

REPORTING UNDER 10 CFR 70 APPENDIX A

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INTRODUCTION

Industry has identified many challenges in its attempts to implement the 10 CFR Part 70, Appendix A reporting criteria. This White Paper lists some of these challenges and identifies inconsistencies or deficiencies that are prompting misunderstanding between licensees and NRC inspection staff.

GENERAL CONCERNS

(i) Timeframe for Reporting

Certain events must be reported to the NRC Operations Center within 1-hour or 24-hours of discovery. But when does the reporting clock actually start? NRC staff's position is reported to be: *"...that the time period starts at the time of discovery by a cognizant and responsible individual, and not at the time a final determination is made. A trained, fissile material operator would constitute a "cognizant and responsible individual" whereas non-fissile material workers would not."*

For certain events determination as to whether they are reportable is comparatively straight forward. For other events, however, this decision may not be immediately apparent. For example, the review of appropriate safety documentation (e.g., ISA) may require time to determine whether an event is reportable. An experienced, fissile material operator has no training or expertise in knowing what must be reported to the NRC, when an IROFS may be compromised or when double contingency may have been lost. Plant operators are trained to report procedure infractions or accident conditions to their supervisors and/or through a facility's problem identification, resolution, and correction system such that "cognizant and responsible" individuals are aware of the event. These "cognizant and responsible" individuals make certain that the NRC is aware of the condition in a timely manner. Internal and external safety experts are sometimes needed to determine if the event is reportable. To establish the size of an exposure or uptake and to validate whether regulatory criteria were exceeded may also require time, while the exposed individual may be receiving medical attention. When a review is required to determine if an event or plant condition is reportable, the clock should start when the event is determined to be reportable. Using this interpretation, plant supervisors will serve as "cognizant and responsible" individuals who must promptly and efficiently evaluate the event or plant condition and determine the appropriate reporting criterion. For facilities with resident inspectors, the resident inspector will be informed of most all events or plant conditions and will in turn notify NRC management of all events or plant conditions that are of interest.

(ii) Severity of Accident

Another general concern addresses the need to report an event whose severity is comparatively minor. For example, does an accidental release of HF that causes a small skin burn to an operator and which clearly does not *"...lead to irreversible or other serious, long-lasting health effects to a worker..."* require to be immediately reportable? A licensee would report the unplanned HF release, but would Appendix A reporting be warranted for the individual who could be satisfactorily treated at the licensed facility?

(iii) *On-Site versus Off-Site Quantitative Standards*

The regulatory requirements in §70.61(b)(4)(i) and §70.61(c)(4)(i) direct the licensee to identify quantitative standards for off-site exposures only. These two requirements set the standards for workers and do not require identification of quantitative chemical standards. This means that on-site determinations are based purely on qualitative assessments. The Standard Review Plan (NUREG-1520) suggests that a licensee needs quantitative standards for worker exposure, but this suggestion is not supported by language in 10 CFR 70.61. In the absence of quantitative standards for on-site chemical releases, the reporting criteria are difficult, if not impossible, to implement.

(iv) *Reporting Requirements for Licensee-Identified Problems*

Consider the situation in which a licensee discovers a problem with an IROFS during a calibration, functional test, etc. (e.g., the IROFS is determined to be out of calibration during a periodic calibration or fails the periodic tests). Should this event be reportable, particularly as the management measure (i.e., calibration or periodic functional test) identified the problem? Does this discovery constitute an "event" in the context of 10 CFR 70, Appendix A? Clearer definition of the term "event" is, by the way, required.

ANALYSIS OF REPORTING CRITERIA

A clause-by-clause analysis of each Appendix A regulatory requirement is presented in this section with areas of concern identified.

(a) **1 Hour Reporting Criteria**

1. An inadvertent nuclear criticality.

An inadvertent nuclear criticality is a clear criterion and industry does not have any issues with (a)(1).

OR

2. An acute intake by an individual of 30 mg or greater of uranium in a soluble form.

An acute intake of 30 mg or greater of uranium in soluble form is a clear criterion and industry does not have any issues with its clarity. However, this threshold value is a much lower threshold than the description listed in item 3 below and industry would like to understand this inconsistency.

OR

3. An acute chemical exposure to an individual from licensed material or hazardous chemicals produced from licensed material that exceeds the quantitative standards established to satisfy the requirements in 70.61(b) (4). i.e. could:
 - a. Endanger the life of a worker
 - b. Lead to irreversible or other serious, long lasting health effects to any individual located outside of the controlled area.

Although 70.61(b)4 only requires quantitative standards to be established for chemical exposures outside of the controlled area (refer to 70.61(b)4(ii)), the NRC has pushed most licensees to also establish quantitative standards for worker exposures. A chemical exposure limit established to satisfy the requirements of 70.61(b)4 has both a concentration and duration component. This is based on best practice in the chemical industry standards. For example, ERPG-2 levels are based on a 1 hour exposure and IDLH levels are based on a 30-minute exposure. However, the NRC seems to interpret the regulation as requiring reporting for any and all possible exposures to the quantitative values identified by the licensee, regardless of the amount of time for which the individual was exposed and regardless of whether or not the exposure was on site or offsite. This ignores the key toxicological principle that concentration and duration together determine potential dose and the requirements to the regulation.

Criteria (a)(2) and (a)(3) are based on exceeding the exposure limits. To establish actual exposures within the required time limits is, however, practically impossible. Can the criteria be written such that the licensee notifies the NRC if an event has occurred in which the amount of material released (i.e., licensed material or hazardous chemicals produced from licensed material) could reasonably be expected to result in exceeding the exposure limits for a high or intermediate consequence event based on analyses documented in the ISAs. Licensees may have documented in their ISAs calculations for material releases that could exceed the performance criteria in 70.61.

OR

4. An event or condition such that no items relied on for safety, as documented in the ISA Summary, remain available and reliable, in an accident sequence evaluated in the ISA, to perform their function:
 - (i) In the context of the performance requirements in 70.61(b) and 70.61(c) or
 - (ii) Prevent a nuclear criticality accident (i.e. loss of all controls in a particular sequence).

This criterion is clear and industry does not have any issues with its implementation.

OR

5. Loss of controls such that only one IROFS as documented in the ISA summary remains available and reliable to prevent a nuclear criticality accident and has been in that state for more than eight hours.

While this criterion may appear to be clear, consider how a licensee should react in the following situation. The licensee discovers this state [(a)(5)] during implementation of management measures (e.g. during a preventive maintenance or calibration) and finds a second IROFS in a two IROFS sequence to be unavailable or failed. Is this state reportable under criterion (a)(5)? A licensee who proactively takes an IROFS out of service under management controls and establishes compensatory measures (temporary IROFS) should not have to report this action.

This reporting requirement does not have any reference to meeting the §70.61 performance requirements. For example, why would one need to report an event in this category if the performance requirements continue to be met? Consider the significance of the other two NCS-related events under 1-hour reports (i.e., inadvertent nuclear criticality and loss of all controls to prevent a nuclear criticality accident). If the performance requirements are still being met, the event does not rise to the same level as the other two NCS-related events under 1-hour reports.

This reporting requirement could be improved to read as follows: a process upset condition has occurred (i.e., an initiating event has occurred), all controls are lost except for one IROFS, and the process remains in a continuously challenged state for greater than eight hours (i.e., the one remaining IROFS is continuously being challenged to prevent a nuclear criticality). This would rise to the same level as the other two NCS-related events under 1-hour reports. A specific example might be the following: a sufficient mass has accumulated in a tank and the only control to prevent a criticality is re-circulating the contents of the tank.

The meaning and significance of the phrase "...has been in this state for greater than eight hours..." must be clarified. Does the phrase mean a continuously failed state for greater than eight hours? For example, what if it is a batch process and the IROFS is only necessary for a short period of time (e.g., during a transfer)?

(b) 24 HOUR REPORTING CRITERIA

1. Any event or condition that results in the facility being in a state that was not analyzed, was improperly analyzed, or is different from that analyzed in the ISA **and** which results in a failure to meet the performance requirements of 70.61 (i.e. an accident sequence with high consequence that is not at least highly unlikely, or an accident sequence with intermediate consequence that is not at least unlikely)

Licensees understand the NRC interprets this requirement to mean that each and every possible condition that could result in high or intermediate consequences must be specifically listed in the ISA/ISA Summary, otherwise the performance criterion is not met. This interpretation does not allow "bounding accident

sequences" to be used. In reality, most licensees establish IROFS that prevent or mitigate "families" of accident sequences without listing each "family member".

Additionally, the NRC does not seem to allow credit for declared IROFS as protections against an accident sequence and for using such IROFS to conclude that the performance criteria of 10CFR70.61 have been met unless the IROFS was previously and specifically listed in the accident sequence in question and the sequence in question was specifically documented in the ISA Summary.

For a 24-hour reporting criteria, why are intermediate consequence events included? A 30-day reporting criterion for these events would seem to be more appropriate. The severity of a high consequence event is far worse than for an intermediate consequence event, and the reporting requirements don't seem to reflect that. A process could be developed that quickly helps a person determine whether a safety problem exists that is not within the bounds of previously analyzed events. The Un-reviewed Safety Question Determination (USQD) process used by the DOE is such an example. Use of such a procedure should be considered by the NRC. A set of questions would assist a licensee determine whether a potential event requires Appendix A reporting and serve as the basis for documenting the evaluation process.

OR

2. Loss or degradation of IROFS that results in failure to meet the performance criteria of 70.61

The performance criteria of 70.61 require IROFS to be available and reliable when needed. In regards to establishing frequency index numbers to plant initiating events and IROFS failures, NUREG 1520 page 3-A-16 states the term "failure" must be understood to mean not merely failure of the IROFS but also a violation of process safety." One can interpret this guidance to mean that unless an initiating event (IROFS challenge) has occurred, the IROFS has not failed. Therefore, so long as the potential for a high consequence event has remained highly unlikely and the potential for an intermediate event has remained unlikely, this criterion for reporting has not been met. Interactions with some NRC staff indicate that they believe this criterion for reportability is met if during a quarterly or semi-annual PM, one of two IROFS preventing a high consequence event is discovered in an "unavailable or unreliable" condition even if there had been no demands on the IROFS.

This appears to be contrary to the credit for the management in depth basis to the ISA method and provides a disincentive to an aggressive PM and self identification program.

OR

3. An acute chemical exposure to an individual from licensed material or hazardous chemicals produced from licensed material that exceed the quantitative standards that satisfy the requirements of 70.61(c)(4). i.e. could:

- a. Lead to irreversible or other serious, long lasting health effects to a worker
- b. Cause mild transient health effects to any individual located outside of the controlled area.

The same comment noted for one-hour reporting criteria (a)(2) and (a)(3) apply to (b)(3). Also for (b)(3), how will the licensee know when an offsite individual has suffered mild transient health effects if the person fails to seek medical attention or the physician fails to contact the licensee?

OR

4. Any natural phenomenon or other external event, including fires internal and external to the facility, that has affected or may have affected the intended safety function or availability or reliability of one or more IROFS.

This criterion is clear and industry does not have any issues with this criterion. Some licensees have questioned the need for this (b)(4) requirement, as criterion (b)(2) would seem to cover what is important for failed or degraded IROFS, regardless of the cause. As written, (b)(4) can cause a licensee to report a natural phenomenon or external event that "may have affected" an IROFS, but would not have resulted in failure to meet the performance criteria of 70.61.

OR

5. The occurrence of an event or process deviation that was considered in the ISA and :
 - (i) was dismissed due to its likelihood or;
 - (ii) was categorized as unlikely and whose associated unmitigated consequences would have exceeded those in 70.61(b) had the item(s) relied on for safety not performed their safety function(s).

This criterion is clear. However, item (5)(i) does not specifically state that the condition must also exceed the performance criteria.

OR

(c) Concurrent Reporting Criteria

Any event or situation, related to the health and safety of the public or onsite personnel, or protection of the environment, for which a news release is planned or notification to other government agencies has been or will be made, shall be reported to the NRC operations center concurrent to the news release or other notification.

Industry does not have any issues with this criterion provided it is applied to events or situations which in and of themselves pose a potential for adverse effects to onsite workers, the public, or environment. These types of events and situations understandably may result in press releases or regulatory agency notifications to instigate and/or facilitate response actions. Licensees are also

often subject to the conditions of a variety of licenses/permits that may impose monitoring and/or effluent limits that, if exceeded, may require regulatory notifications. Such notifications are often required for the purpose of compliance tracking, to provide agency awareness of precursor conditions, or to assure appropriate licensee interventions. An example would be required agency notification when a daily limit in a sewer permit has been exceeded. These types of notifications, albeit to regulatory agencies, should not be considered under this criterion.