

## APPLICATION OF THE GIP TO NEW AND REPLACEMENT EQUIPMENT AND PARTS

One of the most significant benefits of the GIP, beyond resolution of USI A-46, is that the GIP methodology may be used for verifying the seismic adequacy of new and replacement equipment and parts. Use of the GIP methodology is expected to offer a safety benefit for A-46 plants comparable to shake table testing but at a significantly lower cost.

To help A-46 licensees implement the overall principles contained in the GIP (Part I, Section 2.3.4) and the NRC's Supplemental SER No. 2 (Section I.2.3, Item 4), SQUG has developed supplemental guidelines, "Verifying the Seismic Adequacy of New and Replacement Equipment and Parts." Draft copies of these guidelines are being distributed to the SQUG member utility representatives for trial use and comment.



Important issues which are addressed in the guidelines include licensing considerations and differences between the application of the GIP methodology to new and replacement items as opposed to resolution of USI A-46. These issues are summarized below along with an outline of the steps for applying the GIP methodology to new and replacement equipment and parts.

### Licensing Considerations

Resolution of USI A-46 is a snapshot in time. Unless a licensee takes some additional action during or following resolution of USI A-46, under some circumstances the GIP may not be applied to seismic verification of new and replacement equipment and parts. Licensees must conform to applicable, plant-specific licensing basis requirements. For some A-46 plants, the licensing basis requirements may be general enough to allow use of the GIP without additional licensing action. However, in most cases, a change to the plant licensing basis is necessary to support future use of the GIP, particularly when the licensee has committed to specific seismic evaluation criteria. The SQUG guidance document provides recommended actions for various representative licensing scenarios.

## USI A-46 Resolution Versus New and Replacement Equipment

The GIP was developed to evaluate already-installed equipment for resolution of USI A-46. Evaluation of new and replacement items must address additional technical considerations. The GIP approach must also be integrated with plant organizations when new equipment is purchased and installed. This includes plant-specific procedures for procurement, modification, and installation. It also requires application of plant-specific quality assurance and quality control requirements. Verifying the seismic adequacy of new and replacement items may also require enhanced effort, compared to the A-46 program, to ensure that new equipment is properly represented within the earthquake experience and testing databases. An important tool for ensuring representation in the experience databases is the SQUG Electronic Database (see accompanying article).

### Basic Approach For Equipment

The guidelines for applying the GIP methodology to new and replacement equipment include the following steps.

1. Review licensing basis commitments applicable to the equipment and determine if the GIP is an acceptable method for evaluations of seismic adequacy.
2. Determine if the equipment seismic capacity, as represented by the Bounding Spectrum, the Reference Spectrum, or GERS, exceeds the equipment seismic demand.
3. Develop procurement and installation specifications which assure that the installed new equipment item will meet applicable caveats and inclusion rules contained in the GIP and will assure that no seismic interaction concerns will exist.
4. For later vintage equipment, identify any design differences between the new equipment and those in the experience equipment class and demonstrate that identified changes do not adversely impact seismic ruggedness. The SQUG Electronic Database can be used to make these evaluations.
5. Develop anchorage design and installation specifications which ensure that the installed anchorage will meet GIP anchorage requirements.

6. Walkdown the installed equipment by a Seismic Capability Engineer, as necessary, to ensure that the installed equipment meets GIP requirements.
7. Document the evaluation and obtain required Seismic Capability Engineer review and signoff.

### Basic Approach For Parts

Due to differences in the manner in which the GIP can be applied to equipment versus parts, separate guidelines are provided. The guidelines for applying the GIP methodology to new and replacement parts include the following steps.

1. Review licensing basis commitments applicable to the parent equipment and determine if the GIP is an acceptable method for evaluation of seismic adequacy for the parent equipment.
2. Demonstrate that the parent equipment meets the GIP screening criteria.
3. Document that the part mounting and load path are sufficiently rugged.
4. Demonstrate that the seismic capacity of the part is greater than or equal to that of the parent. This can be accomplished using one of the following alternatives.
  - Demonstrate that the part is represented by common parts in the experience equipment classes. The SQUG Electronic Database can be used for this purpose.
  - For later vintage parts, show that identified design differences between the part and those parts common to experience equipment classes do not adversely affect seismic ruggedness. The SQUG Electronic Database can be used to make these comparisons.
  - Apply part-specific seismic qualification data using an approach similar to that specified in Section 6 of the GIP for relays.
  - Determine the part's seismic capacity using current qualification methods (IEEE 344-1975 or IEEE 344-1987).
5. Document the evaluation and obtain required Seismic Capability Engineer review and signoff.

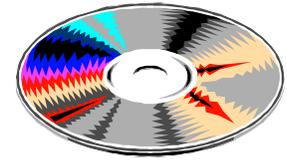
For more information on the SQUG Guidelines for Verifying the Seismic Adequacy of New and Replacement Equipment and Parts, contact Dr. R. P. Kassawara at EPRI, 415-855-2775, or Patrick Butler at MPR, 703-519-0200.

### SQUG ELECTRONIC DATABASE

During the past ten years, when the SQUG Generic Implementation Procedure (GIP) was being developed, a significant amount of earthquake experience data was collected for a variety of equipment types. These data were collected in the form of photographs, manufac-

turer's literature, log books, damage reports, audio tapes from interviews with plant personnel, and accelerographs. Altogether, these data cover several thousand items of equipment, representing over 100 sites which have been subjected to 20 strong motion earthquakes.

In order to document and protect this information and to provide access for use in verifying the seismic adequacy of new and replacement equip-



ment and parts, this information has been archived into the SQUG Electronic Database. Two systems were developed, an analog system (laser disc based) and a digital system (CD ROM based). Both systems are PC driven with software specifically designed to locate and access individual items of experience data.

This SQUG Electronic Database is described in EPRI Report TR-102641, "Database Systems of Power Plant Equipment Seismic Experience." This report also includes solutions for several real-life examples showing how to determine whether items are represented in the experience database. A draft copy of this report is being distributed to each SQUG member utility representative for trial use and comment.

The CD ROM version of the database system is now available and can be ordered by any SQUG or EPRI utility from:

Electric Power Software Center  
 1930 Hi Line Drive  
 Dallas, TX 75207  
 Phone: 214-655-8883  
 FAX: 214-655-8836

To run the CD ROM version, about \$2,000 worth of hardware is required: an IBM-compatible PC with a super-VGA monitor, a CD ROM driver, and a special circuit board for decompression and display of images. To run the laser disc version of the database system, about \$10,000 worth of hardware is required: an IBM-compatible PC, a Panasonic optical disc player, and a high resolution monitor.

While the CD ROM version of the database system contains only about half the number of images as the laser disk version, there is not a significant reduction in useful information since the less useful images were omitted. Image resolution, however, will typically be better for the laser disk version than the CD ROM version.

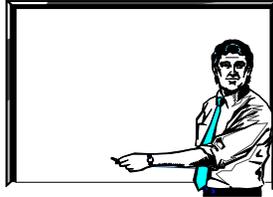
The SQUG Electronic Database is a key tool for applying the GIP methods to new and replacement equipment. It provides significantly more details on the equipment and sub-components than were previously available from other SQUG documents.

For more information on the SQUG Electronic Database, contact Dr. R. P. Kassawara at EPRI, 415-855-2775, or Sam Swan at EQE, 415-989-2000.

## NEW SQUG TRAINING COURSE AND ADDITIONAL SESSIONS OF EXISTING COURSES

A new SQUG training course and three new sessions of existing SQUG courses have been added to the schedule for 1993. (See box with Schedule of SQUG Courses.)

The new SQUG training course, New & Replacement Equipment Course, is being prepared to help engineers apply the SQUG Guidelines for Verifying the Seismic Adequacy of New and Replacement Equipment and Parts. It will also cover how to use the SQUG Electronic Database for establishing representation of equipment and parts within the experience equipment classes. This course will include examples and case studies. The first session of the New & Replacement Equipment course is scheduled to be given on 11/10 - 11/11/93.



### Schedule of SQUG Courses

#### Equipment Selection and Relay Evaluation Courses

\* 9/8 - 9/10/93 Washington, DC - Open Enrollment (\$1000)

#### A-46 Walkdown Screening and Seismic Evaluation Courses

8/2 - 8/6/93 Boston, MA (Class full)  
\* 8/16 - 8/20/93 Minneapolis, MN - Open Enrollment (\$2000)  
11/1 - 11/5/93 Charlotte, NC

#### Seismic IPE Add-On Courses

8/31 - 9/2/93 Boston, MA (Class full)  
\* 9/20 - 9/22/93 Minneapolis, MN - Open Enrollment (\$1000)  
12/6 - 12/8/93 Charlotte, NC

#### New & Replacement Equipment Courses

\* 11/10 - 11/11/93 Location TBD

#### Followup Workshops for SSEL/Relay, A-46 Walkdown, and Seismic IPE Add-On Courses

Nov - Dec Location TBD

\* New session or course

To broaden the availability of the existing SQUG training courses, new sessions of the Equipment Selection and Relay Evaluation Course, the A-46 Walkdown Screening and Seismic Evaluation Course, and the Seismic IPE Add-On Course have been added to the training schedule on an "open enrollment" basis, i.e., *no utility sponsorship is needed*. Registrants will,

however, be charged a registration fee. Dates and locations for these open enrollment courses are listed in the accompanying box along with the other sessions of the training courses remaining in 1993. Note that July 9, 1993, is the final registration date for the open enrollment A-46 Walkdown course scheduled for 8/16 - 8/20/93.

For more information on any of the SQUG courses and Followup Workshops, contact the training coordinators, Dave Freed or Nancy Richardson at MPR, 703-519-0200.

### THE SQUG BBS: THE *ELECTRONIC* WORKSHOP

Have you tried using the SQUG Bulletin Board System (BBS) yet? Just about all of the SQUG member utilities have registered as users. In fact, with multiple users at some utilities (up to four are allowed), the total number of registrants is up to 63, including every Steering Group member and eight Subject Matter Experts (SQUG contractors who developed the GIP and SQUG training courses).



What does the BBS offer you? Suppose you are trying to remember the date of a training course or the next SQUG meeting, but can't find your copy of the announcement memo? Log onto the BBS and go to the Library named "SQUGMEMO". You'll find copies of such memos dating back to April -- copies you can read on-line or download and print. Other Libraries include WordPerfect files for the SQUG Management Guidelines that you can download and tailor to your plant, and WordPerfect redline/strikeout files that explain changes made to Section 3 and Appendix A of the GIP for each revision since Revision 1. Libraries are also provided where you can upload/download files for exchange with other users -- perhaps you want to share a handy spreadsheet you have developed.

Many of you already know the power of the BBS. Over 80 messages have been posted to the Forums, and in excess of 600 E-mail messages have been exchanged to date! This is just the tip of the iceberg, though. The true power of the BBS will be unlocked when each utility actively participates in the BBS "electronic workshop". A representative of your utility should log on at least once a week and review new messages in the forums. If you can offer advice or a solution, by all means contribute. The utility whose question you answer today may offer the solution to that baffling problem you have next week. In fact, you may find that the answer to your problem has already been posted to the BBS in response to someone else's question.

Some of you attended the recent Followup Workshops held at EPRI, and know how valuable they can be. The workshops bring you together with other utility engineers and SQUG contractors who have the

expertise and experience to solve many problems you may encounter in your SQUG program. But why wait for the next workshop? This experience and expertise are only a modem away! Just post your question or problem to the Forums section of the BBS, where others can read it and offer their advice. If you are curious how other utilities handled something, just ask. If your question requires the expertise of the Steering Group or Subject Matter Experts (SMEs), direct the question to the system information manager (userid STARCK), who will coordinate obtaining a Steering Group-approved response. It only costs a few minutes of your time and a phone call.

Don't get left behind. As mentioned, we can accommodate four users per utility. If you are not currently a user, contact your SQUG representative

and find out who your users are, and if slots are available, ask your rep for a BBS registration sheet. A demonstration of the BBS will be featured at the July SQUG meeting. The demonstration will include logging onto the BBS, reading and writing E-mail, scanning the forums, and downloading files from the LIB file libraries. Following the demonstration, a portable PC with modem will be available to try the BBS yourself.

For those of you who were not able to attend the last Followup Workshop, don't despair. Look for summaries of the questions asked and answers given to appear in the BBS Forums. If you have any questions on SQUG BBS, contact Mike Smith at MPR, 703-519-0200.

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SEISMIC QUALIFICATION UTILITY GROUP (SQUG)

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*The Seismic Qualification Utility Group (SQUG) was formed in 1982 to develop a technically sound and cost effective alternative for verifying the seismic adequacy of equipment installed in older nuclear power plants. This newsletter reports on the generic activities of the SQUG program as well as the results and lessons learned from utility implementation of the SQUG methodology.*

*Comments, questions, suggestions, and contribution of articles may be forwarded to:*

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