Safety Policy for Working in Compressed Air

1. **PURPOSE**

The purpose of this Policy is to outline the health and safety measures to be taken for work requiring workers to be subjected to compressed air in accordance with the ABC Company OHS Program and the requirements of Ontario Occupational Health and Safety (OHS) laws, including but not limited to OHS Reg. 213/91 Construction Projects (the "Regulation") as well as other applicable requirements and standards.

2. **DEFINITIONS**

For purposes of this Policy:

"air lock" means a chamber designed for the passage of persons or materials from one place to another place that has a different air pressure from the first;

"CSA Standard" means CSA Z275.3-09 (R2014): Occupational Safety Code for Work in Compressed Air Environments;

"compressed air" means air whose pressure is mechanically raised to more than atmospheric pressure;

"construction" includes erection, alteration, repair, dismantling, demolition, structural maintenance, painting, land clearing, earth moving, grading, excavating, trenching, digging, boring, drilling, blasting, or concreting, the

installation of any machinery or plant, and any work or undertaking in connection with a project but does not include any work or undertaking underground in a mine;

“kilopascals,” unless otherwise indicated, means kilopascals relative to atmospheric pressure;

“maximum air pressure” means the greatest level of air pressure to which a worker is subjected for a period of more than five minutes;

“medical lock” means a chamber in which workers may be subjected to changes in air pressure for medical purposes;

“project” means a construction (as that term is defined above) project, public or private, including: (a) the construction of a building, bridge, structure, industrial establishment, mining plant, shaft, tunnel, caisson, trench, excavation, highway, railway, street, runway, parking lot, cofferdam, conduit, sewer, watermain, service connection, telegraph, telephone or electrical cable, pipe line, duct or well, or any combination thereof; (b) the moving of a building or structure; and (c) any work or undertaking, or any lands or appurtenances used in connection with construction;

“superintendent” means the person appointed by a prime contractor or constructor to be supervisor over and in charge of work done in compressed air;

“work chamber” means a part of a project that is used for work in compressed air other than an air lock or medical lock.

3. **SCOPE OF POLICY**

This Policy applies to work at any project performed at an ABC Company worksite where a worker performs work operations in a compressed air environment, other than work by divers or persons working in diving bells, which will be covered by a separate OHS policy. The intent of this Policy is to ensure

that all such workers receive the required health and safety protection regardless of who pays or employs those workers, including:

- Full- or part-time workers employed by ABC Company;
- Temporary employees placed by an outside agency to work at an ABC Company work site;
- Contract labourers engaged to perform work at an ABC Company work site; and
- Workers employed by constructors or prime contractors ("constructors"), contractors, and subcontractors to perform work at the site under a contract with ABC Company.

4. **NOTIFICATION BEFORE COMPRESSED AIR WORK BEGINS**

4.1 MOL Notification

Whether it is ABC Company, a constructor, contractor or another employer, the employer of workers who may be subjected to compressed air at a project performed at an ABC Company site must give a Director of the Ontario Ministry of Labour ("Director") written notice of the intended use of compressed air on the project at least 14 days before work on the project begins and receive written permission from a Director at least 14 days before work in compressed air begins.

4.2 Other Notification

Before work in compressed air at a project begins, the , the constructor shall give written notice: (a) to the local police department and fire department and public hospital nearest to the project; and (b) to a Director, together with the names and addresses of those to whom MOL notice is provided under Section 4.1 above, setting out:

- the location of the project;
- the name, address and telephone number of the project physician and the superintendent; and

- the location of a medical lock for the project and of every other readily-available medical lock.

The employer must give notice of the completion of work in compressed air at the project to the local police and fire departments and public hospital who were given notice under subsection (a) of the first paragraph of this Section 4.2 above.

5. **SUPERINTENDENT [Optional if You're Not in Ontario]**

ABC Company will ensure a competent person is appointed to serve as superintendent of all work in compressed air at a project performed at its site and that before a worker is first subjected to compressed air, the superintendent ensures that he/she is fully instructed in the: (a) hazards of working in compressed air; and (b) required health and safety measures to be taken. The superintendent must obtain a statement signed by each worker so instructed acknowledging that they have received the instruction.

6. **LOCK TENDER**

The superintendent for the project must designate for each shift at least one competent worker capable of speaking, reading and writing English competently to serve as lock tender to attend to the controls of an air lock. In addition to the lock tender, the superintendent must also ensure that there is at least one competent worker available in an emergency to perform the duties of the lock tender while a worker is working in compressed air.

7. **WORKER BADGES**

For compressed air projects at ABC Company sites run by a constructor in which workers work, ABC Company will ensure that the constructor provides and requires workers to wear for at least 24 hours after working in compressed air a sturdy metal or plastic badge at least 50 millimetres in diameter

that lists:

- the constructor’s name;
- the project physician’s name and telephone number;
- the location of a medical lock at the project; and
- the words, “*compressed air worker – in case of decompression sickness take immediately to a medical lock*”.

8. **COMMUNICATIONS**

The following communications systems and measures are required at every project involving compressed air work carried out at an ABC Company site.

8.1 Telephone System

There must be a telephone system consisting of telephones located:

- As close as practicable to the work face;
- In every work chamber near a door that leads to an air lock;
- In every air lock;
- Near every lock tender’s work position;
- Adjacent to every compressor plant; and
- In the superintendent’s office.

8.2 Electric Buzzer or Bell System

There must be an electric buzzer or bell system consisting of a switch and a buzzer or bell located:

- In every work chamber near a door that leads to an air lock;
- In every air lock; and
- Near every lock tender’s work position.

The following communication signals must be used to communicate between a work chamber, an air lock and the lock

tender’s work position and a copy of the signal code must be posted near each switch of the electric buzzer or bell system. The lock tender must acknowledge every signal received on the system by returning the same signal.

Code of Signals	Meaning
1 signal	When nobody is in the air lock: MATERIAL IS COMING OUT
2 signals	When people are in the air lock: STOP COMPRESSING
3 signals	PEOPLE ARE COMING OUT OF THE AIR LOCK

9. **FIRE PREVENTION**

9.1 General Rules

No person may use acetylene while working in compressed air. Smoking is not permitted in an air lock or work chamber, other than in an area that the superintendent designates as a smoking area.

9.2 Control Combustible Materials & Ignition Sources

As far as practicable, no combustible material will be installed in or stored in an air lock or work chamber. Before introducing a flame-cutting, gas-welding or similar source of ignition into a work chamber in the vicinity of a combustible material:

- A firewatch must be established and maintained;
- A fire hose must be prepared for use;
- The fire hose must be tested to ensure there is an adequate supply of water and water pressure to extinguish a fire; and
- There must be a fire extinguisher suitable for the hazard nearby.

9.3 Standpipe

In every air lock and work chamber at a project, there must be installed a standpipe connected to a source of water or other pipes above ground that includes:

- Valves to isolate the standpipe from the rest of the fire prevention system;
- A fitting that the local fire department can connect to and which is controlled by a valve installed on the standpipe on the work chamber side of the bulkhead and by a valve inside the material lock;
- A fitting and valve similar to that described in the immediately above bullet installed at the end of the standpipe nearest to the work face; and
- Clear markings of the location of the fittings and valves.

10. MEDICAL REQUIREMENTS

10.1 Project Physician

Where compressed air work at an ABC Company site is performed for a project to construct a tunnel or caisson, ABC Company will hire at least one legally qualified medical practitioner to serve as project physician who responsibilities include:

- Performing any medical examinations of workers he/she considers necessary;
- Establishing a medical treatment program for the workers;
- Remaining reasonably available to provide medical treatment or advice on the treatment of decompression sickness while a worker is working in compressed air; and
- Instructing workers on the hazards of working in compressed air and the necessary precautions to be taken to avoid decompression sickness.

10.2 Decompression Sickness Measures

If the pressure in a work chamber at a project may exceed 350 kilopascals for a period of over five minutes, a project physician must establish procedures to control decompression sickness including:

- The maximum length of work periods for workers in the chamber;
- The minimum length of rest periods for workers in the chamber; and
- Compression and decompression procedures.

10.3 Medical Exam for Compressed Air Work

No worker shall work or be permitted to work in compressed air on a project at an ABC Company site unless and until: (a) the project physician provides the necessary instructions on the hazards of compressed air work and precautions required under Section 10.1 above; and (b) the worker receives a medical exam from the project physician to determine his/her fitness for compressed air work that includes:

- A physical examination;
- A test under compressed air, if the worker has not previously worked in compressed air; and
- Such clinical tests as the project physician may require, including x-rays of the chest and shoulders, and hip and knee joints taken at least once every five years.

In addition to the initial fitness exam, every worker working in compressed air at a project must get a medical examination from the project physician every two months after starting work in compressed air to determine his/her continued fitness for working in compressed air.

10.4 Worker Duty to Report If Not Feeling Well

A worker who has or is about to work in compressed air must notify the superintendent or project physician as soon as practicable if, for any reason, the worker does not feel well before beginning or resuming compressed air work. A worker who is absent for a period of 10 or more days from working in compressed air may not resume work in compressed air until a project physician indicates on the form described in Section 10.5 below that the worker is physically fit to resume work in compressed air.

10.5 Documentation of Medical Exam

After completing the medical exam, the project physician must indicate that the worker is physically fit to work in compressed air by completing the "Record of Compressed Air Worker," i.e., Figure 1 in the CSA Standard, and ensure that the superintendent gets a copy. The project physician must also advise ABC Company whether the worker is fit or is fit with limitations or unfit for work in compressed air, without giving or disclosing the personal health records or results of the exam or tests. Upon advising ABC Company that a worker, because of a condition resulting from work in compressed air, is fit with limitations or is unfit, the project physician must promptly communicate such advice to the Chief Physician of the Ontario Ministry of Labour ("Chief Physician").

10.6 Company to Pay for Workers' Medical Exams

If an ABC Company worker undergoes a medical examination, ABC Company will pay: (a) the worker's costs for any medical examinations and tests; and (b) the worker's reasonable travel costs respecting any medical examinations and tests. In addition, the time the worker spends undergoing medical exams and tests, including travel time, will be considered work time for which the worker will be paid at his/her regular or required premium rate.

10.7 Medical Exam Records

The project physician who performs or supervises the medical exams, tests, medical treatment and worker exposure to compressed air made under this Policy must keep the associated medical records in a secure place for at least six years. After that, the project physician may forward the records to the Chief Physician, or a physician the Chief Physician designates for retention.

11. **MEDICAL LOCKS**

11.1 Medical Locks Required for Projects

There must be a first aid room containing all necessary equipment for providing first aid to workers working in compressed air and facilities adequate for conducting medical examinations near each medical lock at a project. There must also be a certificate of inspection issued under Ontario Regulation 220/01 (Boilers and Pressure Vessels) made under the Technical Standards and Safety Act, 2000 for a working pressure of at least 520 kilopascals for every medical lock.

11.2 Standards for Medical Locks

A medical lock must be kept clean and sanitary at a temperature of at least 18^{0}C; it must be well-lit and well-ventilated. A medical lock must be no less than 1.8 metres high at its centre line and be divided into two pressure compartments, each of which has air valves arranged so that the compartment can be pressurized and depressurized from inside and outside the lock. There must be an observation window in each door and in the rear wall of a medical lock.

11.3 Required Equipment

A medical lock must be equipped with:

- A pressure release valve that will automatically blow-off at a pressure not greater than 70 kilopascals more than the operating pressure of the work chamber, and

which is tested and calibrated before the medical lock is used;
- A pressure gauge, a thermometer, a telephone, a cot, seating and a radiant heater; and
- A cot mattress, mattress cover and blankets all of which are made of material that is not readily flammable.

11.4 Treatment in Medical Lock

The project physician must control the medical treatment of workers in a medical lock at a project. While a worker is working in compressed air and for 24 hours afterwards, at least one worker experienced in the decompression of persons suffering from decompression sickness must be: (a) present on the project, if the work in compressed air was done at a pressure greater than 100 kilopascals; or (b) readily available, if the work in compressed air was done at a pressure of 100 kilopascals or less.

12. **AIR COMPRESSORS**

Air compressors for air locks and work chambers must meet the requirements set out in Sections 359 through 385 of the Regulation.

13. **WORK PERIODS**

The following maximum work periods apply for compressed air work depending on the maximum air pressure:

- If the maximum air pressure is 100 kilopascals or less: No worker may work for more than two working periods in any consecutive 24-hour period; or
- If the maximum air pressure is more than 100 kilopascals: No worker may work for more than one working period in any consecutive 24 hour period.

The period between the end of one work period and the beginning of the next for a worker doing manual work under compressed air where the maximum air pressure is over 100

kilopascals must be at least 12 hours.

In addition, no worker working in compressed air may work more than eight hours in a period of 24 hours. No lock tender may work more than nine hours in a period of 24 hours.

14. **REST PERIODS**

The following minimum rest periods apply for compressed air work depending on the air pressure:

Air Pressure	Minimum Rest Period
100 kilopascals or less	15 minutes
100 to 140 kilopascals	45 minutes
141 to 220 kilopascals	90 minutes
Greater than 220 kilopascals	120 minutes

Workers must not be asked nor allowed to perform any manual work or engage in any physical exertion during a rest period. Workers may not leave a project during a rest period. ABC Company will provide, free of charge, sugar and hot beverages for workers working in compressed air to consume during their rest periods. ABC Company will keep containers and cups for beverages in a sanitary condition and store them in a closed container.

15. **LOCK TENDERS**

15.1 Lock Tender Responsibilities

A lock tender must supervise the controls of an air lock when a worker is or is about to be subjected to compressed air in the air lock or work chamber. Lock tenders may attend only one air lock at a time. Exception: A lock tender may tend two locks if: (a) they are in close proximity; (b) the pressure in each work chamber does not exceed 100 kilopascals; and (c) only one of the locks is being used to compress or decompress a worker. Before a worker enters an air lock, the lock tender must ensure that:

- The worker has been examined by a project physician to determine his/her fitness to work in compressed air; and
- The means of air supply, air pressure gauges and controls, lock equipment and other devices necessary for safe operation of an air lock and protection of workers are in working order.

15.2 Air Pressure Adjustments: Increases

A lock tender must follow these rules in increasing the air pressure on a worker in an air lock:

- Air pressure must be increased uniformly and to no more than 35 kilopascals in the first two minutes of application of compressed air;
- Air pressure may not be increased to more than 35 kilopascals until the lock tender ensures that every worker in the air lock is free from discomfort due to air pressure;
- Air pressure must be increased above 35 kilopascals at a uniform rate of no greater than 35 kilopascals per minute.

A lock tender must observe a worker in an air lock while increasing the air pressure on the worker and, if the worker shows signs of discomfort and the discomfort does not quickly disappear, the lock tender must gradually decrease the air pressure until the worker reports that the discomfort has stopped or until the air pressure reaches atmospheric pressure.

15.3 Air Pressure Adjustments: Decreases

The lock tender must decrease air pressure uniformly during each of the stages of decompression referred to in Section 16.1 below. The lock tender must constantly observe a worker in an air lock while decreasing the air pressure on the worker and, if the worker shows signs of discomfort and the discomfort does not quickly disappear, the lock tender must

gradually increase the air pressure until the worker reports that the discomfort has stopped or until the air pressure equals the pressure in the work chamber.

If a worker in an air lock appears to be suffering from decompression sickness, the lock tender must notify, and follow the instructions of, a project physician, the superintendent or a person designated by the superintendent.

If a worker in an air lock appears to be injured or unwell from a cause unrelated to air pressure, the lock tender must notify, and follow the instructions of, a project physician; in these circumstances, the lock tender must decompress the worker unless otherwise instructed by the project physician.

15.4 Compression & Decompression Records

The lock tender must record information about the compression and decompression of a worker in an air lock listing:

- The description of the air lock;
- The worker's name;
- The time of the beginning and end of each compression or decompression to which the worker is subjected;
- The pressure and temperature in the air lock before and after each compression or decompression; and
- A description of any unusual occurrence involving the worker, the air lock or any related matter.

The lock tender must keep a separate record for each air lock and each compression and decompression and give the record to the superintendent.

16. DECOMPRESSION PROCEDURES

16.1 Decompression Rate

A worker who has been in air pressure greater than atmospheric air pressure for more than five minutes must be decompressed down to atmospheric pressure in accordance with Table A.1 and

Table A.2 of the CSA Standard. Exception: The rate of decompression may be doubled for a worker if, while performing the work in compressed air, that worker and every other worker in the air lock: (a) has not been exposed to air pressure greater than 220 kilopascals; (b) has remained under compressed air for a maximum of 30 minutes; (c) has not done manual work; and (d) has previously experienced decompression.

16.2 Posting of Decompression Tables

A copy of the tables used for decompression described must be kept posted at a project,

- In each air lock;
- At the controls outside each air lock; and
- In each change room.

16.3 Reporting of Decompression Sickness

A worker who believes he or she has decompression sickness must promptly notify: (a) the superintendent or a project physician; or (b) the lock tender, if the worker is under compressed air. The superintendent must make a report at least once a week to an MOL Director concerning every case of decompression sickness at a project occurring since the previous report, if any. The superintendent must promptly report by telephone, two-way radio or other direct means to an MOL Director a case of decompression sickness that does not respond to first-aid treatment. Reports required under this section must list, for each case of decompression sickness:

- The air pressure to which the worker was subjected;
- How long the worker was subjected to the air pressure;
- The nature of the medical treatment given to the worker; and
- The extent of the worker’s recovery.

17. **SAFE WORK PROCEDURES**

ABC Company will develop and implement safe work procedures

incorporating these and other required safety measures to be followed for performing work in a compressed air environment. This Policy and safe work procedures will be strictly enforced, including via the imposition of discipline in accordance with ABC Company disciplinary policies and procedures and applicable collective agreements and employment contracts.

18. **EDUCATION & TRAINING**

18.1 Initial Training

All workers and supervisors will receive training by a qualified person before being assigned to work in a compressed air environment covering, at a minimum:

- Health hazards of working in compressed air;
- Applicable safe work procedures;
- Hazard controls in effect;
- The communications systems; and
- Decompression procedures.

Training will be documented in records listing the worker's name, trainer's name, material covered and date provided. Steps will be taken to verify that workers have understood and are competent to carry out their training.

18.2 Refresher & Retraining

Compressed air work safety training will be repeated and reinforced as necessary in response to:

- A worker's violations or failure to follow this Policy or required safety procedures;
- There are grounds to believe that the worker's knowledge and training is inadequate and needs to be repeated or reinforced; and/or
- A worker's request for refresher or retraining.

18.3 Respirator Training

Workers required to use respirators will also receive the training and fit testing required by OHS laws and the ABC Company Respiratory Protection Program.

19. **MONITORING**

This Policy will be reviewed, in consultation with the workplace Joint Health and Safety Committee or Safety Representative, at least once a year and more often in response to incidents, injuries, illnesses, changes to work conditions and other developments suggesting the current Policy may no longer be suited to current work conditions or hazards.