Comments Received on Topic Questions for Operability Workshop

1. Can a degraded SSC ever be determined operable? If so, what are the requirements for an operable but degraded determination? What is the distinction between operable but degraded and inoperable?

A. *Fundamentally, the answer to this question has to be "yes". The realm of degraded but operable is where the Corrective Action Process operates. As a practical licensing matter, the current TS definition of Operable states "Capable of performing its specified functions,…" An interpretation that resulted in an alternative meaning of "Any loss of Full Qualification" would not be consistent with the current TS.*

The existing guidance contained in Sections 5.2 and 5.3 of Generic Letter 91-18 (11/91) provide a good discussion of the distinction between:

Installed capability/final design
Full Qualification
Required/specified function

This discussion could be reformatted and made clearer. However, the answer to Topic Question #1 already exists in Sections 5.2 and 5.3.

More clarity could be provided to the critical concept of "Reasonable Expectation of Operability". (See Question #2 below.)

B. *Yes. Components/systems must be capable of automatically performing their safety function. If engineering judgment is used as the basis for operability, more frequent testing of the affected component(s) may be necessary to provide needed level of confidence that further degradation is not occurring. Likewise, increased monitoring of critical parameters may be necessary in order to identify further degradation where testing may not be feasible. The "degraded but operable" determination should include enough information to determine at what point the operability determination should be revised.*

If a component/system is incapable of performing its safety function automatically in its current degraded state, it is inoperable.

C. *Yes. GL 91-18 provides guidance on the requirements for determining degraded but operable. In simple terms, if the SSC can perform it's safety function in the degraded state, it should be determined to be operable, but degraded. If it can't perform the safety function, it is inoperable. For example, an EDG could have a non-Q part installed that has been evaluated as capable of supporting operation for the entire mission period following an accident. Often a loss of seismic qualification is evaluated with the installed component being evaluated as capable of supporting SSC operation during and following a seismic event. Loss of electrical separation is another example. Small leaks are common on operable SSCs. SSC must be evaluated as capable of performing its design function during an accident with reasonable assurance. If it is not reasonable then the SSC is inoperable.*

D. NUGEQ: Yes. Existing Operable/Operability guidance in the NRC inspection manual is relatively clear and provides reasonable guidance regarding the distinction between operable but degraded and inoperable, including consideration of specific equipment or system values specified in TS action statements. With some caveats (discussed in the inspection manual but not here), the operability standard is reasonable assurance that the component or system is capable of performing "specified functions" (i.e., safety functions as specified in the current licensing basis).

Additional clarification may be needed in selective areas and should be provided in the revised guidance. The "judgment" and "necessary support systems" guidance currently contained in 6.12 Support System Operability is one example. The judgment discussion in Section 6.12 could be more broadly applied, particularly when plant or equipment operating conditions or configurations during a specified interval are less restrictive than those assumed when the TS system or support system design bases were established. For example, actual plant loads and ultimate heat sink temperatures during some specified interval rather than design basis assumptions may be used when evaluating the operability of a cooling water system.

E. *Yes, guidance for declaring a degraded SSC operable is a major Generic Letter 91-18 function. For example, the generic letter states a degraded SSC has some loss of quality or functional capability. The 'Operable/Operability,' Section 5.2, 'Full Qualification' provides guidance on the degraded threshold: "The loss of conservatism not taken credit for in safety analyses and not committed to by the licensee to satisfy licensing requirements does not require a system to be declared inoperable. All other losses of quality or margins are subject to an operability determination and corrective action."*

It may be beneficial to clarify that the Generic Letter 91-18 degradation threshold is the loss of conservatism credited in the safety analyses or committed to in the licensing basis. Note that the existing reliability guidance discussed below should also be an example of degradation situations that should trigger an operability determination.

2. Where is guidance inconsistent with regard to definitions of operability; including supporting terms such as functional, available, reliable, or degraded?

A. *Once the discussion in sections 5.2 and 5.3 of Generic Letter 91-18 is well understood. There is little or no confusion regarding the meaning if these terms. The distinction between "Unavailable for monitoring" and the treatment of an OOS SSC in a 10 CFR 50.65 a(4) assessment is already discussed in Regulatory Guide 1.182. (Section 11.3.2.7 of Numarc 93-01) This discussion could be repeated in a revised GL 91-18. However, the term "Reasonable Expectation of Operability" is used throughout GL 91-18. This concept focuses on how certain one is of an SSC's continued ability to deliver the Specified Functions during design accident conditions. Additional guidance could be provided, along with examples of when a REOO exists and when it would not. The issue of the treatment of degradations in reliability are currently captured with this concept. That is, a licensee may be declaring an SSC Operable using a non-conservative understanding of REOO, thus allowing interim operation with a severely degraded SSC.*

B. *Guidance clearly allows the use of operating experience and engineering judgment to provide the needed reasonable assurance of operability. NRC inspectors and management are apparently expecting absolute assurance of operability of the component/system based on reactions to operability determinations that provide the technical information and basis for the reasonable assurance. The guidance given and implementation of the guidance are inconsistent with each other.*

"Functional" and "available" provided needed information to assess safety impact of the degraded condition, but cannot be relied upon as a basis for operability in and of themselves. "Reliable" and "Degraded" are normally supporting terms used in operability determinations.

C. *There is confusion for some TS equipment when some surveillance requirements can not be satisfied. For example, is RHR inoperable when the TS high point "not full" alarm is inoperable. The system is also verified to be full via manually venting one per month. In addition, there needs to be better guidance with respect to code Class 1,2,3 component pressure boundary leakage, specifically with respect to heat exchanger tube leaks. Typically there is no structural consequence of small tube leaks or tube to tube sheet leaks. The way 91-18 is currently written, these components must be declared inoperable, and there is no means to perform an op eval to say they are operable. For pipe leaks, there is guidance. For heat exchangers, we should just need to be able to show that the system can perform it's safety function with the leak, and a qualitative assessment of structural integrity should be adequate.*

D. *NUGEQ: Section 6.10, <u>Environmental Qualification</u>, establishes an unnecessary distinction between 10 CFR 50.49 (EQ) equipment and other SSCs. This 'EQ specific' operability guidance should be deleted to assure consistency with the 91-18 operability guidance applicable to all other SSCs. The NRC guidance regarding operability and degraded & nonconforming conditions should make clear that the enforcement, operability, and JCO guidance in Generic Letter 88-07, "Environmental Qualification of Electrical Equipment" and its enclosure "Modified Enforcement Policy For EQ Requirements" no longer applies. The guidance in these documents applied to violations of 10 CFR 50.49 which related to the November 30, 1985 deadline and clearly does not apply to any violations occurring after 1988. As stated in the modified policy document:*

"This enforcement policy applies to violations of the EQ rule identified after November 30, 1985 which relate back to action or lack of action before the deadline. Violations which occurred after November 30, 1985 (either as a result of plant modifications or because the plant was licensed after November 30, 1985) will be considered for enforcement action under the normal Enforcement Policy of 10 CFR Part 2, Appendix C. <u>In addition, EQ violations which are identified after the NRC's last first-round inspection, in approximately mid-1988, will also be considered under the normal Enforcement Policy</u> (emphasis added)."

E. *Various guidance documents use different but similar or related terms. Some examples are:*

Specified safety function (Generic Letter 91-18)
Safety function (Generic Letter 91-18)
Specified function (Generic Letter 91-18)
Key safety function NUMARC 93-01, Section 11
Shutdown key safety functions NUMARC 91-06, Section 4
Design bases function NEI 96-07, Rev. 1
UFSAR-described design function – NEI 96-07, Rev. 1

The list can be reduced by two terms with a clear statement that specified safety function, specified function and safety function are all the same. Operability determinations should focus on safety functions that are specified in the licensing basis as implied by the existing specified function(s) definition.

3. If you remove a hazard barrier that is considered a support system but is not in tech specs, what analysis is needed to maintain the supported system operable?

A. *This question is somewhat confusing, as RIS 2001-09 stated that the supported component should be declared Inoperable. If what is intended by this question is a query regarding the need for clarification of the terms "Required" and "Necessary", then I would say "yes". However, the discussion currently contained in Section 6.11 of GL 91-18 is reasonably clear. That is, currently, the only way to remove a hazard barrier from service and maintain the Supported SSC Operable is to demonstrate that the functions performed by the hazard barrier are not "Required", not "Necessary", or neither "Required" nor "Necessary".*

The existing standard of the performance of a Specified Function is that a "Reasonable Expectation of Operability" exists, which is in need of clarification. (See Question #2 above.) However, the existing standard for the performance of a "Support Function" is simply "capable of performing…". Little or no additional guidance has been provided. Therefore clarity could be provided on the meaning of this phrase. (Contained in STS definition of Operable.)

B. *If the support system is required to consider the supported system operable. The ability of the support system to perform its safety function must be addressed in similar fashion.*

C. *If you remove a hazard barrier that is a support system, you need to do one of the following:*

Place the plant in a mode/condition such that the barrier would not be challenged.

Provide an appropriate compensatory action to ensure the design basis of the supported equipment would continue to be met (either at all times, or such that the barrier can be restored prior to being challenged).

D. *NUGEQ: Guidance on the control of hazard barriers, including operability analysis considerations, is provided by Regulatory Issue Summary 2001-09, "Control of Hazard Barriers". The NUGEQ agrees with the guidance provided in the RIS as clarified and amplified in a series of questions and answers submitted by the NUGEQ to the NRC (see May 16, 2003, NUGEQ letter from William Horin to William D. Beckner). In the responding June 23, 2003, letter the NRC concluded that the questions and answers appeared to be consistent with the RIS intentions. The NUGEQ recommends that the*

RIS guidance and NUGEQ clarifications be included in the revised operability guidance.

The RIS states that the planned removal of hazard barriers is permitted for maintenance, design change implementation, or as part of compensatory measures in response to a discovered degraded or nonconforming condition. Licensees must continue to comply with the plant technical specifications, particularly the operability provisions applicable to the protected equipment. The RIS indicates that the operability guidance in Inspection Manual Part 9900 – "Operable/Operability: Ensuring the Functional Capability of a System or Component" can be used to evaluate the operability of such protected equipment. Further, the operability criteria are the same for planned (e.g., in support of maintenance) barrier removal and discovered barrier degradation & nonconforming conditions.

The type of "supported system" operability analysis that would be needed will be hazard barrier dependent. Examples of hazards and the related considerations that might be part of the analysis include:

Fire - fire watch

Internal Missile - equivalent missile protection

MELB – flooding

HELB - flooding, pipe whip, jet impingement and steam/pressure conditions on structures/equipment

Hurricane - external missile protection, flooding, or event is not credible based on time of year

Accident Radiation - effect of increased dose to equipment/personnel

4. Are there ever situations where the reliability of a SSC should impact the determination of operability? Explain.

A. *Presuming clarification has been provided on "Reasonable Expectation of Operability" (See comments above.), then I would say "No". Operability currently allows interim operation with a degraded component, provided its "Specified Functions" can still be performed (REOO). This provides the flexibility for the Corrective Action program to restore Full Qualification "promptly, in accordance with Criterion XVI. In other words, typically SSCs are designed and constructed more robustly than truly required. Therefore, SSC degradations that result in a loss of Full Qualification, but remain capable of performing their "Specified Functions" should be judged "Operable". Again, the existing discussion of Sections 5.2 and 5.3 is crucial, in my opinion, to this understanding.*

B. *Yes. When engineering judgment is relied upon for operability, a basis for reliability should be included in the operability determination. This may result in additional compensatory measures involving monitoring and/or testing.*

C. *Possibly. Currently, GL 91-18 does not allow the use of Probabilistic Risk Assessment (PRA). However, if the postulated failure of a degraded SSC could be shown to have a minimal impact on Core Damage Frequency, then it should be concluded that the SSC is still operable. "Minimal" would need to be defined, possibly similarly to that used in NEI 96-07, Rev. 1, or, since the degraded condition is typically relatively short-term (<18 months), a higher level of "minimum" could be developed. The SSC should be*

capable (with reasonable assurance) of performing function for the credited mission time.

D. *NUGEQ: We do not believe that quantitative reliability considerations should be part of an operability determination. Qualitative reliability considerations are presently integral to a determination that there is 'reasonable assurance' that the component or system is capable of performing the "specified function(s)". NUGEQ recommends that the Section 3.3 discussion of 'Specified Function(s)' be revised to reflect the above comment.*

E. *Yes, SSC reliability is a very important consideration in operability determination. SSCs may have reduced capability that remains at the current time above the credited value, but if that reduced capability indicates an expectation that needed safety functions are at significantly increased risk that they will not be accomplished, the SSC should be considered inoperable.*

A reliability reduction that calls into question the ability of a SSC to perform its safety function should trigger an operability determination per 'Operable/Operability' Section 4.0, Background.

Although reliability reductions should not require quantification, the 10 CFR 50.59 criteria related to accident frequency and malfunction likelihood can serve to indicate reliability reductions that require comprehensive analysis and may require compensatory actions. Personnel using engineering judgment can often be confident a reduction in reliability is less than the 10 CFR 50.59 permitted increases without quantification.

5. Please describe any cases where you have had questions about operational leakage? What were the conditions? What guidance did you use for making these determinations? What was the outcome? (Examples (a) Tech specs require zero pressure boundary leakage but also allow certain amounts of identified and unidentified leakage; (b) ASME code requirements (GL 90-05) regarding Class 1, 2, and 3 piping; and (c) steam generator leakage.)

A. *Only suggestion would be to combine and clarify the existing guidance of Sections 6.14, 6.15, and Generic Letter 90-05.*

C. *a) We had a situation of a leak in a vent connection on the portion of the safety injection system suction line that is common to both SI pumps. The line is Class 2. In accordance with GL 91-18, Enclosure 2, Section 6.15, Operational Leakage, both trains of SI were declared inoperable and a plant shutdown was begun. (The leak was repaired before the shutdown was completed.)*

b) We had a situation where there was a pinhole leak in a Class 3, moderate energy fire protection line. The guidance of GL 91-18, Enclosure 3, Section 6.15, Operational Leakage, last paragraph, was determined to be out of date with respect to Class 3 moderate energy piping. The GL states that GL 90-05 can be used to show the piping is operable until relief is obtained from the NRC. However, ASME Code Case N513 has been approved for use by incorporation into 10 CFR 50.55(a) and provides actions to take to show operability and monitor the leak until it can be repaired. NRC "approval" is not required. Therefore, Code Case N513 was used in lieu of GL 90-05. (Note: Use of GL 90-05 is also referenced in Section 6.14, Flaw Evaluation.)

c) An additional concern: Installing a rubber patch over the hole to preclude having to deal with the leakage of the water onto the floor or other equipment (housekeeping concern) has been viewed by the NRC as a non-approved "repair" and therefore not

allowed. Licensees should be allowed to temporarily patch (not repair) the leak for housekeeping purposes if desired.

d) See response to question 2. Acceptable limits for steam generator leakage is the only example of allowable HX tube leaks. This should be expanded to all HX's.

e) SRV main seat and pilot valve leakage has been evaluated as being acceptable with an op eval.

Additional Comments:

1. Clarify with examples the existing concept of "Reasonable Expectation of Operability". I believe this would be very beneficial and would also resolve the questions regarding reliability while merely clarifying existing guidance, not generating new guidance.
2. Clarify the standard for Support Functions/SSCs and when they are "capable of performing…".
3. The discussion regarding the presumption of the occurrence of Design Basis Accidents or events could be expanded. That is, for a SSC to be Operable, it must be "Capable of performing its specified functions,…" (Operable definition). Generic Letter 91-18 clarifies this simple requirement to include the caveat that the functions must be performed when required (i.e. the DBA). However, this caveat is not currently well articulated in GL 91-18. It is indirectly stated in sections 3.3 ("perform as designed..") and indirectly stated in Sections 6.2 and 6.3. The most direct statement regarding this presumption is in Section 6.9 regarding use of PRAs. ("The inherent assumption is that the occurrence conditions or event exists and that the safety function can be performed.") The simple statement of Section 6.9 should be made a more central part of the guidance.
4. Upon discovery of leakage from a Class 1, 2, or 3 component pressure boundary (i.e., pipe wall, valve body, pump casing, etc.) the licensee should declare the component inoperable. The only exception is for Class 3 moderate energy piping as discussed in Generic Letter 90-05. For Class 3 moderate energy piping, the licensee may treat the system containing the through-wall flaw(s), evaluated and found to meet the acceptance criteria in Generic Letter 90-05, as operable until relief is obtained from the NRC.

   The question relates to the sentence "The only exception is for Class 3 moderate energy piping as discussed in Generic Letter 90-05." Is the exception that a licensee does not have to declare the component inoperable (referencing the first sentence stated above) or is the exception stated in the subsequent sentence in that the component may be evaluated and found to be OPERABLE (or operable) but degraded (with the request for relief following the determination of OPERABILITY/operability)?

   Additionally, we want to make sure that it is the component, not the system, that needs to be declared inoperable, thus permitting us to evaluate whether the operational leakage affects the OPERABILITY of the system in which the component is found. Or does this mean that operational leakage automatically drives you to declare the system inoperable regardless of what component in the system has the operational leakage (e.g., a branch line that does not impact the system's ability to accomplish its intended safety function?
5. When determining if a degraded condition could result in a increase in off-site doses, is it acceptable to use information from RG 1.183 (Alternative Radiological Source Terms For Evaluating Design Basis Accidents At Nuclear Power Reactors) to demonstrate that

doses do not exceed regulatory limits, even if the plant has not received a licence amendment to use alternate source term under 10 CFR 50.67?

6. Is a design related parameter restriction associated with a completed Operability Determination (for example, a reduction in the maximum allowed cooling water temperature to safety related heat exchangers) considered a “Compensatory Measure” (CM) and thus require performance of a 10 CFR 50.59? There are strongly held opinions/viewpoints on both sides of the fence at our station. One perspective is that a parameter restriction is within the existing design envelope and also is not an “action” to be taken; therefore, it is not a CM. The other perspective is that such a restriction is still a “change” from the viewpoint of 10 CFR 50.59 rules and thus a 50.59 is needed and it is a CM.

   Additional clarification on specifics/examples of what constitutes a Compensatory Measure would be very beneficial for the industry.

7. **Background**: A system is out of service for planned maintenance and an unanticipated nonconforming condition is found on a component within the system. The “fix” from Engineering is to REWORK the nonconforming component; thus no 10 CFR 50.59 is required. Operations, for sound personnel safety reasons, wants to return the system to service/operable status “as-is” and to REWORK the nonconforming condition during a later outage when plant conditions are more conducive to safe worker conditions. Operations requests an evaluation to use the component/system for an interim time period “as-is”.

   Question: Since the component/system is out-of-service at the time this request is made by Operations, is an Operability Determination the “proper” process to use since the SSC is already out-of-service/inoperable? If the OD process is not used, what process is used? How do other utilities handle this type of situation from a process perspective?

8. Are there any specific standards/expectations related to “acceptable” use of engineering judgment when performing Operability Determinations? Additional clarification within GL 91-18 would be helpful in this regard. Do any plants have any standards in this area?

9. “Should the operability guidance be limited to “discovered” degraded or nonconforming conditions or can it also be applied to other situations (e.g., reductions in functional capability in support of maintenance)?”

   The NUGEQ believes that the operability guidance can and should be applied to situations other than “discovered” conditions, particularly reductions in functional capability than may occur in support of maintenance. Such an approach is consistent with existing regulatory guidance, including Regulatory Issue Summary 2001-09, “Control of Hazard Barriers” which indicates that the operability guidance contained in Inspection Manual Part 9900 – “Operable/Operability” can be applied to planned barrier removal in support of maintenance. Further, the RIS 2001-09 guidance is consistent with 10 CFR 50.65(a)(4), RG 1.182, Section 11 of NUMARC 93-01, 10 CFR 50.59, RG 1.187, NEI 96-07, Revision 1, Generic Letter (GL) 91-18, and GL 91-18, Revision 1.

   The general rules/actions that would apply for reductions in functional capability in support of maintenance are:

   (1) Licensees must continue to comply with the plant technical specifications, particularly the operability provisions.

(2) The risk associated with the maintenance activity must be controlled and managed in accordance with 10 CFR 50.65(a)(4).

(3) The reduction in functional capability must be evaluated per 10 CFR 50.59 if it is expected to be in effect for more than 90 days during power operations.

An EQ-related example is as follows:

A Licensee is pursuing removing the Tech. Spec 'link' between the ECCS Pumps and the ECCS Pump room coolers (i.e., a support system), during maintenance on an ECCS pump room cooler. The Licensee has previously concluded that once the ECCS Pump room coolers are taken out of Service (OOS) for maintenance, the ECCS pumps (i.e., Containment Spray, LPSI and HPSI) are declared 'inoperable'. This is because the ECCS Pump room post–accident temperature will be significantly higher (projected to be 150°F), without the coolers than the design /qualified temperature (130F) of the pumps/motors with the coolers, if an accident were to occur. The motors are presently 50.49 qualified to 130°F.

Utilizing 'operability' criteria, an ECCS pump room cooler can be taken out of service for maintenance without declaring the affected ECCS pump inoperable. An 'operability' evaluation is performed for the ECCS motor and other required components in the room (pumps, switches, relays, electronics, etc,) and determines that the required equipment is 'operable' at the 150F post–accident temperature.

10. "Does the NRC's inspection program explicitly include review of how licensees implement the guidance of Generic Letter 91-18? (Does the NRC formally review licensee justification for continuing operations using Generic Letter 91-18?)"

11. "Some of the performance indicators in the Reactor Oversight Process are affected by Generic Letter 91-18. For example, if two licensees are each faced with the exact same condition and one licensee opts to immediately shut down the reactor to correct the degradation and the second licensee pencils it away via Generic Letter 91-18, the first reactor will appear "worse" in PI space even though it is the safer plant. How does the NRC plan to fix its ROP to prevent it from reporting the exact opposite of the true risk/performance status of reactors?

12. Using GL 91-18 for planned activities.

13. Including additional guidance or examples for substituting manual for automatic.

14. Revising the current Generic Letter 91-18 issue specific sections such as pipe support requirements, EQ and ASME to make it clear that a licensee could commit to using Generic Letter 91-18 without also committing to all the documents discussed in the generic letter.

15. Scope of SSCs Subjected to Operability Determinations – An Operator's Perspective

    From a plant operator's perspective, GL 91-18 is confusing in that it applies the term "operable" to structures, systems, and components (SSC) that do not have operability. It accomplishes this by taking a term specific to the plant's Technical Specifications and applying it to the full spectrum of SSCs in the plant design basis that are subject to evaluation of degraded and non-conforming conditions. In doing so, SSCs with no Technical Specification operability requirements are judged by operators for operability.

    As an example, the non-safety service water pumps are typically included in a plant's design basis/USAR and, as such, are within the "scope" of SSCs defined by GL 91-18 (NRC Inspection Manual Part 9900, Enclosure 1 and 2, Section 1.0, sub-section viii) for

degraded and non-conforming conditions. Should one of these pumps degrade under the current GL 91-18 requirements and scope, that degradation would be evaluated to assess the pump's "operability". In that these pumps are not included in the plant's Technical Specifications, they in fact have no operability requirements. Upon being notified of the degraded condition of the pump, operators are required to make an operability determination of a pump that, though it has design requirements to fulfill, has no operability requirements. Should the degradation make the pump incapable of fulfilling its design requirements, the operator would declare the pump inoperable with no required action statement to define the necessary actions for this condition. As a further consequence, most plants have a formal process to produce a detailed and documented evaluation of a condition that results in an operability recommendation. The broad use of the term "operable" creates a scope of SSCs unnecessarily subjected to this responsive and resource intensive process – resources that could be better used to improve plant safety.

While the evaluation of degraded and non-conforming conditions may continue to be performed for a broader scope of SSCs, the use of operability determinations should be restricted to only those SSCs that have "operability". The guidance in GL 91-18 should be revised to be clear that only when a degraded or non-conforming condition affects an SSC with operability requirements, the operability of the affected SSC be determined. When a condition affects an SSC with no operability requirements, the condition is evaluated for impact on safe operation – but not "operability". I would suggest that the use of the term "operable" be restricted to a discussion of a subset of SSCs that have operability and upon which operability determinations are performed.

Questions

Should the term "operability" be applied to SSCs that are not included in Technical Specifications?

What SSCs should be included in the scope of degraded/non-conforming condition process? of the Operability Determination process?

Should plant operators determine the operability of SSCs that do not normally have operability associated with them (e.g. not in Technical Specifications)?