Enclosure 2 MANTG Conference Questions and Answers

MANTG Conference Participants were provided the opportunity to feedback questions to the NRC staff using 5x7 cards during the conference. The staff received over 100 cards which captured both questions and comments. The NRC Region I Examiner Staff has attempted to answer the questions and address the comments with the concurrence of the Operator Licensing Program Office in an effort to provide a positive exchange of information and promote feedback to our stakeholders.

The 5x7 cards were handwritten and sometimes were difficult to decipher. We have made our best attempt to translate the questions and comments exactly as written without making any changes to modify the intent of the question or the focus of the comment. We have in a few cases added modifying text in [parentheses] in an effort to assist the reader in understanding the question or comment. The questions and comments were categorized by the section of the Operator Licensing Examination Standards for Power Reactors (NUREG-1021) (the Examination Standards) to which they applied. The questions and answers that did not fit within the context of a section were listed under the "general topics" section.

General Topics

1. "Recent initial exams in Region II had simulator exams that ran for 4+ hours. These exams were written by the NRC and were designed to have greater run time than previous exams.

   My question: Is there an internal review by the NRC on how initial exams are being generated where such a drastic shift in the length of simulator exams would be flagged?"

   RESPONSE

   After discussing the above situation with Region II, there were other extenuating circumstances that precipitated the exceptionally long duration of a scenario at Turkey Point this summer. There is no internal shift regarding how initial exams are generated that could lead to 4-hour scenarios. However, there is nothing in the Examination Standards to preclude extending scenarios to run longer than the normal times (1-1.5 hours) if the examiners are waiting for completion of actions that are required to be evaluated, especially if the time extension prevents having to run another (backup) scenario in order to complete the evaluation.

   Four-hour scenarios can be avoided by proposing events that can be completed in reasonable lengths of time consistent with evaluation of the applicants' performance on each competency and rating factor. This is especially appropriate in regard to normal evolutions. For example, some power increases may require unusually prolonged periods of time in order to meet the evaluation criteria established for the evolution. The Examination Standards allow substitution of component or instrument failures in place of normal or reactivity events in order to maintain the integrity of the scenario timeline.

2. "Region III requires [a] written outline to have dispersion NOT required by NUREG-1021. TR2 [tier 2], Group 1 - ok; TIER 2, Group 2 Horizontal Distribution - They require

that NO categories contain 2 selections if there are 0 selections in another category. They have indicated that this falls within their definition of random and systematic."

RESPONSE

NRC Region I follows the requirements of the Examination Standards for the sample plan selection. We are not completely familiar with these practices so the concern was communicated to the Operator Licensing Program Office, which is working with Region III to address the apparent inconsistency, albeit minor. However, it is noted that this practice might affect computer programs that produce written exam outlines automatically.

3. "Simulator Scenarios - Region I requiring scenarios that start at less than 5% power. All other regions see this as an option."

RESPONSE

Region I had elected to follow NUREG-1021 guidance by varying the simulator scenario initial conditions on each exam. This was in response to OL program office audit issues. However this issue has evolved and we now take the opportunity to clarify the previous position for the future. Generally, we expect that low power scenarios do not have to be selected for every exam. However, if there are no low power scenarios selected for 2-3 exams in a row, a facility should expect the examiner will ask for a justification.

Revision 9 to ES 301 D.5.c states (emphasis added):

"c. The initial conditions, normal operations, malfunctions, and major transients should be varied among the scenarios and should include startup, low-power[2], and full-power situations. Review the associated walk-through outline if it has already been prepared (refer to Section D.4), and take care not to duplicate | operations that will be tested during the systems walk-through portion of the operating test.

[2] NUREG-1449, "NRC Staff Evaluation of Shutdown and Low-Power Operation," defines "low power" to include the range from criticality to 5 percent power."

As used in NUREG-1021, the word "should" connotes a strong desire to comply with the guidance. Indeed, the term "should" has generally meant the guidance should almost always be followed unless there is a good reason to deviate. We recognize that "should" does not have the same sense of determinism as the term "shall" as noted the ANSI/ANS standard definitions, "shall" meaning a requirement and "should" meaning a recommendation. However, we also note that "should" does not have the same optional connotation as the term "may." Case-by-case exceptions from this guidance may be approved if requested in advance and properly justified as noted in the executive summary of NUREG-1021.

4. "How does the NRC define inattentive to duty? At what threshold does a casual conversation or telephone call to home become a problem?

What is an Inattentive operator issue:

- What about reading site e-mail?
- Surfing corporate websites?
- Navigating site electronic databases?"

RESPONSE

The term "inattentive to duty" is meant to be any behavior, condition, or use of materials that could distract the operator from normal attentiveness to the task at hand. Control room personnel can tend to administrative duties (such as navigating site electronic databases) provided that a licensed operator is monitoring the panels and they are available to respond to a change or upset and do not become unnecessarily distracted by duties that are unrelated to the job.

The NRC may further enhance this answer with new generic communications in the future pending further review of recent cases so please periodically check the Operator Licensing Web Page for updates to this and other issues.

5. "Our plant management is placing increasing emphasis on Human Performance tool usage, including, just last week, a mandate that all plant equipment manipulations required a peer check unless it was during AP [Abnormal Procedure] or EOP [Emergency Operating Procedure] usage."

"Following that announcement, startup certification preparation training was conducted using "the full Monty" of tools (pre-job briefings, 3-way, peer checks, update briefings, etc.) - and resulted in the completion of ½ [one-half] the number of startups as planned. The lead instructor recognized the need to modify this approach, and "suspended" the use of peer checking for the next 2 sessions in order to improve the technical skills of the crew in conducting the approach to recognition of criticality. A member of management (with no instructional background), upon hearing of the actions taken, cautioned him that this was not IAW [in accordance with] management's expectations."

RESPONSE

It is difficult to know what was in the mind of the management team member without being present and questioning the individual. However, the exchange above sounds very much like a communication problem in which expectations are not clearly understood. Perhaps the manager was expecting the trainer to reinforce soft skills. The trainer may have seen the need to make progress (quality training within time allotted - another "perceived" management expectation). Note the trainers suspended only one of four soft skills. Both may have been "right" but they apparently failed to communicate.

The NRC has no specified expectations on training implementation, other than it follows SAT [systems approach to training] principles. It would seem that, in general, the training should be focused on achieving the stated objectives for that simulator activity.

If changes in the objectives become necessary, the bases for the change should be understood and clearly communicated to all participants in the process to preclude negative training.

6. "Does the NRC have any policy regarding stand-alone (non-licensed) STAs [Shift Technical Advisors] receiving the same continuing training as Licensed SROs / STAs or any requirement for separate biennial written exams for Licensed SRO/STA and stand-alone STAs?"

RESPONSE

No such policy exists. The training program for STAs should follow the systems approach for determining the instructional design requirements in accordance with 10 CFR 50.120. These programs are also accredited by the Institute of Nuclear Power Operations (INPO), which is responsible for establishing and monitoring specific standards in this area. However, the STA training should not interfere with the training program for SROs including the examining process. The INPO representative attending this conference also indicated that the STA program is accredited and it should have its own set of requirements. The SAT process should be followed.

7. "It appears that INPO assessments and ATVs, focus on ACADs/INPO standards and do not address what is in Inspection Procedure 71111.11 material. What is INPO's position on including NRC inspection manual requirements?"

RESPONSE

The processes are separate and independent of each other. They should not be mixed. They should generally achieve similar ends but they may proceed using different directions.

The INPO representative attending this conference also indicated that he agreed with the answer.

8. "In reference to INPO - NRC meeting information passed on during the requal breakout:

It seems INPO thinks there is no concern over training and OPS [operations] staffing – numbers may be okay, but training staffs have been burdened by non-training additional duties, stressing staffs, reducing quality."

RESPONSE

NRC staff re-reviewed Breakout Session slide - "No Concern" over training and operation staffing is NOT noted in the NRC prepared material. The material presented in part stated:

- *Shaping the Future [INPO rep Opening]*
  - Knowledge Transfer
  - International benchmarking
  - Resources and alignment

The question asked for an explanation regarding an apparent difference between INPO and NRC regarding the issue of the adequacy of operations staffing. The NRC asked the INPO representative at the conference if the conclusion had been reached that the level of OPS staffing was not a concern.

In response to a follow-up question (the INPO representative did not attend this breakout session), the INPO representative noted that in some cases, operations staffing levels had impacted the quality of training. He also noted that rather than comparing the number of operations staff against a set standard, INPO reviews the overall workload of the operations training staff and where applicable, identifies those important activities that are not being accomplished in a quality manner.

ES 201 Topics

1. "Security agreements cause problems, particularly [having] on-shift operators on [the] agreement, as this would preclude students from doing on-shift time with those individuals. Since on-shift time continues through the latter part of the training program and exam review/validation begins 5-6 mos. prior to the license exams, this impacts student completion of the on shift training.

   Is there some relief that could be provided for this?"

   RESPONSE

   No, we need to be careful with respect to facility developed, reviewed and administered exams (especially the written test). The OL program office anticipates no change to the NUREG-1021 guidance in this area unless proposed by industry. We will also review the matter on a case by case situation during the 120-day letter discussion on security measures.

   We recognize that security restrictions can limit the use of on-shift operators for the purpose of training the licensed class. This is a legitimate requirement to assure the integrity of the exam process. Each facility must find an appropriate balance on the use of resources between exam development and training without compromising the integrity of the exam process. Individual or unique situations should be addressed prior to allowing an individual who has signed the NRC Exam security agreement and has knowledge of the exam contents to become involved training the initial operator class.

   "Section D.2.b of ES-201 prohibits all OJT activities for a person on the security agreement. A license applicant should not be standing watches under instruction with, or receive OJT sign-offs from, a licensed operator who has knowledge of the

examination content." (OLB ES 202.12 Feedback)

2. "With today's technology, why must the computer being used to develop the exam be totally divorced from the site network (LAN)?

   All of our procedures are on our LAN. We are required to use the LAN in checking references because the only guaranteed latest revisions or changes exist on the LAN.

   I use an MS Access database to develop my written exams. (It is so useful that NRC Region One Examiners have adopted it.) The database has strong, built-in security and the computer cannot be "reverse/remote" accessed without a user logged into the work station giving permission at that time. Once rebooted, or obviously shutdown for the night, that one-time remote access permission is gone. Also, only IT personnel have the LAN security level to request remote access and they can be put on the Security Agreement, if required."

   RESPONSE

   The specific example noted in the question sounds like a reasonable measure to control the security of the exam. Other facilities may not have such controls. You can review your case-specific situation with your chief examiner. Use of the LAN with controlled measures is permitted per ES 201 subject to certain considerations.

   If NRC exam test items reside on a computer LAN that is not physically separated from the normal utility LAN, then the facility should address the computer security features that provide adequate measures to control exam compromise as part of the exam submittal process. Ideally, this submittal would be received and evaluated prior to commencing exam development to prevent unwarranted surprises.

   ES 201 Attachment 1 states:

   "The NRC staff recommends that facility licensees should consider implementing additional security measures when they are developing, storing, or printing examinations using a computer network to which license applicants or other persons who have not signed the security agreement could gain access. Although the use of passwords should provide adequate security if normal computer security practices (e.g., selecting and changing passwords) are observed, special cases may need additional consideration. For example, if a trainee has extended access to the local area network (LAN) in his normal position, additional security measures might be appropriate."

3. "On the issue of Exam Security Agreements and while it is appropriate to have exam developers (also others that have knowledge of the exam) sign an agreement that they will not reveal any of the contents of the examinations, the restrictions preventing any technical contact with the candidates provides an ongoing challenge. This challenge makes it difficult to have either THE "BEST" exam and THE "BEST" Training Program.

For example:

> - Putting operations management and operations Training Management on [the] security [agreement] to review exam manuals and oversee the process improves the quality of the exam, BUT [it] prevents them from overseeing and coaching the operators and candidates.
>
> -Exam writer resources are limited by how many we can afford to place on exam security.
>
> -Operators used for exam manual review and validation can no longer stand shifts with the candidates."

RESPONSE

The key is the difference between 'technical contact' and 'non-technical contact'. One example of technical contact would be EOP place keeping direction and soft skill requirements such as 3-part communications. Another example would be if the person is reinforcing guidance from the conduct of operations procedure that NRC examiners would use to evaluate applicants. Examples of non-technical contact would be an email message from the Vice President to licensed operators with respect to expectations on recent event response, or verbal expectations by plant management that reflects advice on how to approach an examination.

Use of management personnel to assist in exam review or preparation shall be subject to the restrictions of ES 201 (below) to prevent any appearance of potential exam compromise. It may be appropriate to restrict management personnel involvement on a case-by-case basis subject to the degree of access (technical vs. non-technical) they have had to exam materials subject to the above guidance. For example, a supervisor who has reviewed the entire written exam shall have no technical involvement with the licensed class training but a senior manager who has not reviewed the entire test but may have provided limited management direction on a small number of specific test questions, may be able to provide some coaching in the simulator assuming he/she has not reviewed the operating test. The degree of restrictions for management individuals shall be requested in writing and approved in advance by the NRC Chief Examiner prior to granting deviations from the blanket restrictions.

NUREG 1021 ES 201 attachment 1 states: "NRC and facility licensee personnel must be attentive to examination security measures to ensure compliance with 10 CFR 55.49. Moreover, pursuant to 10 CFR 55.40(b)(2), facility licensees who elect to prepare their own examinations must establish, implement, and maintain procedures to control examination security and integrity. At the time the examination arrangements are confirmed, an NRC examiner shall review the facility licensee's security procedures and brief the facility contact on the following examination security guidelines. Although the Attachment 1 guidelines are not regulatory requirements, the NRC staff encourages facility licensees to consider them when establishing their own procedures."

NUREG 1021 ES-201 section D.2.b further states: "Supervisors and managers having knowledge of the examination content may continue their general oversight of the training program for the license applicants, including the review of examinations, quizzes, and remedial training programs, as well as the counseling of applicants concerning non-technical issues. However, those supervisors and managers may not provide any technical guidance, training, or other direct feedback regarding the content of those examinations, quizzes, or programs in a manner that might compromise the integrity of the licensing examination as defined in 10 CFR 55.49."

ES 204 Topics

1. "When standing the watch under instruction, can a licensed crew member have 2 candidates under instruction/on watch with him [or her] simultaneously, or should a 1=1 ratio be maintained?

   (Historically, there have been times when the ratio was 1=2 in order to complete on-shift watch requirements prior to an upcoming ILO exam date.)"

   RESPONSE

   Two trainees supervised by only one operator is unacceptable for under-instruction watch standing. If time does not permit such quality time and there is confidence in a person's capability, a waiver can be processed.

   The licensed crew member is ultimately responsible for the individual actions of the trainees who are under instruction. If the licensed crew member is required to supervise two trainees, it is not clear how the licensed crew member could be held responsible to identify and correct individual errors made by the trainees because her/his span of control may not be sufficient to detect simultaneous errors.

   ES 204.D.1.i states:

   "The region may authorize a facility licensee to defer completion of the following specific experience and training guidelines:

      1) up to 6 months of 3 years "responsible nuclear power plant experience" RO and SRO, but not to exceed 2 months of 1 year on onsite experience for an RO and 1 month of 6 months for the SRO;

      2) up to 2 months of year actively performing duties as licensed at the facility for which SRO upgrade license is sought;

      3) up to 1 month of 3 months as an extra RO or SRO on shift in training."

2. "If a candidate has previously taken and passed a Generic Fundamentals Exam (GFE) (i.e., > 2 years), he is required to take a previously given NRC GF Exam. Is there any thought of changing this to [a] previously given 50 question exam, after a predetermined

number of 50 question exams are available?"

RESPONSE

There is presently no initiative to make this change from within the NRC staff. The industry is always welcome to make a suggestion with appropriate justification through the NEI OL focus group, via the OL Web page feedback mechanism, or through the MANTG Steering Committee.

The GFE must meet specific sampling limits for K/As that are analogous to the site specific exam. If there is support for an industry proposal to selectively reduce the number of GFE questions taken from a prior 100 question GFE exam, the proposal should address how the integrity of the KA sampling requirements for that exam should be maintained.

Note that it is not appropriate to randomly select from only the recent 50-question GFEs. If a randomly selected GFE is used, then all GFEs must form the bases for the random selection process.

The Headquarters Program Office web page feedback (204-1) states:

"For waiver purposes, it does not matter if you randomly select a 100- or 50-question GFE (i.e., a pre- or post-2004 examination), as long as your selection method is simple, clear, and explainable (if asked during a future inspection); similarly, it does not matter if your selected exam had answer key changes or question deletions resulting in something less than 100 or 50 questions. If your random exam selection does contain a flawed question(s), simply remove it (them) from the exam before you administer it, and score the exam on the basis of its revised denominator. For example, if you randomly choose the October 2002 BWR exam, you will note that Question # 21 had two correct answers. Therefore, remove that question before administering the exam and determine each examinee's grade based on a 99-point exam."

ES 301 Topics

9. "How many critical tasks [steps] are expected in a good JPMS?"

RESPONSE

There is no specific Examination Standard requirement for a minimum (or maximum) number of critical steps in a "good" JPM. As cited below, there are some indications that more than a single critical step may be appropriate. However, it is the overall level of difficulty in concert with its operational significance and importance that determines the discriminatory value of the JPM. It may be possible to develop JPMs with a single critical step provided that the JPM is operationally valid and has a reasonably challenging task standard that provides adequate discrimination for safe and competent operations.

Selected Examination Standards references state:

ES-301.D.1.d. - "Must ensure the materials contribute to the tests overall capacity to differentiate between competent and not competent operators."

ES-301.D.2.d - "The JPMs should, individually and as a group, have meaningful performance requirements that will provide a legitimate basis for evaluating the applicant's understanding of and ability to safely operate the plant (as required by 10 CFR 55.45)."

ES-301-Forms - QA checklist item 2.a "each JPM includes...
- identification of critical STEPS & associated standards."

Appendix C - STEP-B.3. - "Develops performance criteria" - connotes more than one critical step.

Form ES-C-2..."Must also contain operationally specific performance criteria which includes identification of critical STEPS."

ES 302 Topics

10. "The NRR (Nuclear Reactor Regulation) representative at the conference spoke briefly about the use (misuse) of surrogates during exams. What is the NRC expectations/desires for the use of surrogates in both ILT [Initial Licensing Training] and LORT [Licensed Operator Requalification Training] Exams?"

    RESPONSE

    Surrogates should not be used to protect applicants or operators from perceived excessive testing exposure.

    The use of surrogate operators has increased over the past year on initial exams, perhaps because of a perception that applicants should minimize their exposure to the minimum number of simulator scenarios required by the Examination Standards. This practice appears to have unnecessarily increased examiner resources by requiring additional simulator scenarios over and above the minimum number required for the exam, especially after the introduction of Revision 9 to the Standards.

    On an initial license exam, the Chief Examiner determines the balance between schedule efficiency and exam effectiveness. The chief examiner may elect to make or change the facility licensee's crew assignments. However, crew changes will generally not be made less than 2 weeks before the date on which the examinations are scheduled to begin so that the affected applicants have some time to adapt to working as a crew. If you have a problem with the Chief Examiner's expectations as being unreasonable, you should discuss the matter with the local region Branch Chief.

In general, the use of surrogates should be minimized for several valid reasons. The limited role of the surrogate may impede the applicant's ability to function as a full-fledged interactive member of a control room team because the surrogate is not as proactive as an applicant. The use of two surrogates creates an artificial environment and should only be used as a last resort (e.g., a retake simulator exam for one applicant). However, it is recognized that in some cases, the use of surrogates is necessary to prevent applicants from having to be evaluated in more than three scenarios and to address the filtering of applicants by facility licensees.

It is difficult to formulate specific rules for the use of surrogate operators because the use depends on the number and composition of the applicant training class. Each case has a different challenge. However, there are a few general guidelines that should be applied.

The use of surrogate operators should be reasonably limited to exams when it is necessary to minimize the total number of evaluated scenarios. Surrogates should be used to preclude an applicant from having to be evaluated in a fourth scenario unless the individual volunteers to support his or her peers. Surrogates may be used when it is necessary to accommodate a lack of balance of ROs or SROs that makes it difficult to form 3 person crews. Surrogates shall not be used simply to minimize exposure of applicants to a third simulator scenario without the approval of the Chief Examiner especially if this practice increases the number of scenarios or prolongs the exam.

ES 201.C.3.j states that: "The chief examiner should work with the designated facility contact to schedule the operating tests to optimize efficiency and the mix of RO and SRO applicants in the crews assembled for the simulator examinations."

This response specifically addresses the use of surrogates on initial NRC exams. See the response to question #1 under ES 601 for the use of surrogates on requalification exams.

ES 401 Topics

1. "Has the NRC generated written outlines and sent them to the utilities. This could be done to whatever level of scrutiny (i.e., dealing with rejections) deemed necessary by the NRC. This would eliminate any utility from streamlining a written outline."

   RESPONSE

   Region I relies on the exam author to develop the sample plan. The author is fully responsible for the exam content and the sample plan is part of the exam development process. There has been no reason to think that licensee personnel do not have the capability to properly develop a written exam sample plan more efficiently and effectively than NRC Examiners.

Some Regions have been reported to be developing written exam sample plans for licensees. If a licensee specifically requests that Region I develop a sample plan, this request should be fully justified and will be considered on its merits and the availability of examiner resources during the time required.

Region I examiners may also be available to review site-specific KA suppression and addition for the entire KA Catalog to reduce the problems associated with the random selection of K/As that are not job-relevant at the licensee's plant. Requests for site-specific reviews should be submitted in advance of the exam dates to allow an adequate review (~30 hours) by Region I examiners.

The NRC relies on our licensees to produce written exams in order to achieve the most efficient use of resources and produce a quality exam. Exam development includes production of the sample plan. NRC Region I no longer has access to a computer program that will generate a sample plan at the push of a button, as do many of our licensees. Generation of a sample plan by the NRC requires time for examiner sample plan selection by hand. It seems reasonable that a licensee can generate a sample plan more quickly and productively than the NRC given the fact that licensee personnel know their plants better than NRC Examiners. Licensee personnel should have a better site-specific understanding for KA suppression and the addition of operationally valid K/As that may be listed as < 2.5 in the K/A Catalog.

2. "The commission has identified as an exam development concern that sample plans are not random.

   A suggestion: The Commission generates a sample plan for the utility then allow thru discussions refining the sample plan to a randomly generated, and site specific outline.

   Not my original Question or Thought. However, a very good suggestion."

   RESPONSE

   By the term "Commission" we assume the individual is addressing NRC staff and not the five NRC Commissioners. Some events reviewed by NRC staff, suggest that poor sample plan generation practices may have occurred in some isolated cases. Some facilities may be "cherry picking" K/As - i.e., suppressing valid K/As without following the guidelines of ES 401 Attachment 2.

   As explained in question #1 above, there is no current plan to mandate development of all written exam sample plans within Region I. There are no NRC guidelines in the generic communications or Operator Licensing Feedback web page that requires the NRC Regions to produce written exam sample plans. Development of the NRC exam by the licensees is now done on a voluntary basis at the request of the industry. Requests for the NRC to develop the written exam sample plan can always be made and Region I may accept such requests if made with sufficient lead time based on NRC examiner availability. However, we currently see no compelling reason for licensees to routinely request NRC sample plan development in Region I.

3 "With respect to Initial NRC Exam K/A Selection, recently, [an examiner from NRC HQ OLB] stated in an e-mail to one of Exelon's Operators' Training Process Specialists (OTPS) (Exam coordinators) that K/As should not be disregarded or not selected just because the NRC K/A value is <2.5. He stated that these K/As should either be:

- evaluated after random selection to determine if the K//A value <2.5 for that station, OR

- pre-screened where those that the NRC has indicated <2.5 and the station agrees are <2.5 for their station, then the KA could be suppressed and removed from the possible selections.

This seems inconsistent with previous practices. It also seems that if we customize the K/A ratings for each station and base selection on that customization, we take away from the common bases for all exams at every station. (This is why the NRC does not honor site specific K/A manuals).

The results of this are significant so we can ensure that our KA selection software works properly in the selection of K/As."

RESPONSE

An email from an NRC staff member to a specific licensee regarding a specific issue on an exam does not form the bases for new requirements to the industry. There may be other issues involved and further context that is not obvious. It should be noted that the licensee was directed to follow prior practices until this issue could be resolved.

We recognize that the current guidance could be clarified. This topic is scheduled to be discussed at the next meeting of the NEI Operator Licensing Focus Group. When additional official information on this subject becomes available, it will be published on this NRC Operator Licensing Web site. The URL is:

http://www.nrc.gov/reactors/operator-licensing/prog-feedback.html

If you follow the guidelines as stated in ES 401 Attachments 1 and 2, the NRC Chief Examiner will have sufficient information to make a determination whether or not the sample plan comports with the Examination Standards' guidelines. You must describe the methodology used to select the sample plan. If you are unclear regarding the acceptability of your sample plan selection methodology, you are encouraged to contact the Chief Examiner and resolve the questions prior to submitting the sample plan. (See question 4 related to prescreening.)

The following information provides additional background on this issue:

The Examination Standards require that sample plans be developed using random and systematic methods. ES 401 Attachment 1 lists an example of a random selection

method that has been approved for use by NRC. The first step in this process states (emphasis added):

"Review each group and delete those items [emergency/abnormal plant evolutions (E/APEs) for Tier 1 and systems for Tier 2] that clearly do not apply to the facility for which the examination is being written; be prepared to explain the basis for the deletions to the NRC's chief examiner. Add any operationally-important systems or E/APEs that pertain to the facility but are not included in the generic lists on Form ES-401-1."

Note that the last sentence (underlined) was added under revision 9 to the Examination Standards. If the facility uses the Attachment 1 methodology to construct the exam sample plan, then no further explanation is required. ES 401.D.1.b states in part [emphasis added]:

"Attachment 1 provides an example of an acceptable methodology for randomly selecting K/As within the defined structure of the examination outline to achieve as broad a sample as possible. Other methodologies may be used, provided that they are reproducible and scrutable and yield an examination outline that is free of bias, adheres to the applicable examination model, minimizes the number of K/As related to any particular system or evolution (i.e., every system or evolution in the group should be sampled once before selecting a second K/A for any system or evolution), and samples at the specific K/A statement level.

When submitting its examination outline to the NRC, the facility licensee shall describe the process that was used to develop the examination outline (in sufficient detail for the NRC to confirm that it meets the systematic and random selection criteria). Examples of adequate documentation include (1) a statement that the facility licensee used the sampling process described in Attachment 1; (2) identification of the industry standard or widely-available commercial product that was used; or (3) a description or copy of the facility licensee's process document."

The NRC Operator Licensing Feedback web page contains additional information regarding sample plan methodology. Feedback #401.37 states in part:

10 CFR 55.41(a) states that "*the knowledge, skills, and abilities [to be tested on the RO written examination] will be identified, in part, from learning objectives derived from a systematic analysis of licensed operator duties performed by each facility licensee and contained in its training program. ...ES-401 ...does allow the facility licensee to use plant-specific priorities (and a site-specific task list) to justify using an otherwise unimportant K/A for questioning. Therefore, questions...should be acceptable...if they are supported by documented RO learning objectives derived from the RO job task analysis at the site*."

Revision 9 added the guideline to consider including any operationally important systems or E/APEs that are not included on the ES 401-1/2 forms. It should be added that the determination of "operational importance" should be based on the importance to safety of that system or E/APE. The method for inclusion of "operationally important

systems or E/APEs" in the sample plan is not specified and is left to the licensee under revision 9. One suggested method for doing this would be to compare the facility's JTA and learning objectives against the K/A Catalog and screen any learning objectives that are not included in the Catalog for importance to safety (rather than importance to operations) based on PRA insights. Alternatively, one may individually screen K/As on a case by case bases that are <2.5 in the Catalog but are considered "operationally important" to safety when the sample plan is developed. Other approaches may also be used if they meet the intent of the Examination Standards.

Note that there is no current requirement to conduct a full screening of the K/A Catalog for site-specific operationally important systems or E/APEs that are < 2.5. The Examination Standards allow the addition of any systems or E/APES that were noted to be deficient by the licensee as a means of ensuring that the test has sampled the operationally important K/As. However, the Examination Standards do not require the licensee to screen the K/A Catalog prior to constructing a sample plan. The Examination Standards also explicitly allows the use of an "industry standard or widely-available commercial product" which contains only the K/As listed in the K/A Catalogs.

4. "Feedback on ES401 Attachment 2 K/A Elimination Guidance:

Item #1 provides a list of KAs that "...the examination author shall not exclude from the random selection process for Category "G" .... for outline Tier 1 and Tier 2. The remaining Section 2 K/As may be excluded from the random selection process if they aren't applicable to the system or evolution.

Recommendation: Allow pre-screening all generic topics that aren't applicable. I see very little value in keeping the listed KAs in selection process if they don't apply.

Item #2 requires "All" KAs in section 2 to remain eligible for random selection when drawing Tier 3 (Generic) Topics.

Recommendation: Allow pre-screening KAs <2.5 importance."

RESPONSE

The concept of "pre-screening" appears to comport with the concept of "KA suppression" as described in the Examination Standards but is different from rejecting the K/A after it is randomly selected and evaluated. If the guidance in ES 401 Attachment 2 is followed, individual K/As may be rejected on a one-time basis for the current exam (with appropriate documentation and justification in ES 401-4) or suppressed for future exams (by a Site-Wide K/A Catalog Review Document reviewed and accepted by the NRC Regional Office). We will now address each item from the question in turn.

Item #1: The K/As that are on this list essentially correspond to the original listing of system-generic and E/APE-generic K/As (derived from revision 0 of the K/A Catalog). They were determined to be generically applicable to all systems and E/APEs. If any of

these K/As are considered to be "not applicable" to the "G" section of tier 1 or 2, they can be rejected upon random selection if they are listed and justified on the ES 401-9 (Record of Rejected K/As) form provided the guidance of ES 401 attachment 2 (Elimination of K/As) section #1 is followed. This practice allows the NRC Examiner to review the basis for rejection of the K/A for the current exam.

The intent of section #1 of ES 401 Attachment 2 was to ensure that these K/As were not universally suppressed in advance for all systems / E/APEs because the original importance to safety ratings depended upon the risk significance of the individual system or E/APE. These K/As should be included in the sample plan selection process for the exam but then may be rejected on a case-by-case basis for the system or E/APE (if appropriate).

ES 401 Attachment 2 section #1 states (emphasis added):

"1. When preparing the outline for Tier 1 (E/APEs) and Tier 2 (Plant Systems), the examination author shall not exclude from the random selection process for Category "G" any of the following K/As from Section 2 of the applicable K/A Catalog: 2.1.2, 2.1.14, 2.1.23, 2.1.27, 2.1.28, 2.1.30, 2.1.32, 2.1.33, 2.2.22, 2.2.25, 2.4.4, 2.4.6, 2.4.30, 2.4.31, 2.4.49, and 2.4.50. However, these K/As may be rejected and justified on a case-by-case basis while developing the examination outline. The NRC will review the author's justification for each rejected K/A. The remaining Section 2 K/As may be excluded from the random selection process and/or rejected without explanation or justification."

"[Note: With the exception of K/A #2.4.6, the listed K/As equate to the "Old System-Generic K/As" identified on page xiv of NUREG-1122 (Revision 2) and page xiii of NUREG-1123 (Revision 2). K/A #2.4.6 replaces old E/APE-generic K/A #12, "ability to utilize symptom-based procedures," which was omitted from Revision 2 of the catalogs.]"

Item #2: Generic K/As may be individually rejected for tier 3 questions by following the guidance of section 2 in ES 401 attachment 2 if they are included in the random sample and then listed on the ES 401-4 form. The purpose of requiring this sampling is to allow the NRC to review the basis for the suppression of the K/A.

ES 401 Attachment 2 section 2 states (emphasis added):

"2. All of the K/As in Section 2 of the applicable NRC K/A Catalog shall remain eligible for random selection for Tier 3 (generic knowledge and abilities) of the outline for RO examinations; all K/As that are linked to 10 CFR 55.43 are eligible for SRO-only examinations. They may not be pre-screened out; however, they may be rejected and justified on a case-by-case basis while developing the examination outline. The NRC will review the author's justification for each rejected K/A."

"[Note: As stated in Section D.2.a of ES-401, the intent of Tier 3 questions is to evaluate the applicants' knowledge in areas applicable to generic plant operation and not a specific system or procedure. If one of the Old System-Generic K/As is randomly selected for Tier 3, the question

should avoid testing knowledge specific to a particular system or procedure but test a plant-wide generic concept.]"

5. "Are there provisions for plant specific priorities in a Rev. 9 written?"

RESPONSE

Revision 8 to the Examination Standards eliminated the use of the old "plant specific priorities." Under revision 7 (and previous revisions back to revision 4) the licensee was encouraged (but not required) to select up to 10 K/As that were deemed "plant specific priorities" and use these K/As to replace randomly selected K/As on the sample plan. This process overemphasizes the K/As that were deemed "plant specific priorities" and may have resulted in the suppression of validly sampled K/As that had not been emphasized in the training program.

Revision 9 now allows adding any "operationally-important systems or E/APEs that pertain to the facility but are not included in the generic lists on Form ES-401-1." Note that this requirement is somewhat similar to the old "plant specific priorities" from Revision 7 but there are important differences. The key difference is that under NUREG 1021 Revision 9, the operationally important systems or E/APEs are added to the universe of K/As from which a random and systematic selection is made at the start of sample plan development. They are not used as direct replacements to suppress randomly selected valid K/As. Under revision 7, the old plant specific priorities could be used to replace randomly sampled K/As with little justification for the replacement, which may have biased the sample plan.

See the NRC response to question #3 for further guidance on the addition of "operationally important systems or E/APEs that pertain to the facility but are not included in the generic lists."

6. "Part 1: If KA lists a relationship to 10 CFR 55.43(b)(2) (Tech Specs and their Bases), we have run into exam review issues when developing test items for that KA that related to 10 CFR 55.43(B)(5) (Assessment of conditions and selection of procedures). (Better SRO match for the item)?"

"Part 2: [For] SRO items conforming to 10 CFR 55.43(b)(2) - some reviewers are rejecting test items for SRO's as not meeting this item, if the question does not require application of bases. (They expect any item 2 SRO question to cover TS b(5) assessment and procedures and/or basis.)?"

RESPONSE

We were not entirely certain as to the precise meaning of this question. If the question refers to the link between the K/As and the regulations, then the following response is provided.

Enclosure 2 MANTG Conference Questions and Answers

Part 1: The link to 10CFR55.4x in the K/A Catalog is not an extensive or exclusive tie. There may be SRO-level questions that can be written that match a specific K/A that is tied to 10CFR55.43(b)2 in the K/A Catalog but are a better match to 10CFR55.43(b)5. These questions will be acceptable so long as the other attributes of the question meet the Examination Standards. The SRO questions should match the K/A, match one of the areas of 10CFR55.43, and discriminate at the SRO level of knowledge.

Do not rely on the "K/A-to-10CFR 55.43" correlation for SRO only questions. ES 401.D.1.c states: *"The fact that a KA is linked to both 55.41 and 43 does not mean the K/A cannot be used to develop an SRO only question nor does it exclude the KA from sampling on the RO examination."*

Part 2: ES 401 section D.2.d states *"The 25 SRO - level questions shall evaluate the additional K/As required of the higher license level in accordance with 55.43(b) or the facility license's learning objectives."*

The NRC requires that SRO-level questions to test mastery of the elements of 10CFR55.43 and knowledge at the SRO job level. There is no requirement to always test the basis for a Tech Spec when asking Tech Spec questions at the SRO level. However, the SRO should be tested for Tech Spec knowledge that is more than just meeting simple LCOs or complying with simple action statements. Some aspect of interpretation or judgment of more complex technical specification issues should be included within the SRO-level question to differentiate between RO and SRO level of mastery for Technical Specifications.

If this question refers to K/As that have the word "and" to couple parts of the K/A statement (as in system A2 stem statements) then the question should attempt to test both of the coupled parts if possible.

The following paragraph from ES 401 applies:

"When selecting or writing questions for K/As that test coupled knowledge or abilities (e.g., the A.2 K/A statements in Tiers 1 and 2 and a number of generic K/A statements, such as 2.4.1, in Tier 3), try to test both aspects of the K/A statement. If that is not possible without expending an inordinate amount of resources, limit the scope of the question to that aspect of the K/A statement requiring the highest cognitive level (e.g., the (b) portion of the A.2 K/A statements) or substitute another randomly selected K/A."

7. "This is a possible Rev. 10 Proposal to NUREG 1021. For written initial exams, allow having a two (2) part written exam. Part 1 is a package without references. When the test taker turns in Package 1, then Package 2 is provided. Package 2 has selected references (including "Red Herring" References). Overall time limit for written would remain. Test taker would be responsible for time management."

RESPONSE

There are presently no plans to prepare a “Revision 10" to the Examination Standards in the near future. We recognize that the industry appreciates stability in the operator licensing process. The above proposals are currently not options under Revision 9 but may merit future consideration.

There are a number of industry-wide forums where proposals can be made for future changes. These forums may represent a wider cross-section of industry positions and have established a track record of success in proposing and adopting industry-wide changes in the operator licensing process. It may be appropriate to forward these ideas for future changes through the NEI Operator Licensing Focus Group or another industry-wide forum whose members represent the consensus of all utilities.

The Operator Licensing Feedback web page addresses the concept of open vs. closed reference testing and is restated as follows:

“401.42. Why is it valid to use a closed reference exam for initial license exams when it is really important that the operator use all of the tools available to him on shift? Where is the NRC headed on the use of open-reference requalification questions on initial exams?”

ANSWER:

“Open-reference items on the initial license examination should be used judiciously and sparingly because the examination should focus on the broader content areas that rely primarily upon learned information committed to memory.”

“In nearly every field of study (e.g., medicine, law, and education), the testing required for initial licensing or certification is more demanding than that required to maintain certification. The rationale is that newly licensed personnel should possess a broad body of knowledge and ability to perform their job independently and without the aid of supplemental knowledge contained in procedures. This by no means suggests that procedures should not be used, but rather that initial license testing should emphasize those areas where procedures need not be used.”

“Through their training, operators must learn set points, immediate actions, system designs and interrelationships, administrative procedures, and applications of knowledge to the job. The knowledge that is learned is expected to be demonstrated through the NRC examination format that measures recognition and recall of safety-significant knowledge without relying on references. This approach is consistent with the timely retrieval of information that may be required during the licensed operators' job and that might otherwise not be possible if the applicants prepared only for open-reference examinations. If too many open-reference questions are allowed on the initial licensing examination, the need and ability to learn and retrieve a broad body of knowledge would be lessened. Similarly, the confidence that the baseline body of knowledge had been truly established could be questioned.”

8. "Validate exam with licensed operators - what is done when they score <80%?"

RESPONSE

If a currently licensed operator scores <80% on a validation exam, no conclusions should generally be drawn with respect to an overall sat/unsat condition. However, if a qualified operator demonstrates a significant weakness that calls into question his or her ability to operate the plant, this weakness should be evaluated and remediated as appropriate. This principle is analogous to the response required when a surrogate licensed operator demonstrates significant weaknesses during an initial license simulator scenario.

The Operator Licensing Web page feedback section (ES 401.42) addresses the sum of the differences in the expectations between initial license applicants and licensed operators, and has been quoted in its entirety in the previous question (#7).

ES 601 Topics

11. "There [is] no "personnel restrictions" Section in ES-601 as there is in ES-201 - are restrictions the same, for example, on developing quizzes and the biennial written [exam]?"

RESPONSE

The integrity rule 10 CFR55.49 applies to both the initial and requal exam processes. NUREG-1021 provides exam security methods that are acceptable to the NRC and comply with 10CFR55.49. If the licensee desires to adopt alternative exam security processes for a requal exam that differ from those described in NUREG-1021, the processes should be proceduralized and should comply with 10CFR55.49. It may also be prudent (but not required) to have the alternative process reviewed by NRC staff prior to implementing the exam process due to the regulatory implications of an exam security compromise.

The biennial written exam is subject to the regulations under 10CFR55.59. Development of quizzes that are not part of the requalification exam process are not covered under 10CFR55.59 and therefore not explicitly subject to the security requirements of 10CFR55.49.

There are several feedback responses on the Operator Licensing Feedback web page that specifically address requalification exam security. They are quoted as follows:

"601.2. Is there a policy for use of computers and maintaining exam security?"

"Does there need to be a specific procedure for requalification examination security?"

Response: "The requirements of 10 CFR 55.49 apply to all examinations required by the

regulation, including requalification exams, while the requirement to establish, implement, and maintain examination integrity and security procedures in accordance with 10 CFR 55.40(b)(2) only applies to power reactor licensees that elect to prepare their own initial operator licensing examinations. However, it would be appropriate for those licensees that do establish procedures to address all exams required by Part 55. Refer to the section on ES-201 for related security questions."

"201.13. Why does ES-201, Section D.2.b, Bullet #1, permit a person signed onto the initial exam security agreement to operate the simulator from the booth when this is not permitted in ES-601 for requal? Why the inconsistency?"

"Response: (R9) This inconsistency, which resulted from an oversight during the development of Revision 8 of NUREG-1021, has been corrected. The security restrictions on Form ES-601-1 are now the same as in ES-201."

"201.19. If involved in an initial examination, is there a restriction from teaching requal?"

"An initial licensed operator upgrade candidate attends licensed operator requalification training with his crew. The instructor is on the initial NRC exam team and has signed the exam security documents. Is the initial NRC exam candidate allowed to remain in the class/simulator or must he/she leave?"

"Use of instructors is still an issue. The use of an instructor, who is on the exam security agreement, can't teach candidates attending the requalification program. This is an unnecessary burden on resource restrictions."

Response: "SRO upgrade applicants who are removed from the watch rotation do not have to attend RO requalification training while they are training for the SRO license. If there are no upgrade applicants in the requalification class, there would be no restriction on the instructors. However, as stated in Section D.2.b of ES-201 (NUREG-1021), if SRO upgrade applicants are present in the class, instructors would not be permitted to teach in areas in which they have examination knowledge, and their activities would have to be documented on Form ES-201-3. They can teach subjects about which they have no examination knowledge, which is a good reason to limit everyone's access to only those portions of the exam for which they have responsibility. Instructors with examination knowledge should not be used in training environments that require one-on-one contact with trainees. There is no problem with them teaching a requalification lecture or simulator session, but the trainer with examination knowledge must avoid direct individual interaction with the applicants."

12. "What is the NRC stance on using surrogate shift managers [SMs] for requal simulator scenarios, staff crews. [Dual Unit Sites to minimize exposure of SMs]"

13. "[A Conference Presenter from NRC Headquarters] spoke briefly about the use (misuse) of surrogates during exams. What is the NRC expectations/desires for the use of surrogates in both ILT and LORT Exams?"

RESPONSE

With respect to licensed operator requalification exams, ES 601 clearly states that operators are to be trained and examined as they operate. Generally, the NRC expects the crew to include no more than five operators, but the agency will consider larger crews on a case-by-case basis. At times, to ensure an adequate sample size, the examination team may configure crews that do not routinely work together to perform shift duties. Mixed crews of shift and non-shift operators should not be configured unless the facility licensee routinely evaluates mixed crews in its requalification training program, or the facility licensee's normal crew size is so large that it is necessary to separate a normal crew for examination purposes.

A shift manager at a multiple unit site should feel responsible to his or her crew and it is expected that they would want to be in the SM position to guide his or her crew through the complete examination process. In some cases, with three SROs as a part of the minimum technical specification shift complement for a dual or triple unit, the SM may need to rotate out for one scenario. It may also be necessary to use a surrogate operator to replace crew members who are absent during the day of the evaluation.

However, the use of surrogates during requalification exams solely to "minimize the exposure of Shift Managers" (or any other shift position) appears to contradict the fundamental principle of "examine as you train."

ES 601.D.2.a states: "The NRC expects facility licensees to train and examine their operators in the same crew configurations with which they normally operate the plant."

Question #1 from section ES 302 addresses the use of surrogate operators for initial licensing exams.

ES 602 Topics

1. "With respect to requal comprehensive (biennial) exams, I have heard of some facilities that are incorporating a practice of using "core" questions on their comprehensive (biennial) written exams.

   This practice would be to have 8-10 questions that appear on all versions of the exams for that requal exam cycle.

   While it is still possible to change out enough questions to meet the threshold of IP 71111 Att. 11, Appendix 1, I question whether this a concern for exam predictability.

   (My facility does not currently use this process. Since it looks like a cost savings, I am covered for a position when the question comes up why are we not doing this)."

RESPONSE

As long as exams repeat no greater than 50% repetition among exams overall, this practice will not be further reviewed in accordance with IP71111 Att. 11. The inspection procedure requires further review if the overlap in questions from week to week is greater than 50% and requires examiners to determine if there is "grade creep" on the core questions as a result of their repetition. If grade creep is identified for core items, the NRC could issue a finding for failure to maintain exam security under 10CFR55.49.

In addition, the facility will need to prevent licensed personnel from validating the same questions that are included in their own requalification written exams. If this occurs, it could be an integrity issue of 10 CFR 55.49.

ES 603 Topics

1. "We had issues with people making incorrect EAL calls, which put us in jeopardy of getting a green area in the ROP. We have refined EALs to cover situations so that the calls are easier to make - almost any event falls in a category. Now we are being told that JPMs that do not do much more than test the ability to determine EALs are too close to being direct look-ups. What is a good example of an EAL JPM? If we make them all protective action recommendations, it gets to be pretty predictable."

2. "Re: JPM validity/quality - if a JPM meets [NUREG] 1021 standards, what threshold does an examiner/inspector use to determine if JPM is unsatisfactory?"

RESPONSE

Although not explicitly stated in ES 603, ES 602 Attachment 1 is current NRC guidance for open reference testing. Although the guidance was created to address open reference testing on requalification written exams, the same principles apply to certain aspects of the JPMs. JPMs can be viewed as essentially open reference questions. During JPMs, the licensed operators are required to operate the simulator or simulate the task in the plant.

One issue that has been raised as an observation on a recent Region I 71111 Att. 11 requalification inspection, was the adequacy of a JPM that required the shift managers to classify the emergency for a steam generator tube rupture of X+Y gpm. The site EALs explicitly listed an SGTR exceeding X gpm as an "ALERT." This JPM would appear to be a "direct look-up" as defined in the Examination Standards. A better test item might be to provide complex event conditions, each of which warrant a different classification, and then ask the operator to classify the events. This JPM would require the operator to consider 2 or more events and determine which one was the correct (or highest) classification.

The NRC staff continues to carefully review this area based upon issues raised by Region I and an OL feedback may be generated on the OL web page in the future.

Enclosure 2 MANTG Conference Questions and Answers

ES 605 Topics

1. In reference to the [statement on the] NRC 396 Form, "Must not perform licensed duties requiring a respirator" - [if this block is checked] Is the operator respirator qualified?

   Is there a different standard associated, i.e., if licensed operators are expected to be able to don respirators/SBA's in the control room, what is the implication of checking this block on the 396?"

   RESPONSE

   If such a condition were to be on an operator's license, he or she would most likely not be qualified to wear a respirator. The individual could still hold an operator's license but could not be a part of the minimum shift complement as defined by 10 CFR 50.54(m) or the technical specification (whichever is the most restrictive) since the individual might be needed to respond to an event with the control room environment needing a respirator or SCBA. If the individual were part of the minimum required crew staff and respirators became necessary, he/she would have to immediately exit the area and be replaced within 2 hours by an operator who was respirator qualified.

   There are no separate standards for respirator qualifications that are based solely on holding an operator license. The NRC usually applies the license conditions that are recommended by the licensee's Medical Review Official (MRO).

2. "Why not add a block to the 396 Form that requires the utility physician to check/and/or explain - Fit For Duty?"

   RESPONSE

   The determination that a person is fit for duty is essentially done by a company official by signing the signature block of the form. While the primary intent of the form is to communicate that personnel are fit for duty (under 10CFR26), the form is also used to communicate to the NRC any permanent disabilities that need to be reported by rule (10CFR50.74) with any appropriate compensating conditions. If an operator is not fit for duty and never will be, it is not logical for a facility to request that a license application be processed or that a license be maintained. There is additional room on the form for a more detailed explanation regarding an operator's or applicant's overall fitness. Additional pages may also be added if needed to provide a complete medical description.

3. "Given the issues of medical conditions, and the apparent desire by the NRC to "second" review the facility MRO with respect to evaluating medical conditions:

   1) Why is there no standard checklist as part of the 396 Form for the MRO to fill out, e.g., each of the 9 disqualifying conditions would have a yes/no check off?

2) The checklist should require a detailed description of any yes answers and why that particular condition is or is not disqualifying in the opinion of the MRO."

RESPONSE

Providing a simple checklist could be perceived as overly restrictive by the MROs and could potentially reduce the effectiveness of the form. Provisions are made for addressing the standard compensating conditions on the form. Facility licensees are responsible for describing potential permanent disabilities in sufficient detail to allow the NRC's MRO to understand the condition and the restriction. The detailed description of any conditions and compensating measures should be written on the form with supplemental pages if needed. Checklists may appear to be usurping the prerogatives of the MRO.

However, if the industry has specific recommendations for improving this form or providing a revision to this form, these recommendations should be forwarded through one of the various industry focus or standards groups and will be considered by NRC.

4. "What is a permanent disability? The rule and the regulatory guide along with the ANSI/ANS standard do not give a definition."

RESPONSE

You are correct; there is no formal definition of a "permanent disability."

Refer to Section C.3 of ES-605 and Information Notices 04-20, 94-14, and 91-08 which are available via links from the operator licensing web page at:

http://www.nrc.gov/ reactors/operator-licensing/regs-guides-comm/gencomm.html

for additional information regarding the staff's expectations with respect to medical standards for licensed operators.

With regard to "permanence," Subsection C.3.a of ES-605 indicates that if an operator does not meet the specific minimum standards/requirements in the applicable version of ANSI/ANS-3.4 but is expected to meet those standards (without exception) again in the future, then the operator's condition/disability is considered temporary and does not need to be reported to the NRC; however, the facility licensee is expected to administratively restrict the operator's activities, as appropriate, during the term of the condition/disability. While most of the medical conditions/disabilities, including those that result in failure to meet the minimum requirements for medical qualification, identified in ANSI/ANS-3.4 are probably permanent, it is up to the examining physician to evaluate each operator's situation on a case-by-case basis and assess whether the operator will be capable of meeting the standards in the foreseeable future. For example, the facility should consider reporting a condition for an operator who requires medication to meet the minimum standard for blood pressure (i.e., less than or equal to 160/100 mm-Hg), unless the physician can reasonably determine that the condition will

be controllable without medication in the foreseeable future. The NRC will review the facility licensee's administrative controls and the MRO/physician's explanation for why the condition was considered temporary during the licensed operator requalification program inspections.

If an operator develops any permanent physical or mental condition that could adversely affect his or her performance of assigned operator job duties or cause operational errors endangering public health and safety, it must be reported to the NRC within 30 days of learning of the diagnosis (per 10 CFR 55.25 and 55.33(a)(1)). It does not matter whether the operator exceeds the specific minimum requirement or the related disqualifying condition threshold in ANSI/ANS-3.4. All conditions, disabilities, and incapacities should be reported to the NRC for evaluation, regardless whether or not the facility has implemented compensatory measures. If an operator develops a condition that is not identified in the applicable ANSI standard, but the examining physician believes that it could affect the operator's performance or cause errors, then it would still be prudent to report it (or at least inquire whether it should be reported).

If the examining physician concludes that the operator's condition, disability, or incapacity does not affect performance or safety, he or she can request/justify a waiver of the medical requirement. For example, a color-blind operator might be granted a waiver based on a satisfactory practical test. If the operator's condition, disability, or incapacity can be safely accommodated by a restriction on the license (e.g., no-solo, more frequent monitoring, or requiring medication), then the physician should make an appropriate recommendation to the NRC on Form 396. However, if the operator's condition, disability, or incapacity is such that it cannot be reasonably waived or accommodated, then the facility licensee should request the NRC to terminate the operator's license.

5. "Recent self assessments have forced us to change our policy so that any session quiz failure automatically results in removal of shift duties until remediation is conducted. This has forced us to change our quizzes. Is there any licensing or 10 CFR basis for this position?"

RESPONSE

ES 601.F.1 states in part that: "In all cases, a facility licensee's administrative procedures should ensure that an operator who fails a requalification examination is removed from licensed duties, given remedial training, and reexamined before being allowed to return to licensed duties. This also applies to an SRO who performs only RO-level duties at the facility when the failure is caused solely by activities involving SRO responsibility."

The basis for this expectation is that the requalification examination will test areas that are safety-important. If a person hasn't demonstrated satisfactory performance, then the individual is potentially not qualified or safe to operate the plant without retraining as required by the 10 CFR 55.59(c)(4). This expectation applies to the annual operating test and the written comprehensive test only. It may apply to periodic quizzes if the

information is safety-important. Only the facility can make this determination for periodic quizzes and it would have to be handled on a case-specific basis. The question implies a case-specific purpose for the action to be taken. An integrity issue could arise if grading of quizzes is not objective in order to circumvent the license restriction requirement.

ES 605/IP 71111 ATT. 11

1. "An OPs crew fails a requal training session evaluated scenario, what do you look for on the reevaluation?"

   RESPONSE

   We would expect you follow a systems approach to training which is basically a mini-corrective action process. Good corrective action processes will determine underlying causes (root and contributing) and provide corrective actions to address the knowledge or ability weaknesses. The reevaluation test should not repeat the failed test. In other words, if an operator failed 3 JPMs out of 5 on her/his 1st annual operating test it would be inappropriate to repeat 1 or more of the 3 failed JPMs on the reevaluation operating test.

   This issue is further addressed in NRC IP 71111.11 Appendix D (last paragraphs).

2. "In reference to the above questions, do the same regulations apply during the requal year, as they do on an annual exam?"

   RESPONSE

   In accordance with 10 CFR 55.59 (c) (4), the evaluation process should be defined in the facility training program if it is based on a systems approach to training. The program should delineate what is to be done for quiz and interim test failures during the implementation of requal training within the requalification program which is not to exceed 24 months. If safety-important areas are being tested on these interim tests, then the facility needs to evaluate knowledge and abilities prior to returning the individual to shift. Such evaluation is needed for the annual operating test and the comprehensive written exam because of the comprehensive nature of these tests.

IP 71111 & App I 0609 MC SDP

1. "In reference to [the] SDP percentage criteria on exam quality concerns, what is the expectation for adequate sample size to determine a finding? i.e., can you use one exam set or should the inspector broaden the sample to get a better indication of requal program adequacy?"

RESPONSE

The Significant Determination Process (SDP) requires a finding to be produced if one exam set is found to be deficient in excess of 20%. Expansion of the sample is not required but may be prudent depending on the situation. Each situation will be handled on a case by case basis.

For example, a facility was testing SROs (not qualified as shift managers) on Emergency classifications using Emergency Action Level (EALs) that were essentially simple direct look up questions. In this case, the sample size was set at all test items for the EAL calls related to those SROs who were not qualified as shift managers during the exam cycle.

Simulators: Fidelity and Testing

2. "Recently, the NRC has requested that utilities not move off present ANS standard in use. However, I do not see a clear list of issues which need to be resolved before the "hold" is released. A list of focus issues needs to be developed and worked off systematically. SBT may be a top level issue but what specific needs to be answered?"

RESPONSE

At the July 12, 2005 NEI/NRC Licensed Operator Focus Group (LOFG) public meeting, the staff suggested that licensees who were considering moving to the ANSI/ANS-3.5-1998 standard hold off until staff concerns with implementation of scenario-based testing (SBT) could be resolved with the industry. The staff pointed out that licensees are not prohibited from changing their commitment to a different standard.

The NRC continues to endorse the current (1998) consensus standard, as well as the 1993 and 1985 standards and does not have a regulatory basis to require licensees to remain on the standard to which they are currently committed. Licensees should recognize, when considering transitioning to the 1998 standard, that the NRC expects facilities to demonstrate verification of the Section 4.1.4 acceptance criteria.

A summary of the last NEI/NRC LOFG meeting is available on the NRC's Operator Licensing web-page as well as on the agency's Agency Document Access and Management System (ADAMs). In general, the meeting summary identifies issues of concern with action items assignments and resolutions.

The focus group is addressing the following issues:

- How to balance the use of before-the-fact analyses based on actual or best-estimate data verses comparing test results using after-the-fact analyses often based on subject matter expert opinion.

- Industry's proposal to bound or limit the type and quantity of scenarios (e.g.,

limit to only initial and requal operating tests going forward and exclude all training scenarios unrelated to operating test) vs. the NRC's current view that scenarios related to control manipulations for reactivity experience, initial and requal training and operating test is included in SBT.

- How to apply ANS-3.5-1998 Section 4.1.4 as SBT acceptance criteria for malfunctions.

- An Industry proposal that the Malfunction Cause & Effects document to be used as a bases for SBT results comparisons.

- An assessment of the MANTG SBT demo as the industry's proposal as an acceptable method of SBT.

- Requirements for BWR core model testing.

- Requirements for availability and quality of the original verification and validation test documentation at ANSI/ANS 3.5-1998 plants.

Reference: NRC Letter dated August 5, 2005, ML#052210183, Summary of July 12, 2005 Public Meeting with Industry Focus Group Regarding Simulator Issues

The following action items were open after this meeting:

Action Item #5 - Industry will formally provide to the NRC staff for review and comment its consensus white paper on simulator core performance testing for BWRs.

Action Item #6 - Under INPO lead, the industry will provide its view on appropriate criteria for determining what simulator deficiencies should be communicated to the NRC prior to operating test.

Action Item #7 - Under INPO lead, the industry will research and compile existing guidelines for scenario development and assess their adequacy for minimizing negative training by appropriately confirming simulator accuracy.

Action Item #8 - Industry will provide to the staff a proposed approach to an SBT that could then be compared to that developed by the NRC.

Other possible open issues are noted herein.

3. "Has a formal root cause analysis been conducted by NRC staff of simulator fidelity issues? If so, what is/are the cause(s)?"

RESPONSE

The staff has not conducted a formal root cause analysis with regard to simulator fidelity issues. For the most part, licensees rather than NRC staff conduct root cause analysis of simulator issues depending upon their regulatory impact. Some licensees have conducted individual root cause analyses for specific simulator fidelity problems. Generally, INPO conducts site licensed operator requalification program issues common cause analyses, which may or may not include simulator fidelity issues. Most NRC simulator inspection findings and NCVs have not warranted staff to conduct such an analysis. NRC inspection manual, MC 0612, "Power Reactor Inspection Reports" provides guidance to staff with regard to writing inspection details, including a brief analysis of NRC-identified findings and violations.

The staff believes that most simulator fidelity issues may have originated in weak and/or inadequate verification and validation testing programs that are the underpinning for subsequent performance tests, such as normal, transient, and malfunction tests. Many of the fidelity issues may be rooted in a lack of initial rigor in applying various testing methodologies required by the ANS-3.5 standard. Insufficient simulator performance testing appears to surround the fidelity issues, which raises staff concern that fidelity issues should be identified before negative training or safety significant plant events occur as a result.

4. "It would have been helpful if the MANTG SBT demonstration had been run from beginning to end and all data collected as expected. A complete SBT package of the expectations could then be observed and an idea of how much and how detailed it is could be assessed and compared to the NRC's SBT approach.**"**

RESPONSE

The staff agrees that a more complete MANTG SBT demonstration package could have provided a better comparison. However, several factors were at play: (a) Millstone 3 simulator available time was limiting; (b) obtaining logistical support to develop the scenario; and (3) use of the simulator for conducting licensed operator training during the three-day conference. On balance, the staff believes that the key aspects of both the NRC's SBT approach and MANTG's SBT approach sufficiently demonstrated that the criteria of ANSI/ANS-3.5-1998 section 4.1.4 can be verified and documented in an SBT used as a simulator performance test.

5. "At the April 5, 2005 NEI/NRR LOFG meeting, the staff said they would like to see an engineering analysis for each of the annual operability transient tests. When the standard allows operational analysis by SMEs, why is this method unacceptable?**"**

RESPONSE

At the public meeting, the staff pointed out its concern with some licensees on their over-reliance on subject matter experts rather than on use of reference plant data for

determining and/or predicting expected plant response. Licensees are expected to adhere to the standard's requirements with respect to the "order of preference" when implementing their annual operability tests including transient tests.

ANSI/ANS-3.5-1998 Section 5.1.1 (Utilization of Baseline Data) discusses requirements with regard to the order of preference for utilization of baseline data to ensure simulator fidelity. Specifically, the order of preference is: (1) data collected directly from the reference unit; (2) data generated through engineering analysis with a sound theoretical basis; (3) data collected from a plant which is similar in design and operation to the reference unit; (4) data from subject matter expert estimates; and (5) other data sources. The standard provides flexibility for those instances where data are collected from sources other than the reference unit in that the data source shall be specifically identified and shown to be applicable to the simulator.

Licensees need to be cognizant of three specific ANS-3.5 terms when considering methods acceptable to the staff when assessing the adequacy of their performance tests/test results. They are:

(1) Best-estimate - predicted reference unit performance data derived from engineering evaluation or operational assessment by subject matter experts for specific conditions.

(2) Design data base - the design documents, performance data, records, assumptions, simplifications, derivations, and other definable data on which the design of the simulator hardware and software is based.

(3) Subject matter expert - an individual who possesses the appropriate education, license, experience, or unique qualifications to perform assessments and make recommendations in a particular subject area.

The standard requires annual transient testing for a defined set of major plant transients. Ideally, licensees should compare these transients to best-estimate engineering analyses of key parameter responses to these bounding events. It is the staff's belief that simulators, which closely match reference unit response to the Appendix B transients are likely to accurately model other transients for which the licensees lack actual plant data. While the standard does allow (but does not prefer) subject-matter experts (SME) as a method of evaluating simulator response, the staff thinks their use is least appropriate in the area of the Appendix B transient tests. All of these events challenge the plant (simulator) in an integrated manner and the majority of these transients have never occurred in the actual plant. These two factors bring the sole use of an SME into question. It is likely that the SME expectations as to proper simulator response will have been conditioned by the prior observance of the same simulator's response to the very transients he/she is expected to evaluate against the reference plant.

6. "Has the NRC tabulated how many plant-referenced simulators have current best-estimate analysis? If so, how many?"

RESPONSE

We have not tabulated a list of simulators that have current best-estimate analyses. The staff expects all plant-referenced simulators to have a good (e.g., authentic) set of best estimate data from which to establish acceptance criteria for simulator testing. ANSI/ANS-3.5-1998 defines "best estimate" as "predicted reference unit performance data derived from engineering evaluation or operational assessment by subject matter experts for specific conditions."

Again, as indicated in question 4 above, sources of data should not be limited to best estimate data, but should include actual plant data where available.

7. "What are NRC expectations for Malfunction Cause and Effects [documents] that would be acceptable?"

RESPONSE

At the July 12, 2005, NEI/NRC LOFG meeting, industry proposed to the staff the use of Malfunction Cause and Effects (MCE) documents to support SBT. Although the staff remains open to the proposal, the staff cautioned that MCE documents are not addressed nor included in the ANSI/ANS-3.5 standard and as such would be subject to staff scrutiny when conducting the simulator portion of IP-71111.11 requalification inspections for ensuring regulatory performance testing. MCE documents, if used for simulator performance testing, must be up-to-date and must be derived from reference plant design baseline data (see ANSI/ANS-3.5-1998 section 5.1.1.1).

8. "Alot of industry effort and discussion with NRC has gone into expectations for SBT. NRC has expressed concern with quality of V&V. What are NRC expectations for V&V?**"**

RESPONSE

ANSI/ANS-3.5-1998 Sections 4.4.1 and 4.4.2 lay out the requirements/expectations for verification and validation testing (V&V). The staff expects licensees to comply with these testing requirements. When discussing V&V, several key points are in order:

(1)The extent and nature of the testing performed shall be based on the design of the software and its effects on simulator fidelity,
(2) the validation testing may be conducted in a fully integrated, partially integrated or stand-alone mode of system operation, and
(3) a record of the conduct of the test, test results and test evaluation shall be maintained.

Operability testing consists of tests of real time, repeatability, limits of simulation, steady state and normal evolutions, malfunctions, and transients (some of which can be

credited through scenario-based tests). These tests can often reveal fidelity issues when the tests are detailed and critically evaluated with a focus on simulator performance as compared to the reference plant. Their primary intent, however, is to demonstrate the adequacy of the simulator performance for use in training and evaluating operators. In that regard, structured operability testing does not test all operating configurations of the models. It is expected that prior V&V testing was performed in a manner that thoroughly exercised models to identify any design flaws.

Some recent inspection findings and actual events have indicated that latent simulator fidelity issues continue to exist that should have been identified by V&V. In some cases, licensees have been unable to locate records of initial model V&V tests. In other cases, V&V following discrepancy resolution has been too narrow in scope to confirm model fidelity. Questions may be raised that would warrant a closer look by the staff at licensee's V&V testing programs to ensure adherence to the prescribed standard when simulator fidelity issues are identified which impact operator actions on the reference plant. It is the staff's view that V&V testing serves important functions in identifying problems with original model design and in identifying problems with model changes.

9. "In Reg Guide 1.149, Revision 3, it states that editions of ANSI/ANS-3.5 that were previously endorsed by the NRC remain acceptable methods of meeting the regulations. Why do many issued violations not include noncompliance with the applicable standard?"

RESPONSE

ANSI/ANS-3.5 does not have the same status as a regulation. The ANSI/ANS standards are industry-developed documents that specify a method that if followed, will result in compliance with the regulations. The NRC endorses the ANSI/ANS 3.5 standard as stated in Reg Guide 1.149. The federal regulation for simulator fidelity is 10CFR55.46, which must be met regardless of which methodology is used to achieve compliance. The various revisions to ANSI/ANS 3.5 provide several approaches for meeting the requirements of 10CFR55.46. Within the ANSI/ANS 3.5 standards, there is significant latitude for selecting specific methods for simulator testing.

As a result of a number of fidelity and testing issues and adhering to internal inspection guidance (e.g., Inspection Manual Chapter 0612), the staff has developed a regulatory position with respect to simulator findings. "More-than-minor" fidelity issues are performance deficiencies that can be violations written against either 10 CFR 55.46 or findings for non-adherence to the committed version of ANSI/ANS 3.5 standard. A violation that identifies a failure to follow ANSI/ANS-3.5 is not "written against the standard," but typically cites the over-riding regulation. Once a violation is identified to be "more-than-minor," the NRC normally will not independently identify the cause of the finding, which may be related to poor testing or non-adherence to the ANSI/ANS standard. The NRC relies on the licensee's root cause analyses to determine root causes of individual issues. The NRC will review the licensee-determined root cause

and may elect to conduct common cause or generic implications assessments if enough individual issues are noted.

The staff is expected to adhere to direction found in the NRC inspection manuals with regard to identifying simulator performance deficiencies. In general, the NRC staff attempts to cite violations against the Code of Federal Regulations (CFR) rather than citing violations against an internal procedure or committed standard because the CFR forms the regulatory bases for assigning the violation. In most cases, it is the Code of Federal Regulations that provides the bases for citing a violation.

10. "Is SBT required for all scenarios that are used for training or are there some scenarios that are not "designed to test the simulator" that do not require SBT?"

11. "Simulator SBTs should only be performed on NRC required exam scenarios when they are created or taken off the shelf for validation prior to use. This should not be required for all training or evaluation (utility required) scenarios."

12. "Is the goal that every ILT and requal scenario be an SBT?"

13. "How many SBTs do I need to run?"

RESPONSE (to 9, 10, 11, and 12)

ANSI/ANS-3.5-1998 Section 4.4.3.2 requires that: "Scenarios developed for the simulator ... shall be tested before use for operator training or examination." The standard does not bound or limit the type or number of scenarios. At the July 12, 2005, NEI/NRC LOFG meeting, industry proposed that staff give due consideration to bounding scenarios with regard to the number and the type over a period of time. The proposal by industry includes limiting SBTs to only those simulator scenarios developed for initial and requalification operating tests going forward.

14. "After parameters are plotted for SBT, what are these plots compared to? The plot may be generated from a unique set of malfunctions for which there has been no previous engineering analysis."

RESPONSE

ANSI/ANS-3.5-1998 Appendix A, Section A4, discusses basic information that should be included in the documentation of a simulator's performance (e.g., response of pertinent simulator parameters, among others). The responses should be compared, evaluated and assessed to expected reference data, etc. bearing in mind the required order of preference for utilization of design data discussed in Section 5.1.1. We recognize that the standard allows the use of SME judgment as one of several comparison methods. However, we note that SME judgment is the 4th priority on the hierarchy of validation methods. The use of SME judgment could be part of an overall program that also included many of the higher priority methods provided it was not over-relied upon.

15. "Are second order effects captured in the ANS 4.1.4 requirement with regard to malfunction testing that include required operator actions from using applicable reference unit procedures?"

RESPONSE

In general, second order effects should be captured when testing malfunctions that may include required operator actions. However, second order effects are generally limited to those effects closely associated with the operator action such as operation of a component that results in a change in parameter, such as flow or pressure in the correct direction. Depending upon the circumstances, nature, and quantity of operator actions of interest, the order of preference guidance in Section 5.1.1 of the standard apply. The staff does not expect that all possible effects as a result of an operator action to be included in the test documentation. With regard to multiple scenarios for a given malfunction, first and second order effects should be approached the same way in a consistent manner (e.g., following the standard's order of preference guidance).

16. "Would NRC consider quality SBT based on structured malfunction cause and effects as a basis to grandfather V&V to allow a station to transition from early versions of the standard to later versions?"

RESPONSE

ANSI/ANS-3.5-1998 Section 4.4, Simulator Testing, provides standard requirements for both verification testing (4.4.1) and validation testing (4.4.2). Because V&V testing is foundational for supporting the capability of the simulator (under all revisions to ANSI/ANS-3.5) and simulator performance testing (4.4.3), the prospect of "grand-fathering V&V" is problematic. The staff believes that V&V testing comports with the regulatory definition of "performance testing" because it requires: (a) comparison of simulated component or system software design to the actual original requirements, and (b) comparison of simulator model results to actual or predicted reference unit data. Use of "quality SBT based on structured malfunctions cause and effects (MCE) approach in lieu of V&V testing appears to be contrary to the standard.

The staff encourages licensees to give due consideration to the state of their simulator software/hardware ability to meet the requirements of the standard. The staff believes that each version of the standard is appropriate for ensuring simulator scope and fidelity is sufficient and adequate for meeting regulatory requirements. The staff has not taken a position on the use of MCE documentation to support SBT.

17. "Malfunction tests are repeatable and should [continue to] be unless something has changed in the simulator programming. Is it reasonable to expect to have the same test results as the last time the test was run when NRC inspectors request a specific test to be run during an IP71111.11 inspection? Particularly, with SBT being conducted as

integrated malfunctions being impacted by human performance the tests will not be 100% repeatable. What will prevent a scenario from being declared invalid or the simulator deficient if during an inspection the observed scenario results do not match the documented SBT results because of operator actions?"

RESPONSE

ANSI/ANS-3.5-1998 Section 4.1.1 (Real Time and Repeatability) requires that it shall be demonstrated that between successive simulator tests no noticeable differences exist with respect to time base relationships, sequences, durations, and rates.

The staff recognizes that if significant operator actions expected to be taken were not / are not identified in the SBT, then test results repeatability issues may come into question. Licensees should be able to reasonably explain or annotate any significant differences in SBT test results. The idea is to not only demonstrate the adequacy of the simulator but also to identify any outstanding discrepancies from the conduct of the SBT test. Keep in mind that when an SBT is in "use" for training and/or examination it generally should have already been tested prior to use for simulator performance testing for meeting either standard or regulatory requirements.

18. "If testing is conducted using a scenario guide, over time I am concerned that simulator response to an event with other-than-the-expected actions taken by the operator would not be validated. Typically for operator training, we run certain malfunctions with no operator actions, then discuss applicable procedures that would be used to mitigate the event. Then, the event is rerun with operators taking actions. With the testing proposed (SBT) how would we ensure that the simulator responds correctly to the event? For example, during a scenario: (1) a BWR feed water pump trips requiring operator actions to manually start High Pressure Coolant Injection were assumed; and (2) the crew fails to start HPCI on an operating test evaluation scenario and reactor water level decreases below TAF prior to the crew actions. Is the reactor water level decrease response per the reference plant USAR assumptions? It has not been SBTed, so can we fail this crew/individual based on a critical task of maintaining level > TAF?"

RESPONSE

In general, simulator fidelity is assessed and verified through a layered approach to testing (initial V&V, normal operations tests, malfunction tests, steady state comparisons, real time verification, transient testing, and scenario-based tests). SBT is expected to verify simulator response as it occurs when operated in the manner in which the scenario is intended to be used.

If the scenario, as described in the question, provides a demonstration of plant response followed by having operators respond to the event, then the simulator should be evaluated for both those situations. It is neither required nor expected that SBT cover all possible plant responses based on unanticipated actions by an operating crew. Confidence in accurate, high fidelity simulator response is achieved through conduct of

all testing specified in the ANSI standard.

Simulator response is not suspect solely because operators take actions not anticipated in the SBT. We emphasize that facilities are responsible for ensuring simulator fidelity such that negative training does not occur. If operator actions during the conduct of a scenario take the simulator into an operational regime never before challenged, it would be prudent for licensee staff to confirm that the response is as expected of the reference unit. However, there are no formal requirements to conduct or to document this evaluation.

19. "It appears that the NRC's proposal regarding SBT testing detail is designed to solve problems at various sites not related to SBT, as I understand it. SBT is, in my opinion, designed to test the simulator response for a given scenario with selected malfunctions. It is not designed to solve problems outside of proper simulator response to a given set of malfunctions conducted. We should not be using SBT for any other purpose."

RESPONSE

In principle, integrated testing via SBT makes sense. However, it presupposes a level of detail sufficient to identify problems. The staff position is that since credit may be taken for malfunction testing through SBT, the scenario-based tests must contain sufficient detail to verify and document an effective evaluation of simulator response against the Section 4.1.4 criteria. The NRC agrees that SBT should not be expected to identify all modeling problems. However, in order to be effective, SBT must be structured to ensure a careful, critical look at key parameters associated with malfunctions used in the scenarios.

20. "Why did the staff list unexpected alarms in its SBT example? It is my opinion that listing unexpected alarms is an unnecessary burden."

21. "Why list unexpected alarms prior to SBT? If an unexpected alarm does come in, a DR is written to address the unexpected alarm. The DRs written against the test are listed on the MANTG form, i.e., why guess on what of the 100s of alarms to list?"

RESPONSE (to 19 and 20)

ANSI/ANS-3.5-1998 Section 4.1.4 requires, among other things, that: "The simulator shall not cause an alarm or automatic action if the reference unit would not cause an alarm or automatic action under identical circumstances." The staff's SBT example demonstrated how this requirement could be implemented into a test document. Utilizing the order of preference principle, only those pertinent alarms germane to the malfunction or event need to be included. The universe of alarms beyond first order are not included in the test. Keep in mind that the simulator's performance is being tested and that meaningful and adequate testing is required.

Unexpected alarms should be listed as alarms that were not supposed to actuate except where expected parameter trends should pose challenge to the alarm setpoint. If the

parameter trend is not expected to challenge the alarm setpoint, it need not be explicitly listed. For example, parameters that are not expected to change during the scenario need not be listed. Parameters that are expected to increase just short of (not to exceed) the actuation setpoint require more attention and should be listed to ensure that the simulator staff focuses on the parameter and alarm status during the scenario. This would be especially true for alarms that could cause significant variations in the procedural flow path.

22. "How did you handle alarms that were listed as expected alarms that did not come in? Were they SAT or UNSAT or N/A?"

RESPONSE

The answer depends on the scenario conditions. Each difference would have to be analyzed based on the actual as-run scenario conditions at the time the alarms were expected. If the alarms did not actuate because the as-run conditions did not cause the parameter to exceed the alarm set-point, they would be assessed as "SAT" with a reason noted for the difference between the as-run scenario and the expectations. If the alarm did not actuate and there was no apparent valid reason for the parameter not exceeding the alarm setpoint, then the alarm would be listed as "UNSAT" and corrective action would be required.

23. "Will NRC allow use of "stand alone" simulators for SBT testing in view of heavy simulator usage supporting both ILO (Initial Licensed Operator) and LOR (Licensed Operator Requalification) activities ("stand alone" being defined as a simulator not aligned to panels (i.e., desktop)?"

RESPONSE

No, the use of "stand-alone" simulators (i.e., not the plant reference simulator) will not meet the requirement for SBT. ANSI/ANS-3.5-1998 addresses use of stand-alone testing specifically for validation testing but does not provide for operability testing in other than a fully integrated fashion. Scenario-based tests, in particular given their nature, require the simulator software aligned to the panels.

Simulator testing is intended to confirm that the operator will have a like-experience to that of operating the reference unit under similar circumstances. To that end, it is vital to ensure that results of tests performed on the simulator models accurately reflect the response an operator would observe when on the simulator floor. The NRC recognizes enhanced capabilities for off-line or stand-alone testing of simulator model response provided by newer processor platforms, simulator instructor stations and operating environments. These capabilities allow for facilities to perform extensive testing and detailed evaluation of simulator model response while leaving the main simulator floor available for the conduct of training and evaluation of operators.

Stand-alone testing to accomplish the testing prescribed by the ANSI standard may be appropriate where the simulator capabilities lend themselves to effective performance of these tests. Some tests, however, do not lend themselves to stand-alone testing because of the need for timely and extensive interaction with the models via input signals from the boards. One example of a type of test which is appropriately performed on the boards vice stand-alone is a scenario-based test. It is expected that SBTs utilize a crew to perform and receive input from the boards just as would an operating crew.

Where licensees conduct testing in a stand-alone environment, a method must be provided for assuring that the test achieves the same response when run on the boards. Some of the many factors to consider include: 1) potential differences as a result of static, hardware-induced input variable changes due to normal signal voltage fluctuations of analog inputs; 2) potential for unanticipated changes in output variables not monitored during the test; 3) differences in response due to operating environment (single machine vs. a network of machines); 4) differences in response due to lack of connection to stimulated systems such as radiation monitoring or plant computer system; 5) increased requirements for software load control; 6) need for documentation of the scope of tests; 7) difficulties in communicating with models in like-manner to operator inputs from the boards when testing in stand-alone mode; and 8) the need for a method to ensure Section 4.1.4 criteria for alarm verification is performed.

In short, the NRC staff sees potential value-added use for stand-alone testing in some capacity but cautions licensees to thoroughly address potential pitfalls prior to conducting testing on a stand-alone machine. Further, in the staff's view, stand-alone testing is not appropriate for SBT.

24. "Newer simulators are pseudo-engineering codes which are physical principle based. Once the code is verified and validated, the physics does not change unless the malfunction is changed or perhaps plant operation is changed. In this case, the approach should be similar to our legal system - innocent unless proven guilty."

RESPONSE

The NRC commends facilities that have chosen to upgrade the fidelity of their simulators through the use of pseudo-engineering grade models. However, the staff recognizes that in many cases these models have been employed in a limited manner and are not validated with the rigor expected of full engineering grade models. Further, these models must interact with other non-engineering code, introducing the possibility of interface issues.

Software typically provides consistent, repeatable results when input conditions are controlled and the software is not changed. But simulator models are very complex and experience has shown that even well-tested software will occasionally produce unexpected results because of a programming problem that was not uncovered through initial testing. In fact, an argument often put forward in support of scenario-based testing is that problems previously not identified by annual tests reveal themselves when testing a scenario as it is intended to be used. Additionally, software changes in one

piece of code can inadvertently affect the response of another piece of code. Periodic operability testing can add value for both of these reasons (latent problems, problems introduced with discrepancy resolution or design changes).

The ANSI standard defines methods of testing endorsed by the NRC for demonstrating simulator fidelity.

25. "How does NRC approach a new ANSI/ANS-3.5 standard (e.g., 200X?) with respect to CFR and NUREG documents?"

RESPONSE

Generally, the staff will initially review the new standard after it is published for any concerns or issues which may not comport with the simulator rule or any other 10 CFR 55 requirements. Because a new standard is a consensus effort, it may have requirements which the staff finds need amplification, clarification, or withdrawal of endorsement of specific items. Once the staff has completed its review, the next step is to revise the NRC's Regulatory Guide 1.149 as a draft, to reflect the staff's position on any areas of concern. The draft Reg Guide will be placed into the Federal Register soliciting public comments. Once the staff addresses public comments, the revised Reg Guide will be released in the Federal Register.

Unless it is truly needed, the staff will not propose to change the simulator rule. Rule making is generally the avenue of last resort to establish or change requirements that otherwise a standard or regulatory guide can facilitate.

26. "Will NRC staff continue to accept ANSI/ANS-3.5-1985, 1993, and 1998 standards when a new standard is issued?"

RESPONSE

The staff has historically recommended that editions of ANSI/ANS-3.5 that were previously endorsed by the NRC remain acceptable methods for meeting the regulations. Ultimately, the NRC staff would encourage licensees to transition to the latest consensus standard with the goal of everyone being on the same standard so that uniform performance testing / test results could be assessed more effectively. The staff will review any new consensus standard to ensure that regulatory requirements could be adhered to.

27. "Concentration lately is on baseline of testing performed on the simulator. Data collected during scenario-based testing - who needs to analyze the results to ensure the simulator replicates the plant (particularly on variable malfunctions)?"

RESPONSE

Licensees are responsible for the implementation of their simulator test programs,

including personnel assignments for analysis and review of test results. Knowledgeable persons, such as system engineers or subject matter experts, should analyze the tests. ANSI/ANS-3.5-1998 defines a subject matter expert as "an individual who possesses the appropriate education, license, experience, or unique qualifications to perform assessments and make recommendations in a particular subject area."

28. "Looking at resources for SBT: for key parameters plots, are panel variables all that is required or are model parameters also needed / desired? If panel variables are lost due to loss of power, what are the consequences of testing?"

RESPONSE

Evaluation of simulator fidelity should always include parameters that can be observed by an operator on the boards. If a malfunction results in loss of key parameters normally displayed to the operator, then it is of no importance whether or not those unseen parameters behave appropriately as model variables unless their improper response adversely affects some aspect of the simulation observable by the operator. Parameters chosen for monitoring during tests need to be selected to verify proper response such that negative training does not occur.

29. "Assume you did compare year to year and every year convened a board of SMEs to review your test results. If this board of SMEs then declared the new years test data as the new baseline, would this be acceptable?

RESPONSE

The assumption incorrectly infers that it is an acceptable practice to compare the simulator's test results to itself rather than to the reference plant performance. Absent any comparison of the initial test results to the reference plant performance, the likelihood of identifying discrepancies is diminished as each year passes. Licensees are expected to implement the standards for use of baseline data as described in ANSI/ANS-3.5-1998 section (5.1.1) by implementing an ordered or preferenced approach to subsequent testing of the simulator's performance.

30. "I believe an acceptable method for SBT would be to identify first level response in the scenario and use the existing checklist for the remaining elements of the scenario. This would be the case for evaluation scenarios. I would use the current checklist for all other training scenarios."

RESPONSE

The staff is working with industry to resolve its concerns with licensee's SBTs. The suggestion is being considered by the staff through the NEI/NRC LOFG and remains as an open issue at this time pending an acceptable resolution.

31. "SBT should not be limited to examination scenarios. Operator training includes evolutions that are never required on operating tests (e.g., mid-loop operations). I suggest that a subset of exams plus training scenarios apply to SBTs. I also suggest that scenarios be developed specifically for use in testing rather than those developed for use on exams or in training scenarios."

RESPONSE

The staff is working with industry to resolve its concerns with licensee's SBTs. The suggestion is to bound the number of SBTs proposed by industry and is currently under consideration by the staff through the NEI/NRC LOFG. This remains as an open issue pending an acceptable resolution that ensures that the simulator rule is being followed. Although the staff is not opposed to any additional testing (such as developing SBTs specific to testing) that a licensee would desire to add, section 4.4.3.2 of the standard currently requires that simulator scenarios shall be tested before use for operator training or examination.

32. "What if a licensee cannot produce V&V testing documentation from initial simulator vendor delivery? Is the expectation that they do a complete V&V test? Or, if initial V&V test data is inadequate, do they need to redo tests? (Example - plant has a sheet of paper saying LOCA test was acceptable, however there are no graphs/plots showing data or test results collected.)"

RESPONSE

ANSI/ANS-3.5-1998 Section 4.4.2 requires that a record of the conduct of the validation test, the test's results, the test's evaluation be maintained. The staff is cognizant that there may be licensees who cannot provide for NRC review some of its simulator tests, including V&V tests. The V&V test record / test results issue is being considered by the staff at this time.

33. "In the future it might be good for the NRC to give its opinion instead of just asking questions. That may generate more discussion."

RESPONSE

The breakout session structure was designed to solicit frank discussion and independent input from the diverse and experienced group of attendees. We appreciate the participation and input and are responding to the many ideas presented at the breakout in this report. We did not desire to suppress input from industry by stating our opinion because we viewed the MANTG Conference as an opportunity for "brainstorming". In addition, the NRC staff has certain internal restrictions on expressing personal opinions at public meetings because they could be misconstrued as regulatory positions.

34. "What happens if every scenario developed from an exam set (requal or initial) has at least one deficiency? Simulator deficiencies take time to identify, rectify, and verify. I can foresee a time when scenarios would be held for resolution."

RESPONSE

The NRC's role in this process is to ensure that licensees correct modeling and hardware discrepancies and discrepancies identified from scenario validation and from performance testing (10 CFR 55.46(d)(2)). If scenarios are held for resolution (e.g., unable to complete the simulator performance test criteria due to a significant discrepancy) the staff may then chose to review the discrepancy and/or discrepancies for its impact on whether or not simulator fidelity can be demonstrated. The staff may ask if significant control manipulations are completed without procedural exceptions, simulator performance exceptions, or deviations from the approved training scenario sequence. Licensees should resolve outstanding significant simulator discrepancies in a timely manner to promote successful scenario performance testing.

35. "What is the staff's position on what parameters and/or computer points that should be included in performance testing? Can a basis be formed for what should be plotted along with an example?"

RESPONSE

ANSI/ANS-3.5-1998 Appendix A provides examples of acceptable simulator performance test documentation. The recorded responses of pertinent simulator parameters should be included in the test documentation as basic information for assessing, comparing, and evaluating test results for acceptability. ANSI/ANS-3.5-1998 Appendix B provides examples of tests, parameters to be recorded, and time resolution for demonstration of simulator operability. Each facility should develop a basis for those parameters they choose to evaluate in each given situation.

36. "Is it acceptable if an unexpected alarm is received and validated to be okay, that it be listed as unexpected but valid?"

RESPONSE

Yes, unexpected alarms may or may not be valid alarms. If the test revealed an alarm not listed in the scenario as anticipated and subsequent evaluation determined that the simulator response accurately mimics the reference unit, then the test results would be satisfactory as far as this particular response is concerned. Documentation should reflect the difference between anticipated and observed response and the justification for accepting the observed response.

37. "Are the MANTG/NRC (SBT examples/demos) differences significant? When instructors select parameters to compare, there will be many different lists."

RESPONSE

Although the NRC's approach to development of its SBT demonstration evaluated more parameters than that of MANTG's, the malfunctions acceptance criteria appears to meet the intent of the standard's section 4.1.4 requirements for both SBTs. The staff understands that different parameter lists will be developed due in part to individual insights, judgments and the training and/or learning objectives that are being measured. The standard's Appendices A and B provide guidance on what pertinent parameters that should be considered when establishing test acceptance criteria.

38. "The MANTG conference SBT demonstration was really a malfunction validation test, which should have already been "on the shelf " when the malfunction was coded and tested.**"**

RESPONSE

The staff agrees that the malfunctions in the SBT demo were tested in a manner similar to those being tested as stand-along rather than as an integrated response. Section 4.4.3.1 of the standard states that, "... Simulator operability testing credit may be taken for having performed those ..., malfunctions, ... exercised by the scenario during scenario-based testing ... provided that both of the following conditions are satisfied: (1) The evolutions are performed in accordance with reference unit procedures; and (2) The scenario-based testing results are evaluated and documented." The MANTG SBT demo appears to have met the intent of this criteria.

39. "What is the value of listing and verifying setpoints during SBT? If a parameter is supposed to go up and does go up, that defines the proper direction in accordance with 4.1.4."

RESPONSE

The standard requires that the simulator's demonstrated response meet certain acceptance criteria. The simulator shall not fail to cause an alarm or automatic action if the reference unit would have caused an alarm or automatic under identical circumstances and vice versa. Absent a verification and validation testing program (for which a record of the conduct of the test, the test's results, and the test's evaluation is required to be maintained) that compared (in a fully integrated, partially integrated, or stand-alone mode of system operation) the model results to actual or predicted reference unit data, the SBT test documentation should include pertinent setpoints to authenticate the simulator's response test results. It is important that alarms or automatic actions are in fact occurring at their setpoints. Setpoints are germane and are not limited to only malfunctions.

40. "With regard to the NRC's SBT demo product, please describe how it was developed and what comparisons was conducted to validate the test results."

RESPONSE

The staff developed its scenario-based-test by following the guidance established in the standard. The NRC development sequence:

(1) Used a typical operating test scenario for demonstrating the feasibility of using the SBT as a simulator performance test;
(2) Identified the major events to be addressed in the SBT such as malfunction(s), normal evolutions, transients, and/or accidents;
(3) Obtained applicable and pertinent simulator design baseline data including but not limited to as-built Piping and Instrument Diagrams, plant procedures, etc.;
(4) Identified specific first order effects that are germane to the event - e.g., for a pump trip, the associated console panel indications, alarms, computer points, etc.;
(5) Used baseline data, identified pertinent setpoints, alarms, automatic actions that occurred as a result of the event - also noted important operator actions that significantly affect the simulator's response;
(6) Validated the simulator's response to the acceptance criteria in the tests;
(7) Identified discrepancies - rerunning the test if unable to move forward with testing;
(8) Confirmed the standard's 4.1.3.2 criteria is met for normal evolutions and 4.1.4 for malfunctions;
(9) Evaluated test results; and
(10) Maintained a record of the test, including pertinent trends and plots supporting test results.

The development of a meaningful and substantive SBT test involved methodical attention to detail that could otherwise have been overlooked if the simulator's response was inferred rather than authenticated.

41. "Regarding the List of Variables - are current inspectors that are developing initial license exam scenarios providing a list of variables now? Would they be expected to do so in the future?"

RESPONSE

Development of operator licensing exams fundamentally relies upon a simulator that fully meets the ANS 3.5 standards. The processes of simulator testing and license examining are separate and distinct. There is no requirement to conduct scenario-based testing on operator licensing exam simulator scenarios for the sole purpose of exam validation. However, it is necessary for the simulator to comply with the standards in ANSI/ANS-3.5 in order to use the simulator to conduct operator licensing exams.

If our licensees determine that NRC exam scenarios are useful sources of scenario-based tests, they should feel free to use the exam scenarios in the SBT role provided this does not impede or delay the NRC exam development effort. The confirmation of simulator fidelity is presumed before development of NRC exam scenarios should begin. If the industry determines that the NRC exam scenarios are a good source of SBT scenarios, they are welcome to use the exam scenarios.

42. "SBT [demo] - Request that NRC provide a reissue of scenario with all three [malfunctions] combined with time line and operator actions. This would allow me to identify plant conditions at time of subsequent activation of malfunctions. This would allow me to determine if an identified alarm/parameter would change state to level identified in document.
Example:
1st event - 70 gpm SGTR - What was pressurizer level - when CCP was tripped - when second CCP was manually started?
2nd event - pzr level transmitter failure - What was actual pressurizer level - was letdown already secured?"

RESPONSE

The specific parameter values for the industry demonstration are no longer readily available to the NRC because the information was used as a demonstration of the SBT concept by the industry at the MANTG Conference. You may want to contact Mr. Trad Horner at the Millstone Training Center or your plant's MANTG representative to obtain this data (if it still exists in a readily retrievable form).

43. "SBT [demo] - How did you track and document plotted data, malfunction activation (plus ramp), operator action?"

RESPONSE

The data was tracked and plotted using the simulator data collection system. Malfunction activation times, ramp rates and operator actions were maintained using a scenario timeline. The timeline and plots were synchronized at the start of the event. The actual operator actions were annotated on the scenario timeline during the SBT.

44. "SBT [demo] - Listing of notes that do not have [a] basis to the event should not be included. Example - Event 3 - CVCS note. For the normal conditions which I assume was the set up of the scenario - the CVCS was in auto and therefore the note has no basis and is only confusing."

RESPONSE

The use of notes is intended to assist the simulator operator in running the scenario-based test. If the notes are confusing, they may be clarified or eliminated.

45. "Has NRC considered an implementation phase in which comments will be provide without "findings" being issued to get progress started?"

RESPONSE

The NRC has not formally considered an implementation phase because all industry simulators were certified to a valid version of the ANS 3.5 standards by our licensees. There should be no need to phase in the transition to the 1998 version of ANSI/ANS 3.5.

If a simulator was determined not to meet the ANSI/ANS 3.5 standard, then it may be appropriate, as part of the corrective action process, to discuss an implementation or transition phase and compensatory measures to be used to maintain your SAT-based training program.

46. "In deltas between NRC/MANTG, can a "value added" statement be included?"

RESPONSE

If the industry thinks that changes to the current version (1998) of the ANSI/ANS 3.5 standard are required, the changes should be proposed through the current standards-setting process to the ANS 3.5 Subcommittee. One reason we asked the ANS 3.5 Subcommittee to make a presentation at the MANTG Conference was to provide the information regarding how to propose changes to the standards. If a "value added" statement is recommended by the ANS 3.5 Subcommittee using the consensus-building process inherent in standard setting, the NRC will then consider the specific statement when it is proposed by the industry.

47. "What/Who determines how many plot points or key parameters is the correct amount?"

RESPONSE

While the ANSI/ANS 3.5 standards provide general guidance, the decision is left to the individual utility to determine the exact number. The decision should be based on good engineering judgment and operational experience. The NRC will of course continue to review our licensee's compliance with 10CFR55.46 and application of the ANSI/ANS 3.5 standards.

48. "Why not use the EP/AP symptoms as a basis for the list of parameters to collect?"

RESPONSE

The use of EP/AP entry symptoms would be a good place to start. There may be other parameters that should be included depending on the scenario. Operator experience and engineering judgment should be used to determine the list of parameters for collection.

49. "The TTC scenario information said that it took 10 hours to validate the scenario. Was this the total, i.e., how many man-hours did it require?"

RESPONSE

The estimate of 10 staff-hours was the total for this activity. The basis for this estimate is explained as follows.

For staff-hour estimation purposes, the "run" time for the TTC scenario-based test was approximately 1 hour. There were 2 persons involved in running this test so the total

was 2 staff hours. This staff-hour estimation excluded time to pre-run the SBT to ensure smooth logistics for the conduct of the test. The pre-run actually involved more than 2 people, simply because of the available support to the staff for proof of the SBT concept.

In a letter to the Director, Accreditation, INPO, dated June 6, 2005, the staff discussed, among other things, SBT development. Specifically, the staff stated: "In general, the level of effort to develop its SBT was approximately 10 hours. The simulator "validation or run" time was approximately 10-20 minutes for each malfunction and 15-30 minutes for integrated plant responses. Simulator SBT setup time (initial condition, parameter plot/trend, manual manipulations, etc.) was not counted toward SBT testing time."

For purposes of confirming the feasibility, suitability, and acceptability of SBT as a simulator performance test, the actual validation of the TTC SBT on the simulator was approximately 45 - 60 minutes utilizing several NRC staff members to help in verifying the simulator's expected response. The TTC SBT could have been conducted with only one test person one simulator operator.

50. “Parameter plots could be used to validate magnitudes as well as unexpected alarms, although it doesn’t confirm setpoints.’’

RESPONSE

The NRC agrees with this observation and we would expect parameter plots to be assessed using good engineering judgment. The purpose of SBT is certainly more than just validating alarm setpoints.