



Spring 2015

Air Quality Monitoring Update

Background

Giant Mine's Air Quality Monitoring Program provides data to ensure that remediation activities at Giant Mine do not cause adverse effects to people or the environment. A robust environmental monitoring program is an integral part of the Giant Mine Remediation Project to ensure the safety of northerners and the environment.

Air quality monitoring network

The Giant Mine team incorporates best practices for air quality monitoring to ensure remediation activities do not cause adverse effects to either the people or the environment.

The program uses a three-layer air quality monitoring network.

- **Activity-specific monitoring** is established to monitor potential impacts to air quality in the vicinity of workers. Both fixed and mobile monitors are placed near work such as roaster deconstruction or drilling.
- **Fence-line monitoring** is done using six monitors that are placed in six locations around the perimeter of an active work area and along the southeast shore of the site, at the townsite, the cruising club, and the southeast beach.
- **Community monitoring** is done at three community monitoring stations (in N'dilo, downtown Yellowknife and at the Yellowknife Cruising Club) to measure and assess air quality in the community and help to ensure the effectiveness of the fence-line air quality program.

Results from the past field season

It was a successful year for the Air Quality Monitoring Program.

The data shows that work at the Giant Mine site, including the deconstruction of the Roaster Complex, did not adversely impact air quality in the nearby communities.

There were some events that impacted air quality that were not related to activities at the site, such as forest fires.

There were two exceedances during the 2014 field season and in both cases, the Project Team took quick action to ensure there was no risk to worker or public safety (*see details below*).



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The monitors provide real-time air quality data related to on-site activities. They can detect any changes to air quality quickly, regardless of whether the changes are caused by onsite activities. This data helps the Giant Mine Remediation Project Team to:

- Monitor concentrations of airborne contaminants,
- Assess potential effects on the local air,
- Establish whether these contaminants are the result of activities at the Giant Mine site, and
- Determine whether mitigation measures are required.



Fenceline network: This map shows the location of the air monitoring stations around the Giant Mine site.

How does it work?

The programs measure concentrations of contaminants in the air such as arsenic and other airborne dust.

Many things can impact air quality, including construction, vehicle emissions, road dust, smoke, etc. If the established protective levels are exceeded at a given station, the alarm will trigger an investigation and corrective action is taken, as necessary, to ensure that the levels return to background levels. Whenever monitors surpass a certain point, site personnel take action by:

- informing team members
- watering to suppress dust
- modifying or stopping work
- investigating to look for the cause of the elevated levels, which may not be site-related (e.g. forest fires)

In addition, the community monitors are used to check the effectiveness of the monitors on site.

All air criteria have safety factors built in and are set well below the level that may cause harm. When there is a reading above criteria, the Project Team compares this information to long-term trends and previous annual data to measure effects associated with the project.



Spring 2015*Checking a monitoring station on site.*

A successful year for the Air Quality Monitoring Program

The AQMP was successfully implemented in 2013 and continues on. There were some events during the 2014 field season that impacted air quality but were not related to activities at the mine site, such as smoke from forest fires.

However, the data shows that work at the Giant Mine site, including the deconstruction of the Roaster Complex, did not negatively impact air quality in the nearby communities.

Activity-specific monitoring is used to improve dust management practices, improve worker safety and personnel protective equipment practices related to on-site activities. During the 2014 field season, activity-specific monitoring was done in support of the Roaster Complex deconstruction, as well as underground stabilization, surface drilling and work related to tailings.

There were two exceedances in 2014 and in both cases, the Project Team took quick action to ensure there was no risk to worker or public safety.

May 2, 2014: Dust suppression at South Tailings Pond

On May 2, strong wind gusts stirred dust from the South tailings pond. This was detected at the fence-line monitor at the southeast beach. Following operating procedures, a water truck was sent quickly to dampen the dust and levels returned to acceptable levels and a surface seal was reapplied to the pond to prevent further dust blowing. The air monitoring sample gathered at the community station in N'dilo registered a result that was higher than usual, but well below the established air quality standards. This sample was the first such elevated reading, and subsequent readings indicated a return to normal levels. Results were not elevated at the other community monitors.

October 17, 2014: Arsenic levels investigated

A sample collected from the activity-specific monitor to the north-west of the Giant Mine roaster complex showed a 24-hour arsenic average of 5.2 microns per cubic metre. While this amount is above the action level of 0.3 microns per cubic metre, this level is designed to be very conservative. The levels detected in this case were a trigger for further investigation, but did not pose any risk to workers, the public, or the environment. Investigation revealed this was a brief spike in an unpopulated area. The wind



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was blowing away from the nearby communities. Samples from the fence-line and community air quality monitors all showed readings well below the set threshold for arsenic, and all monitors showed real-time readings below the set threshold for total suspended particulate (i.e. dust). Hygiene monitoring for the decontamination work confirmed that employee samples did not exceed occupational exposure criteria for workers, and as usual, all workers were wearing personal protective equipment. This means on-site workers were not at risk.

Moving forward

- Activity-specific and fence-line stations will continue operating. Monitoring at the fence-line stations usually stops during winter periods when no active site work is happening. This year a number of projects were ongoing into winter, so the fence-line stations were extended into January.
- The community monitoring stations will continue throughout the winter on a reduced sampling schedule and will increase again during the active work period, around April. The community monitors at the Yellowknife Cruising Club and in N'dilo will remain at the same locations.
- The past two years of data from the temporary National Ambient Pollution Surveillance (NAPS) program station that was located at 49th Street and 52nd Avenue in Yellowknife will be analyzed. Later in 2015, the unit will be closed and a new unit will be placed in the Niven Lake area.

- These stations collect air quality data for the community, including particulate (i.e. dust), arsenic, asbestos, lead, nickel and iron.

How to stay informed

There are many ways to stay informed on the Air Quality Monitoring Program and air quality reporting.

Weekly air quality monitoring reports

GNWT- ENR website: aqm.enr.gov.nt.ca.

Giant Mine Remediation Project monthly newsletters


Air quality monitoring program information is included in monthly newsletters. The newsletter is posted online at giant.gc.ca, and is distributed to subscribers. Write to GiantMine@aandc.gc.ca to subscribe.

Sign up to receive updates

Weekly air monitoring summaries are sent to subscribers via email. Write to GiantMine@aandc.gc.ca to subscribe.

On-line database

The GNWT ENR website maintains an active database of results from the air monitoring program. Reports are also posted in the “Giant Mine PDF Reports” section of aqm.enr.gov.nt.ca.



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Some common questions and answers

Q1. How do the fence-line monitors help keep us safe?

A1. Giant Mine's air quality monitoring program provides data to assist in the protection of people and the environment during remediation work at the mine site. If an on-site air monitor detects an unusual spike in airborne dust levels, site personnel take action, such as watering to suppress dust at site or stopping the work. These actions help to prevent dust from reaching nearby communities.

Q2. How do the community monitors keep us safe?

A2. The community monitors are used to verify the effectiveness of the fence-line monitors. When contaminant readings at the community monitors stay within acceptable limits, air quality in the community is within acceptable air quality criteria set by health and environmental experts.

Q3. What contaminants at the site should the public be aware of?

A3. Through its Air Quality Monitoring program, the Giant Mine Remediation Project Team measures concentrations of airborne contaminants such as arsenic trioxide dust, asbestos, antimony, iron, lead, nickel, and airborne dust, including total suspended particulate, particulate matter 10 (PM10) and particulate matter 2.5 (PM2.5), in order to take

action to avoid impact on human health or on the environment.

Q4. What is "respirable dust"?

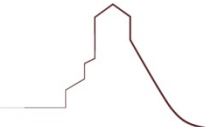
A4. Respirable dust is fine airborne particles that can be inhaled deep into the lungs. Examples include wood smoke, pollen, hair, fibres, and road dust.

Q5. What is particle matter 10 (PM10) and what is particle matter 2.5 (PM2.5)?

A5. PM10 and PM2.5 are types of airborne respirable particles. They are named according to their size, which is measured in microns. PM10 has diameter of 10 microns (μm) or less and PM2.5 has a diameter of 2.5 microns or less. PM2.5 is often present when something is burning.

A micron measures one-millionth of a metre, an extremely small unit of length. A single micron of any substance is so small it is scarcely visible; the average human hair, for example, is about 100 microns wide.

Airborne particulate doesn't necessarily contain arsenic trioxide or other mining by-products. If inhaled, however, particles of 10 microns or smaller (PM10) themselves may pass through protective hairs in the nose and deep into the lower area of the lungs, causing adverse effects on human health, including reduced heart or lung function.



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Q6. What is TSP? How is TSP different from PM10 or PM2.5?

A6. TSP stands for “total suspended particulate”. This is the amount of airborne dust with particles measuring 100 microns or less in diameter. For this reason, PM10 and PM2.5 are types of TSP. By determining the amount of airborne dust, TSP serves as an indicator of overall air quality.

Sources of TSP include construction activities, vehicle emissions, road dust, and incineration. Therefore, TSP includes both respirable dust particles as well as larger dust particles that are more easily removed by the body’s protective systems.

(Depending on its contents, TSP may or may not cause adverse health effects.) If the TSP mostly contains larger particles, it is not considered a significant health risk as these can be removed by the body’s protective systems. However, if the TSP contains a large amount of respirable particles such as PM10 and PM2.5, it has the potential to cause greater adverse health effects.

Q7. How do TSP and PM10 work together to tell us about our air quality?

A7. TSP is an indicator of total particulate in the air; PM10 is the fraction of that particulate that can be inhaled into the lungs. While TSP provides an indication of overall air quality, PM10 indicates more specifically the presence of particles with the potential to cause significant adverse health effects.

Q8. The weekly air quality monitoring summary says that 333 μ/m^3 is the Risk Based Action Limit (RBAL) for TSP. What does the measurement 333 μ/m^3 mean?

A8. TSP is measured in microns per cubic metre, or μ/m^3 . Some amount of TSP in the air is normal, so the monitors are set to look for spikes in their readings. The Giant Mine Remediation Project Team is notified when TSP or PM10 levels meet or surpass 333 μ/m^3 , a predetermined level known as the action level. This level was set in accordance with Health Canada criteria. This level indicates the point at which action, and if necessary, mitigative measures, are taken until the elevated concentrations are reduced below the action levels.

Mitigative measures may include:

- dust suppression activities such as watering and calcium chloride application
- modifying or stopping work activities

Q9. How does the Giant Mine Remediation Project Team know when to take action?

A9. The fence-line and activity-specific monitors alert the Giant Mine Remediation Project Team whenever TSP or PM10 levels meet or surpass a predetermined level called the action level. Similarly, the community monitors alert the Project Team whenever measurements surpass the 24-hour criteria for airborne particulate derived by the Province of Ontario’s Ministry of Environment (Ontario standards are applied as

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they are the most comprehensive standards in Canada). This information confirms the fence-line program is properly monitoring air quality.

When the Project Team is alerted, it takes immediate steps to determine whether the dust is related to activities at Giant Mine and if so, whether it needs to take action to reduce or eliminate the dust.

Q10. How does the Giant Mine Remediation Project Team know whether the dust is coming from the Giant Mine site?

A10. If a monitor indicates dust levels are approaching either the action level or the 24-hour criteria, the Project Team checks the site-wide system, examines site activities, and considers wind direction and speed to determine whether the dust is coming from Giant Mine. The Project Team also considers questions such as, “Is there any visible dust on site?”, “Are any ongoing site activities potentially producing dust?”, “Are the monitors working properly?”, and “Is there something else in the air, such as smoke or ice fog that may have triggered the alarm?”

Q11. Can air quality be affected by external factors that are not related to Giant Mine?

A11. Occasionally, smoke from forest fires, road dust, and ice fog have caused the fence-line monitors to reach the action level. Whenever monitors surpass a certain point, site personnel investigate, looking for the cause of the elevated

reading. Personnel conduct visual checks, review on-site activities, and consider wind strength and direction, and other environmental factors to determine the cause of the monitors’ readings.

During periods of extremely smoky conditions due to external factors such as forest fires, the Project Team is even more vigilant than usual in watching for dust generation and implementing dust prevention.

Q12. How are the contaminants contained in the dust determined?

A12. Samples are collected from community monitoring stations every three days. The Giant Mine Remediation Project Team sends these samples to a lab and has them analyzed for such things as iron, nickel, lead, antimony, arsenic, and asbestos, in addition to TSP and PM10. Results take approximately two weeks to process and are included in the weekly Air Quality Monitoring reports available on the NWT Air Quality Monitoring Network.

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Q13. How would you inform people in the event of something happening on site that could put them at risk?

A13. Air quality data from the community-based locations is provided in live format on the Government of the Northwest Territories air monitoring website and weekly summaries from our other monitoring stations are published on the GNWT site. In the unlikely event that an immediate, urgent risk is identified, communications would be managed through the Project Team's Emergency Response Plan. If required, additional support would be provided by the City of Yellowknife and other first responders.

We want to hear from you

There will be many opportunities to participate in this project in the coming months and years. Engagement will be critical to addressing EA measures, licensing and permitting, as well as project design.

Want to learn more? Here's how:

- Attend community information sessions and stakeholder meetings
- Learn about the project online: www.giant.gc.ca
- Follow us on Twitter @GiantMine
- Talk to us: 867-669-2426
- Come see us: 3rd floor, Gallery Building, 4923 52 Street, Yellowknife

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Moving Forward Together



Canada 