



VIRAGE

Initial Position	- /10	0 Hazard Lights Omitted	0 Horn not used
Maneuver	- /20	0 Excessive Speed	
Final Position	- /70	0 Crash	
Result	...		

Level : 2



Yukon University

Centre for Northern Innovation in Mining

CNIM update

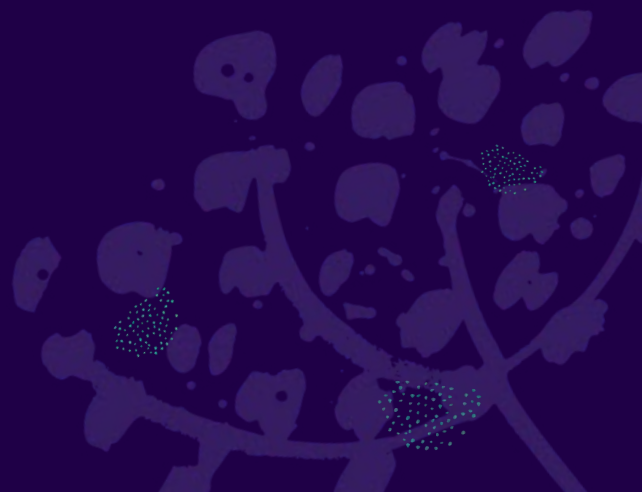
September 2023

YukonU.ca/CNIM



At a glance

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- Class 1, 3 and Air Brakes
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- First Line Supervisor
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Heavy Equipment Technician

In May, four apprentices joined the first-ever offering of Level 4 Heavy Equipment Technician (HET). Three students successfully completed all HET levels and are now Red Seal mechanics.

Over the summer, work was done on the tandem knuckle boom truck to ensure road worthiness for both crane and Class 3 operator training. A close, cooperative relationship was developed with training staff from Government of Yukon (YG) Highways and Public Works, culminating in YG transferring surplus equipment to YukonU for HET and the planned Heavy Equipment Operator training.

HET is expecting a busy shop over the Fall semester with twelve pre-apprentice students and six Level 1 apprentices starting in October. A Champion grader, D8 dozer and a JCB excavator will be used for pre-apprentice experiential training.



Champion 740A grader



JCB JS330LC excavator



Cat D8K dozer

CNIM update - September 2023

Surface Mining/Heavy Equipment Operator Training program

CNIM is preparing for the delivery of Surface Mining/Heavy Equipment Operator Training with the support of industry and Yukon First Nations once the replacement components of the ThoroughTec surface mining simulator arrives in the Yukon. CNIM anticipates programming efforts to begin in late October with the first of two train-the-trainer courses for experienced heavy equipment operators interested in learning instructional skills.

Class 1, 3 and Air Brakes

CNIM continues to develop commercial driver training in advance of the Yukon's Motor Vehicle Act revision to include mandatory entry-level training for new commercial drivers. Following the acquisition of a commercial driving simulator from Virage Simulation in April 2023, CNIM ran a train-the-trainer course for CNIM staff and training partners on May 16-18, 2023 and Class 1 and 3 training in Teslin, resulting in three new Class 3 drivers and one new Class 1 driver.

CNIM has permission from the Government of Saskatchewan to use Saskatchewan's Mandatory Entry Level Training (MELT) curriculum in the Yukon Territory as recommended by Yukon's Motor Vehicle Branch. Yukon University continues to deliver Air Brakes courses and Class 3 instruction throughout the Yukon.



YukonU staff moving the simulator to the Dawson Campus for training.



YukonU staff, Wayne Schmidt, testing out the new simulator.

Underground Mining Operations

CNIM continues to explore responsive and responsible delivery options with Yukon's mining companies with underground operations to prepare the Yukon workforce for underground mining employment opportunities.

First Line Supervisor

CNIM continues the work from the full course to create a fully online and automated recertification course and process for First Line Supervisor. It is anticipated that this will be completed in the coming months.

Blaster Certification

Building on the success of the First Line Supervisor course and process, YukonU was invited by Yukon Workers Safety and Compensation Board (YWSCB) to meet and discuss the possibility of moving the Blaster's training and certification process to a self-directed, online methodology. YukonU will be reviewing the opportunity and drafting a proposal and scope of work for YWSCB to consider.

Workforce Readiness Program

Watson Lake Community Campus

Community Campus Coordinators at the YukonU Watson Lake campus are developing a Workforce Readiness Program with a planned start date of mid-October. Six modules will be offered over a 12 to 16 week period that will include topics such as, getting ready to learn (computer and interview skills), health and wellness, personal finances, mining focus, safety courses (food safe, first aid, chainsaw and driver training) and career exploration. Industry partners, guest speakers and facilitators will be brought in to teach specific subject areas.

The Earth Sciences (ES) Department welcomed several new and returning students in Fall 2023, with 10 ES majors and a number of non-ES students taking courses as elective credit.

The lab is busy with activity five days a week and faculty are offering the following courses:

- **Geological Field Methods and Mapping I (GEOL 207)**
- taught by M. Samolczyk (course completed Sept. 01)
- **Physical Geology (GEOL 105)**
- taught by Dr. J. Cubley (lecture) and Dr. C. Morgan (lab)
- **Mineralogy (GEOL 200)**
- taught by Dr. J. Cubley (lecture) and Dr. C. Morgan (lab)
- **Sedimentology and Stratigraphy (GEOL 206)**
- taught by Dr. C. Morgan (lecture and lab)
- **Structural Geology (GEOL 208)**
- taught by Dr. J. Cubley (lecture and lab)
- **Introduction to Soil Sciences and Resources (SOIL 210)**
- taught by M. Samolczyk (lecture and lab)

The Earth Sciences laboratory did not collect any dust this summer as several research and outreach projects were underway. Some project highlights include:

Groundwater vulnerability to metal(oid) contamination

Under the supervision of ES faculty members, two Yukon University students worked as research assistants through the summer collecting groundwater samples on residential properties in the Whitehorse area. This project brings together collaborators from Yukon University, the University of Saskatchewan, Government of Yukon, the Ta'an Kwäch'än Council, and the City of Whitehorse. The National Research Council Canada's Arctic and Northern Challenge program is the main funder for this project.



ES students learning how to map surficial geology on the banks above the Yukon River in their GEOL 107 field course.

Yukon Virtual Geology Project

The foci of the Virtual Geology Project this summer were 1) Yukon volcanoes and 2) geoscience research in the north. Faculty from Yukon University, project hires, student research assistants and guest researchers worked as a team to collect content for these virtual experiences. Geology of the volcanic features at the Alligator Lake and Fort Selkirk volcanic complexes was unforgettable. Geoscience research projects included: earthquake seismology at Stokes Pt., YT; permafrost degradation along the Dempster Hwy; and tectonics research along the Duke River Fault near Burwash Landing. Release of the new virtual field experiences will take place in early 2024.

Metahalite Project

Dr. Joel Cubley has a current petrology research project collaborating with, and funded by, the Geological Survey of Canada. This project focuses on the mineralogical and geochemical characterization of manganese (Mn) and barium (Ba)-rich chert units within southern Yukon Tanana terrane, assessing whether certain characteristics can be linked to prospectivity for, and proximity to, volcanogenic massive sulfide (VMS) deposits. A relationship between these exhalative (“black smoker”) rocks and economic mineralization has been documented at the Wolverine mine but is poorly constrained elsewhere in the territory.



ES Research Assistant Sheilany Bouchard helping to complete a geophysical survey for permafrost monitoring along the Dempster Hwy (Virtual Geology Project).

Environmental Monitoring Certificate

In June, five Cohort 5 students graduated from the Environmental Monitoring Certificate program and the ENVM 097 - Contaminated Sites: Assessment and Remediation course was delivered at Yukon U's Ayamdigut and Carmacks campuses. The course included a guided tour of the former Faro mine site with a manager from Parsons, the company responsible for the care and maintenance of the site. The visit to the mine site was arranged by Crown Indigenous Relations and Northern Affairs Canada (CIRNAC). Nicole Jacques with CIRNAC presented a history of the mine site, including a summary of remediation work completed to date and work planned as part of the overall Remediation and Closure Plan for the site. During this course students also visited a Land Treatment Facility and the Carmacks Bypass Project.

In August, ENVM 094 – Aquatic Monitoring 2: Biological Aquatic Systems was delivered in the Kluane area at Dalton Trail Lodge. Students learned about fish and aquatic ecological systems, and explored practical applications of monitoring techniques for fisheries, benthic invertebrates and stream physiology. The students visited the DFO fish counting weir at Shäwshe (Dalton Post), observed the limited salmon run at Klukshu village and partook in Champagne and Aishihik First Nations family culture camp.



Environmental Monitoring Certificate students sampling benthic invertebrates in Kluane, YT.

Environmental Monitoring Certificate



Environmental Monitoring Certificate students learning juvenile salmon trapping and identification.

For September, the cohort is currently completing the ENVM 098 – Restoration, Reclamation and Erosion Control course at the Ayamdigut campus. EDI Environmental Consulting is delivering and Erosion and Sediment Control module, and after an introduction to mine closure and reclamation planning the students will travel to Prince George, BC for the Technical Research Committee on Reclamation’s Annual Mine Reclamation Conference. Workshops and technical sessions there will cover a variety of areas including mine revegetation, reclamation planning, and Indigenous engagement and representation in reclamation activities.

CNIM update - September 2023

Other programming

Housing Maintainer

In collaboration with Champagne and Aishihik First Nations (CAFN), CNIM successfully concluded the third small house as part of the Housing Maintainer program. The house was transported from the CNIM building to its designated location within the Takhini River subdivision on September 13. Three of the five Indigenous students hired by CAFN actively engaged and participated throughout the project, including preparing the house for relocation. A few students have successfully secured full-time employment with CAFN.



House ready for transport.



CAFN third Housing Maintainer project.



Students assisting to crib house onto trailer.

The Housing Maintainer project in partnership with Little Salmon Carmacks First Nations restarted May 2023 and was completed in early August on site in Carmacks.



CAFN fourth Housing Maintainer project.

In mid-July, the fourth Housing Maintainer project in partnership CAFN was started. The house is being constructed in the CNIM building, with six students hired through CAFN. The students are enthusiastic to learn and have been actively engaged. On September 18, the structural framing inspection was passed and they are ready to start insulating the walls and ceiling and vapour barrier.

Yukon University's NSERC Industrial Research Chair in Northern Mine Remediation leads applied research projects that address challenges facing the northern mining industry.

This research program supports the development of new evidence-based approaches to northern mine development and operations, and supports mining companies as they navigate the environmental assessment process and operate mines in northern Canada.

Areas of expertise are:

- passive treatments
- tailing management
- mine revegetation

General updates

- Minto Metals' announcement to cease activity at Minto Mine impacted tremendously the Northern Mine Remediation program, such as access to the mine for existing or future projects, as well as funding and in-kind commitments.
- NSERC IRCC 48-month report submitted on May 31, 2023.
- Yukon Research Mining Consortium Meeting hosted on May 3, 2023.
- UArctic Seminar took place September 18-20, 2023 at YukonU in Whitehorse.



Frederik Paulsen Seminar: Mine Bioremediation in the Arctic



This seminar will bring together leading experts from around the world to advance our knowledge and approaches to bioremediation at mine-impacted sites in the circumpolar Arctic. Increasing exploration and economic development in the world's Arctic regions continues against a backdrop of growing attention on climate change, sustainability, and the critical importance of acknowledging indigenous rights, governments, and ways of knowing. Advances in bioremediation in cold climates are a key part of this ecosystem; this gathering builds on UArctic's reputation for northern leadership by facilitating the sharing of knowledge and identification of new approaches to research and innovation on this important topic. The seminar will pose the following key question to all participants:

What key innovations are required to advance bioremediation as a viable solution for mine-impacted sites in cold climates? What are the barriers, and how can these be overcome?

- Taylor Belansky, master's degree candidate, and Guillaume Nielsen, Industrial Research Chair NMR, will present at Yukon Water and Wastewater workshop and tradeshow on October 18, 2023.

- Guillaume has been accepted as a Sustainable Development Advisory Council member under the Federal Minister of Environment and Climate Change. He will represent Yukon Territory.

> Letter from Honourable Steven Guilbeault, Minister of Environment and Climate Change.



- Following a grant application in July 2023, College Institute Canada awarded the NMR team \$112,000. The team will use this grant to develop its Northern Mine Remediation course in two Yukon communities.

Publications, reports and media

- Guillaume was interviewed by Up Here Business. The article should appear in the November 2023 edition.
- One peer reviewed publication has been submitted to Water Research and another publication will be submitted to appropriate journals in winter 2023-2024.
- The NMR team released two important reports this summer (below) available at YukonU.ca/mine-remediation



*Pilot scale Bioreactors at Eagle Gold Mine site.
Date should be August 2023.*



Role of saturated covers as oxygen buffers in cold climates. June 2023.

Projects

Mine revegetation

Ben Budzey's master's degree project

When Minto Metals announced they were ceasing all activities, it was difficult to gain access to the site to ensure the two master's degree projects under NMR would survive. After gaining support from Yukon Government and Selkirk First Nations, access was finally granted in July and a research team from YukonU NMR and University of Saskatchewan spent one week on site.

What's been done:

- Shrub survival and monitoring. Various characteristics of green alder (*Alnus viridis*) and mountain avens comprising the biotic fences were assessed to evaluate plant health and all individuals were counted to determine survival.
- Loggers and photopoints. Data collection + six HOBO loggers and 24 iButtons were installed.
- Natural regeneration survey. A total of 12 quadrats were surveyed.
- Planting event. 144 fireweed (*Chamerion angustifolium*) and 240 Canada bluejoint (*Calamagrostis canadensis*) seedlings were planted in 128 plots.



Planting, measuring, biological survey and data collection at Minto Mine.



NMR team at the revegetation research location at Minto Mine.

Semi passive treatment to remove Nitrate in cold climate at Minto Mine

Taylor Belansky's master's degree project

Following Minto Metals' announcement, the opportunity to conduct a pilot Bioreactor experiment cannot happen as planned. NMR's mobile lab is on site. It impacts Taylor's project, and it will be very difficult to recover YukonU's mobile lab.

What's been done:

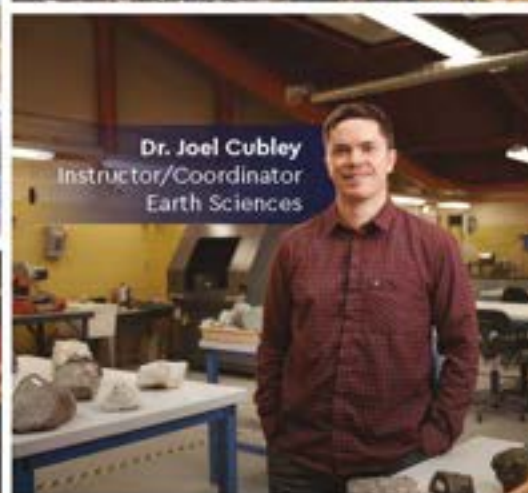
- Dr. Sean Crowe, a partner professor from UBC visited for four days. Dr. Crowe helped the NMR team to extract DNA from 55 inoculum samples from Minto Mine to perform a genomic characterization for the master's degree project.
- Taylor's master's seminar hosted at Institut National de la Recherche Scientifique (INRS) is on September 25.
- Columns Experiment are being run in YRC lab.
- All analysis (except Ammonium) is being done at YRC lab following successful method development done by Inderjeet Kaur, lab tech in NMR team on SmartChem and Skalar TOC with good results.



Taylor Belansky's columns at YRC lab.



Dr. Crowe, professor in the Microbiology department at UBC in the YRC lab with Taylor Belansky and Inderjeet Kaur.



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