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SAFETY INFORMATION BULLETIN: SB00-18 Rev. 3
(Supersedes Safety Information Bulletin: SB00-18 Rev. 2 issued June 18, 2003)

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Subject: Deaerators and Hot Water Storage Tanks - Periodic Inspection Intervals

Background

Pressure vessels at pressures greater than 15 psig, such as deaerators and high temperature (212°F and above) hot water storage tanks in which steam can be generated have a potential high risk for failure due to corrosion and fatigue cracking. To minimize the potential for failure, this document sets out periodic inspection requirements for these items.

Water within these vessels or systems can contain dissolved gases such as oxygen, carbon dioxide and ammonia which may lead to corrosion, erosion, scaling, pitting and/or cracking. Deterioration of internal surfaces may be further accelerated by improper deaeration, inadequate water treatment, water or steam hammer and/or differential thermal expansion. Defects in the form of pinhole leaks and/or cracks may be found in or adjacent to the longitudinal or circumferential welded seams, supports or structural attachments or near the liquid level line.

The failure mechanism anticipated is that of corrosion-fatigue-cracking and will most often be found in coarse grain material (such as SA 515, SA-212B) of non heat-treated vessels.

Inspection Requirements

The Ontario *Technical Standards and Safety Act 2000*, Regulation 220/01 for Boilers and Pressure Vessels (Regulation), Section 10(1) requires that pressure vessels be inspected by a TSSA Inspector or, where the equipment is insured by an insurance company (by insurance personnel qualified in accordance with the Regulation, Section 12).

The Ontario Boilers and Pressure Vessels Code Adoption Document mandates a one year minimum periodic inspection interval for deaerators and a minimum three year interval for high temperature hot water storage tanks.

Due to the nature of the operation of this equipment and resulting susceptibility to cracking, it is required that in service deaerators and hot water storage tanks containing water at pressures greater than 15 psig and temperatures greater than 212°F be thoroughly visually inspected on all internal surfaces for indication of cracks, corrosion, erosion, pitting or other defects particularly above and below the liquid level line. Weld seams and their heat affected zone and all structural attachment welds of vessels shall also be wet-fluorescent-magnetic particle examined for the presence of cracks, pinholes or other defects. Light surface preparation may be necessary to obtain meaningful results from wet-fluorescent-magnetic particle examination

(WFMPE). Care should be exercised during surface preparation to avoid closing surface discontinuities.

As a minimum, internal visual examination (IVF) and WFMPE of not less than 20% of the highly stressed weld areas including the longitudinal weld seams and adjacent heat affected zone are to be performed at the following intervals:

<u>Condition</u>	<u>IVE and WFMPE Inspection Interval not to Exceed</u>
No cracks shown	3 years
Cracks have historically shown	2 years
Cracks have shown in the year previous	1 year

The WFMPE described above shall be carried out by Level II or III personnel qualified in accordance with the requirements of the Canadian General Standards Board (CGSB), 48.9712-002 latest edition.

The Owner shall maintain the reports for the WFMPE which shall as a minimum include:

- NDE organization name & procedure number(s) used
- Location address of installed equipment
- Equipment description including manufacturer's name and serial number
- a clear description of the inspection technique used to perform the inspection;
- the name, signature and qualifications of the person performing the inspection;
- the date of the inspection;
- results of the inspection;
- the required inspection interval being followed selected from the list above.

These records shall be made available to the TSSA or insurance company inspector at the time of periodic inspection.

The person performing the periodic inspection required by the Regulation (TSSA or the Insurer, as applicable) shall perform all other inspection necessary to permit the issue of a certificate of inspection.

For further guidance on inspection refer to the National Board Inspection Code ANSI/NB-23, Part 2.

Original Document Signed

Director,
Boilers & Pressure Vessels Safety and Operating Engineers