Central File

50-352

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAY 17 1984

MEMORANDUM FOR: Vincent S. Noonan, Chief
Equipment Qualification Branch Division of Engineering

THRU: Goutam Bagchi, Section Leader
Equipment Qualification Branch Division of Engineering

FROM: Arnold Lee
Equipment Qualification Branch
Division of Engineering

SUBJECT: TRIP REPORT FOR SEISMIC QUALIFICATION REVIEW TEAM (SQRT)
PLANT SITE AUDIT - LIMERICK 1

The Seismic Qualification Review Team (SQRT), consisting of staff from Equipment Qualification Branch (EQB), and from Idaho National Engineering Laboratory (INEL), the consultant, conducted a plant site audit at Limerick 1 Nuclear Station on January 17 to January 20, 1984. The purpose of the audit is two-fold: (1) to perform a plant site review of the seismic and dynamic qualification methods, procedures, and results for selected safety-related mechanical and electrical equipment and their supporting structures, (2) to observe the field installation of the equipment in order to verify and validate equipment modeling employed in the qualification program.

The background, review procedures, findings and the required follow-up actions are summarized below. A list of attendees at the conference is contained in Attachment I, and a list of the equipment selected for audit is shown in Attachment II.

I. Background

The applicant has described the equipment qualification program in Sections 3.9 and 3.10 of the Final Safety Analysis Report, consisting of dynamic testing and analysis, used to confirm the ability of seismic Category I mechanical and electrical (includes instrumentation, control and electrical) equipment and their supports, to function properly during and after the safe shutdown earthquake (SSE) specified for the plant

The plant site review was performed to determine the extent to which the qualification of equipment, as installed in Limerick 1, meets the current licensing criteria described in IEEE 344-1975, "Recommended Practices for Seismic Qualification of Class IE Equipment for Nuclear Power Generating Stations," and Regulatory Guides 1.92, "Combining Modal Responses and Spatial Components in Seismic Response Analysis, "1.100, "Seismic Qualification of Electrical Equipment for Nuclear Power Plants," and the Standard Review Plan (NUREG-0800) Section 3.10. Conformance with these criteria is required to satisfy the applicable portions of the General Design Criteria in 1, 2, 4, 14, 18 and 30 of Appendix A to 10 CFR Part 50, as well as, Appendix B to 10 CFR Part 50 and Appendix A to 10 CFR Part 100.

II. Review Procedures

Prior to the site visit, the SQRT reviewed the equipment seismic qualification information contained in the pertinent FSAR sections and the reports referenced therein. A representative sample of 25 pieces of safety-related mechanical and electrical equipment, including 12 in NSSS and 13 in BOP scopes as shown in Attachment II, were selected for the plant site review. The review consisted of field observations of the actual equipment configuration and its installation, followed by the review of the corresponding test and/or analysis documents.

Observation of the field installation of the equipment is required in order to verify and validate equipment modeling employed in the qualification program. Brief technical discussions were held during the review sessions to provide SQRT's feedback to the applicant on the equipment qualification. An exit conference was held to summarize and conclude the plant site visit.

III. Review Endings

In general, the site audit revealed that the applicant's seismic and dynamic equipment qualification program had been adequately implemented. For the 25 equipment items subjected to detail auditing, the SQRT found their qualification to be acceptable with the exception of certain equipment specific details (see Section IV, Follow-Up Actions) which would need to be further clarified by the applicant. Summaries of the SQRT review for each equipment item are presented in Attachment III, the INEL Evaluation Report.

IV. Follow-Up Actions

In order to complete our review we have requested the applicant to address the following issues:

(1) RCIC Steam Turbine Assembly (Equipment Specific Issue)

(a) The turbine governor and electrical accessories as originally installed at Limerick Unit 1, must be upgraded to be similar to the turbine which was tested.

(b) There were two qualification tests performed. In the first test program, #8 taper pins were used for coupling-end alignment. One of these pins failed after an accumulated test time of about 15 minutes. The turbine for the second test program, which was a success, used #9 taper pins and lock plates for the pedestal bolting.

(c) The existing trip and throttle (T&T) valve in the Limerick Unit 1 turbine has a General Electric S&K trip solenoid (push to trip), whereas the successful test turbine used a Thrombetta trip solenoid (pull to trip). During the first qualification test program, with Thrombetta assembly, it became necessary to increase spring stiffness to 25 lb/inch in order to prevent trip latch separation during the resonance search tests. The T&T valve solenoid should be replaced with Thrombetta assembly and stiffness checked or justification provided

(d) In the first test program, it was evident that structural improvements were required in the turbine auxiliary piping. These were implemented in the second test program which was successful. However, each turbine installation has somewhat of a unique piping arrangement. For the turbine oil piping adequacy, therefore, the Limerick Unit 1 as installed piping should be reviewed and adequate supports provided.

(e) The qualified life and resulting preventive or replacement schedule for the new accessories should be incorporated in the maintenance manual.

In order for the RCIC turbine assembly at Limerick Unit 1 to be dynamically qualified the above upgrading and modifications should be done. NRC should be notified when completed.

(2) Justification for Interim Operation

Justification for interim operation while some equipment items are yet to be completely qualified should be submitted for the staff review and acceptance prior to fuel loading.

CENTRAL FILE

MAY 17 1984

V. Conclusion

Based on the results of the site audit conducted, we conclude that the applicant's seismic and dynamic qualification program of safety related equipment in Limerick 1 has been adequately defined and implemented, which will provide adequate assurance that such equipment will function properly during and after the Safe Shutdown Earthquake. Our review of the applicant's qualification program will be continued until all the follow-up actions as identified in Section IV of this report are completed to the SQRT's satisfaction.

Arnold Lee
Equipment Qualification Branch
Division of Engineering

Enclosure: As stated

cc: J. P. Knight (w/o enclosure)
T. Novak (w/o enclosure)
B. Youngblood (w/o enclosure)
A. Schwencer (w/o enclosure)
G. Bagchi (w/o enclosure)
L. Kintner
R. Martin
J. Singh (INEL)
C. Hofmayer (BNL)
A. Lee
PDR

OFFICE	DE/EQB	DE/EQB					
SURNAME	ALee	GBagchi					
DATE	5/17/84	5/17/84					

V. Conclusion

Based on the results of the site audit conducted, we conclude that the applicant's seismic and dynamic qualification program of safety related equipment in Limerick 1 has been adequately defined and implemented, which will provide adequate assurance that such equipment will function properly during and after the Safe Shutdown Earthquake. Our review of the applicant's qualification program will be continued until all the follow-up actions as identified in Section IV of this report are completed to the SQRT's satisfaction.

Arnold Lee
Equipment Qualification Branch
Division of Engineering

Enclosure: As stated

cc: J. P. Knight (w/o enclosure)
T. Novak (w/o enclosure)
B. Youngblood (w/o enclosure)
A. Schwencer (w/o enclosure)
G. Bagchi (w/o enclosure)
L. Kintner
R. Martin
J. Singh (BNL)
C. Hofmayer (BNL)
A. Lee

Attachment I

SQRT/PVORT Audit (1/17 - 1/20/84)

List of Attendees

NRC

Arnold Lee

Jerry Jackson

INEL, EG&G

Jag Singh

Tom Rahl

Bob Harris

Clarke Kido

Thomas Humphrey

Bechtel

John Strohm

Ranga Palaniswamy

Mark Schletz

Lalji Patel

S. S. Sharma

Roop L. Jindal

Chris Cotton

Pete McMahon

Tony Tocci

Russ Werner

John Decker

Lou Pons

Anand Bhatia

PECO

Marie Bundy

Tom Szonntagh

David Marano

Kenneth W. Earle

Thomas Hinkle

John Cotton

Carl Endriss

Jerry Phillabalm

J. J. Whittle

GE

Dick Hardy

Donald K. Henrie

Gary L. Moore

W. H. Fleming

Jim Kelso

Gayle Starkey

Diane Shamis

Frances Collier

Norman Anderson

N. G. Luria

Rod J. Pence

Attachment II

Equipment Selected for SQRT Audit

NSSS Equipment

NSSS1	B21-F013	SRV - 6" x 10" Air Operated
NSSS2	E51-C002	RCIC Turbine
NSSS3	F18-E012	Jib Crane
NSSS4	E32-C001	MSIV LCS Blower
NSSS5	C41-F004	SLC Explosive Valve 1½"
NSSS6		HPCI Pump
NSSS7	2112-P655	Control Room Panel
NSSS8	H23-P075	Local Rack
NSSS9	159e4361	Level Switch
NSSS10	194x927	Sensor & Conv
NSSS11	163C1561	Pressure Transmitter
NSSS12	E11-C002	PHR Pump & Motor

BOP Equipment

BOP1	185	Chlorine Gas Detectors
BOP2	14	Medium Voltage Metal Clad Switch-gear
BOP3	158	1000KVA Ventilated Type Transformer
BOP4	7(12)	Air Compressor Skid w/motor
BOP5	159(17)	Control Relay
BOP6	17	Batteries & Racks
BOP7	210(D)	Microprocessor
BOP8	D-6	Diesel Generator Ventilation Fans
BOP9	16	480V Motor Control Center

BOP10	D-123C	2"M.O.S.S. Globe Valve
BOP11	D-98D	18"M.O.C.S Gate Valve
BOP12	56B	Control Valves
BOP13	D62B	HPCI Pump Room Fan Cabinet