

# PROFESSIONAL DEVELOPMENT COURSE

PRESENTED BY ANRIC Enterprises Inc. [www.anric.com](http://www.anric.com)

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## ASME B31.1 MATERIALS, FABRICATION, AND EXAMINATION

### OBJECTIVE:

The objective of this course is to provide participants with an understanding of the existing materials, fabrication, and inspection/examination rules of B31.1 and their basis. There will be references, as appropriate, to the design requirements as they relate to these rules. Emphasis will be given to the importance of building the piping systems to the B31.1 Code and the design specification. The course will also cover the basis for the rules by discussing how materials respond to fabrication processes. Fabrication (particularly welding) and examination processes and their implementation and control will be discussed. Slides and videos will be shown to emphasize the discussion points. The course will also provide ample opportunity to discuss issues raised by the participants. An overview of the Canadian requirements for pressure retaining systems will be presented and the fact that B31.1 is a legal requirement in Canada will be discussed.

### CONTENTS: A two day course consisting of the following:

Day 1 - Course Content	Day 2 - Course Content
<ul style="list-style-type: none"><li>• Introduction to B31.1</li><li>• <b>Impact of Provincial Laws</b><ul style="list-style-type: none"><li>– Hierarchy of documents</li><li>– Role of the regulator (CNSC - nuclear and TSSA - non-nuclear)</li><li>– Application of N285.0 and B51</li><li>– Use of B31.1</li></ul></li><li>• <b>Materials</b><ul style="list-style-type: none"><li>– Chapter III rules for acceptability of materials</li><li>– Chapter IV rules for acceptable standard components</li><li>– Materials selection</li></ul></li><li>• <b>Metallurgy of Steels</b><ul style="list-style-type: none"><li>– Structure</li><li>– Alloying</li><li>– Hardenability</li><li>– Effect of welding</li><li>– Residual stresses</li></ul></li></ul>	<ul style="list-style-type: none"><li>• <b>Fabrication</b><ul style="list-style-type: none"><li>– Chapter V Rules for Fabrication</li><li>– Design Assumptions</li><li>– Special processes<ul style="list-style-type: none"><li>• Welding &amp; brazing</li><li>• Bending &amp; forming</li><li>• Preheat &amp; PWHT</li></ul></li></ul></li><li>• <b>Fabrication</b><ul style="list-style-type: none"><li>– Stamping</li><li>– Assembly</li></ul></li><li>• <b>Welding Qualification</b><ul style="list-style-type: none"><li>– Section IX Overview</li></ul></li><li>• <b>Inspection, Examination &amp; Testing</b><ul style="list-style-type: none"><li>– Inspection<ul style="list-style-type: none"><li>• By owner</li><li>• By authorized inspector</li></ul></li><li>– Examination<ul style="list-style-type: none"><li>• Visual</li><li>• Penetrant</li><li>• Magnetic particle</li><li>• Radiography</li><li>• Ultrasonic</li></ul></li><li>– Testing<ul style="list-style-type: none"><li>• Hydrostatic</li><li>• Other methods</li></ul></li></ul></li></ul>

### WHO SHOULD ATTEND:

This course is excellent training for persons whose work activity requires them to review the B31.1 Code for Power Piping, particularly in the materials, fabrication, and examination/inspection areas. It is targeted at the personnel who are responsible for meeting the design requirements of the Code and of the design specifications while actually building the piping systems. Designers and engineers responsible for the design of the piping systems would also find this course useful. Persons involved in the above work in both the fossil or the nuclear power industry as well as those that are working on industrial or institutional power piping systems would also find this course useful. It will enhance their understanding of what is behind the various requirements and enable them to conform more readily to these requirements. The course will be useful to the people in the many disciplines that are required to understand and implement Code requirements. The people in these disciplines include construction managers, designers, engineers, fabrication supervisors, inspectors, and maintenance personnel.

### EXPECTATIONS:

Course participants with adequate experience will have attained the following by the end of the course:

1. An understanding of the B31.1 Rules concerning materials, fabrication, and inspection/examination.
2. An understanding of the basis for these rules.
3. A basic knowledge of how steels react to fabrication processes.
4. A basic knowledge of how fabrication special processes are qualified and controlled.
5. An understanding of the rules for inspection, examination, and testing.
6. A basic knowledge of typical nondestructive examination processes.

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