HEALTH, SAFETY & ENVIRONMENTAL MANUAL	13.1 Workplace Risk Assessments			
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WORKPLACE RISK ASSESSMENTS

Hazards

Management will work closely with supervisors and the JHSC to recognize, assess, control and evaluate workplace hazards and risks as required.

Definitions

Hazard:
A hazard is any situation, thing or condition that may expose a person to risk of injury or occupational disease.

Risk:
Risk is the chance or probability of a person getting harmed or experiencing an adverse health effect if exposed to a hazard.

Scope

Risk assessment is the process where you:

a) Recognize and identify hazards that can expose a worker to the risk of injury or disease.
b) Assess the risk of a worker getting harmed if exposed to the hazard.
c) Fix the problem by eliminating or controlling the hazard.
d) Resume work. Monitor and re-evaluate.

A risk assessment must take into consideration the nature of the workplace, the type of work, the conditions of work at that workplace and the conditions of work common at similar workplaces.

J-AAR shall, in consultation with Joint Health and Safety Committee or the Health and Safety Representative develop and maintain written measures to eliminate or control the hazards, and potential hazards, identified in a risk assessment.

Regulation 854/90:

5.1 (1) An employer shall conduct a risk assessment of the workplace for the purpose of identifying, assessing and managing hazards, and potential hazards, that may expose a worker to injury or illness.
(2) A risk assessment must take into consideration the nature of the workplace, the type of work, the conditions of work at that workplace and the conditions of work common at similar workplaces.
(3) The results of an assessment must be provided, in writing, to the Joint Health and Safety Committee or the Health and Safety Representative, if any.
(4) If no Joint Health and Safety Committee or Health and Safety Representative is required at the workplace, the results of an assessment must be communicated to workers at the workplace and provided, in writing, to any worker at the workplace who requests them.
(5) The requirement in subsection (1) to conduct a risk assessment is in addition to any specific assessments required by the Act or any Regulation made under it.

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5.2 (1) An employer shall, in consultation with the Joint Health and Safety Committee or the health and safety representative, if any, develop and maintain measures to eliminate, where practicable, or to control, where the elimination is impracticable, the hazards, and potential hazards, identified in a risk assessment conducted under subsection 5.1 (1).

(2) The measures referred to in subsection (1) shall be put in writing and shall include each of the following, as applicable and reasonable in the circumstances:

1. Substitution or reduction of a material, thing or process.
2. Engineering controls.
3. Work practices.
4. Industrial hygiene practices.
5. Administrative controls.
6. Personal protective equipment.

(3) Personal protective equipment shall only be used as a measure if the measures referred to in paragraphs 1 to 5 of subsection (2) are not obtainable, are impracticable or do not eliminate or fully control hazards and potential hazards.

5.3 (1) The risk assessment required by section 5.1 must be reviewed as often as necessary and at least annually.

(2) When conducting the review, the employer shall ensure that,

(a) new hazards or new potential hazards are assessed;

(b) existing hazards or potential hazards that have changed are re-assessed; and

(c) the measures required by section 5.2 continue to effectively protect the health and safety of workers.

(3) Subsections 5.1 (3) and (4) and section 5.2 apply with necessary modifications in respect of any new hazards and potential hazards and any existing hazards or potential hazards that have changed.

Hazard Recognition and Identification

How do you recognize a hazard…?

- Make observations onsite.
- Look at inspections.
- Get worker response / comments.
- Know or check legislation.
- Client or owner input.
- HSE Manual.
- Experience.

There are different types of hazards to think about….

- **Chemical** – gases, vapours, liquids, solids, plasma, dust, fume, or mist.
- **Biological** – living organisms, such as bacteria, viruses, mould, parasites, and fungi.
- **Physical** – noise, vibration, electricity, heat and cold, pressure and radiation.
- **Ergonomic** – poorly designed equipment or work process, strain on the body.
- **Psychosocial** – risks of crime, violence / harassment, production pressures.

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- **Safety** – housekeeping, falls, pinch points, moving machinery, fire, explosion.

There are 5 factors that can contribute to hazards at a workplace….

- **People** – training, communication, education, hygiene practices.
- **Equipment** – protective equipment, maintenance, condition.
- **Materials** – correct use, adequate supply, storage.
- **Environment** – noise, air quality, lighting, physical layout, housekeeping.
- **Process** – work design, flow, reporting requirements, policies, and procedures.

Assess and Prioritize the Risks

Ranking or prioritizing hazards is one way to help determine which hazard is the most serious and thus which hazard to control first.

A risk matrix, like the example below, helps determine the risk rating of each hazard.

The 1st step is to identify the consequence that could occur as a result of the hazard and then determine the likelihood of the hazard occurring.

The intersection of the likelihood and consequence in the chart gives you the risk rating level.

The priority in controlling hazards is used with the risks ranked from low to extreme.

The J-AAR "***Hazard Identification and Risk Assessment***" form is used for all worksites.

RISK MATRIX: HIGH - MODERATE - LOW

Consequence x Likelihood = Risk Rating			LIKELIHOOD 5 Certain	4 Likely	3 Possible	2 Unlikely	1 Highly Unlikely
CONSEQUENCE	Critical/Fatality	5	25	20	15	10	5
	Serious	4	20	16	12	8	4
	Medical Aid, Loss Time Injury and Restricted Duties	3	15	12	9	6	3
	Medical Aid	2	10	8	6	4	2
	First-Aid	1	5	4	3	2	1

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Low/Acceptable risk – The total numerical value is calculated to be between 1 and 5, the controls are considered adequate to mitigate the risk and no other action is required.
Moderate – The total numerical value is calculated to be between 6 and 10. Consideration must be given to additional measures reducing risk. Work can proceed, however controls must be maintained to ensure that the risk does not increase.
High - The total numerical value is calculated to be between 11 and 25, the risk is unacceptable. Work must not proceed until risk is reduced to a lower level. Controls including training, tools, equipment, safe work practices and procedures are required to reduce risk. Tasks that have a high-risk rating are not to be carried out without approval from management.

Hazard Control

Once you have established your hazards and assessed the risks of each, you can decide on ways to control each specific one. Hazard control methods are often grouped into the following categories:

- **Elimination (including substitution)**: remove the hazard from the workplace, or substitute (replace) hazardous materials or machines with less hazardous ones.
- **Engineering Controls**: includes designs or modifications to plants, equipment, ventilation systems, guards and processes that reduce the source of exposure.
- **Administrative Controls:** controls that alter the way the work is done, including timing of work, policies and other rules, and **work practices** such as standards and operating procedures (including training, housekeeping, and equipment maintenance, and personal hygiene practices).
- **Personal Protective Equipment (PPE)**: equipment worn by individuals to reduce exposure such as contact with chemicals or exposure to noise.

(Personal protective equipment shall only be used as a measure if the other control measures are not obtainable, are impracticable or do not eliminate or fully control hazards and potential hazards).

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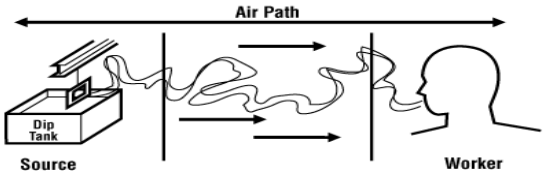
Where are controls used?

Controls are usually placed:

a. At the source (where the hazard comes from).
b. Along the path (where the hazard travels).
c. At the worker.



Controls placed at the source are preferred. The last line of defense is typically controls placed at the worker, like PPE.

Using procedures detailed in this J-AAR HSE Manual for specific tasks must be part of your steps to control hazards.

EVALUATE AND REVIEW

It is important to monitor both the hazard and the control method to make sure that the control is working effectively and that exposure to the hazard is reduced or eliminated. Some tools include physical inspection, testing, exposure assessment, observations, incident reports, employee feedback/input.

Be sure to answer the following questions:

- Have the controls solved the problem?
- Is the risk posed by the original hazard contained or reduced?
- Have any new hazards been created?
- Are new hazards appropriately controlled?
- Are monitoring processes adequate?
- What else can be done?

The risk assessment must be reviewed as often as necessary and at least annually.
The results of an assessment must be provided, in writing, to the Joint Health and Safety Committee or the Health and Safety Representative.
If no Joint Health and Safety Committee or Health and Safety Representative is required at the workplace, the assessment must be communicated to workers at the workplace.

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Airborne Hazard Management Program (AHMP)

Purpose and Background

As per the Mining Regulations, J-AAR shall develop an airborne hazard management program. The program will be written in conjunction with the risk workplace assessments required under Section 5.1.

An airborne hazard is a chemical, biological, or radiological agent that can occur in either a gaseous form (as a gas or vapour) or as an aerosol (dust, mist, or fume) and has the potential to cause harm through occupational exposure. Short-term exposure may cause acute health effects or long-term exposure may cause chronic health effects or occupational illness.

There are occupational exposure limits (OELs) set out in the OHSA regulations that restrict the amount of airborne concentration and the length of time a worker can be exposed to hazardous biological or chemical agents. While workplaces must comply with the current OELs, workplaces should also strive to eliminate or reduce worker exposures to hazardous airborne substances to as low as reasonably achievable.

Airborne hazards can be generated through a variety of surface activities, including but not limited to:

- crushing
- grinding
- blasting
- welding
- transporting

Common airborne hazards in Ontario surface mines include, but are not limited to:

- diesel emissions
- silica and dust
- carbon monoxide
- chromium (welding)

Workers in mines and mining plants can potentially be exposed to airborne contaminants that can cause occupational diseases including lung diseases (for example silicosis) or various forms of cancer.

Legislation

182. (1) An employer at a mine or mining plant shall, in consultation with the joint health and safety committee or health and safety representative, if any, develop and maintain a written airborne hazard management program.

(2) The program shall,

(a) set out the airborne hazards and potential airborne hazards that have been identified and assessed in a risk assessment conducted under section 5.1;

(b) list any measure developed and maintained under section 5.2 to eliminate or control the airborne hazards or potential airborne hazards;

(c) set out the number of samples to be taken and the frequency and locations of testing and monitoring;
(d) include measures and procedures to,
  (i) maintain control systems and all of the components of such systems, and
  (ii) monitor the effectiveness and measure the performance of those controls;
(e) identify the persons responsible for implementing the program, including the persons responsible for testing, monitoring or sampling; and
(f) set out information about the training and instructions that the persons responsible for implementing the program must complete.

(3) A copy of the program shall be provided to the joint health and safety committee or health and safety representative, if any, and be kept readily available at the mine or mining plant.

(4) Subject to subsections (5) and (6), the program shall be reviewed at least annually.

(5) The program shall be reviewed as soon as possible if there has been a change to,
(a) a mining process, work method or ventilation system that results in new airborne hazards or a change to existing airborne hazards; or
(b) the biological or chemical substances in the workplace that affect airborne hazards.

(6) If a review is required under subsection (5), the next annual review required by subsection (4) shall be within one year of the date of the review under subsection (5).

(7) For greater certainty, an employer's duty to provide information and instruction to a worker under clause 25 (2) (a) of the Act includes the duty to provide the worker with information and instruction that is appropriate for the worker on the contents of the airborne hazard management program.

Program Details

The AHMP must set out the airborne hazards and potential airborne hazards that have been identified and assessed as part the workplace risk assessment. An airborne hazard management program must also include the following elements:

- measures and procedures required to effectively eliminate or control airborne hazards and potential airborne hazards
- identified persons responsible for implementing the program
- identified training required for the responsible persons
- sampling and testing frequencies, locations, strategies and methodologies for assessing worker exposure and identifying air contaminant sources
- measures and procedures to maintain, monitor and measure the effectiveness and performance of control systems

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J-AAR will consider the hierarchy of controls (HOC) to protect workers from exposure. When controlling airborne hazards, it can be useful to apply the HOC using the source, pathway, and receptor model. These controls will be discussed with the industrial hygienist.

1. **source**: creation of contaminants
2. **pathway**: contaminants in the work environment
3. **receptor**: worker exposure to contaminants

Sampling

Industrial hygiene sampling programs must be developed and implemented in consultation with an industrial hygiene professional (Certified Industrial Hygienist or Registered Occupational Hygienist).

Industrial hygiene exposure assessments can identify airborne hazards in the workplace and can help in the selection of appropriate control measure(s) to effectively control the hazards. Industrial hygiene exposure assessments include sampling, testing and monitoring.

Sampling is the process of:

1. Collecting the constituents within a quantity of air over a period of time.
2. Analyzing the sample to determine the quantity of the different materials, including contaminants within.
3. Using the measurement to calculate the quantity of contaminants in the volume of air, otherwise known as the concentration.

A sample is as a measurement of the concentration of a certain agent (contaminant).

Sample schedules will be developed by a competent person trained in occupational hygiene. Sampling must also address measuring exposures during peak activities. This would include, for example, sampling crushing plant operators while the crushing plant is operating.

Industrial hygiene sampling can identify airborne hazards in the workplace and can help in the selection of appropriate control measure(s) to eliminate or effectively control the hazards.

Following a review of the information gathered in the sampling stage, workers can be grouped into categories for those who:

- work in similar processes
- perform similar jobs or tasks
- work with similar materials
- perform work in a similar manner, including the use of control measures

The industrial hygienist must also consider these factors:

- number of workers exposed
- frequency and duration of exposure

- the health effects of the agent

J-AAR will ensure that records of occupational hygiene monitoring are maintained in accordance with legislated requirements and filed accordingly.

All affected workplace parties and the JHSC, if any, must be informed of:

- the findings from any monitoring and assessment conducted in the workplace
- additional controls that are implemented because of exposures to workers

Program implementation and responsibilities

Workplace parties responsible for implementing, overseeing, and coordinating the program are as follows:

Workers:

- comply with all requirements of the AHMP
- attend all training as required to review and understand the requirements of the AHMP
- report all hazards to J-AAR supervisors or management when known

Health and Safety team:

- review workplace risk assessments on an annual basis with the J-AAR supervisors and/or top management
- review the written airborne hazard management program to ensure it is current and meets legislation
- help administer the selection and management of industrial hygienists, under the guidance of J-AAR top management
- administer the approved worker training program

Industrial Hygienists:

- prepare a sampling, testing and monitoring program for the control of any identified airborne hazards, as it relates to the legislation
- conduct and manage all sampling at work locations
- prepare and distribute all required reports for the employer

Top Management / Supervisors

- manage and implement the AHMP
- approve the selection of all external parties working on the program, including any industrial hygienists
- ensure sampling is completed as required
- ensure the implementation and maintenance of any controls required as part of the AHMP
- approve the worker training program and ensure all affected workers are trained under the AHMP

Training

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Every worker, including subcontractors, who may be exposed to airborne contaminants in the workplace, must be provided with information and training about the properties and health effects of the contaminants to which they could be exposed.

The training program will include the following items:

- requirement for an AHMP and the purpose of the program
- general information related to the exposure to airborne hazards
- potential health effects of those airborne hazards present within the workplace (site specific)
- sources of exposure, factors that influence exposure levels, and high exposure situations
- occupational exposure limits specific to the hazards in the workplace
- how exposure levels will be measured at the workplace
- the controls that are in place to minimize exposure, how they function and what must be done if problems are encountered
- detail of procedures and expectations of the airborne hazard controls

The J-AAR Health and Safety team will deliver training to workers at required work locations. The training will be conducted as follows:

- review the AHMP section of this J-AAR HSE Manual
- review the sampling, testing and data reported by the industrial hygienist for any airborne hazard that may affect the worker(s)
- review the control strategies implemented by J-AAR for any airborne hazards at the workplace.
- Review any site or task specific procedures for the worker(s) at their workplace

All workers affected by airborne hazards will be trained initially under the AHMP. Training will also occur at new hire orientations.
All training records will be filed electronically (on HCSS) and available for review as required.
All training will be approved by top management.
As changes to the program are made through the annual review or the introduction of new controls, workers may require additional training, information and instruction.

Program Review

Section 182 requires that the airborne hazard management program must be reviewed as often as necessary and at least annually. This review is necessary to ensure that new airborne hazards, or existing hazards that may have changed are addressed.
The review will be conducted by all J-AAR parties in conjunction with the industrial hygienist.

PROCEDURES

1. The J-AAR health and safety team will conduct an annual review of the workplace risk assessments with the J-AAR supervisors and/or top management for each work location (Sec. 5.1).

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2. The controls in place to manage the identified airborne hazards will be listed in the workplace risk assessment (Sec. 5.2).
3. For any airborne hazards identified in the workplace risk assessment, the J-AAR health and safety team, in conjunction with top management will select an industrial hygienist for workplace sampling.
4. The industrial hygienist will prepare a program and conduct sampling and testing that meets the requirements under the AHMP.
5. The industrial hygienist will prepare a report to be reviewed by top management.
6. Procedures and controls identified in the industrial hygienist report will be added to the workplace risk assessment, as needed.
7. All workers affected by airborne hazards at workplace locations will be trained by the health and safety team, as described in the Training section of this AHMP.
8. The AHMP will be reviewed as often as necessary, and at least annually.
9. All changes required as part of the review will be documented in the AHMP.

REQUIREMENTS

Mining Regulations 854, Section 5.1, 5.2, 5.3, 182