



Department of Energy

Washington, DC 20585

February 5, 2004

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, D.C. 20004

Dear Mr. Chairman,

I am pleased to transmit to you training materials committed to in the Department of Energy's (DOE) Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls*.

Commitment 4.3 of the referenced Implementation Plan is:

EH will develop appropriate training materials for contractor personnel responsible for selecting, developing, and implementing and maintaining critical administrative controls. In addition, EH will develop training materials for DOE safety basis reviewers and DOE oversight personnel that will describe methods for identifying the critical administrative controls, methods of assuring their dependability and effectiveness, and how they should be treated in TSRs [Technical Safety Requirements].

The training materials consist of six modules. The first five modules are common to both contractor and DOE personnel because the topics are the same for both audiences. The sixth module focuses on DOE review and oversight responsibilities. Taken together, these modules satisfy Implementation Plan Deliverables 4.3.1 and 4.3.2.

It should be noted that these training materials are based in part on the draft DOE Technical Standard, DOE-STD-XXXX-03, *Specific Administrative Controls*, that is currently under DOE review and comment. If necessary, appropriate updates of these training materials will be made after resolution of the comments and issuance of the final Technical Standard.

The training modules are being supplied to the National Nuclear Security Administration and the Office of Environmental Management for their use in conducting the training that is responsive to Commitment 4.4 of the Implementation Plan.

Please contact me at 202-586-6151 if you have questions.

Sincerely,

A handwritten signature in cursive script that reads "Beverly A. Cook".

Beverly A. Cook
Assistant Secretary
Environment, Safety and Health

Enclosures



**U. S. Department of Energy
Environment, Safety and Health (EH)
Office of Nuclear and Facility Safety Policy**

*Specific Administrative Controls
Training Materials*



Washington, D.C. 20585

January 31, 2004

COURSE DESCRIPTION

Purpose: To provide training on Specific Administrative Controls (ACs) to contractor and DOE staff who support preparation/review of facility nuclear safety basis documentation. Participants will develop an understanding of the new Technical Standard on Specific ACs, including identification, implementation, maintenance and evaluation of specific ACs.

Description: The Specific AC Course is structured around the new Technical Standard on Specific ACs. The course was designed for both contractor and DOE personnel and consists of six modules. Modules one through five are designed for both contractor and DOE staff. These modules cover identifying, implementing and maintaining Specific ACs. The sixth module is designed for DOE staff and focuses on the evaluation of requirements for Specific ACs. The course also addresses how Specific ACs are implemented through Technical Safety Requirements.

The course does not support site/facility-specific training on Specific ACs. EH anticipates that individual sites and facilities will provide further instruction on the specifics of implementation of Specific ACs at the respective sites.

Length: One day

Target

Audience: The course is designed for both contractor and DOE personnel supporting nuclear facility safety basis documentation development, review, and approval.

Logistics: The participating organization is responsible for reproduction of Specific AC training materials provided in advance by the Office of Nuclear and Facility Safety Policy. They must provide a classroom and supporting audio/visual equipment.

COURSE OUTLINE

Module 1 – Introduction (1 hour)

- Overview of Specific ACs
- Background
- New DOE Technical Standard on Specific ACs
- Relationship of the New Standard to 10 CFR 830 and Supporting DOE Directives
- Specific ACs as a Part of the Ensemble of Hazard Controls Identified in the DSA

Module 2 – Identifying, Implementing and Maintaining Specific ACs (2 hours)

- Criteria for Identification of Specific ACs
- Requirements for Derivation and Documentation of Specific ACs
- Design Requirements Related to the Development and Implementation of Specific ACs
- Improving the Dependability of Controls
- Improving the Effectiveness of Specific ACs
- Factors that Can Improve or Degrade Human Performance
- Impact of a Facility's Safety Culture on the Dependability of Specific ACs

Module 3 – Treatment of Specific ACs in TSRs (1 hour)

- Treatment of Safety Controls Covered by Safety Management Programs
- Implementing Specific ACs as LCOs
- Implementing Specific ACs as Specific Directive Action ACs
- MAR Limits as ACs
- Modifications to the TSRs to Support Specific ACs

Module 4 – Specific AC Training Requirements (0.5 hours)

- 10 CFR 830, Nuclear Safety Management, Requirements
- DOE O 5480.20A, Personnel Selection, Qualification and Training Requirements for DOE Nuclear Facilities
- Training Implementation Matrices
- Key Points to be Addressed for Training on Specific ACs
- Use of DOE-STD-1070-94, DOE Standard Guidelines for Evaluation of Nuclear Facility

Module 5 – Specific AC Violation Reporting and Failure Analysis (0.5 hours)

- Identifying Violations of Specific ACs
- Sources of Requirements for Reporting Violations of Specific ACs

- Sources of Guidance for Investigating and Reporting Violations of Specific ACs
- Notification Requirements for Violations of Specific ACs
- Causal and Failure Analysis for Violation of Specific ACs
- Guidance for Causal and Failure Analysis for Violation Specific ACs

Module 6 – Evaluation of Specific AC Requirements (1 hour)

- Review Criteria for Identification of Specific ACs
- Review Criteria for Documentation of Specific ACs in the DSA
- Review Criteria for Implementation of Specific ACs Through the TSRs
- Review Criteria for Training and Qualification of Operations Personnel on Specific ACs
- Review Criteria for Specific AC Violation Reporting and Failure Analysis

Specific Administrative Controls

Module 1 – Introduction

Lesson Plan

FOR TRAINING USE ONLY

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SPECIFIC ADMINISTRATIVE CONTROLS

Module 1 – Introduction

I. INSTRUCTOR PREPARATION

- A. Qualified nuclear safety basis document preparer/reviewer
- B. Qualified in the preparation of TSRs
- C. Intimately familiar with the SAC and 3009 Standards and the DSA and TSR IGs

II. INSTRUCTIONAL AIDS

A. Classroom Equipment

- Whiteboard
- Whiteboard Markers
- Computerized Projection System Using MS PowerPoint or an Overhead Projector
- Projection Screen

B. Transparencies TP-1-1 through TP-1-10

C. Handouts

1. Slides for Module 1
2. Technical Standard for Specific ACs

III. REFERENCES

- A. 10 CFR 830, Nuclear Facility Safety Management
- B. DOE-STD-3009, Preparation Guide for U.S. Department of Energy Non-Reactor Nuclear Facility Documented Safety Analyses

IV. OBJECTIVES

COURSE OBJECTIVE

Upon completion, the student will understand and be able to apply the requirements for developing, implementing, maintaining, and evaluating Specific Administrative Controls.

MODULE 1 OBJECTIVES

- 1.1 Explain why a new classification of administrative control is needed to ensure that the safety bases for DOE nuclear facilities is adequately established and maintained.
- 1.2 Define the term, Specific AC.
- 1.3 Explain the relationship of the Technical Standard on Specific ACs to 10 CFR 830 and DOE-STD-3009, and other “safe harbors” identified in 10 CFR 830.

SPECIFIC ADMINISTRATIVE CONTROLS

Module 1 – Introduction

- 1.4 Discuss DOE's approach to using Specific ACs as part of the ensemble of hazard controls identified in the DSAs.

SPECIFIC ADMINISTRATIVE CONTROLS

Module 1 – Introduction

I. INTRODUCTION

TP-1-1

II. OBJECTIVES

A. Upon completion of this course your management wants you to: **understand and be able to apply the requirements and expectations for developing, implementing, maintaining, and evaluating Specific Administrative Controls.**

TP-1-2

B. Upon completion of this Module you should be able to:

TP-1-3

- Explain why a new classification of administrative control is needed to ensure that the safety bases for DOE nuclear facilities is adequately established and maintained.
- Define the term Specific AC.
- Explain the relationship of the new Technical Standard on Specific ACs to 10 CFR 830, DOE-STD-3009 and the other DSA safe harbors identified in 10 CFR 830.
- Discuss DOE's approach to using Specific ACs as part of the ensemble of hazard controls.

III. PRESENTATION

A. Overview

TP-1-4

1. What are Specific ACs?

ACs that are intended to provide preventive and/or mitigative functions for specific potential accident scenarios, and which have safety importance equivalent to engineered controls that would be classified as Safety Class (SC) or Safety Significant (SS) if the engineered controls were available and selected.

SPECIFIC ADMINISTRATIVE CONTROLS

Module 1 – Introduction

2. Why are Specific ACs needed?

- a. To improve the dependability of these controls, and
- b. To enhance their availability to perform specific safety functions when needed commensurate with their safety importance.

TP-1-5

B. Background

TP-1-6

1. DNFSB Rec. 2002-3

1. *“DOE should promulgate a set of requirements for safety-class and safety-significant administrative controls to establish appropriate expectations for the design, implementation, and maintenance of these important safety controls. The requirements should address the following at a minimum:*

- (a) Specific design attributes to ensure effectiveness and reliability;*
- (b) Specific TSRs and limiting conditions of operation;*
- (c) Specific training and qualifications to ensure that the appropriate facility operators, maintenance and engineering personnel, plant management, and other staff properly implement each control;*
- (d) Periodic re-verification that each control remains effective; and*
- (e) Root cause and failure analyses, similar to those required upon failure of an engineered system.*
- (f) DOE should ensure that all existing administrative controls that serve the function of a safety-class or safety-significant control are evaluated against these new requirements and upgraded as necessary and appropriate to meet DOE’s expectations.”*

SPECIFIC ADMINISTRATIVE CONTROLS

Module 1 – Introduction

- | | |
|--|---------------|
| <p>2. DOE IP 2002-3 – Plan includes:</p> <ul style="list-style-type: none">1) <i>“Finalizing the assessment of existing requirements and guidance;</i>2) <i>Consolidating and clarifying existing DOE rule guidance and standards to ensure that contractors consistently develop, implement, and maintain critical administrative controls consistent with their importance to safety;</i>3) <i>Consolidating and clarifying the guidance to federal employees for reviewing existing safety bases to assure proper implementation of DOE’s requirements;</i>4) <i>Ensuring that critical administrative controls in use in the DOE complex meet Departmental expectations;</i>5) <i>Strengthening the DOE processes that ensure the effectiveness and dependability of administrative controls; and</i>6) <i>After completion of implementation reviews and use of interim guidance, revising as necessary Part 830 safe harbor methodologies to ensure continued proper interpretation and application of DOE requirements.”</i> | <p>TP-1-7</p> |
| <p>3. New DOE Technical Standard on Specific Administrative Controls:</p> <ul style="list-style-type: none">a. Addresses guidance intended to apply to Administrative Controls that are intended to provide preventive and/or mitigative functions for specific potential accident scenarios, and which have safety importance equivalent to engineered controls that would be classified as Safety Class (SC) or Safety Significant (SS) if the engineered controls were available and selected.b. The Standard represents an approved methodology for addressing Specific ACs. Contractors may choose to use another methodology and provide | <p>TP-1-8</p> |

SPECIFIC ADMINISTRATIVE CONTROLS

Module 1 – Introduction

justification for using a different methodology.

4. Relationship of new Standard on Specific ACs to 10 CFR 830, DOE-STD-3009 and other safe harbors listed 10 CFR 830.

TP-1-9

- a. The new Standard should be used to comply with all DOE methods for DSAs and their associated TSRs for compliance with 10 CFR 830, when developing and implementing Specific ACs.
- b. It complements and expands on guidance contained in Nuclear Safety Technical Position 2003-1, *Use of Administrative Controls for Specific Safety Functions*

5. Specific ACs as a part of the ensemble of hazard controls identified in the DSA.

TP-1-10

- a. DOE prefers SSCs over ACs, as ACs introduce more opportunity for human error or neglect
- b. The new Standard requires that Specific ACs be treated in a similar fashion to safety SSCs regarding design, verification, TSRs, training, and failure analysis.
- c. Based on the new Standard guidance, it may or may not be more cost effective and safer to employ SSCs vs. ACs

IV. CONCLUSION

A. Review Objectives



SPECIFIC AC COURSE

SPECIFIC ADMINISTRATIVE CONTROLS

Introduction

What are Specific ACs and why do we need them?

10104
Module 1

TP-1-1



SPECIFIC AC COURSE

Course Objective

Upon completion, the student will understand and be able to apply the requirements for developing, implementing, maintaining, and evaluating Specific Administrative Controls.

10104
Module 1

TP-1-2



SPECIFIC AC COURSE

Module 1 Enabling Objectives

- Explain why a new classification of administrative control is needed to ensure that the safety bases for DOE nuclear facilities is adequately established and maintained.
- Define the term Specific AC.
- Explain the relationship of the new Technical Standard on Specific ACs to 10 CFR 830, DOE-STD-3009, and the other DSA safe harbors identified in 10 CFR 830.
- Discuss DOE's approach to using Specific ACs as part of the ensemble of hazard controls.

10104
Module 1

TP-1-3



SPECIFIC AC COURSE

What are Specific ACs?

- Administrative Controls that are:
 - selected to provide preventive and/or mitigative functions for specific potential accident scenarios, and
 - which have safety importance equivalent to engineered controls that would be classified as Safety Class (SC) or Safety Significant (SS) if the engineered controls were available and selected.

10104
Module 1

TP-14



SPECIFIC AC COURSE

Why are Specific ACs needed?

- DOE recognizes a need to:
 - Ensure the dependability of these controls, and
 - Enhance their availability to perform specific safety functions when needed, commensurate with their safety importance.

10104
Module 1

TP-15



SPECIFIC AC COURSE

Background

- DNFSB Recommendation 2002-3
- DOE Implementation Plan 2002-3

10104
Module 1

TP-16



SPECIFIC AC COURSE

DOE Implementation Plan 2002-3 includes:

- Finalizing the assessment of existing requirements and guidance;
- Consolidating and clarifying existing DOE rule guidance and standards to ensure that contractors consistently develop, implement, and maintain critical administrative controls consistent with their importance to safety;
- Consolidating and clarifying the guidance to federal employees for reviewing existing safety bases to assure proper implementation of DOE's requirements;
- Ensuring that critical administrative controls in use in the DOE complex meet Departmental expectations;
- Strengthening the DOE processes that ensure the effectiveness and dependability of administrative controls; and
- After completion of implementation reviews and use of interim guidance, revising as necessary Part 830 safe harbor methodologies to ensure continued proper interpretation and application of DOE requirements.

10104
Module 1

TP-17



SPECIFIC AC COURSE

New Technical Standard on Specific ACs

- Provides guidance intended to apply to Administrative Controls that are selected to provide preventive and/or mitigative functions for specific potential accident scenarios, and which have safety importance equivalent to engineered controls that would be classified as Safety Class (SC) or Safety Significant (SS) if the engineered controls were available and selected.

10104
Module 1

TP-18



SPECIFIC AC COURSE

Relationship of new Technical Standard to 10 CFR 830, Nuclear Safety Management

- The new Standard should be used to comply with all DOE methods for DSAs and their associated TSRs for compliance with 10 CFR 830, when developing and implementing Specific ACs.
- It complements and expands on guidance contained in Nuclear Safety Technical Position 2003-1, *Use of Administrative Controls for Specific Safety Functions*

10104
Module 1

TP-19



SPECIFIC AC COURSE

Specific ACs as a part of the ensemble of hazard controls identified in the DSA.

- SSCs are preferred over ACs
 - ACs introduce possibility of human error or neglect
- The new Standard requires that Specific ACs be treated in a similar fashion to safety SSCs regarding design, verification, TSRs, training, and failure analysis.
- May or may not be more cost effective and safer to employ ACs vs. SSCs.

Specific Administrative Controls

Module 2 –Identifying, Implementing and Maintaining SACs

Lesson Plan

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SPECIFIC ADMINISTRATIVE CONTROLS

Module 2 - Identifying, implementing and Maintaining SACs

I. INSTRUCTOR PREPARATION/QUALIFICATION

- A. Qualified nuclear safety basis document preparer/reviewer
- B. Qualified in the preparation of TSRs
- C. Intimately familiar with the SAC and 3009 Standards and the DSA and TSR IGs.

II. INSTRUCTIONAL AIDS

A. Classroom Equipment

- Whiteboard
- Whiteboard Markers
- Computerized Projection System Using MS PowerPoint or an Overhead Projector
- Projection Screen

B. Transparencies TP-2-1 through TP-2-22

C. Video Tapes

NONE

D. Handouts

1. SAC Standard, Safety Management Rule
2. Transparencies for Module 3 (3 per page with room for notes)

III. REFERENCES

- A. Nuclear Safety Management Rule, 10 CFR 830
- B. DOE O 420.1
- C. DOE-STD-3009-94, *CN2 Preparation Guide For U.S. Department Of Energy Nonreactor Nuclear Facility Documented Safety Analyses*
- D. DOE G 421.1-2, *Implementation Guide For Use in Developing Documented Safety Analyses To Meet Subpart B Of 10 CFR 830*
- E. DOE G 423.1-1, *Implementation Guide For Use in Developing Documented Safety Analyses To Meet Subpart B Of 10 CFR 830*
- F. DOE O 5480.19, *Conduct of Operations*, especially the Attachment to the Order, chapters X, Independent Verification, XI, Logkeeping, and XVI, Operations Procedures
- G. DOE-STD-1092, Change Notice No. 1, *Writer's Guide for Technical Procedures*, December 1998.
- H. *Excellence in Human Performance*, INPO, September 1997
- I. "Environmental Management Guidelines and Lessons Learned for Nuclear Facility Safety Control Selection and Implementation," dated April 2003.
- J. *Guidelines for the Conduct of Operations at Nuclear Power Stations*, Institute of Nuclear Power Operations, INPO 01-002, May 2001

SPECIFIC ADMINISTRATIVE CONTROLS

Module 2 - Identifying, implementing and Maintaining SACs

- K. *Putting the Human into Hazard Assessment*, Helen Rycraft, BNFL, a paper presented at the 2003 annual meeting of the Energy Facility Contractors Group (EFCOG) Safety Analysis Working Group (SAWG), Salt Lake City, June 2003
- L. Memorandum and its Attachment from the Assistant Secretary for Environmental Management, subject “*Environmental Management Guidelines and Lessons Learned for Nuclear Facility Safety Control Selection and Implementation*,” EM Secretarial Letter dated May 20, 2003

Additional Resources:

1. Key Practical Issues In Strengthening Safety Culture", IAEA, INSAG-15, 2002.
2. NUREG/CR-6751, *The Human Performance Evaluation Process: A Resource for Reviewing the Identification and Resolution of Human Performance Problems*.

IV. OBJECTIVES

MODULE 2 (TERMINAL) OBJECTIVE

Explain how Specific ACs are identified, implemented, and maintained.

MODULE 2 (ENABLING) OBJECTIVES:

- Discuss the process for identifying administrative controls during development of the Documented Safety Analysis.
- State the criteria used to identify an administrative control as a Specific AC.
- Compare and contrast general ACs with Specific ACs.
- State the specific requirements for documentation of Specific ACs in the DSA.
- Discuss the application of the principles of defense-in-depth, as described in DOE O 420.1, to the ensemble of hazard controls, including Specific ACs
- Describe the following concepts as they relate to development of Specific ACs:
 - ◆ Defense in depth
 - ◆ Redundancy
 - ◆ Independency
 - ◆ Diversity
- Explain the process for verifying and validating the effectiveness of Specific ACs, both prior to and after implementation.
- Identify and explain three important measures used to ensure and improve the dependability of Specific ACs
- Identify five worker performance factors that impact the operator performance for Specific ACs.
- Explain the impact of a facility’s safety culture on the dependability of Specific ACs, and identify the basic principles used to improve the safety culture

SPECIFIC ADMINISTRATIVE CONTROLS

Module 2 - Identifying, Implementing and Maintaining Specific ACs

I	INTRODUCTION TO MODULE 2	TP-2-1
II.	OBJECTIVES	TP-2-2 through 2-5
A.	Review Objectives	
III.	PRESENTATION	
A.	Our approach to the task - Trainer should briefly touch on topical outline with emphasis on most important items to be covered:	
1.	Identification of Specific ACs	
2.	Improving effectiveness and dependability	
	Note that Section 2.1 in the Standard is a short "high-level" review of requirements for identifying, implementing, and maintaining safety SSCs as an illustration of DOE expectations for Specific ACs	
B.	Identify Administrative Controls	TP-2-6
1.	Existing guidance from 3009 and the TSR IG	
2.	Sources of Requirements for ACs	TP-2-7
	NOTE: Trainer should add and be familiar with the content of site specific requirements (Site/facility policies and manuals of practice)	
C.	Sources of Guidance for ACs	TP-2-8
	NOTE: Trainer should add and be familiar with the content of site specific guidance (Site/facility guides and procedures)	
D.	Criteria used to identify an administrative control as a Specific AC:	TP-2-9
	By definition: If an administrative control:	
◆	is explicitly identified in the hazard analysis as a control needed to prevent or mitigate an accident scenario, and	
◆	has a safety function that would be safety significant or safety class if the function were provided by an SSC, or	
◆	is required to complete the safety function of a safety class or safety significant SSC,	

SPECIFIC ADMINISTRATIVE CONTROLS

Module 2 - Identifying, Implementing and Maintaining Specific ACs

it is a Specific AC.	
E. Identifying Specific administrative controls	TP-2-9 & 2-10
TP-2-10 provides additional helpful criteria in identifying the possibility of a Specific AC.	
NOTE: DOE suggests creating a list of all ACs classified as Specific ACs.	
F. General ACs vs. Specific ACs	TP-2-11
1. Specific ACs	
2. General ACs include commitments to Safety Management Programs and other administrative measures such as staffing, etc.	
G. Identifying, Implementing, and Maintaining Safety SSCs	TP-2-12 & 2-13
These two viewgraphs simply review the concept of Identifying, Implementing, and Maintaining safety SSCs and their associated TSRs as a preview of the parallel (but not identical) to requirements for Identifying, Implementing, and Maintaining Specific ACs.	
H. Requirements for Derivation and Documentation of Specific ACs	TP-2-14
It is important to note that STD 3009 and the 830 Rule Implementation Guides do not describe Specific ACs, per se. Therefore, the draft SAC Standard helps discuss how existing nuclear safety requirements apply to them and how they can be satisfied.	
I. Design requirements related to development and implementation of Specific ACs	TP-2-15
Redundant, independent, and diverse hazard controls are essential to ensuring that exposure to a high consequence hazard does not come about due to failure of a single barrier. Application of this concept to Specific ACs, as part of the ensemble is particularly important, as ACs are generally regarded as less dependable due to the introduction of potential human error.	
J. Documenting Specific ACs in the TSR	TP-2-16
Two methods are identified. Module 3 will cover the methods in more detail	

SPECIFIC ADMINISTRATIVE CONTROLS

Module 2 - Identifying, Implementing and Maintaining Specific ACs

K. Describe the following concepts as they relate to development of controls:	TP-2-17
◆ Defense in depth	
◆ Redundancy	
◆ Independency	
◆ Diversity	
L. Improving the Dependability of Controls	
Note that these are general design principles (identified in 420.1 and 3009) that apply to the ensemble of controls.	
M. Improving Effectiveness of Specific ACs	TP-2-18
The trainer and the trainee need to understand that the concepts of verification and validation are distinct processes that are essential to ensuring that a Specific AC will effectively accomplish its required safety function and maintain its ability to perform its required function.	
TP-2-18 and 19 highlight some of the most important factors that can be used to improve (TP-2-18) or degrade (TP-2-19) worker performance	TP-2-19 & 20
N. Impact of a facility's safety culture on the dependability of Specific ACs, and identify the basic principles used to improve the safety culture	
These principles highlight the common features of organizations with a strong safety culture	TP-2-21
O. Because a Specific AC has a safety function as important as a safety SSC, it's function must be protected as carefully as a safety SSC	TP-2-22
IV. CONCLUSION	TP-2-23
The trainer needs to be familiar with the module content and be prepared to return to specific viewgraphs for clarity of discussion	
A. Review Objectives	



SPECIFIC AC COURSE

**Identifying, Implementing, and
Maintaining Specific ACs**

10104
Module 2

TP-21



SPECIFIC AC COURSE

Module 2 Terminal Objective

Explain how Specific ACs are identified,
implemented, and maintained.

10104
Module 2

TP-22



SPECIFIC AC COURSE

Module 2 Enabling Objectives

- Discuss the process for selecting administrative controls during development of the Documented Safety Analysis.
- State the criteria used to identify an administrative control as a Specific AC.
- Compare and contrast general ACs with Specific ACs.
- State the specific requirements for documentation of Specific ACs in the DSA.
- State the principle of defense in depth for nuclear facilities as described in DOE O 420.1, and relate this principle to requirements to development and implementation of Specific ACs as part of the ensemble of hazard controls.

10104
Module 2

TP-23



SPECIFIC AC COURSE

Module 2 Enabling Objectives (Continued)

- Describe the following concepts as they relate to development of the ensemble of hazard controls, including Specific ACs:
 - Redundancy
 - Interdependency
 - Diversity
- Explain the process for verifying and validating the effectiveness of Specific ACs, both prior to and after implementation.

10104
Module 2

TP-24



SPECIFIC AC COURSE

Module 2 Enabling Objectives (Continued)

- Explain why Specific ACs are inherently less dependable than safety SSCs.
- Identify the five primary factors that impact the dependability of Specific ACs.
- Identify and explain the measures used to ensure and improve the dependability

10104
Module 2

TP-25



SPECIFIC AC COURSE

Identifying Administrative Controls

- DOE-STD-3009-94 addresses derivation of ACs with major significance to defense in depth, or worker safety
 - Primarily related to safety management programs
 - Can include specific accident risk reduction
- DOE G 423.1-1 recognizes that ACs may be applied for risk reduction of individual accident scenarios
 - ACs should be a direct result of the DSA, but they may also result from institutional requirements
 - ACs should be considered for defense in depth
 - ACs (may) specifically state a limit or specific requirement rather than a generic safety management program

10104
Module 2

TP-26



SPECIFIC AC COURSE

Sources of Requirements for ACs

- DOE STD-XXXX-2004 SAC Draft Standard, December 2003
- DSA Rule (830.204)
- TSR Rule (830.205) plus Table 4 of the Rule
- QA Criteria (830.122)

10104
Module 2

TP-27



SPECIFIC AC COURSE

Sources of Guidance for ACs

- DOE STD-XXXX-2004 SAC Draft Standard, December 2003
- DOE G 423.1-1, *Implementation Guide For Use In Developing Technical Safety Requirements*
- DOE G 421.1-2, *Implementation Guide For Use in Developing Documented Safety Analyses To Meet Subpart B Of 10 CFR 830*
- DOE-STD-3009-94, CN2, *Preparation Guide For U.S Department Of Energy Nonreactor Nuclear Facility Documented Safety Analyses*

10104
Module 2

TP-28



SPECIFIC AC COURSE

Identifying Specific Administrative Controls during development of the Documented Safety Analysis

- All hazard controls are identified and characterized during the course of the hazards and accident analyses performed in support of the DSA.
- Some ACs that perform specific preventive or mitigative functions for accident scenarios may be identified in hazards analyses.

By definition: If an administrative control:

- is explicitly identified in the hazard analysis as a control needed to prevent or mitigate an accident scenario, and
- has a safety function that would be safety significant or safety class if the function were provided by an SSC, or
- is required to complete the safety function of a safety class or safety significant SSC,

then the AC must be designated as a Specific AC.

10104
Module 2

TP-29



SPECIFIC AC COURSE

Identifying administrative controls (continued)

Additional Criteria that may indicate the need for a Specific AC :

- The AC is the basis for validity of the hazard or accident analyses.
- The safety function of the AC is explicitly identified in the DSA as needed to prevent or mitigate an accident scenario.
- The AC has no defense-in-depth backup to prevent or mitigate an accident described in the DSA.
- ACs provide the main mechanisms for hazard control Violation of the AC is important enough to result in an immediate TSR violation.
- Violation of the AC results in an immediate TSR violation.
- The safety function of the AC could be considered for classification as safety significant or safety class if the function were provided by an SSC.
- Safety SSCs are often used to provide a similar safety function.
- The AC is used to replace a Safety SSC that has failed or been disabled.

10104
Module 2

TP-2-10



SPECIFIC AC COURSE

Distinguishing general administrative controls from Specific ACs

General Administrative Controls include:

- Safety Management Programs
- Administrative measures (eg, staffing requirements, documentation controls)

Specific ACs provide a specific safety function as identified in the DSA

NOTE: As with Safety Significant SSCs, not all ACs that call for specific actions may rise to the level of importance of safety function appropriate for Specific AC designation. DOE suggests creating a list of the Specific ACs in order to distinguish between them and those of lower significance.

10104
Module 2

TP-2-11



SPECIFIC AC COURSE

Identifying, Implementing, and Maintaining Safety SSCs

- Safety class SSCs are SSCs that have special importance with regard to protection of the public.
 - The evaluation guideline (25 rem) in DOE-STD-3009 is used to identify safety class SSCs.
- Safety significant SSCs provide additional public protection by providing multiple means of dealing with accidents (defense in depth) and to provide protection for onsite personnel.
 - The qualitative criteria of DOE-STD-3009-94, Change Notice No. 1 for worker protection (acute worker fatality or serious injury) are intended to apply to in-facility workers.
- TSRs ensure the operability of the safety SSCs and define actions to be taken if a safety SSC is not operable.
- TSRs establish limits, controls, and related actions necessary for the safe operation of a nuclear facility.

10104
Module 2

TP-2-12



SPECIFIC AC COURSE

Identifying, Implementing, and Maintaining Safety SSCs (Continued)

- **Safety Limits (SLs), Limiting Condition Statements (LCSs), and Limiting Conditions (LCOs) for Operations ensure that the operating regime is restricted to the bounds of safe operation as defined by the safety analyses.**
 - SLs are limits on important process variables needed for the facility function that, if exceeded, could directly cause the failure of one or more of the passive barriers that prevent the uncontrolled release of radioactive materials, with the potential of consequences to the public above specified evaluation guidelines.
 - LCSs define the settings on safety systems that control process variables to prevent exceeding an SL.
 - LCOs define the limits that represent the lowest functional capability or performance level of safety SSCs required to perform an activity safely.
 - SRs are used to ensure operability or availability of the safety SSCs. SRs are most often used with LCOs to periodically validate the operability of active systems or components that are subject to a limiting condition.

10104
Module 2

TP-2-13



SPECIFIC AC COURSE

Requirements for Derivation and Documentation of Specific ACs in the DSA

- All hazard controls are identified and characterized during the course of the hazards and accident analyses performed in support of the DSA
- Hazard controls should be identified on a case-by-case basis and should be graded according to the guidance in DOE-STD-3009
- The DSA required by 10 CFR 830.204 furnishes the technical basis for TSRs including specific ACs
- The DSA shall specifically describe the safety function, control description, functional requirements of the control, and the TSR controls for each Specific AC
- Descriptions of Specific ACs shall be sufficiently detailed so that a basic understanding is provided of what is controlled and why.

10104
Module 2

TP-2-14



SPECIFIC AC COURSE

The principle of defense in depth as related to development and implementation of Specific ACs

- DOE O 420.1A and DOE STD 3009 support the principle that nuclear facilities be designed with multiple layers of protection to prevent or mitigate the unintended release of radioactive materials
- Defense in depth is enhanced by including redundant, independent, and diverse hazard controls to ensure that a high consequence event does not come about due to failure of a single barrier

10104
Module 2

TP-2-15



SPECIFIC AC COURSE

Documenting Specific ACs in the TSR

Specific ACs generally have two forms:

- **Specific ACs can often be written in the format of an LCO. This format shall be used when the Specific AC is well defined, clear corrective actions are available, and conditions supporting the Specific AC can be easily surveilled**
- **A Specific "Directive Action" AC is a statement of an AC requirement that prescribes a specific action to be performed in response to an observed facility condition**

10104
Module 2

TP-2-16



SPECIFIC AC COURSE

Improving the Dependability of Controls

Defense in depth is the provision of multiple means to ensure the performance of safety functions needed to control the processes, maintain them in a safe state, and to confine and mitigate the release of radioactivity including:

- ▶ **Redundancy:** Important safety functions should not be protected by a single control.
- ▶ **Independency:** Controls should be independent of the process being controlled, and to the extent practicable they should be independent from other controls that have been credited.
- ▶ **Diversity:** refers to separate controls of a dissimilar nature.

10104
Module 2

TP-2-17



SPECIFIC AC COURSE

Improving Effectiveness of Specific ACs

- **Verification:** TSRs must be initially and periodically verified to ensure they will perform their intended safety function
- **Validation:** ensures that plant operators have sufficient time, indicators or alarms, tools, or other necessary resources to perform the task

10104
Module 2

TP-2-18



SPECIFIC AC COURSE

Improving the Dependability of Specific ACs

- **Independent Verification:** Independent verification refers to the concept of having a second, qualified operator verify the actions of a primary operator.
- **Task Feedback:** measures should be implemented that provide appropriate feedback (eg, valve position indication) to the operators that a required action has been successful.
- **Worker Dependability:**
 - Training
 - Interlocks
 - Alarms & Monitors

10104
Module 2

TP-2-19



SPECIFIC AC COURSE

Worker Performance Factors that Impact Specific AC Dependability

- **Specification of the task** (eg, written procedures)
- **Level of difficulty of the task**
- **Design of the equipment and feedback**, e.g. alarms
- **Time available to do a task or recover an error**
- **Stress levels induced by the external environment**

10104
Module 2

TP-2-20



SPECIFIC AC COURSE

Administrative and Design Principles that Improve Specific AC Dependability

- **Even well trained workers are fallible, and can make mistakes.**
- **Error-likely situations are predictable and avoidable.**
- **Individual behavior is influenced by organizational processes and values.**
- **Workers achieve high levels of performance based largely on the encouragement and reinforcement received from their leaders, peers, and subordinates.**
- **Most accidents can be avoided by applying the lessons learned from similar operations.**

10104
Module 2

TP-2-21



SPECIFIC AC COURSE

Conclusion

If an administrative control:

- is explicitly identified in the hazard analysis as a control needed to prevent or mitigate an accident scenario, and
- has a safety function that would be safety significant or safety class if the function were provided by an SSC, or
- is required to complete the safety function of a safety class or safety significant SSC,

then the AC **must be** designated as a **Specific AC**.

Because a Specific AC has a safety function as important as a safety SSC, it's function must be protected as carefully as a safety SSC.

12104
Module 2

TP-2-22



SPECIFIC AC COURSE

Questions?

12104
Module 2

TP-2-23

Specific Administrative Controls

Module 3 – Treatment of Specific ACs in TSRs

Lesson Plan

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SPECIFIC ADMINISTRATIVE CONTROLS

Module 3 – Treatment of Specific ACs in the TSRs

I. INSTRUCTOR PREPARATION

- A. Qualified nuclear safety basis document preparer/reviewer
- B. Qualified in the preparation of TSRs
- C. Intimately familiar with the SAC and 3009 Standards and the DSA and TSR IGs.

II. INSTRUCTIONAL AIDS

A. Classroom Equipment

- Whiteboard
- Whiteboard Markers
- Computerized Projection System Using MS PowerPoint or an Overhead Projector
- Projection Screen

B. Transparencies 3-1 through 3-13

C. Handouts

- Slides for Module 3
- Technical Standard for Specific ACs

III. REFERENCES

- A. 10 CFR 830
- B. DOE G 423.1-1

IV. OBJECTIVES

MODULE 3 TERMINAL OBJECTIVE

Explain how Specific ACs are implemented through the TSRs.

MODULE 3 ENABLING OBJECTIVES

- 3.1 Identify the two methods used to implement Specific ACs in the TSRs, and explain when each should be used.
- 3.2 Identify the DOE Directives that should be used for guidance when developing Specific ACs as LCOs or Directive Actions.
- 3.3 Compare and contrast the benefits of Specific ACs as LCOs vs. Specific ACs as directive actions.
- 3.4 Discuss the specific limitations associated with establishing Specific ACs for facility Material at Risk (MAR) limits.

SPECIFIC ADMINISTRATIVE CONTROLS

Module 3 – Treatment of Specific ACs in the TSRs

3.5 Identify the sections of the TSRs that are affected based on implementing Specific ACs through the TSRs.

SPECIFIC ADMINISTRATIVE CONTROLS

Module 3 – Treatment of Specific ACs in the TSRs

I. INTRODUCTION TO MODULE 3

TP-3-1

II. OBJECTIVES

TP-3-2 and 3-3

A. Review objectives

III. PRESENTATION

A. Treatment of safety controls covered by safety management programs

1. Most ACs are “programmatic ACs.” Some ac may have same format as a SAC but do not rise to the level of Specific Aces as discussed in this standard.
2. Programmatic ACs are credited in safety basis documents with a significantly lower level of specificity than are Specific ACs.

NOTE: A list of Specific ACs should be documented to distinguish them from others, which may be treated in the same format in a TSR document.

3. Typically, these ACs are implemented as performance requirements contained in organizational or company-level procedures, as applied to the facility.
4. Continuing verification of implementation of the programmatic control is typically verified through continuing assessment and performance monitoring (trend analysis)

B. Implementing Specific ACs in TSRs

1. Two methodologies are acceptable for the appropriate treatment of Specific ACs in TSRs

- a. LCO in Operating Limits and Surveillance section of the TSRs

- (1) SHOULD be used when the Specific AC is well defined, clear corrective actions are available, and conditions supporting the Specific AC can be easily surveilled

TP-3-4 through
TP-3-8

SPECIFIC ADMINISTRATIVE CONTROLS

Module 3 – Treatment of Specific ACs in the TSRs

- (2) Guidance given for LCO format and content in DOE G 423.1-1
 - (3) Guidance in DOE G 423.1 assumes LCOs are based on safety SSCs. Specific AC has a safety function with importance similar to, or the same as, the safety function of safety class or safety significant SSCs.
 - (4) Guidance includes specification for Limiting Conditions for Operation, Action Statements, Operability, Surveillance Requirements, Violation of Technical Safety Requirements, and TSR Bases.
 - (5) Developing Specific ACs as LCOs elevates the importance of the controls and provides increased flexibility through the use of action statements.
- b. Identify the specific requirement/action in the Administrative Control section of the TSRs as a Directive AC
- (1) Appropriate when it is essential that the Specific AC be performed when called upon every time and without any delay (e.g., hoisting limits for nuclear explosives or expected responses during criticality safety infractions not covered by an LCO) or when definitive program requirements for specific activities can be stated.
 - (2) Verification through operations and maintenance procedures.
2. What about MAR limits as administrative controls?
- a. MAR is a major analytic assumption that must be made before a hazard analysis can support any consequence binning beyond the purely subjective and before any non-qualitative accident analysis can be initiated.
 - b. MAR assumption violations place the facility in a formally unanalyzed space for which consequences would be unknown and potentially unbounded.

TP-3-9 through
TP-3-11

TP-3-12

SPECIFIC ADMINISTRATIVE CONTROLS

Module 3 – Treatment of Specific ACs in the TSRs

- d. Not normally possible to control MAR with an active or passive Structure, System, or Component (SSC). Under normal circumstances MAR cannot be controlled through a Design Feature (DF) or SSC based LCO.
 - e. Use of an LCO is warranted when a defensible estimate can be made of how much of a MAR exceedance can occur.
 - f. If this estimate can be made, it may be possible to make an estimate of the risk involved in exceeding the analyzed MAR for some time interval to support LCO action times as well as associated surveillance frequencies.
 - g. In the event that no reasonably confident estimate can be made of potential MAR exceedances to support action times and surveillance frequencies, or if the LCO is too complex and unwieldy, it would be appropriate to use a TSR Section 5 AC.
3. TSR Use and Application Section treatment for SACs
- a. Use and Application section of the TSR should define the ground rules for treating Specific ACs, including treatment of non-compliances as TSR violations and associated reporting requirements.
 - b. Some facilities include a statement of the basis of the Specific AC in the TSR Document. This is important for operators to understand the importance of Specific ACs and the role they play in safety.
4. TSR Definitions should address Specific ACs
- a. Must include definition of Specific ACs

TP-3-13

TP-3-13

IV. CONCLUSION

- A. Review objectives



SPECIFIC AC COURSE

Treatment of Specific ACs in the TSRs

10104
Module 3

TP-31



SPECIFIC AC COURSE

Module 3 Terminal Objective
Explain how Specific ACs are implemented through the TSRs.

10104
Module 3

TP-32



SPECIFIC AC COURSE

Module 3 Enabling Objectives

- Identify the two methods used to implement Specific ACs in the TSRs, and explain when each should be used.
- Identify the DOE Directives that should be used for guidance when developing Specific ACs as LCOs or Directive Actions.
- Compare and contrast the benefits of Specific ACs as LCOs vs. Specific Directive Action ACs.
- Discuss the specific limitations associated with establishing Specific ACs for facility Material at Risk (MAR) limits.
- Identify the sections of the TSRs that are affected based on implementing Specific ACs through the TSRs.

10104
Module 3

TP-33



SPECIFIC AC COURSE

Methods of Incorporating Specific ACs in the TSRs

- Specific AC as an Limiting Condition for Operation (LCO)
- Specific AC as a Specific Directive Action AC

10104
Module 3

TP-34



SPECIFIC AC COURSE

Specific AC as an LCO

- Specific ACs should be implemented as LCOs when:
 - the Specific AC is well defined,
 - clear corrective actions are available, and
 - conditions supporting the Specific AC can be easily surveilled.

10104
Module 3

TP-35



SPECIFIC AC COURSE

Specific AC as an LCO (Continued)

- Standard LCO format is used
- Guidance for developing LCOs is given in DOE G 423.1-1
- Key components of LCO that should be used
 - Action Statements
 - Operability
 - Surveillance Requirements
 - Bases

10104
Module 3

TP-36



SPECIFIC AC COURSE

Specific AC as an LCO (Continued)

- Advantages of Specific ACs as LCOs
 - Elevates the importance of the controls from an operations standpoint.
 - Improves the dependability of the control through routine verification of control operability through LCO Surveillance Requirements.
 - Provides increased flexibility through the use of action statements.



SPECIFIC AC COURSE

Example Specific AC as an LCO

Use Example LCO from the Technical Standard on Specific ACs



SPECIFIC AC COURSE

Specific AC as a Specific Directive Action AC

- Used when:
 - it is essential that the Specific AC be performed when called upon every time and without any delay (e.g., hoisting limits for nuclear explosives or
 - when definitive program requirements for specific activities can be stated.



SPECIFIC AC COURSE

Example Specific AC as a Specific Directive Action AC

Use Example Specific Directive Action AC from the Technical Standard on Specific ACs

10104
Module 3

TP-3-10



SPECIFIC AC COURSE

Limitations of Specific ACs as Specific Directive Action ACs

- A violation of a Specific Directive Action AC is an immediate TSR violation.
- Sub-tier procedures can become TSR-level enforceable documents thus expanding the scope of the nuclear safety basis to procedures. (Not desirable)

10104
Module 3

TP-3-11



SPECIFIC AC COURSE

MAR Considerations

- MAR assumption violations place the facility in a formally unanalyzed space for which consequences would be unknown and potentially unbounded.
- Not normally possible to control MAR with an active or passive Structure, System, or Component (SSC). Under normal circumstances MAR cannot be controlled through a Design Feature (DF) or SSC based LCO.
- Use of an LCO may be warranted when a defensible estimate can be made of how much of a MAR exceedance can occur.
- It may be possible to make an estimate of the risk involved in exceeding the analyzed MAR for some time interval to support LCO action times as well as associated surveillance frequencies.
- If no estimate can be made of potential MAR exceedances to support action times and surveillance frequencies, or if the LCO is too complex and unwieldy, it would be appropriate to use a TSR Section 5 AC.

10104
Module 3

TP-3-12



SPECIFIC AC COURSE

TSR Modifications Supporting Specific ACs

- **Definitions**
 - Specific AC Definition
- **Use and Application**
 - should define the ground rules for treating Specific ACs, including treatment of non-compliances as TSR violations and associated reporting requirements.

Specific Administrative Controls

Module 4 – Specific AC Training Requirements

Lesson Plan

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SPECIFIC ADMINISTRATIVE CONTROLS

Module 4 – Specific AC Training Requirements

I. INSTRUCTOR PREPARATION

- A. Intimately familiar with the SAC and 3009 Standards and the DSA and TSR IGs.
- B. Intimately familiar with DOE O 5480.20A

II. INSTRUCTIONAL AIDS

A. Classroom Equipment

- Whiteboard
- Whiteboard Markers
- Computerized Projection System Using MS PowerPoint or an Overhead Projector
- Projection Screen

B. Transparencies TP-4-1 through 4-7

C. Handouts

1. Slides for Module 4
2. Technical Standard for Specific ACs

III. REFERENCES

1. 10 CFR 830
2. DOE O 5480.20A

IV. OBJECTIVES

TERMINAL OBJECTIVE

Explain how the implementation and maintenance Specific ACs are addressed in facility training programs.

ENABLING OBJECTIVES

- 4.1 Identify the general requirements for operator training programs at nuclear facilities.
- 4.2 Identify the training-related factors that must be addressed for operator tasks supporting Specific ACs and explain how each should be addressed in the training program.

SPECIFIC ADMINISTRATIVE CONTROLS

Module 4 – Specific AC Training Requirements

I. INTRODUCTION TO MODULE 4	TP-4-1
II. OBJECTIVES	TP-4-2 and 4-3
A. Review Objectives	
III. PRESENTATION	
A. 10 CFR 830, Subpart A, Quality Assurance Requirements	TP-4-4
1. Section 830.121 requires that “(a) Contractors conducting activities, including providing items or services, that affect, or may affect, the nuclear safety of DOE nuclear facilities must conduct work in accordance with the Quality Assurance criteria in § 830.122.”	
2. Section 830.122 establishes the following criteria for Management/Personnel Training and Qualification:	
a. Train and qualify personnel to be capable of performing their assigned work.	
b. Provide continuing training to personnel to maintain their job proficiency.	
B. DOE O 5480.20A	TP-4-5
1. This Order is implemented using a graded approach at DOE Nuclear Facilities based on the facility hazard categorization.	
2. Training Implementation Matrix defines and describes the application of the selection, qualification, and training requirements of the Order.	Point out that this matrix is approved by DOE
3. The following points must be addressed when training facility staff for Specific ACs.	TP-4-6, Both the operations and maintenance staff training programs must be addressed

SPECIFIC ADMINISTRATIVE CONTROLS

Module 4 – Specific AC Training Requirements

- a. Minimum qualification and experience requirements of the personnel performing the task.
 - b. Job Task Analysis for the Specific AC.
 - (1) Required plant instrumentation, physical controls, operator/technician skills and abilities, and other important variables necessary to successfully perform the task are identified.
 - (2) Human factors to be taken into consideration when developing the Specific ACs are identified.
 - c. Do initial training requirements exist for each important variable in the JTA, hazard analysis, or other basis documents being used to develop the Specific AC?
 - (1) Does the training program explicitly identify the required training for Specific ACs?
 - (2) Does the training program require demonstration of the operator's/technician's ability to carry out the Specific ACs?
 - d. Are the objectives of the training program for Specific ACs periodically addressed through the Continuing Training Program?
4. DOE-STD-1070-94 must be used to confirm implementation of 5480.20A

Review the JTA process. Critical point - KSAs must be identified for Specific AC tasks

TP-4-7

IV. CONCLUSION

- A. Review objectives



SPECIFIC AC COURSE

Specific AC Training Requirements

12104
Module 4

TP-41



SPECIFIC AC COURSE

Module 4 Terminal Objective

Explain how the implementation and maintenance of Specific ACs are addressed in facility training programs.

12104
Module 4

TP-42



SPECIFIC AC COURSE

Module 4 Enabling Objectives

- Identify the general requirements for operator training programs at nuclear facilities.
- Identify the training-related factors that must be addressed for operator/technician tasks supporting Specific ACs and explain how each should be addressed in the training program.

12104
Module 4

TP-43



SPECIFIC AC COURSE

10 CFR 830 Requirements for Training and Qualification of Personnel

- 10 CFR 830, Subpart A, Quality Assurance Requirements, Section 830.122 establishes the following criteria for Management/Personnel Training and Qualification:
 - Train and qualify personnel to be capable of performing their assigned work.
 - Provide continuing training to personnel to maintain their job proficiency.

10104
Module 4

TP-44



SPECIFIC AC COURSE

DOE Order 4580.20A, Personnel Selection, Qualification and Training Requirements for DOE Nuclear Facilities

- The Order defines the training process using a graded approach based facility hazard level
 - Systematic analysis of jobs (JTA) to identify tasks and knowledge, skill and ability (KSA)
 - Learning objectives derived from the analysis of the job that describe desired performance after training.
 - Training design, development, and implementation based on the learning objectives.
 - Evaluation of trainee mastery of the objectives during training.
 - Process is used to develop both initial and continuing training requirements.

10104
Module 4

TP-45



SPECIFIC AC COURSE

Key Points to be addressed for Specific ACs in training programs

- Minimum qualification and experience requirements of the personnel performing the task.
- Job Task Analysis (JTA) for the Specific AC.
- Initial training requirements for each important variable in the JTA, hazard analysis, or other basis documents being used to develop the Specific AC
- Continuing Training Requirements

10104
Module 4

TP-46



SPECIFIC AC COURSE

Training Program Assessments

- DOE O 5480.20A requires that DOE-STD-1070-94 be used as the guide for assessing training programs

Specific Administrative Controls

Module 5 – Specific AC Violation Reporting and Failure Analysis Lesson Plan

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SPECIFIC ADMINISTRATIVE CONTROLS

Module 5 - Specific AC Violation Reporting and Failure Analysis

I. INSTRUCTOR PREPARATION

- A. Qualified nuclear safety basis document preparer/reviewer
- B. Qualified in the preparation of TSRs
- C. Intimately familiar with the SAC Standard and the Causal and Failure Analysis for TSR Violations

II. INSTRUCTIONAL AIDS

A. Classroom Equipment

- Whiteboard
- Whiteboard Markers
- Computerized Projection System Using MS PowerPoint or an Overhead Projector
- Projection Screen

B. Transparencies TP-5-1 through 5-11

C. Handouts

- SAC Standard, Safety Management Rule (previously)
- DOE Order 231.1A, Environment, Safety, and Health Reporting,
- Viewgraphs (3 per page with room for notes)

III. REFERENCES

- A. Nuclear Safety Management Rule, 10 CFR 830
- B. 10 CFR 830.205, Technical Safety Requirements
- C. DOE STD-XXXX-2004 SAC Draft Standard, December, 2003
- D. DOE Order 231.1A, Environment, Safety and Health Reporting,
- E. DOE M 231.1-2, Occurrence Reporting and Processing of Operations Information.
- F. DOE G 231.1-2, Occurrence Reporting Causal Analysis Guide
- G. DOE G 231.1-1, Occurrence Reporting and Performance Analysis Guide
- H. NUREG/CR-6751, The Human Performance Evaluation Process: A Resource for Reviewing the Identification and Resolution of Human Performance Problems.

IV. OBJECTIVES

MODULE 5 (TERMINAL) OBJECTIVE

To be able to describe the requirements associated with Specific AC violations

SPECIFIC ADMINISTRATIVE CONTROLS

Module 5 - Specific AC Violation Reporting and Failure Analysis

MODULE 5 (ENABLING) OBJECTIVES:

- Explain how both forms of Specific ACs used in the TSRs can be violated.
- Describe the notification requirements for violation of Specific ACs and the source of these requirements
- Describe the requirements for Causal and Failure Analyses related to violations of Specific ACs
- Identify the DOE Directives that provide guidance for investigating TSR violations
- Describe the requirements for the final report for a violation of a Specific AC

SPECIFIC ADMINISTRATIVE CONTROLS

Module 5 - Specific AC Violation Reporting and Failure Analysis

I. INTRODUCTION TO MODULE 5	TP-5-1
II. OBJECTIVES	TP-5-2 and 5-3
III. PRESENTATION	
A. Identifying Violations of Specific ACs	TP-5-4
A "grace period" is sometimes defined in the general SRs to allow time to perform a missed surveillance, thereby avoiding the need for a facility to take immediate, possibly unnecessary corrective action. Entering the grace period remains a TSR violation even though an immediate corrective action may not be required. (as per TSR Guide)	
B. Sources of Requirements for Reporting Violations of Specific ACs	TP-5-5
Trainer should add to and be familiar with the content of any site specific requirements (Site/facility policies and manuals of practice)	
C. Sources of Guidance for Investigating and Reporting Violations of Specific ACs	TP-5-6
Trainer should add to and be familiar with the content of any site specific guidance (Site/facility guides and procedures)	
D. Notification Requirements for Violations of Specific ACs	TP-5-7
<ul style="list-style-type: none">• Note that for purposes of reporting, TSR violations are "pre-categorized" so that there should be no delay added by the categorization process.• Late surveillances are downgraded to SC3 if the equipment is still found to be capable of performing its safety function.• SL violations are upgraded to SC1.	
E. Causal and Failure Analysis Requirements for a Violation of a Specific AC	TP-5-8
F. Guidance for Causal and Failure Analysis for a Violation of Specific ACs	TP-5-9

SPECIFIC ADMINISTRATIVE CONTROLS

Module 5 - Specific AC Violation Reporting and Failure Analysis

G. Specific AC Violation Reporting Requirements

TP-5-10

AC violations are treated like other TSR violations and have immediate notification requirements and follow-up investigation and reporting requirements. However, a full (root cause) investigation is only required for SL violations or recurring SAC violations.

IV. CONCLUSION

TP-5-11

A. Review objectives



SPECIFIC AC COURSE

Specific AC Violation Reporting and Failure Analysis

121164
Module 5

TP-5-1



SPECIFIC AC COURSE

Module 5 Terminal Objective

Upon completion, the student will understand and be able to describe the requirements associated with Specific AC violations

121164
Module 5

TP-5-2



SPECIFIC AC COURSE

Module 5 Enabling Objectives

- Explain how both forms of Specific ACs used in the TSRs can be violated.
- Describe the notification requirements for violation of Specific ACs and the source of these requirements
- Describe the requirements for Causal and Failure Analyses related to violations of Specific ACs
- Identify the DOE Directives that provide guidance for investigating TSR violations
- Describe the requirements for the final report for a violation of a Specific AC

121164
Module 5

TP-5-3



SPECIFIC AC COURSE

Identifying Violations of Specific ACs

For a Specific AC in the format of an LCO, a violation occurs when:

- The required ACTION is not performed within the prescribed interval
- The associated surveillance is not performed within the prescribed interval

For a Specific AC in the format of a directive action statement, a violation occurs when:

- The required ACTION is not performed as specified (e.g., immediately)

10104
Module 5

TP-54



SPECIFIC AC COURSE

Sources of Requirements for Reporting Specific AC Violations

- TSR Rule (830.205)
- DOE Order 231.1A, Environment, Safety and Health Reporting
- DOE M 231.1-2, Occurrence Reporting and Processing of Operations Information

10104
Module 5

TP-55



SPECIFIC AC COURSE

Sources of Guidance for Investigating and Reporting Specific AC Violations

- DOE STD -XXXX-2004 SAC Draft Standard, December, 2003
- DOE G 423.1-1, Implementation Guide For Use In Developing Technical Safety Requirements
- DOE G 231.1-2, Occurrence Reporting Causal Analysis Guide
- DOE G 231.1-1, Occurrence Reporting and Performance Analysis Guide
- DOE-NE-STD-1004-92, Root Cause Analysis
- NUREG/CR-6751, The Human Performance Evaluation Process: A Resource for Reviewing the Identification and Resolution of Human Performance Problems

10104
Module 5

TP-56



SPECIFIC AC COURSE

Notifying DOE of Violations of Specific ACs

- The TSR Rule (830.205) requires DOE notification for TSR violations
- DOE M 231.1 -2 categorizes TSR violations (except SL violations and late surveillances) as Significance Category 2 and requires prompt (2 hours) notification to the DOE Facility Representative and written notification by close of business on the next business day

10104
Module 5

TP-57



SPECIFIC AC COURSE

Causal and Failure Analysis Requirements for a Violation of a Specific AC

- DOE Order 231.1A requires occurrence reports to be submitted in accordance with DOE M 231.1 -2
- DOE M 231.1 -2 prescribes the significance category (SC2 for Specific AC violations, or SC-R for recurring violations). The significance category in turn prescribes investigation and reporting requirements:
 - Causal analysis by a trained investigator for a Specific AC violation
 - A full-root cause analysis by a team of trained investigators for a recurring Specific AC violation

10104
Module 5

TP-58



SPECIFIC AC COURSE

Guidance for Causal and Failure Analysis for a Violation of a Specific AC

- DOE G 231.1-2, *Occurrence Reporting Causal Analysis Guide*, provides guidance on how to determine the Apparent Cause(s) of specific reportable occurrences including Specific AC violations. However, Identifying the causes for Specific AC violations is often difficult.
- DOE STD-XXXX-2004 *Specific AC Draft Standard*, December 2003 provides expectations for the investigation of Specific AC violations.
- DOE-NE-STD-1004-92, *Root Cause Analysis*, provides guidance if a full root cause investigation is needed (eg, for recurring violations)
- NUREG/CR-6751, *The Human Performance Evaluation Process: A Resource for Reviewing the Identification and Resolution of Human Performance Problems*, provides additional insights for developing corrective actions.

10104
Module 5

TP-59



SPECIFIC AC COURSE

Specific AC Violation Reporting Requirements

- **The Final Report must be submitted within 45 days after initial categorization of the violation.**
- **The Final Report must include:**
 - ▶ **The significance, nature, and extent of the violation;**
 - ▶ **The causes of the violation or condition (including the root cause, as required);**
 - ▶ **The immediate actions taken and the corrective action(s) to be taken; and**
 - ▶ **The lessons learned.**

121104
Module 5

TP-5-10



SPECIFIC AC COURSE

Conclusion

As discussed previously, the safety function of a Specific AC is as important as that of a safety SSC, therefore the process for:

- ▶ notification of Specific AC violations,
- ▶ investigation of Specific AC violations and
- ▶ reporting of Specific AC violations

Must be as prompt and as thorough as those for failures of safety SSCs.

121104
Module 5

TP-5-11

Specific Administrative Controls

Module 6 – Evaluation of Specific AC Requirements

Lesson Plan

FOR TRAINING USE ONLY

The uncontrolled material contained in this lesson plan is FOR TRAINING USE ONLY. In no way should it be interpreted that the material contained herein may be substituted for approved DOE Directives. Where copies of (or excerpts from) procedures are given, they are intended for clarification and information only. The latest revision of the reference in question should be obtained for actual use. If there are any questions, contact your supervisor.

SPECIFIC ADMINISTRATIVE CONTROLS

Module 6 – Specific AC Violation Reporting and Failure Analysis

I. INSTRUCTOR PREPARATION/QUALIFICATION

- A. Qualified nuclear safety basis document preparer/reviewer
- B. Qualified in the preparation of TSRs
- C. Qualified to conduct training program assessments
- D. Qualified to conduct Occurrence Reporting assessments
- E. Intimately familiar with the SAC Standard and the Causal and Failure Analysis for TSR Violations

II. INSTRUCTIONAL AIDS

A. Classroom Equipment

- Whiteboard
- Whiteboard Markers
- Computerized Projection System Using MS PowerPoint or an Overhead Projector
- Projection Screen

B. Viewgraphs – TP-6-1 through TP-6-12

C. Handouts

- Specific AC Standard,
- 10 CFR 830
- DOE-STD-1070
- DOE Order 231.1A,

III. REFERENCES

- A. Nuclear Safety Management Rule, 10 CFR 830
- B. 10 CFR 830.205, Technical Safety Requirements
- C. DOE STD-XXXX-2004 SAC Draft Standard, December, 2003
- D. DOE-STD-1104-96, Review and Approval of Non-Reactor Nuclear Facility Safety Analysis Reports
- E. DOE O 5480.20, Personnel Selection, Qualification and Training Requirements for DOE Nuclear Facilities
- F. DOE Order 231.1A, Environment, Safety, and Health Reporting,
- G. DOE M 231.1-2, Occurrence Reporting and Processing of Operations Information.
- H. DOE G 231.1-2, Occurrence Reporting Causal Analysis Guide
- I. DOE G 231.1-1, Occurrence Reporting and Performance Analysis Guide
- J. NUREG/CR-6751, The Human Performance Evaluation Process: A Resource for Reviewing the Identification and Resolution of Human Performance Problems.

SPECIFIC ADMINISTRATIVE CONTROLS

Module 6 – Specific AC Violation Reporting and Failure Analysis

IV. OBJECTIVES

MODULE 6 (TERMINAL) OBJECTIVE

To be able to describe the requirements associated with Specific AC violations

MODULE 6 (ENABLING) OBJECTIVES:

- Explain how both forms of Specific ACs used in the TSRs can be violated.
- Describe the notification requirements for violation of Specific ACs and the source of these requirements
- Describe the requirements for Causal and Failure Analyses related to violations of Specific ACs
- Identify the DOE Directives that provide guidance for investigating TSR violations
- Describe the requirements for the final report for a violation of a Specific AC

SPECIFIC ADMINISTRATIVE CONTROLS

Module 6 – Specific AC Violation Reporting and Failure Analysis

I. INTRODUCTION to Module 6	TP-6-1
II. OBJECTIVES	TP-6-2 and 6-3
III. PRESENTATION	
A. This module is designed for DOE personnel responsible for verifying implementation of the requirements for Specific ACs.	
B. The module focuses on reviewing evidence of the contractor's implementation of the requirements for Specific ACs.	
C. The most important aspect of the assessment is determining if the contractor has identified all of the Specific ACs, based on the criteria identified in the new Standard.	TP-6-4
1. Process is similar to selection of SC and SS SSCs:	TP-6-5
• ACs performing safety functions equivalent to SC SSCs must be Specific ACs	
• ACs that provide important safety functions for defense in depth or worker safety have the same subjective criteria that are applied to SS SSCs. Not all specific AC actions need rise to the level of Specific ACs.	
• Lower level ACs may have the same format as Specific ACs in TSR documents.	
• A list of Specific ACs should be prepared in order to distinguish them	
2. Some existing ACs may be formulated as LCOs or have the same wording as Specific Directive Action ACs and NOT be selected as a Specific AC.	
3. DOE suggests creating a list of the ACs classified as Specific ACs to provide documentation of ACs selected as Specific ACs.	

SPECIFIC ADMINISTRATIVE CONTROLS

Module 6 – Specific AC Violation Reporting and Failure Analysis

- | | |
|---|--------|
| <p>D. Specific ACs must be properly documented in the DSA. The following review criteria are based on the guidance given for SSCs in DOE-STD-1104-96, Review and Approval of Non-Reactor Nuclear Facility Safety Analysis Reports.</p> <ol style="list-style-type: none">1. Specific ACs are identified and described in the DSA and are consistent with the logic presented in the hazard and accident analyses.2. Safety functions for Specific ACs are defined with clarity and are consistent with the bases derived in the hazard and accident analyses.3. Functional requirements and Specific AC evaluations are derived from the safety functions and provide evidence that the safety functions can be performed.4. Control of Specific ACs relevant to TSR development are clearly identified. | TP-6-6 |
| <p>E. Specific ACs must be implemented through the TSRs in one of two forms</p> <ol style="list-style-type: none">1. Specific ACs as LCOs should meet the requirements for LCOs listed in DOE -G 423.1-1, including:<ol style="list-style-type: none">a. Action Statementsb. Operabilityc. Surveillance Requirementsd. Bases2. Specific ACs as Specific Directive Action ACs | TP-6-7 |
| <ol style="list-style-type: none"><ol style="list-style-type: none">a. Are contained in the AC section of the TSRsb. Clearly describe the Critical Safety Function of the Specific ACc. Specify the control or limitd. Provide a basis for the control | TP-6-8 |

SPECIFIC ADMINISTRATIVE CONTROLS

Module 6 – Specific AC Violation Reporting and Failure Analysis

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|--|---------|
| e. Have provisions in operations and/or maintenance procedures for periodic verification of the control or limit | |
| 3. DSR Definitions and Use and Application sections incorporate the requirements for Specific ACs. | TP-6-9 |
| 4. Operator actions required by Specific ACs have been validated to ensure that the operators have sufficient indicators or alarms, time, and equipment to perform their required actions. | TP-6-10 |
| 5. Specific ACs are initially and periodically verified as capable of performing the specified safety function | |
| 6. Formulation of Specific ACs includes evaluation of the following factors when establishing time necessary to complete required actions: | TP-6-11 |
| a. Adequate description of the task | |
| b. Level of difficulty of the task | |
| c. Design of the equipment and feedback, e.g. alarms. | |
| d. Time available to do a task or recover an error. | |
| e. Stress levels induced by the external environment, e.g. noise, heat, light and protective clothing worn. | |
| D. Specific ACs are adequately addressed in the training program. | TP-6-12 |
| a. Operator/Technician tasks associated with Specific ACs have been analyzed to identify the required knowledge, skill and abilities (KSAs) | |
| b. Learning Objectives reflect the required KSAs | |
| c. The appropriate training setting is used for the required KSAs (OJT, classroom or simulator) | |
| d. The program requires demonstration of the knowledge, ability and skill to perform Specific AC tasks for operator/technician qualification and | |

SPECIFIC ADMINISTRATIVE CONTROLS

Module 6 – Specific AC Violation Reporting and Failure Analysis

re-qualification

E. Violation Reporting and Failure Analysis for Specific ACs
are addressed in the TSR Use and Application Section

TP-6-13

IV. CONCLUSION

A. Review Objectives



SPECIFIC AC COURSE

Evaluation of Specific AC Requirements

10104
Module 6

TP-6-1



SPECIFIC AC COURSE

Module Terminal Objective

Upon completion of this module, the student will be able to assess the contractors' implementation of the requirements for Specific ACs.

10104
Module 6

TP-6-2



SPECIFIC AC COURSE

Enabling Objectives

- Discuss the review criteria for:
 - Identification of Specific ACs
 - Documentation of Specific ACs in the DSA
 - Implementation of Specific ACs through the TSRs
 - Training and qualification of operations personnel on Specific ACs
 - Specific AC violation reporting and failure analysis

10104
Module 6

TP-6-3



SPECIFIC AC COURSE

Review Criteria for Identification of Specific ACs

All Administrative Controls identified in the DSA that meet the following Specific AC criteria are identified as Specific ACs.

- The control is explicitly identified in the hazard analysis as a control needed to prevent or mitigate an accident scenario, and
- The control has a safety function that would be safety significant or safety class if the function were provided by an SSC, or
- The control is required to complete the safety function of a safety class or safety significant SSC

NOTE : DOE suggests creating a list of the ACs classified as Specific ACs to provide documentation of ACs selected as Specific ACs.



SPECIFIC AC COURSE

Selection of Specific ACs

Process is similar to selection of SC and SS SSCs:

- ACs performing safety functions equivalent to SC SSCs must be Specific ACs
- ACs that provide important safety functions for defense in depth or worker safety have the same subjective criteria that are applied to SS SSCs. Not all specific AC actions need rise to the level of Specific ACs.
- Lower level ACs may have the same format as Specific ACs in TSR documents.
- A list of Specific ACs should be prepared in order to distinguish them.



SPECIFIC AC COURSE

Review Criteria for Documentation of Specific ACs

- Specific ACs are identified and described in the DSA and are consistent with the logic presented in the hazard and accident analyses.
- Safety functions for Specific ACs are defined with clarity and are consistent with the bases derived in the hazard and accident analyses.
- Functional requirements and Specific AC evaluations are derived from the safety functions and provide evidence that the safety functions can be performed.
- Control of Specific ACs relevant to TSR development are clearly identified.



SPECIFIC AC COURSE

Review Criteria for Implementation of Specific ACs Through the TSRs

- Specific ACs are implemented as LCOs or as Specific Directive Action ACs
- Specific ACs implemented as LCOs meet the requirements for LCOs listed in DOE -G 423.1-1, including:
 - Action Statements
 - Operability
 - Surveillance Requirements
 - Bases

10104
Module 6

TP-67



SPECIFIC AC COURSE

Review Criteria for Implementation of Specific ACs Through the TSRs (Continued)

- Specific Directive Action ACs :
 - Are contained in the AC section of the TSRs
 - Clearly describe the Critical Safety Function of the Specific AC
 - Specify the control or limit
 - Provide a basis for the control
 - Have provisions in operations and/or maintenance procedures for periodic verification of the control or limit

10104
Module 6

TP-68



SPECIFIC AC COURSE

Review Criteria for Implementation of Specific ACs Through the TSRs (Continued)

- The following TSR Sections have been revised to address Specific ACs
 - Definitions
 - Use and Application

10104
Module 6

TP-69



SPECIFIC AC COURSE

Review Criteria for Implementation of Specific ACs Through the TSRs (Continued)

- Specific ACs are initially and periodically verified as capable of performing the specified safety function
- Operator actions required by Specific ACs have been validated to ensure that the operators have sufficient indicators or alarms, time, and equipment to perform their required actions.

10104
Module 6

TP-6-10



SPECIFIC AC COURSE

Review Criteria for Implementation of Specific ACs Through the TSRs (Continued)

Formulation of Specific ACs includes evaluation of the following factors when establishing time necessary to complete required actions:

- Adequate description of the task
- Level of difficulty of the task
- Design of the equipment and feedback, e.g. alarms.
- Time available to do a task or recover an error.
- Stress levels induced by the external environment, e.g. noise, heat, light and protective clothing worn.

10104
Module 6

TP-6-11



SPECIFIC AC COURSE

Review Criteria for Training and Qualification of Operators

- Specific ACs are adequately addressed in the Operator Training Program
 - Operator/Technician tasks associated with Specific ACs have been analyzed to identify the required knowledge, skill and abilities (KSAs)
 - Learning Objectives reflect the required KSAs
 - The appropriate training setting is used for the required KSAs (OJT, classroom or simulator)
 - The program requires demonstration of the knowledge, ability and skill to perform Specific AC tasks for operator/technician qualification and re-qualification

10104
Module 6

TP-6-12



SPECIFIC AC COURSE

Review Criteria for Specific AC Violation Reporting and Failure Analysis

- Violation Reporting and Failure Analysis for Specific ACs are addressed in the TSR Use and Application Section
