BROOKHAVEN NATIONAL LABORATORY
ASSOCIATED UNIVERSITIES, INC.
Upton, Long Island, New York 11973

Department of Nuclear Energy
Division of Structural Analysis
Building 129

(516) 282-2448
FTS 666-2448

January 18, 1982

Dr. Zoltan Rosztoczy, Chief
Equipment Qualification Branch
MS P-1030
Phillips Building
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Dr. Rosztoczy:

Enclosed are the BNL summary reports of the six items audited during our second visit to the Susquehanna Steam Generating Station. Specifically, the items audited and reported herein are BOP equipment identified as follows:

BOP

4. Control Panel, 2C-681 and 1C-681 (J05A)
7. Pilot Solenoid Valves (J69)
10. Containment Vacuum Relief Valve (M149)
11. Nuclear Safety and Relief Valve (M159)
12. Motor Operated Gate Valves 150# and 300# (P12B(1))
13. Motor Operated Globe Valves -2" (P148).

As noted in the reports themselves there are open issues that are either generic or equipment specific.

In addition to reviewing the above equipment a walkdown audit involving other equipment was also conducted The items for this audit were selected at the plant site and were only checked for proper installation. With the exception of the hydraulic control units (HCU) all equipment looked at, were found to be satisfactory. The headers connecting to all the HCU's were found to be inadequately supported. This question has as yet to be resolved.

During the visit the team also inspected the record room where all plant design related documents are filed. About ten item records were picked at random and examined for content. It was found that the design documents related to the qualification of the chosen ten pieces of equipment were indeed readily available for future reference.

Sincerely yours,

Morris Reich, Head
Structural Analysis Division

lg
Encs.

Attachment II

1. EQUIPMENT REVIEWED IN SECOND SQRT AUDIT

1. Control Panel, 2C-681 & 1C-681 (J05 A)
2. Pilot Solenoid Valves (J69)
3. Containment Vacum Relief Valve (M149)
4. Nuclear Safety & Relief Vavles (M159)
5. Motor Operated Gate Valves 150# & 300# (P12B(1))
6. Motor Operated Globe Valves - 2" (P14B)

2. ADDITIONAL EQUIPMENT SELECTED FOR WALK-DOWN

BOP

1.	SGTS Centrifugal Fans (M362)	Central Bldg.
2.	HVAC Filters, High Efficiency (M325-1)	Central Bldg.
3.	Electric Hydrogen Recombiner (M87-1)	Reactor Bldg.
4.	Drywell Unit Coolers (M317)	Drywell
5.	Centrifugal Water Chillers (M310)	Control Bldg.
6.	Chlorine Detector (M320-1)	Control Bldg.

NSSS

7.	Hydraulic Control Unit (C12 D001)	Reactor Bldg.
8.	Recirc. Pump & Motor (B31C001)	Reactor Bldg.
9.	RCIC Flow Orifice Assembly (E51-N001)	Reactor Bldg.
10.	SLC Pump (C41C001)	Reactor Bldg.

PDR
A. Lee
Lee

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

SEP 2 6 1981

50-341

MEMORANDUM FOR: Zoltan R. Rosztoczy, Chief
Equipment Qualification Branch
Division of Engineering

FROM: Arnold Lee
Equipment Qualification Branch
Division of Engineering

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

SUBJECT: TRIP REPORT FOR SEISMIC CRITERIA IMPLEMENTATION REVIEW MEETING WITH DETROIT EDISON COMPANY ON FERMI-2

The Seismic Qualification Review Team (SQRT), consisting of engineers from the Equipment Qualification Branch (EQB) and the Brookhaven National Laboratory (BNL), made a visit to Fermi-2 at Monroe, Michigan, on July 27-31, 1981. The purpose of the visit was to conduct a plant site audit of the qualification methods, procedures, and results for selected safety-related mechanical and electrical equipment and their supports. The intention was also to observe the field installation of the equipment, to validate the equipment model employed in the Fermi-2 qualification program.

The background, review procedures, findings and conclusions of the meeting, and the required followup actions are summarized below. A list of attendees at the conferences is contained in Attachment I, and a list of the equipment selected for audit is shown in Attachment II.

1. Background

The applicant has described the equipment qualification program in Sections 3.9 and 3.10 of the Final Safety Analysis Report, consisting of testing and analysis, used to confirm the ability of safety-related mechanical and electrical (includes instrumentation, control and electrical) equipment and their supports, to function properly during and after the excitation imposed by earthquake loadings.

The plant site audit was performed to determine the extent to which the qualification of equipment, as installed in Fermi-2 meets the current licensing criteria as described in the Standard Review Plan (SRP) Sections 3.9.2 and 3.10.

~~8111290613~~

PDR

During the current staff review of the seismic input (see SER Sections 2.5.2 and 3.7.1), it was determined that the shape of the original design response spectra for the Fermi-2 site is not consistent with that currently acceptable to the staff. The applicant was then required to develop site-specific response spectra for a reevaluation of structural and mechanical component design and equipment qualification. The site-specific response spectra were reviewed by the staff and found acceptable (see Section 2.5.2 of SER supplement). This change in the input spectrum shape required that the resulting effect of the loading on the equipment be reassessed. As a result, we have determined to not only audit the applicant's original equipment qualification program against the original response spectra, but also to audit his qualification reassessment for the site specific spectra.

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. Twenty-four pieces of safety-related mechanical and electrical equipment (See Attachment II) were selected for audit against the original response spectra. Of the 24 selected equipment items, 15 are in safe-shutdown systems and are part of the applicant's reassessment program. The audit therefore also included the review of the reassessment of these 15 pieces of equipment (See Attachment II). The plant site audit consisted of field observations of the actual equipment configuration and its installation, followed by the review of the corresponding test and/or analysis documents. 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 on the final day, July 31 to summarize and conclude the plant site visit.

Qualification of torus-attached equipment under the effects of combined seismic and hydrodynamic loads was not reviewed in this audit. It is part of the applicant's Mark I Containment Long-Term Program, and will be completed and submitted for staff review before August 1, 1982.

III. Findings

The applicant was notified at the beginning of the site audit that the 7 percent structure damping used in generating floor response spectra for equipment reassessment is not acceptable because the stresses in critical structural elements obtained in building seismic analysis reassessment are far below yield limit. For such a case, the staff concluded that an adequate structure damping value is 5 percent (see Section 3.7.1 of SER supplement). Although we proceeded with our review for equipment reassessment based on the spectrum curves of 7% structure damping value, we requested the applicant to perform an updated reassessment of the equipment qualification based on a 5% structure damping and submit the results for SQRT further review.

As a result of the audit, we identified concerns regarding the applicant's original equipment qualification as well as the reassessment due to site-specific response spectra (see Section IV). The applicant has committed to submit additional information and clarification for a follow-up review prior to approval of plant operation.

IV. Follow-up Actions

In order to proceed with our review we have requested the applicant to provide the following information:

(1) Provide an updated list of equipment which was either not qualified or not installed at the time if SQRT Audit, by August 31, 1981.

(2) Provide a list of equipment contained in the Equipment Summary List which is no longer considered safety related, by August 31, 1981.

(3) Provide the summary results of the Equipment Seismic Qualification Reassessment based on the use of 5% structural damping instead of 7% and a table similar to Table 5.4-1 of July 15, 1981, submittal to NRC for components requiring requalification, by August 31, 1981.

In addition, provide a complete list of floor response spectra with respect to 5% structural damping, by August 31, 1981.

(4) At completion of Equipment Seismic Qualification Program (including reassessment), provide a list of typical hardware modifications, for equipment both audited and not audited, which were found necessary in order to meet the current licensing criteria, by September 1, 1982 (3 months prior to issue of O.L.).

(5) Provide confirmation for adequacy of acceleration values used in valve qualification by comparison with the results of As-built piping analysis for all types of valves audited, by September 1, 1982 (3 months prior to issue of O.L.).

(6) Provide SQRT forms for all equipment which was either not qualified or not installed at the time of audit, by September 1, 1982 (3 months prior to issue of O.L.).

(7) Provide clarifying details concerning the qualification of some pieces of equipment as listed in Attachment III, and detailed in BNL's evaluation report.

V. Conclusions

Based on the results of the review to date, we conclude that an appropriate seismic qualification program has been defined. The review of the applicant's implementation of the equipment qualification program is continuing and the applicant is required to resolve all outstanding items as identified in Section IV above.

Arnold Lee
Equipment Qualification Branch
Division of Engineering

Enclosures: As stated

cc: See next page

cc: R. Vollmer
W. Johnston
R. Tedesco
B. Youngblood
G. Bagchi
L. Kintner
T. Y. Chang
R. LaGrange
M. Haughey
R. Riggs
M. Reich, BNL
J. Singh, INEL
A. Lee

ATTACHMENT 1
SQRT PLANT SITE AUDIT
Fermi 2

Plant Site Conference
July 27 - July 31, 1981

LIST OF ATTENDEES

NRC

Arnold Lee

Brookhaven National Laboratory

John Curreri
Mano Subudhi
A.J. Philippacopoulos
P. Brown
S. Sharma

Detroit Edison Company

Wm. J. Fahrner
Walter M. Street
John Hankala
Timothy J. Okeefe
Shahan Kavafian
H.A. Walter
G.R. Overbeck
L.J. Frasson
H.A. Balbale
R.L. Buchholz
S.P. Zoma
R.L. Smith

General Electric

Bernadette Bohn
Sy Hassan
R.L. Smith

Sargent & Lundy

George Hibet
B. Gogiwewi
M. Hassaballa
T. Fornek

Hopper & Associates

David M. Hopper

ATTACHMENT II

EQUIPMENT LIST FOR

Fermi 2 SQRT Site Audit

BOP Equipment			Bldg.
Mechanical	1*	Chilled Water Pumps (T41-00-C-041-FA-001)	Aux.
	2*	10" Type 4340 Damper (T41-00-F-900)	"
	3*	Engine Instrument Panel (R30-00-S-900-BA-003)	RHR Complex
	4*	Diesel Generator Service Water Pumps (R30-00-S-900-RA-005)	" "
	5*	RHR Mech. Draft Cooling Towers (E11-56-B-900-BA-003)	" "
	6*	24" 300# Globe Valve, WE SMB-4-200 Motor Oper. (A31-00-F-900-RA-029)	Reactor
	7.	4" 600# Y Globe Valve, Limit SMB-0-40 Motor Oper. (A31-00-F-900-RA-042)	Reactor
	8.	20" Wafersphere Valve with Bettis Robotarm Actuator (A31-00-F-900-RA-153)	Reactor
	9*	Swing Check Valves 20", V12-2001, 2002, 2003, 2004, (A31-01-F-900-RA-001)	Reactor
	10*	EECW Pumps B11-93M (P44-00-C-001A-RA-001)	Reactor
	11.	Floor Mounted Instrument Racks (H21-01-P-501B-RA-001)	Reactor
	12.	Remote Shutdown Panel (C35-Pool)	Reactor
	13*	480V SWGR Volt. Reg. - 1500KVA (R14-00-S-900-QL-031)	Aux.
	14*	Battery Racks for 130 VDC battery (R32-00-S-900-RA-003)	Aux.
	15*	Nuclear Penetration Canister Assembly (T23-01-X-900-BA-008)	Aux.
NSSS Equipment			
Mechanical	16*	Reactor Vessel Stabilizer (B11-U002)	Reactor
	17*	Isolation Valve (B21-F028)	" "
	18*	Recirc. Discharge Valve (B31-F031)	" "
	19*	Hydraulic Control Unit (C11-D001)	" "
Electrical	20.	Barton Flow XMTR (B31-N014A)	" "
	21.	GE Relay (E11A-K001A)	Aux.
	22.	Bailey Diff Press (G33-N041)	Reactor
	23.	GE Rack (H21-P025)	" "
	24.	Temp. Element (C41-N006)	" "

*Equipment Reassessed

ATTACHMENT III

OPEN ITEMS: EQUIPMENT SPECIFIC

(1) Engine Instrument Panel, RHR Complex: 4 Items

The Engine Instrument Panel is shock mounted on the support frame. The clearance provided between the shock mounting and the support frame is 0.12". Clearance of 0.16" minimum is required to prevent bottoming out of the shock spring. The clearance will be increased as required by September 1, 1982 (3 months prior to issue of O.L.).

(2) Diesel Generator Service Water Pumps:

Work needed to close out concerns arising from reassessment for site specific earthquake will be completed by September 1, 1982 (3 months prior to issue of O.L.).

(3) RHR Mechanical Draft Cooling Towers: 4 Items

The motor, the spray nozzles, and the fan have yet to be installed. The work on placing of fill and eliminators is in progress. All work on mechanical draft cooling towers will be completed by September 1, 1982 (3 months prior to issue of O.L.).

(4) Floor Mounted Instrument Rack:

Instrument tubing/pipe supports have yet to be installed. This work will be completed by September 1, 1982 (3 months prior to issue of O.L.).

Drywell I & C pipe up to excess flow check valve which is outside the drywell and the tubing from there to the rack will be computer analyzed and appropriate supports designed and installed.

Other tubing attached to the rack will be designed as per DECO Design Spec. 3071-525 and S&L Report SL-3159.

(5) Hydraulic Control Unit:

Work on supports for the attached piping will be completed by September 1, 1982 (3 months prior to issue of O.L.).

(6) Barton Flow Transmitter:

Provide: 1) Bolt size and base plate dimensions as mounted on the panel; 2) Details of test mount conditions, and 3) Investigation of the device capability at resonance frequency of 30Hz in z-direction by August 31, 1981.

(7) G.E. Relay:

Provide amplification of Panel H11-P617, by August 31, 1981.

(8) G.E. Rack:

Provide report(s) to show that resonance in side to side and vertical direction is higher than that in front to back direction by August 31, 1981.