

## 500,000 HOURS

Denison Environmental Services (DES) has been working on achieving 500,000 no lost time injuries (LTI's) since January 27, 2010.

The last LTI was recorded on January 26, 2010 at a closed mine site in Yukon Territory. Since that time DES's staff have been working safely & diligently to regain a title of Safety Excellence. At the close of October 2018 our safety stats recorded a total of 499,184 hours without a lost time injury.

On December 5th once the hours had been recorded by all staff we reached a total of 500,025.5 hours. The hours include all sites operated by Denison Environmental Services in Ontario, Quebec & Yukon. Each active staff member of Denison Environmental Services received a Roots winter parka with our DES logo on the chest and "500,000 no LTI's" embroidered on the sleeve in recognition of this achievement.



"I'm unbelievably proud of our DES team for achieving 500,000 hours without a lost time injury and I'm looking forward to celebrating future DES safety milestones as the team maintains its culture of safety through its daily safety briefings and frequent safety training initiatives."

David Cates, President & CEO of Denison Mines Inc.

## DENISON MINE SITE

The Denison Mine site is located 16 km north of the City of Elliot Lake. When the site was operational, the complex consisted of a mine, a mill and two Tailings Management Areas (TMAs). Over its operational period between May 1957 and April 1992, Denison produced a total of 63 million tonnes of uranium ore. Tailings were deposited into two bedrock-lined basins: TMA-1 (formerly Bear Cub Lake and Long Lake) and TMA-2 (formerly Upper Williams Lake). TMA-2 was filled in the early 1960s.

Decommissioning of the site involved the removal of underground equipment for reuse or recycling. Hazardous materials were removed for reuse or disposal. All surface facilities were dismantled. A till cover was applied to the area and the site was graded and re-vegetated. Flooding was the preferred decommissioning option for TMA-1 and TMA-2. The flooding option was anticipated to pose no negative effects on Quirke Lake or the Serpent River, no further outside disturbances



and low security risks.

The tailings are currently submerged beneath a water cover approximately 1 m deep and are contained by the natural topography and engineered containment dams. Surface drainage from TMA-2 flows through a spillway leading to TMA-1. Seepage from the top corner of TMA-2 is treated downstream at the Williams Lake Effluent Treatment Plant (ETP). All other discharge is treated at the single surface water discharge spillway from TMA-1. It is expected that over time, these ponds will become wetlands.

The Denison ETP was upgraded in 2013 and is designed to treat normal



flows of 200 L/s and peak flows of up to 600 L/s with barium chloride to precipitate radium. The Williams Lake ETP was upgraded in 2016 to improve the overall condition of the building and to replace aging equipment. The ETP is designed to precipitate radium from any seepage of the TMA-2 site. All plant operations are automated and monitored on a 24 hour a day basis. Treated water is tested regularly and meets discharge criteria prior to being released to the Serpent River. Both plants operate under a Uranium Mine Decommissioning License issued by the Canadian Nuclear Safety Commission. The site is closed to ensure public safety and to maintain the integrity of the tailings management areas.

## ANNUAL REPORT SUMMARY

Denison Mines Inc. (DMI) continues to be committed to high quality of work relating to operations, care and maintenance of the sites in Elliot Lake. DES, on behalf of DMI, performs routine inspections and preventative maintenance as required to ensure safe operations and reliable performance, specifically of the tailings management areas (TMAs) and the effluent treatment plants (ETPs). This includes any work ranging from servicing, repairing or replacing equipment such as pumps, agitators, etc. to calibrating monitoring equipment such as pH meters and flowmeters. These tasks are usually done locally by DES staff, but equipment is sometimes sent to a service provider if required.

Routine TMA maintenance is also an important aspect of long-term care and maintenance. This includes dam maintenance, including herbicide application and the removal of woody vegetation, as well as managing beaver activity on site, grading the access roads, and snow removal on these same roads to ensure safe access on site. Most maintenance work that is required at the site is on a schedule (i.e. calibration of flowmeters) and is tracked in a preventative maintenance tracking system.

Occasionally larger projects are required that are outside of the realm of routine care and maintenance. These may include construction projects such as improving buildings on site. In 2018,



there were no major projects that took place on the Denison sites, however, here are some of the highlights of non-routine tasks from 2018:

- ❑ A rain gauge was installed at the TMA-1 ETP to allow for better precipitation monitoring during the summer;
- ❑ A secondary spill containment pad was installed at TMA-1 ETP at the chemical reagent offloading area;
- ❑ End of life for some original equipment meant that a new pump was purchased and installed at the Dam M pump house on the Stanrock site, with the old one being serviced and kept available as a spare.

Another important aspect of long-term care and maintenance is the focused and integrated performance monitoring network that was developed by both Rio Algom and DMI. This program is intended to monitor TMA performance and quality of water being discharged to the Serpent River Watershed (SRW) as well as assess the recovery of the receiving environment (i.e. the SRW). As part of this program, DES operates three ETPs on the DMI sites in the Elliot Lake area. These ETPs operate as required to treat water coming from the TMAs before being released into the environment via the SRW. This involves the collection of TMA surface water or seepage into either basins or collection ditches, depending on the nature of the site, and directed to the ETPs. This water is then treated with lime and/or barium chloride reagents in order to neutralize pH in the water and remove contaminants by binding to them and forming particles that are settled out of the water in settling ponds



downstream of the ETPs. Once this is complete, the resulting water is then discharged to the SRW.

The data that is collected from these programs is reviewed regularly, and is also reviewed in great depth every five years as part of an integrated assessment in a State of the Environment report (SOE). The monitoring programs are intended to evolve over time in response to changes observed in the watershed and TMA conditions. The programs are reviewed every five years and modified based on previous findings. Currently, the Elliot Lake sites are in the fourth cycle of monitoring (2015-2019). DES, Rio Algom and other third party consultants are currently working on the most recent SOE, as well as the next cycle of the monitoring program (i.e. Cycle 5).

Overall, TMAs are performing as predicted, with water quality improving over time. Water quality results from 2018 support this statement, with water quality results from discharge water meeting government guidelines established for the protection of aquatic life. It is important to note that water leaving the sites must meet the discharge limits for certain parameters set out in the decommissioning licenses issued by the Canadian Nuclear Safety Commission. In 2018, all water leaving the Denison sites in Elliot Lake met these criteria.

## DES ENVIRONMENTAL TEAM HOURS OF OPERATION = 24/7

It doesn't matter the time of day or night, in spring, summer, fall or winter, our Environmental team is actively monitoring the local closed mine sites. At minimum, all operating sites are checked daily. Newer technology has allowed many activities to be monitored remotely, but many times site visits are still required, especially if weather conditions are poor or when power failures occur. With a combined total of 75 years experience in water monitoring, analysis and treatment, our team is well-equipped to manage the local sites. Meet the team:

**WADE WIGGINS** Environmental Manager: Knowledgeable in treatment plant operations and environmental sustainability, Wade has completed many hours of training through Sacramento State University and other sources, all related to water and wastewater treatment. With over 30 years of experience operating and maintaining treatment plants, he is very capable to supervise treatment operations of any size as well as demonstrate excellent operational, managerial and mechanical aptitude skills.

**JODY STEFANICH** Environmental Coordinator: Jody has spent most of his career working at the Elliot Lake mine sites. Jody has spent over 25 years in the field, collecting various forms of samples and preparing these samples for laboratory analysis, water level management and treatment plant operation. As Environmental Coordinator, Jody oversees the Field Staff, and is responsible for compliance and reporting for the closed sites in Elliot Lake.

**VALERIE KILP** Environmental Coordinator: Valerie has 14 years of experience in the environmental field. Her experience



includes regulatory licensing, permitting and reporting; site assessment and rehabilitation; acid mine drainage and treatment, environmental performance monitoring, data quality assessment and facility inspection. As Environmental Coordinator, Valerie oversees the daily sampling requirements and is responsible for compliance and reporting for the closed sites in Elliot Lake.

**CHRIS MASSICOTTE** Environmental Technician/Effluent Treatment Plant Operator: Chris joined the Denison Environmental team in 2016. Chris works mostly in the field collecting and preparing various samples for analysis and operating treatment plants. While most of his tasks are in the field, he is also responsible to prepare various technical reports for the Elliot Lake closed sites. Chris shares a role in routine facility inspections.

**CHARLA SHAIN** Environmental Technician/Effluent Treatment Plant Operator: Charla is the newest member of the Environmental team, joining us in April 2019. Charla will also spend most of her time in the field collecting and preparing various samples from the Elliot Lake closed sites. Under the mentorship of both Environmental Coordinators, Charla's responsibilities will increase as she becomes comfortable with each task.



## WORKING TOGETHER IN OUR COMMUNITY

Denison recognizes the importance of community responsibility and awareness. We support local students by providing educational bursaries to graduates from Elliot Lake Secondary School, École secondaire Villa Française des Jeunes and Serpent River First Nation.

We participate in the Adopt-A-Highway program, looking after a portion of Highway 108. We support the local food banks in the cities where

we work — including the Sudbury Food Bank, the Whitehorse Food Bank, Maison Saint-André Abitibi Ouest and the Elliot Lake Emergency Food Bank. We provide in-kind manpower to assist local community groups like the Chamber of Commerce.

Denison is a member of the City of Elliot Lake's Emergency Management Committee and acts as a resource on the Shared Use Trails committee.

## SAFETY TRAINING

**Denison Environmental Services** — We want to share our safety culture with our community

Did you know that Denison Environmental Services (DES) offers **local training** for you and your employees?

Did you know that businesses with **between 5 and 20 employees** require a Health and Safety Representative?

Are your **employees trained** to do their jobs **safely**?

Did you know that **DES offers** the following courses and more:

- St. John Ambulance Emergency and Standard First Aid
- Basic Certification Parts I and II
- WHMIS
- Confined Space Entry
- Safe Driving/Driving Evaluations
- Book 7 Traffic Control Training
- Violence and Harassment in the Workplace
- CSA-required fit testing

If you need a course that is not listed, give us a call.

We can come to your location or you can send your employees to us.

**Call us today at  
705-848-9191**

## HEALTH AND SAFETY

### WHY DO OUR SITES SAY NO TRESPASSING?

Denison would like to remind everyone that our sites are not just big empty spaces. They are closed uranium mine sites with large tailings management areas. These areas were designed to isolate the tailings from the surrounding environment for a very long time. These sites use man-made barriers (such as dams) to contain the tailings. The dams are designed to ensure that groundwater and surface water is diverted from the tailings to prevent any contamination.

The Canadian Nuclear Safety Commission (CNSC) is responsible for regulating and licensing all uranium mining operations in Canada. The CNSC regulates the use of nuclear energy and materials to protect health, safety, security and the environment and to disseminate objective scientific, technical and regulatory information to the public. It is under our CNSC license that our sites are closed to the public. All hikers, dog walkers, ATV'ers and other unauthorized people who enter the sites are trespassing.

What you can see behind our locked gates are not open fields, or picturesque lakes. What you see are tailings management areas. When closing the mines, the tailings were covered with water or vegetation. Uranium tailings are the radioactive, sand-like materials left over from the uranium milling process. When the tailings are covered, it helps to reduce acid generation and the release of gamma radiation and radon gas. Although the site roads were constructed using clean fill, trespassers that walk or drive off the roads may inadvertently take home radioactive material in their tires, on their shoes or in the paws of their pets.

Our Environmental and Maintenance staff are on and off these sites, working every day. We drive trucks, transports and other large mobile equipment to complete our daily tasks, and we may not know you are walking right around the corner.

Although the sites have been decommissioned, with all mine features capped or blocked, facility structures demolished and the sites landscaped and revegetated, dangers still remain. Some of the structures were buried in



place. Over time subsidence areas (eg. sink holes) appear due to the instability of the underground workings. Denison Environmental Services (DES) staff inspect the properties regularly, but this is an unpredictable hazard.

Water management is one of our key roles on the sites. We have to ensure a sufficient flow of water in many areas. Part of this process is the control of nuisance beaver activity through traps. Traps are set below the water and are not visible from shore. These traps can be a danger to those owners who insist on walking dogs off leash, and on closed mine site properties.

There are many established trails and roads in the Elliot Lake area that are not located on a closed mine site. Please obey the signs and stay safe.

## STAY INFORMED

Denison Mines invites you to stay informed about our activities within the Serpent River Watershed by:

- Attending a mine site tour, organized annually by the City of Elliot Lake's Nuclear and Mining Museum as part of the Uranium Heritage Days activities
- Watching our presentation to Elliot Lake Council, in person, on the local TV station or on the City's website
- Reviewing our technical reports, available at the Elliot Lake Library or at [www.denisonenvironmental.com](http://www.denisonenvironmental.com)
- Reading this annual newsletter
- Contacting us using this response form.

We would like to hear your thoughts about our performance in the operation, care and maintenance of our closed mine sites. Please call us or send us a note. You can use the attached form and drop it off to our office.

We will respond as quickly as possible.

**Question(s):** \_\_\_\_\_  
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### I would like to know more about:

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### YOUR CONTACT INFORMATION:

Name: \_\_\_\_\_  
 Phone: \_\_\_\_\_  
 Email: \_\_\_\_\_

### SEND YOUR RESPONSE FORM TO:

Denison Mines Inc. Attn: Janet Lowe, General Manager, Denison Environmental Services  
 1 Horne Walk, Suite 200, Elliot Lake, ON, P5A 2A5 • 705-848-9191 • [jlowe@denisonenvironmental.com](mailto:jlowe@denisonenvironmental.com)

