Docket No.: 50-440

JUL 25 1984

Mr. Murray R. Edelman
Vice President - Nuclear Group
The Cleveland Electric Illuminating Company
P. O. Box 5000
Cleveland, Ohio 44101

Dear Mr. Edelman:

Subject: Equipment Qualification PVORT and SQRT Audits of the Perry Nuclear Power Plant (Unit 1)

As a part of its review of the Perry plant's conformance with equipment qualification requirements, the NRC Pump and Valve Operability Review Team (PVORT) and the Seismic Qualification Review Team (SQRT) have scheduled site audits at Perry for the week of August 13-17, 1984. Enclosures (1) and (2) are, respectively, the PVORT and SQRT forms to be used by your staff in preparation for the scheduled team audits. The forms should be completed by your staff prior to the audits.

This letter serves to notify the Public in the PDR of the NRC site visit. The Public is invited as observers to the opening and closeout meetings between the NRC staff and the applicant. The opening meeting will take place in the morning of August 13th and the closeout meeting in the morning of August 17th. Times and locations should be coordinated and arranged with the Cleveland Electric Illuminating Company, representatives.

Sincerely,

B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing

Enclosures:
As stated

cc: See next page

CONCURRENCES:

DL:LB#1	DL:LB#1
JStefano:es	BJYoungblood
7/27/84	7/25/84

DIST:

Docket File	NSIC	OELD, Attorney	VNoonan
NRC PDR	LB#1 Rdg	ACRS 16	GBagchi
Local PDR	MRushbrook	EJordan	ALee
PRC System	JStefano	NGrace	NRomney

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A PDR

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

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PERRY

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ENCLOSURE 1

EQUIPMENT QUALIFICATION BRANCH
PUMP AND VALVE OPERABILITY REVIEW TEAM
REQUEST FOR ADDITIONAL INFORMATION

In light of increased emphasis on mechanical equipment qualification, the Pump and Valve Operability Review Team (PVORT) has been formed to review the pump and valve operability assurance program for those utilities applying for their operating license. The PVORT will review these programs by selecting various pumps and valves that are important to safety and then verifying that these components are qualified to perform their necessary functions when subjected to those loads associated with normal, upset, emergency, and faulted plant conditions. The findings of the team's review will then be included in the staff's safety evaluation report (SER).

The basic criteria used by the PVORT to determine the acceptability of the applicant's pump and valve operability assurance program are stated in SRP 3.9.3.[1] Two other documents are also used for basic guidance: SRP 3.10,[2] and IEEE-627.[3] Specific references are provided within the first two documents. All of these references, as well as good engineering judgement, will aid the PVORT in making recommendations concerning the adequacy of the applicant's pump and valve operability assurance program.

To aid the PVORT in this review, the staff requires that a "Pump and Valve Operability Assurance Review" form be prepared by the applicant for each selected component and submitted to the staff two weeks prior to the team's plant-site visit. The applicant should also make available for review all pertinent documents and reports concerning the qualification of the selected components. Specifically, the documentation package for each of the selected components should include documents that will provide the type of information listed in SRP 3.10, page 3.10-9, a-1, as well as purchase specifications and plant test procedures, (applicable sections). The PVORT is particularly interested in insuring that sequential testing and failure mode determination (aging) are addressed; and that analyses are supported by test documents, whenever possible. Another topic of discussion during the audit will be the applicant's maintenance/surveilance

program and how that program interfaces with the applicant's operability assurance program.

It should be noted that it is beyond the charter of the PVORT to make assessments involving the applicant's overall seismic and environmental qualification programs even though seismic and environmental qualification are addressed and included in the pump and valve operability assurance program.

REFERENCES

1. U.S. Nuclear Regulatory Commission Standard Review Plan, Section 3.9.3, NUREG-75/087.

2. U.S. Nuclear Regulatory Commission Standard Review Plan, Section 3.10, NUREG-0800 (Formerly NUREG-75/087).

3. IEEE Standard for Design Qualification of Safety Systems Equipment Used in Nuclear Power Generating Stations, IEEE Std. 627-1980.

PUMP AND VALVE
OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: _____ Unit No. ___ 2. Docket No.: _____

3. Utility: _____

4. NSSS: _____ [] PWR [] BWR

5. A/E: _____

6. C.P. Docket Date: _____ C.P. SER Date: _____

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [] NSSS [] BOP

2. Location: a. Building/Room _____

   b. Elevation _____

   c. System _____

3. Component I.D. No. on P&ID dwg: _____

4. If component is a [] Pump complete II.5.

   If component is a [] Valve complete II.6.

5. General Pump Data

a. Pump		b. Prime-mover	
Name	_____	Name	_____
Mfg.	_____	Mfg.	_____
Model	_____	Model	_____
S/N	_____	S/N	_____
Type	_____	Type	_____

---

* The component, whether pump or valve, is considered to be an assembly composed of the body, internals, prime-mover (or actuator) and functional accessories.

a. Pump (continued)

Overall Dimensions _____

Weight _____

Mounting Method _____

Required B.H.P. _____

b. Prime-mover (continued)

Overall Dimensions _____

Weight _____

Mounting Method _____

H.P. _____

Parameters:	Component Design	System Normal	System Accident
Press			
Temp			
Flow			
Head			
Media			

Required NPSH at maximum flow _____

Available NPSH _____

Operating Speed _____

Critical Speed _____

Prime-mover requirements: (include normal, maximum and minimum).

Motor (voltage)_____

_____

_____

Turbine (pressure)_____

_____

_____

If MOTOR list:

Duty cycle _____

Stall current _____

Class of insulation _____

List functional accessories:* _____

_____

_____

_____

_____

* Functional accessories are those additional sub-components that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, speed control system, feedback, etc.) Include manufacturer and model number.

6. General Valve Data

a. Valve	b. Actuator (if not an integral unit)
Name _____	Name _____
Mfg. _____	Mfg. _____
Model _____	Model _____
S/N _____	S/N _____
Type _____	Type _____
Size _____	Size _____
Weight _____	Weight _____
Mounting Method _____	Mounting Method _____
Minimum Required Operating Torque _____	Maximum Delivered Torque _____

Parameters:	Component Design	System Normal	System Accident
Press	_____	_____	_____
Temp	_____	_____	_____
Flow	_____	_____	_____
Media	_____	_____	_____
Max ΔP across valve	_____		
Closing time @ max ΔP	_____		
Opening time @ max ΔP	_____		

Power requirements: (include normal, maximum and minimum).

Electrical _____

_____

_____

Pneumatic/Hydraulic _____

_____

_____

List functional accessories:* _____

_____

_____

_____

III. FUNCTION

1. Describe components normal and safety functions (include accident initiating signals, if applicable):

Normal: _____

_____

_____

_____

Safety: _____

_____

_____

_____

2. The components normal state is: [] Operating [] Standby

3. Safety function:

a. [] Emergency reactor shutdown

b. [] Containment heat removal

c. [] Containment isolation

d. [] Reactor heat removal

e. [] Reactor core cooling

f. [] Prevent significant release of radioactive material to environment

g. [] Does the component function to mitigate the consequences of one or more of the following events? [] Yes [] No
If "Yes", identify.

[] LOCA [] HELB [] MSLB

[] Other _____

_____

* Functional accessories are those additional sub-components that are required to make the valve assembly operational, (e.g., limit switches, solenoid valves, accumulators, etc.) Include manufacturer and model number.

4. Safety requirements:

[] Intermittent Operation [] During postulated event

[] Continuous Operation [] Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational.

_____ (e.g., hours, days, etc.)

5. For VALVES:

Does the component [] Fail open [] Fail closed [] Fail as is

Is this the fail safe position? [] Yes [] No

Is the valve used for throttling purposes? [] Yes [] No

What is the maximum acceptable internal and external leakrate?

_____ _____

IV. QUALIFICATION

1. Reference by specific number the design codes and standards used as a guide to qualify the component:

_____

_____

_____

_____

2. Have acceptance criterias been established and documented in the test plan(s) for the component? [] Yes [] No

3. Are the margins* identified in the qualification documentation? [] Yes [] No

4. Was the component that was qualified a model or an actual assembly? _____. If a model, what was its scale? _____. If an actual assembly, was it qualified as an assembly or by sub-assemblies? (i.e., valve, actuator, pump, driver) _____

_____

* Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

5. List all component tests performed or to be performed that demonstrate qualification:

6. List all component analyses performed that demonstrate qualification:

7. As a result of any of the tests (or analysis), were any deviations from design requirements identified? [] Yes [] No
If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

8. Was the tested component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [] No If "No", is installed component [] oversized or [] undersized?

9. Is component orientation sensitive? [] Yes [] No [] Unknown If "Yes", does installed orientation coincide with test/analysis orientation? [] Yes [] No

10. List all plant loading conditions considered during tests or analysis; (e.g., normal, upset, emergency, faulted).

_____

_____

11. What is the fundamental frequency of the component?

_____

_____

12. Does the component have a unique design or utilize unique material in its construction? (Examples are special gaskets or packing, one of a kind components, limitations on nonferrous materials, special coatings or surfaces, etc.)

[ ]Yes [ ]No If "Yes" identify: _____

_____

_____

13. What is the design (qualified) life of the component, exclusive of normal maintenance items such as packing, bearings, seals, diaphragm, gaskets, and other elastomers? _____

_____

14. Which of the components normal maintenance items requires the most frequent replacement/repair? _____
What is the normal time interval between replacements/repairs?

_____

15. List the harshest environmental conditions that the component could be exposed to during or following an accident, [e.g., temp., pressure, humidity, submergence, radiation (type and dose), etc.]:

_____

_____

_____

nformation Concerning Qualification Documents for the Component

Report Number	Report Title	Date	Company/Organization Preparing Report	Company/Organization Reviewing Report

ENCLOSURE 2

QUALIFICATION SUMMARY OF EQUIPMENT

° To be completed to stand on its own (do not refer to any document)
° All questions are to be answered (if not applicable; mark "N/A")

I. Plant Name: _____

1. Utility: _____
2. Location: _____
3. Type: _____ 4. Capacity (MWe Net): _____
5. Containment Type: _____ 6. Cooling Source:
7. NRC Docket No.: _____ 8. CP Docket Date: _____
9. NSSS Vendor: _____ 10. A/E: _____

II. Component Name: _____

1. Scope: [ ] NSSS [ ] BOP
2. Vendor: _____ 3. Vendor Model No.: _____
4. Manufacturer: _____ 5. Manufacturer Model No.: _____
6. Purchase Spec. No.: ____ 7. Total No. in Safety Systems: _____
8. Location (Choose the worst one with respect to seismic)
   a. Building: _____ b. Elevation and Area: _____
   c. Environment: [ ] Harsh [ ] Mild
9. Field Mounting:
   a. [ ] Floor [ ] Wall [ ] Pipe [ ] Panel
      [ ] Other (describe) _____
   b. [ ] Bolted; description: _____
      (no. size, grade, etc.)
      [ ] Welded; description: _____
      (size, length, electrode type, etc.)
      [ ] Other; description: _____
   c. Mounting restriction from the manufacturer, if any: (horizontal vertical, etc.)_____
10. Functional Description of the Equipment:
   a. System in which located: _____
      (for item 8 in II, above)
   b. Type: [ ] Active [ ] Passive
   c. Equipment required for: [ ] Hot standby [ ] Cold shutdown
      [ ] Both [ ] Neither
   d. Intended safety function: _____
      _____

e. Direct consequences of its failure (brief description of the effect on the system): _____

_____

f. Redundancies, if any: _____

III. Equipment Qualification Method:

[ ] Test [ ] Analysis

[ ] Combination of test & analysis [ ] Other (describe) _____

IV. Loads and Load Combinations:

1. Loads:

a. [ ] Seismic b. [ ] Hydrodynamic

c. [ ] Flow induced vib. d. [ ] Normal operation vib.

e. [ ] Other dynamic loads: (specify) _____

2. Combination technique: _____

3. Required acceleration in each direction:

a. [ ] ZPA [ ] Other;specify: _____

b. OBE: s/s _____; f/b: _____; v: _____

SSE: s/s _____; f/b: _____; v: _____

V. Qualification by Test (complete this section for each report including partial test):

1. Test report: (Company) _____

a. Title: _____

_____

no.: _____; revision: _____; date: _____

b. Reviewed by: _____

2. Qualification report: (Company) _____

a. Title: _____

_____

no.: _____; revision; _____; date: _____

b. Reviewed by: _____

3. Laboratory mounting:

a. Describe [from shaker table to the equipment; include orientation, bolt (size, no., gr., etc.), weld (type, size, length, electrode type, etc.)]: _____

_____

b. If different from field mounting include equivalency justification:

_____

_____

4. Resonance search: [ ] yes [ ] no

a. Technique: _____

b. Excitation magnitude & frequency interval (or sweep rate): _____

_____

c. Resonances found: (up to: _____)

s/s: _____; f/b: _____; v: _____

5. Test Description:

a. Input:

(a) [ ] single axis; [ ] biaxial; [ ] pseudo biaxial;
[ ] tri-axial [ ] random; [ ] sine beat;
[ ] other: _____
[ ] phase coherent; [ ] phase incoherent

(b) Frequency range: _____

(c) Input level (g-level & frequency)

OBE: s/s: _____; f/b: _____; v: _____

SSE: s/s: _____; f/b: _____; v: _____

(d) Number of tests performed: OBE:___; SSE:___; other:_____

(e) Sequential test, including fatigue & vibration aging conducted: [ ] yes [ ] no

Justification, if not performed: _____

_____

b. Output:

(a) TRS generated: [ ] yes [ ] no

(b) Percent damping in TRS generation: _____

(c) Percent damping used in RRS: _____

(d) Margin included in RRS: _____

[ ] by test lab. [ ] by others: (specify) _____

(e) Attach sets of TRS and RRS comparison plots (if not provided, explain): _____

_____

c. Results:

(a) Basis of qualification:

[ ] structural integrity verified; [ ] operability verified

(b) Failures detected during qualification tests: _____

_____

_____

(c) Anomalies (with disposition) if any: _____

_____

_____

(d) Modifications made (in the equipment or mounting) during the qualification phase; describe, if any: _____

_____

_____

(e) How (modifications) implemented in the field: _____

_____

_____

d. Other tests performed (such as fragility test; include results)

_____

VI. Qualification by Analysis (complete this section for each report)

1. Analysis Report: (Company) _____

a. Title: _____

_____

no.: _____; revision: _____; date: _____

b. Reviewed by: _____

2. Qualification Report: (Company) _____

a. Title: _____

_____

no.: _____; revision: _____; date: _____

3. Failure modes: _____

_____

4. Method of Analysis:

[ ] static [ ] static coefficient [ ] dynamic

[ ] time history [ ] response spectrum

5. Natural frequencies (up to cut off frequency of: _____):

s/s: _____; f/b: _____; v: _____

6. Model type:

   [ ] 1D; [ ] 2D; [ ] 3D

   [ ] finite element: (kinds of elements used) _____

   [ ] other: (specify) _____

7. Support & Boundary conditions in the model:

   _____

   _____

8. Computer codes used: _____

   Method of verification: _____

9. Damping: OBE: _____; SSE: _____; Basis: _____

10. Fatigue & aging consideration: [ ] yes [ ] no

11. Responses:

    a. Method of combination: [ ] ABS; [ ] SRSS;

       [ ] algebraic, [ ] other, specify: _____

    b. For critical elements:

Identification	Location	Loads	Total Calculated Stresses	Allowable Stresses	Source of Allowables

Identification	Location	Loads	Total Defl.	Allow. Defl.	Source of Allow. Defl.

VII. Surveillance and Maintenance Program:

1. Qualified life: _____
   (based on weakest link or appendage in the equip.)

2. Basis: _____

3. Procedure of assuring operability of the equipment under seismic and dynamic condition throughout the plant life: _____

   _____