

# Module 11

## CHANGE CONTROL

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### OBJECTIVES:

After completing this module you will be able to:

- CRO 11.1 Define the terms *change* and *change control* in the context of NPP operations. Distinguish between temporary and permanent *changes*, and how they are documented. ↔ Page 2
- CRO 11.2 State three advantages of strict procedural controls on making *changes* at a NPP. ↔ Page 2
- 11.3 List and give the rationale for five concerns reviewed by an SS before approving the field installation of a *change*. ↔ Page 3
- CRO 11.4 State two responsibilities of the Control Room Operator (CRO) upon implementation of a *change*. ↔ Page 4

### THE NEED FOR RIGOROUS CHANGE CONTROL AT A NPP

During commissioning and operation, changes are frequently made to NPP equipment and documentation. Such changes can be initiated by Design or Operations staff.

All changes must be analyzed and approved as safe. Because of the risk of invalidating the safety analysis by introducing unanalyzed changes, the change approval process is necessarily rigorous.

All permanent changes must be approved by the Operations Manager. In the case of special safety systems, even temporary changes must be approved by the Operations Manager. Prior AECB approval is also required for all changes which impact the assumptions on which the Reactor Operating License was granted. The approval requirements are given in the OP&P.

Obj. 11.1 ⇔

**Definitions:** In the context of NPP operations, a *change* is any alteration to systems, procedures, work practices, or station organization. Changes may be temporary or permanent.

*Change control* is the process by which *changes* are proposed, evaluated to be safe, approved, scheduled, implemented, and documented.

## Temporary Versus Permanent Changes

*Temporary changes* are those changes which will eventually be reversed, to restore original conditions. Temporary changes are documented by jumper records or Operating Memos, and are not normally featured in permanent station documents. The following are examples of documents subject to temporary changes:

- Calibration specifications
- Mechanical or control drawings
- System flow sheets
- Operating procedures.

*Temporary changes* are usually installed to accommodate temporary conditions, such as equipment failure, or the need to facilitate maintenance or testing by placing a device in an off-normal state. Jumpers are also used to document an intermediate state between the initial and final states, during the installation of a permanent change.

A *permanent change* is any change which is to remain installed indefinitely, and is documented by revising standard station documentation.

## Why Changes Must Be Procedurally Controlled

Obj. 11.2 ⇔

Due to the complexity of the plant organization and systems, and interrelationships between systems, every change must be scrutinized, no matter how trivial it may appear. There are three reasons why changes must be procedurally controlled:

### 1. *To facilitate configuration management*

In other words, to keep the physical plant consistent with the *paper plant*, as described in the licensing documents, design manuals, flow sheets and data bases. Discrepancies between field conditions and supporting documents can result in operating and maintenance errors, as well as misinterpretation of system

surveillance data. Procedural control ensures that station documents are revised, flagged, or marked-up to reflect changes.

## 2. *To maintain the integrity of the safety analysis*

If a change to equipment or procedures invalidates the safety analysis assumptions, then unsafe operation may result—eg, the accident risk may have increased, or the capability of mitigating systems might be impaired under accident conditions. Procedural control of changes ensures that sufficient analysis is performed to avoid such consequences.

## 3. *Compliance with legal codes and standards*

Much industrial operating experience with pressurized piping and pressure vessels has been captured in the ASME and ANSI codes, and CSA standards. Applying these codes and standards to system design provides a very high level of assurance that the system components will not fail during the plant's life cycle. On the other hand, failure to comply with applicable codes and standards could result in injury to workers or the public. Therefore, procedural control of plant changes is required to ensure that design changes comply with these codes and standards.

## Shift Supervisor Change Control Responsibility

The SS is responsible for approving and controlling the field installation of all jumpers and permanent changes. The SS reviews changes for the following concerns prior to approving implementation:

### 1. *Risk versus benefit*

The benefits of making the proposed change should outweigh the risks to safety and production. This is not to suggest that the SS does a formal cost:benefit analysis, but rather that he would ask himself such questions as, “What are the risks of doing this job? Have we got into trouble doing similar work in the past? Why is this change necessary? What are the consequences of not doing the work? Are unit conditions conducive to doing this job?”

### 2. *Effect on capability to control, cool, and contain*

This review pertains to both normal and abnormal operations, and must determine if the change will jeopardize the capability to *control*, *cool* and *contain* under the current unit conditions. The SS must be satisfied that the change neither violates the Operating License, nor invalidates any safety analysis assumptions.

⇔ Obj. 11.3

### 3. *Adequate operating instructions and documentation*

The SS must ensure that procedures exist, which will enable staff to operate and maintain the station safely under normal and emergency conditions after the proposed change is implemented. The SS must also ensure that the change is adequately documented, in order to facilitate good configuration management.

### 4. *Training requirements*

In addition to ensuring that properly qualified staff are assigned to install the change, the SS must determine whether the scope and complexity of the change will require retraining of personnel.

### 5. *Testing and verification*

Specified tests and checks must provide assurance that the installed change is properly documented, and that specified performance criteria are met. Routine tests and acceptance criteria must also be specified, as required.

### 6. *Reporting requirements*

In some cases, an agency or individual must be notified of the change to ensure compliance with regulatory constraints, or to initiate some follow-up action.

### 7. *Approvals and authorizations*

The SS ensures that managerial and regulatory approvals are obtained, as required, before giving his own approval to implement the change.

## **Control Room Operator Change Control Responsibility**

Obj. 11.4 ↔

The CRO reviews and approves implementation of a change via the work authorization process. When satisfied that the change is operationally acceptable, the CRO issues the work authorization. After implementation, the CRO should log the change, ensure that he is familiar with any changes to operating procedures, feature the change in the shift turnover to the incoming CRO, and notify the SS promptly of any unanticipated operational effects.

## **SUMMARY OF THE KEY CONCEPTS**

- A *change* is any alteration to a NPP's systems, procedures, work practices, or organization. A *temporary change* is one which will eventually be reversed to

restore the original conditions. A *permanent change* is one which will remain installed indefinitely.

- **Change Control** is the process whereby proposed NPP changes are evaluated to be safe, approved, scheduled, implemented and documented.
- Changes must be procedurally controlled to facilitate good configuration management, to protect the integrity of the safety analysis, and to ensure compliance with applicable design codes and standards.
- The Shift Supervisor reviews changes for the following concerns:
  - benefits versus risks
  - the effect on capability to control, cool, and contain
  - adequacy of operating instructions and other documentation
  - training requirements
  - testing and verification
  - reporting requirements
  - approvals and authorizations.
- CROs will document and report any concerns regarding changes, ensure they are familiar with any changes in system operation, log the implementation, and ensure that the incoming CRO is apprised of the change at shift turnover.

## ***ASSIGNMENT***

1. Carefully prepare detailed answers to the Module 11 learning objectives.
2. List and explain the rationale for five examples of change control procedures at your station.

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