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AUTH.NAME AUTHOR AFFILIATION
CURTIS,N.W. Pennsylvania Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
YOUNGBLOOD,B.J. Licensing Branch 1

SUBJECT: Forwards responses to questions 123.1 - 123.9 per 810202 request for addl info. Info will be incorporated into next revision of facility FSAR.

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	LIC QUAL BR		1	1	MATL ENG BR	17	1	1
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	RAD ASSESS BR	22	1	1	REAC SYS BR	23	1	1
	REG FILE	01	1	1	SIT ANAL BR	24	1	1
	STRUCT ENG BR	25	1	1	SYS INTERAC BR		1	1
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APP 4

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PP&L

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NORMAN W. CURTIS
Vice President-Engineering & Construction-Nuclear
770-5381

March 17, 1981

Mr. B. J. Youngblood, Chief
Licensing Projects Branch #1
Division of Project Management
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
RESPONSES TO QUESTIONS 123.1 THRU 123.9
ER 100450 FILE 841-2
PLA-660

Dear Mr. Youngblood:

In response to the February 2, 1981 request for additional information (Tedesco to Curtis), attached please find PP&L's responses to questions 123.1 thru 123.9. This information will be incorporated into the next revision of the Susquehanna SES FSAR.

Sincerely,

N. W. Curtis
Vice President-Engineering & Construction-Nuclear

TEG/mks

Attachment

B001
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1/40

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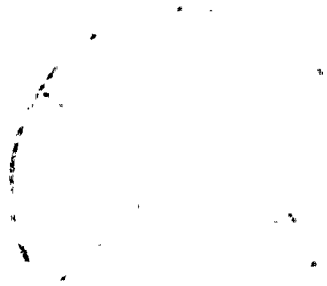
A



QUESTION 123.1

Pursuant to General Design Criterion 2, safety-related structures, systems and components are to be designed for appropriate load combinations arising from accidents and severe natural phenomena. With regard to the vibratory loads attributed to the feedback of hydrodynamic loads from the pressure suppression pool of the containment, the staff requires that safety-related mechanical, electrical, instrumentation and control equipment be designed and qualified to withstand effects of hydrodynamic vibratory loads associated with either safety relief valve (SRV) discharge of LOCA blowdown into the pressure suppression containment combined with the effects of dynamic loads arising from earthquakes.

The criteria to be used by the staff to determine the acceptability of your equipment qualification program for seismic and dynamic loads are IEEE Std. 344-1975 as supplemented by Regulatory Guides 1.100 and 1.92, and Standard Review Plan Sections 3.9.2 and 3.10. State the extent to which the equipment in your plant meets these requirements and the above requirements to combine seismic and hydrodynamic vibratory loads. For equipment that does not meet these requirements provide justification for the use of other criteria.

RESPONSE:

I. BOP

For Susquehanna Project, all BOP Safety related mechanical, electrical, instrumentation and control equipment located inside Primary Containment, Reactor and Control buildings, is being qualified for Seismic loads in combination with hydrodynamic vibratory loads associated with SRV discharge and LOCA blowdown. Although the SRSS method of combination of seismic and hydrodynamic loads is acceptable, for the project to be conservative, the loads are combined by absolute sum method. The cases which have deviations from the absolute sum method of combination will be identified in the qualification reports.

The criteria for the qualification of BOP equipment for seismic loads is described in Section 3.7b.3 of the FSAR. The criteria for load combinations and methodology for the design assessment and qualification of Safety related BOP equipment for seismic and hydrodynamic loads have been described in Sections 5.7 and 7.1.7 of the Design Assessment Report (DAR) Rev. 2. Basically the requirements of IEEE Std. 344-1975 as Supplemented by Regulatory guides 1.100 and 1.92 and SRP Sections 3.9.2 and 3.10 are covered in the criteria with the following exception for spatial combination of three components of dynamic motion as stated in Section 7:1.7.1.3 of the DAR. The criteria states "the response at any point is the maximum value

obtained by adding the response due to vertical dynamic load with the larger value of the responses due to one of the horizontal dynamic loads by the absolute sum method."

All Susquehanna BOP equipment is being qualified for the criteria discussed above.

II. NSSS

LOAD COMBINATIONS:

These were transmitted to the NRC on 8/28/80 as Page 3 of Attachment N to PLA-536. This was in response to NRC Question 110.42.

IMPLEMENTATION OF LOAD COMBINATIONS:

The GE SQRT Program uses outputs from the GE Equipment Adequacy Evaluation Program which combines dynamic loads by SSES as accepted by the NRC in NUREG-0484.

The individual items associated with the load combinations are added as described below:

Steady State Events (e.g., Dead Load, Pressure) - Absolute Sum

Time Varying Components (e.g., Maximum Seismic, Maximum Hydrodynamic) - SRSS

Components of Events (e.g., Maximum X-Load Due to Y-Earthquake) - SRSS

Modal Response-SRSS, except for closely spaced modes where effects are combined by Absolute Sum, Double Sum, or Grouping.

Details for each item of equipment are contained in that equipment's Design Record File which is available for audit.

QUESTION 123.2:

Provide the following information:

(i) Two summary equipment lists (one for NSSS supplied equipment and one for BOP supplied equipment). These lists should include all safety related mechanical components, electrical, instrumentation, and control equipment, including valve actuators and other appurtenances of active pumps and valves. In the lists, the following information should be specified for each item of equipment.

(1) Method of qualification used:

a) Analysis of test (indicate the company that prepared the report, the reference report number and date of the publication).

b) If by test, describe whether it was a single or multi-frequency test and whether input was single axis or multi-axis.

c) If by analysis, describe whether static or dynamic, single or multiple-axis analysis was used. Provide natural frequency (or frequencies) of equipment.

(2) Indicate whether the equipment has met the qualification requirements.

(3) Indicate the system in which the equipment is located and whether the equipment is required for:

a) hot stand-by

b) cold shutdown

c) both

d) neither

(4) Location of equipment, i.e., building, elevation.

(5) Availability for inspection (Is the equipment already installed at the plant site?)

(ii) An acceptable scenario of how to maintain hot stand-by and cold shutdown based on the following assumptions:

(1) SSE or OBE

(2) Loss of offsite power

(3) Any single failure

(iii) A compilation of the required response spectra (RRS) for all applicable vibratory loads (individual and combined if required) for each floor of the nuclear station under consideration.

RESPONSE:

The response to this question was submitted via PLA-627 (Curtis to Youngblood) dated February 5, 1981.

QUESTION 123.3

Identify those items of nuclear steam supply system and balance-of-plant equipment requiring reevaluation and specify why reevaluation is necessary (i.e. because the original qualification used the single frequency, single axis methodology, because equipment is affected by hydrodynamic loads, or because both of the above conditions were present) for each item of equipment.

RESPONSE:

Originally almost all Safety related BOP equipments for Susquehanna had been qualified for only Seismic loads. This equipment has been re-evaluated due to the inclusion of new hydrodynamic (SRV & LOCA) loads, and are being re-qualified with respect to the criteria described in DAR Section 7.17. The qualification program for the BOP Safety related equipment is being executed in the following four phases.

Phase-I: Qualification of Equipment for Only Seismic Loads:

The only known dynamic load at the time of execution of this phase of the program was Seismic loads. During this phase, the vendors supplying the equipment were required to qualify the equipment in accordance with the requirements specified in FSAR Subsection 3.7b.3.

Phase-II: Evaluation for Combined Seismic and Hydrodynamic (SRV & LOCA) Loads:

This phase was undertaken to evaluate if the existing Seismic qualification of all Safety related BOP equipment could be extended to the combined Seismic and hydrodynamic loads. The criteria used for the re-evaluation is described in DAR Section 7.1.7. The general problem areas identified during this evaluation and the proposed action to mitigate these problems are shown below.

PROBLEM	ACTION
Additional Hydrodynamic Loads	o Retest and/or Reanalysis. o Modifications to equipment or their Supports if required.
Flexibility of Equipment Support not considered	o Provide response spectre considering support flexibility. o Include Support Conditions during analysis or testing.
Inadequate Modelling	o Correct during reanalysis.
Inadequate Testing	o Retest o Qualification by analysis.

Phase III: Requalification Efforts:

Specifically, the Problem areas identified in the previous phase are resolved during this phase by taking appropriate actions. The requalification reports demonstrate that the criteria of DAR Section 7.1.7 have been complied with.

Phase IV: Modifications to Equipment or Equipment Supports:

Equipment or their Supports needing modifications identified during the regulations efforts of Phase III are executed during this phase.

The following are NSSS equipment:

SYSTEM	MPL #
Safety Relief Valve	B21F013
MSIV	B21F022/F028
Flow Element	B21N051/52/53/54
Recirc. Pump Motor	B31C001
Gate Valve	B31F023/31/32
HCU	C12D001
CRD Valves	C12F009/10/11/12
SLC Storage Tank	C41A001
SLC Accumulator	C41A003
SLC Pump	C41C001
SLC Explosive Valve	C41F004

RHR Heat Exchanger	E11B001
RHR Pump	E11C002
Flow Orifice Assembly	E11N012/N014
LPCS Pump & Motor	E21C001
Flow Orifice Assembly	E21N002
MSIV Heater	E32B001
MSIV Blower	E32C001/C002
HPCI Pump	E41C001
HPCI Turbine	E41C002
Flow Orifice Assembly	E41N007
RCIC Pump	E51C001
RCIC Turbine	E51C002
Flow Orifice Assembly	E51N001
Fuel Prep Machine	E18E001
Gen. Purpose Grapple	F18E011
Dryer & Separator Sling	F19E008
Head Strong Back	F19E009
Control Rod Grapple	F20E002
Refueling Platform	E21E003
In Vessel Rack	F22E006
Def. Fuel Storage Cont.	F22E009
Fuel Storage Vault	F22E012

CONTROL ROOM PANELS

Reactor Core Cooling BB	H12-P601
Power Range Monitoring Cabinet	H12-P608
RPS Div. 1 and 2 Log VB	H12-P609
RPS Div. 2 and 3 Logical VB	H12-P611
NSSS Temperature Recorder VB	H12-P614
Feedwater & Recirculation Instrument Panel	H12-P612
NSSS Process Instrument Panel	H12-P613
Div 1 RHR/HPCI Relay VB	H12-P617
Div 2 RHR/HPCI Relay VB	H12-P618
ADS Ch A Relay VB	H12-P628
MSIV Leakage Control Div 2 VB	H12-P654
HPCI Relay VB	H12-P620
RCIC Relay VB	H12-P621
Inboard Valve Relay Board	H12-P622
Outboard Valve Relay VB	H12-P623
Div 1 CS Relay VB	H12-P626
Div 2 CS Relay VB	H12-P627
ADS Ch B Relay VB	H12-P631
MSIV Leakage Control Div 1 VB	H12-P655
Radiation Monitoring Instrument Panel A	H12-P606
Radiation Monitoring Instrument Panel B	H12-P633
Operating BB	H12-P680

Termination Cabinets	H12-P700 Series
Plant Operation Benchboard	H12-P853

NUCLEAR BOILER

Condensing Chamber	B21-D002
Condensing Chamber	B21-D004AB
Condensing Chamber	B21-D006AD
Condensing Chamber	B21-D007AD
Condensing Chamber	B21-D008AD
Condensing Chamber	B21-D009AD

LOCAL PANELS

Reactor Water Clean-Up	H23-P002
Reactor Vessel Level and Pressure (A)	H23-P004
Reactor Vessel Level and Pressure (B)	H23-P005
Recirculation Pump A	H23-P009
Jet Pump B	H23-P010
High Pressure Coolant Injection B	H23-P014
Reactor Core Isolation Cooling A	H23-P017
Residual Heat Removal Channel A	H23-P018
Residual Heat Removal Div. 2 Channel B	H23-P021
Recirculation Pumps	H23-P022
Drywell Pressure Local Panel A	H23-P057
Drywell Pressure Local Panel B	H23-P058
Main Steam Isolation Valve Leakage Control	H23-P074 Div. 2
Core Spray Local Panel A	H23-P001
Standby Liquid Control	H23-P011
Main Steam Flow A/B	H23-P015
High Pressure Coolant Injection Leak Det.	H23-P016
Core Spray Channel B	H23-P019
Main Steam Flow C/D	H23-P025
High Pressure Coolant Injection	H23-P036
Reactor Core Isolation Cooling Leak Det.	H23-P038 Div. 2 (B)
Main Steam Flow A/B	H23-P041
Main Steam Flow C/D	H23-P042
Main Steam Isolation Valve Leakage Con.	H23-P073 Div. 1
High Pressure Coolant Injection Div. 1 A	H23-P034
Reactor Core Isolation Cooling Div. 2 B	H23-P037
SRM/IRM	H23-P030/31/32/33

NUCLEAR BOILER

Temperature Element	B21-N004
Temperature Element	B21-N010AD
Temperature Element	B21-N014AD

Pressure Switch	B21-N015AD
Temperature Element	B21-N016AD
Temperature Element	B21-N017
Vacuum Switch	B21-N056AD
Temperature Element	B21-N064
Differential Pressure Transmitter	B31-N014CD
Temperature Element	B31-N023AB
Differential Pressure Transmitter	B31-N024AB
Level Switch	C12-N013AD
Level Switch	C12-N013EF
Temperature Switch	C41-N003
Pressure Transmitter	C41-N004
Pressure Indicator	C41-R003
Valve, Guide Tube	C51-J004AE
Miscellaneous Parts	C51-5110001
Pressure Switch	C72-N003AD
Pressure Switch	C72-N005AD
Limit Switch	C72-N006AD
Limit Switch	C72-N008AD
Level Transmitter	E11-N008AB
Temperature Element	E11-N009AD
Differential Pressure Transmitter	E11-N013
Differential Pressure Transmitter	E11-N015A
Differential Pressure Transmitter	E11-N015B
Pressure Switch	E11-N018
Switch	E11-N021AB
Pressure Switch	E11-N022AB
Level Switch	E11-N023AB
Level Switch	E11-N024
Temperature Element	E11-N029AD
Temperature Element	E11-N030AD
Flow Indicating Switch	E11-N033AB
Differential Pressure Transmitter	E21-N003AB
Switch	E21-N006AB
Pressure Switch	E21-N007AB
Flow Meter	E32-N006
Level Switch	E41-N002
Level Switch	E41-N003
Level Switch	E14-N014
Level Switch	E41-N015AB
Level Switch	E41-N018
Temperature Element	E41-N024AB
Temperature Element	E41-N025AH
Temperature Element	E41-N028AB thru E41-N030AB
Temperature Indicator	E41-R002
Level Switch	E51-N010
Temperature Element	E51-N011AB

Temperature Element	E51-N021AB
Temperature Element	E51-N022AB
Temperature Element	E51-N023AB
Temperature Element	E51-N025AD thru E51-N027AD
Temperature Indicator	E51-R005
Temperature Element	G33-N016AF
Temperature Element	G33-N022AF
Temperature Element	G33-N023AF
Switch	G33-N044A

QUESTION 123.4:

Describe the methods and criteria used to determine the acceptability of the original equipment qualification to meet the required response spectra of item 2. (iii). - 123.2 (iii).

RESPONSE:

I. BOP

For cases where the original spectra for which an equipment was qualified enveloped the combined Seismic and hydrodynamic load spectra of Item 123.2 (iii), the equipment is considered qualified. Otherwise (which is true for most cases) the equipment is requalified for the combined spectra to meet the criteria discussed in response to Questions 123.1. These criteria are described in Section 7.1.7 of the Design Assessment Report.

II. NSSS

The methods and criteria used to determine the acceptability of the original equipment qualification may be found in General Electric Company's Proprietary reports: NEDE-24788, "Seismic Qualification Review Team (SQRT) Technical Approach for Re-Evaluation of BWR 4/5 Equipment"; and NEDE-25250 "Generic Criteria For High-Frequency Cutoff of BWR Equipment".

QUESTION 123.5:

Describe the methods and criteria used to address the vibration fatique cycle effects on the affected equipment due to required loading conditions.

RESPONSE:

I. BOP

As described in Subsection 3.7b.3.2 of FSAR, in general, the design of equipment is not fatigue controlled since the number of cycles in an earthquake is low.

For combined Seismic and hydrodynamic loads for equipment qualified by analysis, the fatigue effects are implicitly considered since the stresses due to SRV (which are generally controlling for fatigue) are a small contribution to the overall equipment stresses.

Fatigue effects in BOP equipment qualified by testing are accounted for by repetition of the tests. Typically tests are done for 5 OBE (or 5 upset conditions, i.e., OBE + SRV + LOCA) followed by 1 SSE (or 1 faulted condition, i.e., SSE + SRV + LOCA) in each of front-to-back/vertical and side-to-side/vertical biaxial configurations. In addition, on some selected pieces of equipment, vibratory table testing is carried out for an extended duration of time (such as 30 to 60 minutes) beyond the combined loading test. The input motions for the extended duration tests will be such that the generated test response spectra for any segment of the extended duration tests will envelope the SRV spectra. Furthermore, it will be ascertained that the equipment performs its intended function before, during and after the vibratory table tests. The results of the extended duration tests will be documented in the respective qualification reports.

II. NSSS

Vibration fatigue cycle effects for NSSS equipment designed to ASME code requirements was reviewed at GE by NRC consultants from Battelle Pacific Northwest Laboratories on October 7, 1980. The consultants stated satisfaction with the GE approach which encompasses OBE, SRV, thermal and pressure cycles.

Non ASME Code components qualified by test address the "strong motion" phase of seismic and SRV dynamic motion sufficient to generate maximum equipment response. These loads are controlling. GE testing generally consists of 5 upset and 1 faulted test of 30 seconds each which is about 50% greater than required to address strong motion vibration.

Non ASME Code components qualified by analysis generally have not, in the past, had to address vibration fatigue cycle effects. In most cases, such effects are not now part of the qualification record.

QUESTION 123.6:

Based on the methods and criteria described in items 4 and 5, provide the results of the review of the original equipment qualification with identification of (1) equipment which has failed to meet the required response spectra and required requalification, and (2) equipment which was found acceptable, together with the necessary information to justify the adequacy of the original qualification.

RESPONSE

I. BOP

For cases where the original seismic reports can be extended to qualify an equipment for combined seismic and hydrodynamic loads by inspection and subsequent concurrence by vendor, such documents form a part of the qualification package. The following pieces of equipment bought under the indicated purchase order (P.O.) fall into this category:

(1) Cooling and chilled water pumps (P.O. #M-327)

(2) Expansion Tanks and Air Separator Tanks (P.O. #M-302)

(3) Nitrogen Gas Accumulators (P.O. #M-156)

The rest of the BOP equipment is being qualified for the criteria described in Section 7.1.7 of the Design Assessment Report. The qualification reports for this equipment will provide the appropriate documentation.

II. NSSS

Refer to the Response to Question 123.3 for the list of equipment reevaluated by GE on the Susquehanna SQRT Program. All of the equipment listed in qualified to SQRT Criteria with the exception of the following:

B21-F022/F028	MSIV	Data required from vendor
B31-F031/F032	Gate Valve	Operability deflection analysis required
C12-F009/F010 F011/F012	CRD Valve	Operability deflection analysis required
C41-A003	SLC Accumulator	A/E pipe accelerations required
C41-F004	SLC Explosive Valve	A/E pipe accelerations required
E32-B001	MSIV Heater	Test required

E41-C002	HPCI Turbine	Test required
E51-C002	RCIC Turbine	Analysis of lube oil piping required
F22-E006	Invessel Rack	Analysis required
F22-E009	Def. Fuel Storage Cont.	Analysis required
H12-P608	Power Range Monitoring Cabinet	Test required
H23-P030 -P031 -P032 -P033	SRM/IRM Panels	Test required
163C1158	Flow Transmitter on H23-P074	Test required
272A8005	Switch on H12-P853	Test required
272A8006	Switch on H12-853	Test required

Information to justify qualification of the equipment selected by the NRC for the Site Audit will be available at the site for NRC inspection. Information to justify qualification of the remainder of the equipment is available for NRC audit at GE-San Jose.

QUESTION 123.7:

Describe procedures and schedule for completion of each item identified in item 6.(1) 123.6.(1) that requires requalification.

RESPONSE:

I. BOP

Typically, the qualification program is executed in the following steps.

- o Determine Qualification Awards
  - Request Vendor (or Consultant) Quote
  - Receive and Evaluate Quote
  - Place Purchase Order
- o Perform Qualification
  - REview Test Procedure
  - Review Analysis Methodology.
  - Begin Analysis or Testing
- o Final Completion
  - Receive and review Requalification Reports
  - Final Approval of the Report

The schedule for the completion of the qualification program is shown in the attached Table 123.7-1.

II. NSSS

The response to Question 123.6 lists the equipment found by GE to require requalification along with a statement defining the work to be performed. All requalification will be completed on a schedule sufficient to permit NRC review prior to fuel load.

TABLE 123.7-1

SCHEDULE FOR COMPLETION
OF EQUIPMENT REQUALIFICATION

SQRT Form No.	Equipment	No. of Items/ 2 Units	Completion Date
E-109-1	4 kV Switchgear	12	3-13-81
E-109-2	4 kV Switchgear Sub-Components	12	5-15-81
E-112	ESW & RHR Pump Motors	8	Complete
E-117-1	480 V Safe-Guard Load Center Unit Substations	8	3-27-81
E-118	480 V Motor Control Centers	24	4-17-81
E-119A-1	Battery Monitors	20	3-27-81
E-119A-2	Battery Fuse Boxes	16	3-27-81
E-119A-3	Battery Chargers	22	3-27-81
E-119BC	24 Vdc, 125 Vdc & 250 Vdc Battery Cells & Racks	8	5-29-81
E-120-1	125 Vdc Distribution Panels	16	3-20-81
E-120-2	24 Vdc Distribution Panels	4	4-10-81
E-121-1	125 V & 250 Vdc Load Centers	12	3-27-81
E-121-2	250 Vdc Control Centers	6	4-10-81
E-135-1	Electrical Penetration (Medium Voltage)	12	5-15-81
E-135-2	Electrical Penetration (Low Voltage)	32	5-15-81
E-136	AC Instrument Transformers	14	3-27-81
E-151	Motor Generator Sets & Control Cabinet	4 Sets	Complete
E-152	Automatic Transfer Switches	8	Complete
E-155	Control Switches	44	6-15-81
J-038A	Field Mounted Electronic Pressure Transmitters	32	Complete

SQRT Form No.	Equipment	No. of Items/ 2 Units	Completion Date
J-03B-1 thru J-03B-14	Panel - Mounted Instruments	242	4th quarter 1981
J-05A-14,31,33,37, 10A & B, 43,47,49, 92,93,95 & 97	Control Panels & Devices	31	5-30-81 (panels) 6-15-81 (devices)
J-05B-1	Remote Shutdown Control Panel	1	5-30-81 (panels) 6-15-81 (devices)
J-27	Reactor Coolant Pressure Boundary Leak Detection System	2	Complete (panels) 6-15-81 (devices)
J-31	Annubar Flow Elements	2	Complete
J-59-1 thru J-59-10	RTD's	54	5-22-81
J-65-1 thru J-65-4	Control Valves in Nuclear Service	28	3-27-81
J-65B-1 thru J-65B-11	Control Valves in Nuclear Service	86	3-27-81
J-69-1 & 2	Pilot Solenoid Valves	8	5-15-81
J-69B-1 thru 6	Pilot Solenoid Valves	74	5-15-81
J-70-1	Pressure Regulating Valves	8	5-15-81
J-70-2	Process Solenoid Valves	76	5-15-81
J-92-1 thru J-92-5	Excess Flow Check Valves	238	5-1-81
J-98	Carrier Modulator (Isolator)	-	6-15-81
M-11	ESW Pumps	4	Complete
M-12	RHR Suction Water Pumps	4	Complete
M-22-1 & 2	Reactor Building Cranes	2	4-3-81
M-30 (78 forms)	Diesel Generator	4 Sets	Complete
M-30 (6 forms)	Diesel Generator	4 Sets	2-27-81
M-55	Reactor Vessel Top Head Insulation Support Steel	2	Complete

SQRT Form No.	Equipment	No. of Items/ 2 Units	Completion Date
M-58	Diesel Oil Transfer Pumps	4	Complete
M-60	Buried Diesel Generator Fuel Oil Storage Tanks	4	3-27-81
M-87-1	Containment Hydrogen Recombiners	8	5-15-81
M-87-2	Hydrogen Recombiner Power Supply	4	Complete
M-90	Fuel Pool Skimmer Surge Tanks	2	4-27-81
M-149	Containment Vacuum Relief Valves	20	5-22-81
M-151	Suppression Pool Suction Strainers	32	Complete
M-156	Containment Nitrogen Gas Accumulators	60	Complete
M-159-1 thru M-159-21	Nuclear Safety & Relief Valves	58	5-1-81
M-160AC	SRV Discharge Line & RHR Relief Valve F055 Discharge Line Vacuum Breakers	68	5-15-81
M-164	CRD Vent Valve Platform	2	Complete
M-192	High Density Spent Fuel Pool Racks	48 Modules	Complete
M-302	Expansion Tanks & Air Separators	4	Complete
M-307-1 thru M-307-3	Centrifugal Fans	6	3-13-81
M-308-1	Vane Axial Fans, Reactor Building	2	5-1-81
M-308-2	Vane Axial Fans, Diesel Generator Building	4	Complete
M-308-3 & 4	Vane Axial Fans, ESSW Pumphouse	8	Complete
M-309-1 thru M-309-4	Air Handling Units	12	4-17-81
M-310	Centrifugal Water Chillers	2	5-22-81
M-315	Reactor Building Unit Coolers	24	5-29-81
M-317	Drywell Unit Coolers	12	3-27-81
M-320-1	Chlorine Detectors	2	6-15-81

SQRT Form No.	Equipment	No. of Items/ 2 Units	Completion Date
M-320-2-1A & 1B	Flow Switches	28	6-15-81
M-320-2-2A	Flow Switches	2	6-15-81
M-320-3	Level Gauge	2	6-15-81
M-320-4	Pressure Differential Switches	4	6-15-81
M-370-5A & 5B	Temperature Switches	24	6-15-81
M-320-6-1A & 1B	Temperature Switches	4	6-15-81
M-320-6-2A	Temperature Switches	4	6-15-81
M-320-6-3A & 7	Temperature Switches	10	6-15-81
M-320-8	Pressure Differential Transmitter	18	6-15-81
M-320-9	Temperature Detector Unit	2	6-15-81
M-320-10	Level Switches	4	6-15-81
M-321-1	Standby Gas Treatment System - Housing	2	2-20-81
M-321-2	Standby Gas Treatment System - Deluge Drain Valves	8	5-1-81
M-321-3	Standby Gas Treatment System - Control Panels	4	3-6-81
M-323C-1	Air Flow Monitoring Unit	1	3-13-81
M-323C-2	SGTS Exhaust Vent Flow Conditioning & Sampling Probe System	1	3-13-81
M-325	High Efficiency Ventilation Filters	2	Complete
M-327-1	Chilled Water Pump	2	Complete
M-327-2	Cooling Water Pump	2	Complete
M-334-1 thru M-334-5	HVAC Control Panels & Devices	12	5-30-81 (panels) 6-15-81 (devices)
M-336A	HVAC Dampers	195 Units	5-8-81
M-362	SGTS Centrifugal Fans	2	Complete
M-365	Chilled Water Relief Valves	2	5-1-81
P-10A-1	Motor Operated Gate Valves, 600#	5	6-15-81

SQRT Form No.	Equipment	No. of Items/ 2 Units	Completion Date
P-10A-2	Motor Operated Gate Valves, 900#	15	6-15-81
P-10A-3	Motor Operated Globe Valves, 900# & 600#	9	6-15-81
P-10B	Motor Operated Stop Check Valves, 900#	2	6-15-81
P-11A-1	Motor Operated Gate Valves, 900#	2	6-15-81
P-11A-2	Air Operated Testable Check Valves, 900#	2	6-1-81
P-12A-1	Motor Operated Gate Valves, 150#	24	6-15-81
P12A-2	Motor Operated Globe Valves, 300#	11	6-15-81
P12A-3	Motor Operated Gate Valves, 300#	20	6-15-81
P-12A-4	Gear Operated Gate & Globe Valves, 300#	7	6-1-81
P-12B-1	Motor Operated Gate Valves, 150# & 300#	4	6-15-81
P-12B-2	Air Operated Gate Valves, 150#	14	6-1-81
P-12B-3	Gear Operated Gate & Globe Valves, 150#	13	6-1-81
P-14A	Motor Operated Globe Valves, 1500#	1	6-15-81
P-14B	Motor Operated Globe Valves, 1500#	1	6-15-81
P-15A	Motor Operated Globe Valves, 1500#	11	6-15-81
P15B-1	Motor Operated Gate Valves, 1500#	18	6-15-81
P-15B-2	Air Operated Gate Valves, 1500#	2	6-1-81
P-16A-1	Motor Operated Butterfly Valves, 150#	28	6-15-81
P16A-2	Air Operated Butterfly Valves, 150#	8	6-1-81
P-16A-3	Gear Operated Butterfly Valves, 150#	12	6-1-81
P-17A-1	Motor Operated Gate Valves, 900#	7	6-15-81
P-17A-2	Motor Operated Globe Valves, 900#	1	6-15-81

SQRT Form No.	Equipment	No. of Items/ 2 Units	Completion Date
P-17A-3	Air Operated Testable Check Valves, 900#	2	6-1-81
P-17A-4	Gear Operated Gate Valves, 900#	5	6-1-81
P-17B	Air Operated Testable Check Valves, 900#	2.	6-1-81
P-18A	Gear Operated Gate Valves, 150#	1	6-1-81
P-31A	Air Operated Butterfly Valves, 150#	9	6-1-81

QUESTION 123.8

Describe plans for a confirmatory in-situ impedance test and an in-plant SRV test program or other alternatives to characterize the ability of equipment to accommodate hydrodynamic loading.

RESPONSE:

In-Situ tests are being performed for the determination of structural dynamic characteristics of the equipment for in-service condition. This in-situ information is being used as supporting evidence for (a) validating a mathematical model for qualification by analysis, or (b) simulating the in-service condition on the vibratory table tests for qualification by testing. The results and the usage of in-situ testing will be described in the respective qualification reports, whenever such tests are performed.

All safety related BOP equipment fo Susquehanna project is being qualified for combined seismic and hydrodynamic loads for the criteria described in Section 7.1.7 of DAR. Susquehanna has no plans to perform an in-plant SRV test for equipment qualifications per se. An air bubble test was conducted in the suppression pool in an attempt to simulate the effects of an SRV air clearing transient load. The data from this test are being studied in an effort to determine the extent of conservatisms in the analytical prediction of applied hydrodynamic loads.

QUESTION 123.9:

To confirm the extent to which the safety related equipment meets the requirements of General Design Criterion 2, the Seismic Qualification Review Team (SQRT) will conduct a plant site review. For selected equipment, SQRT will review the combined required response spectra (RRS) or the combined dynamic response, examine the equipment configuration and mounting, and then determine whether the test or analysis which has been conducted demonstrates compliance with the RRS if the equipment was qualified by test, or the acceptable analytical criteria if qualified by analysis.

The staff requires that a "Qualification Summary of Equipment" as shown on the attached pages be prepared for each selected piece of equipment and submitted to the staff two weeks prior to the plant site visit. The applicant should make available at the plant site for SQRT review all the pertinent documents and reports of the qualification for the selected equipment. After the visit, the applicant should be prepared to submit certain selected documents and reports for further staff review.

RESPONSE:

Susquehanna SQRT pre-visit information required for the SQRT site review has been submitted for all BOP and NSSS equipment. "Qualification Summary of Equipment" and the pertinent documents, reports, vendor prints and all necessary information as required are available for SQRT review.