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Rev. 1

Bechtel Hanford, Inc. Unreviewed Safety Question Process

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Authors

A. R. Larson
Bechtel Hanford, Inc.

T. R. McDonnell
Bechtel Systems and Infrastructure, Inc.

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ACRONYMS

BHI	Bechtel Hanford, Inc.
CAR	corrective action request
CFR	*Code of Federal Regulations*
DCN	Design Change Notice
DES	Design Engineering Specialist
DOE	U.S. Department of Energy
ECN	Engineering Change Notice
FCN	Field Change Notice
FCR	Field Change Request
JCO	justification for continued operation
PISA	potential inadequacy of the safety analyses
SSCs	structures, systems, and components
TSR	technical safety requirements
USQ	unreviewed safety question

DEFINITIONS

Definitions of terms obtained from the interim final nuclear safety management rule, 10 *Code of Federal Regulations* (CFR) 830, are identified by reference to the rule. In some cases, the terminology used in the interim final rule differs from that used in Environmental Restoration Contractor (ERC) nuclear safety implementation documents. Therefore, this definitions section identifies terminology employed in existing ERC nuclear safety implementation documents that is considered to be equivalent to the terms used in the rule and explains how differences in terms should be interpreted.

Some of the terms in this glossary that are not defined in the interim final rule have multiple meanings in the U.S. Department of Energy (DOE) complex. These definitions reflect the DOE guidance and practices used for ERC projects.

Accident: Anticipated operational occurrences and postulated events that are analyzed to demonstrate that the consequences do not result in undue risk to the health and safety of the public (e.g., those accidents considered credible enough to warrant inclusion in the safety analysis report).

Change: Any modification or replacement, whether temporary or permanent, with something that is not identical to the original in design requirements. The term applies to procedures, documentation, etc., as well as structures, systems, and components. Additions (e.g., new systems or structures, or procedure steps) and subtractions (e.g., abandoning a system or component in place) are also changes.

Contractor responsible for a nuclear facility: The "prime contractor" for the facility. The prime contractor is the contractor whose work for the facility (including operations and activities) is contracted directly with DOE. The prime contractors include management and operating contractors, management and integration contractors, and environmental restoration contractors.

Design basis: The set of requirements that bound the design of systems, structures, and components within the facility. These design requirements include consideration of safety, plant availability, efficiency, reliability, and maintainability. Some aspects of the design basis are important to safety, although other aspects are not.

Design features: The design features of a nuclear facility specified in the technical safety requirements that, if altered or modified, would have a significant effect on safe operation. (10 CFR 830.3)

Different type: Introduction of a new type of accident (e.g., use of new type of hazardous material) or a new type of malfunction (e.g., replacement of relays with solid-state components).

Definitions

Discovery: A condition that may indicate a facility's documented safety analysis is not bounding or is otherwise inadequate (i.e., discrepant as-found conditions, operational events, and receipt of new information). Identification of analytic errors, omissions in the safety analysis, or inadequacies in the safety basis documents constitute discoveries. The term discovery is equivalent to the term "potential inadequacy in the safety analysis," which is used in DOE G 424.X.

Discrepant as-found condition: Actual physical configuration of the facility is different than as described in the facility's documentation or assumed in the safety analysis (e.g., as-built drawings or safety analyses).

Documented safety analysis: A documented analysis of the extent to which a nuclear facility can be operated safely with respect to workers, the public, and the environment, including a description of the conditions, safe boundaries, and hazard controls that provide the basis for ensuring safety. (10 CFR 830.3).

Environmental restoration activities: The process(es) by which contaminated sites and facilities are identified and characterized and by which contamination is contained, treated, or removed and disposed. (10 CFR 830.3) These activities include environmental remediation of contaminated soils. Environmental restoration activities are considered to be nuclear facilities if the activities involve radioactive and/or fissionable materials in such forms and quantities that a nuclear hazard or a nuclear explosive hazard potentially exists.

Facility: A facility includes systems, buildings, utilities, and related activities that are directed to a common purpose at a single location. Examples include storage areas, nuclear reactors, production or processing plants, radioactive waste disposal systems and burial grounds, environmental restoration activities, testing and research laboratories, and transportation activities.

Final hazard classification: The results of an assessment of potential impacts of a facility that are based on a bounding, unmitigated release of hazardous substances and a comparison to defined threshold values. The assessment of potential impacts considers the material quantity, form, location, dispersability, and interaction with available energy sources to determine unmitigated release potential.

Hazard: A source of danger (i.e., material, energy sources, or operations with the potential to cause illness, injury, or death to personnel or cause damage to an operation or the environment). Does not consider likelihood or credibility of accident scenarios or consequence mitigation.

Hazard analysis: A systematic analysis of hazards to identify appropriate controls to mitigate the hazards. Hazards analysis consists of work definition, hazard identification, and hazard evaluation.

Hazard category: In summary, as defined in DOE-STD-1027 (DOE 1997), a hazard category 1 nuclear facility has the potential for significant offsite consequences. A hazard category 2 nuclear facility has the potential for significant onsite consequences beyond localized consequences. A hazard category 3 nuclear facility has the potential for only local significant consequences. A below hazard category 3 facility has the potential for consequences less than the other categories. Below hazard category 3 facilities are sometimes referred to as "radiological facilities." (65 FR 60299)

Hazardous materials: Materials that are toxic, explosive, flammable, corrosive, reactive, or otherwise physically or biologically threatening to health.

Hazardous substance: Those materials identified in 40 CFR 302.4, Table 302.4, "List of Hazardous Substances and Reportable Quantities," and 40 CFR 302.4, Appendix B, "Radionuclides."

Important to safety: Any equipment whose function can impact safety (either directly or indirectly). This includes equipment that performs or meets the following functions:

- Primary process equipment that has pressure-boundary type capability
- Safety-class or safety-significant structures, systems, and components that prevent, detect, or mitigate
- Structures, systems, and components important to defense-in-depth or worker safety.

Increase in consequence/probability: A criterion used in USQ determinations. If a proposed change results in a clearly discernible increase in consequence or probability, the criterion is satisfied.

Integrated Environment, Safety, and Health Management System (ISMS): Systematically integrates safety management and work practices at all levels so missions are accomplished while protecting the public, the workers, and the environment.

Justification for continued operation (JCO): A document containing a contractor request to operate temporarily outside of the current safety basis. A JCO is submitted to DOE for approval.

Major modification: A modification to a DOE nuclear facility that is completed on or after April 9, 2001, that substantially changes the existing safety basis for the facility. (10 CFR 830.3) Major modifications to Hazard Category 1, 2, and 3 DOE nuclear facilities (e.g., the replacement of a major safety system) are considered to be equivalent to the design, construction, and initial operation of a new facility.

Malfunction: Failure to perform as expected (includes undesired spurious operations).

Margin of safety: The range above the established acceptance limit to the safety limit reviewed and approved by DOE (as defined in the basis for technical safety requirements).

New information: New information can arise from several different sources. The question is whether or not these different types of new information could lead to the current safety analysis being deemed inadequate. Three categories of new information can have impacts to safety analyses and could therefore require unreviewed safety question evaluation:

- Determination that structures, systems, and components malfunction or fail under certain conditions. An example would be when the facility receives notification from a vendor that a procured part was discovered to fail under certain conditions.

- Technological advances or new data from research that may invalidate assumptions in the safety analysis. An example would be a study concluding that high-efficiency particulate air filters fail at much lower temperatures than previously determined.

- Discoveries of errors of inaccuracy or omission in the current safety analyses. Examples of errors would be discoveries of errors in supporting calculations, erroneous assumptions in hazard analysis, invalid technical assumptions, or discovery of an actual facility condition that is beyond the bounds of the safety analyses.

(Refer to NE-70, *Interpretation of DOE 5480.21, Unreviewed Safety Question* [DOE 1992], for additional guidance and examples.)

Nonreactor nuclear facility: Those facilities, activities or operations that involve, or will involve, radioactive and/or fissionable materials in such forms and quantities that a nuclear or a nuclear explosive hazard potentially exists to workers, the public, or the environment, but does not include accelerators and their operations, and does not include activities involving only incidental use and generation of radioactive materials or radiation such as check and calibration sources, use of radioactive sources in research and experimental and analytical laboratory activities, electron microscopes, and x-ray machines (10 CFR 830.3).

Nuclear facility: A reactor or a nonreactor nuclear facility where an activity is conducted for or on behalf of the DOE and includes any related area, structure, facility, or activity to the extent necessary to ensure proper implementation of the requirements established by this part. (10 CFR 830.3) The facility may be wholly or partially owned or controlled by DOE. The term "DOE nuclear facility" and "nuclear facility" are used interchangeably; the use of the term "DOE nuclear facility" does not necessarily require the facility to be owned by DOE.

Risk: The quantitative or qualitative expression of possible loss that considers the probability that an event will occur and the consequences of that event.

Safety analysis: A documented process (1) to provide systematic identification of hazards within a given DOE operation; (2) to describe and analyze the adequacy of the measures taken to eliminate, control, or mitigate identified hazards; and (3) to analyze and evaluate potential accidents and their associated risks. The safety analysis is used as the basis to derive technical safety requirements (if appropriate). Equivalent to the term "documented safety analysis."

Safety analysis report (SAR): The report that documents the adequacy of the safety analysis for a nuclear facility. A SAR describes the facility operations (e.g., surveillance and maintenance, or decontamination and decommissioning), the principal design criteria, the facility hazards, the facility design features (including structures, systems, and components [if any]) provided to prevent or mitigate postulated accidents, and a summary of the analysis of the risks associated with operation of such facilities. The SAR also provides the technical basis for the operational limitations (e.g., technical safety requirements) that ensure operations within the accepted level of risk. A SAR is one type of documented safety analysis.

Safety basis: The documented safety analysis and hazard controls that provide reasonable assurance that a DOE nuclear facility can be operated safely in a manner that adequately protects workers, the public, and the environment. (10 CFR 803.3) The safety basis is contained in the documented safety analysis, technical safety requirements (if applicable), DOE safety evaluation reports or other DOE approval documents, and the results of unreviewed safety question determinations and any associated evaluations of safety are part of the safety basis for the facility. Existing ERC nuclear safety implementation documents may use the equivalent term, "safety basis."

Safety class structures, systems, and components: The structures, systems, or components, including portions of process systems, whose preventive or mitigative function is necessary to limit radioactive hazardous material exposure to the public, as identified by the documented safety analysis. (10 CFR 803.3)

Safety evaluation report: Report prepared by the DOE to document the following:

1. The sufficiency of the documented safety analysis for a hazard category 1, 2, or 3 DOE nuclear facility;

2. The extent to which a contractor has satisfied the requirements of Subpart B of this part; AND

3. The basis for approval by DOE of the safety basis for the facility, including any conditions for approval. (10 CFR 803.3)

Safety management program: A program designed to ensure a facility is operated in a manner that adequately protects workers, the public, and the environment by covering a topic such as quality assurance, maintenance of safety systems, personnel training, conduct of operations, inadvertent criticality protection, emergency preparedness, fire protection, waste management, or radiological protection of workers, the public, and the environment. (10 CFR 803.3)

Safety-significant structures, systems, and components: The structures, systems and components that are not designated as safety-class structures, systems, and components, but whose preventive or mitigative function is a major contributor to defense-in-depth and/or worker safety as determined from safety analysis.

Safety structures, systems, and components: This term includes both safety-class structures, systems, and components and safety-significant structures, systems, and components.

Technical safety requirement (TSR): Requirements that define the conditions, safe boundaries, and management or administrative controls to ensure safe operation of a nuclear facility and to reduce the potential risk to the public and workers from uncontrolled releases. The TSRs set forth the minimum acceptable limits for operation under normal specified failure conditions; they ensure that the available equipment and initial conditions meet the assumptions in the accident analysis. The TSRs are based on the facility safety analysis report and constitute the agreement between DOE and the operating contractor regarding safe operation of the facility. The basis for TSRs defines the acceptable limits that are used to answer the margin of safety question of the unreviewed safety question safety evaluation.

Temporary change: Modification intended for a limited duration. Examples include electrical jumpers and lifted leads, temporary shielding on pipes and equipment, nonpermanent blocks and bypasses (electrical and mechanical), temporary supports, or other equipment used for a limited period of time**.**

Unreviewed safety question (USQ) determination: The total body of documents prepared in the USQ process related to a given change, test or experiment, or potential inadequacy of the documented safety analysis. The record required by 10 CFR 830.203 and DOE Order 5480.21 to document the review of a proposed change or discovery (also called an unreviewed safety question evaluation). The document records the scope of work being evaluated and the basis for determining if a USQ exists.

Unreviewed safety question (USQ): A situation where:

1. The probability of occurrence or the consequences of an accident or the malfunction of equipment important to safety previously evaluated in the documented safety analysis could be increased;

2. The possibility of an accident or malfunction of a different type than any evaluated previously in the documented safety analysis could be created; OR

3. A margin of safety could be reduced.

Definitions

Unreviewed safety question (USQ) process: The mechanism for keeping a safety basis current by reviewing potential USQs, reporting USQs to DOE, and obtaining approval from DOE prior to taking any action that involves a USQ. (10 CFR 830.3)

Unreviewed safety question (USQ) safety evaluation: This term has the same meaning as "unreviewed safety question determination."

1.0 INTRODUCTION

1.1 BACKGROUND

The U.S. Department of Energy's (DOE's) interim final rule, 10 *Code of Federal Regulations* (CFR) 830.203, "Unreviewed Safety Question Process" (as promulgated in the October 10, 2000, issue of the *Federal Register* [65 FR 60292]), requires that a contractor responsible for a hazard category 1, 2, or 3 existing nuclear facility submit a procedure for its unreviewed safety question (USQ) process to DOE for approval by April 10, 2001. This document provides Bechtel Hanford, Inc.'s (BHI's) procedure for implementing the USQ process.

1.2 PURPOSE

This document describes the USQ procedure used by BHI to evaluate proposed changes and discoveries of potential inadequacies in the safety analyses and to document and report those evaluations. This document also defines requirements for the training and qualification of persons performing USQ evaluations and for preparing justification for continued operations (JCOs) that may be required if a discovery is determined to involve an inadequacy in the documented safety analysis. Definitions of terms used in conjunction with the USQ process are identified in the front matter of this document.

10 CFR 830 (Subpart B, Appendix A, Section H) and DOE Order 5480.21(7)(a) note that the purpose of the USQ process with respect to proposed changes and new operations is to establish the approval authority for the proposal. The objective of the USQ process is to provide the flexibility needed to conduct day-to-day operations by allowing contractors to make certain physical and procedural changes and to conduct tests and experiments without DOE approval. Proposed changes, tests, and experiments that <u>do not</u> implicitly or explicitly impact the safety basis may be implemented by the contractor without DOE approval. Proposed changes, tests, and experiments that <u>do</u> impact the safety basis require DOE approval before implementation.

DOE Order 5480.21(7)(b) notes that the purpose of the USQ process with respect to potential inadequacies in the safety analyses (PISA) is to provide a benchmark of the relative safety significance of the discovery. This benchmark is necessary and must be established in a timely manner because the existence of a PISA may pose serious implications. The PISAs are evaluated using the USQ process to determine if operations can still be conducted in a safe manner that is consistent with the approved safety basis, or if a new safety basis needs to be established.

1.3 APPLICATION

This USQ procedure applies to proposed physical or procedural changes to DOE hazard category 1, 2, or 3 nuclear facilities for which BHI is the responsible contractor and to situations that might involve an inadequacy of the safety analyses of such a facility.

2.0 UNREVIEWED SAFETY QUESTION METHODOLOGY

A contractor responsible for a hazard category 1, 2, or 3 DOE nuclear facility must use the USQ process for any of the following situations to determine if a USQ is involved:

- A temporary or permanent change in the facility as described in the existing documented safety analysis.

- A temporary or permanent change in the procedures as described in the existing documented safety analysis.

- A temporary or permanent change that constitutes a test or experiment (new operation) not described in the existing documented safety analysis.

- A potential inadequacy of the documented safety analysis is discovered for which the safety analysis may not be bounding or may be otherwise inadequate. In this case, the contractor must (1) take action to place the facility in a safe condition, (2) notify DOE of the situation, (3) perform a USQ determination, and (4) submit the evaluation of the safety of the situation to DOE.

Appendix A provides additional information on changes and discoveries.

A situation involves an USQ if at least one of the following conditions is true:

- The probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the documented safety analysis could be increased;

- The possibility of an accident or malfunction of a different type than any evaluated previously in the documented safety analysis could be created; OR

- A margin of safety could be reduced.

2.1 UNREVIEWED SAFETY QUESTION PROCEDURE OVERVIEW

The DOE recognizes that it is possible that some changes can be justified as not requiring detailed USQ determinations as long as screening criteria are developed that will ensure that there are no indirect or secondary effects of the change and to ensure that the change does not introduce a USQ. The purpose of USQ screening is to ascertain if there is reasonable technical justification for not performing a USQ determination. The DOE encourages the use of screening to limit the number of matters for which USQ determinations must be performed, provided that the reasons for exclusion are documented and well supported. When properly defined and implemented, the screening criteria should assist in reducing the efforts expended for matters of

minor significance and should focus efforts more on the more important matters for which the USQ process is intended (see DOE G 424.X and DOE Order 5480.21, Chapter III, Section 4).

Accordingly, the BHI USQ procedure has three tiers:

- The first tier consists of pre-screening proposed changes to determine if the proposed change is outside of the USQ process, if the proposed change is consistent with the existing safety basis, or if the proposed change is categorically excluded from further evaluation. This tier does not apply to PISAs (i.e., discoveries).

- The second tier consists of the screening of proposed changes that were not pre-screened out by the first tier of the USQ process to determine if a USQ determination is required. This tier does not apply to PISAs (discoveries).

- The third tier consists of the USQ determination. This tier applies to PISAs and proposed changes that were not screened out in the first two tiers of the USQ procedure.

2.2 PRE-SCREENING OF PROPOSED CHANGES

The first tier of the USQ procedure consists of evaluating proposed changes to determine if the changes are subject to the USQ process and, if so, whether the changes require further evaluation.

2.2.1 Changes Not Subject to the Unreviewed Safety Question Process

Two types of changes always require DOE approval and, therefore, need not be evaluated in accordance with this USQ procedure:

- A change to a technical safety requirement (TSR)
- A change that constitutes a major modification.

2.2.1.1 Change to a Technical Safety Requirement. In accordance with 10 CFR 830.205(a)(2) and DOE Order 5480.22, changes to TSRs (including additions of new TSRs) must be approved by DOE prior to use. Therefore, if a proposed change involves a change to a TSR, the change is not subject to the USQ process. However, it may be useful to perform a USQ determination of the proposed change to identify the impacts on the existing safety basis and to help assess the safety significance of the change.

2.2.1.2 Major Modification. A major modification to a DOE nuclear facility is one that substantially changes the facility's existing safety basis. In these cases, it is not necessary to apply the USQ process to determine that DOE is the proper approval authority. However, it may be useful to perform a USQ determination of the proposed change to identify the impacts on the existing safety basis and to help assess the safety significance of the change.

2.2.2 Procedural Changes

A qualified USQ evaluator may pre-screen procedural changes that are subject to the USQ process to determine if the affected documents satisfy one of the following conditions:

- Changes are consistent with the safety basis, OR
- Changes are categorically excluded from detailed USQ evaluation.

If one of these conditions is satisfied, further USQ evaluation is not required.

2.2.2.1 Procedures Subject to the Unreviewed Safety Question Process. All procedures that are identified in the facility's documented safety analysis are subject to the USQ process.

The DOE considers that procedures are not limited to those items specifically identified as procedure types (e.g., operating, chemistry, system, test, surveillance, and emergency plan), but could include anything described in the documented safety analysis that defines or describes activities or controls over the conduct of work. Changes to these activities or controls qualify as changes to procedures as described in the documented safety analyses and, therefore, must be evaluated to determine if these changes involve a USQ.

Procedures may be explicitly or implicitly identified in the facility's documented safety analysis. If the procedure is implied directly by the nature of a topic in the safety basis (including the operational safety requirements/TSRs), that procedure should be considered to be described in the documented safety analysis. Such implicitly described procedures include (1) the procedures that implement a safety management program described in the safety basis, and (2) operating/ maintenance procedures for safety equipment when that equipment is identified in the documented safety analysis.

Changes to procedures include (1) revising an existing procedure and (2) creating a new procedure. For the case of a new procedure, the question becomes the following: If the documented safety analysis were to be prepared (or updated) after the new procedure had been approved, is the new procedure of a type that would be identified in the documented safety analysis? If so, the new procedure should have a USQ determination prepared.

The safety basis identifies approved work scope and may identify special procedural controls or other constraints that require field implementation for a defined scope of work. The project engineer ensures that the work scope and controls are translated into implementing procedures or work packages that are consistent with the bounds of the safety basis.

To ensure that these controls are reflected in work documents, each implementing procedure or work package can be individually reviewed against the safety basis by a qualified USQ evaluator. Based on this review, a decision can be made regarding the scope of the procedure or work package and its potential to impact the safety basis. Those implementing procedures or work packages that have potential to impact the safety basis require evaluation by the USQ process. Subsequent changes to these implementing procedures or work packages also require evaluation by the USQ process.

The implementing procedures or work packages that are determined not to have work scopes with the potential to impact the safety basis do not require future USQ review when making changes that are within the existing scope. However, if the scope of the implementing procedure or work package is subject to change or redefinition, the revised scope requires evaluation by the USQ process.

2.2.2.2 Exclusions. DOE G 424.X and DOE Order 5480.21 acknowledge that screening criteria should be applied to those items that, by broad definition, would enter into the USQ process but for which a detailed evaluation (i.e., USQ determination) is not necessary. For example, an operational procedure that is described in the documented safety analysis may be changed to correct a typographical error or to include an additional reference to an equipment list. Such a change is not of any safety significance and clearly does not involve a USQ.

The following subsections describe the types of exclusions employed by BHI and establish the criteria to be used to determine if a particular category of exclusion is applicable.

2.2.2.2.1 Editorial Changes. Editorial changes that do not constitute technical change(s) and have no impact on safety may be excluded.

2.2.2.2.2 Work Scope Addressed by Previous Unreviewed Safety Question Determination. Changes for which a prior USQ determination fully covers the current issue (e.g., post-modification acceptance testing or field change requests during installation) may be excluded.

2.2.2.2.3 Procedures Simply Listed in the Safety Analyses. As stated in DOE Order 5480.21, Attachment II.3.a, changes to procedures that are simply listed and not outlined, summarized, or described in the safety analyses do not require USQ evaluation. This exclusion does not apply to procedures that appear explicitly only in a list but are implicitly described in the safety basis (as discussed in Section 2.2.2.1).

2.2.2.2.4 Changes Involving Commercial Practices. Changes for which common commercial practices would be sufficient and a formal nuclear-grade change control process is not warranted (e.g., changing fixtures for fluorescent lighting in an office area of the facility) are excluded.

2.2.2.2.5 Routine Maintenance Activities. Maintenance activities are necessary and authorized to maintain the functional condition and performance capability of facility equipment. As stated in DOE G 424.X and DOE Order 5480.21, Chapter II, item 2.b, routine maintenance activities do not require evaluation by the USQ process, except for those activities that are not enveloped by current analyses or might violate a TSR.

Examples of routine maintenance activities that do not require evaluation by the USQ process include calibration, refurbishment, and housekeeping. Other examples include the installation of an item that is an exact replacement or an equivalent component.

Examples of maintenance activities that require evaluation by the USQ process include the following:

- Activities that remove from service safety systems or components identified in the safety basis when allowed outage times are not included in the TSRs.

- Activities that could alter the design, function, or method of performing the function of the structures, systems, and components (SSCs) described in the safety basis (e.g., changes to ventilation balance, tube plugging, or impeller rework).

2.2.2.2.6 Surveillance Activities. Surveillance activities are regularly scheduled inspections of equipment, systems, facilities, structures, etc., to ensure that these items function safely and reliably in their intended application. Surveillance activities that do not require evaluation by the USQ process consist of the following:

- Work that does not have the potential to defeat or compromise special controls in current, approved safety basis document(s) (documented safety analysis)

- Work that does not require changing high-efficiency particulate air filters, sand filters, resin columns, or other filters used to remove radiological or chemical contaminants

- Work that does not have the potential to expose personnel to the unexpected release of hazardous energy or materials, OR if the work has the potential to expose personnel to hazardous energy or materials, lockout/tagouts may be installed to control the hazardous energy in accordance with approved lockout/tagout procedures

- Work that does not have a design document, OR if the work has a design document, the work meets routine work definitions provided in BHI-FS-01, *Field Support Administration*.

2.2.2.3 Documentation. If a qualified USQ evaluator concludes that a change is not subject to detailed USQ evaluation under the provisions of Section 2.2.2.1 or 2.2.2.2, the conclusion may be documented on the appropriate routing sheet. The USQ evaluator's signature/date documents the following:

- The implementing procedure or work package is consistent with activities already authorized in the facility's safety basis as discussed in Section 2.2.2.1 (i.e., the activities required to execute the work package are authorized in the facility's safety basis), OR

- The change is excluded from further evaluation based on the criteria described in Section 2.2.2.2.

2.2.3 Other Changes

Changes not addressed in Sections 2.2.1 or 2.2.2 require written USQ evaluations.

2.3 SCREENING OF PROPOSED CHANGES

Proposed changes do not need to be screened if the project engineer or a qualified USQ evaluator conclude that a USQ determination is required. Otherwise, a proposed change is screened against the following set of questions to determine if a USQ determination (also referred to as a USQ safety evaluation) is required.

Does the proposed temporary or permanent change:

- Change the facility as described in the documented safety analysis?
- Change the procedures as described in the documented safety analysis?
- Represent a test or experiment (new operation) NOT described in the documented safety analysis?
- Require a change to the basis for a TSR?

If all responses to these screening questions are negative, the proposed change does not impact the safety basis and may be implemented without DOE approval. Affirmative response to one or more of the screening questions requires the preparation of a USQ determination.

Appendix B provides guidance to evaluators responding to these screening questions. The originator of the screen must provide written documentation justifying each response. The documentation should include a description of the change being evaluated and of its effects on SSCs and/or procedures. The responses to the screening questions should provide sufficient detail to allow an independent technical reviewer to understand the basis for the originator's conclusions. Two qualified USQ evaluators must sign the documentation to indicate concurrence with the conclusions of the evaluation originator (who may be one of these two USQ evaluators.)

2.4 DISCOVERIES

The USQ process is also used to evaluate discoveries that indicate the documented safety analysis may not be bounding or may be otherwise inadequate. If the contractor discovers or is made aware of a potential inadequacy in the documented safety analysis, the contractor must:

1. Take action, as appropriate, to place the facility in a safe condition until an evaluation of the safety of the situation is completed;
2. Notify DOE of the situation;
3. Perform a USQ determination and notify DOE promptly of the results; AND

4. Submit an evaluation of the safety of the situation to DOE prior to removing any operational restrictions previously imposed.

2.4.1 Determination if a Potential Discovery Meets General Entry Conditions for Inadequate Safety Analysis

New information must be promptly evaluated against the following general entry conditions:

- Does the potential discovery represent a discrepant as-found condition?
- Does the potential discovery result from operational events or incidents?
- Does the potential discovery represent new information that impacts the documented safety analysis, the TSRs, or any margin of safety?

A positive answer to any one of these three questions indicates a potential inadequacy of the safety analysis.'

2.4.2 Actions Required Upon Determination that a Potential Inadequacy of the Safety Analysis Exists

Because the discovery of a PISA may pose serious implications, the following actions are taken immediately:

- Any actions determined necessary to place the facility in a safe condition are implemented immediately.
- DOE is notified of the situation.
- Preparation of a USQ determination is initiated to determine if the PISA involves a USQ.

The declaration of a USQ is typically based on the results of the USQ determination; however, if two qualified USQ evaluators agree that the PISA is a USQ, a USQ can declared immediately.

2.4.3 Timely Evaluation

Because discoveries may indicate that operations are occurring outside of the safety basis, timely evaluation of new information and PISAs is necessary. Section 3.1.2 describes DOE's expectations regarding the time frame for these evaluations.

2.5 UNREVIEWED SAFETY QUESTION DETERMINATION

All proposed changes that are not screened out under the provisions in Sections 2.2 and 2.3 and all PISAs must be evaluated against the three criteria that define a USQ. 10 CFR 830 refers to

this evaluation as a USQ determination, but it has traditionally been called a USQ safety evaluation. The three USQ criteria can be subdivided into the following seven questions:

1. Could the proposed change increase the probability of occurrence of an accident previously evaluated in the facility's existing safety analyses?

2. Could the proposed change increase the consequences of an accident previously evaluated in the facility's existing safety analyses?

3. Could the proposed change increase the probability of occurrence of a malfunction of safety SSCs required by the facility's existing safety analyses?

4. Could the proposed change increase the consequences of a malfunction of safety SSCs previously evaluated in the facility's existing safety analyses?

5. Could the proposed change create the possibility of an accident of a different type than any previously evaluated in the facility's existing safety analyses?

6. Could the proposed change create the possibility of a malfunction of safety SSCs of a different type than any previously evaluated in the facility's existing safety analyses?

7. Does the proposed change reduce the margin of safety as defined in the basis for any TSR?

An affirmative response to one or more of the USQ determination questions indicates that a USQ exists; a negative response to every USQ safety evaluation question indicates that a USQ does not exist.

Appendix C provides guidance to evaluators responding to these questions. The originator of the USQ determination must provide written documentation justifying each response. The documentation should include a description of the change being evaluated and of its effects on SSCs or procedures. The responses to the USQ determination questions should provide sufficient detail to allow an independent technical reviewer to understand the basis for the originator's conclusions. Two qualified USQ evaluators must sign the documentation to indicate concurrence with the conclusions of the evaluation originator (who may be one of these two USQ evaluators.)

Sections 3.1.1 and 3.1.2 describe the actions that must be taken based on the outcome of the USQ determination.

2.6 JUSTIFICATION FOR CONTINUED OPERATION

As both the owner and regulator, DOE accepts the risks associated with operation of DOE facilities. The documented safety analysis provides the common understanding of these risks and the limits within which a contractor may operate. If a PISA is found to increase risk beyond

that accepted in the documented safety analysis (i.e., if the PISA involves a USQ), DOE must be notified.

In these cases, DOE has two basic options: (1) to accept the increased risk, or (2) to reduce risk through the imposition of controls. A justification for continued operation (JCO) is used to specify the controls and the basis for why the controls will limit risk to a level acceptable to DOE. In cases where an actual USQ exists and activities have been limited or temporarily suspended, BHI may develop a JCO and submit it to DOE for approval. After receiving approval, the JCO becomes a temporary part of the safety basis until a complete safety analysis has been developed and approved that resolves the safety issue.

3.0 REPORTING AND DOCUMENTATION

3.1 REPORTING TO THE U.S. DEPARTMENT OF ENERGY

3.1.1 Identification of an Unreviewed Safety Question

BHI must obtain DOE's approval of any action determined to involve a USQ.

3.1.2 Discovery of a Potential Inadequacy of the Safety Analysis

If BHI discovers, or is made aware of, a PISA, BHI must proceed as follows:

1. Take action, as appropriate, to place or maintain the facility in a safe condition.

2. Notify DOE of the situation.

3. Promptly perform a USQ determination and notify DOE of the results.

4. Implement any additional actions determined to be necessary to place or maintain the facility in a safe condition.

5. Submit an evaluation of the safety of the situation to DOE.

6. For PISAs that involve a USQ, do NOT remove any compensatory measures implemented to meet paragraph (1) or (4) without prior DOE approval.

7. For PISAs that do NOT involve a USQ, do NOT remove any compensatory measures implemented to meet paragraph (1) or (4) above before the completing the requirements of paragraph (5).

Thus, there are three points in the PISA evaluation process that call for notification or reporting to DOE.

With respect to item (3), DOE's expectation is that facility management will be allowed a reasonable amount of time to confirm the reasonableness of the potential for having an inadequate safety analysis. This timeframe should be on the order of hours, up to several days, but not a matter of weeks or months. This timeframe includes the time necessary to evaluate new information to determine if it involves a PISA (Section 2.4.1) and the time necessary to perform the USQ determination (Section 2.4.2).

Note that defect identification and occurrence reporting and processing are addressed through contract provisions that require contractors to use the DOE Occurrence Reporting and Processing System. Within BHI, these reporting requirements are addressed in BHI-MA-02, *ERC Project Procedures*, Procedure 2.6, "Occurrence Investigation and Reporting."

3.1.3 Annual Unreviewed Safety Question Summary

Each year when BHI submits its updated documented safety analysis to DOE, the contractor must also submit a report that summarizes all situations for which BHI performed a USQ determination since the prior submission. The report must summarize the results of those determinations and should be submitted concurrently with the updated safety analysis. Safety analysis updates must be submitted by the anniversary of the date of DOE's original approval of the DSA.

3.1.4 Unreviewed Safety Question Determination Documentation Retention

A contractor must maintain complete and accurate records as necessary to substantiate compliance with the requirements of the rule.

BHI will retain records of USQ actions for the authorized operating period of each nuclear facility for which it is the responsible contractor and will ensure the complete transfer of all documentation to any subsequent contractor prior to the termination of its contract.

4.0 RESPONSIBILITIES, QUALIFICATIONS, AND TRAINING

4.1 ROLES AND RESPONSIBILITIES

4.1.1 Unreviewed Safety Question Originators

The USQ originators shall be qualified in accordance with the requirements noted in Section 4.2 and prepare USQ screenings or determinations as directed by the project engineer. The USQ originators shall follow the requirements of this procedure in performing these duties.

4.1.2 Unreviewed Safety Question Evaluators

The USQ evaluators shall be qualified in accordance with the requirements noted in Section 4.2. The USQ evaluators perform the following duties:

- Prepare USQ screenings or determinations.
- Review and approve (as first evaluator) USQ screenings or determinations prepared by USQ originators who are not qualified USQ evaluators.
- Review and concur with (as second evaluator) USQ screenings or determinations.
- Concur with JCOs.

The USQ evaluators shall follow the requirements of this procedure when performing USQ evaluations and shall report the results of their evaluations to the project engineer.

4.1.3 Project Engineer

The project engineer (or designee) has the following responsibilities under the USQ process:

- Promptly determine if new information represents a PISA and initiate a USQ determination, if appropriate.
- Oversee determination if any actions are needed to establish a “safe” condition for the facility or activity as a result of the PISA.
- Notify BHI project management that a PISA exists, and provide assistance in preparation/update required reports.
- Direct preparation of an evaluation of the safety of situations involving a PISA
- Identify Design Change Notices (DCNs), Engineering Change Notices (ECNs), Field Change Requests (FCRs), and Field Change Notices (FCNs) that require USQ evaluation.
- Notify BHI project management of proposed changes that require DOE approval.
- Designate candidate qualified USQ evaluators.
- Assign duties to USQ originators and evaluators.
- Review and approve JCOs prior to submittal to DOE.

4.1.4 Project Manager

The project manager (or designee) has the following responsibilities under the USQ process:

- Obtain DOE approval prior to implementing any proposed changes that result in positive USQs.
- Implement measures needed to establish a safe condition for the facility or activity as a result of a PISA.
- Report PISAs to DOE.
- Implement measures needed to establish a safe condition for the facility or activity as a result of the discovery.
- Report to DOE the results of PISA USQ determinations.
- Submit evaluations of the safety of situations involving PISAs to DOE.
- Maintain compensatory measures implemented for PISAs that do not involve a USQ until the evaluation of the safety of the situation is submitted to DOE.
- Obtain DOE approval prior to removing compensatory measures implemented for PISAs that involve a USQ.
- Ensure that proposed changes that involve a USQ are not implemented without prior DOE approval.
- Submit JCOs to DOE for approval.

4.1.5 Nuclear/Safety Analysis/Decontamination and Decommissioning Design Engineering Specialist

- Approve qualification of individuals to perform USQ screenings and USQ determination safety evaluations.
- Review and resolve USQ evaluations where two USQ evaluators do not agree.
- Review and approve JCOs prior to submitting to DOE for approval.

4.2 UNREVIEWED SAFETY QUESTION EVALUATOR QUALIFICATIONS AND TRAINING

This section establishes the basic qualifications and training requirements for the personnel that implement the BHI USQ process.

4.2.1 Education and Experience

- The design engineering specialist, the project engineer, and the project manager shall have education and experience as specified in the applicable BHI training position description. These positions require a Bachelor of Science degree in a technical discipline, or a combination of 5 years of related work experience and education, plus a minimum of 7 years of progressively responsible related work experience.

- USQ originators and evaluators shall have a Bachelor of Science degree in a technical discipline, or a combination of 5 years of related work experience and education, plus 3 years of related work experience.

- Related work experience includes experience in the design, construction and/or operation of DOE nuclear facilities, NRC-licensed facilities, and/or other similar facilities.

4.2.2 Training

- All personnel involved in the USQ process shall receive documented training in the requirements of the USQ process. At a minimum, this training shall consist of reading the BHI procedure that implements this USQ process. Knowledge of the procedure shall be validated. Evidence of this training and its validation shall be documented in training records.

- All personnel involved in the USQ process shall be familiar with the facility's safety basis. The project engineer, project manager, and design engineering specialist are familiar with the safety basis by virtue of their review and approval responsibilities.

- USQ evaluators and USQ originators shall receive documented training in the facility safety basis. At a minimum, this training shall consist of reading the facility safety basis documents. Evidence of this training shall be documented in training records.

- USQ evaluators shall have significant prior experience in preparing USQ determinations for DOE nuclear facilities or NRC licensed facilities, OR shall have completed a minimum of three USQ determinations under the direction of a qualified USQ evaluator. These USQ determinations may be based on hypothetical situations.

4.2.3 Maintaining Qualifications

- Personnel involved in the USQ process shall be current on changes in the USQ process. Training in the USQ process must be revalidated at least once in every 2 years.

- USQ evaluators and originators shall be current on safety basis changes.

- USQ evaluators must be actively involved in implementing the USQ process to remain qualified. This involvement may be demonstrated by performing a minimum of two USQ determinations/screenings in a 2-year period.

4.2.4 Documentation of Qualifications

The qualifications of USQ evaluators shall be documented by the project engineer and concurred to by Nuclear/Safety Analysis/Decontamination and Decommissioning Design Engineering Specialist (DES) in a memorandum to the file. If the initial qualification is based on significant prior experience, this experience should be verifiable through the individual's employment history. If the initial qualification is based on completion of five USQ determinations, the memorandum should identify the five USQ determinations. The memorandum should also indicate that the project engineer considers that the evaluator is sufficiently familiar with the project and the safety basis to perform the USQ process. The USQ qualification documentation shall be filed in training records.

5.0 REFERENCES

10 CFR 830, "Nuclear Safety Management," *Code of Federal Regulations*, as amended.

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29 CFR 1910.119, "Process Safety Management of Highly Hazardous Chemicals," *Code of Federal Regulations*, as amended.

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APPENDIX A

CHANGES AND DISCOVERIES

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CHANGES AND DISCOVERIES

A.1 PROPOSED CHANGES

A.1.1 Potential Sources Identifying Proposed Changes

The Design Change Notices (DCNs) and Engineering Change Notices (ECNs) may indicate proposed change that requires evaluation by the USQ process. Both DCN and Field Change Request/Field Change Notice (FCR/FCN) forms require a determination if revision to hazard classification or safety analysis is required. The PE is responsible for approving DCNs/FCNs and identifying those that require evaluation by the USQ process.

A.1.2 Proposed Change from a Decontamination and Decommissioning Perspective

What constitutes a "proposed change" for a facility undergoing decontamination and decommissioning may be different than for a facility under long-term surveillance and maintenance (S&M). A decontamination and decommissioning project entails the removal of structures, systems, and components (SSCs), which is described and evaluated in the associated DSA. In this context, the removal of SSCs is not generally a "proposed change" or modification to the facility or activities described in the safety basis. However, it would be expected that proposed changes to SSCs that still remain important to safety would require evaluation by the USQ process.

A.1.3 Proposed Change from a Surveillance and Maintenance Perspective

The functions of SSCs are not normally anticipated to change for facilities that are under long-term S&M. Removal of SSCs is not a standard activity under the S&M program and would not typically be analyzed within the scope of the safety analysis. Therefore, a USQ review of proposed changes to the configuration of the facility under long-term S&M would typically be expected to result in a "YES" answer to at least one of the screening questions.

A.2 POTENTIAL DISCOVERIES AND POTENTIAL INADEQUACIES OF THE SAFETY ANALYSIS

A.2.1 Evaluation of Potential Discoveries and Potential Inadequacies of the Safety Analysis

The DOE has issued an interpretive memorandum (NE-70, *Interpretation of DOE Order 5480.21, Unreviewed Safety Questions* [DOE 1992]). BHI personnel responsible for evaluating potential discoveries and performing USQDs of potential inadequacies of the safety analysis (PISAS) should use the specific guidance and examples of these documents. As noted in the DOE memorandum, some discoveries (e.g., procedural violations or inadequacies resulting

from imposition of new design requirements) are clearly not related to inadequacies in the existing safety analysis. Conversely, some discoveries resulting from an upgrade to the safety analysis report in response to new requirements (e.g., discovery of analytical or assumption errors) are clearly related to inadequacies in the existing safety analysis. In either case, the USQ safety evaluation documents the determination of whether the discovered condition is (or is not) a USQ.

A.2.2 Potential Sources Identifying Discoveries

The following types of documents may identify discoveries, some of which may require USQ evaluation:

- Occurrence reports.

- Corrective action requests (CARs) typically identify programmatic deficiencies. The CARs are assigned to a responsible project manager, who typically delegates the CAR to the project engineer for resolution. The project engineer is responsible for identifying any CAR conditions that require USQ review.

- External assessments may indicate a potential error, omission, or inadequacy in the safety basis. The project engineer is responsible for identifying external assessment conditions that require USQ review.

- Nonconformance reports typically used to indicate deficient conditions. The project engineer is responsible for identifying nonconformance reports that require USQ review.

- Site planning activities, communication from other parties, and direct observation are all sources that may reveal changes at existing adjacent facilities or plans for new adjacent facilities with the potential to impact the safety basis. Such changes should be treated as potential discoveries.

APPENDIX B

GUIDANCE FOR UNREVIEWED SAFETY QUESTION SCREENING QUESTIONS

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GUIDANCE FOR UNREVIEWED SAFETY QUESTION SCREENING QUESTIONS

The answers to the unreviewed safety question (USQ) screening questions should use the guidance provided below to determine the conditions that would constitute a change.

1. Change the facility as described in the safety basis?

The following bullets provide a selection of proposed facility changes (in question form) that indicate a USQ safety evaluation is required. Change is not limited to permanent changes, but must also consider temporary changes.

- Does change have potential to alter ability of structures, systems, and components (SSCs) to meet expected performance?
- Does change alter design, function, or method of performing the function of SSCs described by text, drawing, or other information in the safety basis?
- Does change affect seismic qualification, environmental qualification, or quality group classification?
- Does the change affect fire protection?
- Does change introduce new system or physical interactions?
- Are components relied upon in the safety basis being removed?
- Are components relied upon in the safety basis being replaced with a nonequivalent component?
- Is equipment being disabled?
- Does the activity affect redundancy, diversity, or separation of equipment?

2. Change the procedures as described in the safety basis?

There are three types of procedure changes:

- If a procedure is not described in the safety analyses, it would not require a USQ evaluation to be performed.

- Changes to procedures simply listed, and not outlined, summarized, or described in the safety analyses do not require evaluation.

- Changes to procedures that are outlined, summarized, or described must be evaluated if the outline, summary, or description in the safety analyses are impacted.

In instances when procedural modifications are implementing operational changes (e.g., setpoint changes) while the procedure itself may not meet the requirement for USQ evaluation, the operational change should be evaluated to ensure that it does not impact safety basis limits or supporting safety analyses.

3. Represent a test or experiment (new operation) NOT described in the existing safety basis?

The USQ evaluations are required for tests or experiments that are not described in safety basis documents. The term "tests or experiments" encompasses any new operatoins that are not addressed in the safety basis. By definition, these are tests and experiments that could degrade the margin of safety during normal operations or anticipated transients or degrade the adequacy of SSCs to prevent accidents or mitigate accident conditions. For example, for pre-operational tests, surveillance tests, functional tests, and start-up tests that are performed regularly, safety evaluations are not required every time a test is performed. However, one-of-a-kind tests used to measure the effectiveness of new techniques or a new system configuration that might affect systems important to safety require evaluation before the tests can be conducted.

4. Require a change to the technical safety requirements (TSRs) or TSR basis?

Changes to TSRs

In accordance with 10 CFR 830.205 (a) (2), changes to TSRs (including additions of new TSR requirements) must be approved by the U.S. Department of Energy (DOE) prior to use; therefore, they are not subject to the USQ process.

Changes to TSR Basis

The TSR basis provides a summary of the reasons for TSR requirements. The basis for TSRs is derived from the safety analysis. Changes to the TSR basis may be evaluated under the USQ process. Changes to the TSR basis may be made under contractor authority if the proposed change is determined not to involve a USQ or an inadequacy of the documented safety analysis.

APPENDIX C

GUIDANCE FOR UNREVIEWED SAFETY QUESTION SAFETY EVALUATION QUESTIONS

APPENDIX C

GUIDANCE FOR UNREVIEWED SAFETY QUESTION SAFETY EVALUATION QUESTIONS

The answers to each of the seven questions for the unreviewed safety question (USQ) safety evaluation should use the interpretations provided in this appendix. The examples given for each of the questions are provided to help the reviewer identify potential USQs. These examples are not meant to be examples of USQs, nor are they intended to be requirements.

1. Could the proposed change or discovery increase the probability of an accident previously evaluated in the approved safety analyses?

In answering this question, the first step is to determine what accidents, which have been evaluated in the previously approved safety analysis, may be affected by the proposed activity. A determination is made as to whether the likelihood of the accident occurring would be increased. The following examples may provide a useful approach in making this determination.

a. Will the proposed activity meet the design, material, and construction standards applicable to the system or equipment being modified? If the answer is "YES," this aspect of the proposed change is judged not to increase the likelihood of an accident occurring. If the answer is "NO" to any of the items, either a justification for saying there is no increase in the likelihood of the accident occurring will need to be developed, or it is concluded that the likelihood of the accident occurring is increased.

b. Will the proposed activity affect the overall system performance in a manner that could increase the probability of an accident? Examples of questions to ask are as follows:

   1. Will the proposed activity use instrumentation with accuracy or response characteristics that are different than existing instrumentation so an accident is more likely to occur?

   2. Will the proposed activity cause systems to be operated outside their design or testing limits? Examples include: imposing additional loads on electrical systems, operating a piping system at higher than normal pressure, and operating a motor outside of its rated voltage and amperage.

   3. Will the proposed activity cause system vibration or water hammer, fatigue, corrosion, thermal cycling, or degradation of the environment for equipment important to safety that would exceed the design limits?

   4. Will the proposed activity cause a change to any system interface in a way that would increase the likelihood of an accident?

If the proposed activity affects overall system performance in a manner that could lead to an accident or cause an accident previously evaluated to shift to a higher frequency category, then the issue would increase the probability of an accident previously evaluated in safety analyses.

2. Could the proposed change or discovery increase the consequences of an accident previously evaluated in safety analyses?

In answering this question, the first step is to determine which accidents evaluated in the safety analyses may have their radiological and hazardous material consequences altered as a direct result of the issue. The next step is to determine whether the issue does, in fact, increase the consequences of any of the accidents evaluated in the safety analyses. Examples of questions that assist in this determination are as follows:

a. Will the proposed activity change, degrade, or prevent actions described or assumed in the accident analyses?

b. Will the proposed activity alter any assumptions previously made in evaluating the radiological and hazardous material consequences in the accident analyses?

c. Will the proposed activity play a direct role in mitigating the radiological or hazardous material consequences assumed in the accident analysis?

d. Will the proposed activity affect any fission product or any radioactive or hazardous material barriers?

If it is determined that the issue does have an effect on the consequences of any accident analysis previously described in safety analyses, then the contractor should either:

a. Demonstrate and document that the safety consequences of the accident described in the safety analyses are bounding for the proposed activity (e.g., by showing that the results of the previous analyses bound those that would be associated with the issue), OR

b. Revise and document the analysis, taking into account the proposed activity and comparing the consequences to the consequences accepted by DOIE in the approved safety analyses.

3. Could the proposed change or discovery increase the probability of a malfunction of equipment important to safety previously evaluated in the safety analyses?

In answering this question, the first step is to determine what important to safety equipment could be impacted by the proposed activity. Then evaluate the effects of this activity on important to safety equipment. This evaluation should include both direct and indirect effects. Direct effects are those where the issue affects the equipment (e.g., a motor change on a pump). Indirect effects are those in which the issue impacts one piece of equipment, and this piece of equipment affects the important to safety equipment.

After identifying the impact of the issue on the important to safety equipment, a determination is made if an increase in the probability of a malfunction of the important to safety equipment has occurred. The following are examples of questions that can be used in making the determination.

a. Will the proposed activity meet the original design specifications for materials and construction practices when the following questions are considered:

   1. Are the seismic specifications met (e.g., use of proper supports, proper lugging at terminals, and isolation of lifted leads)?

   2. Are separation criteria met (e.g., minimum distance between circuits in separate divisions, channels in the same division, and jumpers run in conduit)?

   3. Are the environmental qualification criteria met (e.g., use of materials qualified for the radiation or thermal environment in which they will be used)?

b. Will the proposed activity degrade structure, system, or component (SSC) reliability by:

   1. Imposing additional loads not analyzed in the original design?

   2. Deleting or modifying system/equipment protection features?

   3. Downgrading the support system performance necessary for reliable operation of the important to safety equipment?

   4. Reducing system/equipment redundancy or independence?

   5. Increasing the frequency of operation of important to safety system/equipment?

   6. Imposing increased or more severe testing requirements on important to safety system/equipment?

If the issue adversely impacts the important to safety equipment, the likelihood of equipment malfunction may be increased. A "YES" answer to any question in (b) above does not mean that there is an impact on safety. However, it does indicate the existence of a potential USQ and the need for justification that the equipment can provide the intended safety function.

4. Could the proposed change or discovery increase the consequence of a malfunction of equipment important to safety previously evaluated in the safety analysis?

This question is asking whether, assuming a malfunction of important to safety equipment, the issue would result in increased hazardous material or radiological consequences. For example, consider a change such that a safety-related valve now fails in the closed position where previously it failed in the open position. If failing the valve in the closed position

results in an increase in consequences of an accident, then this is a change that increases the consequence of a malfunction of equipment important to safety.

5. Could the proposed change or discovery create the possibility of an accident of a different type than any previously evaluated in the safety analyses?

In answering this question, the first step is to determine the types of accidents that have been evaluated in the prior safety analyses. The types of credible accidents that the issue could create can then be identified. Comparing the two lists will determine the answer to the question.

6. Could the proposed change or discovery create the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the safety analyses?

This question asks whether the issue could lead to a failure mode of a different type than the types evaluated in previous safety analyses. In answering this question, the types of failure modes of important to safety equipment that have previously been evaluated in safety analyses affected by the issue are identified. The types of failure modes that the issue could create are then identified. Comparing the two lists can provide an answer to the question. An example that might create a malfunction of a different type could be the relocation of equipment so that it now becomes susceptible to flooding. Another might be replacement of a mechanical control system on equipment important to safety with a digital control system that can potentially fail in a different mode.

7. Does the proposed change or discovery reduce the margin of safety as defined in the basis for any technical safety requirements (TSRs)?

To answer this question, it is first necessary to determine whether a margin of safety as defined in the basis for any TSR is involved. To do this, the bass sections of all applicable TSR documents should be consulted. If a margin of safety is defined, or if any safety basis document defines a margin of safety that TSRs were derived from, then a margin of safety as defined is involved and the effects of the issue on the margin should be assessed. The margin may be implicitly or explicitly expressed as a numerical value.

To develop the definition of "margin of safety," it is necessary to define the relationship of operating points, acceptance limits, and actual failure points. Actual failure points are derived from parameters that result in the failure of an SSC to perform a specified function (e.g., the minimum temperature at which a pump it fails is an actual failure point). Acceptance limits are thresholds determined to be the "peak value" of worst-case calculated results. Operating points are standard operating parameters and are typically set lower than acceptance limits. A margin of safety defined in a TSR document may depend on a parameter other than one of the process variables. Examples of implicit margins are conditions of acceptance for a computer code, method, or industry-accepted practice.

In making the judgment on whether the margin is reduced, the decision should be based on physical parameters or conditions that can be observed or calculated. Where a change in margin is so small or there is no clear trend toward reduction of the margin, the change need not be considered a reduction in margin. A change in the margin of safety above the acceptance limit is the focus of the USQ process. For example, an increase in initial conditions (not already limited by TSRs) in the non-conservative direction can be compensated for by lowering a setpoint or reallocating analyses conservatism. If the analyses results continue to be bounded by the acceptance limit, a reduction of margin is not involved. (Refer to NSAC-125, *Guidelines for 10 CFR 50.59 Safety Evaluations*, dated June 1989, for additional guidance and examples.)

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R. C. Nelson	A5-17

ERC Team

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