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DOE HANDBOOK

GUIDE TO GOOD PRACTICES FOR THE SELECTION, TRAINING, AND QUALIFICATION OF SHIFT TECHNICAL ADVISORS

U.S. Department of Energy
Washington, D.C. 20585

AREA TRNG

FOREWORD

1. This Department of Energy (DOE) Handbook is approved for use by all DOE Components and their contractors. The Handbook incorporates editorial changes to DOE-STD-1057-93, *Guide to Good Practices for the Selection, Training, and Qualification of Shift Technical Advisors,* and supersedes DOE-STD-1057-93. Technical content of this Handbook has not changed from the original technical standard. Changes are primarily editorial improvements, redesignation of the standard to a Handbook, and format changes to conform with current Technical Standards Program procedures.

2. This technical standard provides guidance to DOE staff and contractors that can be used to modify existing programs or to develop new programs. DOE contractors should not feel obligated to adopt all parts of this guide. Rather, they can use the information in this guide to develop programs that apply to their facility. This guide can be used as an aid in the design and development of a facility's shift technical advisor training program. This guide can be used in developing a program for initial and continuing training.

3. Beneficial comments (recommendations, additions, deletions) and any pertinent data that may improve this document should be sent to the Office of Nuclear Safety Policy and Standards (EH-31), U.S. Department of Energy, Washington, DC 20585, by letter or by using the self-addressed Document Improvement Proposal (DOE F 1300.3) appearing at the end of this document.

4. DOE technical standards, such as this Handbook, do not establish requirements. However, all or part of the provisions in a technical standard can become requirements under the following circumstances:

(1) they are explicitly stated to be requirements in a DOE requirements document; or

(2) the organization makes a commitment to meet a technical standard in a contract or in a plan or program required by a DOE requirements document.

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1. INTRODUCTION

The DOE *Guide to Good Practices For The Selection, Training, and Qualification of Shift Technical Advisors* can be used by any DOE nuclear facility that has implemented the shift technical advisor (STA) position. DOE Order 5480.20A, *Personnel Selection, Qualification and Training Requirements for DOE Nuclear Facilities*, states that only Category A reactors must have a shift technical advisor. However, many DOE nuclear facilities have implemented the shift technical advisor position to provide independent on-shift technical advice and counsel to the shift operating personnel to help determine cause and mitigation of facility accidents. Those DOE nuclear facilities that have implemented or are going to implement the shift technical advisor position will find this guide useful.

This guide addresses areas that may be covered by other training programs. In these cases, it is unnecessary (and undesirable) to duplicate these areas in the STA training program as long as the specific skills and knowledge essential for STAs are addressed. The guide is based on the premise that the trainee has not completed any facility-specific training other than general employee training.

1.1 Purpose

The purpose of this guide is to provide information on the STA training and qualification program. The guide is based on STAs being assigned specific responsibilities and duties within the shift crew. The responsibilities and duties of the STA should be proceduralized. Some typical responsibilities and duties of STAs include the following:

- C During transients and accidents, compare existing critical parameters to facility-specific safety feature limiting values, and provide an independent verification of engineered safety features to the shift supervisor.
- C Immediately report to the operating crew any abnormalities or facility parameters that may represent a challenge to the engineered safety features or that could result in a degradation of the safety level.
- C Assess facility parameters during and following an accident in order to ascertain whether facility damage has occurred or appears imminent.
- C During emergencies, use redundant and diverse facility indications to verify that no engineered safety feature is being challenged.
- C Provide recommendations to the shift supervisor on appropriate corrective actions to restore facility parameters to acceptable values. This includes recommendations for the selection of specific abnormal, emergency, and safety function restoration procedures.
- C Investigate the cause(s) of abnormal or unusual events that occur and assess any adverse effects; recommend changes to procedures or equipment to prevent recurrence.

- C Evaluate the effectiveness of procedures in terms of terminating or mitigating accidents and make recommendations when changes are needed.
- C Assist the operators in evaluating the operability of facility equipment to comply with the provisions of facility Technical Safety Requirements (Technical Specifications/Operational Safety Requirements). Provide results of assessments to the shift supervisor so that appropriate actions are taken to address any facility conditions that do not satisfy the limiting conditions for operation.
- C Perform a preshift review of facility status and planned activities for the upcoming shift to ascertain whether special considerations or precautions are warranted, and make appropriate recommendations to the shift supervisor.
- C Trend critical plant parameters during normal operation to detect early warning of potentially serious conditions.
- C Assist the shift supervisor in classifying an emergency in accordance with the emergency procedure implementing plan.

This guide contains good practices for the selection, training, qualification, and professional development of STAs. Training and qualification programs based on this guide should provide assurance that STAs perform their jobs safely and competently. Training design, development, and implementation should be based on Systematic Approach to Training (SAT) guidelines.

1.2 Background

The Department of Energy identified the need for STA training, qualification, and professional development guidance in DOE Order 5480.20A, *Personnel Selection, Qualification and Training Requirements for Nuclear Facilities*. This DOE *Guide to Good Practices for the Training and Qualification of Shift Technical Advisors* was developed to expand the guidance given in DOE Orders, but it is not intended to duplicate the information contained in them. The information in this guide was developed on the basis of requirements of DOE Orders and DOE nuclear operating experience.

1.3 Application

The content of this guide is generally applicable to all DOE reactor and non-reactor nuclear facilities, with the exception of those topics which relate specifically to reactor activities. Portions of the programs outlined may not be applicable to all facilities because operations department organizations, titles, and responsibilities vary among DOE reactor and non-reactor nuclear facilities. Facility training personnel can verify the adequacy of or improve existing STA training programs by adapting the portions of this guide that are applicable to their specific facility STA needs. To avoid duplicative or conflicting recommendations, DOE facilities and activities that are subject to regulation by the Nuclear Regulatory Commission (NRC) should use the recommendations of the NRC in lieu of this guidance.

1.3.1 Discussion

Full implementation of an STA training program requires a long-term commitment. Training activities should be carefully managed to produce effective results. Plans should be developed, organizations should be staffed with qualified instructors, and sufficient controls should be applied to ensure delivery of an effective STA training program.

Each facility should assess its training needs to develop a facility-specific training program. Assessment results should be used to establish learning objectives, test items, instructional methods, and instructional settings. Performance measures used to evaluate employee performance and assess training effectiveness can also be derived from the assessment.

Training programs should be evaluated on a continuous basis to determine the extent to which established learning objectives are being accomplished. Evaluation results should be used to improve training plans, facilities, programs, materials, and procedures. In addition, it is important to implement a systematic method to update training-program content to incorporate facility modifications, operating experiences, procedure changes, and changes in job requirements.

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2. SELECTION OF SHIFT TECHNICAL ADVISORS

The facility organization should have a selection process for initial hiring and transferring of personnel into the operating organization. This process should consider such selection criteria as: problem-solving ability, emotional stability, motivation, initiative, background, experience, educational level, and mechanical aptitude. This process may involve a selection test, in addition to interviews. Administrative procedures should be developed to establish the criteria for STA selection. Selection should be based on the ability to meet position qualification criteria with reasonable amounts of training.

2.1 Education and Experience

The educational and experience requirements should be consistent with those stipulated in DOE Order 5480.20A, *Personnel Selection, Qualification and Training Requirements for DOE Nuclear Facilities*.

2.2 Selection Process

The selection of STA trainees should be a careful and thoughtful process that recognizes the responsibilities that are unique to the STA position. The selection process should include an evaluation of the STA trainee's surveillance and technical skills, as well as the individual's experience and past performance. Line management should establish the attributes, characteristics, and skills used as criteria for selecting STA trainees. The criteria should include demonstrated qualities such as: judgment, motivation, integrity, communication skills, teamwork skills, diagnostic skills, analytical ability, and strong technical competence. Selection of STA trainees should include consideration of the following characteristics and associated attributes listed below them:

C Sound judgment
- conservative approach toward nuclear safety and personnel safety
- inquisitiveness
- persistency, yet cautiousness
- planning effectiveness
- logical and cautious decision making
- understanding personal limitations and policies

C High values and integrity
- professional ethics
- personal standards of performance and commitment to quality
- positive attitude

C Thorough technical knowledge
- technical knowledge of the tasks performed by the shift crew
- analytical ability
- industrial safety awareness.

Some techniques that may be used to provide input for selecting STA trainees include: questionnaires, aptitude tests, examinations of technical knowledge, on-the-job observations, performance during continuing training, and interviews by facility line managers. These techniques should be applied in a manner that attains uniform assessment of trainees, regardless of the techniques used to provide inputs.

3. QUALIFICATION REQUIREMENTS

Qualification for shift technical advisors should be documented by the responsible manager's written endorsement of the satisfactory completion of initial training and qualification requirements. Administrative procedures should be developed to describe the process for progressing through the levels of qualification, frequency for and renewal of qualification, and personnel record keeping. Facilities should describe the authority, duties, and responsibilities of the STA in a procedure, policy, etc.

Qualification programs should be developed that include the elements identified in DOE Order 5480.20A, *Personnel Selection, Qualification and Training Requirements for DOE Nuclear Facilities*.

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4. INITIAL TRAINING

An initial training program should be established to develop and enhance the skills, knowledge, and abilities of STA trainees at DOE reactor and non-reactor nuclear facilities to perform their job assignments. The program should consist of a combination of classroom-type and on-the-job training and should include simulator and laboratory training (for those facilities that have a simulator or laboratory facilities), as it applies to the STA position.

The guidance in this section and in Appendix A provides the basis for establishing the initial training program. Appendix A contains learning objectives and recommended learning activities to support the enhancement of training materials for initial training. Additional facility-specific subjects may be added to the initial training program for shift technical advisors, as deemed appropriate, by management.

The facility manager, the facility manager's staff, and other senior managers and selected personnel (e.g., top-performing STAs) should conduct training and mentoring sessions with STA trainees to discuss and promote areas that include commitment to high standards of performance and nuclear safety. Some of these sessions should be conducted in a one-on-one setting and some should consist of small group activities. Training should be conducted, evaluated, and documented through the use of qualification guides, discussion outlines, or checklists. Use of qualifications guides is an excellent method of tracking progress through the training program. Some portions of initial training may also be accomplished through on-the-job interaction with other appropriate departments within the nuclear organization or on-shift as an STA under instruction.

Standards of excellence throughout the operating organization should be stressed during the training. The role of the STA, which is to independently advise the shift supervisor concerning normal and abnormal facility operations, should be stressed during training. Management expectations of STA performance should be provided while presenting positive role models to foster development of the trainee.

4.1 General Orientation Training

This section provides STA trainees with an overall indoctrination in departmental and facility philosophy, and acquaints the trainees with site facilities, interdepartmental responsibilities, and communications. This section is designed to expand upon the training received in general employee training.

4.1.1 Introduction

Training should provide trainees with the requisite knowledge and skills to perform the following:

C Describe the parent department (i.e., department to which the STA is assigned) and operations department organization.
C Identify key parent and operations department personnel and their positions and responsibilities, emphasizing department operating philosophy (e.g., professionalism, procedural adherence, regulatory relationships).
C Explain facility directives, including
- personal conduct (including fitness-for-duty)
- work hours
- overtime
- reporting structure during backshifts and weekends.

C Describe the purpose and interdepartmental relationships of the parent and operations departments.
C Describe the purpose and intradepartmental relationships of all other department groups.

4.1.2 Facility Communication Systems and Methodology

Training should provide trainees with the requisite knowledge and skills to perform the following:

C Explain the importance of the onsite and offsite communication system.
C Describe the types of communication systems and equipment in use.
C Demonstrate the method(s) of maintaining professional communications when using facility communication equipment.
C Describe the application of communication systems and equipment in
- directing work activities
- performing test procedures
- handling emergency communications.

C Identify facility areas with restrictions on the use of certain communication systems.
C Describe procedures for obtaining portable communication equipment.
C Locate facility communication equipment.
C Explain how to contact key positions, including
- shift supervisor
- administrative supervisor
- fire and other emergency personnel
- security personnel
- maintenance supervisors
- radiological protection personnel

- chemistry personnel
- emergency support facilities personnel.

C Demonstrate the purpose and use of communication systems and equipment, such as the
- paging system
- facility telephone
- sound-powered telephone
- two-way radios.

4.1.3 Interdepartmental Functions and Responsibilities

Training should provide trainees with the requisite knowledge and skills to state the general reporting relationships, functions, and responsibilities of the following personnel:

C Shift supervisor
C Certified nuclear facility operator
C Facility equipment operator
C Operations manager
C General facility management
C Mechanical maintenance personnel
C Electrical maintenance personnel
C Instrument and control technicians
C Radiological protection technicians
C Quality control and assurance personnel
C Engineers
C Industrial safety personnel
C Security personnel
C Technical staff personnel
C Facility or site DOE representatives.

4.2 Facility Procedures Training

Training should provide trainees with the requisite knowledge and skills to perform the following:

C Explain the purpose, general content, hierarchy, and significant precautions and limitations of
- operating procedures
- abnormal operating procedures
- emergency operating procedures
- emergency plan implementing procedures
- alarm response procedures
- surveillance procedures

- maintenance procedures
- special test procedures
- administrative procedures.

C Explain in depth the purpose and content of
- facility safety analysis report
- facility Technical Safety Requirements
- regulatory documents.

C Describe the review and approval process for
- special test procedures
- temporary procedure changes
- permanent procedure changes
- safety-related procedure changes.

C Describe the process required for installing and removing temporary changes to facility equipment (including lifted leads, mechanical jumpers, etc.).

C Describe the process for controlling the content of facility procedures, drawings, and publications.

C Retrieve schematic, logic, and piping and instrument drawings.

C Describe the process for changing setpoints.

C State what type of occurrence should be reported to DOE, and describe the process and requirements for making the occurrence reports.

C Describe the process for equipment tagouts and clearances.

C Describe job-specific responsibilities in
- reviewing facility procedures, including use of human factors
- reading and interpreting piping and instrumentation diagrams, logic diagrams, and schematic diagrams
- document retrieval
- shift turnover
- posttransient evaluation reports.

4.3 Applied Fundamentals

The tasks assigned to STAs during normal, abnormal, and emergency operations require STAs to rapidly analyze facility information. The processes of monitoring, interpreting, and intervening require the highest order diagnostic and predictive skills. STAs should be able to evaluate facility conditions, detect abnormalities, accurately communicate concerns, and carry out assigned duties accordingly. To do this, STAs should possess the requisite knowledge and skills in applied fundamentals. Training for STA trainees in applied fundamentals should include the following areas: (as applicable to the facility)

C Heat transfer, fluid flow, and thermodynamics

C Reactor control and fuel behavior

C Chemistry fundamentals

C Electrical fundamentals
C Electronics fundamentals
C Nuclear physics
C Materials science fundamentals
C Mechanical equipment operating principles
C Radiation and radiological protection fundamentals
C Instrumentation and control fundamentals.

The recommended content for these areas is provided below.

4.3.1 Heat Transfer, Fluid Flow, and Thermodynamics

Training should provide trainees with the requisite knowledge and skills to perform the following:

C Apply concept of heat transfer, fluid flow, and thermodynamics as related to nuclear facility operation.
C Describe fluid flow and heat transfer processes in systems during normal, abnormal, and emergency conditions.
C Identify and use facility indications to confirm acceptable limits of system flow and heat transfer.
C Analyze system conditions to determine the status of the system with respect to the system thermal-hydraulic limits.
C Perform or evaluate system heat balance calculations.
C Analyze the effect of variations in heat sink parameters.
C Discuss the mechanisms that can create water hammer and prevention methods.
C Describe facility and equipment performance effects on
- heat exchanger fouling
- heat sink temperature changes
C Describe normal thermal hydraulic operating parameters and limits associated with critical facility systems.

4.3.2 Reactivity Control and Fuel Behavior (Reactor Facilities Only)

Training should provide trainees with the requisite knowledge and skills to perform the following:

C Describe the effects of control rod worth on
- axial position of the rod in the core
- radial position of the rod in the core
- relative rod position
- poison concentration
- moderator and/or coolant temperature

- core exposure
- fuel temperature
- local thermal neutron flux.

C Describe the effect of operating the control- and power-shaping rods both inside and outside specified control bands for varying facility conditions.

C Describe the core parameters that affect the following coefficients, and evaluate how changes in these coefficients affect facility operations

- moderator and/or coolant temperature coefficient
- Doppler coefficient
- power Doppler coefficient
- power defect
- pressure coefficient
- void coefficient.

C Evaluate the impact of decay heat generation on posttrip operations for varying facility conditions.

C Describe the bases for limits on power escalation and descent.

C Calculate reactivity balance, critical rod position, shutdown margin, and inverse count-rate ratios (1/m).

C Determine the effect of poison concentration and loading on reactivity control and fuel management for

- fission product poisons
- burnable poisons
- nonburnable poisons.

C Determine the effect of each of the following on reactivity control and facility operations

- thermal-hydraulic limits
- linear heat generation rates
- minimum critical power ratio
- average planar linear heat generation rate
- peaking factors.

C Evaluate the effect of the following on reactivity control and facility operations

- unbalanced core flow
- recirculation flow changes
- control rod movements
- natural circulation
- thermal-hydraulic instabilities
- main generator load changes
- inadvertent changes in burnable poison concentration
- xenon and samarium concentrations.

C Discuss ways to prevent, identify, and mitigate operation with failed fuel.

4.3.3 Chemistry Fundamentals

Training should provide trainees with the requisite knowledge and skills to perform the following:

C Explain the purpose of chemistry control and the guidelines used to maintain proper facility chemistry.
C Describe the effect that pH, conductivity, and impurities have on the operation and lifetime of components in the facility systems and what processes are used to control and monitor these chemistry parameters.
C Describe hazards and safety requirements associated with chemicals and gases used in the facility.
C Evaluate the results of chemical and radiological analyses to determine facility system conditions and provide recommendations to mitigate adverse trends.

4.3.4 Electrical Fundamentals

Training should provide trainees with the requisite knowledge and skills to perform the following:

C Describe the principle of operation and basic construction of major components such as
- fuses
- magnetic overloads
- undervoltage coils
- shunt coils.

C Describe how electrical characteristics of a circuit are affected by
- temperature
- humidity
- radiation
- magnetic flux
- ground fault.

C Demonstrate the ability to provide technical advice to the operating crew regarding the function of electrical equipment using system component and circuit data
- rectifiers
- motors
- circuit breakers
- inverters
- generators
- transformers
- electrical protective devices such as fuses and protective relays.

4.3.5 Electronics Fundamentals

Training should provide trainees with the requisite knowledge and skills to perform the following:

C Describe the function and principles of operation of
  - facility process computers
  - facility high-speed data acquisition systems.

C Describe the principle of operation and failure mechanisms of
  - integrated circuits
  - diodes
  - light-emitting diodes
  - optical couplers
  - transistors
  - bistables
  - logic circuits
  - time-delay circuits
  - piezoelectric devices.

4.3.6 Nuclear Physics

Applicable learning objectives should enable the trainee to explain the following:

C Criticality control
C Nuclear cross sections
C Fission process and chain reaction
C Prompt and delayed neutrons
C Reactivity coefficients
C Reactivity control methods
C Poison effects
C Power distribution and peaking factors
C Fuel cycles
C Fuel management.

4.3.7 Materials Science Fundamentals

Training should provide trainees with the requisite knowledge and skills to perform the following:

C List the nuclear properties of materials that are considered in the design and construction of nuclear systems.
C Describe the relationship between stress, strain, and modulus of elasticity.
C Describe how material properties and strength are affected by

- irradiation
- chemical impurities in the environment
- pressure
- temperature and temperature gradient
- welding.

C Describe the conditions that contribute to pressurized thermal shock, and state the facility materials and equipment susceptible to it.

C Evaluate facility operations conditions to determine the margin to pressurized thermal shock limits.

4.3.8 Mechanical Equipment Operating Fundamentals

Training should provide trainees with the requisite knowledge and skills to perform the following:

C Identify the major components of the most common facility valves.

C Identify the basic valve types from symbols used in mechanical drawings.

C Describe the principle of operation of valve types such as

- relief
- gate
- globe
- ball
- needle
- pressure and back-pressure regulating
- butterfly
- check.

C Describe the principle of operation of valve operators types such as

- motor operators
- solenoid operators
- hand operators
- hydraulic operators.

C Describe how to check the position of remotely operated and manually operated valves.

C Describe the principles of operation of equipment such as

- heat exchangers
- filter demineralizers
- diesel generators.

C Describe the operating precautions associated with station diesel generators and operating practices that could lead to degraded diesel generator performance.

C Describe the principle of operation of pumps such as

- reciprocating positive displacement
- rotary positive displacement
- jet
- centrifugal

- axial flow
- mixed flow.

4.3.9 Radiation and Radiological Protection Fundamentals

Training should provide trainees with the requisite knowledge and skills to perform the following:

C Describe the operating principle for radiation detection instruments such as
- ionization chamber
- proportional counter
- Geiger-Müeller tube
- scintillation.

C State the purpose and functions of the criticality, process, airborne, and area radiation monitors in the facility radiation monitoring system.

C State the types of monitors used at the facility and the characteristics of the detectors used.

C Evaluate abnormal operation indications on the facility radiation monitoring system to determine possible causes.

C Predict radiation monitoring system response during emergency conditions.

4.3.10 Instrumentation and Control Fundamentals

Training should provide trainees with the requisite knowledge and skills to perform the following:

C Describe the principles of operation, typical applications, and failure modes of detectors and instrument strings such as
- bourdon tube pressure/differential pressure detector
- force balance transmitter
- bubbler system level detector
- float-type level detector
- buoyancy-type level/differential pressure detector
- manometer-type level/differential pressure detector
- venturi flow detector
- orifice flow detector
- rotameter
- pitot tube flow detector
- sonic flow meter
- pressure switches
- bimetallic temperature detector
- filled system temperature detector
- resistance temperature detector

  - thermocouple
  - pyrometer.

C Describe the failure modes of valve operators such as
  - pneumatic diaphragm
  - motor
  - piston
  - solenoid
  - hydraulic.

C Describe the operation of the process computer.

C Describe the application of wet and dry reference legs, and state their failure modes.

C Describe the effect of environmental conditions on facility instrumentation.

4.4 Facility Systems and Components Training

All facility systems relevant to safety and/or facility reliability should be covered during facility systems training. This training should include associated parameter values; control room indications and controls; and normal, abnormal, and emergency operating procedures and limitations associated with each system. Following this, emphasis should be placed on integrated plant operations and transient/failure analysis.

Training in facility systems and components should provide STA trainees with the requisite knowledge and skills to perform the following:

C State the purpose of the system.

C State the design basis of the system.

C Describe the characteristics and locations of major system components.

C State the normal and alternate power supplies of major system components.

C Describe system response to failure of instrument channels selected for control.

C Draw a basic block diagram of the system.

C State major precautions, limitations, and major safety considerations for the system, and describe their bases.

C Describe alternate methods of performing system design functions.

C Describe how the system is used to provide backup for other facility systems.

C Describe the Technical Safety Requirements limiting conditions for operations, their bases, associated surveillance requirement(s), and relationship to operability.

C State the parameters monitored in the system that are used to monitor that status of the engineered safety features.

C Describe how the system assists in maintaining the engineered safety features.

C Given system performance data, detect abnormalities, and determine possible causes for performance problems.

4.5 Facility Operations

4.5.1 Normal Operations

Although STAs are primarily involved in providing an independent assessment of facility conditions during abnormal and emergency facility conditions, STAs can contribute significantly to the safe and reliable operations of the facility during normal operations. Through routine independent monitoring of equipment and system operation, STAs can detect conditions that may be potential challenges to the engineered safety features. In this manner, STAs can focus on normal operations using preventive actions rather than just being reactive during abnormal and emergency conditions.

To enable STAs to function as contributing members of the operations team during normal operations, the training program should emphasize normal operations and provide the requisite knowledge and skills for STAs to perform the following:

- C Predict expected facility response for system operations covered in normal operating procedures.
- C Evaluate equipment and system operating conditions to identify degraded performance.
- C Evaluate equipment and system operations to determine impact on engineered safety features.
- C Evaluate facility conditions to identify potential causes of change in efficiency.
- C Evaluate facility conditions to determine compliance with facility Technical Safety Requirements.
- C Explain the basis for normal operating procedure limits or precautions.

4.5.2 Abnormal and Emergency Operations

Training in abnormal and emergency operations should provide the requisite knowledge and skills for STA trainees to perform the following:

- C Recognize a condition for which no procedures exist, and recommend operator action to maintain engineered safety features and stabilize the facility.
- C Predict the expected values of critical parameters as an event progresses.
- C State the anticipated indications, automatic actions, and immediate operator actions for selected analyzed events.
- C Describe long-term actions required for core cooling and/or facility stabilization.
- C Describe the initial facility conditions assumed in accident analysis.
- C Discuss the effects on accident progression of initial facility conditions outside the values assumed in accident analysis.
- C Describe the accidents analyzed in the facility Safety Analysis Report and the consequences of these accidents.
- C Describe the response and analysis of facility transients and accidents.

- C Evaluate facility conditions to determine the applicability of emergency operating procedures, and provide recommendations regarding facility control to maintain engineered safety features and stabilize the facility.
- C Describe the relationship of accident conditions to offsite consequences and protective actions strategies.
- C Evaluate facility conditions to assist the crew in classifying events.

4.6 Mitigating Damage

The shift operating crews must be able to recognize and respond correctly to mitigate the consequences of facility damaging accidents until management and technical help arrive onsite. They must continue to operate the facility to maintain the engineered safety features during degraded system or facility conditions.

Training methods and settings should be selected so that basic principles and recognition of appropriate parameters are understood and operating proficiency is gained to mitigate facility damage. For maximum effectiveness, training on mitigating facility damage should be factored into existing training material whenever feasible rather than making this area a stand-alone subject. Simulator exercises and classroom case studies based on accident sequences that lead to facility damage should be developed by extending existing training on anticipated transients to include facility-damaging events.

Training on mitigating facility damage should provide trainees with the requisite knowledge and skills to perform the following:

- C Identify conditions that could, if not corrected, lead to facility damage during or following a transient.
- C Evaluate facility conditions to determine the scope of facility damage.
- C Describe the mechanisms controlling reactivity under facility damage conditions.
- C Analyze facility conditions to determine the status of facility, and develop strategies for the operating crew to prevent further facility damage and commence accident recovery procedures.
- C Assess the status of the normal radioactive containment barriers, describe mechanisms for preventing the release of large quantities of radioactive material or radiation to the environment, and develop strategies for the operating crew to restore containment barriers.
- C Describe the instruments used to monitor critical facility parameters, interpret these parameters under accident conditions, and identify alternate equipment or methods available to provide appropriate information.
- C Describe and assess the performance of equipment (including nonsafety-related equipment) that can be used to maintain the engineered safety features under accident conditions, and provide recommendations to the operating crew on their use.

4.7 Simulator Training (Category-A Reactors Only)

Initial training should incorporate training on facility operating fundamentals, system integrated response, and event analysis in the simulator. The simulator should be used to provide demonstration training, support classroom training, and develop teamwork and diagnostic skills necessary to support the operating team. For facilities without simulators, facilities might consider using drills, walkthroughs, etc. to conduct the training described in this section.

Demonstrating facility operating fundamentals and principles on the simulator greatly enhances STA comprehension and retention. The following are some of the situations for which demonstration training is effective:

- Reinforcing classroom sessions in theory or system operation
- Creating awareness of lessons learned from operating experience
- Showing the effect operators or maintenance personnel have on the facility while performing the jobs
- Showing the skills required to control the facility
- Showing the effects of a transient on the facility
- Demonstrating the strategy of facility procedures to mitigate the severity of an event
- Demonstrating an understanding of the impact of equipment failure, malfunctioning and out of service equipment.

The simulator also can be used to develop and enhance the ability of the STA to operate with a control room team. Simulator exercises can be developed to specifically address some of the skills necessary for operating teams to be successful. Training in the simulator in teamwork, diagnostics, and procedures should enhance the ability of the STA to interface with the control room team, and thus result in improved performance in the following:

- Ability to use symptom-based procedures through a better understanding of procedural strategies and improved ability to think logically while using procedures
- Ability to cope with situations not specifically addressed by procedures
- Ability to predict facility response and the effects of operator actions
- Ability to think through changing conditions logically, thus increasing the possibility of terminating an event and initiating appropriate recovery actions.

Training in the simulator should incorporate all areas of STA performance at a frequency sufficient so that necessary skills are developed and maintained. Training should be conducted using a shift team concept. Static simulator examinations should be performed to

assess the accident diagnostic ability of the STA. Periodically, STAs should attend simulator training with licensed operators and perform their STA functions. Simulator training should address the following areas:

- Conduct of normal operations
- Diagnosis of and response to abnormal or emergency conditions in the nuclear system and balance-of-plant systems
- Diagnosis of and response to emergency conditions that challenge the engineered safety features, such as
  - control of reactivity
  - maintenance of reactor coolant system integrity
  - assurance of adequate core cooling and decay heat removal
  - maintenance of containment integrity.

Simulator exercises should be conducted from a variety of operating conditions. This should include the following modes and transitions between these modes:

- Power operations
- Startup
- Hot standby
- Hot shutdown
- Cold shutdown.

Simulator exercises should address events of various severity and complexity initiated by events such as natural disasters, fires, or toxic gases, human error, and instrument or equipment failure. Based on significant events at operating facilities in recent years, some exercises should include multiple failures that provide opportunities to assess the ability of the STA to deal with complex situations and establish priorities for corrective action.

Simulator training should be structured to reflect an actual facility operating environment and to apply the theory and fundamentals presented in lecture and discussion sessions to actual facility situations. In-house and industry operating experiences should provide examples of initiating events, event sequences, and lessons learned that need to be used when developing scenarios. A sufficient number of scenarios should be developed initially, and new scenarios should be added periodically so that the STAs are presented with varying situations to diagnose. Repeated use of the same scenario causes STAs to make conditioned responses rather than making a true diagnosis of the event. Additionally, enough scenarios should be developed so tasks are exercised under different facility modes.

4.8 Probabilistic Risk Assessment

For those facilities for which a Probabilistic Risk Assessment (PRA) has been performed, initial and continuing training programs should include the principal results of the PRA. The training should address the following:

- The importance of facility systems in preventing damage or severe accidents
- The probabilistic basis for defining magnitudes and compositions of potential releases of radionuclides (or other toxic materials) and consequences of potential releases in terms of facility worker and offsite population health effects
- Dominant types of potential operational accidents as defined in terms of frequency and consequences
- Locations of all significant amounts of radioactive and other hazardous materials, and measures to prevent their release
- The importance of maintaining operational limits and conditions, and the consequences of violating those limits
- Identification of potential hardware failures and human errors which constitute dominant contributors to important accident sequences
- The role PRA can play in optimizing operating limits, Technical Safety Requirements, testing, and maintenance intervals
- The role of external events such as earthquakes, extreme winds, flooding, transportation accidents, etc., in terms of their contribution to facility risk
- The role PRA can play in evaluating proposed changes in operating procedures or equipment configuration.

4.9 Nuclear Safety

A goal of operations of DOE facilities is that operation will not result in any significant impact on the health and safety of the public, facility employees or contractors, or the environment. Therefore, STA trainees should receive training in the following areas:

- Nuclear criticality safety limits
- Nuclear materials safeguards
- Limiting conditions of operation
- Safety envelope
- Facility Safety Analysis Report
- Technical Safety Appraisals
- Safety analysis and review system
- DOE Nuclear Safety Policy Statement
- DOE orders relating to nuclear safety
- Applicable NRC regulations relating to nuclear safety
- Operating experience.

4.10 Occurrence Reports

STA trainees should receive occurrence report training as appropriate to their job responsibilities. This training should be further emphasized in the continuing training program. Training should address the following:

- Importance of the occurrence reporting system
- Internal, external, and follow-up notification requirements of reportable occurrences
- Occurrence categorization and notification process
- Utilization of reportable occurrence information
- Occurrence Reporting and Processing System (ORPS)
- Data collection required for generation of occurrence reports, to include
  - operating conditions at the time of the occurrence
  - documented statements of persons who were involved in or witnessed the occurrence
  - recordings, charts, and/or printouts from instruments or computers monitoring the operation during the occurrence
  - first 18 fields of an occurrence report
- Internal and external investigations of the occurrence
- Final evaluation and lessons-learned from occurrence.

4.11 Facility Self-Assessment

STA trainees should receive training in facility self-assessment as appropriate to their job responsibilities. This training should be further emphasized in the continuing training program. Training should include the following topical areas:

- Importance of self-assessment
- Role of the STA in the self-assessment program
- Self-assessment process and reporting requirements
- Standard operating procedures for self-assessment
- Root cause analysis process
- Reporting system to document, communicate, and track findings and corrective actions.

4.12 Conduct of Operations

STA trainees should receive training in conduct of operations because the STA is a key player in the safe operation of the facility. This training should be further emphasized in the continuing training program. Training should address the requirements listed in DOE Order 5480.19, *Conduct of Operations Requirements For DOE Facilities*.

4.13 Suspension of Operations

The STA trainee should receive training in the criteria for suspending facility operations. This training should be given by a management representative. The STA should receive training in the following:

C Suspending facility operations
C Reporting requirements for suspending operations
C Remedial actions to resume after suspended operations.

5. CONTINUING TRAINING

The frequency of continuing training should be on a biennial cycle and should be based on job performance. Continuing training in technical and administrative subjects should be provided to help ensure that STAs maintain and improve their job proficiency. Continuing training program should not be a repeat of the initial training program, rather it should build on the knowledge and skills that the individual gained during initial training. Specific areas that should be part of a continuing-training program include but are not limited to the following:

- Facility, DOE Complex, and commercial nuclear industry operating experience
- Abnormal and emergency procedures
- Changes to applicable facility procedures, codes, and standards
- Significant facility systems, components, and equipment changes
- Changes to Technical Safety Requirements
- Selected topics from the initial training program to correct identified weaknesses and performance problems
- Selected fundamentals with emphasis on seldom-used knowledge and skills necessary to ensure safety
- Lessons learned and near-miss events
- Topics requested by STAs or management.

During evaluations of training program effectiveness, areas for training opportunities may be identified. When performance deficiencies or training weaknesses are noted, the continuing training program can serve to upgrade the skills and knowledge level of the STA trainee. For further guidance in developing, implementing, and evaluating a continuing training program, refer to the DOE *Guide to Good Practices for Continuing Training*.

The participation and performance of STAs in the continuing training program should be documented. Documentation should be in a form that is easily auditable by internal and external reviewers.

5.1 Teamwork and Diagnostic Skills

Critical to the success of the STA is the ability to systematically apply knowledge and skills to complete assigned tasks. STAs must possess the necessary knowledge and skills to monitor facility data, determine if facility response is as expected, and recommend intervention activities when required to contribute effectively as members of the operations team during both normal and off-normal facility conditions. To enable STAs to function as team members and fulfill the STA function, training should be provided in teamwork and diagnostic skills.

Training provided to STA trainees in teamwork should contain the requisite knowledge and skills to perform the following:

- C Demonstrate and promote effective communications, using both verbal and nonverbal methods.
- C Interact effectively with team members.
- C Provide mentoring to team members to achieve team goals.
- C Contribute to the resolution of conflicts within the control room team and with interfacing organizations.
- C Respond effectively to different leadership systems.
- C Recognize and mitigate individual stress.

Training provided to STA trainees in diagnostics should contain the requisite knowledge and skills to perform the following:

- C Recognize the importance of attention to detail and the early recognition of problems.
- C Monitor facility data, and detect impending facility problems.
- C Identify facility conditions requiring action.
- C Differentiate between actual and expected facility conditions.
- C Determine expected facility response in abnormal transients, and identify deviations.
- C Identify potential causes of problems.
- C Analyze potential causes of problems to identify a most probable cause(s).
- C Prioritize facility problems using a systematic process.
- C Evaluate success of corrective action, and respond accordingly.

Further discussion of this subject is provided in the DOE *Guide to Good Practices for Teamwork Training and Diagnostic Skills Development*.

6. PROFESSIONAL DEVELOPMENT

An important aspect of developing an STA is ongoing professional development. The selection process can be helpful in forming the basis for long-range professional development.

Each facility should establish activities that promote the professional growth of the STA. These activities should provide a means of career development to ensure that STAs remain motivated in their current assignments. They should also be provided the opportunity to increase their contribution to the facility.

Good practices that can enhance professional growth include management by objectives and individual development plans. These approaches link individual performance to facility goals and can provide benefits to both the organization and the individual STA.

Professional growth opportunities may be identified from sources such as facility human resource groups or surveys of STAs. Professional development activities may include the following:

- Working for short periods in a variety of functional areas in the facility nuclear organization to broaden their perspective and understanding of overall plant functions
- Authoring operating procedures and other facility documentation
- Assignments to the operations department's problem-solving and decision-making “task forces”
- Participating in operations committees and groups (operations review, design review, procedural review, etc.)
- Participating actively in professional associations and operations-related workshops
- Enrolling in company-funded college vocational/educational programs
- Participating actively in professional organizations related to technical areas
- Visiting other nuclear facilities to broaden their perspective and to simulate comparison and emulation of good practices
- Membership in professional organizations [American Nuclear Society (ANS), etc.].

Another important element of the professional development of STA is the day-to-day mentoring provided by their manager. Though not formally structured or documented, mentoring should focus on individual needs and reinforcement of management expectations, with the results reflected in the improved performance of the STA.

An additional source of professional development is the Shift Technical Advisor Professional Development Seminar that is described in Appendix B. The seminar would provide an environment for STAs to share and learn from peers. This seminar should be integral part of the ongoing development of STAs. The seminar is designed to augment, but not replace, each facility's professional-development program for STAs.

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7. EVALUATION

The training program should be evaluated on a continuous basis to determine program effectiveness using DOE-STD-1070-94, *Guidelines for the Evaluation of Nuclear Facility Training Programs*. Recommended changes to the training program as a result of the evaluation should be formalized, approved, and tracked to implementation. The areas encompassed should include the following:

- Feedback from recently qualified STAs and their managers
- Inspection, audit, and evaluation reports of training completed by outside organizations and facility personnel
- Individual performance evaluations related to STA duties
- Facility and simulator performance evaluations and examinations results
- Facility operations problems related to individual knowledge or skills deficiencies
- Occurrence reports from the facility or the nuclear organization relevant to STAs
- Changes in the job assignments related to facility duties or safety-related functions of STAs
- Regulations or standards affecting STA training
- Assessment by the operations manager of STA performance deficiencies related to training
- Analysis of changes from updates in the STA position assessment.

Training program evaluations should also be used to identify operating practices, facility design factors, and procedures that adversely impact the performance of STAs. This evaluation should include root-cause analysis to determine if problems are attributable to training, procedures, operating procedures, facility design, or any combination of these factors. Analysis results and recommendations for corrections should be transmitted to facility line management for resolution.

The operations supervisor should review the training curriculum periodically to identify deficiencies, required changes that need immediate action, or significant program modifications. The supervisor should recommend corrective action for review and approval by the training manager and operations manager. Additionally, the operations training supervisor should implement the necessary changes to the program and lesson plans.

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8. TRAINING RECORDS

Auditable records of each individual's participation and performance in or exception(s) granted from the training program(s) should be maintained. Training records should include the following (as appropriate):

- C Education, experience, employment history, and most recent health evaluation summary
- C Training programs completed and qualification(s) achieved
- C Lists of questions asked and the examiners' overall evaluation of responses on oral examinations
- C Correspondence relating to exceptions granted to training requirements (including justification and approval)
- C Records of qualification for one-time-only special tests or operations
- C Attendance records for required training courses or sessions
- C Latest completed checklists, graded written examinations (with answers corrected as necessary or examination keys) and operational evaluations used for qualification. Some facilities may prefer to maintain a separate file of completed examinations with answer keys for each individual, since inclusion of the examinations with the answer key requires controlled access to training records to maintain examination security.

A historical record that documents initial qualifications on each position qualified should be maintained as part of individual training records. For example, if an individual initially qualified in 1986, the record should have the date and name of the qualification entered into it. If more than one qualification is achieved and maintained, the individual training record should contain documentation to that effect.

For presently held qualification(s), the completed examinations, checklists, operational evaluations, etc., should be maintained on record. When an individual holds qualification on multiple positions, records that support current qualifications for each position should be maintained. Duty area or task qualification should be documented using a similar method (for facilities/positions that use duty area or task qualification instead of position qualification).

Upon requalification, records that supported the previous qualification may be removed from the record and replaced with the information documenting present qualification. Superseded information should be handled in accordance with procedures contained in applicable DOE Orders.

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APPENDIX A
SHIFT TECHNICAL ADVISOR INITIAL TRAINING LESSON SPECIFICATIONS

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SHIFT TECHNICAL ADVISOR INITIAL TRAINING LESSON SPECIFICATIONS

This appendix provides lesson specifications for an STA initial training program. These lesson specifications should be used in conjunction with the topical subjects discussed in the Initial Training section of this guide to develop an initial training program. The learning objectives on which the training is based address higher-order knowledge and abilities. Because of this, these learning objectives should be modified to be consistent with facility-specific philosophy and values.

These lesson specifications and the topics described in the Initial Training section provide a framework which the training department can use to enhance or develop facility training materials. These lesson specifications are not intended to limit facility-specific development of initial training materials. Instead, the lesson specifications provide the learning objectives and suggested activities from which to develop instructional materials and evaluation methods. The suggested learning and evaluation activities in the lesson specifications are one method for presenting appropriate STA training and, as such, should be reviewed and modified to meet the needs of line management.

Learning activities for STAs should maximize the experiential learning process (i.e., active trainee participation and internalization) and minimize use of lectures. The learning activities may be conducted and documented through the use of any or all of the following:

- Discussion outlines or checklists
- Qualification guides
- Simulator training
- On-the-job interaction with appropriate persons in the nuclear organization
- On-the-job as an STA under instruction
- Role-plays
- Case studies
- Classroom presentations.

The learning objectives in each lesson specification have conditions for performance (or are implied as being “from memory”) and action statements. Learning objective standards should be added or modified to conform to the performance standards at the facility and the level of performance expected from the trainee. Often, and especially for higher-order learning objectives, the standard statements should be qualitative rather than quantitative.

Suggested instructors or facilitators for individual lessons are included in the suggested learning activities portion of the lesson specifications. These are only suggestions; however, involvement by appropriate facility managers is an important part of the success of the STA initial training program. In those learning activities where a suggested instructor is not indicated, selected training staff instructors should be used.

References have been provided for the lesson specifications. These references are generic in nature and are given as recommended references for lesson preparation. The references used may vary and should be modified as necessary to meet individual facility needs. Also, references to operating experience should include selected industry operating experience and facility-specific operating experience. Appropriate and more recent operating experience should be incorporated into and normally replace the operating experience used in STA training as it is updated over time.

In order to evaluate the effectiveness of the training presented to STA trainees, suggested evaluation activities have been provided in the outlines in this appendix. Performance checks and other interactive evaluation methods should be considered. These could be both formal and informal exchanges between the trainee and the instructor but should be documented. The evaluation activity that is used for each specific lesson or group of lessons should be based on the associated learning objectives and may be achieved concurrently with the training activities. Evaluations should be focused on the trainee's understanding of the underlying principles associated with each learning objective and the internalization of the material.

The lesson specifications described above for the initial training program are presented on the following pages. A brief table-of-contents page has been prepared to facilitate determining the location of each lesson. The lesson specifications are divided into lesson modules. The terminal learning objectives are numbered consecutively from module to module. The lesson modules are represented in the following format:

- OE—Operating Experience
- AN—Analytical Process
- OB—Observation skills
- SA—Safety
- AD—Administrative Procedures
- TE—Technical (plant design bases)
- EP—Emergency Plans
- AC—Accident Assessment.

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LESSON SPECIFICATIONS

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Application of Operating Experience

Lesson Module: Operating Experience **Lesson Number: OE—1**

Terminal Learning Objective:

1. Promote the application of lessons learned from operating experience.

Enabling Learning Objectives:

1.1 Describe the facility and company philosophy concerning the review and use of lessons learned from operating experience.

1.2 Using the appropriate facility procedure(s), explain the facility/company process for obtaining, reviewing, and assigning actions based on the lessons learned from industry- and facility-specific operating experience.

1.3 Describe how application of the lessons learned from operating experience can prevent a facility event and how you can make better use of the lessons learned from operating experience in the future.

References:

1. Plant procedures and policies concerning receipt or initiation, review, and incorporation of industry- and facility-specific operating experience.

2. Examples of operating experience that were used to benefit facility operations, and examples that could have been used more effectively to avoid a facility event. (Note: The facility event can be any activity that caused undesirable results. It does not need to be limited to occurrence reports that are significant.)

Enabling Learning Objectives	Suggested Learning Activities:
1.1, 1.2	Review and discuss the facility philosophy and process for obtaining and using industry- and facility-specific operating experience. Specifically discuss the role of the STA in this process (e.g., provide the perspective of an observer in the review process and share facility-specific operating experience in a complete and candid manner).
1.3	Discuss several examples and the facility-specific benefits derived from obtaining and incorporating the lessons learned from industry- and facility-specific operating experience. Include in this discussion how the use of lessons learned from operating experience has prevented several events and how better use of operating experience could have prevented several events. Emphasize the role of the STA in achieving the maximum benefit from the examples discussed and the lessons learned from operating experience in general. Discuss how the STA can impart similar attitudes and resulting behavior to the operators. Also, discuss how the STA can influence support personnel to use the lessons learned from operating experience for their benefit.

Enabling Learning Objectives	Suggested Evaluation Activities:
1.1-1.3	Conduct a qualitative evaluation of trainee responses and discussions.

Maintaining a Broad View of Facility Operations

Lesson Module: Operating Experience **Lesson Number: OE—2**

Terminal Learning Objective:

2. Demonstrate a broad view of facility operations.

Enabling Learning Objectives:

2.1 Given a description of an operating task that puts the public at risk, state the steps necessary to eliminate the risk.

2.2 Describe what conservative actions might be necessary to prevent challenges to facility safety (or decrease in the margin of safety) during facility operations.

2.3 Given a series of operating tasks, evaluate each task to determine the degree to which the STA should be personally involved.

2.4 Given a facility condition, diagnose the impact that manual intervention, in anticipation of automatic system actions, would have on facility operation.

2.5 Given a facility condition involving several parallel tasks, identify the indication that must be monitored to maintain oversight and overall perspective of facility operations.

References:

1. Examples of operating experience that have resulted in occurrence reports such as a severe or adverse accident following an improperly conducted test, a criticality event, or problems experienced during a heat exchanger tube rupture.

Enabling Learning Objectives	Suggested Learning Activities:
2.1, 2.2	Review and discuss, with an experienced STA, the necessary involvement of the STA and the impact of the STA's actions on facility operations and public safety.
2.2-2.5	Use a case-study approach to facility operations with emphasis on STA involvement and oversight to maintain the basic design operating considerations associated with safety. Stress the responsibility of and need for the STA to maintain an overall perspective of facility operations and not be so drawn into a specific problem or activity that this perspective is essentially lost. Reference 1 may be helpful in demonstrating this need [e.g., taking conservative actions, monitoring appropriate indications, and exercising necessary caution when the facility approaches or is in a condition that could result in challenges to reactor facility safety or a reduced safety margin (operating experience can be used to support this activity)].
2.1, 2.2, 2.5	A simulator (for those facilities that have them) may be used to exercise implementation skills in advocating public safety, STA involvement, monitoring appropriate indications, and exercising caution when the facility is approaching or in a condition that could result in reduced safety.

Note

The simulator may be used to exercise these skills in conjunction with other learning objectives and training activities.

Enabling Learning Objectives	Suggested Evaluation Activities:
2.2-2.5	Conduct a qualitative evaluation of trainee responses and discussions.
2.1, 2.2, 2.5	Complete appropriate simulator objectives that include advocating public safety, STA involvement and oversight, and exercising necessary caution when the facility is approaching or in a condition that could result in reduced safety.

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Problem-Solving Skills

Lesson Module: Analytical Process **Lesson Number: AN—1**

Terminal Learning Objectives:

3. Diagnose facility operating problems.

4. Lead in the use of the fundamental principles for effective problem-solving.

Enabling Learning Objectives:

3.1 Given a significant event or accident, review the information, identify the root cause(s), and recommend and verify corrective actions.

3.2 When making decisions based on a large amount of input data, categorize the data, ignore irrelevant data, and prioritize important facts for evaluation and action.

3.3 Given a set of personnel, facility, or equipment conditions, and actions taken in response to the conditions, predict the most probable outcomes.

3.4 Given information that needs to be acted upon and intervening variables or distractors, conscientiously and thoroughly review the information before making a decision.

3.5 Once a solution to a problem has been determined, implement it, and follow up to determine that the solution is effective.

3.6 When one or more people have input to a decision, facilitate a discussion of the facts, issues, and possible responses by listening to input from everyone, asking questions, accepting questions, and leading the group to a decision.

3.7 Using a team approach (group discussion, brainstorming, etc.), develop a problem-solving plan of action for a given set of conditions.

3.8 Given a set of conditions, actions taken, and expected responses to the actions, diagnose the causes when the expected responses do not occur.

3.9 Using alternate indications for a given set of conditions, and before selecting a course of action, verify or confirm all initial assumptions made during a problem-solving activity.

3.10 Given a situation identified as a problem, manage the follow-through to an acceptable solution, either directly or through delegation, by setting priorities and evaluating resources.

3.11 Given a problem requiring resolution, anticipate the outcome of potential decisions and predict the expected impact of the final decision.

3.12 For a given activity, assess the impact of procedural/resource limitations and time constraints on planned actions.

3.13 When choosing among alternative actions, prioritize the alternatives to select the optimum choice including actions outside of established procedures.

3.14 Given a situation requiring a decision, consider whether the benefits outweigh the risks for selected alternatives.

3.15 In rapidly changing or uncertain situations, display a cautious approach to decision making.

3.16 Develop conservative decisions that protect the safety of the facility, personnel, and equipment.

3.17 Following the completion of a job, task, or step, evaluate whether the actions taken resulted in the desired response.

4.1 Given a situation or problem to solve, apply knowledge gained from operating experience to identify possible causes.

4.2 Explain and support the reasons for making cautious decisions.

References:

1. Problem-solving and root cause analysis reference(s) or handout(s).

2. Conduct of operations procedure.

3. Examples of situations (operating experience) with associated data (if case-study approach discussions are used).

Enabling Learning Objectives	Suggested Learning Activities:
3.1, 3.2	Review and discuss problem-solving skills with an individual who is routinely assigned to review events and problems. Include a discussion of root cause analysis, recommend corrective actions, and the basic principles and techniques that may be used.
3.3-3.17 4.1-4.2	Apply the basic principles and techniques for problem-solving to actual situations or to exercises such as the case-study approach. In so doing, use a team approach to problem-solving and carry out or discuss follow-up activities for recommended corrective actions. Develop the application of caution, a questioning attitude, dealing with uncertainty, and open-mindedness during these learning activities. This may be accomplished with an occurrence investigation team, a human performance enhancement team, an experienced STA, or an instructor. During these learning activities, the trainee should be faced with operational situations encountered by STAs.

Note

Existing simulator scenarios may be used to exercise problem-solving skills in conjunction with other training activities. Postexercise critiques and discussions should be used to review results and sharpen the problem-solving skills that were applied.

Enabling Learning Objectives	Suggested Evaluation Activities:
All	Conduct a qualitative evaluation of trainee responses and discussions, including caution, a questioning attitude, dealing with uncertainty, and open-mindedness.

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Application of Observation Skills

Lesson Module: Observation Skills **Lesson Number: OB—1**

Terminal Learning Objective:

5. Apply the results of observations in the control room and facility to management of shift activities.

Enabling Learning Objectives:

5.1 Identify the steps of the observation process.

5.2 Describe how the results of observation of facility and control room activities can be used.

5.3 Given a task affecting operations, evaluate the task to determine the level of independent verification needed.

5.4 Given an actual or simulated task affecting operations, identify areas for improvement and areas where additional investigation is required.

References:

1. Appropriate administrative procedures.

Enabling Learning Objectives	Suggested Learning Activities:
5.1-5.3	Review and discuss, with an operations manager, the role of the STA in observing facility activities. Discuss the techniques for observing personnel performance and facility conditions (e.g., material, cleanliness, and industrial safety conditions) in a thorough and critical manner as part of the normal routine for the STA. Emphasize really "seeing" what exists, application of observation results, and taking action (i.e., reinforcing what is correct or taking action to correct deficiencies).
5.4	Perform a structured exercise of observation skills on operations activities (i.e., operators performing tasks or technicians or workers performing tasks that have a direct effect on facility operations) and inspection of facility conditions (e.g., material, cleanliness, and industrial safety conditions). Facility observations (including facility tours) with the operations manager or an experienced STA can be useful in providing the experience. Simulator activities and videotaped operational activities may also be useful in providing the experience.

Enabling Learning Objectives	Suggested Evaluation Activities:
5.1-5.3	Conduct a qualitative evaluation of trainee responses and discussion.
5.4	Conduct a critique during the structure exercise.

Industrial Safety

Lesson Module: Safety **Lesson Number: SA—1**

Terminal Learning Objective:

6. Evaluate potential industrial safety problems associated with work assignments or operator tasks.

Enabling Learning Objectives:

6.1 Describe the effects of various facility operations on radiation levels in work areas.

6.2 List potential processing hazards.

6.3 Describe situations involving the potential for tripping, falling, dropping items, hearing loss, and sight loss.

6.4 Describe potential facility situations that present electrical shock hazards.

6.5 Describe potential facility problems associated with high-energy systems.

6.6 Describe the typical risks and cautions when working around rotating equipment.

6.7 List the methods available for determining if an industrial safety problem exists.

6.8 Describe any unique facility hazards.

6.9 While viewing a movie/videotape or on a facility tour, identify actual or potentially unsafe work practices.

6.10 Given a facility work assignment, predict potential safety problems and actions to take to prevent them.

6.11 Discuss reasons for the industrial safety program including the potential effects of safety problems on the company.

References:

1. Company safety manual.

2. Annual safety reports.

3. Examples of leadership and management problems that have resulted in occurrence reports such as excessive personnel radiation exposures caused by inadequate work practices, an inadvertent introduction of hydrogen in the instrument and facility air systems, or extremity overexposure during system or compartment closeout inspection.

Enabling Learning Objectives	**Suggested Learning Activities:**
6.1-6.8, 6.11	Review and discuss, with an emphasis on recognition of hazards, potential personnel injury hazards, facility radiological hazards, responsibilities of STA, preventive measures, and reasons for safety programs (i.e., potential consequences to employees and the company) with the facility safety coordinator or other individual knowledgeable of industrial safety practices.
6.9	Perform a structured exercise (observation) with a discussion on the results of the observation, including application of observation skills.
6.10	Use a case-study approach to industrial accidents, including a discussion of accidents and injuries that have occurred at the facility (if possible), and how they could have been prevented. Use of accident and injury reports that describe undesirable trends and the operating experience listed in occurrence reports can be used to support this activity.

Enabling Learning Objectives	**Suggested Evaluation Activities:**
6.1-6.8 6.11	Conduct a qualitative evaluation of trainee responses and discussions.
6.9	Review of the product resulting from the observation.
6.10	Review products derived by trainees during the case study.

Personnel Accident Procedures

Lesson Module: Administrative Procedures **Lesson Number: AD—1**

Terminal Learning Objective:

7. Apply administrative procedure requirements of personnel accidents.

Enabling Learning Objectives:

7.1 Given an industrial safety event, analyze the event for the root cause(s).

7.2 Given a personnel accident event and using facility procedures, develop a plan to accomplish required activities.

References:

1. Appropriate facility administrative procedures.

2. Applicable portion of company safety manual.

3. Site emergency plan.

Enabling Learning Objectives	**Suggested Learning Activities:**
7.1, 7.2	Use a case-study approach, performed by the facility safety coordinator or another individual knowledgeable of industrial safety practices, which addresses a personnel accident and includes a diagnosis of root causes and a determination of activities to be accomplished by the STA. The case study should include a discussion of the bases for the company's safety policy, responsibilities of the STA following a personnel accident (including immediate and follow-up actions), company policy and the role of the STA in correcting accident causes, and the reasons for the implementation of procedural requirements during and following an accident.

Enabling Learning Objectives	Suggested Evaluation Activities:
7.1, 7.2	Review products derived by trainees during the case study, including correctness of diagnosis and the process used to determine causes, completeness, and correctness of actions to be accomplished.

Facility Modifications

Lesson Module: Administrative Procedures **Lesson Number: AD—2**

Terminal Learning Objective:

8. Evaluate the effect of modifications or configuration changes to the facility.

Enabling Learning Objectives:

8.1 Given a proposed facility modification package, describe the reviews required for approval of the modification.

8.2 Given a proposed facility modification package, explain the purpose of each review in the approval process.

8.3 Describe what potential problems may occur from inadequate design review.

8.4 Given a proposed facility modification package, evaluate the package for potential problems.

8.5 Given a proposed facility modification package, explain how the change will affect facility operations.

References:

1. Appropriate facility administrative procedures

Enabling Learning Objectives	Suggested Learning Activities:
8.1, 8.3	Discuss with the manager, who is knowledgeable of the entire modification process: the key steps and the reasons for the steps in the modification process; authority of the STA and basis for this authority; and the associated responsibilities of the STA as seen by facility, design engineering, and construction managers.
8.2, 8.4, 8.5	Use a case-study approach to a modification that includes evaluation of potential problems with the design, facility limitations during work, and how to determine the effects of the modification on facility operation.

Enabling Learning Objectives	Suggested Evaluation Activities:
8.1, 8.3	Conduct a qualitative evaluation of trainee responses and discussions.
8.2, 8.4, 8.5	Review responses derived by trainees during the case study.

Temporary Modifications

Lesson Module: Administrative Procedures **Lesson Number: AD—3**

Terminal Learning Objective:

9. Apply and promote the philosophy underlying administrative procedure requirements for temporary modifications.

Enabling Learning Objectives:

9.1 Given a recommended temporary modification and using administrative procedures, describe the review and approval process for a temporary modification and discuss the reasons for the key steps in the process.

9.2 Given various requests for temporary modifications and facility conditions, evaluate the impact of temporary modifications on facility conditions.

References:

1. Appropriate facility administrative procedures.

2. Applicable facility operating experience.

3. Conduct of operations procedure.

4. DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*.

Enabling Learning Objectives	Suggested Learning Activities:
9.1	Discuss with the manager who is knowledgeable of the entire temporary modification process: what is an allowed temporary modification, including lifted leads and jumpers; the review and approval process; the authority of the STA and basis for this authority; and associated responsibilities in the process, as seen by facility and design engineering managers.
9.2	Use a case-study approach to various situations of a requested temporary modification; focus on evaluating all applicable considerations for the facility condition, any limitations that would be necessary, any individuals whose advice should be sought, and when authorization should not be given or should be delayed to involve the facility management team.

Enabling Learning Objectives	Suggested Evaluation Activities:
9.1	Conduct a qualitative evaluation of trainee responses and discussions.
9.2	Review responses derived by trainees during the case study.

Procedure Changes

Lesson Module: Administrative Procedures **Lesson Number: AD—4**

Terminal Learning Objective:

10. Apply and promote the philosophy underlying administrative requirements for procedure changes.

Enabling Learning Objectives:

10.1 Apply administrative procedure requirements for temporary or permanent procedure changes; discuss the reasons for these requirements.

10.2 Given a procedural change request for approval, evaluate the effect of a recommended procedure change on facility operations and safety to determine if a procedure change should be processed.

10.3 For an adverse operational situation, discuss the authorization of a procedural deviation to protect public health and safety as allowed by administrative procedures and discuss the factors considered and the benefits and risks in making such a decision.

References:

1. Appropriate facility administrative procedures.

2. Conduct of operations procedure.

3. DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*.

Enabling Learning Objectives	Suggested Learning Activities:
10.1	Engage in a discussion with management regarding the authority of the STA, using the basis for this authority, and associated responsibilities and expectations of management when authorizing change approvals.
10.2	Discuss factors that should be considered before approving a procedure change, using various actual or hypothetical recommended changes. Also, discuss who should be consulted if advice is desired and typical situations where authorization should not be given or should be delayed in order to involve the facility management team.
10.3	Discuss factors that should be considered before authorizing procedural deviations, and management expectations associated with such an authorization. Apply discussion to actual or hypothetical situations emphasizing the factors to be considered and the benefits and risks to authorizing a procedural deviation, especially in an unusual situation when it is deemed that public health and safety require such an authorization.

Enabling Learning Objectives	Suggested Evaluation Activities:
10.1-10.3	Conduct a qualitative evaluation of trainee responses and discussions.

Setpoint Changes

Lesson Module: Administrative Procedures **Lesson Number: AD—5**

Terminal Learning Objective:

11. Apply and promote the philosophy underlying administrative procedure requirements for setpoint changes.

Enabling Learning Objectives:

11.1 Identify and discuss the reasons for the required actions necessary to implement a setpoint change.

11.2 Given a need to adjust an equipment setpoint, evaluate the appropriateness of making the adjustment.

References:

1. Appropriate facility administrative procedures.

2. Applicable facility operating experience.

3. Conduct of operations procedure.

4. DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*.

Enabling Learning Objectives	Suggested Learning Activities:
11.1, 11.2	Discuss with management the key steps and the reasons for these steps in the setpoint change process, stressing the basic principles and operations impact of the process, authority of the STA, basis for this authority, and associated responsibilities as seen by facility and design engineering managers. Also, address considerations prior to approving adjustment, including who should be consulted if advice is desired, typical situations when authorization should not be given or should be delayed to involve the facility management team, and required actions to implement a setpoint change. Apply discussion to actual or hypothetical situations in a role-playing environment.

Enabling Learning Objectives	Suggested Evaluation Activities:
11.1, 11.2	Conduct a qualitative evaluation of trainee responses and discussions.

Postmodification and Postmaintenance Testing

Lesson Module: Administrative Procedures **Lesson Number: AD—6**

Terminal Learning Objective:

12. Apply and promote the philosophy underlying postmodification and postmaintenance test requirements.

Enabling Learning Objectives:

12.1 Identify when postmodification and postmaintenance testing are required using facility procedures and regulatory requirements.

12.2 Given a request to perform postmodification or postmaintenance testing, determine if the test can be conducted considering the potential adverse effects on facility conditions and personnel safety.

12.3 Determine if test results meet predetermined test criteria and if equipment may be returned to service.

12.4 Given the appropriate procedures, identify the required postmodification testing for several given situations.

References:

1. Appropriate facility administrative procedure.

3. Examples of operating experience that have resulted in occurrence reports such as valve inoperability caused by motor-operator failures, and lack of testing control that disables or challenges safety systems.

Enabling Learning Objectives	Suggested Learning Activities:
12.1-12.3	Discuss with the maintenance manager, engineering manager, or an experienced STA when testing is required and how to determine appropriate testing. This discussion should focus on the principles for determining what test is needed and understanding the intent of the test [i.e., testing that will verify proper operational performance of the equipment and system(s) worked on and isolated during the work]. Discuss the adequacy of facility conditions for safe test performance and evaluating test results. Focus on the responsibility and authority of the STA, the basis for this authority, and associated responsibilities as seen by facility and design engineering managers. Also, apply these testing principles to a discussion of postmaintenance testing and, as appropriate, postmodification testing.
12.2-12.4	Use a case-study approach to postmodification and postmaintenance testing including determining appropriate testing, considerations for authorizing performance, who should be consulted if advice is desired and evaluate the test results for follow-up action as necessary. Operating experience listed in occurrence reports can support this activity.

Enabling Learning Objectives	Suggested Evaluation Activities:
12.1-12.3	Conduct a qualitative evaluation of trainee responses and discussions.
12.2-12.4	Review responses derived by trainees during the case study.

Nonroutine Reporting Requirements

Lesson Module: Administrative Procedures **Lesson Number: AD—7**

Terminal Learning Objective:

13. Apply nonroutine reporting requirements to operational situations.

Enabling Learning Objectives:

13.1 Given a facility condition, analyze the process or system status to determine the reporting requirements.

13.2 Given a facility condition and using facility procedures, determine the reporting requirements.

13.3 Given a facility condition and using facility procedures, formulate required reports and identify proper notification.

13.4 Apply administrative and corporate philosophy to occurrence reporting requirements.

References:

1. Appropriate facility administrative procedures.

2. Federal, state, and local reporting requirements (excluding emergency plan reports).

Enabling Learning Objectives	Suggested Learning Activities:
None	Review basic concepts to familiarize the trainee with the nonroutine reporting requirements.
13.1-13.4	Discuss with an operations manager or an experienced STA situations with potential for adversely affecting the environment, and reasons for required reports, including environmental impact of parameters monitored, consequences to the company for failure to report, responsibilities to initiate various special reports, reporting priorities, and practical application of procedures for various situations.

Enabling Learning Objectives	Suggested Evaluation Activities:
13.1-13.4	Conduct a qualitative evaluation of trainee responses and discussions.

Applying Design Bases to Operations

Lesson Module: Technical **Lesson Number: TE—1**

Terminal Learning Objective:

14. Apply design bases to operational situations.

Enabling Learning Objectives:

14.1 Given various facility conditions, determine if operation is outside facility design bases.

14.2 In the presence of conditions outside the normal operating limits, identify any safety concerns associated with facility operations.

14.3 In the presence of conditions outside the design bases, identify the safety concerns associated with facility operations.

14.4 Given a situation where the facility is known to be outside the design bases, determine the appropriate course of action to return the facility to within design bases.

14.5 Explain the design basis for environmental qualification of instrumentation.

14.6 Given a facility-specific event that has the potential for putting the facility outside the design bases (such as loss of the residual heat removal system, and improper surveillance or maintenance), evaluate the effect of the event on facility safety using the appropriate design bases.

References:

1. Facility safety analysis reports regarding design bases.

2. Facility operating limits.

Enabling Learning Objectives	Suggested Learning Activities:
None	Review basic concepts to familiarize the trainee with information contained in the facility safety analysis report and plant operating limits.
14.1-14.5	Have a discussion with an operations instructor knowledgeable of facility design criteria) on fundamental design considerations and the relation of these considerations to facility operation and operating limits. Stress aspects of design that affect facility safety, including systems important to mitigating facility transients. Discuss the role of design bases and operating limits in minimizing the potential for adverse interactions among systems (e.g., adjustments of cooling water to a large component may affect cooling to other components served by that cooling water system). Discuss environmentally qualified equipment and the impact upon facility operation if environmental qualification deficiencies are encountered.
14.6	Use a case-study approach to facility-specific, challenging, and plausible event(s) that addresses the potential of putting the facility outside the design bases, such as loss of residual heat removal. Operating experience may be used to support this activity. (A simulator may also be used for demonstration following classroom discussion.)

Enabling Learning Objectives	Suggested Evaluation Activities:
14.1-14.5	Conduct a qualitative evaluation of trainee responses and discussions.
14.6	Review responses derived by trainees during the case study or simulator exercise as described by learning objectives.

Emergency Plans

Lesson Module: Emergency Plans **Lesson Number: EP—1**

Terminal Learning Objectives:

15. Determine protective measures for onsite personnel.

16. Recommend protective action guidelines to public officials.

17. Determine additional resources needed during an emergency event.

18. Maintain necessary communications during an emergency event.

Enabling Learning Objectives:

15.1 Given a facility condition requiring event classification, determine protective measures for onsite personnel in accordance with emergency plan.

15.2 Develop a plan for protection of onsite personnel when normal protective measures, routes, or devices are constrained.

16.1 Given emergency event condition and the emergency plan, identify the proper protective action recommendations in accordance with the emergency plan.

16.2 Make conservative recommendations based on system status and given information.

16.3 Given emergency conditions, identify constraints or impediments that may impact timely protection of the general public.

16.4 Given emergency event conditions, analyze the radioactive release data and make conservative recommendations in accordance with the emergency plan.

17.1 Identify organizations available to offer equipment or assistance for mitigating an emergency.

17.2 Given emergency conditions, determine additional resources needed for mitigating the event.

18.1 Explain the STA's responsibilities to the Emergency Control Centers in accordance with the emergency plan.

18.2 Given emergency event conditions, accurately communicate the required information in accordance with the emergency plan.

References:

1. Site emergency plan.

Enabling Learning Objectives	**Suggested Learning Activities:**
None	Review basic concepts to familiarize the trainee with information contained in the site emergency plan.
15.1, 15.2	Discuss with a senior member of the facility management team the emergency plan, with emphasis on responsibilities and application of procedures and basic philosophy associated with key steps in the procedures. A simulator may be useful to exercise application in conjunction with other training related to emergency plan implementation.
16.1-16.4 17.1, 17.2 18.1, 18.2	Have a discussion with an emergency preparedness director emphasizing appropriate conservative protective action recommendations, resources to mitigate an emergency event, determining relevant information, and responsibilities of the director and the STA. Role-play may be a useful technique for all or portions of the discussion.

Enabling Learning Objectives	**Suggested Evaluation Activities:**
All	Conduct a qualitative evaluation of trainee responses and discussions.
18.1, 18.2	Conduct a critique of the role-playing activity with emphasis on the STA's responsibilities.

Transient and Accident Analysis

Lesson Module: Accident Assessment **Lesson Number: AC—1**

Terminal Learning Objective:

19. Apply transient and accident analysis considerations to accident events.

Enabling Learning Objectives:

19.1 Discuss the assumptions used in the facility accident analysis.

19.2 Using the facility accident analysis curves, predict facility response to varied initial conditions.

19.3 Given a set of accident data, recognize the parameters to determine the system or process conditions.

19.4 Given a set of accident data, evaluate parameters to determine if a loss of cooling flow is occurring prior to equipment damage.

19.5 Given a set of accident data, identify when conditions have degraded to such an extent that system or process damage is possible.

19.6 During simulated conditions, demonstrate a thorough understanding of and the skills needed to maintain and restore the following safety conditions:

- C Transportation of fuels or wastes
- C Spent-fuel receiving and storage
- C Criticality control
- C Reactivity control
- C Process control
- C Heat sink availability
- C Primary system integrity
- C Containment integrity.

19.7 For a given facility operational condition, identify and discuss the failure mechanism (human or equipment) that would provide a large risk of facility damage.

19.8 List the parameters used and identify the indications of a degraded process.

19.9 State the potential problems of a degraded system or process, and discuss policies and procedures that are used to diagnose and mitigate the situation.

References:

1. Safety Analysis Report.

2. Probabilistic Risk Assessment data or reports.

Enabling Learning Objectives	**Suggested Learning Activities:**
None	Review basic concepts to familiarize the trainee with information that has operational impact contained in the safety analysis report.
19.1, 19.2 19.6-19.9	Have a discussion with an individual knowledgeable in transient and accident analysis, with an emphasis on providing the STA a thorough operational understanding of transient and accident analyses that will enhance the ability to make decisions during emergencies. Include a discussion of the concepts and information that have operational impact contained in the Probabilistic Risk Assessment. Operating experience may be useful to relate the reasons and operational considerations resulting from the analyses.
19.3, 19.4	Use a case-study approach with emphasis on understanding, evaluating, and responding to the parameters affecting core heat transfer capabilities and accident mitigation.
19.5, 19.6	A simulator (for those facilities that have them) should be used to exercise implementation skills related to the application of transient and accident analysis to events that could result in system or process damage. This should be done to the extent that the simulator models conditions approaching core damage. Emphasize the understanding and skills needed to maintain and restore safety functions.

Enabling Learning Objectives	Suggested Evaluation Activities:
19.1, 19.2, 19.6-19.9	Conduct a qualitative evaluation of trainee responses and discussions.
19.3, 19.4	Review products derived by trainees during the case study that would include parameters for evaluating system or process capabilities and accident mitigation.
19.5, 19.6	Complete appropriate simulator objectives that would include identification of and proper response to degraded system or process conditions.

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Emergency Operating Procedures

Lesson Module: Accident Assessment **Lesson Number: AC—2**

Terminal Learning Objective:

20. Apply the bases of the emergency operating procedures to accident events that may require deviation from the procedures.

Enabling Learning Objectives:

20.1 Explain the methods of verifying proper implementation of the emergency operating procedures, in accordance with facility operating philosophy.

20.2 Given an accident scenario, predict the facility response to the recommended actions by applying knowledge of emergency operating procedure bases.

20.3 Describe and discuss example situations that allow for deviation from emergency operating procedures, in accordance with facility administrative procedures.

20.4 Given situations that allow for deviation from emergency operating procedures, discuss the benefits of the deviation and potential problems if improperly applied.

References:

1. Facility emergency operating procedures.

2. Documents that describe the emergency operating procedures design bases.

3. Facility administrative procedures on deviation from emergency operating procedures.

Enabling Learning Objectives	Suggested Learning Activities:
None	Review basic concepts covered in previous training to refamiliarize the trainee with information contained in the emergency operating procedure design bases.
20.1-20.3	Have a discussion with an individual that is knowledgeable in transient and accident analysis, with an emphasis on providing the STA a thorough, design-based operational understanding of emergency operating procedures that will enhance their ability to make decisions during emergencies.
20.4	Use a case-study approach with emphasis on situations where deviation from emergency operating procedures is allowed. Also, discuss the limitations and problems associated with such a decision. Trainee's plans may be run in the simulator to illustrate the results.

Enabling Learning Objectives	Suggested Evaluation Activities:
20.1-20.3	Conduct a qualitative evaluation of trainee responses and discussions.
20.4	Review responses derived by trainee during the case study to include allowances in deviation from emergency operating procedures and associated problems and benefits.

Note

A simulator (for those facilities that have simulators) may be used to apply learning from discussions and case studies for evaluation of the terminal learning objective.

APPENDIX B
SHIFT TECHNICAL ADVISOR PROFESSIONAL DEVELOPMENT SEMINAR

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SHIFT TECHNICAL ADVISOR PROFESSIONAL DEVELOPMENT SEMINAR

A professional development seminar for STAs may be conducted by the facility. The purpose of this appendix is to provide facility and training management a description of the seminar for their use in planning professional development assignments. The seminar should augment, but not replace, each facility's professional development program for STAs.

A major attribute of this seminar is the interaction of trainees with their peers from other shifts in the facility. The benefit of this interaction will be the sharing by peers of different experiences, perspectives, and methods for effectively overseeing a shift crew. Each newly qualified STA should attend the seminar a short time after being assigned to the position.

The content of the Shift Technical Advisor Professional Development Seminar should incorporate the knowledge and skills beyond those necessary for initial training and qualification. The content of the seminar is primarily focused on leadership and management learning objectives, including some of the same subject areas as were in the initial training program for STAs. The seminar should be conducted in a facilitative manner that allows STAs to share experiences with one another, and should include the following subjects:

C Oversight of Facility Operations—evaluating conditions of reduced facility safety and recommending actions (to the shift supervisor) to minimize the impact of adverse conditions on facility operations and on public safety.

C Promoting Team Communication—application of team communication skills and the STA's role in promoting good communications.

C Team-Building Techniques—role of the team leader, facilitation skills to obtain the best results from the team as a whole and when participative management may be exercised.

C Applying Interpersonal Skills—various situations of interaction between the STA and the shift crew or other facility members in which the STA should optimize the responses of the individuals involved to achieve management objectives.

C Fact Gathering Through Interviews—the interview process, common interviewer mistakes, and listening techniques. (Type of interviewing addressed involves day-to-day facility interactions with operators, maintenance personnel, technicians, engineers, and other support personnel.)

C Applying Problem-Solving Fundamentals—decision making in uncertain circumstances, considering alternatives, resolving minor problems, considering preemptive actions, and applying facility and industry experience to corrective actions.

C Conducting Group Presentations or Meetings—preparing for presentations, directing and facilitating discussion, and responding to questions.

C Case Studies of Selected Industry Operating Experience—many of the above areas should be discussed using operating experience. Additionally, some industry operating experience should be discussed to reinforce generic industry operating principles (e.g., Three Mile Island and Chernobyl).

The facility manager should be provided a summary of the seminar as their STAs participate so that the facility management team is aware of the seminar content and can reinforce the principles developed during the seminar by their day-to-day interactions with the STAs.

CONCLUDING MATERIAL

Review Activity:

DOE
HR
DP
EH
EM
ER
FM
NE

Operations Offices
AL
CH
FN
ID
NV
OR
RF
RL
OAK
SR

National Laboratories
ANL
BNL
FNAL
INEEL
LANL
LLNL
MNREL
ORNL
PNNL
SNL

Preparing Activity:
DOE-EH-31

Project Number:
TRNG-0005

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