

OVERVIEW

TITLE: Confined Space Isolation, Alternate Procedures

Part 9, Confined Spaces
Section 9.22, Alternate procedures

1. WHAT IS THE NATURE OF THE PROBLEM TO BE SOLVED?

As an oversight, section 9.22 of the OHS Regulation (“OHSR”) was not amended in 2007 when exemptions were adopted for “public water supply systems” and “water passageways of dams” under new section 9.18.1 with respect to the isolation of piping within these structures. This has led to unclear application of section 9.22. As written, section 9.22 requires an employer to seek approval for methods for isolation of piping running through, or in close proximity to a confined space other than those isolation measures prescribed by section 9.18; no distinction is made for exempted confined spaces and their isolation provided for by section 9.18.1.

The purpose for isolating piping from a confined space is to keep hazardous substances out of the confined space to ensure workers in the confined space have a clean and safe work environment to work in.

Section 9.18, as currently written, is complex and difficult for stakeholders to understand and comply with. Section 9.18.1 does not clarify that an obligation exists for the employer to obtain certification by a professional engineer for public water supply systems and water passageways of dams before allowing entry to these structures. In most cases, engineering and occupational and safety staff employed in the business of operating dams are well resourced to perform the necessary risk assessments, evaluations, and certifications necessary prior to allowing worker entry.

It has been pointed out that the term “alternate” as used in section 9.22 is incorrect. “Alternate”, by definition, means there is one other choice; while “alternative” means there are two or more possible choices. Alternative confined space measures can be different in a number of ways; they are not restricted to only two measures. Accordingly it is more appropriate to use the term “alternative” in section 9.22.

2. WHAT IS THE PURPOSE OF THE PROPOSED AMENDMENTS?

The proposed amendments will:

- a) clarify that section 9.22 applies to section 9.18.1 covering public water supply systems and water passageways of dams; and,

- b) clarify the relationship between sections 9.18.1 and 9.18 as well as related sections covering blanking, blinding and use of double block and bleed systems for isolating piping passing through, or in close proximity to a confined space.

These amendments will facilitate a better understanding of the methods of isolation that must be applied to prevent hazardous substances contained in the piping from entering the confined space.

These amendments will reduce the number of “Acceptance Requests” submitted to WorkSafeBC relating to measures for isolating piping associated with dams and public water systems. Over a 3 year period (2006 – 2008), 31 “Acceptance Requests” relating to section 9.22 were submitted by employers to WorkSafeBC. Each request requires an average time of four weeks for review by WorkSafeBC staff.

3. SOURCE OF REQUEST

WorkSafeBC Worker and Employer Services Division (Regulatory Practices)
WorkSafeBC Investigations Division (Engineering)

PART 9: CONFINED SPACES

- Isolation** **9.18** ~~(1) Except as provided in subsection (2), before a worker enters a confined space, adjacent piping which contains or has contained a harmful substance must be controlled by~~
- ~~(a) disconnecting, blanking or blinding, or equivalent engineered system, or~~
 - ~~(b) if the adjacent piping contains a harmful substance that is not a gas or a vapour, nor a liquid of sufficient volatility to produce a hazardous concentration of an air contaminant in the discharge of the piping, a double block and bleed system.~~
- ~~(2) If adjacent piping contains or has contained a substance that is hazardous only because of its pressure, temperature or quantity, before a worker enters the space, the pressure must be controlled~~
- ~~(a) to meet the requirements of subsection (1),~~
 - ~~(b) provided there is no other pressure source or head pressure, by de-energizing and locking out the pressure source and depressurizing the line, or~~
 - ~~(c) by other effective means.~~
- ~~(3) Repealed.~~
- ~~(4) Except when used in an acceptable double block and bleed system, the closing of one or more valves in a line is not an acceptable means of isolation.~~
- ~~(5) Isolation of a confined space from gases found in a gravity flow municipal or domestic sanitary or storm sewer system may be accomplished by a p-trap, provided that~~
- ~~(a) the integrity of the trap is ensured immediately upon entry, and~~
 - ~~(b) the atmosphere is continuously monitored and shown to contain clean respirable air.~~

- Exemptions** **9.18.1** ~~(1) In this section:~~
- ~~“public water supply system”~~ ~~includes valve and meter chambers and pressure reducing stations;~~
- ~~“dam water passageway”~~ ~~includes conduits, pipes, penstocks, power generating chambers, valves and related structures located within storage, diversion or other dams.~~
- ~~(2) Section 9.18 (4) does not apply to water piping that is part of a public water supply system if the piping and associated equipment is designed, constructed, maintained and certified by a professional engineer to American Water Works Association standards.~~
- ~~(3) Section 9.18 (4) does not apply to a dam water passageway if the structures of the passageway, including a gate valve or other flow control device, are certified by a professional engineer as being safe for workers to enter to perform the intended work.~~

- Isolation of adjacent piping** **9.18** **(1) Before a worker enters a confined space where adjacent piping in relation to the confined space contains a harmful substance that is**

- (a) a liquid with sufficient volatility to produce a hazardous concentration of an air contaminant, or
- (b) a gas or vapour,

the adjacent piping must be disconnected, or controlled or isolated by blanks or blinds that meet the requirements of section 9.20.

- (2) Before a worker enters a confined space where adjacent piping in relation to the confined space contains a harmful substance that is neither

- (a) a liquid with sufficient volatility to produce a hazardous concentration of an air contaminant, nor
- (b) a gas or vapour,

the adjacent piping must be disconnected, or controlled or isolated by blanks or blinds that meet the requirements of section 9.20 or by a double block and bleed system that meets the requirements of section 9.21.

- (3) Before a worker enters a confined space where adjacent piping in relation to the confined space contains a substance that is harmful only because of the temperature, pressure or quantity of the substance,

- (a) the adjacent piping must be disconnected, or controlled or isolated by blanks or blinds that meet the requirements of section 9.20 or by a double block and bleed system that meets the requirements of section 9.21, or
- (b) each pressure source for the adjacent piping must be de-energized and locked out, and the adjacent piping must be depressurized.

- (4) In subsection (5), “potable water supply system” includes valve and meter chambers, pressure reducing stations and other similar structures.

- (5) A worker must not be permitted to enter a potable water supply system where adjacent piping in relation to the potable water supply system is isolated by means of closing one or more valves unless

- (a) all the adjacent piping, associated valves, connectors and similar devices are designed, installed and operated in accordance with established engineering principles,
- (b) a professional engineer has certified that all the adjacent piping, associated valves, connectors and similar devices meet the requirements of paragraph (a), and
- (c) all the adjacent piping, associated valves, connectors and similar devices are maintained in good working order.

- (6) In subsection (7), “dam water passageway” includes the conduits, pipes, penstocks, power generating chambers, valves and similar structures located within a dam.

(7) Before a worker is permitted to enter a dam water passageway where isolation of the dam water passageway is by means of closing one or more valves, a professional engineer must have certified that the structure of the dam water passageway is safe to enter, based on established engineering principles.

(8) Where a confined space is

(a) subject to the ingress of gases from a gravity-flow municipal or domestic sanitary sewer system or storm sewer system, and

(b) protected from the ingress of gases by a p-trap,

a worker must not be permitted to enter the confined space unless the atmosphere of the confined space has been tested immediately before entry and the test results confirm that the confined space contains clean respirable air.

(9) If a worker enters a confined space of the type referred to in subsection (8), the following must be undertaken:

(a) the operational integrity of the p-trap must be confirmed immediately on the entry of the worker;

(b) while the worker is inside the confined space, the atmosphere of the confined space must be continuously monitored and confirmed to contain clean respirable air.

Alternate procedures
Alternative measures of isolation of adjacent piping

9.22

(1) If isolation using the measures specified in section 9.18 is not practicable, the employer may implement alternate measures acceptable to the Board.

If a measure specified in section 9.18 to control or isolate substances contained in adjacent piping from a confined space is not practicable, the employer may implement alternative measures of control or isolation acceptable to the Board.

(2) All workers affected by measures implemented under subsection (1) must be informed of the measures taken and instructed in any applicable work procedures.

Explanatory Note:

Section 9.22 (1) states that if isolation using the measures specified in section 9.18 is not practicable, the employer may implement alternate measures acceptable to WorkSafeBC. Employers must obtain approval from WorkSafeBC before implementing alternate measures.

The exemptions described in section 9.18.1 are intended to be included in section 9.22 (1). Therefore, the alternative methods set out in section 9.18.1 do not require approval from WorkSafeBC. However, this is not clear in the current wording of section 9.22 (1).

The purpose of these proposed amendments is to clarify that isolation methods, described in section 9.18.1 covering public water supply systems and water passageways of dams, are acceptable methods of isolation and do not require approval from WorkSafeBC as intended.

Piping associated with dams and their isolation present a unique situation for the utilities that operate them when considering the appropriateness of isolation measures necessary before permitting entry of workers to the confined space such as the water passageway in a dam. In most cases, engineering and occupational health & safety staff employed by the utility have a high level of expertise to develop safe measures of isolation for confined spaces within their

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workplaces. Hence, it is not necessary for these utilities to seek approval from WorkSafeBC for isolating adjacent piping for section 9.18.1 exempted confined spaces. The section mandates that the employer obtain engineering certification for the control and similar structures within the water passageway prior to permitting entry of workers to the confined space. A similar situation exists for worker entry to public water supply systems such as valve and meter stations. Prior to entry the employer must ensure that the piping and associated valves, connectors and similar devices within a valve and meter station are designed, installed and operated according to good engineering practices and maintained in good working order.

In preparing for an amendment to section 9.22, it was thought prudent to review section 9.18 as well with the intent of incorporating section 9.18.1 into section 9.18. Furthermore, due to the complexity and highly technical nature of section 9.18 and associated sections – blanking and blinding (section 9.20), double block and bleed methods of isolation (9.21) – revisions are proposed to help bring clarity and facilitate a better understanding of the stated requirements relating to the isolation of adjacent piping.

Proposed amendments to section 9.18 have resulted in a re-organization of the five subsections into nine new revised subsections. The proposed amendments are as follows:

- Current section 9.18.1 is proposed to be rescinded with its requirements incorporated into new subsections 9.18 (5) to (7) as described in more detail below.
- The contents of current subsections (1) to (2) have been re-arranged into 3 subsections based on the level of hazard posed by the hazardous nature of the contents of the piping running through or in close proximity to the confined space, as described in more detail below.
- Proposed amendments – new subsection 9.18 (1):
 - Harmful substances of greatest concern are those that are in a gas or vapour form or those harmful substances in solid or liquid form which are capable of releasing a harmful gas or vapour into the confined space;
 - Subsection (1) covers this level of hazard and isolation of piping requires a high level of control, with control being limited to disconnecting, blanking or blinding of adjacent piping;
 - Blanks and blinds must meet the requirements of section 9.20;
 - The current reference to “equivalent engineering system” has been removed; section 9.22 will apply for other methods of isolation.
- Proposed amendments – new subsection 9.18 (2):
 - Harmful substances that are not in gas or vapour form and not capable of releasing a harmful gas or vapour from the liquid or solid state it is in, and, thereby pose a lower risk to workers than subsection (1) substances, can be isolated per the provisions of subsection (1) or by a double block and bleed system;
 - Double block and bleed systems must meet the requirements of section 9.21.
- Proposed amendments – new subsection 9.18 (3):
 - This subsection covers substances that are harmful only because of the temperature, pressure, or quantity of the substance;
 - the substance is not classified as harmful by virtue its toxic, irritant or other harmful properties;
 - These substances – which includes water – when present in adjacent piping can be isolated following the hierarchy of control measures prescribed in subsections (1) or (2) or by de-energizing and locking out of the pressure source (such as an electric pump and associated valve) and further de-pressurizing of the piping such that there is no residual head or other pressure within the piping.

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- The abovenoted proposed amendments covered by subsections (1) to (3) have not altered the intent of current subsections (1) and (2). The purpose of the proposed wording is to bring clarity to section 9.18.
- Current subsection 9.18 (4) has been rescinded as its stated instruction that the closing of one or more valves in not an acceptable means of isolation, has been transferred to proposed subsections (5) and (7) covering potable water supply systems and dam water passageways and the use of isolation via one or more valves. Section 9.21 covers isolation measures for double block and bleed systems.
- Proposed amendments – new subsection 9.18 (4):
 - This subsection provides a revised definition for “public water supply systems”.
 - The term “public” has been replaced by “potable”.
 - This is in recognition that water supply systems are not necessarily limited to public systems; there are also non-public systems such as industry-based water supply systems; hence, “potable” is a more appropriate term.
- Proposed amendments – new subsection 9.18 (5):
 - This subsection is a revision of current subsection 9.18.1 (2);
 - This proposed amendment recognizes the fact that much of the water pipes and associated valves, connectors and similar equipment seen in most municipal and other potable water supply systems pre-date American Water Works Association (“AWWA”) standards, and are designed, constructed and installed to older standards;
 - Hence, the reference to the AWWA has been removed with the revised wording stating that the adjacent piping and associated valves, connectors and similar devices must be:
 - designed, installed, operated in accordance with established engineering principles,
 - certified by a professional engineer accordingly, and
 - maintained in good working order,before a worker is permitted entry to the confined space.
- Proposed amendments – new subsection 9.18 (6):
 - Current subsection 9.18.1 (1) and its definition for “dam water passageway” has been moved to new subsection 9.18 (7);
 - The definition has seen a minor editorial change; “...within storage, diversion or other dams” is replaced by “...within a dam”. Hence, it covers any dam which contains a water passageway.
 - Water passageways within dams are large structures which require periodic inspection and maintenance. Water behind the dam is typically held back by virtue of a single valve.
- Proposed amendments – new subsection 9.18 (7):
 - The contents of current subsection 9.18.1 (3) covering dam water passageways has been revised for clarity and moved to new subsection 9.18 (7).
 - It is clarified that before a worker is allowed to enter the water passageway within the dam, where isolation is accomplished typically by the closure of one large valve, the water passageway must be certified as safe to enter by a professional engineer in accordance with established engineering principles.

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- Proposed amendments – new subsections 9.18 (8) and 9.18 (9):
 - The contents of current subsection 9.18 (5), which covers a confined space that is subject to the ingress of gases from a gravity-flow municipal or domestic sanitary sewer or storm sewer system, and where a p-trap is used as a measure of isolation, has been revised for clarity and moved to new subsections 9.18 (8) and (9).
 - It has been clarified that before a worker is permitted to enter the confined space covered by this subsection, the air quality must be tested prior to allowing entry;
 - Once it is assured that the space contains clean respirable air (a defined term per section 9.1) the next step is to ensure that the p-trap is operating properly (i.e., filled with water) so that no hazardous gases or vapours can enter the confined space from the sewer system.
 - It is clarified that it is the air of the confined space that needs to be continuously monitored to ensure clean respirable air is present.

- Proposed amendments – section 9.22:
 - Section 9.22 is revised to clarify that if measures specified in section 9.18 – which includes all the provisions covered by subsections (1) to (9) – to isolate substances contained in adjacent piping from a confined space – are not practicable, the employer can consider alternative measures of isolation. These alternative measures of isolation require approval from WorkSafeBC before they can be implemented.
 - The term “alternate” is replaced by the term “alternative”, which is a more appropriate term. “Alternate”, by definition, means there is one other choice; while “alternative” means there are two or more possible choices. Alternative confined space measures can be different in a number of ways; they are not restricted to only two measures.

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