

# Requirements for the safe operating envelope of nuclear power plants



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*In addition to the members of the Subcommittee, the following made valuable contributions to the development of this Standard:*

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# Preface

This is the first edition of CSA N290.15, *Requirements for the safe operating envelope of nuclear power plants*.

This Standard provides requirements for the definition, implementation, and maintenance of the safe operating envelope at nuclear power plants. In addition, guidance material for existing CANDU nuclear power plants has been provided in [Annex A](#) to support the requirements.

Users of this Standard are reminded that the design, manufacture, construction, commissioning, operation, and decommissioning of nuclear facilities in Canada are subject to the provisions of the Nuclear Safety and Control Act and its supporting Regulations.

This Standard has been prepared by the Subcommittee on Requirements for Safe Operating Envelope of Nuclear Power Plants, under the jurisdiction of the Technical Committee on Reactor Control Systems, Safety Systems, and Instrumentation for Nuclear Power Plants and the Strategic Steering Committee on Nuclear Standards.

August 2010

## Notes:

- (1) Use of the singular does not exclude the plural (and vice versa) when the sense allows.
- (2) Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.
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# N290.15-10

## ***Requirements for the safe operating envelope of nuclear power plants***

### **0 Introduction**

#### **0.1 General**

The licensing of a nuclear power plant requires a detailed safety evaluation to demonstrate its safe operation.

Since the power reactor operating licence requires that operation of the facility conforms with this safety evaluation, the underlying assumptions used in the analysis become a key element of the essential requirements for safe plant operation.

The set of limits and conditions associated with these essential safety requirements forms the safe operating envelope (SOE). Inclusion in the SOE is based on those aspects of safe plant operation for which the operator is responsible to demonstrate compliance and to take corrective action in cases of non-compliance.

#### **0.2 Objectives**

A successfully implemented and managed SOE program ensures that

- (a) the SOE, as expressed in terms of the limits and conditions that govern plant operation in compliance with the safety analysis, is clearly, completely, and consistently defined, and fully reflected in the documentation that governs plant operation;
- (b) the SOE and the basis for its derivation are contained in a set of documentation that can be readily referenced by users requiring an understanding of the basis for safe plant operation;
- (c) a compliance framework has been established that avoids plant operation outside of the SOE, ensures timely detection of plant operation outside of the SOE, and specifies appropriate and timely corrective actions to restore plant operation to within the SOE; and
- (d) the SOE is kept up to date within the context of other processes.

#### **0.3 Benefits**

The benefits of achieving these objectives can include enhanced

- (a) safety of plant operation and nuclear safety, by assuring that important safety analysis parameters are recognized and are monitored and controlled accordingly;
- (b) change control process, by improving the documented baseline against which the safety implications of changes or unplanned events can be assessed;
- (c) safety culture, by promoting more widespread awareness, understanding, and acceptance of the basis for the constraints imposed on safe plant operation;
- (d) generation performance and economics, by removing ambiguity around the constraints imposed on safe plant operation; and
- (e) regulatory relationship, by allowing compliance with the constraints imposed on safe plant operation to be demonstrated rigorously.

### **1 Scope**

#### **1.1**

This Standard outlines a consensus approach to defining, implementing, and maintaining the safe operating envelope (SOE) at operating nuclear power plants.