



MURR
ADMINISTRATIVE PROCEDURE

AP-RR-003

10 CFR 50.59 EVALUATIONS

MASTER COPY
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A handwritten signature in black ink, appearing to read 'John Fruits', is written over a horizontal line.

Date 5-20-13

This procedure contains the following:

Pages	<u>1</u>	through	<u>14</u>
Attachments	<u>1</u>	through	<u>4</u>
Tables	<u>None</u>	through	<u> </u>
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10 CFR 50.59 EVALUATIONS

1.0 PURPOSE

This procedure establishes and maintains the program that satisfies the regulatory requirement for the performance and documentation of evaluations pursuant to 10 CFR 50.59.

2.0 SCOPE

10 CFR 50.59 establishes the conditions under which licensees may make *changes* to their *facility* or *procedures*, and conduct tests or experiments without prior NRC approval. Proposed *changes*, tests and experiments (hereafter referred to as activities) that satisfy the definitions and one or more of the criterion (see Attachment 9.4) in the rule must be reviewed and approved by the NRC prior to implementation. As such, 10 CFR 50.59 provides a threshold for regulatory review — not the final determination of safety — for proposed activities. The text of 10 CFR 50.59 is presented in Attachment 9.3.

2.1 The scope of this procedure applies to implementation of certain activities that affect the following:

- Changes to the *Hazards Summary Report (HSR)* including items incorporated by reference.
- Permanent and temporary design changes.
- Changes to MURR *procedures* that are outlined, summarized, or completely described in the *HSR*.
- *Tests or experiments not described in the HSR*.
- Revisions to NRC approved analysis methodology or assumptions as described in the *HSR*.
- Proposed compensatory actions to address *degraded* or non-conforming conditions.

2.2 The scope of this procedure does not apply to implementation of certain activities of the following systems, as determined by the Reactor Manager, to require additional consideration for 10 CFR 50.59 evaluation. These systems fall within the site boundary of MURR, however they do not impact the reactor or any reactor-related systems.

All items detailed in MURR Control Print Numbers:

- 2715, Sheets 1-3 Liquid Radioactive Waste Disposal & Waste Tank Pump Controls - North Office Addition
- 2720 Facility Air Supply - North Office Addition

2.0 SCOPE (CONT.)

- 2721 Vacuum Supply - North Office Addition
- 2722 Domestic Cold Water – North Office Addition (beginning on downstream side of Valve N-DCW-1)
- 2723 Domestic Hot Water & Domestic Hot Water Return – North Office Addition
- 2724 Deionized Water – North Office Addition
- 2725 Heat Recovery System – North Office Addition
- 2726, Sheets 1-2 Heating Water System – North Office Addition
- 2727 Chill Water System – North Office Addition
- 2742, Sheet 2 Argon System – North Office Addition
- 2755 AH-2 Supply Ventilation – North Office Addition
- 2756 Exhaust Ventilation – North Office Addition
- 522, Sheet 2 of 5 Electrical Distribution – North Office Additions (with the exception of any Emergency Power)

3.0 DEFINITIONS / ACRONYMS

- 3.1 50.59 Evaluation - A documented evaluation that is prepared using the eight criterion presented in 10 CFR 50.59(c)(2). This documented evaluation is performed to determine if a proposed *change*, test or experiment requires prior NRC approval by means of a license amendment pursuant to 10 CFR 50.90.
- 3.2 50.59 Screen - An assessment performed using established screening criteria to determine if an activity requires the preparation of a *10 CFR 50.59 Evaluation*.
- 3.3 Accident Previously Evaluated in the HSR - A design basis accident or event described in the *HSR* including accidents, such as those typically analyzed in Chapter 13 of the *HSR*, and transients and events the *facility* may be required to withstand such as floods, fires, tornadoes, earthquakes, or other external hazards.
- 3.4 Change - A modification or addition to, or removal from, the *facility* or *procedures* that affects: 1) a design function, 2) method of performing or controlling the function, or 3) an evaluation that demonstrates that intended functions will be accomplished.

3.0 DEFINITIONS / ACRONYMS (CONT.)

- 3.5 DBLFPB - *DBLFPB* is the acronym for "Design Basis Limits for Fission Product Barriers." 10 CFR 50.59 (c)(2)(vii) requires prior NRC approval any time a proposed *change* would exceed or alter a *DBLFPB*. Such a *change* must be processed as a license amendment to obtain prior NRC approval. Section 4.3.7 of NEI 96-07 (Reference 7.3) defines the *DBLFPBs* that are subject to control.
- 3.6 Degraded Condition - A condition of a structure, system, or component (*SSC*) in which there has been any loss of quality or functional capability.
- 3.7 Departure from a Method of Evaluation Described in the HSR - i) Changing any of the elements of the method described in the *HSR* (as updated) unless the results of the analysis are conservative or essentially the same; or ii) changing from a method described in the *HSR* to another method unless that method has been approved by NRC for the intended application.
- 3.8 Design Bases - That information which identifies the specific functions to be performed by a structure, system, or component (*SSC*) of a *facility* and the specific values or ranges of values chosen for controlling parameters as reference bounds for design. These values may be (1) restraints derived from generally accepted "state-of-the-art" practices for achieving functional goals, or (2) requirements derived from analysis (based on calculations and/or experiments) of the effects of a postulated accident for which an *SSC* must meet its functional goals.
- 3.9 Facility as Described in the HSR - means:
- Those structures, systems, and components (*SSC*) described in the *HSR* (as updated).
 - The design and performance requirements for such *SSCs* described in the *HSR* (as updated).
 - The evaluations (or method of evaluations) included in the *HSR* (as updated) for such *SSCs*, which demonstrate that their intended function(s) will be accomplished.
- 3.10 Failure Modes and Effects Analysis (FMEA) - An analysis that evaluates the failure mode(s) of an *SSC* to determine if the resultant effect (i.e., consequence) of the failure is acceptable. A *FMEA* is typically performed for modifications made to the Reactor Protective System or Engineered Safety Features to determine if the modification will introduce a new failure mode that has not been previously analyzed.

3.0 DEFINITIONS / ACRONYMS (CONT.)

3.11 FSAR/HSR - *FSAR* is the acronym for “*Final Safety Analysis Report*.” For commercial power reactors, the *FSAR* includes information that describes the *facility*, presents the *design bases* and the limits on its operation. It also presents a safety analysis of the *facility’s SSCs*.

HSR is the acronym for “*Hazards Summary Report*.” The complete *HSR* document consists of the original report and its five (5) individual addendum. For research and test reactors, the *HSR* includes information that describes the *facility*, presents the *design bases* and the limits on its operation. It also presents a safety analysis of the *facility’s SSCs*.

<p>NOTE: The revised 10 CFR 50.59 rule uses the term <i>FSAR</i>. <i>FSAR</i> as used in the rule and elsewhere in this procedure is synonymous with the University of Missouri’s <i>Hazard Summary Report (HSR)</i>.</p>
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3.12 Input Parameters - Those values derived directly from the physical characteristics of *SSC* or processes in the *facility*, including flow rates, temperatures, pressures, dimensions or measurements (e.g., volume, weight, size, etc.), and system or component response times.

3.13 Malfunction of an SSC Important to Safety - The failure of an *SSC* to perform its intended design basis function(s) as described in the *HSR*.

3.14 Methods of Evaluation - means the calculational framework used for evaluating behavior or response of the *facility* or an *SSC*.

3.15 Nonconforming Condition - A condition of an *SSC* in which there is failure to meet requirements or licensee commitments. Some examples of *nonconforming* conditions include the following:

- A failure to conform to one or more applicable codes or standards specified in the *HSR*.
- “As-Built” equipment, or “As-Modified” equipment, is not consistent with how they are described in the *HSR*.
- Operating experience or engineering reviews demonstrate a design inadequacy.

3.16 Procedures as Described in the HSR - Those *procedures* that contain information described in the *HSR* (as updated). The *procedures* establish how *SSCs* are operated, controlled, maintained, and tested. The various types of *procedures* are identified in Section 10.7 and Chapter 11.0 of the *HSR*, and Section 6.1 of the MURR Technical Specifications.

3.0 DEFINITIONS / ACRONYMS (CONT.)

3.17 Safety Analyses - Analyses performed pursuant to NRC requirements to demonstrate the integrity of the primary coolant pressure boundary, the capability to shut down the reactor and maintain it in a safe shutdown condition, or the capability to prevent or mitigate the consequences of accidents that could result in potential offsite dose exposures. *Safety analyses* are presented in Chapter 13 of the *HSR*.

3.18 SSC - Nuclear industry acronym for “structures, systems, and components.”

3.19 Tests or Experiments Not Described in the HSR - Any activity where any structure, system, or component is utilized or controlled in a manner which is either:

- Outside the reference bounds of the *design bases* as described in the *HSR*, or
- Inconsistent with the analyses or descriptions presented in the *HSR*.

4.0 RESPONSIBILITIES

4.1 Associate Director of Reactor & Facilities

4.1.1 Overall implementation of this procedure as applicable to the activities performed at MURR.

4.2 Reactor Advisory Committee

4.2.1 Review of all 10 CFR 50.59 *Evaluations* in accordance with MURR Technical Specifications 6.1.c.(1) and 6.1.c.(2).

4.3 Reactor Manager

4.3.1 Reviews and approves all 10 CFR 50.59 *Screens and Evaluations*.

4.3.2 Transmits completed 50.59 *Evaluations* to records storage (i.e., document control center).

4.3.3 Compiles and submits the annual 50.59 Report to the Nuclear Regulatory Commission in accordance with the MURR Technical Specifications.

4.3.4 Ensures 10 CFR 50.59 review process initial training and recurrent training of designated personnel is performed and documented.

4.3.5 Ensures that personnel who are responsible for reviewing 50.59 *Screens* and 50.59 *Evaluations* meet established qualification requirements.

4.3.6 Maintains 10 CFR 50.59 review process training records for each qualified Reviewer.

4.0 RESPONSIBILITIES (CONT.)

4.4 Preparers

- 4.4.1 Ensure that *50.59 Screen/50.59 Evaluation* forms are performed and completed in accordance with this procedure.
- 4.4.2 Have adequate expertise in the technical or administrative matters related to the activity being reviewed or obtain necessary assistance. [Refer to Section 5.1]

4.5 Reviewers

- 4.5.1 Maintain qualification for performing a *50.59 Screen/50.59 Evaluation*.
- 4.5.2 Ensure that *50.59 Screen/50.59 Evaluation* forms are performed and completed in accordance with this procedure.
- 4.5.3 Have adequate expertise in the technical or administrative matters related to the activity being reviewed or obtain necessary assistance. [Refer to Section 5.1]
- 4.5.4 Verify that the results and conclusions of the *50.59 Screen/50.59 Evaluation* being performed are correct, and that sufficient justification exists to support the results and conclusions.

5.0 PRECAUTIONS AND LIMITATIONS

- 5.1 When the scope of the *50.59 Screen* or *50.59 Evaluation* extends beyond the expertise of the Preparer or Reviewer, the Preparer or Reviewer shall obtain assistance from other knowledgeable qualified personnel.
- 5.2 Any activity addressed by the scope of this procedure that requires a *50.59 Screen* shall not be approved for implementation until the *50.59 Screen* is completed.
- 5.3 Any activity requiring a *50.59 Evaluation* shall not be approved for implementation until the Reactor Manager concludes that the activity does not require prior NRC approval and approves the *50.59 Evaluation*.
- 5.4 Any activity that requires prior NRC approval or requires a change to the MURR Technical Specifications shall not be approved for implementation until NRC approval has been obtained by processing the activity as a license amendment (Reference 7.7).

6.0 PROCEDURE

6.1 GENERAL GUIDANCE

- 6.1.1 NRC Regulatory Guide 1.187 (Reference 7.2) endorses NEI 96-07 (Reference 7.3). Paragraph C.5 of NRC Regulatory Guide 1.187 specifically discusses the applicability of NEI 96-07 to non-power reactors. NEI 96-07 provides explicit guidance relative to performing *50.59 Screens* and *50.59 Evaluations*.
- 6.1.2 Figure 10.1, “10 CFR 50.59 Process Flowchart” presents an overview of the process that can be referred to during the implementation of this procedure.
- 6.1.3 *Nonconforming or Degraded Conditions*

<p>NOTE: When resolving <i>nonconforming</i> or <i>degraded</i> conditions, the need to obtain NRC approval for a proposed activity does <u>not</u> affect the University of Missouri’s authority to operate the <i>facility</i>. MURR may make reactor operating mode changes, restart from outages, etc., provided that necessary <i>SSCs</i> are operable and the <i>nonconforming</i> or <i>degraded</i> condition is <u>not</u> in conflict with the MURR Technical Specifications or Operating License.</p>
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- 6.1.3.1 Three (3) general courses of action are available to address *nonconforming* or *degraded* conditions. Whether or not 10 CFR 50.59 must be applied, and the focus of a 10 CFR *50.59 Evaluation* if one is required, depends on the corrective action plan chosen by MURR. The three (3) general courses of action are as follows:
- If MURR elects to restore the *SSC* to its “as-designed” condition, then this corrective action should be performed in a timely manner commensurate with the degree of reactor safety that corresponds to the *nonconforming* or *degraded* condition. This activity is not subject to the requirements of 10 CFR 50.59.
 - If an interim compensatory action is taken to address the *nonconforming* or *degraded* condition and involves a temporary *procedure* change or temporary *facility* change, 10 CFR 50.59 requirements must be applied to the temporary *procedure* change or temporary *facility* change. The intent is to determine whether the temporary change/compensatory action itself (not the *nonconforming degraded* condition) impacts other aspects of the *facility* or *procedures* described in the *HSR*. When considering whether a temporary change impacts other aspects of the *facility*, particular attention should be paid to ancillary aspects of the temporary change that result from actions taken to directly compensate for the *nonconforming* or *degraded* condition.

6.0 PROCEDURE (CONT.)

- If the MURR corrective action is either: 1) accept the condition “as-is” which results in something different than the “as-designed” condition, or 2) change the *facility or procedures*, the requirements 10 CFR 50.59 must be applied to the corrective action. For these cases, the final corrective action becomes the proposed change that would be subject to 10 CFR 50.59 requirements.

6.2 QUALIFICATIONS

- 6.2.1 Reviewers of *50.59 Screens / Evaluations* shall have successfully completed 10 CFR *50.59 evaluation* process training and shall be competent in technical and administrative matters related to the activity being evaluated. Document training of FM-34, “MURR Training Documentation Form.”
- 6.2.2 Reviewers must complete recurrent 10 CFR 50.59 training on a biennial basis to refresh or enhance their knowledge of the *50.59 Screen/Evaluation* processes. Document training of FM-34, “MURR Training Documentation Form.”
- 6.2.3 Training records shall be maintained for those individuals who have successfully completed the required training and certification.

6.3 OVERALL SAFETY OF PROPOSED ACTIVITIES

- 6.3.1 10 CFR 50.59 provides a threshold solely for regulatory review for proposed activities. It is not a determination of safety as it relates to a proposed activity. The determination that a proposed activity is safe from the perspectives of occupational and radiation safety, and equipment protection, should be made by means of applicable safety procedures. Safety concerns to consider may include, but are not limited to the following:
- Occupational safety issues
 - Increases in worker dose rates
 - Increases in dose rates or contamination levels
 - Expansion of contaminated areas
 - Unnecessary challenges to *facility* equipment
- 6.3.3 If there is a safety concern immediately identify and report the concern in accordance with applicable safety procedures.

6.0 PROCEDURE (CONT.)

6.4 APPLICABILITY DETERMINATION

- 6.4.1 If it is recognized that the proposed activity requires a change to the Technical Specifications, a license amendment in accordance with 10 CFR 50.90 must be submitted to and approved by the NRC. Do not continue with this procedure and inform the Reactor Manager.
- 6.4.2 Section 2.1 of this procedure identifies those activities that must be evaluated in accordance with 10 CFR 50.59. Section (c)(4) of the rule (see Attachment 9.3) specifically excludes from the scope of 10 CFR 50.59, changes to the *facility* or *procedures* that are controlled by other more specific requirements and criteria established by regulation. For example, 10 CFR 50.54 (q) specifies criteria and reporting requirements for changing MURR's Emergency Plan, therefore, 10 CFR 50.59 is not applicable. Also, any change made to the administrative aspects of MURR's Security Plan is not subject to the requirements of 10 CFR 50.59. Changes to the administrative aspects of MURR's Security Plan must be performed in accordance with 10 CFR 50.54, Section (p). However, a proposed change to *facility* hardware that is credited in the Security Plan may be subject to the requirements of 10 CFR 50.59.
- 6.4.3 If the proposed activity is controlled by other more specific requirements and criteria established by regulation, do not continue with this procedure and inform the Reactor Manager.
- 6.4.4 For those activities identified in Section 2.1 of this procedure, the activity will require the performance of a *50.59 Screen* and possibly a *50.59 Evaluation*.

6.5 50.59 SCREEN

- 6.5.1 If required by Step 6.4.4 above, complete a *50.59 Screen* in accordance with Attachment 9.1.
- 6.5.2 Obtain a *50.59 Screen* number from Document Control (DC).
- 6.5.3 If the overall conclusion of the *50.59 Screen* is that a *50.59 Evaluation* is not required, the Preparer shall provide a written justification to support this conclusion. The documented justification must contain sufficient detail. Sufficient detail is necessary to ensure that a qualified Reviewer knowledgeable in the subject area can recognize and understand the essential argument leading to the conclusion reached by the Preparer.
- 6.5.4 The Preparer should list the documents (licensing basis/technical/other) reviewed and used to prepare the *50.59 Screen*, including section numbers where the relevant information is located.

6.0 PROCEDURE (CONT.)

- 6.5.5 The Preparer shall sign and date the completed *50.59 Screen* and forward the Screen to a qualified Reviewer for review and concurrence.
- 6.5.6 Following the resolution of all comments/questions, the Reviewer shall sign and date the *50.59 Screen* so as to document concurrence with the results, as well as the adequacy of the results written justification.
- 6.5.7 The Reactor Manager shall sign and date the completed *50.59 Screen* to document his concurrence and approval.
- 6.5.8 If the results of the *50.59 Screen* indicate that the activity does not require the performance of a *50.59 Evaluation*, then the completed *50.59 Screen* should be routed along with the documentation associated with the proposed activity that was screened.
- 6.5.9 If a *50.59 Evaluation* is required, then the Preparer will prepare the *50.59 Evaluation* in accordance with the requirements and criteria identified in Attachment 9.2.

6.6 50.59 EVALUATION

- 6.6.1 If required by Section 6.5.8 above, a knowledgeable Preparer shall complete a *50.59 Evaluation* in accordance with Attachment 9.2. The purpose of the *50.59 Evaluation* is to determine if the proposed activity requires prior NRC approval by means of an applicable license amendment.
- 6.6.2 Obtain a *50.59 Evaluation* number from DC.
- 6.6.3 Attachment 9.4, "Eight Criterion of a 10 CFR 50.59 Evaluation--Guidance and Example Responses," as well as NEI 96-07 (Reference 7.3), present specific guidance with respect to preparing a response to each of the eight (8) criterion that must be addressed in a *50.59 Evaluation*.
- 6.6.4 The Preparer shall complete a separate written response to each of the questions on the *50.59 Evaluation* Form. Each response must include a sufficient discussion to support each individual conclusion reached.
- 6.6.5 The Preparer shall sign and date the completed *50.59 Evaluation* and forward it to a qualified Reviewer for review and approval.
- 6.6.6 Following the resolution of all comments/questions, the Reviewer shall sign and date the *50.59 Evaluation* so as to document concurrence with the results, as well as the adequacy of the written justification that support each of the eight (8) individual conclusions reached.

6.0 PROCEDURE (CONT.)

- 6.6.7 The Reactor Manager shall sign and date the completed *50.59 Evaluation* to document his concurrence and approval.
- 6.6.8 The Reactor Manager shall ensure that the *50.59 Evaluation* is subsequently reviewed by the Reactor Advisory Committee or Reactor Safety Subcommittee (Reference 7.8).
- 6.6.9 The Preparer shall initiate a change to the *HSR* if the effect of the *50.59 Evaluation* meets one or more of the following criteria:
- The existing information in the *HSR* (e.g., *design bases*, *safety analyses*, or descriptions of existing structures, systems, components (*SSCs*) or their function) is no longer correct or accurate and, therefore, needs to be revised,
 - *SSCs* described in the *HSR* are being removed,
 - functions or *procedures* described in the *HSR* are eliminated, or
 - a new (or revised) design basis or safety analysis (or their associated description) is being created.

<p>NOTE: A revised <i>50.59 Evaluation</i> is subject to the same review and approval process as an initial <i>50.59 Evaluation</i>.</p>

- 6.6.10 If a revision to a previously approved *50.59 Evaluation* is required, the Preparer must document the revision number on the *50.59 Evaluation*. The Preparer must also place vertical change bars and the revision number in the margins where changes were made.
- 6.6.11 If the *50.59 Evaluation* for a previous activity remains applicable and valid for a current activity, then the Preparer may reference the previous *50.59 Evaluation* on the *50.59 Screen* for the current activity in lieu of preparing a new *50.59 Evaluation*.

6.7 NRC REQUIRED REPORTS

- 6.7.1 The annual report required by the MURR Technical Specifications shall be submitted to the NRC describing the 10 CFR *50.59 Evaluations* performed for those activities completed during the reporting period.

7.0 REFERENCES

- 7.1 10 CFR 50.59, "Changes, Tests and Experiments"
- 7.2 NRC Regulatory Guide 1.187, "Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments," October 2000
- 7.3 NEI 96-07, Revision 1, "Guidelines for 10 CFR 50.59 Evaluations," November 2000
- 7.4 ANSI/ANS-15.21-1996, "Format and Content for Safety Analysis Reports for Research Reactors"
- 7.5 NUREG - 1537, Part 1, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors - Format and Content," February 1996
- 7.6 NUREG - 1537, Part 2, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors - Standard Review Plan and Acceptance Criteria," February 1996
- 7.7 10 CFR 50.90, "Application for Amendment, of License or Construction Permit"
- 7.8 MURR Administrative Technical Specifications 6.1.c(1) and 6.1.c(2). |

8.0 RECORDS

- 8.1 Completed *50.59 Screens* and *50.59 Evaluations* must be filed with their associated activity and transmitted to DC. Records shall be retained for the life of the *facility*.

9.0 ATTACHMENTS

- 9.1 50.59 Screen
- 9.2 50.59 Evaluation
- 9.3 Text of 10 CFR 50.59
- 9.4 Eight Criterion of a 10 CFR 50.59 Evaluation – Guidance and Examples

10.0 FIGURES

- 10.1 10 CFR 50.59 Process Flowchart

50.59 SCREEN

Number: _____

Page 1 of _____

Title: _____

Description of Activity (*what is being changed and why*): _____

Safety Determination:

Does the proposed activity have the potential to adversely affect nuclear safety or safe *facility* (i.e., MURR) operations? _____
YES _____
NO

If this question is answered yes, do not continue with this procedure. Identify and report the concern to the Reactor Manager.

50.59 Screening Questions:

1. Does the proposed activity involve a change to an *SSC* that adversely affects a *design function* described in the *HSR*? _____
YES _____
NO
2. Does the proposed activity involve a change to a *procedure* that adversely affects how *HSR* described *SSC* design functions are performed, controlled, or tested? _____
YES _____
NO
3. Does the proposed activity involve revising or replacing an *HSR* described evaluation methodology that is used in establishing the *design bases* or used in the *safety analyses*? _____
YES _____
NO
4. Does the proposed activity involve a *test or experiment not described in the HSR*, where an *SSC* is utilized or controlled in a manner that is outside the reference bounds of the design for that *SSC* or is inconsistent with analyses or descriptions in the *HSR*? _____
YES _____
NO
5. Does the proposed activity require a change to the MURR Technical Specifications? _____
YES _____
NO

If all screening questions are answered NO, then implement the activity per the applicable approved *facility procedure(s)*. A License Amendment or a *50.59 Evaluation* is not required.

If Screen Question 5 is answered YES, then request and receive a License Amendment prior to implementation of the activity.

If Screen Question 5 is answered NO and Question 1, 2, 3, or 4 is answered YES, then complete and attach a *50.59 Evaluation* form. [Refer to Attachment 9.2.]

NOTE: If the conclusion of the screening questions is that a *50.59 Evaluation* is not required, provide justification for the “No” determination. In addition, list the documents (*HSR*, Technical Specifications, and other Licensing Basis documents) reviewed where relevant information was found. Include section / page numbers. Use Page 2 of this form to document your statements.

	Print Name	Sign Name	Date
Preparer:			
Reviewer:			
Reactor Manager:			
Submit copy of screen to HSR / SAR file (circle one)? Yes / No			

50.59 SCREEN (Cont.)

Number: _____

Page 2 of _____

Title: _____

If the conclusion of the five (5) Screening Questions is that a *50.59 Evaluation* is not required, provide justification to support this determination: [Use and attach additional pages as necessary.]

1. Does the proposed activity involve a change to an *SSC* that adversely affects a *design function* described in the *HSR*?

2. Does the proposed activity involve a change to a *procedure* that adversely affects how *HSR* described *SSC* design functions are performed, controlled, or tested?

3. Does the proposed activity involve revising or replacing an *HSR* described evaluation methodology that is used in establishing the *design bases* or used in the *safety analyses*?

4. Does the proposed activity involve a *test or experiment not described in the HSR*, where an *SSC* is used or controlled in a manner that is outside the reference bounds of the design for that *SSC*, or is inconsistent with analyses or descriptions presented in the *HSR*?

List the documents (*HSR*, Technical Specifications, and other Licensing Basis documents) reviewed where relevant information was found. [Include section / page numbers.]

50.59 EVALUATION

Number: _____

Rev. No.: _____

Page 1 of _____

Title: _____

A separate written response providing the basis for the answer to each question below must accompany this form. Identify references used to perform the Evaluation. [Include Section / Page Nos.]

EFFECT ON ACCIDENTS AND MALFUNCTIONS PREVIOUSLY EVALUATED IN THE HSR

1. Does the proposed activity result in more than a minimal increase in the frequency of occurrence of an *accident previously evaluated in the HSR*? _____ YES _____ NO
2. Does the proposed activity result in more than a minimal increase in the likelihood of occurrence of a *malfunction of an SSC important to safety* previously evaluated in the *HSR*? _____ YES _____ NO
3. Does the proposed activity result in more than a minimal increase in the consequences of an *accident previously evaluated in the HSR*? _____ YES _____ NO
4. Does the proposed activity result in more than a minimal increase in the consequences of a *malfunction of an SSC important to safety* previously evaluated in the *HSR*? _____ YES _____ NO

POTENTIAL FOR CREATION OF A NEW TYPE OF EVENT NOT PREVIOUSLY EVALUATED IN THE HSR

5. Does the proposed activity create a possibility for an accident of a different type than any previously evaluated in the *HSR*? _____ YES _____ NO
6. Does the proposed activity create a possibility for a *malfunction of an SSC important to safety* with a different result than any previously evaluated in *HSR*? _____ YES _____ NO

IMPACT ON FISSION PRODUCT BARRIERS AS DESCRIBED IN THE HSR

7. Does the proposed activity result in a design basis limit for a fission product barrier as described in the *HSR* being altered or exceeded? _____ YES _____ NO

IMPACT ON EVALUATION METHODOLOGIES DESCRIBED IN THE HSR

8. Does the proposed activity result in a *departure from a method of evaluation* used to establish any design basis or any safety analysis *described in the HSR*? _____ YES _____ NO

If the answer to any of the 50.59 questions is "YES", then the proposed activity may not be implemented until a License Amendment has been obtained from the NRC.

	Print Name	Sign Name	Date
Preparer:			
Reviewer:			
Reactor Manager:			

Date of Review - Reactor Advisory Committee / Reactor Safety Subcommittee: _____

Text of 10 CFR 50.59

§50.59--Changes, tests, and experiments.

(a) Definitions for the purposes of this section:

(1) *Change* means a modification or addition to, or removal from, the *facility* or *procedures* that affects a design function, method of performing or controlling the function, or an evaluation that demonstrates that intended functions will be accomplished.

(2) *Departure from a method of evaluation described in the FSAR (as updated) used in establishing the design bases or in the safety analyses* means:

(i) Changing any of the elements of the method described in the *FSAR* (as updated) unless the results of the analysis are conservative or essentially the same; or

(ii) Changing from a method described in the *FSAR* to another method unless that method has been approved by NRC for the intended application.

(3) *Facility as described in the final safety analysis report (as updated)* means:

(i) The structures, systems, and components (*SSC*) that are described in the *final safety analysis report (FSAR)* (as updated),

(ii) The design and performance requirements for such *SSCs* described in the *FSAR* (as updated), and

(iii) The evaluations or *methods of evaluation* included in the *FSAR* (as updated) for such *SSCs* which demonstrate that their intended function(s) will be accomplished.

(4) *Final Safety Analysis Report (as updated)* means the *Final Safety Analysis Report* (or *Final Hazards Summary Report*) submitted in accordance with §50.34, as amended and supplemented, and as updated per the requirements of §50.71(e) or §50.71(f), as applicable.

(5) *Procedures as described in the final safety analysis report (as updated)* means those *procedures* that contain information described in the *FSAR* (as updated) such as how structures, systems, and components are operated and controlled (including assumed operator actions and response times).

(6) *Tests or experiments not described in the final safety analysis report (as updated)* means any activity where any structure, system, or component is utilized or controlled in a manner which is either:

(i) Outside the reference bounds of the *design bases* as described in the *final safety analysis report* (as updated) or

Text of 10 CFR 50.59 (Cont.)

(ii) Inconsistent with the analyses or descriptions in the *final safety analysis report* (as updated).

(b) Applicability. This section applies to each holder of a license authorizing operation of a production or utilization *facility*, including the holder of a license authorizing operation of a nuclear power reactor that has submitted the certification of permanent cessation of operations required under §50.82(a)(1) or a reactor licensee whose license has been amended to allow possession but not operation of the *facility*.

(c)(1) A licensee may make changes in the *facility* as described in the *final safety analysis report* (as updated), make changes in the *procedures* as described in the *final safety analysis report* (as updated), and conduct *tests or experiments not described in the final safety analysis report* (as updated) without obtaining a license amendment pursuant to §50.90 only if:

(i) A change to the technical specifications incorporated in the license is not required, and

(ii) The *change*, test, or experiment does not meet any of the criteria in paragraph (c)(2) of this section.

(2) A licensee shall obtain a license amendment pursuant to §50.90 prior to implementing a proposed *change*, test, or experiment if the *change*, test, or experiment would:

(i) Result in more than a minimal increase in the frequency of occurrence of an *accident previously evaluated in the final safety analysis report* (as updated);

(ii) Result in more than a minimal increase in the likelihood of occurrence of a *malfunction of a structure, system, or component (SSC) important to safety* previously evaluated in the *final safety analysis report* (as updated);

(iii) Result in more than a minimal increase in the consequences of an *accident previously evaluated in the final safety analysis report* (as updated);

(iv) Result in more than a minimal increase in the consequences of a *malfunction of an SSC important to safety* previously evaluated in the *final safety analysis report* (as updated);

(v) Create a possibility for an *accident* of a different type than any *previously evaluated in the final safety analysis report* (as updated);

(vi) Create a possibility for a *malfunction of an SSC important to safety* with a different result than any previously evaluated in the *final safety analysis report* (as updated);

(vii) Result in a design basis limit for a fission product barrier as described in the *FSAR* (as updated) being exceeded or altered; or

Text of 10 CFR 50.59 (Cont.)

(viii) Result in a *departure from a method of evaluation described in the FSAR* (as updated) used in establishing the *design bases* or in the *safety analyses*.

(3) In implementing this paragraph, the *FSAR* (as updated) is considered to include *FSAR* changes resulting from evaluations performed pursuant to this section and analyses performed pursuant to §50.90 since submittal of the last update of the *final safety analysis report* pursuant to §50.71 of this part.

(4) The provisions in this section do not apply to changes to the *facility* or *procedures* when the applicable regulations establish more specific criteria for accomplishing such changes.

(d)(1) The licensee shall maintain records of changes in the *facility*, of changes in *procedures*, and of tests and experiments made pursuant to paragraph (c) of this section. These records must include a written evaluation which provides the bases for the determination that the *change*, test, or experiment does not require a license amendment pursuant to paragraph (c)(2) of this section.

(2) The licensee shall submit, as specified in §50.4, a report containing a brief description of any *changes*, tests, and experiments, including a summary of the evaluation of each. A report must be submitted at intervals not to exceed 24 months.

(3) The records of changes in the *facility* must be maintained until the termination of a license issued pursuant to this part or the termination of a license issued pursuant to 10 CFR Part 54, whichever is later. Records of changes in *procedures* and records of tests and experiments must be maintained for a period of 5 years.

EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION GUIDANCE AND EXAMPLE RESPONSES

1. Criterion (i): Does the proposed activity result in more than a minimal increase in the frequency of occurrence of an *accident previously evaluated in the HSR*?

Discussion of Intent

NRC approval is required if the *change* results in more than a minimal increase in the frequency of occurrence of an *accident previously evaluated in the HSR*. In answering this question, the first step is to identify the accidents that have been evaluated in Section 13.0 of the *HSR* that are affected by the proposed activity. Then a determination should be made as to whether the frequency of these accidents occurring would be more than minimally increased.

Evaluation Process

Review the proposed activity to identify any accidents that have the potential to be initiated by the installation, testing, and/or operation of this activity.

Review the types of *accidents evaluated in the HSR* and the regulatory basis for the accidents addressed in the *HSR*.

Based on the above, does the potential exist that the frequency of occurrence of any accident could be affected by this activity?

If the answer to the above question identifies that there is no (or a minimal) effect upon the frequency of occurrence of any accidents, the response should state this conclusion and the basis of the conclusion.

If the review to this point has quantified the frequency of increase and determines that the activity could cause the frequency of occurrence of one or more of these accidents to result in an increase in frequency of occurrence of 10% or more, NRC approval is required to implement this activity.

If the review to this point determines that the activity could cause the frequency of occurrence of one or more of these accidents to change from one frequency class to a more frequent class, NRC approval is required to implement this activity.

Recommended Explanation

The following information should be provided to document the conclusion regarding the potential for affecting the frequency of occurrence of accidents.

A listing (or reference to a listing) of those accidents whose frequency of occurrence is affected (positively and/or negatively) by this activity.

EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION GUIDANCE AND EXAMPLE RESPONSES (CONT.)

Explain how and why the change in frequency of occurrence of accidents is either beneficial or minimal.

Provide a brief discussion, or reference to an engineering analysis, describing the magnitude (either qualitatively or quantitatively) of the change in frequency of the identified accidents.

Example Responses

If the review identifies that there is no increase in the frequency of occurrence of an accident:

The [describe the activity] does not introduce the possibility of a change in the frequency of an accident because the [activity or SSC description] is not an initiator of any accident and no new failure modes are introduced. [Depending on the complexity of the activity, provide further justification for why the *change/activity* does not introduce new failure modes or causes changes in accident(s) frequency.]

If the review identifies new failure modes or minimal increase in the frequency of accidents:

The [describe or reference the applicable accidents] are the only accidents that are (or may be) credibly affected as a result of [describe the activity.] The frequency of these events are currently analyzed for [describe the conditions and or reactor operating mode(s)]. This conservatively bounds the other [describe the conditions and or reactor operating mode(s)].

This [describe the *change/activity*] does not physically alter any equipment, system performance, or operator actions that could affect [describe the applicable accident(s)] such that the current *HSR* analyses remain bounding [or describe how there is only a minimal change in the frequency of occurrence] for the reactor operating modes/conditions for which [describe applicable accident(s)] is applicable.

[Provide further justification for why the *change/activity* is bounded by present analyses or how and why the change in frequency of occurrence should be considered minimal. Include references to applicable (supporting) engineering analyses and/or technical evaluations.]

When changes to the HSR are required:

The following changes to the *HSR* will assure that the above assumptions are, and continue to be, complied with. [Provide detailed description of required *HSR* changes and/or references to marked up (pen-and-ink/red-line) *HSR* pages needed to assure compliance with any new assumptions that assure minimal changes in the likelihood of occurrence.]

In summary, there is no [only a minimal] increase in the frequency of occurrence of accidents.

**EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION
GUIDANCE AND EXAMPLE RESPONSES (CONT.)**

- 2. Criterion (ii): Does the proposed activity result in more than a minimal increase in the likelihood of occurrence of a malfunction of an SSC important to safety previously evaluated in the HSR?**

Discussion of Intent

The term "*malfunction of an SSC important to safety*" refers to the failure of structures, systems and components (SSCs) to perform their intended design functions. The cause and mode of a malfunction should be considered in determining whether there is a change in the likelihood of a malfunction. The effect or result of a malfunction should be considered in determining whether a malfunction with a different result is involved.

In determining whether there is more than a minimal increase in the likelihood of occurrence of a malfunction of an SSC to perform its design function as described in the *HSR*, the first step is to determine what SSCs are affected by the proposed activity. Next, the effects of the proposed activity on the affected SSCs should be determined. This evaluation should include both direct and indirect effects.

Evaluation Process

Review the proposed activity to identify any malfunctions that have the potential to be initiated following implementation of this activity.

Review the types of malfunctions evaluated in the *HSR* and the regulatory basis for the accidents addressed in the *HSR*.

Based on the above, does the potential exist that the likelihood of occurrence of any malfunctions could be affected by this activity?

If the review to this point identifies that there is no (or a minimal) effect upon the likelihood of occurrence of any malfunctions, the response should state this conclusion and the basis for the conclusion.

If the review to this point has quantified the likelihood of occurrence and determines that the activity could cause one or more of these malfunctions to result in a factor of two (2) increase in likelihood of occurrence, NRC approval is required to implement this activity.

EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION GUIDANCE AND EXAMPLE RESPONSES (CONT.)

Recommended Explanation

The following information should be provided to document the conclusion about the potential for affecting the likelihood of occurrence of malfunctions.

A listing (or reference to a listing) of those malfunctions of *SSCs* whose likelihood of occurrence is affected (positively and/or negatively) by this activity.

Explain how and why the change in likelihood of occurrence of malfunctions is either beneficial or minimal.

Provide a brief discussion, or reference to an engineering analysis, describing the magnitude (either qualitatively or quantitatively) of the change in likelihood of occurrence of the identified accidents.

Example Responses

If the review identifies that there is no increase in the likelihood of occurrence of a malfunction:

The [describe the activity] does not introduce the possibility of a change in the likelihood of a malfunction because the [activity or *SSC* description] is not an initiator of any new malfunctions and no new failure modes are introduced. [Depending on the complexity of the activity provide further justification for why the *change/activity* does not introduce new failure modes or causes changes in the likelihood of malfunction(s).]

If the review identifies new failure modes or minimal increase in the likelihood of occurrence of malfunctions:

The [describe or reference the applicable malfunctions] are the only malfunctions that could credibly occur as a result of [describe the activity.] The likelihood of these events is currently analyzed for [describe the conditions and or reactor operating mode(s)]. This conservatively bounds the other [describe the conditions and or reactor operating mode(s)].

This [describe the *change/activity*] does not physically alter any equipment, system performance, or operator actions that could affect [describe the applicable malfunction(s)] such that the current *HSR* analyses remain bounding [or describe how there is only a minimal change in the likelihood of occurrence] for the reactor operating modes/conditions for which [describe applicable malfunction(s)] is applicable.

[Provide further justification for why the *change/activity* is bounded by present analyses or how and why the change in likelihood of occurrence should be considered minimal. Include references to applicable (supporting) engineering analyses and/or technical evaluations.]

EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION GUIDANCE AND EXAMPLE RESPONSES (CONT.)

When Changes to the HSR are required:

The following changes to the *HSR* will assure that the above assumptions are, and continue to be, complied with. [Provide detailed description of required *HSR* changes and/or references to marked up (pen-and-ink/red-line) *HSR* pages needed to assure compliance with any new assumptions that assure minimal changes in the likelihood of occurrence.]

In summary, there is no [only a minimal] increase in the likelihood of occurrence of any malfunction.

3. Criterion (iii): Does the proposed activity result in more than a minimal increase in the consequences of an *accident previously evaluated in the HSR*?

Discussion of Intent

During the design phase of the *facility*, protection of the health and safety of the public is ensured through the design of engineered safety features and protection of physical barriers to guard against the uncontrolled release of radioactivity. These physical barriers are the fuel cladding, the primary coolant system pressure boundary, and the containment.

The *HSR* accident analyses demonstrate that under assumed accident conditions, the radiological consequences of those accidents that challenge the integrity of the barriers will not exceed the guideline values specified in the Code of Federal Regulations. The *HSR* analyses provide the final verification of the nuclear safety design phase by documenting *facility* performance in terms of protection of the public from uncontrolled releases of radioactivity.

Evaluation Process

The Preparer must first identify which *SSCs* could be affected by the proposed activity, and then determine which *SSCs* or system parameters are relevant to the discussion of accidents contained in the *HSR*. The Preparer must make a judgment about the affect of the proposed *change* on the radiological consequences of the accident.

- 1) Review the proposed activity to identify any accidents that have the potential to be initiated by the installation, testing, and/or operation of this activity.
- 2) Review the types of *accidents evaluated in the HSR* and the regulatory basis for the accidents considered in the *HSR*. This may include a review of References 7.5, 7.6, and 7.7.

**EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION
GUIDANCE AND EXAMPLE RESPONSES (CONT.)**

- 3) Determine which *accidents evaluated in the HSR* may have their radiological consequences altered as a result of the proposed activity. Potential interfaces (both direct and indirect) with *SSCs* important to safety should be included.
- 4) Determine if the proposed activity does, in fact, increase the radiological consequences of any of the *accidents evaluated in the HSR*. Examples of questions that assist in this determination are:
 - a) Will the proposed activity *change*, degrade or prevent actions described or assumed in an accident discussed in the *HSR*?
 - b) Will the proposed activity alter any assumptions previously made in evaluating the radiological consequences of an accident described in the *HSR*?
 - c) Will the proposed activity play a direct role in mitigating the radiological consequences of an accident described in the *HSR*?
 - d) Will the proposed activity affect any fission product barrier (i.e., fuel clad, primary coolant pressure boundary, or containment structure)?
- 5) If it is determined that the proposed activity does have an effect on the radiological consequences of any accident analysis described in the *HSR*, then either:
 - Demonstrate and document that the radiological consequences of the accident described in the *HSR* are bounding for the proposed activity (e.g., by showing that the results of the *HSR* analysis bound those that would be associated with the proposed activity), or
 - Revise and document the analysis taking into account the proposed activity and determine if more than a minimal increase in radiological consequences has occurred.

Recommended Explanation

The following information should be provided to document a conclusion about the affect of the proposed *change* on the radiological consequences of an accident:

- A listing (or reference to a listing) of those accidents whose radiological consequences could be affected.
- Explain how and why implementation of the proposed activity could or could not affect the radiological consequences of the accident(s) listed above.

EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION GUIDANCE AND EXAMPLE RESPONSES (CONT.)

- Demonstrate and document that the radiological consequences of the accident(s) described in the *HSR* are bounding for the proposed activity, or
- Describe how the activity would not cause the dose consequences of a previously analyzed accident to be increased more than minimally beyond the licensed limit.

Example Responses

If the review identifies that there is no increase in the consequences of an Accident:

The [describe the activity] does not introduce the possibility of a change in the consequences of an accident because the [activity or *SSC* description] is not an initiator of any new accidents and no new failure modes are introduced. [Depending on the complexity of the activity provide further justification for why the *change/activity* does not introduce new failure modes or causes changes in the consequences of accidents.]

If the review identifies new failure modes, accidents or minimal increase in the consequences of an accident:

The [describe or reference the applicable accident] are the only accidents that could credibly occur as a result of [describe the activity.] The consequences of these events are currently analyzed for [describe the conditions and or reactor operating mode(s)]. This conservatively bounds the other [describe the conditions and or reactor operating mode(s)].

This [describe the *change/activity*] does not physically alter any equipment, system performance, or operator actions that could affect [describe the applicable malfunction(s)] such that the current *HSR* analyses remain bounding [or describe how there is only a minimal change in the consequences of an accident] for the reactor operating modes/conditions for which [describe applicable accident(s)] is applicable [discuss magnitude of minimal].

[Provide further justification for why the radiological consequences of the *change/activity* is bounded by present analyses or how and why the change in consequences of an accident should be considered minimal. Include references to applicable (supporting) engineering analyses and/or technical evaluations.]

When changes to the HSR are required:

The following changes to the *HSR* will assure that the above assumptions are, and continue to be, complied with. [Provide detailed description of required *HSR* changes and/or references to marked up (pen-and-ink/red-line) *HSR* pages needed to assure compliance with any new assumptions that assure minimal changes in the consequences of an accident.]

EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION GUIDANCE AND EXAMPLE RESPONSES (CONT.)

In summary, there is no [only a minimal] increase in the consequences of an accident.

- 4. Criterion (iv): Does the proposed activity result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the HSR?**

Discussion of Intent

This question is asking if the proposed activity would result in more than a minimal increase in radiological consequences from a malfunction of a SSC important to safety. The presumption of a failure is implied.

For example, an air system supply solenoid valve that controls an air-operated valve is replaced with a different type than used previously. The performance of a *Failure Mode and Effect Analysis (FMEA)* determines that the modification (proposed activity) could cause the controlled, important to safety, air-operated valve to fail in the open position where previously its failure mode was in the closed position.

If the air-operated valve failing in the open position could result in a radiological release, then this is a *change* that has the potential to increase the consequence of a *malfunction of SSCs important to safety*. As a result, a determination of the change in consequences must be performed.

Evaluation Process

In determining if there is more than a minimal increase in consequences, the first step is to determine which malfunctions evaluated in the *HSR* have their radiological consequences affected as a result of the proposed activity. The next step is to determine if the proposed activity does, in fact, increase the radiological consequences and, if so, are they more than minimally increased.

The guidance for determining whether a proposed activity results in more than a minimal increase in the consequences of a malfunction is the same as that for accidents.

Discuss how the activity will impact the radiological consequences from a *malfunction of SSCs important to safety* as described in the *HSR*.

- 1) Review the proposed activity to identify any malfunctions that have the potential to be initiated by the installation, testing, and/or operation of this activity.
- 2) Review the types of *accidents evaluated in the HSR* and the regulatory basis for the malfunctions of *SSCs* considered in the *HSR*. This may include a review of References 7.5, 7.6, and 7.7.

**EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION
GUIDANCE AND EXAMPLE RESPONSES (CONT.)**

- 3) Determine which *SSCs* important to safety could be affected by the proposed activity or *change*, (system interactions, both direct and indirect, should be included.).
- 4) Identify which *SSCs* or system parameters are included in descriptions of malfunctions included in the *HSR*.
- 5) Determine any new or changed failure modes. This may require performance of an *FMEA*. (If this activity is modifying (replacing, changing) components and the failure modes are identical, no further action is required, as the consequences would be the same.)
- 6) Make a judgment (or perform an analysis) to determine the impact of the *change* on the radiological consequences of the *SSC* malfunction.
- 7) Based on the above, does the potential exist that more than a minimal increase in radiological consequences from a malfunction of an *SSC* could be affected by this activity?
 - a) If the review to this point determines that the activity would result in more than a minimal increase in radiological consequences from a malfunction of an *SSC*, NRC approval is required to implement this activity.
 - b) If the review to this point identifies that there is no (or minimal) effect upon the radiological consequences from a malfunction of *SSCs*, the response should state this conclusion and the basis for the conclusion.

Recommended Explanation

The following information should be provided to document the conclusion about the effect of the activity on the radiological consequences of a *malfunction of an SSC important to safety*:

- A listing (or reference to a listing) of those malfunctions of *SSCs* affected (positively and/or negatively) by this activity.
- Explain how and why the change in the consequences of a malfunction is either beneficial, minimal, or remains unchanged.
- Provide a brief discussion, or reference to an engineering analysis, describing each of the malfunctions affected and the magnitude of change in consequences, if any.

EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION GUIDANCE AND EXAMPLE RESPONSES (CONT.)

Example Responses

If the review identifies that there is no increase in the consequences of a Malfunction:

The [describe the activity] does not introduce the possibility of a change in the consequences of a malfunction because the [activity or SSC description] is not an initiator of any new malfunctions and no new failure modes are introduced. [Depending on the complexity of the activity provide further justification for why the *change/activity* does not introduce new failure modes or causes changes in the consequences of malfunction(s).]

If the review identifies new failure modes or minimal increase in the consequences of malfunctions:

The [describe or reference the applicable malfunctions] are the only malfunctions that could credibly occur as a result of [describe the activity.] The consequences of these events are currently analyzed for [describe the conditions and or reactor operating mode(s)]. This conservatively bounds the other [describe the conditions and/or reactor operating mode(s)].

This [describe the *change/activity*] does not physically alter any equipment, system performance, or operator actions that could affect [describe the applicable malfunction(s)] such that the current *HSR* analyses remain bounding [or describe how there is only a minimal change in the consequences] for the reactor operating modes/conditions for which [describe applicable malfunction(s)] is applicable. [Provide further justification for why the *change/activity* is bounded by present analyses or how and why the change in radiological consequences should be considered minimal. Include references to applicable (supporting) engineering analyses and/or evaluations.]

When changes to the HSR are required:

The following changes to the *HSR* will assure that the above assumptions are, and continue to be, complied with. [Provide detailed description of required *HSR* changes and/or references to marked up (pen-and-ink/red-line) *HSR* pages needed to assure compliance with any new assumptions that assure minimal changes in the consequences of malfunction(s).]

In summary, there is no [only a minimal] increase in the consequences of malfunction.

EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION GUIDANCE AND EXAMPLE RESPONSES (CONT.)

5. Criterion (v): Does the proposed activity create a possibility for an *accident* of a different type than any *previously evaluated in the HSR*?

Discussion of Intent

While it may be possible for the Preparer to postulate accidents which are new with respect to those included in the *HSR*, it may not be appropriate to consider all postulated accidents, especially those that are highly improbable.

The objective of this question is to determine whether the activity creates the possibility for accidents of similar frequency and significance to those already included in the licensing basis for the *facility*. Thus, accidents that would require multiple independent failures or other circumstances in order to “be created” would not meet Criterion (v).

Evaluation Process

- 1) Review the proposed activity from the standpoint of “what could go wrong?” Consider approaching the activity as if the accident analysis is being written for the very first time.
- 2) Review the types of *accidents evaluated in the HSR* and the regulatory basis for the accidents considered in the *HSR*. This may include a review of References 7.5, 7.6, and 7.7.
- 3) Based on the above, are there new accidents that should be considered?
If the review to this point identifies that there are no new accidents that need to be postulated, the response should state this conclusion and the basis for the conclusion.
- 4) Assess whether the postulated new accident (or accidents) is a different accident as it relates to 10 CFR 50.59. While it may be possible to postulate many *accidents* that have never been explicitly *evaluated in the HSR*, this may not be appropriate.
 - a) Does the *HSR* provide a documented or implied reason that this accident was not previously considered? If so, does this activity impact the basis for that conclusion?
 - b) Is the accident bounded by another, more probable accident?

Recommended Explanation

The following information is recommended to document the conclusion about the possibility for introducing an accident different from those already evaluated in the *HSR*:

- Compare the *HSR* accident analyses to the potential failure(s).

EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION GUIDANCE AND EXAMPLE RESPONSES (CONT.)

- Explain how and why the postulated failures identified could or could not create the possibility of an *accident* different from any accident already *evaluated in the HSR*.

Example Responses

If the review identifies that there are no new accidents that need to be postulated:

The [activity] does not introduce the possibility of a new accident because the [activity] is not an initiator of any accident and no new failure modes are introduced. [Provide further justification for why the activity *change* does not introduce new failure modes or accidents].

If the review identifies new failure modes or accidents:

The [applicable accident(s) e.g., Maximum Hypothetical and Pool Loop Rupture Accidents] are the only accidents that could credibly occur in reactor operating mode(s) _____. These events are currently only analyzed in reactor operating mode(s) _____ because this conservatively bounds the other reactor operating modes. This [activity] *change* does not physically alter any equipment, system performance, or operator actions that could affect an [applicable accident(s)] such that the current *HSR* analyses remain bounding for the reactor operating modes for which [the accident] is applicable.

In summary there is no increase in the possibility of an accident of a different type than is already analyzed in the *HSR*.

6. Criterion (vi): Does the proposed activity create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in the HSR?

Discussion of Intent

Malfunctions that need to be considered are those that have not been previously evaluated and that impact an *SSC* considered important to safety. A malfunction that leads to an accident of a different type is reviewed in the previous question.

The objective of this question is to determine if there is a new, non-bounded result as a consequence of the *malfunction of an SSC important to safety*. An *SSC* is considered important to safety if it was credited for performing a function that reduces the possibility (or minimizes the consequences) of a design basis accident or event described in the *HSR*.

This determination should be made at the component level or consistent with a failure modes and effects analysis (*FMEA*), taking into account single failure assumptions, and the magnitude of the proposed activity.

EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION GUIDANCE AND EXAMPLE RESPONSES (CONT.)

Evaluation Process

- 1) Identify the failure modes of the *SSC* important to safety associated with the activity. This review is typically contained in a design *change* (i.e., modification) package. Otherwise, the Preparer should assess the activity for “what can go wrong.” In activities involving the addition of operator actions, the Preparer should postulate the consequence of the operator taking the wrong action (such as closing versus opening a valve).
- 2) Determine the effects of the failure modes identified. The effects are the directly attributable results or occurrences due to the failure modes introduced by the activity.
- 3) Compare these effects with the effects of malfunctions already considered in the *HSR*. If the effect of the malfunction identified was previously evaluated, the Preparer should evaluate the issue under Likelihood of Occurrence of a Malfunction or Increase in Consequences of a Malfunction.
- 4) Based on the comparison, are there new malfunctions that should be considered? If the review to this point identifies that there are no new malfunctions that need to be postulated, the response should state this conclusion and the basis for the conclusion.

Recommended Explanation

The following information is recommended to document the conclusion about the possibility for introducing a *malfunction of an SSC important to safety* different from any already evaluated in the *HSR*:

- Identify the potential failure modes for the *SSC*.
- Identify the effects of the failures introduced by the potential failure modes identified.
- Compare the effects of the potential failures to those already evaluated in the *HSR*.
- Explain how and why the potential failures identified could or could not create the possibility of a malfunction with a different result than any previously evaluated in the *HSR*.

Example Responses

If the review identifies that the activity does not involve any new failure modes:

The [activity] does not introduce the possibility for a malfunction of an *SSC* with a different result because the activity does not introduce a failure result.

EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION GUIDANCE AND EXAMPLE RESPONSES (CONT.)

If the review identifies that the failure modes of activity are consistent with or bounded by those already considered in the HSR:

The [activity] does not introduce the possibility for a malfunction of an SSC with a different result because the activity does not introduce a failure mode that is not bounded by those described in the [system or FMEA] description in *HSR* Section [xx].

The identified failure modes include [list failure modes identified]. The failure modes and effects analysis for the [system] include [list comparative failure modes]. A comparison of these indicates that the results of the failure modes resulting from this [activity] are bounded by those presented in the *HSR*.

If the review identifies that the activity possesses new, unbounded failure results:

The [activity] introduces a failure result involving [list new failure results]. These failure results are not bounded by those failures identified in the failure modes and effects analysis presented in *HSR* Section [xx]. [Identify the specific differences and basis for conclusions.]

Therefore, the [activity] creates the possibility of a *malfunction of an SSC important to safety* with a different result than any previously evaluated in the *HSR*. Prior NRC approval is required to implement the activity.

7. Criterion (vii): Does the proposed activity result in a design basis limit for a fission product barrier as described in the HSR being exceeded or altered?

Discussion of Intent

Activities that would result in a design basis limit for fission product barrier (*DBLFPB*) as described in the *HSR* being exceeded or altered will require prior NRC review and approval. The NRC has defined a *DBLFPB* as the controlling numerical value for a parameter established during the licensing review as presented in the *HSR* for any parameter(s) used to determine the integrity of a fission product barrier.

Typically the controlling value for the parameter is set at a point far enough away from failure that there is confidence in the integrity of the barrier. For power reactors, these barriers are generally limited to the fuel cladding, the reactor coolant system pressure boundary, and containment. These three (3) barriers are the same for research and test (i.e., non-power) reactors.

EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION GUIDANCE AND EXAMPLE RESPONSES (CONT.)

Evaluation Process

- 1) Determine the parameters that would be affected by the proposed activity. The affected parameters are not limited to the specific parameters in the system in which the activity is being made or to parameters that are only directly linked to the actual fission product barrier. Rather, the design parameters must include an assessment of all affected parameters, including design parameters of mitigation and support systems.
- 2) Determine whether the parameters are controlling parameters that are reference bounds for the design of a fission product barrier.
- 3) Once the parameters are identified, establish whether the parameters have values established in the *HSR*.
- 4) If the specific parameter values are already subject to controls established by the MURR Technical Specifications or other rules or regulations, those requirements shall be followed.
- 5) After assessing the information discussed above, identify the specific design basis limits that could be affected for each of the identified parameters.
- 6) Compare the affected parameters applicable to the proposed activity against each design basis limit. If no design basis limit is altered or exceeded, the proposed activity may be implemented without prior NRC review and approval.

Recommended Explanation

The following information is recommended to document the conclusion about the possibility for exceeding or altering a *DBLFPB* as described in the *HSR*.

- Identify the parameters affected by the proposed activity.
- State whether the parameters have values established in the *HSR*.
- State whether the identified values constitute design basis limits.
- Identify whether other regulatory or technical specification controls apply. If so, indicate which controls.
- Explain how and why the affected parameters could or could not alter or exceed a *DBLFPB*.

EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION GUIDANCE AND EXAMPLE RESPONSES (CONT.)

Example Responses

If the review determines that the activity does not affect any system, performance, or response parameter:

This [activity] does not result in a *change* that would cause any system parameter to change. Therefore, the [activity] does not result in a *DBLFPB* as described in the *HSR* being exceeded or altered.

If the review determines that the activity does affect system, performance, or response parameters but that they are not associated with a fission product barrier:

This [activity] results in the [system parameter] changing due to [cause or operational impact]. However, the [affected parameter] is not associated with a fission product barrier. Therefore, the [activity] does not result in a *DBLFPB* as described in the *HSR* being exceeded or altered.

If the review determines that the activity does affect system, performance, or response parameters associated with a fission product barrier but they are not controlling parameters that are reference bounds for design:

This [activity] results in the [system parameter] changing due to [cause or operational impact]. As established in *HSR* Section [xx], the [affected parameter] is associated with the [specified] fission product barrier. However, this value does not constitute a controlling parameter used to establish the acceptance limit for fission product barriers. Therefore, the [activity] does not result in a *DBLFPB* as described in the *HSR* being exceeded or altered.

If the review determines that the activity does affect system, performance, or response parameters associated with a fission product barrier and that they are controlling parameters that are reference bounds for design:

This [activity] results in the [system parameter] changing due to [cause or operational impact]. As established in *HSR* Section [xx], the [affected parameter] is a controlling parameter or reference bound for design associated with the [specified] fission product barrier.

As a result of this activity, the specified design basis limit will be [altered or exceeded]. Therefore, the [activity] does result in a *DBLFPB* as described in the *HSR* being exceeded or altered. This activity will require a license amendment that must be reviewed and approved by the NRC.

**EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION
GUIDANCE AND EXAMPLE RESPONSES (CONT.)**

- 8. Criterion (viii): Does the proposed activity result in a departure from a method of evaluation described in the HSR used in establishing the design bases or in the safety analyses?**

Discussion of Intent

A *departure from a method of evaluation described in the HSR* used in establishing the *design bases* or in the *safety analyses* means:

- 1) Changing any of the elements of the method described in the *HSR* unless the results of the analysis are conservative or essentially the same, or
- 2) Changing from a method described in the *HSR* to an alternate method - unless the alternate method has been approved by NRC for the intended application.

Evaluation Process

- 1) Identify the *methods of evaluation* that are affected by the proposed activity.
- 2) Determine whether the method of evaluation is described in the *HSR* (as updated).
- 3) Determine whether the *HSR* described method of evaluation is used to establish a design basis or is used in a safety analysis.

<p><u>NOTE:</u> Steps 1 through 3 are usually identified as part of the 10 CFR 50.59 Screen process.</p>
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- 4) Determine whether the proposed activity constitutes a *departure from a method of evaluation* by determining if the proposed activity:
 - a) Changes any element of an analysis methodology that yields results that are non-conservative or not essentially the same as the results from the analyses of record.
 - b) Uses new or different *methods of evaluation* that are not approved by NRC for the intended application.

Recommended Explanation

The following information is recommended to document the conclusion about whether the proposed activity results in a *departure from a method of evaluation described in the HSR* that was used to establish the *design bases* or used in the *safety analyses*.

EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION GUIDANCE AND EXAMPLE RESPONSES (CONT.)

- Identify the *methods of evaluation* pertinent to the activity as they relate to the establishment of the *design bases* or usage in the *safety analyses*.
- Identify those *methods of evaluation* identified in the previous step that are presented in the *HSR*.
- Identify whether the *HSR* described method of evaluation is modified or whether a new method is used.
 - If the method is modified, identify the results and indicate whether they are conservative or essentially the same.
 - If the method is new, identify whether the new method is approved for the *facility* and the basis for its acceptability.
- Conclude with a determination of the acceptability of the proposed activity or identify the need for a license amendment.

Example Responses

If the review identifies that there are no methods of analysis pertinent to the proposed activity:

This [activity] modifies a [component, system, structure or process] that does not involve a method of evaluation as defined in [the *procedure* or section xx]. Therefore, the [activity] does not result in a *departure from a method of evaluation described in the HSR* used to establish the *design bases* or in the *safety analyses*.

If the review identifies that there are revised or new methods of analysis pertinent to the proposed activity but that they are not described in the HSR:

This [activity] modifies a [component, system, structure or process] that does involve a method of evaluation as defined in [the *procedure* or section xx]. However, this method of evaluation is not specified in the *HSR*. Therefore, the [activity] does not result in a *departure from a method of evaluation described in the HSR* used to establish the *design bases* or in the *safety analyses*.

**EIGHT CRITERION OF A 10 CFR 50.59 EVALUATION
GUIDANCE AND EXAMPLE RESPONSES (CONT.)**

If the review identifies that there are revised or new methods of analysis pertinent to the proposed activity and that they are described in the HSR, but that the results are conservative or essentially the same:

This [activity] modifies a [component, system, structure or process] that does involve a method of evaluation as defined in [the *procedure* or section xx]. This method of evaluation is specified in the *HSR* [Section xx]. However, based on benchmarking between the [first method] and the [second method], the results of the new method are [conservative or essentially the same] because [provide explanation]. Therefore, the [activity] does not result in a *departure from a method of evaluation described in the HSR* used to establish the *design bases* or in the *safety analyses*.

If the review identifies that there are methods of analysis pertinent to the proposed activity and that they are described in the HSR, but that the results are non-conservative or not essentially the same:

This [activity] modifies a [component, system, structure or process] that involves a method of evaluation as defined in [the *procedure* or section xx]. This method of evaluation is specified in the *HSR* [Section xx]. However, based on benchmarking between the [first method] and the [second method], the results of the new method are [non-conservative or not essentially the same] because [provide explanation]. Therefore, the [activity] does result in a *departure from a method of evaluation described in the HSR* used to establish the *design bases* or in the *safety analyses*. This [activity] will require a license amendment.

10 CFR 50.59 Process Flowchart

