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Nuclear Resurgence

TRAINING AND INFRASTRUCTURE TO ACCOMPLISH NEW REACTOR INSPECTIONS AND OPERATOR LICENSING

The NRC has just issued a paper (SECY-08-0096) that establishes the NRC staff's plan for assessing and meeting training and infrastructure (e.g., simulator) needs to accomplish inspections and operator licensing related to new reactors, including pre-construction, construction, and operations phases.[1]

The NRC staff is planning to apply the current inspector and examiner training model to develop the technical knowledge of plant design and operations specific to each new reactor design. The NRC considers it essential that a complete plant design, including control room design and plant procedures, be available to develop a training program. These items will provide NRC inspectors and examiners with the technical knowledge of plant design and operation required to effectively carry out their regulatory responsibilities. As of this writing, control room designs have not been completed or approved for any new reactor design to be licensed in the US.

Human factors engineering will be part of the final control room design process. A task analysis, performed as part of an applicant's Human Factors Engineering Program, will serve as a basis for highly integrated control room (HICR) design, emergency procedure development, and staffing decisions. The task analysis is intended to be used to identify specific knowledge and abilities (K&A) of licensed operators. These K&As will be cataloged and provided to the staff and then used in inspector/examiner training and in preparing operator licensing examinations. The nuclear industry plans to provide the new K&As to the NRC to permit publication in April 2011.

In the interim, the NRC has developed four training courses to provide an overview of the differences between the new reactor designs (Westinghouse's AP1000, General Electric Nuclear Energy's Advanced Boiling Water Reactor and Economic Simplified Boiling Water Reactor, AREVA Nuclear Power's U.S. Evolutionary Power Reactor, and Mitsubishi Heavy Industries, Ltd's. U. S. Advanced Pressurized Water Reactor) and the operating reactor designs. In addition, a detailed two-week course, similar to the classroom portions of the Combustion Engineering and Babcock and Wilcox cross-training courses, has been piloted for the Westinghouse AP1000 design. The NRC plans to develop similar courses for the remaining new reactor designs. These two-day and two-week courses are to be conducted at the Professional Development Center for Office of New Reactor Licensing project managers and technical reviewers. Completion of the new reactor cross-training courses for inspectors and examiners must await the completion of control room designs, because simulator acquisition cannot proceed without more detailed information on design-specific HICRs. The advent of the HICR will require changes to the regulatory oversight practices now used to monitor plant operations. With the current operating plants, NRC inspectors and examiners can easily observe

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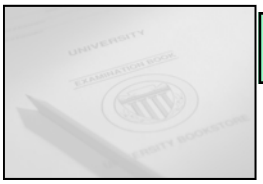

Advice for Writing NRC Operator Exams

By Rob Brixey, NWI New Rx Projects Mgr[a]

Many utilities are having trouble developing NRC Initial License Operator Examinations. UNSAT submittals and poor pass rate are the end result of poorly executed examination projects. The difference between successful projects and marginal or unsatisfactory project can be boiled down to a few simple issues:

1. Appropriate Level of Management Commitment

Every plant project is a management challenge. This project is no exception. As with all projects, appropriate resources and priorities must be applied. Often NRC examination preparation resources are underestimated and priorities are set too low, resulting in less than acceptable outcomes. NRC Initial License Operator Examinations should be treated as a multi-million dollar project. Some US utilities value an NRC License at $370,000.00, and the figure is rising. If a class has 12 candidates, the examination project should be treated as a $4.4 million project. This figure does not account for the regulatory margin which may be gained or lost, depending on the success of the project. This project is a thorough NRC inspection of all aspects of Licensed Operator Training Programs, and should not be treated as a routine administrative task.

Management commitment is required to ensure the following resources are available:

- Authors – for Operating and Written Examinations (~1000-1500 hours)
- Facility Representative – a licensee to assist in technical screening and reviews (~200 hours)
- Validators – three Reactor Operators and three Senior Reactor Operators (~600 hours)

2. Communication with the NRC Chief Examiner

All NRC Chief Examiners are interested in a high-quality product, which is ready for approval with minimal ad-

(Cont. on page 3)

TRAINING AND INFRASTRUCTURE TO ACCOMPLISH NEW REACTOR INSPECTIONS AND OPERATOR LICENSING [b]

(Cont. from page 1)

plant status and operator actions because they work at large control room panels that are easily observable. In the HICR environment, inspector and examiner observation of operator performance will be different because they work at individual computer consoles. The NRC plans to address this challenge through a variety of approaches including the use of HICR mockups and walk-through exercises and the conduct of focus meetings. For instance, the Technical Training Center (TTC) staff plans to meet with currently qualified licensing examiners and resident inspectors to investigate the impact of HICR on the new reactor training and qualification program. The purpose of the meetings will be to observe an HICR simulator to assist the staff in defining reactor inspector and examiner training and qualification program changes necessitated by HICRs, the digital human-system interface, and distributed control systems. Proposed topics of discussion include physical fidelity requirements for NRC HICR simulators, challenges to HICR crew interactions and communications, and inspector oversight in the HICR environment.

The NRC expects to benefit from the experiences overseas with the HICR environment and relevant regulatory oversight as well as monitoring in the HICR environment. Communications between the NRC and its international regulatory counterparts is planned to continue to develop its inspection and examination processes for new reactors. A complete design is needed to support technical knowledge training of NRC inspectors and examiners. A generic HICR simulation is likely to be sufficient for training them on how to maintain regulatory oversight in an HICR environment. HICR generic simulation is also likely to be useful in training instructors on unique teaching techniques applicable to digital controls. An example of an existing generic HICR simulation is the Halden Man-Machine Laboratory at the Halden Reactor Project in Norway. The staff plans to consider this simulator option and its use both for instructor training and for developing effective strategies that examiners can use to monitor operator actions and interject examination questions at appropriate times. The NRC also plans to assess how such a simulator may help their staff develop effective strategies that inspectors can use to monitor plant status in the HICR environment during normal and off-normal operations.

[b]Note: Excerpts taken from NRC publication July 3, 2008 SECY-08-0096 entitled "TRAINING AND INFRASTRUCTURE NEEDS TO ACCOMPLISH NEW REACTOR INSPECTIONS AND OPERATOR LICENSING ."

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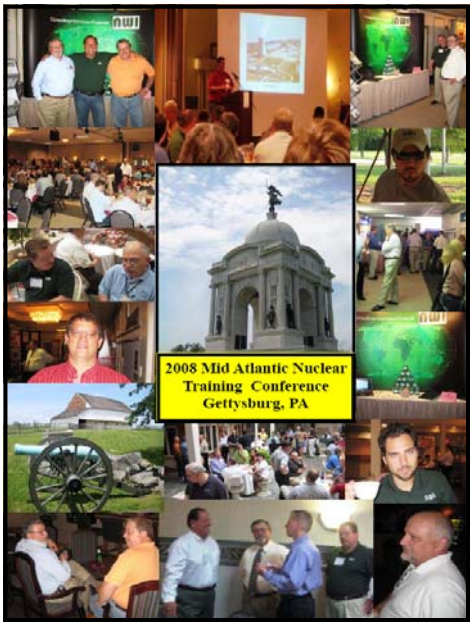
NWI News Update...

2008 Mid Atlantic Nuclear Training Group Workshop

Over 250 training professionals and 10 vendors convened on June 2, 2008 at the Eisenhower Inn & Conference Center in Gettysburg, PA at the 2008 MANTG Conference. For 3 days, numerous presentations and breakout sessions were conducted all centered around the theme of "Training's New Challenge: Leveraging Multiple Generations to Improve Performance." Bill Lindsey, Rob Brixey and Scott Tsakeres represented NWI at the workshop. Keynote speakers included Maria Korsnick, VP Nuclear Training Services, Constellation Generation Group, Kent Hamlin, VP Accreditation, INPO and Bill Levis, Chief Operations Officer, PSE&G. Since more than 20 years have passed since the inception of our accredited training programs a transition has occurred from the initial focus on implementing the systematic approach to training to a strong focus on human performance and training to improve performance. Now facing the challenge of adding a new generation of workers to our workforce, the question has been presented as how do we learn from our past in preparing the new workforce for the future.



Advice for Writing NRC Operator Exams

justment required. The NRC Chief Examiner will focus the Exam Author(s) on recent areas of concern. They will discuss individual topics with authors, recognizing that early corrections will prevent later problems of larger scale.

3. Validation of Examination Material

Validation accomplishes two purposes, a SAT examination submittal and 100% pass rate result. The ability for the examination to discriminate the *minimum competency* for safe operation is determined by administering the examination to licensed individuals of *established competency*. Validators are licensed experts, and their opinions are valid.

NRC Examinations should be validated by current licensees. If any validator questions why a particular question or item is part of an examination, "Low Operational Validity" criteria should be considered for the rejection and reselection of a replacement topic.

Do NOT attempt to "put lipstick on a pig" to adapt a poor topic into a suitable NRC Examination item. In my experience, the NRC has not questioned the justified deselection and random reselection of topics on any exam. A randomly selected outline will result in several KAs requiring replacement. Form ES 401-4 contains sufficient lines to accommodate numerous KA replacements. **There is no stated regulatory maximum**. Experienced writers have adopted a thumb rule called "40/30/20/10".

Of any 100 new original questions from a random outline, 40 will be OK as written, 30 will have one bad distractor or stem condition, 20 will have two bad distractors and are UNSAT, and 10 are patently bad topics requiring reselection. **Using this thumb rule, with minimal validation applied, the submitted examination will be UNSAT**. The first validation should catch a large portion of the bad distractors. Revalidation of corrected items with **no less than** three iterations of validation will result in < 5 questions requiring adjustment after submittal and a fewer number of UNSAT questions. If more than one validator misses the same NRC Examination question, rewrite or replace the question. If more than two validators miss the same question, consider "Low Operational Validity" criteria.

After talking with dozens of other authors in the industry, these three focus areas produce the lion's share of the issues associated with most poorly executed NRC Examination projects. **Management Commitment** is required to secure the necessary resources to successfully complete the project. **EARLY Communication with the NRC Chief Examiner** is required to avoid big surprises and inconveniences. **Validation** is required to ensure our candidates are fairly examined and earn the licenses they deserve.

[a]The author has written 5 NRC Initial License Operator Examinations, resulting in the issuance of 44 NRC Licenses. ALL examinations were "SATISFACTORY " submittals.

NRC MEETING AUG. 7 IN VICTORIA, TEXAS, REVIEW OF NEW REACTOR APPLICATION

Nuclear Regulatory Commission staff will conduct a public meeting in Victoria, Texas, on Thursday, Aug. 7, to discuss how the agency will review an expected Combined License (COL) application for two reactors at the Victoria County site, about 13 miles south of Victoria. The prospective applicant, Exelon, has told the NRC it intends to apply later this year for a license to build and operate two Economic Simplified Boiling Water Reactors (ESBWR) at the site. David Matthews, Director of the Division of New Reactor Licensing in the NRC's Office of New Reactors said "Since the proposed site has no existing operating nuclear power plant, we'll be looking to residents in the area for valuable information we need during our reviews."

NWI News Board

- Bill Lindsey is supporting HB Robinson's Ops Training Accreditation renewal efforts in S. Carolina...and was the OTM for brief stint.
- Rob Brixey continues to support Exelon's new Rx development project as NWI's project manager. Also, Bill McNeill and Rob assisted Entergy's HB Robinson in their Performance Improvement Planning.
- Bill Cheever is providing full time at Hope Creek supporting their NLO, ILT and LORT programs.
- Ernie Harkness has joined Entergy's Nuclear Safety Review Board and is providing support to all Entergy stations.
- Mike Gettle has joined NWI and Terry Johnson supporting Bruce Power's Maintenance training improvement initiatives for 2008.
- Dr. Ray Waldo has teamed up with NWI to support Bruce Power by providing training oversight.
- Steve Pettinger continues to assist DC Cook...but now is providing tech. support for the new U2 simulator build, just finishing another quality Cook NRC exam.
- Roger Armitage is support River Bend's Maintenance Training Programs, following a brief assignment at HB Robinson.
- Dan Slater continue to support Turkey Point's training programs.

We wish to express special thanks to the following clients for recently making NWI a preferred full services company:

- **AEP's D.C. Cook Nuclear Power Plant**
- **APS's Palo Verde Nuclear Station**
- **Bruce Power**
- **FPL's Turkey Point Plant**
- **SCE's San Onofre Nuclear Generating Station**
- **PSEG's Hope Creek Station**
- **Exelon's New Reactor Development Group**
- **Entergy's River Bend**
- **Progress Energy's H.B. Robinson Plant**
- **Exelon's New Technology Development Group**

Editor: Frank S. Tsakeres

NWI Director of Operations

Associate Editor:

Kate Hendrickson

NWI Director, Marketing

Associate Editor:

Steven Scott. Tsakeres