monitoring Results
Detailed Results for 2021

DS-2: Stanrock ETP Influent

Date	ACID mg/L	FLOW L/s	Freeboard(m) m	pH	SO4 mg/L	Ra Bq/L	Ba mg/L	Co mg/L
2021-09-12		0.00						
2021-09-13		0.00	1.9000					
2021-09-14		0.00	1.8600					
2021-09-15		0.00	1.6700					
2021-09-16		0.00	1.6200					
2021-09-17		0.00	1.6000					
2021-09-18		0.00						
2021-09-19		0.00						
2021-09-20		0.00	1.5400					
2021-09-21		0.00	1.5300					
2021-09-22		95.00	1.3700					
2021-09-23		67.00	1.8200					
2021-09-24		0.00	1.7600					
2021-09-25		0.00						
2021-09-26		0.00						
2021-09-27		0.00	1.3700					
2021-09-28		0.00	1.3100					
2021-09-29		103.00	1.2100					
2021-09-30		78.00	1.7000					
2021-10-01		0.00	1.6700					
2021-10-02		0.00						
2021-10-03		0.00						
2021-10-04		0.00	1.4100					
2021-10-05	197	100.00	1.3400	3.0	550.0		0.020	0.0609
2021-10-06		0.00						
2021-10-07		0.00	1.7300					
2021-10-08		0.00	1.7000					
2021-10-09		0.00						
2021-10-10		0.00						
2021-10-11		0.00						
2021-10-12		115.00	0.9900					
2021-10-13		113.00						
2021-10-14		96.00						
2021-10-15		80.00						
2021-10-16		62.00						
2021-10-17		0.00						
2021-10-18		0.00	1.7300					
2021-10-19		0.00	1.6600					
2021-10-20		0.00	1.4800					
2021-10-21		99.00	1.3800					
2021-10-22		74.00	1.8100					
2021-10-23		0.00						
2021-10-24		0.00						
2021-10-25		0.00	1.5800					
2021-10-26		0.00	1.4900					
2021-10-27		0.00	1.3900					
2021-10-28		99.00	1.3500					
2021-10-29		70.00	1.8700					
2021-10-30		0.00						
2021-10-31		0.00						
2021-11-01		0.00	1.7300					

2021 Performance Monitoring Results
Detailed Results for 2021

DS-2: Stanrock ETP Influent

Date	ACID mg/L	FLOW L/s	Freeboard(m) m	pH	SO4 mg/L	Ra Bq/L	Ba mg/L	Co mg/L
2021-11-02		0.00	1.7100					
2021-11-03		0.00	1.7000					
2021-11-04		0.00	1.6800					
2021-11-05		0.00	1.6800					
2021-11-06		0.00						
2021-11-07		0.00						
2021-11-08		0.00	1.6200					
2021-11-09		0.00	1.6000					
2021-11-10		0.00	1.5900					
2021-11-11		85.00	1.5800					
2021-11-12		61.00						
2021-11-13		0.00						
2021-11-14		0.00						
2021-11-15		0.00	1.5400					
2021-11-16		0.00	1.4700					
2021-11-17		0.00	1.4200					
2021-11-18		98.00	1.3600					
2021-11-19		69.00	1.8300					
2021-11-20		0.00						
2021-11-21		0.00						
2021-11-22		0.00	1.6300					
2021-11-23		0.00	1.5100					
2021-11-24		0.00	1.3800					
2021-11-25		104.00	1.2500					
2021-11-26		80.00	1.6600	2.8		0.311		
2021-11-27		0.00						
2021-11-28		0.00						
2021-11-29		0.00						
2021-11-30		0.00	1.2000					
2021-12-01		0.00	1.0300					
2021-12-02		124.00	0.7900					
2021-12-03		104.00	1.1700					
2021-12-04		119.00	0.8900					
2021-12-05		92.00	1.4300					
2021-12-06		0.00	1.3500					
2021-12-07		0.00	1.0900					
2021-12-08		115.00	0.9100					
2021-12-09		86.00						
2021-12-10		0.00	1.3100					
2021-12-11		0.00						
2021-12-12		0.00						
2021-12-13		117.00	0.9000					
2021-12-14		96.00	1.3400	2.4		0.200		
2021-12-15		112.00	1.0000					
2021-12-16		101.00	1.8500					
2021-12-17		114.00						
2021-12-18								
2021-12-19								
2021-12-20		117.00	0.8800					
2021-12-21		98.00	1.2700					
2021-12-22		0.00	1.0600					

2021 Performance Monitoring Results
Detailed Results for 2021

DS-2: Stanrock ETP Influent

Date	ACID mg/L	FLOW L/s	Freeboard(m) m	pH	SO4 mg/L	Ra Bq/L	Ba mg/L	Co mg/L
2021-12-23		116.00	0.8900					
2021-12-24		89.00	2.0300					
2021-12-25		0.00						
2021-12-26		0.00						
2021-12-27		0.00						
2021-12-28		0.00						
2021-12-29		117.00	0.8900					
2021-12-30		100.00	1.2600					
2021-12-31		114.00	0.8900					
Count	4	365	358	12	4	11	4	4
High	210	134.00	2.1900	3.6	560.0	0.777	0.021	0.0609
Low	144	0.00	0.5400	2.4	340.0	0.083	0.010	0.0450
Mean	175	32.09	1.4824	2.9	467.5	0.265	0.017	0.0551
High Limit				8.5	128-429	0.469	1.000	0.0025
Low Limit				6.5				
Lim Ex	0	0	0	12	4	0	0	4
Frequency	0%	0%	0%	100%	100%	0%	0%	100%
10x Lim Ex	0	0	0	0	0	0	0	4
Frequency	0%	0%	0%	0%	0%	0%	0%	100%

Date	Fe mg/L	Mn mg/L	U mg/L
2021-01-13	33.30	1.430	0.0107
2021-04-13	31.10	0.829	0.0125
2021-07-16	20.10	1.450	0.0115
2021-10-05	22.10	1.740	0.0133
Count	4	4	4
High	33.30	1.740	0.0133
Low	20.10	0.829	0.0107
Mean	26.65	1.362	0.0120
High Limit	0.76	0.841	0.0150
Low Limit			
Lim Ex	4	4	0
Frequency	100%	100%	0%
10x Lim Ex	4	0	0
Frequency	100%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

DS-3: Stanrock pH Probe Control (ETP Operations)

Date	BaCl2T kg/month	CaOT tonnes/mth.	NaOHT kg/month	ODays day	pH
2021-01-01					
2021-01-04					
2021-01-05					
2021-01-06					10.6
2021-01-07					10.7
2021-01-08					
2021-01-11					
2021-01-12					
2021-01-13					10.6
2021-01-14					10.8
2021-01-15					
2021-01-18					
2021-01-19					
2021-01-20					
2021-01-21					10.9
2021-01-22					10.9
2021-01-25					
2021-01-26					
2021-01-27					
2021-01-28	47.90	4.60	0.00	8	
2021-01-29					10.8
2021-02-28	39.30	3.72	0.00	7	
2021-03-28	216.97	19.12	0.00	20	
2021-04-28	169.10	13.16	0.00	18	
2021-05-28	105.00	10.70	0.00	11	
2021-06-28	14.35	1.21	0.00	2	
2021-07-28	77.50	9.57	0.00	9	
2021-08-28	50.30	5.40	0.00	6	
2021-09-28	42.30	5.20	0.00	6	
2021-10-28	96.30	11.70	0.00	11	
2021-11-29	36.00	4.00	0.00	6	
2021-12-28	148.00	18.20	0.00	20	
Count	12	12	12	12	21
High	216.97	19.12	0.00	20	10.9
Low	14.35	1.21	0.00	2	10.6
Mean	86.92	8.88	0.00	10	10.8
High Limit					8.5
Low Limit					6.5
Lim Ex	0	0	0	0	7
Frequency	0%	0%	0%	0%	100%
10x Lim Ex	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

DS-4: Stanrock Orient Lake Polishing Pond Outlet (Final Discharge)

Date	DDays	DOC	FLOW	hard	pH	SO4	TSS	TOXCD
	day	mg/L	L/s	mg/L		mg/L	mg/L	IC25
2021-01-04			17.00		7.1		1	
2021-01-12		2.0	9.00	262.0	7.4	220.0	1	
2021-01-19			9.00		7.3		1	
2021-01-26			13.00		7.3		<1	
2021-01-28	31							
2021-02-02		2.1	6.00	273.0	7.4	230.0	<1	
2021-02-09			9.00		7.0		<1	
2021-02-16			6.00		7.2		1	
2021-02-23			13.00		7.2		<1	
2021-02-28	28							
2021-03-02			9.00		7.2		1	
2021-03-09		2.1	9.00	260.0	7.4	230.0	<1	
2021-03-16			47.00		7.1		1	
2021-03-23			51.00		7.0		<1	
2021-03-28	31							
2021-03-30			91.00		7.0		1	
2021-04-06			35.00		7.0		1	
2021-04-13		2.1	105.00	204.0	7.1	160.0	1	
2021-04-20			47.00		7.0		1	
2021-04-27			17.00		7.1		1	
2021-04-28	30							
2021-05-04			91.00		7.2		1	
2021-05-11			25.00		7.2		1	
2021-05-18			9.00		7.0		1	
2021-05-25		1.3	9.00	<0.1	7.2	220.0	<1	100
2021-05-28	31							
2021-06-01			1.00		7.0		1	
2021-06-08		1.2	0.00	308.0	6.9	210.0	1	
2021-06-15			0.00		6.9		<1	
2021-06-22			0.00		7.1		<1	
2021-06-28	30							
2021-06-29			9.00		7.2		3	
2021-07-06			1.00		7.0		1	
2021-07-13		1.3	0.00	296.0	6.9	240.0	<1	
2021-07-20			1.00		7.0		1	
2021-07-27			9.00		7.3		1	
2021-07-28	31							
2021-08-03			17.00		7.2		1	
2021-08-10		1.8	17.00	268.0	7.0	220.0	1	
2021-08-17			25.00		7.3		1	
2021-08-24			6.00		7.0		<1	
2021-08-28	31							
2021-08-31			9.00		7.3		<1	
2021-09-07			3.00		7.1		1	
2021-09-14		1.6	4.00	266.0	7.1	230.0	<1	
2021-09-21			3.00		7.2		1	
2021-09-28	30		17.00		7.3		1	
2021-10-05			17.00		7.3		1	
2021-10-12		2.1	30.00	277.0	7.5	230.0	2	
2021-10-19			21.00		7.5		1	

2021 Performance Monitoring Results
Detailed Results for 2021

DS-4: Stanrock Orient Lake Polishing Pond Outlet (Final Discharge)

Date	DDays day	DOC mg/L	FLOW L/s	hard mg/L	pH	SO4 mg/L	TSS mg/L	TOXCD IC25
2021-10-26			13.00		7.2		2	
2021-10-28	31							
2021-11-01			13.00		7.1		1	
2021-11-09			6.00		7.3		1	
2021-11-16		2.3	21.00	260.0	7.1	230.0	2	0
2021-11-23			17.00		7.2		1	
2021-11-28	30							
2021-11-30			17.00		7.1		1	
2021-12-07			35.00		7.0		1	
2021-12-14		1.8	35.00	274.0	7.0	250.0	1	
2021-12-21			67.00		7.0		1	
2021-12-28	31							
2021-12-29			21.00		7.1		1	
Count	12	12	52	12	52	12	52	2
High	31	2.3	105.00	308.0	7.5	250.0	3	100
Low	28	1.2	0.00	<0.1	6.9	160.0	<1	0
Mean	30	1.8	20.42	245.7	7.1	222.5	1	50
High Limit					8.5	128-429	10	
Low Limit					6.5			
Lim Ex	0	0	0	0	0	12	0	0
Frequency	0%	0%	0%	0%	0%	100%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

DS-4: Stanrock Orient Lake Polishing Pond Outlet (Final Discharge)

Date	TOXDM	TOXRT	Ra	Ba	Co	Fe	Mn	U
	%	%	Bq/L	mg/L	mg/L	mg/L	mg/L	mg/L
2021-01-04			0.066					
2021-01-12			0.054	0.134	<0.0005	0.13	0.037	0.0021
2021-01-19			0.064					
2021-01-26			0.051					
2021-02-02			0.063	0.121	<0.0005	0.12	0.041	0.0020
2021-02-09			0.072					
2021-02-16			0.066					
2021-02-23			0.056					
2021-03-02			0.072					
2021-03-09			0.059	0.112	<0.0005	0.07	0.032	0.0032
2021-03-16			0.071					
2021-03-23			0.070					
2021-03-30			0.044					
2021-04-06			0.040					
2021-04-13			0.043	0.120	<0.0005	0.18	0.042	0.0015
2021-04-20			0.052					
2021-04-27			0.095					
2021-05-04			0.080					
2021-05-11			0.105					
2021-05-18			0.090					
2021-05-25	0	0	0.164	<0.005	<0.0005	<0.02	<0.002	<0.0005
2021-06-01			0.093					
2021-06-08			0.151	0.097	<0.0005	0.03	0.054	0.0017
2021-06-15			0.157					
2021-06-22			0.170					
2021-06-29			0.178					
2021-07-06			0.244					
2021-07-13			0.211	0.094	<0.0005	0.04	0.051	0.0042
2021-07-20			0.199					
2021-07-27			0.254					
2021-08-03			0.224					
2021-08-10			0.139	0.060	<0.0005	0.09	0.030	0.0077
2021-08-17			0.233					
2021-08-24			0.206					
2021-08-31			0.210					
2021-09-07			0.201					
2021-09-14			0.204	0.048	<0.0005	0.05	0.032	0.0081
2021-09-21			0.157					
2021-09-28			0.143					
2021-10-05			0.167					
2021-10-12			0.173	0.051	<0.0005	0.10	0.022	0.0091
2021-10-19			0.175					
2021-10-26			0.196					
2021-11-01			0.169					
2021-11-09			0.174					
2021-11-16	0	0	0.188	0.041	<0.0005	0.12	0.020	0.0100
2021-11-23			0.130					
2021-11-30			0.123					
2021-12-07			0.095					
2021-12-14			0.111	0.039	<0.0005	0.12	0.016	0.0100

2021 Performance Monitoring Results
Detailed Results for 2021

DS-4: Stanrock Orient Lake Polishing Pond Outlet (Final Discharge)

Date	TOXDM %	TOXRT %	Ra Bq/L	Ba mg/L	Co mg/L	Fe mg/L	Mn mg/L	U mg/L
2021-12-21			0.062					
2021-12-29			0.068					
Count	2	2	52	12	12	12	12	12
High	0	0	0.254	0.134	<0.0005	0.18	0.054	0.0100
Low	0	0	0.040	<0.005	<0.0005	<0.02	<0.002	<0.0005
Mean	0	0	0.129	0.077	<0.0005	0.09	0.032	0.0050
High Limit			0.469	1.000	0.0025	0.76	0.841	0.0150
Low Limit								
Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

DS-5: Stanrock Orient Creek Discharge into Moose Lake

Date	CONDF µmho/cm	FLOW L/s	Head(ft) ft	pH
2021-01-14	117.8	<1.00		4.2
2021-04-13	79.5	10.42	0.3	4.0
2021-07-13		0.00	0.0	
2021-10-12	94.9	7.41	0.2	4.2
Count	4	4	3	4
High	117.8	10.42	0.3	4.2
Low	79.5	0.00	0.0	4.0
Mean	97.4	4.71	0.1	4.1
High Limit	69.5			8.5
Low Limit				6.5
Lim Ex	3	0	0	3
Frequency	100%	0%	0%	100%
10x Lim Ex	0	0	0	0
Frequency	0%	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

DS-6: Stanrock Moose Lake Settling Pond Narrows, Upstream of DS-1

Date	FLOW L/s	pH
2021-01-05	16.00	7.4
2021-01-12	6.00	7.6
2021-01-19	6.00	7.6
2021-01-26	6.00	7.5
2021-02-02	1.00	8.0
2021-02-09	6.00	7.0
2021-02-16	1.00	7.0
2021-02-23	6.00	7.7
2021-03-02	0.00	
2021-03-09	<1.00	7.5
2021-03-16	29.00	7.0
2021-03-23	126.00	7.3
2021-03-30	176.00	7.0
2021-04-06	82.00	7.1
2021-04-13	82.00	8.7
2021-04-20	82.00	7.8
2021-04-27	0.00	
2021-05-04	176.00	7.5
2021-05-11	4.00	7.4
2021-05-18	0.00	
2021-05-25	2.00	7.2
2021-06-01	0.00	
2021-06-08	0.00	
2021-06-15	0.00	
2021-06-22	0.00	
2021-06-29	0.00	7.8
2021-07-06	0.00	
2021-07-13	0.00	
2021-07-20	0.00	
2021-07-27	82.00	7.9
2021-08-03	6.00	7.9
2021-08-10	0.00	
2021-08-17	16.00	8.3
2021-08-24	0.00	7.8
2021-08-31	0.00	
2021-09-07	0.00	
2021-09-14	0.00	
2021-09-21	0.00	
2021-09-28	1.00	7.8
2021-10-05	0.00	
2021-10-12	1.00	7.7
2021-10-19	6.00	7.8
2021-10-26	1.00	7.2
2021-11-01	1.00	7.8
2021-11-09	0.00	
2021-11-16	4.00	7.2
2021-11-23	6.00	7.4
2021-11-30	1.00	7.7
2021-12-07	16.00	7.0
2021-12-14	82.00	7.1

2021 Performance Monitoring Results
Detailed Results for 2021

DS-6: Stanrock Moose Lake Settling Pond Narrows, Upstream of DS-1

Date	FLOW L/s	pH
2021-12-21	126.00	7.0
2021-12-29	6.00	7.0
Count	52	52
High	176.00	8.7
Low	0.00	7.0
Mean	22.37	7.5
High Limit		8.5
Low Limit		6.5
Lim Ex	0	1
Frequency	0%	3%
10x Lim Ex	0	0
Frequency	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

FBDST

Date	pH	SO4	TSS	Ra	Ba	Co	Fe	Mn
		mg/L	mg/L	Bq/L	mg/L	mg/L	mg/L	mg/L
2021-01-12	6.0	<0.2	<1	<0.007	<0.005	<0.0005	<0.02	<0.002
2021-02-02	6.0	<0.2	<1	<0.007	<0.005	<0.0005	<0.02	<0.002
2021-03-09	6.0	<0.1	<1	<0.007	<0.005	<0.0005	<0.02	<0.002
2021-04-13	6.0	<0.1	<1	<0.007	<0.005	<0.0005	<0.02	<0.002
2021-05-25	6.2	<0.1	2	<0.005	<0.005	<0.0005	0.02	<0.002
2021-06-08	6.3	<0.1	<1	<0.005	<0.005	<0.0005	<0.02	<0.002
2021-07-13	6.2	<0.1	<1	<0.005	<0.005	<0.0005	<0.02	<0.002
2021-08-10	6.1	<0.1	1	<0.005	<0.005	<0.0005	<0.02	<0.002
2021-09-14	5.9	<0.1	<1	<0.005	<0.005	<0.0005	<0.02	<0.002
2021-10-12	6.0	<0.1	<1	<0.005	<0.005	<0.0005	<0.02	<0.002
2021-11-16	5.9	<0.1	<1	<0.005	<0.005	<0.0005	<0.02	<0.002
2021-12-14	5.8	<0.1	<1	<0.005	<0.005	<0.0005	<0.02	<0.002
Count	12	12	12	12	12	12	12	12
High	6.3	<0.2	2	<0.007	<0.005	<0.0005	<0.02	<0.002
Low	5.8	<0.1	<1	<0.005	<0.005	<0.0005	0.02	<0.002
Mean	6.0	<0.1	1	<0.006	<0.005	<0.0005	0.02	<0.002
High Limit	8.5	128-429	10	0.469	1.000	0.0025	0.76	0.841
Low Limit	6.5							
Lim Ex	12	0	0	0	0	0	0	0
Frequency	100%	0%	0%	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Date	U
	mg/L
2021-01-12	<0.0005
2021-02-02	<0.0005
2021-03-09	<0.0005
2021-04-13	<0.0005
2021-05-25	<0.0005
2021-06-08	<0.0005
2021-07-13	<0.0005
2021-08-10	<0.0005
2021-09-14	<0.0005
2021-10-12	<0.0005
2021-11-16	<0.0005
2021-12-14	<0.0005
Count	12
High	<0.0005
Low	<0.0005
Mean	<0.0005
High Limit	0.0150
Low Limit	
Lim Ex	0
Frequency	0%
10x Lim Ex	0
Frequency	0%

2021 Performance Monitoring Results
Detailed Results for 2021

ST-1: Stanrock Downstream of Dam G

Date	CONDF µmho/cm	pH
2021-01-14	72.7	5.9
2021-04-13	52.3	4.3
2021-07-13		
2021-10-12	69.5	4.5
Count	4	4
High	72.7	5.9
Low	52.3	4.3
Mean	64.8	4.9
High Limit	69.5	8.5
Low Limit		6.5
Lim Ex	1	3
Frequency	33%	100%
10x Lim Ex	0	0
Frequency	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

ST-1A: Stanrock Seepage from Dam J at Toe of Dam

Date	CONDF µmho/cm	FLOW L/s	pH
2021-01-14		0.00	
2021-04-13	86.8	0.01	4.3
2021-07-13		0.00	
2021-10-12		0.00	
Count	4	4	4
High	86.8	0.01	4.3
Low	86.8	0.00	4.3
Mean	86.8	0.00	4.3
High Limit	69.5		8.5
Low Limit			6.5
Lim Ex	1	0	1
Frequency	100%	0%	100%
10x Lim Ex	0	0	0
Frequency	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

ST-3: Stanrock Downstream of Dam G

Date	CONDF µmho/cm	pH
2021-01-14	583.0	2.9
2021-04-13	574.0	3.3
2021-07-13	832.0	3.4
2021-10-12	876.0	3.6
Count	4	4
High	876.0	3.6
Low	574.0	2.9
Mean	716.3	3.3
High Limit	69.5	8.5
Low Limit		6.5
Lim Ex	4	4
Frequency	100%	100%
10x Lim Ex	2	0
Frequency	50%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

ST-3A: Stanrock Dam G Toe of Dam G

Date	CONDF µmho/cm	FLOW L/s	pH
2021-01-14	946.0	0.11	4.7
2021-04-13	836.0	0.25	3.7
2021-07-13	856.0	0.08	3.9
2021-10-12	896.0	0.10	4.2
Count	4	4	4
High	946.0	0.25	4.7
Low	836.0	0.08	3.7
Mean	883.5	0.14	4.1
High Limit	69.5		8.5
Low Limit			6.5
Lim Ex	4	0	4
Frequency	100%	0%	100%
10x Lim Ex	4	0	0
Frequency	100%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

ST-4

Date	ACID	ALK	CONDF	DOC	hard	pH	SO4	Ra
	mg/L	mg/L	µmho/cm	mg/L	mg/L		mg/L	Bq/L
2021-02-02	<1	7.00	60.1	3.7	38.6	7.2	28.0	0.024
2021-05-11	<1	7.00	74.6	3.2	36.8	7.0	26.0	0.174
2021-08-10	<1	10.00	68.4	2.9	35.3	7.0	25.0	0.035
2021-11-09	<1	10.00	65.1	3.0	28.2	7.0	27.0	0.035
Count	4	4	4	4	4	4	4	4
High	<1	10.00	74.6	3.7	38.6	7.2	28.0	0.174
Low	<1	7.00	60.1	2.9	28.2	7.0	25.0	0.024
Mean	<1	8.50	67.0	3.2	34.7	7.0	26.5	0.067
High Limit			69.5			8.5	128-429	0.469
Low Limit						6.5		
Lim Ex	0	0	1	0	0	0	0	0
Frequency	0%	0%	25%	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Date	Ba	Co	Fe	Mn	U
	mg/L	mg/L	mg/L	mg/L	mg/L
2021-02-02	0.045	<0.0005	0.04	0.008	0.0011
2021-05-11	0.043	<0.0005	0.03	0.005	0.0013
2021-08-10	0.043	<0.0005	0.04	0.008	0.0011
2021-11-09	0.042	<0.0005	<0.02	0.004	0.0011
Count	4	4	4	4	4
High	0.045	<0.0005	0.04	0.008	0.0013
Low	0.042	<0.0005	<0.02	0.004	0.0011
Mean	0.043	<0.0005	0.03	0.006	0.0012
High Limit	1.000	0.0025	0.76	0.841	0.0150
Low Limit					
Lim Ex	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%
10x Lim Ex	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

SR-16 Fox Creek @ Hwy 108

Month	DOC mg/L	hard mg/L	pHF	SO4 mg/L	Ra Bq/L	Ba mg/L	Co mg/L	Fe mg/L
2021-02	11.3	10.8	5.6	0.5	<0.007	0.008	0.0007	1.88
2021-05	8.6	5.0	6.3	0.6	<0.005	<0.005	<0.0005	0.22
2021-08	17.1	7.6	5.8	0.3	<0.005	0.008	0.0007	1.21
2021-11	16.3	6.4	6.0	<1.0	<0.005	0.006	<0.0005	0.44
Count	4	4	4	4	4	4	4	4
High	17.1	10.8	6.3	<1.0	<0.007	0.008	0.0007	1.88
Low	8.6	5.0	5.6	0.3	<0.005	<0.005	<0.0005	0.22
Mean	13.3	7.5	5.9	0.6	<0.005	0.007	0.0006	0.94
High Limit			8.5	128.0	0.469	1.000	0.0025	2.49
Low Limit			5.3					
Lim Ex	0	0	0	0	0	0	0	2
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	Mn mg/L	U mg/L
2021-02	0.059	<0.0005
2021-05	0.010	<0.0005
2021-08	0.050	<0.0005
2021-11	0.024	<0.0005
Count	4	4
High	0.059	<0.0005
Low	0.010	<0.0005
Mean	0.036	<0.0005
High Limit	0.841	0.0150
Low Limit		
Lim Ex	0	0
10x Lim Ex	0	0
Frequency	0%	0%

2021 Performance Monitoring Results
Detailed Results for 2021

SR-18 Jim Christ Lake Outlet

Month	DOC mg/L	hard mg/L	pHF	SO4 mg/L	Ra Bq/L	Ba mg/L	Fe mg/L	Mn mg/L
2021-05	4.7	9.6	6.8	3.4	0.007	0.046	0.03	0.008
2021-11	5.4	10.0	6.8	3.5	<0.005	0.046	0.11	0.062
Count	2	2	2	2	2	2	2	2
High	5.4	10.0	6.8	3.5	0.007	0.046	0.11	0.062
Low	4.7	9.6	6.8	3.4	<0.005	0.046	0.03	0.008
Mean	5.1	9.8	6.8	3.5	0.006	0.046	0.07	0.035
High Limit	11.0		8.5	128.0	0.469	1.000	0.76	0.841
Low Limit			6.5					
Lim Ex	0	0	0	0	0	0	0	0
10x Lim Ex	0	0	0	0	0	0	0	0
Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Month	U mg/L
2021-05	<0.0005
2021-11	<0.0005
Count	2
High	<0.0005
Low	<0.0005
Mean	<0.0005
High Limit	0.0150
Low Limit	
Lim Ex	0
10x Lim Ex	0
Frequency	0%

Denison Mines Inc. Elliot Lake Division
2021 Denison Tailings Management Area
Groundwater Performance Monitoring Results

Station: BH91 D1A 218.00 ft

Parameter	Elevation[A]	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	363.16	7.3	830.0	<1	33.6
2018	359.89	6.9	770.0	<1	22.2
2019	360.41	No sample collected (no recharge)			
2020	360.74	6.9	780	<1	27.3
2021	361.01	No sample collected (no recharge)			

Station: BH91 D1B 149.20 ft

Parameter	Elevation[A]	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	363.67	7.3	620.0	<1	1.73
2018	360.34	collected (no recharge)			
2019	360.96	collected (no recharge)			
2020	361.24	7.4	680	<1	0.02
2021	361.45	No sample collected (no recharge)			

Station: BH91 D3A 159.00 ft

Parameter	Elevation[A]	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	363.62	6.6	1600.0	176	190
2018	361.17	6.6	1700.0	209	205
2019	361.37	collected (no recharge)			
2020	361.78	6.6	1600	157	151
2021	362.14	6.6	1500	129	161

Station: BH91 D3B 69.00 ft

Parameter	Elevation[A]	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	370.99	6.4	1400.0	215	171
2018	370.20	6.6	1500.0	204	185
2019	370.26	6.6	1400.0	228	140
2020	370.57	6.6	1600.0	207	148
2021	370.67	6.5	1500.0	160	145

Denison Mines Inc. Elliot Lake Division
2021 Denison Tailings Management Area
Groundwater Performance Monitoring Results

Station: BH91 D9A 72.20 ft

Parameter	Elevation[A]	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	396.25	6.6	1600.0	238	223
2018	396.04	6.6	1600.0	220	202
2019	396.12	6.5	1500.0	196	201
2020	395.94	6.6	1600.0	178	199
2021	396.06	6.5	1600.0	181	202

Station: BH91 DG4B 35.80 ft

Parameter	Elevation[A]	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	358.40	6.2	730.0	<1	21.9
2018	358.28	6.6	560.0	<1	13.9
2019	358.52	6.2	670.0	<1	13.8
2020	358.59	6.3	780.0	5.0	21.2
2021	358.64	6.6	730.0	<1	18.8

Denison Mines Inc. Elliot Lake Division
2021 Stanrock Tailings Management Area
Groundwater Performance Monitoring Results

BH91 SG1A 5.49 m

Parameter	Elevation	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	387.98	4.0	3800.0	3110	1600
2018	387.68	4.1	2900.0	3540	875
2019	387.81	4.1	2900.0	2270	1270
2020	387.78	4.1	3200.0	2370	1050
2021	387.82	4.2	2800.0	1990	839

BH91 SG2A 33.31 m

Parameter	Elevation	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	401.22	6.3	4400.0	2450	1450
2018	400.96	6.4	4500.0	3140	1280
2019	400.54	No sample collected (no recharge)			
2020	400.56	6.4	4500.0	2420	1320
2021	400.88	6.5	4500.0	2659	1540

BH91 SG2D 4.39 m

Parameter	Elevation	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	404.39	No sample collected (no recharge)			
2018	404.29	No sample collected (no recharge)			
2019	404.76	No sample collected (no recharge)			
2020	404.82	No sample collected (no recharge)			
2021	404.62	No sample collected (no recharge)			

Denison Mines Inc. Elliot Lake Division
2021 Stanrock Tailings Management Area
Groundwater Performance Monitoring Results

BH91 SG3A 8.78 m

Parameter Units	Elevation m	Field pH pH units	Sulphate mg/L	Acidity mg/L	Iron mg/L
2017	399.69	No sample collected (no recharge)			
2018	399.39	No sample collected (no recharge)			
2019	399.75	No sample collected (no recharge)			
2020	400.07	No sample collected (no recharge)			
2021	399.40	No sample collected (no recharge)			

BH91 SG3B 5.85 m

Parameter Units	Elevation m	Field pH pH units	Sulphate mg/L	Acidity mg/L	Iron mg/L
2017	399.22	3.9	1700.0	901.0	295.0
2018	399.01	No sample collected (no recharge)			
2019	399.43	No sample collected (no recharge)			
2020	399.72	No sample collected (no recharge)			
2021	399.20	No sample collected (no recharge)			

Denison Mines Inc. Elliot Lake Division
2021 Stanrock Tailings Management Area
Groundwater Performance Monitoring Results

BH98 15A 7.86 m

Parameter	Elevation	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	392.21	5.4	2400.0	1040	651
2018	392.24	6.2	2400.0	1080	601
2019	392.03	6.0	2400.0	1130	504
2020	392.24	5.9	2800.0	1170	718
2021	392.24	6.1	2600.0	1040	489

BH98 16A 5.49 m

Parameter	Elevation	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	396.35	5.6	4900.0	2660	2140
2018	396.43	5.7	3400.0	2060	1080
2019	396.58	5.8	3500.0	2190	1300
2020	395.68	5.7	3700.0	2050	1220
2021	395.90	5.8	3700.0	1960	980

Denison Mines Inc. Elliot Lake Division
2021 Stanrock Tailings Management Area
Groundwater Performance Monitoring Results

PN ST3 P3 5.94 m

Parameter	Elevation	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	404.61	5.8	2800.0	1280	771
2018	404.25	5.9	3000.0	1560	767
2019	404.29	5.6	2800.0	1610	887
2020	404.32	5.8	3200.0	1930	979
2021	404.50	5.7	na[1]	1960	1100

[1] Sulphate result was removed from the data set due to a laboratory error in the analysis and could not be repeated

PN ST3 P5 2.64 m

Parameter	Elevation	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	404.08	3.2	3000.0	1850	827
2018	403.85	3.4	3200.0	1700	668
2019	404.30	3.2	3000.0	2130	1070
2020	404.33	3.3	3400.0	2050	996
2021	404.42	3.4	3000.0	1770	716

PN ST3 P6 11.58 m

Parameter	Elevation	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	404.54	6.0	5400.0	4050	2370
2018	404.37	6.1	5900.0	4540	2400
2019	404.14	5.9	5400.0	4430	2580
2020	404.25	5.9	7100.0	4690	2670
2021	404.43	6.0	6200.0	4570	2550

PN ST3 P8 20.91 m

Parameter	Elevation	Field pH	Sulphate	Acidity	Iron
Units	m	pH units	mg/L	mg/L	mg/L
2017	402.68	4.9	11000.0	9550	5480
2018	402.38	4.9	11000.0	9010	4790
2019	402.29	5.6	9300.0	8210	4730
2020	402.37	5.3	9500.0	7780	4770
2021	402.60	5.5	14000.0	7180	4210

APPENDIX V
Laboratory Investigation
Notification of Radium-226

Radium-226 Analytical Change and Investigation

With the closure of the Perdue Laboratory at Laurentian University at the end of April 2021, radium-226 analysis in water was moved to Testmark Laboratories Ltd. (Testmark). After receipt of historically high radium-226 results and a lack of precision in repeat analysis, an investigation into the laboratory methodology for radium-226 analysis was conducted.

Testmark's analytical method for radium-226 utilized 7500 Ra-B – Precipitation Method from "Standard Methods for the Examination of Water and Wastewater" (2011), referencing Environmental Protection Agency (EPA) Method 903.0 "Alpha-Emitting Radium Isotopes in Drinking Water" (1980) and EPA Method 900.0 "Gross Alpha and Gross Beta Radioactivity in Drinking Water" (1980). Testmark's method is approved with Certified Association for Laboratory Accreditation (CALA). With the switch to Testmark in May, 2021 there was also a change in the instrumentation used to measure radium-226 and some minor changes in the sample preparation methodology. Prior to May 2021, radium-226 was measured using an alpha spectrometer at the Perdue Laboratory. From May 2021 until October 2021, radium-226 was measured using an alpha/beta counter at the Testmark laboratory.

Unusual radium-226 values reported by Testmark using the alph/beta counter between May and October 2021, were likely caused by interferences from radium-224 when analyzed within the 3.63 days (which is the half-life for that isotope) or from radium-228 which is a beta emitter and that can accumulate alpha activity over time. Sample repeat concentrations for DMI samples were greatly reduced over a period of time after the decay of radium-224, which has a short half-life of 3.6 days. The inclusion of radium-224 in the alpha count methodology accounted for the high initial results, the lower re-run results, and high RPD.

As part of the investigation into the abnormal radium-226 values, beginning on August 31, 2021, duplicate samples were analyzed for radium-226 at SGS laboratories. SGS radium-226 analytical method utilizes the Eichrom Application Note AN-1401-10, Rapid determination of Ra-226 in Emergency Urine and Water (2018) with use of the alpha spectrometer. Results of the radium-226 analysis by alpha spectrometer at SGS are similar to historical values at this location, within discharge limits and consistent between initial analysis and repeat analysis with precision that meets the target of 20%. After meeting with Testmark and reviewing the data, DMI made the decision to move radium-226 analysis to SGS laboratories for analysis by alpha spectrometer in October 1, 2021.

The changes in instrumentation and sample preparation methodology at Testmark accounts for the recent differences seen in radium-226 concentrations compared to historical values, as well as the variability between the initial results and the repeat results. Testmark has concluded that analysis by alpha counter is not appropriate for the type of samples DMI submits for analysis.

DMI will continue to analyse radium-226 in water using alpha spectroscopy to ensure results are more accurate and reliable.

Reported Radium-226 Exceedance at D-3

In August 2021, DMI reported an exceedance of the monthly mean radium-226 discharge limit at D-3 for the month of July (email, August 18, 2021, Benson to Crosson and Pandolfi). Since the initial reporting, the investigation into the high results revealed that the change in analytical instrumentation, as described above, resulted in the high radium-226 values. Re-evaluation of the data, including repeats and duplicates, determined that the July 2021 mean monthly exceedance is no longer considered a non-compliance (email, December 21, 2021, Benson to Crosson, Pandolfi, Bauman, Rumboldt and Burton).