



Part I
***Licensing and Implementation
Guidelines***

1.0 Introduction

1.1 BACKGROUND

In December 1980, the Nuclear Regulatory Commission (NRC) Staff initiated an unresolved safety issue, USI A-46, “Seismic Qualification of Equipment in Operating Plants,” related to seismic adequacy of mechanical and electrical equipment in older nuclear plants. After substantial technical research by both the Seismic Qualification Utility Group (SQUG) and the NRC regarding this issue, the Staff published, on February 19, 1987, a detailed approach for resolving USI A-46, in Generic Letter 87-02, “Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors, Unresolved Safety Issue (USI) A-46.” Implementation guidance for generic and plant-specific resolution of A-46 was provided in an enclosure to the Generic Letter, entitled “Seismic Adequacy Verification Procedure” (herein referred to as the Generic Letter Procedure). Subsequently, the NRC Staff issued Supplement 1 to Generic Letter 87-02 on May 22, 1992 (Reference 13 of Part I^[1]), which included Supplemental Safety Evaluation Report No. 2 (SSER No. 2) on the GIP Revision 2 (corrected February 14, 1992). SSER No. 2 provides additional implementation guidance which should be used when applying the GIP for resolution of USI A-46. ^[1](Note that the references identified in this part of the GIP are listed in Section 4.0 at the end of Part I.)

The resolution methodology for USI A-46 is based, in part, on the belief that there is adequate seismic capacity of properly anchored equipment, ^[2]with certain other important considerations, in older operating plants. It should be noted that early SQUG implementation of the A-46 methodology (including review of experience data, tests, and analysis coupled with trial plant walkdowns) supports this conclusion. The purpose of USI A-46 is to verify this conclusion.

The Generic Letter Procedure sets forth an approach for verifying seismic adequacy of equipment using earthquake experience data supplemented by test results and analyses, as necessary. Licensees subject to USI A-46 are encouraged to participate in a generic program to accomplish seismic verification of equipment. As a result, SQUG developed this “Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment.”

1.2 PURPOSE OF THE GIP

The GIP provides the detailed technical approach, generic procedures, and documentation guidance which can be used by USI A-46 licensees to verify the seismic adequacy of mechanical and electrical safe shutdown equipment. In this regard, the GIP also contains all of the activities necessary for resolution of USI A-46.

The USI A-46 (GIP) methodology involves an initial screening process. If safe shutdown equipment should fail to pass this initial screening, i.e., it is classified as an outlier, more detailed methods for verifying its seismic adequacy may be used as described in Section 5 of Part II of the GIP.

^[3]Because the NRC has documented its evaluation of GIP-2 and GIP-3 in Supplemental Safety Evaluation Reports Nos. 2 and 3 (SSER No. 2 and SSER No. 3) (References 13 and 15 of Part I), the GIP provides an NRC-accepted method to verify the seismic adequacy of equipment and to resolve USI A-46 for individual plants. Every aspect of the Generic Letter Procedure (Reference 3 of Part I) and these SSERs has been fully considered in development of the GIP. Therefore, licensees will be guided by the GIP as modified by SSER No. 2 and SSER No. 3. ^[4]By satisfying the provisions of the GIP as modified by SSER No. 2 and SSER No. 3, licensees will have fully satisfied the guidance of the Generic Letter 87-02, SSER No. 2, and SSER No. 3.

The GIP contains two major Parts. Part I introduces USI A-46 and its resolution and establishes direction on specific licensing and implementation issues. Part II provides direction on how to apply the generic procedure to a plant-specific implementation. Part II also includes direction for selecting seismic evaluation personnel, identifying safe shutdown equipment, performing screening verifications and walkdowns, and resolving outliers.

1.3 GIP COMMITMENTS AND GUIDANCE

Each section of Part II of the GIP (except Sections 1 and 10) is divided into SQUG commitments (generally the “X.1” paragraph of each section, where “X” is the section number) and implementation guidance in the remaining paragraphs of that section. The SQUG commitments are key features of each aspect of the program. For the USI A-46 verification of seismic adequacy of electrical and mechanical equipment in response to the Generic Letter, licensees agree to implement the SQUG commitments as stated or to justify any substantial deviations from the SQUG commitments to the NRC in writing prior to implementation.

The implementation guidance in the GIP, i.e., all of the GIP except the SQUG commitments, comprises acceptable methods for implementing the noted SQUG commitments. USI A-46 licensees may use the GIP guidance or may substitute clearly equivalent methods without prior notification of the NRC. However, USI A-46 licensees must notify the NRC of significant or programmatic deviations from the GIP guidance.

^[4]If licensees know they will implement significant or programmatic deviations from the GIP guidance, they should so notify the NRC Staff. If significant or programmatic deviations are implemented without prior notification of the NRC Staff, licensees must then notify the NRC Staff of these deviations no later than the final USI A-46 summary report. The NRC Staff has cautioned in Reference 13 of Part I that methods which deviate from the GIP may not be acceptable and may result in the licensee not fully satisfying the provisions of the Generic Letter, even though the licensee considers the substitute method equivalent. Thus, licensees are encouraged to notify the NRC Staff as soon as they decide to make significant or programmatic deviations from the GIP guidance. This will provide an opportunity for the Staff to comment prior to implementation. Justification for these significant or programmatic deviations will be prepared and made available onsite for NRC audit. Notification is not required for minor, i.e., less than significant or programmatic, deviations from the GIP guidance. However, documentation of minor deviations should be available onsite for NRC audit.

For purposes of USI A-46 resolution, licensees will be bound by the commitments specifically set forth in their docketed submittals. Submittals which commit to the entire GIP, i.e., the SQUG commitments and implementation guidance portions of each section of Part II ^{[3][5]} and the NRC Staff clarifications, interpretations, and exceptions reflected in SSER No. 2, shall be regarded as accepted by the Staff upon docketing. (See Section 2.2.1 of Part I, below.) Submittals that do not fully commit to the GIP shall be reviewed and accepted by the Staff on a case-by-case basis.

2.0 Issues and Positions

2.1 INTRODUCTION

Development of a generic program to resolve USI A-46 has led to a number of licensing and implementation issues, some of which are covered in this section and some of which are covered in other parts of the GIP. Issues addressed in this section generally pertain to the licensing aspects of the A-46 program, the impact of related NRC requirements (such as reporting regulations) on the implementation of the generic program, and technical matters which have been the subject of considerable discussion between SQUG and the NRC and have a significant impact on the implementation of the generic program.

Identification and resolution of A-46 issues have been the result of evolutionary processes starting with the Generic Letter and continuing to the present. These processes are documented by the references listed in Section 4 of Part I of the GIP, starting with the SQUG response to the Generic Letter (Reference 4 of Part I). The primary issues contained in these references have been addressed and incorporated into the GIP. Each revision of the GIP, including this revision, contains prior resolutions or positions on unresolved issues. For example, Revision 0 of the GIP included issues identified by SQUG in response to the Generic Letter. The Safety Evaluation Report (SER) prepared by the NRC based on Revision 0 of the GIP resulted in a new set of issues and positions that were subsequently included in Revision 1 of the GIP. SQUG intends to continue the process of revising the GIP to capture resolved issues as well as to reflect current issues and positions.

The SQUG “Checklist of Open/Unresolved Issues in the USI A-46 Program” and “Resolutions to NRC Comments on GIP, Rev. 2” (contained in References 9 and 12 of Part I), which were provided to the NRC Staff for review and concurrence, summarize the resolution history of many of the issues and cross-reference supporting documentation containing details of the resolution. SQUG may update these documents from time to time to track issues from identification to resolution. These documents may provide valuable information if future questions arise as to the scope and intent of these issues. References noted in these documents and in other sections of

the GIP should be referred to where more detail is desired or the historical development of an issue is of interest. ^[6]GIP Revision 3A incorporates the NRC Staff clarifications, interpretations, and exceptions from SSER No. 2 and SSER No. 3 in light of the resolution history contained in References 9 and 12 of Part I. Note, however, that the NRC Staff considers the final resolution of all issues to be contained in Revision 2 of the GIP (corrected, 2/14/92), as supplemented by SSER No. 2; the resolution history summarized in (References 9 and 12 of Part I reflects SQUG's perception of the resolution.

The remainder of this section of Part I documents SQUG's position on some of these issues, and for clarification provides examples of possible licensing issue scenarios. The examples are merely accepted methods to resolve these issues on a plant-specific basis; other methods may also be used.

2.2 INTERPRETATIONS OF GUIDELINES

2.2.1 *Implementation Schedule and Commitments*

An implementation schedule and commitment letter should have been provided by each licensee to the NRC staff by 120 days after ^[7]SSER No. 2 on the GIP is issued and all open issues are resolved. Assuming the licensee intends to use the GIP to resolve USI A-46, the letter should include the following:

1. A commitment to a final date (for example, a calendar date, or optionally, a specified number of days after completion of a given refueling outage) for submitting to the Staff a report summarizing the results of the A-46 review (see Paragraph 2.2.8 of Part I and Section 9 of Part II). Any delay beyond that date should be justified to the Staff; however, the licensee may organize and conduct its review as necessary to meet the scheduled date (the objective is to complete the USI A-46 program within three years);
2. A statement that a specific revision of the GIP will be used by the licensee for resolution of USI A-46;
3. Identification of substantial deviations from the SQUG commitments of the GIP and a justification for such deviations (see GIP Part I, Paragraph 1.3);
4. Identification, if known, of significant or programmatic deviations from the GIP guidance; (see GIP Part I, Paragraph 1.3);

5. ^[8]In ^[7]SSER No. 2 on the GIP, the NRC Staff has requested licensees of certain plants, as shown in Table A of SSER No. 2, to describe the method used in generating the in-structure response spectra to be used for resolution of USI A-46. When requested, this information should have been provided in the 120-day commitment letter. The in-structure response spectra to be used for resolution of USI A-46 need not be the plant licensing or design basis spectra. If the type of spectra is changed following notification, licensees should notify the NRC Staff of the change prior to implementing the USI A-46 resolution.

^[8]The licensee should await written Staff approval of the in-structure response spectra information prior to commencing implementation of the USI A-46 program. If the Staff does not respond by accepting, questioning, or rejecting the spectra within sixty days, the Staff is deemed to have accepted the licensee's spectra and the licensee may proceed with implementation. If a rejection or question is received from the Staff, the licensee will provide additional information to the Staff to resolve the problem. The Staff will respond to any submittal of additional information received from a licensee within sixty days. In this response, the Staff will either state its approval (or rejection) of the information provided, or indicate the time duration needed for the review of such information, prior to transmitting a follow-up response of acceptance (or rejection) to the licensee. This time duration will vary depending on the complexity of the submittal.

The above information in the licensee's schedule and commitment letter will be reviewed and responded to by the NRC Staff. Licensees are not obligated to initiate the USI A-46 implementation until receipt of NRC approval of the plant-specific commitments for resolution of USI A-46, including agreement on the in-structure response spectra, substantial deviations from the SQUG commitment Sections of Part II of the GIP, and significant or programmatic deviations from GIP implementation guidance, if reported. If the Staff withholds approval of the licensee's commitment letter beyond ninety days after submittal, the licensee may extend the USI A-46 implementation schedule by a corresponding amount of time without additional Staff concurrence.

2.2.2 Assumptions

Section 3 of Part II of the GIP sets forth the basic assumptions regarding plant conditions to be used by USI A-46 licensees.

2.2.3 *Achieving and Maintaining Hot Shutdown*

Licensees are to identify equipment necessary to bring the plant to, and maintain it in, a hot shutdown condition during the first 72 hours following a Safe Shutdown Earthquake (SSE) as described in Section 3 of Part II of the GIP. Achieving hot shutdown within 72 hours may be inconsistent with some aspects of the licensing and design bases of some plants. Therefore, deviations from the 72-hour hot shutdown period will be considered by the Staff on a case-by-case basis with sufficient justification.

2.2.4 *Multiplier for Equipment Above the 40-foot Level*

It may be possible to justify seismic demand multipliers based on ground response for equipment above 40 feet. (Note: Section 4 of Part II uses a 1.5 multiplier for equipment below about 40 feet.) If the seismic demand study being undertaken by EPRI establishes multipliers above the 40-foot level, SQUG may submit this in a GIP revision for approval by the NRC in accordance with Section 3.0 of Part I of the GIP.

2.2.5 *Reportability and the Need for JCOs*

USI A-46 resolution methodologies do not impose any additional reporting requirements beyond the submittal requirements of Section 2.2.8, below, nor do they require preparation of Justifications for Continued Operation (JCOs) unless necessary to meet existing regulatory requirements applicable to the licensee, including the requirement to operate the facility in a manner that will not endanger the public health and safety. (It should be noted that the JCO referenced above need not necessarily be submitted to the NRC staff.)

Thus, failure of equipment to meet GIP initial screening or outlier resolution guidelines does not, of itself, give rise to a need for the licensee to consider a JCO or reporting under applicable reporting requirements unless the plant has modified its commitments to adopt the USI A-46 (GIP) methodology as its licensing basis for verifying the seismic adequacy of electrical and

mechanical equipment, as set forth in Paragraph 2.3.3, below.^{1[9]} If a determination is made that equipment failing to meet the GIP initial screening or outlier resolution guidelines does not meet the existing plant licensing or design bases, including specific plant commitments and requirements, the licensee must consider reportability and operability implications pursuant to Technical Specifications and 10 C.F.R. §§ 50.72, 50.73, and 50.9, among others as appropriate, including the need for a JCO. Non-safety grade equipment selected for use in A-46 is not exempt from reporting requirements.

There is no independent requirement to notify the Staff when an outlier or equipment deficient against A-46 criteria, which is not a deficiency against the plant's licensing or design basis, will not be modified to conform to the A-46 guidelines.² However, licensees will report unresolved A-46 outliers or equipment deficient against A-46 criteria to the NRC Staff in their final summary reports. These reports will include an explanation of the safety implications of not modifying the outliers or equipment deficient against A-46 criteria. The Staff will justify any requirement to modify these outliers under 10 C.F.R. § 50.109 as stated in Section 2.3.1, below.³

2.2.6 The Role of SSRAP During Implementation of A-46

The Senior Seismic Review and Advisory Panel (SSRAP) was established to provide technical review of SQUG efforts in developing a generic program to resolve USI A-46 through the use of experience data on equipment in industrial facilities which had been subjected to strong motion seismic events. SSRAP's functions and responsibilities were defined and agreed upon mutually by SQUG and the NRC Staff. SSRAP's tenure will end as a group at the completion of the development of the GIP. SQUG may reconvene SSRAP from time to time for assistance on

¹ If a licensee modifies its licensing commitment to adopt the USI A-46 methodology for demonstrating the seismic adequacy of electrical and mechanical equipment, a deficiency against the A-46 criteria is also a deficiency against the licensing basis.

² To be consistent with Generic Letter 87-02, we distinguish between "outliers," "equipment deficient against A-46 criteria," and "equipment deficient against the plant's licensing or design basis." Only the deficiency against the licensing or design basis may give rise to a reporting requirement under Sections 50.72, 50.73.

³ The backfitting analysis supporting Generic Letter 87-02 applies only to the A-46 review, not to subsequent modifications. See NUREG-1211, Section V, second paragraph, at 16.

generic matters. Use of SSRAP for such generic tasks will be mutually agreed upon by SQUG and the NRC Staff.

2.2.7 Third-Party Audits

An independent evaluation will be performed for each plant by one or more individuals who were not a part of the original walkdown team. This evaluation will provide an assessment of the walkdown and analyses by audit and sampling. This is intended to be a one- or two-day overview to ^[10]assess the adequacy of the entire plant-specific implementation program, and, specifically to determine if gross errors have been made. This overview effort should be substantially less than the original walkdown and analyses. The individual(s) performing this evaluation will meet the qualification requirements prescribed for a Seismic Capability Engineer (as described herein). ^[10]The auditor(s) should have broad engineering experience and have completed the SQUG-developed Walkdown Screening and Seismic Evaluation Training Course. The auditor(s) will document the review in letterform. This report and the evaluator's qualifications will be submitted to the NRC.

2.2.8 Completion Reports

To resolve USI A-46, the Generic Letter Procedure provides for submittal of an inspection report by each licensee upon completion of the plant walkdown. Licensees using the GIP for resolution may satisfy this USI A-46 report provision by referencing the GIP and by providing a plant-specific summary report, including a proposed schedule for future modifications and replacements, where appropriate. Details regarding the contents of the report are contained in Section 9 of Part II of the GIP. Each licensee will also provide a completion letter advising the NRC that any corrective actions identified in the summary report or agreed to with the Staff as a result of other related correspondence have been completed.

2.2.9 Plant-Specific SERs

The NRC Staff will, for some plants, either join the licensee for selected plant walkdown inspections, or review the licensee's implementation summary report of walkdown results (see Section 2.2.8 of Part I, above) and conduct plant-specific audits based on sampling. Thereafter,

the Staff will issue to each licensee a simple plant-specific Safety Evaluation Report (“SER”) to close USI A-46 on each docket.

2.2.10 Maintenance Programs

Existing preventive maintenance and inspection programs, as required by existing NRC requirements, will suffice to meet the maintenance and inspection guidelines for USI A-46. For example, during individual plant walkdowns, tightness testing of bolts and visual inspection to determine that bolts are not missing or obviously loose are covered in Section 4 of Part II of the GIP. It is not necessary to establish a program to periodically reinspect tightness after the walkdowns.

2.2.11 Inter-SQUG Communication

^[11]A cognizant industry organization will facilitate a transfer of knowledge regarding major problems identified and lessons learned in the walkdowns and third-party reviews. This will be accomplished by periodic written communications to all SQUG member utilities and, as needed, periodic workshops.

2.3 COMPLIANCE WITH REGULATIONS

2.3.1 Backfitting

When a licensee concludes that no further action is necessary for an equipment condition that fails to meet the GIP initial screening or outlier resolution guidelines, but the condition is not a deficiency against the plant’s current licensing or design bases, the Staff must comply with backfitting requirements pursuant to 10 C.F.R. § 50.109 before the licensee can be required to take any further action. The licensee must notify the Staff of the condition in the summary report (see Paragraph 2.2.8 of Part I) and provide an explanation of the safety implications of not modifying the outliers and equipment found to be deficient against the A-46 criteria. This explanation need not be a detailed analytical justification for not modifying the identified condition.

It is the staff's responsibility under 10 C.F.R. § 50.109 to first justify that the condition must be modified, after which, modifications may be required. However, a backfitting analysis is not needed if the condition is a deficiency against the plant's current licensing or design bases.

2.3.2 Compliance with Commission Regulations Related to Seismic Adequacy

The successful completion of the USI A-46 implementation will verify the seismic adequacy of the equipment to which the USI A-46 methodology has been applied by the licensee. This will constitute compliance with the requirements of GDC-2 (in those plants to which GDC-2 applies) and will satisfy the purpose of the NRC regulations relevant to equipment seismic adequacy (including 10 C.F.R. Part 100) and applicable to the licensee's plants for the identified equipment.⁴

2.3.3 Revision of Plant Licensing Bases

A USI A-46 licensee, in accordance with 10 C.F.R. § 50.59, may revise the plant licensing bases to reflect that the USI A-46 (GIP) methodology may^[12] be used as the methodology for verifying the seismic adequacy of mechanical and electrical equipment within the scope of equipment covered by the GIP.^[13] Note that compliance with 10 C.F.R. § 50.59 will result in the licensee addressing all aspects of unreviewed safety questions (for example, where the FSAR has specified damping values which differ from the GIP). Licensees should include deviations from the SQUG commitments and guidance of the GIP in their unreviewed safety question analyses under 10 C.F.R. § 50.59. (See Example 5 and Paragraph 2.3.4, below, for extending the scope of plant equipment to which the revised licensing bases apply.)

With the exception of cable and conduit raceway systems, the USI A-46 (GIP) methodology is an equipment-level seismic verification methodology for mechanical and electrical equipment, tanks, and heat exchangers. For A-46 plants, this methodology is adequate to verify the seismic

⁴ Staff Supplemental Safety Evaluation Report No. 1 on SQUG Generic Implementation Procedure, Revision 1, June 29, 1990 ("SSER No. 1"), at 18, NRC response to Item I.B. ["GDC-2 (in those plants where GDC-2 applies)" has been expanded to also include "and will satisfy the purpose of the NRC regulations relevant to equipment seismic adequacy (including 10 C.F.R. Part 100) and applicable to the licensee's plants for the identified equipment."]

adequacy of equipment within the scope of the GIP. However, it is recognized that in some cases the plant licensing basis may address aspects of the seismic adequacy of the systems, in which this equipment is installed, that are not addressed by the GIP. Where this is true, licensees are not relieved of the responsibility to evaluate and adequately address such system-level seismic requirements as part of the revision of a plant's licensing bases for equipment.

The USI A-46 (GIP) methodology shall not supersede any seismic qualification requirements imposed or committed to in connection with the resolution of other specific issues (e.g., Regulatory Guide 1.97, TMI Action Item II.F.2, and Individual Plant Examination for External Events) unless these qualification requirements or commitments are also revised according to appropriate regulatory requirements, where applicable.⁵

To help clarify the intent of this section for modifying the licensing bases of the plant, the following examples are provided. These examples explore some, but not all, of the possible scenarios that may be encountered by licensees when revising their licensing bases to adopt the USI A-46 (GIP) methodology (or an alternative) as the method for verifying the seismic adequacy of electrical and mechanical equipment within the scope of equipment covered by the GIP.

Example 1

Revising the plant licensing bases when the plant is not currently committed to using any specific method to verify the seismic adequacy of equipment, and there are no specific commitments to seismic qualification requirements for equipment connected with the resolution of other specific issues.

When a plant has no general commitment to methods or standards for seismic verification or qualification of equipment, i.e., the FSAR is silent, and no specific licensing commitments exist for specific issues (as discussed in Example 2, below, the plant may adopt the USI A-46 (GIP) methodology without specific notification of the NRC. This is neither a license change nor a change to the facility as described in the FSAR.

Nevertheless as with any change in the plant procedures or methodology for evaluation of plant adequacy, the basis for the change should be documented. One option available is a

⁵ SQUG has adopted the language of the Staff's SSER No. 1 verbatim (at 7, numbered paragraph (2)) up to the word "unless" in the GIP. SQUG has added a statement that even specific commitments, such as Regulatory Guide 1.97, can be superseded by proper application of 10 C.F.R. § 50.59. However, SQUG recognizes that a Section 50.59 analysis to supersede a specific commitment would need to consider factors in addition to the analysis to change the plant's general seismic licensing basis.

safety evaluation pursuant to 10 C.F.R. § 50.59 together with a formal FSAR change (if appropriate) in accordance with 10 C.F.R. § 50.71(e).

Example 2

Revising the plant licensing bases when the plant is not generally committed to any specific method to verify seismic adequacy, but when specific commitments to seismic qualification requirements exist for equipment connected with the resolution of other specific issues.

- (a) For equipment not covered by any specific commitment, a Section 50.59 safety evaluation should be conducted and the FSAR changed (if appropriate) to reflect the new commitment in the manner suggested for Example 1, above.
- (b) The USI A-46 (GIP) methodology will not supersede seismic qualification requirements imposed or committed to in connection with the resolution of other specific issues (e.g., Regulatory Guide 1.97, TMI Action Item II.F.2, and Individual Plant Examination for External Events). To substitute the USI A-46 (GIP) methodology for specific licensing commitments such as these, licensees must follow ^[14]appropriate Commission regulations.

Example 3

Revising the plant licensing bases when the plant is generally committed to using IEEE 344-1971 to verify the seismic adequacy of equipment, but has no specific commitments to seismic qualification requirements for equipment connected with the resolution of other specific issues.

Where the plant has a general commitment to IEEE 344-1971 and no other specific licensing commitments exist, a Section 50.59 safety evaluation should be performed and documented. In addition, if a change to the FSAR is appropriate, the NRC must be notified pursuant to Section 50.71.

^[15]The USI A-46 (GIP) methodology is an acceptable alternative evaluation method and, as discussed in GIP Part I, Section 2.3.2 above, will satisfy the pertinent equipment seismic requirements of General Design Criterion 2 and the purpose of all applicable NRC regulations relevant to equipment seismic adequacy for plants within the scope of USI A-46. Accordingly, unless there are some unique and unusual circumstances applicable to the plant (such as deviations from the SQUG commitments or implementation guidance of the GIP), a change of commitment from IEEE 344-1971 to the USI A-46 (GIP) methodology should not involve an unreviewed safety question for matters related to verifying the seismic adequacy of electrical and mechanical equipment. This determination is subject to the previously discussed limitation that the USI A-46 (GIP) methodology applies to equipment seismic adequacy and not to the overall adequacy of the system in which the equipment is installed. Thus, USI A-46 licensees are not relieved of the requirement to perform and document a Section 50.59 evaluation to determine whether unreviewed safety questions exist.

Example 4

Revising the plant licensing bases when the plant is generally committed to using IEEE 344-1971, and in addition, has specific commitments to other guidance for equipment connected with resolution of specific issues.

- (a) For equipment not subject to seismic qualification requirements imposed or committed to in connection with the resolution of other specific issues, the plant may modify its commitment to reflect use of the USI A-46 (GIP) methodology as described for Example 3, above.
- (b) For equipment subject to seismic qualification requirements imposed or committed to in connection with the resolution of other specific issues, the commitments to the specific requirements may be revised as described in ^[7]Example 2, above.

Example 5

This is a variation of Examples 1-4 that expands the scope of the USI A-46 (GIP) methodology to include equipment outside the scope of A-46, when the equipment is within the scope of equipment covered by the GIP.

A change of licensing basis commitment from IEEE 344-1971, as described in above examples, will result in the application of the USI A-46 (GIP) methodology to plant equipment outside the scope of A-46. The scope of application of the USI A-46 (GIP) methodology may be expanded to include this additional mechanical and electrical equipment, provided the licensee also commits to the guidelines presented in Section 2.3.4 of Part I of the GIP, “Future Modifications and New and Replacement Equipment.” The Section 50.59 safety evaluation to change the plant licensing bases (as discussed in the above examples) should also consider the effects of expanding the application of the USI A-46 (GIP) methodology from A-46 equipment to the new scope of equipment. However, absent unique and unusual circumstances applicable to the plant, expanding the scope of the A-46 methodology as noted above should not constitute an unreviewed safety question ^[16]for matters related to verifying the seismic adequacy of mechanical and electrical equipment, tanks and heat exchangers, and cable and conduit raceway systems.

Subsequent to resolution of USI A-46, if licensees take exception to the GIP criteria and modify those criteria for plant-specific application, this shall be accomplished by modifying the plant licensing bases using the regulatory provisions of 10 C.F.R. § 50.59. This will be considered a plant-specific modification of a licensing commitment, not a modification of the GIP.

2.3.4 Future Modifications and New and Replacement Equipment

For any new equipment and replacement of or modifications to equipment having seismic requirements (including equipment not evaluated in response to A-46), licensees shall comply with the plant's licensing bases. Should the licensing bases include use of the USI A-46 (GIP) methodology as an option for verifying seismic adequacy, that methodology will be extended to all mechanical and electrical equipment if and only if the following conditions are satisfied:^{6[19]}

1. The equipment is reviewed and/or inspected in accordance with the GIP;
2. Equipment changes and modifications are performed in accordance with the GIP;
3. New or replacement equipment complies with any one of the following:
 - a. If it is identical to the equipment originally installed in the plant, the criteria and procedures in the GIP apply,
 - b. If it is not identical to the equipment originally installed in the plant, the licensee may, on a case-by-case basis establish the equipment's similarity to the installed equipment. The definition of similarity includes the following elements:
 - 1) excitation, 2) dynamic properties and operability, and 3) dynamic response. After the similarity is established, then the criteria and procedures in the GIP apply, or
 - c. If it is not identical to the equipment originally installed in the plant and the similarity is not established, its seismic adequacy may be verified by conducting a plant and equipment-specific evaluation using the approved USI A-46 (GIP) procedures, or at the licensee's option, application of current seismic qualification criteria or other means acceptable to the staff.

The A-46 criteria contained herein may be applied in USI A-46 plants to new or replacement equipment not identical to the equipment originally installed in the plant, provided the seismic evaluations are performed in a systematic and controlled manner so as to assure that new or replacement equipment are represented in the earthquake experience or generic testing equipment classes and that applicable caveats are met. In particular, each new or replacement item of equipment and part will be ^[17]evaluated for any design changes that could reduce its seismic capacity from that reflected by the earthquake experience or generic testing equipment classes, and these evaluations will be documented.

[18]

⁶ The USI A-46 (GIP) methodology is acceptable and sufficient for verifying the seismic adequacy of commercial grade equipment to be dedicated for safety-related purposes; for other (non-seismic) critical characteristics of equipment to be dedicated, licensees are referred to the guidance/requirements delineated in Generic Letters 89-02, 89-09, and 91-05 which include applicable criteria of 10 C.F.R. Part 50, Appendix B.

^[17]Each new or replacement item of equipment will be evaluated on a plant-specific and equipment-specific basis to show that it is either identical (item 3.a, above), similar (item 3.b), or represented in the GIP equipment classes with applicable caveats met (item 3.c).

4. The GIP is to be maintained in a usable form in the future, with NRC approval of significant changes, in accordance with Section 3.0 of Part I of the GIP. The USI A-46 (GIP) criteria and methodology do not supersede any seismic qualification requirement imposed or committed to in connection with the resolution of other specific issues (e.g., Regulatory Guide 1.97, Three Mile Island Action Item II.F.2, and Individual Plant Examination for External Events) unless those requirements or commitments are revised according to applicable regulatory requirements.

^{[18][19]}The USI A-46 (GIP) methodology is acceptable and sufficient for verifying the seismic adequacy of commercial grade equipment to be dedicated for safety-related purposes; for other (non-seismic) critical characteristics of equipment to be dedicated, licensees are referred to applicable guidance and requirements, such as Generic Letter 89-02 (and its supplement), Generic Letter 89-09, and Generic Letter 91-05, which include applicable criteria of 10 C.F.R. Part 50, Appendix B.

A-46 (GIP) criteria may be applied to modification or repair of existing anchorages (e.g., anchor bolts or welds) including one-for-one component replacements (e.g., replacing bolts in one-for-one component replacements). ^[20]For new installations and newly designed anchorages in modifications or replacements, the USI A-46 (GIP) criteria and procedures may also be applied, except that the factor of safety currently recommended for new nuclear plants in determining the anchorage capacities shall be met.

The A-46 criteria contained herein may also be applied to new and replacement cable and conduit raceway systems or parts thereof, in USI A-46 plants. However, the criteria for evaluation of tanks and heat exchangers, as defined in Section 7 of Part II of the GIP, are intended only for use on existing tanks and heat exchangers, not for new installations.

When verifying the seismic adequacy of replacement equipment, some flexibility will be allowed in considering the safety function of the equipment. For example, as discussed in Section 6 of

Part II, a relay may either be shown to be seismically adequate during an SSE or it may be determined that its function is not necessary for safe shutdown, in which case it is not an essential relay and seismic adequacy need not be verified. Similar functional screening is applicable to other parts of replacement equipment.

2.3.5 Quality Assurance and Quality Control

The USI A-46 program for verification of seismic adequacy of equipment as defined by this procedure is outside the scope of commitments made in plant FSARs and Technical Specifications which form the basis of the operating license for the plant; therefore, there is no requirement to perform the USI A-46 program under the nuclear quality assurance and quality control requirements defined for the safety-related equipment in these plants. Instead, the following quality assurance elements apply to implementation of this procedure for the USI A-46 program:

1. SQUG training courses will be provided to train individuals in the use of the GIP;
2. The safe shutdown alternatives will be reviewed by plant operations personnel; and
3. The seismic adequacy of equipment will be evaluated by at least two engineers, either of whom may identify the equipment as an outlier.

These training, evaluation, and review guidelines, together with the documentation requirements described in this procedure, are consistent with the requirements of Generic Letter 87-02 (Reference 3 of Part I).

The A-46 program is a review methodology and does not encompass safety-related activities including, among other things, procurement, receipt, storage, and modification of equipment. However, if modifications are made to any safety-related plant equipment as a result of the USI A-46 program or if the USI A-46 criteria are used to verify the seismic adequacy of any new or replacement equipment or parts, the modifications or verifications of seismic adequacy shall be performed in accordance with the licensee's quality assurance and quality control requirements as defined in applicable plant documents such as the FSAR, Quality Assurance Program Manual, plant procedures and Technical Specifications.

Records of the USI A-46 program resolution and any plant modifications to safety-related equipment shall be retained in accordance with the licensee's quality assurance program.

The seismic adequacy verifications described in the GIP are based on the assumption that the equipment being evaluated was constructed and installed in accordance with the design and installation documents used by the licensee; therefore, it is not necessary to perform quality control checks of the equipment or their installation for resolution of USI A-46 except as described in this document.

2.3.6 Resolution of USI A-40 and A-17

Licensees implementing the GIP and successfully completing the A-46 resolution for tanks and heat exchangers needed for safe shutdown, for refueling water storage tanks in pressurized water reactors, and possibly other tanks as described in Section 3.3.10 of Part II will have fully addressed, without any other actions, USI A-40 (Seismic Design Basis), as it applies to seismic adequacy of tanks and heat exchangers. Likewise, licensees implementing the GIP and successfully completing the USI A-46 resolution for seismic spatial systems interactions, will have fully addressed, without any other actions, USI A-17 (Systems Interactions), as it applies to spatial interactions. Resolution of A-46 thus closes the remaining seismic issues associated with these USIs.

2.4 EQUIPMENT SELECTION AND VERIFICATION

2.4.1 Operability and Redundancy

In general, operability and availability of A-46 safe shutdown systems and components will be governed by existing plant Technical Specifications. In all cases, unless in conflict with a Technical Specification or a license condition, the USI A-46 (GIP) methodology may be used to assess operability as related to seismic adequacy.

If an item of equipment is taken out of service for maintenance and the allowable time is controlled by a Technical Specification or is appropriately limited by administrative controls, that item of equipment is considered the single-failure equipment for the purpose of this procedure. Thus, the plant system containing the out-of-service equipment need not withstand a single failure in addition to the equipment taken out of service.

Where a licensee concludes that A-46 safe shutdown equipment not currently covered by Technical Specifications should be available during plant operation and, therefore, controlled, the licensee may develop either administrative controls or additional Technical Specifications, at its option, for that equipment. Administrative controls for A-46 equipment not subject to Technical Specifications should 1) address the operability of redundant components or alternative means for achieving and maintaining safe shutdown prior to removing A-46 equipment from service, and 2) establish a maximum amount of time the A-46 equipment may be out of service, considering the post-earthquake safe shutdown function of the equipment.

2.4.2 Regulatory Guide 1.97 Equipment

Post-accident monitoring instrumentation as reflected in Regulatory Guide 1.97 shall be verified seismically adequate according to plant-specific commitments agreed to with the NRC Staff, which might have involved resolution using the USI A-46 (GIP) criteria. Meeting the seismic commitments agreed to with the NRC Staff regarding Regulatory Guide 1.97 will fully resolve USI A-46 for that equipment.

2.4.3 Instrumentation and Controls

Section 1 of the Generic Letter Procedure suggests that safe shutdown equipment should be selected to, among other things, “maintain control room functions and instrumentation and controls necessary to monitor hot shutdown.” In this regard:

1. The reference to the control room does not preclude reliance on local instrumentation; and
2. This guidance only applies after the period of strong motion from the earthquake.

Details regarding the use of instrumentation and controls to monitor and control the plant shutdown are contained in Section 3 of Part II of the GIP.

3.0 Revisions to the GIP

It is anticipated that the earthquake experience and generic testing equipment classes will be periodically updated and revised as new information becomes available. These additions and changes will be made available to the NRC. ^[21]Based on this information, and lessons learned during the USI A-46 plant walkdowns, updates and revisions to the GIP will be performed by a cognizant industry organization in accordance with procedures which are mutually agreed upon by SQUG/EPRI and the NRC Staff.

^[22]SQUG developed a Procedure for Revising the GIP, Revision 3, and submitted it to the NRC for review and approval (Reference 14 of Part I). The NRC Staff reviewed this procedure and found it acceptable (Reference 15 of Part I). SQUG also developed a Procedure for Gathering and Validating Earthquake Experience Data, Revision 2 and submitted it to the NRC for review and approval (Reference 16 of Part I). The NRC Staff reviewed and accepted the portion of this procedure that covered estimation of a ground motion response spectra at selected facility sites, provided such evaluations are performed in accordance with 10 CFR 50, Appendix B, Quality Assurance (QA) controls (Reference 17 of Part I). SQUG prepared Revision 3 to this second procedure which incorporated the NRC Staff QA requirement (Reference 18 of Part I).

These procedures^[22] provide for review of significant changes and additions to the GIP by the NRC and a peer review group acceptable to SQUG/ EPRI and the NRC Staff. As part of this process, all revisions to the GIP will be submitted to the NRC Staff for review prior to implementation. Changes to the GIP shall be regarded as accepted by the Staff upon receipt of a letter to this effect from the Staff, or sixty days after submittal to the NRC, whichever occurs first.

Revisions to the GIP will not apply retroactively to licensees committed to an earlier revision unless the licensees specifically commit to the new revision or, as a result of the safety significance of the issue, the NRC Staff finds the change in position is warranted after following appropriate NRC regulatory controls, e.g., 10 C.F.R. § 50.109.

Unless the change is made retroactive by the NRC Staff, as discussed above, licensees have the option of committing to the new revision (using the Staff letter or the Staff's lack of response to the new revision within sixty days, as justification). If the commitment results in a modification of the licensing bases, licensees will be required to follow the provisions of 10 C.F.R. § 50.59, where appropriate.

In addition to revisions to the GIP, an individual licensee may modify its licensing bases using the regulatory provision of 10 C.F.R. § 50.59 or its commitment to use of the A-46 methodology. This may result in plant-specific modifications to the GIP criteria, as discussed in Paragraph 2.3.3 of Part I. This is considered to be modification of a plant commitment, not a change to the GIP.

4.0 References for Part I

^[1]Note that the references listed below are only for Part I of the GIP. The references for Part II are listed in Section 10 of Part II.

1. NUREG-1030, "Seismic Qualification of Equipment in Operating Nuclear Power Plants," February 1987.
2. NUREG-1211, "Regulatory Analysis for Resolution of Unresolved Safety Issue A-46 Seismic Qualification of Equipment in Operating Plants," February 1987.
3. NRC Generic Letter 87-02, issued February 19, 1987.
4. SQUG response to Generic Letter 87-02 sent to T. Murley (NRC) by N. Smith (SQUG Chairman) on October 9, 1987.
5. SQUG Generic Implementation Procedure, Revision 0, issued June 1988.
6. NRC Safety Evaluation Report on Revision 0 of the GIP, issued July 29, 1988.
7. SQUG response to NRC Safety Evaluation Report on Revision 0 of the GIP sent to L.C. Shao (NRC) by N. Smith (SQUG Chairman) on September 22, 1988.
8. Generic Implementation Procedure, Revision 1, issued December 2, 1988.
9. "Checklist of Open/Unresolved Issues in USI A-46 Program," dated September 21, 1990.
10. NRC Supplement 1 to the Safety Evaluation Report on Rev. 1 of the GIP, issued June 29, 1990.
11. SQUG Letter from N.P. Smith (SQUG Chairman) to L.B. Marsh (NRC) dated December 5, 1989, forwarding SQUG Position Paper, "Technical Basis for Excluding NSSS Equipment and Supports from the Scope of USI A-46," October 16, 1989.
12. "Resolutions to NRC Comments on GIP, Rev. 2," June 28, 1991.
13. Generic Letter 87-02, Supplement No. 1, transmitting Supplemental Safety Evaluation Report No. 2 (SSER No. 2) on SQUG Generic Implementation Procedure, Revision 2, as corrected on February 14, 1992 (GIP-2) U.S. Nuclear Regulatory Commission, Washington, D.C., May 22, 1992.
14. SQUG (N. Smith) letter to NRC (J. Stolz) dated May 16, 1997, "Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Power Plant Equipment, Revision 3, Updated 05/16/97, and Procedure for Revising the GIP, Revision 3."
15. NRC (J. Stolz) letter to SQUG (N. Smith) dated December 4, 1997, "Supplemental Safety Evaluation Report No. 3 to the Generic Implementation Procedure for Seismic Verification of Nuclear Power Plant Equipment, Updated May 16, 1997, (GIP-3)."

16. SQUG (N. Smith) letter to NRC (R. Hernan) dated June 27, 2000, “Procedure for Gathering and Validating Earthquake Experience Data – Revision 2 to Appendix A Containing Ten Examples of Ground Motion Estimate Derivations.”
17. NRC (R. Hernan) letter to SQUG (J. Richards) dated April 27, 2001, “Review of the Seismic Qualification Utility Group Procedure for Gathering and Validating Earthquake Experience Data, Revision 2.”
18. SQUG Procedure for Gathering and Validating Earthquake Experience Data, Revision 3, May 3, 2001.

REASONS FOR CHANGES TO GIP, PART I

Listed below are the specific reasons for making the changes marked with a vertical line in the margin of this part to create GIP-3A from GIP-3, Updated 5/16/97. The endnote numbers listed below correspond to the bracketed numbers (e.g., ^[1]) located in the text of this part where the changes are made.

¹ Editorial clarification added.

² SSER No. 2, Sec. I.1.1 – The Staff noted that although “proper anchorage” is important for adequate seismic capacity of equipment, there are other aspects that must also be considered when evaluating the seismic adequacy of equipment.

The GIP has been amended in Part I, Section 1.1 to add the phrase, “with certain other important considerations,” to the sentence discussing “properly anchored equipment.”

³ SSER No. 2, Sec. I.1.2.1 – The Staff position is that the GIP is an acceptable method for verifying the seismic adequacy of equipment in USI A-46 plants provided the GIP is used in its entirety in conjunction with the clarifications, interpretations, and exceptions provided in SSER No. 2.

The GIP has been amended in Part I, Sections 1.2 and 1.3 to address the Staff position.

⁴ SSER No. 2, Sec. I.1.2.2 and Sec. I.1.3.1 – The Staff position is that deviations from GIP-2 and SSER No. 2 without the Staff’s prior approval may result in the licensee not fully satisfying the provisions of GL 87-02.

The GIP has been amended in Part I, Sections 1.2 and 1.3 to warn the licensee that methods which deviate from the GIP may not be acceptable to the NRC Staff, even though the licensee may consider the methods to be equivalent.

⁵ SSER No. 2, Sec. I.1.3.2 – The Staff concurs in the GIP statement that “submittals which commit to the entire GIP . . . shall be regarded as accepted by the Staff upon docketing . . .” provided the licensee also commits to use of the entire GIP as supplemented by the NRC clarifications, interpretations, and exceptions from SSER No. 2.

The GIP has been amended in Part I, Section 1.3 to incorporate the Staff position.

⁶ SSER No. 2, Sec. I.2.1 – The Staff position is that although they recognize the importance of the references cited in Part I, Section 2.1, which summarize the resolution histories of many issues, these documents reflect SQUG’s perception of the resolution.

The GIP has been amended in Part I, Section 2.1 to reflect this Staff position.

⁷ Typographical error corrected.

⁸ SSER No. 2, Sec. II.4.2.3 – The Staff provided their definition of “conservative, design” in-structure response spectra and defined the mechanism for their review of the in-structure response spectra (ISRS) for certain USI A-46 plants.

The GIP has been amended in Part I, Section 2.2.1.5 and in Part II, Section 4.2.4 to incorporate the Staff definition of “conservative, design” in-structure response spectra and their plan for reviewing ISRS.

⁹ The footnotes previously located at the end of Part I have been moved to the bottom of the page on which the footnote is cited.

¹⁰ SSER No. 2, Sec. I.2.2 1st ¶ – The Staff position is that the third-party auditors should have broad engineering experience, have completed the SQUG-developed training course on seismic adequacy verification, and have sufficient qualification and experience to be able to assess the adequacy of the entire plant-specific implementation program during the limited time of the audit.

The GIP has been amended in Part I, Section 2.2.7 to reflect the portions of the Staff position not already covered in other portions of the GIP.

¹¹ SSER No. 2, Sec. I.2.2, 2nd ¶ – The Staff recommended that to provide a desired degree of assurance concerning the effectiveness of the third-party audit, a process for inter-plant information exchange and coordination should be implemented to collect, evaluate, and disseminate generic problems, questions, and lessons learned during the USI A-46 plant-specific walkdowns and third-party reviews to all member utilities in a timely manner.

The GIP has been revised to add Section 2.2.11 to Part I to address the Staff recommendation.

¹² SSER No. 2, Sec. I.2.3.1 – The Staff understands that the word “henceforth” in the first sentence of Part I, Section 2.3.3 to mean, based on SQUG GIP-0 (page 5 of Part I), “after issuance of a final, plant-specific SER resolving USI A-46.”

The GIP has been amended in Part I, Section 2.3.3 to delete the word “henceforth” from the first sentence since licensees may revise their plant licensing bases at any time, subject to NRC regulations.

¹³ SSER No. 2, Sec. I.2.3.1 – The Staff position is that their approval of the implementation of the GIP does not relieve the licensees from the requirement to address all aspects of unreviewed safety questions as specified in 10 CFR 50.59 (for example, those plants where the FSAR has specified damping values which differ from the GIP).

The GIP has been amended in Part I, Section 2.3.3 to incorporate the Staff position as a reminder to the licensee.

¹⁴ SSER No. 2, Sec. I.2.3.2 – The Staff position is that any previous commitments, such as for RG 1.97 and TMI Action Plant Item II.F.2, are not superceded by the resolution methods of the GIP.

The GIP as been amended in Part I, Section 2.3.3, Example 2, to delete the reference to 10 CFR 50.59. In addition, the last paragraph of Example 2 has been incorporated into subparagraph (b).

¹⁵ Clarified the text of the GIP in Part I, Section 2.3.3, Example 3 where the GIP methodology is described as satisfying the pertinent equipment seismic requirements of GDC 2 and the purpose of regulations relevant to equipment seismic adequacy. This was done so that the text parallels the discussion of this topic in the GIP Part I, Section 2.3.2 and in SSER No. 2.

¹⁶ SSER No. 2, Sec. I.2.3.3 – The Staff position is that the following phrase should be added to the last sentence of Example 5 in Part I, Section 2.3.3, “. . . for matters related to verifying the seismic adequacy of electrical and mechanical equipment.”

The GIP has been modified in Part I, Section 2.3.3, Example 5, to incorporate the Staff suggested addition. This phrase was also expanded to include tanks and heat exchangers and cable and conduit raceway systems.

- ¹⁷ SSER No. 2, Sec. I.2.3.4 – The Staff provided their position on how to evaluate design changes when applying the GIP for new and replacement equipment and parts. Their position included a statement that the evaluation must be done on a case-by-case (i.e., plant-specific and equipment-specific) basis. The position also included a few editorial changes to the language used in the GIP.

The GIP has been edited in Part I, Section 2.3.4 to address the Staff position by adding a new paragraph at the end of Item 3 and making editorial changes in Item 3.c, ¶2.

- ¹⁸ The last paragraph in Part I, Section 2.3.4, Item 3.c has been moved to a new paragraph in Section 2.3.4 following Item 4.

- ¹⁹ SSER No. 2, Sec. I.2.3.3 – The Staff suggested that in addition to GL 89-02 and GL 89-09, licensees should also refer to GL 91-05 when defining non-seismic critical characteristics for use in dedicating commercial-grade equipment and parts.

The GIP has been changed in Part I, Section 2.3.4 to include the Staff suggestion.

- ²⁰ SSER No. 2, Sec. II.4.4.7 – The Staff concurred with the GIP statement in Part I, Section 2.3.4 that the factor of safety currently recommended for new nuclear plants should be used for new installations and newly designed anchorages in modifications or replacements instead of those contained in the GIP for resolution of USI A-46. However, the Staff provided alternative language to describe this requirement.

The GIP has been edited in Part I, Section 2.3.4 to incorporate the alternative Staff language. Part II, Section 4.4.2 and Appendix C have also been amended to include a paragraph reminding the licensee of this requirement.

- ²¹ SSER No. 2, Sec. I.3.0 – The Staff suggested that in addition to use of new earthquake experience data, the cognizant industry organization (EPRI/SQUG) should include lessons learned during walkdowns as a source of information to be considered when making future revisions to the GIP.

The GIP has been amended in Part I, Section 3.0 to incorporate the Staff suggestion.

- ²² SSER No. 2, Sec. I.3.0 – The Staff suggested that the cognizant industry organization (EPRI/SQUG) should submit, for NRC Staff review and approval, (1) a procedure for evaluating the acceptability of new data and (2) a procedure for updating and revising GIP-2 and subsequent revisions.

The GIP has been amended in Part I, Section 3.0 to reference the two procedures that SQUG developed and submitted to the NRC (References 16 and 14 of Part I, respectively) and the NRC Staff's review and approval of these procedures (References 17 and 15 of Part I, respectively).