NATIONAL ACADEMY FOR NUCLEAR TRAINING

Self-Assessment Guide

Assessing Training Effectiveness in Addressing Operator Fundamentals

A guide to self-assess current station training effectiveness of processes, procedures, methods, and practices in addressing operator fundamentals during operator training

This guide is the product of an industry working group of operations line and training personnel convened in May 2011.

LIMITED DISTRIBUTION

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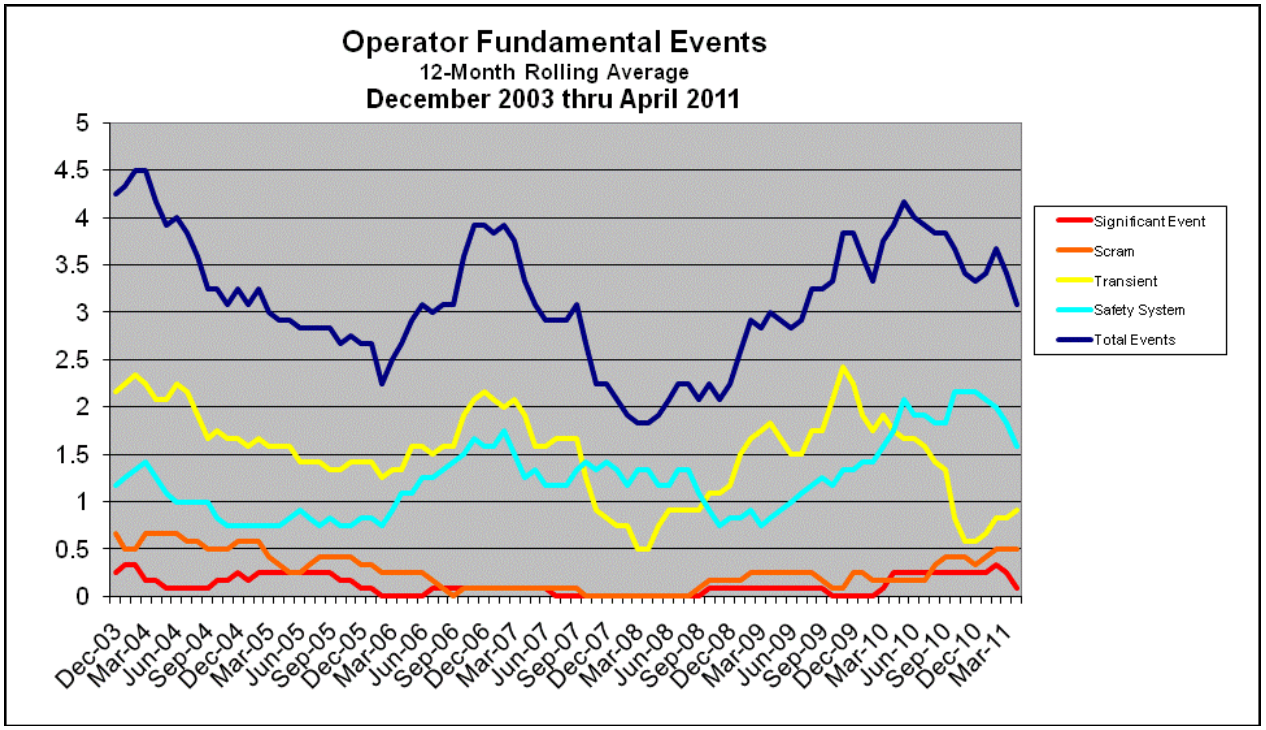
INTRODUCTION

Recent events indicate our industry is experiencing a decline in the application of operator fundamentals during plant operational activities and transient situations. Causes and contributors to these recent events analyzed by INPO indicate that they are very similar to those seen in 2003-
2005 that led to INPO SER 3-05, *Weaknesses in Operator Fundamentals*, issued in July 2005 and WANO SER 2005-2, *Weaknesses in Operator Fundamentals*, issued in September 2005. Industry efforts to focus on operator fundamentals immediately following issuance of these SERs, appear to have had a short-term positive influence on the number and severity of operator fundamentals- related events. However, as depicted in the graph below, in 2009 these type events began to
recur with increasing frequency and severity.



The events described in INPO and WANO SERs indicate weaknesses in five aspects of operator fundamentals, as follows:

- Monitoring plant conditions and indications closely
- Controlling plant evolutions precisely
- Having a conservative bias toward plant operations
- Working effectively as a team
- Having a solid understanding of plant design, engineering principles, and sciences

To establish the current state of training's effectiveness in teaching, refreshing, and reinforcing the operator fundamentals described in the INPO and WANO SERs, an industry working group was convened at INPO in May 2011 to develop this self-assessment guide.

Members of this group include both operations line and training senior personnel, and the working group is sponsored by the Corporate Training Directors/Vice Presidents Forum. **It is intended that each INPO member station conduct a self-assessment of their training programs using the guidance contained herein (as a minimum) to fully understand their effectiveness in training on operator fundamentals.**

Results of self-assessments using this guidance will be collectively used to strategically establish a foundation for industry-wide training improvements for training on operator fundamentals. As such, this effort on operator fundamentals training is similar in process to that conducted for initial licensed operator training in the 2009 "Call-To-Action" industry efforts.

PURPOSE

This document provides guidance for performing a station self-assessment of the implementation and effectiveness of training on operator fundamentals. The criterion for this self-assessment is based on aspects of INPO performance objective and criteria TR.1 and INPO accreditation objectives and criteria ACC.1, ACC.4, and ACC.5.

Training programs to be self-assessed by each station using this guidance are the six accredited operator training programs:

- Nonlicensed Operator
- Reactor Operator
- Senior Reactor Operator
- Shift Manager
- Continuing Training for Licensed Personnel
- Shift Technical Advisor

This self-assessment guide is designed to assist each station with its assessment of training processes, procedures, methods, practices, and rigor in addressing operator fundamentals during operations training.

Results of each station self-assessment conducted to this guidance will be analyzed by the same industry working group that developed this guide to identify industry-wide training gaps and key shortfalls for further broad industry action. As such, what is learned as a training industry depends on each station conducting critical and thorough assessments for gaps and areas for improvement. Time spent during the self-assessment should be focused on the identification of shortfalls and gaps rather than strengths. Actions following the analysis of results of all station self-assessment training gaps later this year will likely result in additional actions to gather best industry practices, strengths, and innovations for training on operator fundamentals.

CONDUCT OF THE SELF-ASSESSMENT

It is expected each station conduct a self-assessment of their training on operator fundamentals using their normal procedures, administrative processes, protocols, and forms for conducting
self-assessment activities. As with any self-assessment, combinations of data review, interviews, and observations of training should be used to identify gaps in processes (how we say we do it), process implementation (how we really do it), and performance (how well the learner retains and uses what we teach).

Regardless of station-specific policy for use of external industry peers on self-assessments, it is strongly suggested that at least one external peer be used on each station self-assessment team.

> The guidance contained herein is intended to provide the subject, focus areas, and key attributes that each station self-assessment addresses as a minimum to allow some degree of industry-wide comparison. It is not intended to be prescriptive and finite. It is expected each station consider how to best assess the focus areas and, as desired, adjust the breadth and depth of assessment to attain thorough evaluation of operator fundamentals training.

Once completed and approved, each self-assessment report is forwarded to INPO (electronically) to enable subsequent industry-wide analysis by the industry working group.

A suggested timeline for conducting self-assessment activities is as follows:

- By Friday September 23, 2011 ─ Self-assessments are complete and approved; report results (electronically) to INPO. Stations begin implementing actions from gaps identified during their self-assessments.
- By Friday October 14, 2011 ─ An industry working group analyzes the results of the self- assessments and recommends industry action plans, best practices, and workshops. Stations consider and adopt best practices as desired.
- March 2012 ─ INPO begins implementing phase 2 of the crew performance evaluation (CPE) process (expanded focus on evaluating operator fundamental knowledge and skills).

SELF-ASSESSMENT FOCUS AREAS

> NOTE: the use of the term "operator fundamentals" throughout this guide refers specifically to the operator fundamentals outlined in SER 3-05, *Weaknesses in Operator Fundamentals*. Also note that the assessment of operator fundamentals training is to be conducted for all six accredited operator training programs, as described above.

As a minimum, each station self-assessment is expected to assess the following focus areas:

1. How does training incorporate operator fundamentals into training program design, development of training materials and methods used for the conduct of training? Does a process/procedure govern this? Does training material reflect integration of operator fundamentals?

   a. How are operator fundamentals reflected (where appropriate) in lesson materials for all operator disciplines? (scenario guides, lesson plans, JPMs, OJT/TPE, and other training and qualification materials)

b. What are training management expectations for instructors to include operator fundamentals in lesson materials? How do training supervisors verify/reinforce the inclusion of operator fundamentals when reviewing/approving lesson materials?

c. Are specific learning objectives used for operator fundamentals knowledge, skill, ability, and behaviors in lesson/training material?

d. What is the process used to select/target the retraining of a specific operator fundamental(s) in continuing training? How is a specific fundamental topic area determined?

e. How does operator performance influence the selection of operator fundamentals for continuing training?

2. How are operator fundamental knowledge, skills, abilities, and behaviors measured? How are weaknesses identified? Do training processes/procedures govern this activity?

a. What diagnostic tools are used to trend performance in operator fundamentals?

b. How do training oversight committees focus on operator fundamentals? What ensures operator fundamentals are discussed during training oversight meetings?

c. Are targeted observations of operator fundamentals performed during training? Who does them? How often?

d. How do instructors know what to "look for" with respect to operator fundamentals? How do simulator instructors reinforce operator fundamentals during training? What tools/techniques are used?

e. How are deficiencies in operator fundamentals documented and trended?

f. How is the corrective action program data reviewed and trended by training personnel for knowledge, skill, ability, and behavior weaknesses associated with the operator fundamentals?

g. How are acceptance criteria (standards) for performance of operator fundamentals established? Is operations line management involved in setting these standards? How and when is remediation performed for sub-standard operator fundamental performance?

h. Are operator fundamentals considered in post-training evaluation of student performance?

3. How is operator fundamental performance assessed during simulator crew evaluations?

a. Review crew performance documentation and management observations for evaluated crew performance for the last 24 months of operator training. How do comments indicate that operator fundamentals are being evaluated?

b. Does performance documentation of crew evaluations support the information needs of operations and training management in area of operator fundamentals?

4. How does the operations line organization actively support and engage in training topic selection and in the subsequent training for operator fundamentals reinforcement? What are examples?
5. How are instructors trained on expectations for the teaching of operator fundamentals? How are simulator instructors trained to identify and effectively convey gaps in operator fundamentals during training and evaluation activities?
6. How are operator fundamentals covered/addressed/reinforced during Just-In-Time-Training (JITT)? (Note that several recent events indicate weaknesses here.) Is this dependant on individual instructors or included in JITT process?

Additional aspects that self-assessment teams may want to consider when conducting assessments are listed below. These aspects are sectioned by the five associated operator fundamentals areas as outlined in SER 3-05. **These aspects are provided to help spur thought and provide a deeper detail on how to assess the above focus areas, but are not to be viewed as required assessment criteria.**

Monitoring the Plant (attentiveness)

1. What techniques are used by instructors to verify/evaluate that the parameter monitoring expected of the students is occurring during simulator training?
2. How are OJT/TPE line trainers and evaluators trained on expectations for monitoring of plant parameters? How do qualification processes measure and assure appropriate plant monitoring is demonstrated by the student during qualification activities?
3. How are NLOs trained on expected plant parameter monitoring during transient or power maneuver conditions? How are critical parameters identified and trained on for NLO field activities? How do NLOs know what diverse indications are available for any one important situation/action/component? Does training material (such as knowledge items in OJT guides or lesson plans) contain this information?
4. Do training materials/methods for ILO students specifically teach expected parameter monitoring and validation of indications through independent means? Are critical parameters trained on for various conditions and transients?
5. How are use of diverse/redundant indications addressed/instructed? (For example, loss of computer systems, instrument buses, annunciators/alarm panels, and so forth.)
6. How is balancing the use of technology (such as computer trending) with “hands, eyes, and ears” aspects trained? How do we train to maximize benefits of both? What training is done on electronic rounds equipment and expectations for review of the data collected?
7. What training methods are used to reinforce desired NLO watchstanding skills (tactile senses, abnormality recognition, unusual vibrations, unexpected pipe deflection, and so forth) associated with equipment monitoring? Are these type skills taught in continuing training or just once in initial training?

8. How do instructors maintain know-how of NLO rounds methods and expectations? Does instructor in-plant time include activities to refresh the instructor on expectations and techniques expected for monitoring of the plant?

Controlling the Plant (deliberate)

1. Are clear standards for precise plant control behaviors established such that training can instruct/observe performance?
2. How do instructors impart station management team philosophy and expectations for precise parameter control in training?
3. How do instructors monitor and reinforce precise reactivity manipulation and positive control of plant activities that affects reactivity during training?
4. What training materials, settings, and techniques are used to train and evaluate on expected precise parameter control?
    - In the classroom
    - In the simulator
    - JPMs, OJT, TPE
    - Mockups/flowloops/labs
5. How are Tech Spec and design limits, and their bases, taught in a manner that supports precise plant control well-within these bases and limits?

Conservative Bias (Judgment)

1. How do instructors impart station management team philosophy and expectations for conservative bias in training?
2. What training materials, settings, and techniques are used to train and evaluate on expected conservative bias (judgment)? (attributes such as placing plant in a safe condition, conservative decisions, not proceeding in the face of uncertainty, questioning unusual conditions, having contingent actions ready)
    - In the classroom
    - In the simulator
    - JPMs, OJT, TPE
    - Mockups/flowloops/labs
3. Are clear standards for conservative bias behaviors established such that training can instruct/observe performance? How are these standards and expected behaviors conveyed to the instructors?

Crew Performance (teamwork)

1. How do instructors train and evaluate on expected crew performance (teamwork) in the simulator? Are scenarios sometimes designed to specifically challenge crew teamwork behaviors and the ability of the crew to stay in role?

2. How do instructors evaluate/measure how well the operating crew in the simulator stay in role:
    - The SM maintains oversight
    - The CRS maintains command and control
    - The STA provides technical oversight
    - The RO/EO monitors and controls the plant
3. How well do scenarios challenge crew prioritization of competing actions? How do evaluators and instructors evaluate crew prioritization?
4. How are NLOs integrated into control room crew teamwork-focused training?
5. Are crews evaluated in normal crew compliments (or is training often conducted with multiple extras to get the required LOR satisfied)? Are SROs sometimes evaluated in positions that they normally relieve? Are reactor engineers, workers, shift chemist, shift RP, radwaste, etc..sometimes incorporated into operator training? How do training personnel select when to do this and how do they evaluate and capture results when this type training is used?
6. How are instructors deployed (instructor-to-crew ratios and coverage methods) to ensure evaluation/assessment of crew performance (teamwork)? How are new instructors trained in protocols and expectations (standards) for crew roles with respect to teamwork?
7. Is teamwork training provided to operating crews – particularly when new crews or significantly reconstructed crews occur? (reference SOER 96-1, *Control Room Supervision, Operational Decision-Making, and Teamwork*)
8. What techniques are used during training critiques / post-scenario interactions to engage crew members and to provide constructive feedback on teamwork attributes? How do instructors solicit crewmember input on their teamwork performance?

Knowledge of Plant Design, Engineering Principles and Sciences

1. How are knowledge of plant design, engineering principles, and sciences in various settings and training programs evaluated during continuing training? Are scenarios sometimes designed to specifically challenge operator fundamental knowledge of plant design, engineering principles, and sciences?
2. What training methods are used to establish operator knowledge levels of these operator fundamentals?
3. How are plant design, engineering principles, sciences, and GFES material addressed in continuing training for all disciplines? Is there a planned approach to this (such as incorporated into backbone schedules?)
    - Classroom lecture
    - Diagnostic tools (such as questions on cycle quizzes, diagnostic exams, simulator diagnostic scenarios, etc…)
    - How are results rolled-up and analyzed? Who reviews the results?

4. Does the simulator modeling/capability support training on reactivity fundamentals, reactor theory, mechanics of core cooling, system interlocks, and so forth, for the following:

    - Various times in core life
    - Varying moderator temperature coefficients
    - Different seasonal operations
    - Credible electrical system losses and lineups

5. Does the STA training program highlight and reinforce fundamental knowledge and skill associated uniquely to the STA position (reference NUREG 0737)?