COVID-19 Testing and Screening

Public Health Advice and Mining Association of Canada Member Practices

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The Mining Association of Canada
L'association minière du Canada

THE MINING ASSOCIATION OF CANADA

The Mining Association of Canada (MAC) is the national organization for the Canadian mining industry. Its members account for most of Canada's production of base and precious metals, uranium, diamonds, metallurgical coal, and mined oil sands, and are actively engaged in mineral exploration, mining, smelting, refining and semi-fabrication.

Representing members committed to sustainability, MAC's Towards Sustainable Mining® (TSM®) initiative is an award winning and world-leading standard that fosters continuous performance improvement in environmental and social mining practices.

MAC promotes the interests of the industry nationally and internationally, works with governments on policies affecting minerals, informs the public, and promotes collaboration to solve common issues and foster progress. MAC works closely with provincial and territorial mining associations and other industries, as well as with environmental and community groups across Canada.

This document consolidates the latest information on COVID-19 testing for use by MAC members. It includes advice from public health agencies and information on current industry practices to manage the risk of COVID-19 at mine sites. This document will be regularly updated as industry practices and public health guidance evolve.

TABLE OF CONTENTS

COVID-19 TEST KIT INFORMATION 4
- Types of Tests 4
- Authorized PCR Tests 4
- Authorized Antibody Tests 4
- Emerging PCR Test Options 4
- Unauthorized Antibody and Antigen Tests 5
- PCR Test Kit Selection Process 5

PUBLIC HEALTH ADVICE 6
- Comprehensive Guidance 6
- Symptoms Assessment 6
- Prevention 6
- Cleaning and Disinfection 6
- Education and Awareness 7
- Personal Protective Equipment 7
- Contact Tracing 7

MINING INDUSTRY PRACTICES 7
- Screening 7
- Testing 7
- Prevention 8
- Education and Awareness 8
- Personal Protective Equipment 8
- Physical Distancing 8
- Contact Tracing 8
- Remote Sites 9

OTHER INDUSTRY PRACTICES 9
- General 9
- Symptoms Assessment 9
- Prevention 9

AVAILABLE TECHNOLOGIES 9
- Physical Distancing 9
- Contact Tracing 9
- Personal Protective Equipment 10

ANNEX A – Types of COVID-19 Tests 11
ANNEX B – Test Detection of Infection Relative to Symptom Onset 13
ANNEX C – Test Kit Comparison Chart 14

COVID-19 TEST KIT INFORMATION

Types of Tests
Three types of tests for COVID-19 are available on the global market:

- polymerase chain reaction (PCR)
- antibody detection
- antigen detection

More information on each of these tests and their limitations is available in **Annex A**. A figure demonstrating the when the diagnostic tests can detect infection, relative to symptom onset, is available in **Annex B**.

Authorized PCR Tests

- ***NEW*** Datametrex AI Limited: Is offering the 1copy test kit can facilitate lab-based testing for submitted samples or the development and staffing of on-site testing labs.
- Health Canada: A complete list all PCR tests currently authorized for use in Canada.
- Quidel Lyra SARS-CoV-2 Assay: An authorized lab-based test in which at least one MAC member has expressed an interest.
- Caprion: Lab-based PCR testing service in Montreal. Samples can be submitted with a 24-hour turnaround at a cost of $100 per sample.
- Baffinland, Agnico Eagle, ArcelorMittal and Glencore have secure portable COVID-19 testing labs using lab-based PCR tests authorized by Health Canada. Agnico Eagle's pilot project is being led by GuardRX at a cost of about $72 per sample and can produce results in as little as three hours.
- Xpert Xpress SARS-CoV-2: The only authorized point-of-care device.

Authorized Antibody Tests

- ***NEW*** Health Canada has authorized two antibody tests, one from Abbott Laboratories and one from DiaSorin. The availability of these test for procurement and use by private industry is currently unknown.

Emerging PCR Test Options

- ***UPDATE*** iLamp Novel-CoV19 Detection Kit: Datametrex AI Limited is working to get approvals for this PCR test widely used in South Korea, which is currently available for purchase for use in many jurisdictions outside of Canada. This test kit has been submitted for Health Canada approval, with rumours that it will soon be approved.
- Bio Molecular Systems: The Mic qPCR Cycler is a portable testing device in which some MAC members have expressed an interest.
- Precision Biomonitoring: New Gold has been working with this company to seek Health Canada approval for their rapid PCR testing devices, with rumours that the devices will soon be approved. More information on this product is available here.
- Spartan Cube: A test previously authorized by Health Canada, now restricted to research purposes due to a lack of test reliability. Spartan Biosciences expects to resolve these issues by summer 2020. Further information on the company's product can be found and here (et ici en français).
- Quantum Genetix: A Saskatoon-based company looking to convert existing genetic testing capacity to conduct PCR tests for COVID-19. More information available here and here.

- Real Diagnostics: Based in the United States and authorized to conduct PCR testing. The cost is about US$130 per test.
- See **Annex C** for a comparison of some of the key features of two types of Precision Biomonitoring tests, the Spartan Cube and laboratory tests.

Unauthorized Antibody and Antigen Tests

- Center for Health Security: Describes the types of antibody tests, including rapid diagnostic tests, and provides information on antibody tests approved for use in the United States and other jurisdictions.
- Rapid Microbiology: An unverified list of suppliers of PCR test kits, antibody detection kits and other supplies associated with COVID-19 testing.
- Biozek: Rapid antibody tests being used by Eldorado at its operations in Greece.
- Spring Healthcare: A rapid antibody test being advertised by Medical ESI for purchase in Canada, currently used in Italy and other jurisdictions. More information on the product is available here. Information on the legal status of this test in the United States is available here. The test is not yet approved for use in Canada.

PCR Test Kit Selection Process

The below (draft) steps outline a series of considerations in selecting an appropriate PCR test kit to reduce the risk of COVID-19 being spread in the workplace.

Step 1: Compare technical specifications

- Is the test kit available immediately for purchase? If not, when will it be available?
- How many tests can be completed per batch?
- How many gene channels are in each tube?
- What types of swabs are used? Are these readily available for purchase?
- What is the cost per test?
- What does research demonstrate about the sensitivity of the test?
- What does research say about the accuracy and reliability of the test?

Step 2: Consider how the test would contribute to reduced risk

- Considering the sensitivity and accuracy of the test, what is the risk of an individual having a false negative or false positive test result?

Step 3: Consider how to implement test procedures

- Who will be responsible for testing employees? What type of PPE will they wear and what types of hygiene practices will they need to practice?
- At what stages in their return to work or during a given work period will an employee be tested?
- Would quarantining individuals for 24 hours prior to taking the test allow for greater test accuracy by allowing the virus potential to develop? If so, what would be the costs associated with this quarantine policy?
- Would repeating the test at multiple points during an employee's on-site rotation improve the likelihood of detecting the virus?
- After how many negative test results, or after how many days, might an individual be deemed clear of the virus?

Step 4: Consider non-test controls to reduce risk

- Understanding that testing will not detect all potential individuals carrying the virus on site, what other controls can be put in place to reduce risk?

PUBLIC HEALTH ADVICE

Comprehensive Guidance

The below government documents provide comprehensive guidance for industry operating during COVID-19, including advice on screening, symptoms assessment, monitoring, isolation, hygiene, and physical distancing.

- Ontario Public Health (for industry operators)
- BC Ministry of Health (for large industrial work camps)
- Canadian Centre for Occupational Health and Safety (for work camps)
- Government of British Columbia (for construction sites)
- Government of Alberta (for industrial work camps)
- Government of Yukon (for work camps)
- City of Toronto (for workplaces)
- U.S. Centers for Disease Control and Prevention (for businesses)
- U.S. Centers for Disease Control and Prevention (for manufacturing)

Symptoms Assessment

- Symptoms of coronavirus: An overview of coronavirus symptoms, including fever, tiredness, dry cough, shortness of breath, aches and pains, sore throat, and others. *(Source: WHO)*
- COVID-19 online self-assessment tools: Screening criteria from provincial and territorial public health agencies can be used as a reference for employee self-assessment and integrated into site-specific screening questions. *(Source: Health Canada)*
- Daily self-monitoring form: A two-week checklist document to support self-monitoring by those who have recently travelled or been exposed to COVID-19. *(Source: BC CDC)*

Prevention

- Risk-informed decision-making guidelines: A framework for risk-informed decision making about public health actions for workplaces operating during the COVID-19 pandemic. *(Source: Government of Canada)*
- Preventing exposure to COVID-19: A series of questions for employers to ask to ensure that they are addressing all risks related to preventing the spread of COVID-19 in the workplace. *(Source: Work Safe BC)*
- Preventing COVID-19 in the workplace: Advice for employees and employers on handwashing, disinfection, distancing, and other prevention measures. *(Source: Government of Canada)*
- Construction site health and safety during COVID-19: Recommendations on prevention, including physical distancing and sanitation. *(Source: Government of Ontario)*
- Staying safe at work: Recommendations on respiratory protection, physical distancing and protecting mental health. *(Source: Work Safe BC)*

Cleaning and Disinfection

- Hand-washing advice: Advice on when and how to wash hands, and how to use alcohol-based hand sanitizer. *(Source: Mayo Clinic)*

- Reopening guidance for cleaning and disinfecting: Guidance on cleaning and disinfecting workplaces and other public spaces as they reopen. *(Source: CDC)*
- Cleaning and Disinfection for Community Facilities: Interim guidance on cleaning and disinfection after an individual with a suspected or confirmed case of COVID-19 has been in a facility. *(Source: CDC)*
- Water and sanitation management guidance: Detailed interim advice on water, sanitation and hygiene risks and practices, including safe water and waste management and cleaning and hygiene practices. *(Source: WHO)*
- Cleaning and disinfectants for public settings: A poster with detailed recommendations for cleaning and disinfection. *(Source: BC CDC)*

Education and Awareness

- Awareness resources: Posters, videos and other media to raise awareness on preventing the spread of COVID-19. *(Source: Government of Canada)*
- COVID-19 myth-busters: A public education resource responding to common misconceptions and beliefs about COVID-19. *(Source: WHO)*

Personal Protective Equipment

Advice on mask use is available from:

- WHO
- BC Centre for Disease Control
- Ontario Public Health

Contact Tracing

- Africa CDC: A plain-language guide to contact tracing and management.
- CDC: A useful outline of the core principles of contact tracing.
- Health Canada: Public health guidance for contact and case management.

MINING INDUSTRY PRACTICES

Screening

- Exclusion, isolation and return to work guide: Detailed information on screening, exclusion and isolation criteria, including useful definitions of terms such as “close contact” and criteria related to employee travel history. *(Source: South32)*
- Employee health surveillance verification tool: A checklist to ensure that all employees and contractors are fit to be at work and those with high-risk conditions are appropriately managed. Includes identification of individuals for self-isolation and monitoring, as well as business rules for exclusion of individuals. *(Source: South32)*
- Restricted site access verification tool: A checklist to verify site restrictions for employees, contractors, and other site visitors with international and domestic travel history, contact with confirmed COVID-19 cases and flu-like symptoms. *(Source: South32)*
- Fever testing procedure: Instructions for testing employees for fever and the process for those with fevers above 38.0°C or who otherwise fail pre-screening. *(Source: Hudbay)*

Testing

- Rapid testing guidelines: Advice on the appropriate use of rapid testing kits, including a flow

chart as to how to incorporate this advice into the screening process and what to do if an employee tests positive. *(Source: AngloGold Ashanti)*
- Kinross is exploring rapid detection antigen tests for their on-site clinic in Mauritania, with a procedure requiring three negative antigen tests over a 96-hour period before employees can return to work. A flow chart for this procedure is available .

Prevention
- Prevention and hygiene plan: Detailed checklists for procedures related to cleaning and disinfection, social distancing, personal protection, elimination of potential interaction, awareness, and communication, and more. *(Source: Agnico Eagle)*
- Employee travel questionnaire: A document to verify that rotational employees have self-isolated and practice physical distancing and good hygiene practices on their drive while returning to site. *(Source: Hudbay)*
- Personal and workplace hygiene verification tool: A checklist to ensure regular cleaning, availability and use of handwashing facilities, provision of hand sanitizer and adherence to good hygiene practices. *(Source: South32)*

Education and Awareness
- Communication and education verification tool: A checklist to ensure that employees are aware of requirements for working on site (e.g., physical distancing, hygiene practices), including regular updates, signage, and available support from within and outside of the company. *(Source: South32)*

Personal Protective Equipment
- Respiratory protective equipment verification tool: A checklist to ensure that workers are correctly using face masks and other respiratory protective equipment (RPE), there is an adequate supply of RPE, and it is being properly laundered or disposed, among other hygiene criteria. South32 does not consider wearing a mask an effective control in close contact situations, noting that it cannot be verified that the worker was adequately protected despite wearing full PPE. Tendencies to touch one's face, not change masks often and temporarily remove masks could lead to a higher risk of infection. *(Source: South32)*

Physical Distancing
- Social distancing task observation procedure: A procedure to ensure that social distancing task observations are carried out. *(Source: Eldorado Gold)*
- Social distancing verification tool: A checklist to ensure clear demarcation in high-traffic areas, demonstrated understanding and practice of physical distancing, procedures for travel in vehicles, meeting room capacity limits and other measures. *(Source: South32)*
- Physical distancing guidelines: Requirements for physical distancing on site, including detailed procedures and diagrams for appropriate distancing during travel in vehicles and spacing in meeting rooms. *(Source: Syncrude)*

Contact Tracing
- Contact Tracing Guidance: Developed for the Australian context, provides advice on what companies can do to support contact tracing and case management by public health authorities. *(Source: South 32)*

- Kinross had two-meter physical distancing protocols in place on site at their mine in Ghana, but authorities took a much broader definition of “close contact” when conducting contact tracing after a confirmed case.

Remote Sites

- Fly-in fly-out operations verification tool: A detailed checklist that outlines criteria for airport pre-departure, flights, bus transport, on-site check-in and check-out, and hygiene in common and residential facilities. *(Source: South32)*
- Agnico Eagle has procedures in place to safely transport individuals with potential cases of COVID-19 for testing and treatment.
- Agnico Eagle and Baffinland have established procedures to isolate or quarantine individuals.
- Baffinland is isolating and sterilizing a section of the site residence facility for cases requiring isolation.
- Baffinland is shifting to a 28-days on and 28-days off schedule, with a rest day every 14 days as per legal requirements.

OTHER INDUSTRY PRACTICES

General

- Smart start playbook: A guide to start-up and continuity protocols, including information on isolation, daily health risk assessments, contact tracing and more. *(Source: Magna)*
- Safe work playbook: Guidance on cleaning and disinfection procedures, staggering shifts and lunch breaks and other physical distancing strategies. *(Source: Lear)*

Symptoms Assessment

- Advice on temperature screening in the workplace: Advice on how temperature screening in accordance with provincial privacy requirements. *(Source: Gowling WLG)*

Prevention

- Employer’s COVID-19 return to the workplace playbook: A return-to-work guide that includes advice on physical distancing and PPE for employees. *(Source: Osler)*
- Standardized construction site protocols: Construction industry criteria to prevent the spread of COVID-19, including communications, travel, site access and cleaning, among others. *(Canadian Construction Association)*

AVAILABLE TECHNOLOGIES

Physical Distancing

- Barrick has introduced additional controls for physical distancing in the cage at its Hemlo operations. Limiting the cage to only 5 employees was causing long delays, so the facility introduced plexiglass cubicles to safely accommodate 13 workers at a time. More information is available here and here.

Contact Tracing

- UBand Access Wristbands: Wristbands that can be used like ID security cards by employees to access different spaces on site and support contact tracing if required.
- Blackline Safety: Service to produce an interactive online contact tracing report using safety wearables and a smartphone app to stream employee location data.
- Eldorado Gold is currently in the process of building employee tracking systems at its mine sites, utilizing existing employee ID security systems. The company is considering wrist band options that would be compatible with site ID security card systems.

Personal Protective Equipment

- ***NEW*** Datametrex AI Limited: Offering a range of PPE, including protective clothing, isolation gowns and sanitizer.
- Medical ESI: Offering a range of PPE, including face masks, gloves, safety glasses and hand sanitizers. More information on their products is available here and here.

ANNEX A – Types of COVID-19 Tests

Polymerase chain reaction (PCR): RT-PCR (reverse transcription polymerase chain reaction) is a process to detect the virus by extracting RNA (ribonucleic acid) from a test sample. An in-depth explanation of this process is available here.

Key Information	*Limitations*
• Recommended by the World Health Organization and authorized for use by Health Canada • Used to detect current infection • Lab-based tests the gold standard • Cartridge-based molecular diagnostic tests available for testing outside of lab • Can be used for early diagnosis and may detect asymptomatic cases • Low likelihood of false positives • Requires special equipment, PPE and training to administer	• Highly contingent on sampling quality • True clinical sensitivity unknown • Possibility of false negatives • Positive tests do not necessarily correlate with transmissibility • Unclear how many tests required per patient (e.g., if initial test is negative, to document viral clearance) • Due to high demand, generally only available for purchase by medical facilities

Sources: Health Canada, WHO, CDC, CMS Against COVID-19

Antibody detection: Serological-based testing is used to detect the antibodies (immunoglobulin) produced in response to an infection.

Key Information	*Limitations*
• Not recommended by the WHO outside of research settings • Not yet authorized in Canada • Used for contact tracing, epidemiological research and research on the sensitivity of PCR tests • Used to test individuals with negative PCR tests who present late symptoms • Experimental use to identify individuals with therapeutic antibodies	• Not appropriate for early diagnosis as most patients require 7-11 days post-exposure for antibodies to be detected • Development and duration of immunity in recovered patients remains unknown • An individual may be contagious for days before a positive test result • Strength of antibody response depends on several factors (e.g., age, nutrition) • Antibody responses are weak, late or absent in some confirmed cases • Potential for cross-reaction with other pathogens, resulting in false positives

Sources: Health Canada, WHO, CDC, CMS Against COVID-19

Rapid antigen detection: A quick point-of-care testing option to detect viral antigens (unique parts of the virus, such as fragments of a specific protein).

Key Information	*Limitations*
• ***UPDATE*** Authorized in Canada • Not recommended by the WHO outside of research settings	• Similar tests (influenza, RSV) have suboptimal sensitivity to rule out disease, meaning high potential for false negatives

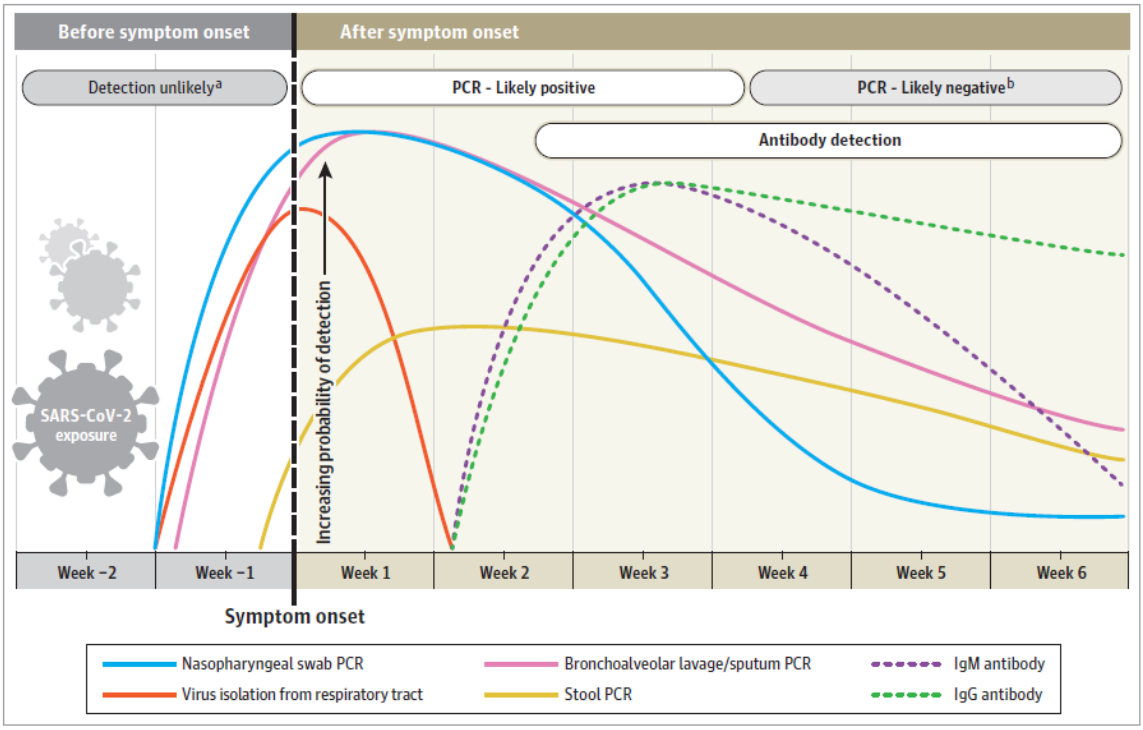
• Potential for rapid diagnosis in resource-limited environments, if sensitive enough • Antigens are expressed only during active virus replication, so best used to identify acute or early infection • Potential for use to rapidly identify patients, reducing the need for expensive molecular testing • Similar tests for influenza and respiratory syncytial virus (RSV) can provide results within minutes	• Effectiveness dependent on multiple factors (time elapsed, concentration in specimen, etc.) • False positive results possible if antibodies in the test recognize other antigens

Sources: Health Canada, WHO, CDC, CMS Against COVID-19

ANNEX B – Test Detection of Infection Relative to Symptom Onset

NEW Health Canada has indicated that individuals without symptoms of COVID-19 could carry the virus for up to five days before testing positive on PCR tests.

Figure. Estimated Variation Over Time in Diagnostic Tests for Detection of SARS-CoV-2 Infection Relative to Symptom Onset



Estimated time intervals and rates of viral detection are based on data from several published reports. Because of variability in values among studies, estimated time intervals should be considered approximations and the probability of detection of SARS-CoV-2 infection is presented qualitatively. SARS-CoV-2 indicates severe acute respiratory syndrome coronavirus 2; PCR, polymerase chain reaction.

[a] Detection only occurs if patients are followed up proactively from the time of exposure.

[b] More likely to register a negative than a positive result by PCR of a nasopharyngeal swab.

(Source: JAMA)

ANNEX C – Test Kit Comparison Chart

Below is a comparison of some of the key features of two types of Precision Bioscience tests (PBI Test for T-COR 8 and PBI Test for Franklin), Spartan Cube and laboratory tests:

Feature	**PBI Test for T-COR 8**	**PBI Test for Franklin**	**Spartan Cube**	**Laboratory**
Availability	Summer 2020	May 2020	On hold	March 2020
Concurrent Test Throughput	8	9	1	≤384
Gene Channels per Tube (Multiplexed)	4	3	1	≤4
Microbes per 1-hour Cycle	≤8	1	1	N/A
Lyophilized Tests for Point of Need	Yes	Yes	Yes	No
Swabs	Common (off the shelf)	Common (off the shelf)	Proprietary	Common (off the shelf)
Battery Life	8 hours	8 hours	Unknown	N/A
Result at POC	1 hour	1 hour	1 hour	Days or Weeks
Vendor Lock-In	No	No	Yes	N/A
Cost per Test	$97	$97	$75	>$160 (all in)
Multiple Manufacturers	Yes	Yes	No	N/A
Digital Connectivity	Yes	Yes	Yes	No
Test Made in Canada*	Yes (July 2020)	Yes* (July 2020)	Yes	N/A
24/7 Support	Yes	Yes	No	N/A

(Source: Precision Biomonitoring)

*Note: The Franklin test will be available immediately for sourcing from the United States upon approval from Health Canada. It will likely be available for May 2020 delivery, although there is a constrained supply. Availability of a made-in-Canada test kit is targeted for July 2020, with the ability to scale supply.