New York PowerAuthority
James A. FitzPatrick Nuclear Power Plant

USI A-46
Project Summary

September 1995

NEW YORK POWER AUTHORITY	
DOCUMENT REVIEW STATUS	
STATUS NO:	
1	☒ ACCEPTED
2	☐ ACCEPTED AS NOTED RESUBMITTAL NOT REQUIRED
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4	☐ NOT ACCEPTED
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Purpose

The purpose of this report, together with References 1 and 2, is to document the evaluations performed to address Unresolved Safety Issue (USI) A-46 at the James A. Fitzpatrick Nuclear Power Plant (JAFNPP) using the Generic Implementation Procedure (GIP, Reference 3) developed by the Seismic Qualification Utility Group (SQUG).

Background

Because of the extent of the changes in the requirements for seismic qualification of equipment over the years, the U.S. Nuclear Regulatory Commission (NRC) initiated USI A-46, "Seismic Qualification of Equipment in Operating Nuclear Plants," in December 1980. The purpose of USI A-46 is to verify the seismic adequacy of essential equipment in operating plants which had not been qualified in accordance with more recent criteria.

In 1982, SQUG was formed to develop a practical approach for seismic qualification of equipment in operating plants. The approach developed by SQUG was to use experience with the performance of power plant and industrial equipment in actual earthquakes as the primary basis for evaluating the seismic ruggedness and functionality of essential equipment in nuclear power plants. In 1983, the NRC issued NUREG 1018 which includes a general endorsement of the use of experience data for verification of the seismic adequacy of equipment in nuclear plants.

In early 1987, the NRC issued Generic Letter (GL) 87-02 to owners of operating nuclear plants which were licensed prior to development of modern seismic qualification standards. The recipients of GL 87-02 are referred to as A-46 plants and include JAFNPP. Essentially, all owners of A-46 plants, including NYPA, are SQUG members. GL 87-02 requires owners to take action to verify the seismic adequacy of important equipment in their plants. The SQUG approach embodied in the GIP is explicitly recognized by the NRC as the preferred method for accomplishing this objective.

In 1992, the NRC issued Supplement No. 1 to GL 87-02 [Reference 4] which transmitted Supplemental Safety Evaluation Report No. 2 on SQUG GIP, Revision 2, as corrected on February 14, 1992 [Reference 3]. References 3 and 4 are the basis for the evaluations described in this report.

In Reference 5, NYPA described its approach for resolving USI A-46. This approach was accepted by the NRC in Reference 6.

Project Team

The project team consisted of New York Power Authority (NYPA) engineering staff and two engineering consulting firms: Stevenson and Associates of Woburn, Massachusetts (S&A), and Engineering and Plant Management (EPM) of Framingham, Massachusetts (EPM). Independent reviews were provided by the JAFNPP Operations Department, Dr. John D. Stevenson, President of S&A, and Dr. Robert J. Budnitz, President of Future Resources Associates, Inc.

Report Organization

The complete report consists of this report and References 1 and 2. This report provides a summary of the project. Reference 1 documents the development of the safe shutdown equipment list (SSEL) and the relay evaluations. Reference 2 documents the seismic evaluations.

Development of the Safe Shutdown Equipment List (SSEL)

The GIP's methodology requires a system analysis to select a set of plant systems and equipment necessary to achieve and maintain safe shutdown from a normal plant operating condition, and assuming a loss of offsite power. The resulting list of equipment comprises the *composite* SSEL. Based on its type, function, and operational characteristics, each item of equipment on the composite SSEL is designated for seismic and/or relay evaluation. The list of equipment requiring a seismic evaluation is the *seismic* SSEL, and the list of equipment requiring a relay evaluation is the *relay* SSEL.

JAFNPP's composite SSEL consists of 776 items of equipment (Reference 1, Attachment C). The seismic SSEL contains 522 items of equipment (Reference 1, Attachment D). The relay SSEL contains 405 items of equipment (Reference 1, Attachment E).

Relay Evaluations

The supporting relays for each item of equipment on the relay SSEL are identified (any device with electrical contacts is considered a relay). These relays comprise the *associated* relay list. Each relay on the associated relay list is then classified as essential or non-essential. Essential relays are those relays for which contact chatter could adversely impact the function of the associated equipment. Non-essential relays are those relays which either are considered sesimically rugged (such as mechanically actuated switches) or whose chatter could not adversely impact the function of the associated equipment. Essential relays are then reviewed to determine if their seismic capacity (the level of seismic motion that a specific model of relay can experience without exhibiting contact chatter) is greater than their seismic demand (the expected level of seismic motion for a particular relay based on its location in the plant). An essential relay is classified as an outlier if its sesimic capacity does not exceed its seismic demand.

JAFNPP's associated relay list contains 1734 relays (Reference 1, Attachment G). Of these, 382 are essential relays (Reference 1, Attachment H). Of the essential relays, EPM classified 144 (consisting of 13 unique makes) as outliers (Reference 1, Attachment I). Stevenson & Associates subsequently reviewed the outliers and resolved 14 (5 unique makes); this review is included in Reference 1, Attachment I. The remaining 130 outliers (8 unique makes) are outliers because, to date, no seismic capacity data is available.

Seismic Evaluations

Each item of equipment on the seismic SSEL was evaluated by a Seismic Review Team (SRT) consisting of two or three Seismic Capability Engineers (trained and certified per GIP requirements), and always included at least one licensed professional engineer. The evaluation consisted of a walk-down (visual examination) of the equipment and consideration of three factors: 1) a comparison of the plant equipment to equipment in SQUG's earthquake experience data base, 2) an evaluation of the equipment's anchorage (calculations and bolt tightness checks were performed where required), and 3) an evaluation of any potential seismic interaction hazards (for example, masonry block walls near the equipment). An item of equipment that did not meet GIP criteria was classified as an outlier.

Of the 522 items on JAFNPP's seismic SSEL, 62 are classified as outliers. Twenty-two (22) of the outliers have been resolved analytically, the remaining 40 require either corrective action or a modification; some of these have already been completed. The most common modifications are 1) bolting together of adjacent cabinets that contain essential relays, and 2) repair or improvement of equipment anchorages. The equipment seismic evaluations are summarized in Reference 2, Sections 3 and 4. As required by the GIP, the findings are summarized on Screening Verification Data Sheets (SVDS, Reference 2, Appendix B), and outliers are documented on Outlier Seismic Verification Sheets (OSVS, Reference 2, Appendix E). The complete evaluations, including check lists, SRT's notes, sketches, photographs, and calculations, are documented on Screening Evaluation Worksheets (SEWS, Reference 2, Appendix G).

A seismic review of conduit and cabletray raceways was also performed as required by the GIP. Raceway systems were walked-down and checked against GIP criteria. Ten (10) representative, worst-case raceway supports were selected and as-built. These supports then received a Limited Analytical Review per GIP Section 8.3.

Two outliers were identified. Both outliers resulted from the Limited Analytical Reviews. One outlier was resolved analytically. This analytical resolution encompasses all hangers that are enveloped by this worst-case support. The second outlier required modification of the support. Several other supports in the immediate area of similar construction were also identified and modified. In addition, an action plan has been initiated to identify any other supports of similar construction that may require modification.

This raceway review is summarized in Reference 2, Section 5. The walk-down is documented on Plant Area Summary Sheets (PASS, Reference 2, Appendix C). The calculations performed for the Limited Analytical Reviews (LARs) are in Reference 2, Appendix D. Outlier Seismic Verification Sheets (OSVS) are included in Reference 2, Appendix E.

Project Reviews

The JAFNPP Operations Department performed a review of the SSEL (Reference 7). The review consisted of a "table top" review by a licensed Senior Reactor Operator, and a simulator validation. The SSEL was found to be acceptable. An additional peer-level review of the methodology used to develop the SSEL was performed by Dr. Robert J. Budnitz of Future Resources Associates (Reference 8). Dr. Budnitz found the methodology acceptable.

Dr. John D. Stevenson of Stevenson & Associates performed a peer review of seismic evaluation (References 9 -11). The review consisted of selecting 19 representative items of equipment from the seismic SSEL, an independent walk down of those items, and a review of the SRT's evaluation of those items. The evaluations were found acceptable.

References

1. Engineering and Planning Management, Inc. "New York Power Authority James A. FitzPatrick Nuclear Power Plant Safe Shutdown Equipment and Relay Evaluation for Unresolved Safety Issue (USI) A-46", Final Report, September 1995

2. Stevenson & Associates, Inc. "New York Power Authority James A. FitzPatrick Nuclear Power Plant USI A-46 Seismic Evaluation Report", September 1995.

3. Seismic Qualification Utility Group (SQUG), "Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment", Revision 2, corrected February 14, 1992.

4. USNRC, "Supplement No. 1 to Generic Letter (GL) 87-02 that Transmits Supplemental Safety Evaluation Report No. 2 (SSER No. 2) on SQUG Generic Implementation Procedure, Revision 2, as Corrected on February 14, 1992 (GIP-2)," dated May 22, 1992.

5. Letter from R. E. Beedle (NYPA) to USNRC dated 9/22/92, "Response to Supplement No. 1 to Generic Letter 87-02..." (IPN-92-043 / JAFNPP-92-053)

6. Letter from Brian C. McCabe (USNRC) to R. E. Beedle (NYPA) dated 11/17/92, "Response to Supplement No. 1 to Generic Letter 87-02 ... James A. Fitzpatrick Nuclear Power Plant"

7. Memorandum from J. Klevorn to P. Okas, "Report of JAFNPP Operations Department Review of SSEL Systems for Resolution of USI A-46", JPOS-94-006, Rev. 1, January 31, 1994.

8. Letter from Robert J. Budnitz (Future Resources Associates) to Thomas J. Tracy (Stevenson & Associates) dated March 15, 1994.

9. Letter from John D. Stevenson (S&A) to Priit Okas (NYPA) dated September 26, 1994.

10. Letter from John D. Stevenson (S&A) to Stephen Anagnostis (S&A) dated August 25, 1995.

11. Letter from Stephen Anagnostis (S&A) to Priit Okas (NYPA) dated September 16, 1995.

ATTACHMENT 2 to JPN-95-049

Summary of Commitments

Number	Commitment	Due Date
JPN-95-049-01	Resolve outstanding outliers identified in the USI A-46 Summary Report.	Startup from the Refuel 13/Cycle 14 refueling outage
JPN-95-049-02	Submit Completion Letter to the NRC when outstanding outliers identified in the USI A-46 Summary Report are resolved.	One month after outstanding outlier resolution.
JPN-95-049-03	Update UFSAR to reflect use of USI A-46 methodology.	First UFSAR update due more than six months after issuance of final NRC SER.

ENCLOSURE 1 TO JPN-95-049

USI A-46 Safe Shutdown Equipment and Relay Evaluation Report, Volume I

New York Power Authority

JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

ENCLOSURE 2 TO JPN-95-049

USI A-46 Seismic Evaluation Report, Volume I

New York Power Authority

JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

New York Power Authority

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

SAFE SHUTDOWN EQUIPMENT AND RELAY EVALUATION

FOR UNRESOLVED SAFETY ISSUE (USI) A-46

SEPTEMBER 1995

VOLUME I OF XII

EPM ENGINEERING PLANNING AND MANAGEMENT, INC.
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