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INFORMAL REPORT

AUDIT OF THE PUMP AND VALVE OPERABILITY ASSURANCE PROGRAM FOR THE SEABROOK GENERATING STATION UNIT 1

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EG&G Idaho

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Docket No. 50-443

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ABSTRACT

The Seabrook Station Unit 1 was audited November 5 to 8, 1985 to determine the adequacy of their Pump and Valve Operability Assurance Program. Ten concerns (five specific and five generic), which could not be resolved by the close of the audit, were identified to the applicant; he committed to address these concerns prior to fuel load. The results of this audit indicate that the applicant has established and is implementing a program that will track all pumps and valves important to safety from manufacture and in-shop testing through qualification, installation, testing, maintenance, and surveillance for the purpose of assuring continued operability of these components over the life of the plant.

FOREWORD

This report is supplied as part of the "Equipment Qualification Case Reviews" project that is being conducted for the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Division of Engineering, Equipment Qualification Branch by the Engineering Analysis Division of EG&G Idaho, Inc.

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SUMMARY

The Pump and Valve Operability Assurance Review Team (PVORT), comprised of one member of the Nuclear Regulatory Commission (NRC) staff and three EG&G personnel, conducted an on-site audit of the Seabrook Pump and Valve Operability Assurance Program during the week of November 5 to 8, 1985. A representative sample of active pumps and valves was selected for review and evaluation. These components are categorized as either Nuclear Steam Supply System (NSSS) or Balance of Plant (BOP), based upon which organization was responsible for the purchase and installation of the component. Westinghouse is Seabrook's NSSS vendor while United Engineers and Constructors Power Corporation, an architectural engineering firm, is responsible for the BOP components.

The process used to evaluate the plant's overall Pump and Valve Operability Assurance Program includes: (a) becoming familiar with each selected component and the system in which it is installed, (b) understanding the component's normal and safety function, (c) visually inspecting the component's configuration and mounting, (d) reviewing those documents relating to the operability of each selected component, (e) ensuring the applicant has an adequate document retrieval system, and (f) reviewing the applicant's preoperational testing and maintenance/surveillance programs.

The results of the evaluation process are two-fold. Any component specific deficiencies or concerns are identified and documented. Of greater importance are any generic concerns, which may be identified, that could affect other components in the plant or possibly even extend to other plants.

During the PVORT review, a number of component specific concerns were raised. All but five of these specific concerns were satisfactorily resolved during the audit by the applicant supplying additional information or demonstrating that administrative procedures were in place that would

address them. The applicant committed to resolve these five component specific concerns prior to fuel load. In addition, the staff also requests that prior to fuel load the applicant confirm that: (a) all pre-service testing that is required to be completed is completed, (b) all pumps and valves important to safety are qualified (c) the maintenance procedures are consistent with manufacturer's recommendations and provide several maintenance procedures for review, (d) the FSAR indicates all active BOP valves are covered by the Seabrook pump and valve operability assurance program including valves two inches and smaller and (e) all active valves are correctly identified in the FSAR.

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AUDIT OF THE PUMP AND VALVE OPERABILITY ASSURANCE PROGRAM FOR THE SEABROOK GENERATING STATION UNIT 1

1. INTRODUCTION

The Equipment Qualification Branch (EQB) performed a two-step review of the Pump and Valve Operability Assurance Program being implemented by the Seabrook Station Unit 1. The purpose of this review was to determine whether Seabrook's program is adequate to ensure that pumps and valves important to safety will operate when required during the life of the plant under normal and accident conditions. (Seabrook is a 1150-MWe pressurized water reactor (PWR) located in Seabrook, New Hampshire.)

The first step was a review of Section 3.9.3.2 of the applicant's Final Safety Analysis Report (FSAR). This information was general in nature, and, therefore, by itself was not adequate to properly determine the scope of the applicant's overall equipment qualification program as it pertains to pump and valve operability. The results of this FSAR review appeared as input to Seabrook's Safety Evaluation Report (SER). The resolution of all open SER issues was accomplished prior to or concurrently with the on-site audit.

The second step of the review was an on-site audit to assess the applicant's overall program, as it is implemented. A Pump and Valve Operability Review Team (PVORT) consisting of engineers from the EQB and the Idaho National Engineering Laboratory (INEL-EG&G) conducted an audit from November 5 to 8, 1985, of a representative sample of installed pump and valve assemblies and their supporting qualification documents at the applicant's plant site. Based upon the results of the FSAR review and the on-site audit, the PVORT was able to determine whether the applicant's overall program conforms to the current licensing criteria presented in Section 3.10 of the Standard Review Plan (SRP). Conformance with SRP 3.10 criteria is required in order to satisfy the applicable portions of General Design Criteria (GDC) 1, 2, 4, 14, and 30 of Appendix A to 10 CFR 50 as well as Appendix B to 10 CFR 50.

Section 2 of this report presents the basic methodology used to evaluate Seabrook's overall equipment qualification program as well as a discussion of the concerns raised during the evaluation of the selected components and other qualification issues. Section 3 presents the staff's conclusions concerning the audit. Sections 4 and 5 present the references for the NSSS and BOP components, respectively.

2. EVALUATION METHODOLOGY

In order to evaluate the adequacy of Seabrook's Pump and Valve Operability Assurance Program and the extent to which it is being implemented, the PVORT conducted an audit at the plant site November 5 to 8, 1985. The first phase of the on-site audit consisted of the applicant presenting the major elements of his overall equipment qualification program. The remainder of the audit consisted of determining whether the applicable elements of the program had been (or would be) implemented for the set of selected components. By performing a detailed review on a diverse set of components, the PVORT is attempting to identify concerns that may be generic to the applicant's overall program. Table 1 presents a list of pumps and valves selected for the PVORT audit.

As the first step of the detailed review of the selected components, the PVORT conducted a plant walkdown of each component accompanied by cognizant licensee personnel. One purpose of this walkdown was to obtain information that could later be compared with the evidence of qualification contained in each component's document package. Some examples of walkdown information that was compared with relevant documents are: (a) nameplate data versus design and purchase specifications, (b) installed configuration and mounting versus the configuration and type of mounting that was tested (or assumed in an analysis), (c) local equipment environment (including the environment that could result from an accident) versus the environment enveloped during required testing, (d) system interfaces versus energy or fluid requirements, and (e) installed functional accessories versus actual equipment tested. In addition, a second purpose of the walkdown was to evaluate each selected component in order to determine whether any operability concerns may have been overlooked. Examples of such concerns are: (a) the potential for flooding, (b) component misapplication, (c) the potential for pipe whip or missile damage, and (d) the potential for personnel interactions that could inadvertently cause a component to become inoperable.

TABLE 1. PUMPS AND VALVES SELECTED FOR THE PVORT AUDIT

NSSS Components		BOP Components	
CS-P-2B	Centrifugal Charging Pump	FW-V-331	Feedwater System Control Check Valve
RC-V-456A	Power Operated Relief Valve	FW-P-37A	Turbine Driven Emergency Feedwater Pump
RH-V-14	Cold Leg Injection/RHR Return Line Isolation Valve	CC-V-975	Primary Component Cooling Water Radiation Monitor Isolation Valve
		FW-V-48	Feedwater Isolation Valve
		CC-V-122[b]	Primary Component Cooling Automatic Containment Isolation Valve
		SW-P-110A[a]	Cooling Tower Pump

Note: The applicant has six weeks to prepare document packages for all but the surprise components; for those he has only a few days. The contents of the document package for the surprise components is an indicator of: (a) the applicant's ability to retrieve documents in a timely manner, and (b) the completeness of his central files.

a. The applicant provided a separate presentation concerning the deep draft pump issue (refer to IE Bulletin 79-15) for this component.

b. Surprise component--The applicant is informed of this component only a few days prior to the on-site audit.

The document review portion of the audit was conducted after the completion of the applicant's program presentation and the walkdown of the selected components. One purpose of the document review was to verify that the principles established in Seabrook's program had been (or would be) uniformly implemented. Therefore, the document package for each of the audit components was reviewed to ensure that, as a minimum, each package contained the following:

- o A purchase specification that reflects design and functional requirements
- o Results of applicable in-shop tests
- o Evidence that the component was subjected to a qualification evaluation that addressed:
  - Pre-aging
  - Significant aging mechanisms (if applicable)
  - Normal and accident loads (including seismic and hydrodynamic loads)
  - Acceptance criteria requiring operability both during and after an event
  - Identifiable safety margins (difference between design basis parameters and the test parameters used for equipment qualification)
- o Applicable preoperational test procedures
- o Similarity statements, where the qualification of a similar equipment is used to qualify the installed equipment (if applicable)

- o Evidence that maintenance/surveillance practices incorporate qualification and operability concerns.

In addition, a second purpose of the document review was to ensure that an auditable link existed between the documents in the package and that all documents had been reviewed and approved by personnel having a working knowledge of equipment qualification issues and concerns. Those documents not present in the audit component document package were requested by the PVORT. Seabrook's timely response to these requests and their ability to compile a complete package for the surprise components were considered to be positive indicators of the acceptability of the applicant's central file system.

The remainder of Section 2 is devoted to discussing any concerns raised by the PVORT as a result of the equipment and issues reviewed during the on-site audit. Sections 2.1 and 2.2 present the evaluation of the NSSS and BOP components, respectively. Section 2.3 summarizes the status of other equipment qualification issues relating to pump and valve operability.

2.1 Nuclear Steam Supply System (NSSS) Components

2.1.1 Centrifugal Charging Pump, CS-P-2B (Audit Status: Closed)

2.1.1.1 Component Description. This component is a single speed, horizontal, eleven stage centrifugal pump manufactured by Pacific Pump (Model 2-1/2 RL IJ) which is driven by a 600 HP induction motor manufactured by Westinghouse (Model Life Line D). The component is part of the chemical volume and control system and is located in the Auxiliary Building at the 7-ft level. During normal operation, the pump maintains a programmed water level in the pressurizer by pumping purified reactor flow from the volume control tank reactor coolant to the RCS after heating via the regenerative heat exchanger. Upon receipt of a safety injection signal, the two centrifugal charging pumps are automatically aligned to take suction from the refueling water storage tank and then pump borated water to the RCS.

The charging pump subsystem of the CVCS is an integral part of the ECCS and must be capable of providing long-term cooling for one year. There are three charging pumps (one positive displacment and two centrifugal) only one of which is required to handle normal charging flow. The pump is required to be operable for 1 year post-accident.

2.1.1.2 Component Walkdown. The walkdown of this component revealed four anomalies, all of which were resolved prior to the close of the audit. First, the oil level glass for the gear box did not indicate the presence of any oil. Also, the vertical oil level glass on the pump sump was 2/3 full but there weren't any markings on the glass casing to indicate minimum and maximum fill levels. A Westinghouse engineer explained that the pump assembly including gear box is adequately lubricated if any oil is detected in the sump oil level glass. The glass is normally filled to the halfway position to allow for thermal expansion. The oil level glass on the gear box is located above the normal oil level of the sump. Consequently, the proper oil level is determined by the sump oil level glass only. Second, there was a loose wire coming from the rear motor bearing box. Documentation was provided to demonstrate that the work to repair the temperature element will be completed before the pump is placed in operation. Third, the boron injection tank (BIT) was removed completely, which was not shown on the FSAR drawings. The BIT was removed by the applicant because its additional boron concentration was not considered to be necessary for plant operation. Documentation was reviewed which authorized the modification, specifying those systems and equipment that were affected. And fourth, the miniflow valves (2"-CS-196 and -197) were shown in parallel in the FSAR drawing, but were shown in series in the Westinghouse drawing. The startup engineer explained that United Engineers took over responsibility for this section of piping from Westinghouse in order to improve isolation reliability of the miniflow line. Documentation was reviewed which demonstrated that the as-built piping has been qualified by analysis. In the clarification of these last two items, Seabrook personnel stated that the FSAR is being scrutinized for consistency and that the anomalies in drawings, tables, and text will be resolved in future amendments.

2.1.1.3 Document Review. The review of the qualification documents[1-16] revealed that qualification of this component was addressed by a combination of tests, analyses, and similarity statements. It was discovered that the motor was qualified by a generic test program and that the qualified life was given as 5 years. Documentation was reviewed which listed the various motor types that were covered by the generic environmental qualification program. A 450 HP motor stator was used to determine the 5 year qualified life based upon the testing of the thermalastic epoxy insulation. Draft procedures were already written to maintain qualification of the lubricant and motor per vendor recommendations. However, a complete set of approved maintenance procedures were unavailable for review. This concern was brought to the applicant's attention as a generic issue. See Section 2.3.3 for a discussion of the Seabrook maintenance program. The FSAR description was not clear whether LOCA loads were applicable for this pump. Westinghouse explained that the pump is located outside containment and that the major LOCA effects would be damped out at the penetration. In addition, the generic nozzle loads, used to qualify the pump, are significantly higher than the plant specific loads and provide sufficient margin to envelop residual LOCA effects.

An identical charging pump assembly was mounted to a shake table and operated under full flow but reduced pressure conditions. Operation of the pump was limited to 150 psi to avoid overpressurizing the test loop piping. Generic nozzle loads and 2.1 g seismic loads were applied while the pump was operated. The 100 hour endurance run was comprised of 10 ten-hour runs, each of which included at least one hour of full flow operation. The test results did not detect any degradation in vibration levels or bearing temperature. Similarly, the motor insulation and lubricants did not degrade from the prolonged pump operation at runout conditions. Construction tests have already been performed as required and the hot functional tests were still in progress at the conclusion of the audit.

2.1.1.4 Findings. No specific operability concerns remained after the evaluation of this component.

2.1.2 Power Operated Relief Valve (PORV), 456A, (Audit Status: Closed)

2.1.2.1 Component Description. This component is a solenoid controlled, 3 x 6 in. plug-type, inlet pressure-operated shutoff valve manufactured by Garrett (Model 3750014). The valve is located on the top head of the pressurizer and inside containment at the 56.5 ft level. The PORV is designed to flow any combination of air, water, or steam at inlet conditions up to 2600 psig at 700°F. Valve position indication is achieved through the use of four single-pole, double throw switches. The solenoid control valve is a continuous-duty, direct-acting, three-way solenoid valve designed and constructed to meet the requirements of the ASME code, Section III, Class 1. The normal function of the PORV is to control pressurizer pressure. The safety function is to prevent the safety valve from lifting, as well as to prevent reactor trip on high pressurizer pressure and cold overpressure mitigation.

The PORV is operated automatically or by remote control. Steam from the PORV is discharged into the pressurizer relief tank, where it is condensed and cooled by mixing with water near ambient temperature. The valve is required to be capable of operation up to 12 hours post accident.

2.1.2.2 Component Walkdown. At the time of the audit, the hot functional tests were still in progress. Access to the PORV was determined to be difficult and potentially dangerous. Instead, recent photographs taken by the utility prior to the hot functional tests were studied. The photographs showed that the valve body was wrapped in insulation, while the valve solenoid and limit switches were exposed. Westinghouse engineers pointed out that the PORV had been recently modified to eliminate leakage past the body-to-bonnet gasket. The original design used a vent through the bonnet flange connecting the upper pressure chamber of the bonnet with the discharge port of the valve. The leakage occurred at the point of the body-to-bonnet gasket which sealed the vent opening. The new modification

used a stainless steel pipe welded to the vent opening in the valve body. The bonnet flange was drilled to allow the pipe to pass entirely through the flange, avoiding the gasket area. Then, a separate piece of threaded tubing was used to connect the exposed pipe with the upper pressure chamber of the bonnet. This configuration was requested by Seabrook specifically for the hot functional test sequence. Westinghouse presented test results which demonstrated operation of the PORV at the design settings. No external leakage at the body-to-bonnet joint was detected. Although the Westinghouse test report had not yet received final approval, Seabrook did review the preliminary test results and did accept the PORV in order to conduct the hot functional tests as scheduled. In general, the modification to the PORV did not invalidate the original qualification stress analysis of the pipe, demonstrating that the new tubing configuration was acceptable. Procedures have been written to assure that new pipe will not be damaged whenever the bonnet is pulled.

2.1.2.3 Document Review. The review of the qualification documents [17-22] revealed that qualification of this component was addressed by a combination of tests and analyses. Minor discrepancies in the PVORT long form were resolved by discussion with Westinghouse personnel and substantiated by the appropriate documentation. A static deflection test was conducted without any problems at a generic acceleration of 7.75 g compared to the plant specific load of .06gH1, .43gH2, .10gV. The solenoid was qualified in accordance with the IEEE 323 test sequence (baseline parameters, mechanical and thermal aging, containment pressure, radiation, vibration aging, seismic, and LOCA conditions). The qualified life of the solenoid was calculated as 12.7 years, although the vendor recommends replacement after 5 years. Seabrook personnel indicated that the vendor recommendations will be incorporated into the maintenance program once the qualification documents have been transferred from the startup group.

Although the methodology for implementing the maintenance program appears to be established, the specific procedures have not been written. This concern was found throughout the audit and was elevated to a generic issue at the close of the audit. See Section 2.3.3 for a discussion of this concern.

2.1.2.4 Findings. No specific operability concerns remained after the evaluation of this component.

2.1.3 Cold Leg Injection/RHR Return Line Isolation Valve, RH-V-14, (Audit Status: Closed)

2.1.3.1 Component Description. This component is an 8-inch gate valve manufactured by Westinghouse (Model 08002GM88FNB000) powered by a Limitorque motor operator (model SB-1-60). The valve is located in the auxiliary building at the -18.5 ft level. The valve is normally open in the discharge line from the residual heat removal pump downstream of the RHR heat exchanger. One safety function of the valve is to open for cold leg injection and recirculation. The other safety function of the valve is to close for containment isolation and hot leg recirculation. There are redundant torque switches to prevent the actuator from exceeding the specified torque setting. Likewise, there are redundant limit switches which read the linear travel of the valve stem to ensure full open and closed positions. Upon loss of power the valve will fail as is, which is the fail-safe position. The valve is required to be operable for 24 hours after event initiation.

2.1.3.2 Component Walkdown. The walkdown of this component revealed two anomalies, both of which were resolved prior to the close of the audit. First, a ventilation system (HVAC) duct was located a foot away from the side of the motor. The PVORT asked what might be the consequences of a cooling water coil in the HVAC system rupturing, and having that water blown directly into the motor. The applicant explained that there were no cooling coils in that portion of the HVAC system. Second, the valve and motor were installed vertically in the pipeline without any additional lateral support. Documentation was reviewed which demonstrated that the stress level due to faulted conditions were acceptable for the as-built configuration.

2.1.3.3 Document Review. The review of the qualification documents[23-28] revealed that the qualification of this component was addressed by a combination of tests, analyses, and similarity statements.

The Limitorque SB-1-60 operator was included in the generic design group of operators that were qualified by type testing. In particular the SMB-00-15 and SMB-1-60 operators met all acceptance criteria associated with the type test sequence in IEEE 323-1974. The various models within the design series have identical enclosure assemblies, gasket assemblies, electrical contact assemblies, internal wiring, and materials of construction. The only difference between these operators involve the spring mounting configuration, direction and length of travel, and type of travel.

A stress analysis of the valve assembly met the criteria of the 1974 ASME code, Section III. Functional tests were successfully completed on 4 and 12 inch valves of a similar design. The cold cyclic tests recorded cycling times within allowable limits. However, the opening and closing current reading was 13.8 amp compared to the nameplate rating of 12 amp. The applicant justified the apparent discrepancy by providing a Limitorque letter which indicated that the full load current shown on the motor nameplate represents a current value equivalent to 20 percent of the motor's starting torque rating. Furthermore, the applicant will invoke Limitorque's recommendation to inspect the valve packing and stem lubrication if the current drawn ever exceeds the 120 percent of the nameplate rating. The yoke-mounted external limit switches were upgraded by Westinghouse to meet Class 1E requirements. The new switches were shop tested for seismic and environmental conditions, and found to have a qualified life of 10 years. Seabrook confirmed that the maintenance procedures will include the vendor recommendations for replacement.

The above evidence, as well as completion of the construction tests, provide confidence that the valve will operate as required.

2.1.3.4 Findings. No specific operability concerns remained after the evaluation of this component.

2.2 Balance of Plant (BOP) Components

2.2.1 Feedwater System Controlled Check Valve (FW-V-331) (Audit Status: Closed Pending Resolution by Applicant)

2.2.1.1 Component Description. This component is an 18-inch, Y-pattern, piston-type control check valve manufactured by the flow control division of Rockwell International Corporation (Model 18 x 16 x 18 Fig 2092 (WCC) BJQTY). The valve is buttwelded to the 18 inch pipe as a part of the Feedwater Feed to steam generator "B". The valve assembly is located in the main steam and feedwater pipe chase building at the level of 8 ft-3 in. (centerline of pipe). It is a normally open valve. The safety function is to close at a controlled rate when the emergency feedwater pump is activated or in the event of feedwater line break upstream of the check valve. It is held closed by back pressure to prevent flow in the reverse direction. Valve operation is timed open and closed by an internal dashpot formed by the design of the check piston.

2.2.1.2 Component Walkdown. The valve was covered with insulation. There were no visible anomalies found during the walkdown.

2.2.1.3 Document Review. The review of the qualification documents[21-31] revealed that the operability was demonstrated by analysis and limited testing. The documentation review encompassed design and qualification documents. The review determined that the component had been designed for operating conditions of 1011 psig and 445°F. The qualification documents provided the results of the stress, vibration and operating time analyses. The stress analysis accounted for normal, upset, emergency and faulted conditions stress loading. The stress analysis was found acceptable. The vibration analysis determined that the fundamental frequency is greater than 33 Hz. Therefore, no exploratory vibration analysis or testing was performed. The operating time analysis determined valve closing time to be 1.26 seconds which is acceptable, compared with the specified minimum closing time of .8 seconds. However, there was no testing performed to demonstrate timing of the valve as it is installed in

the plant. There remains some question as to whether operability can be demonstrated by analysis only. This concern was brought to the applicant's attention as a component specific issue, which must be resolved prior to fuel load. The applicant has committed to evaluating timing requirements and performing testing as required. The applicant has also committed to providing IST training requirements as required.

2.2.1.4 Findings. The valve was qualified by analysis only. There were no instrumented test results to verify the valve closure time, and there is no reported operational experience at other nuclear plants subject to similar design conditions. Therefore, we don't feel the qualification by analysis alone can assure the operability of the valve to meet its design requirements. The applicant is requested to address this issue by the following actions:

a. Demonstrate the valve performance meets the design specifications through means other than the analysis already performed.

b. Provide copies of the IST procedures which demonstrate the verification of the valve closure time according to ASME code Section XI requirements to assure its continual operability.

2.2.2 Turbine Driven Emergency Feedwater Pump, FW-P-37A (Audit Status: Closed Pending Resolution by the Applicant)

2.2.2.1 Component Description. This component is a ten stage centrifugal pump manufactured by Ingersoll-Rand (Model NH-10) driven by a 770 hp steam turbine manufactured by Terry Corporation (Model GS-2N). The component is part of the Emergency Feedwater System and is located in the Emergency Feedwater Pump House. There are two pumps in redundant loops; one is steam turbine driven and the other electric driven with both pumps in standby during normal operation. The pump's safety function is to start and provide feedwater to the steam generators in the event of a line break, loss of main feedwater or reactor-turbine trip.

2.2.2.2 Component Walkdown. During the walkdown of the auxiliary feedwater pumps, eight operability concerns were identified. Four concerns were resolved before the close of the audit and four are items that require resolution by the applicant.

The items that were resolved during the audit were; operability of the lube oil filter during equipment operation, equipment danger tags on the turbine steam supply isolation valve and the pump feedwater suction and discharge valves, caution tags on the pump pipe hangers, and the pump to turbine coupling and thermocouple had been removed. The lube oil filter concern was addressed by demonstrating that the filter would not have to be operated during pump operation as the filter would be automatically bypassed if it became clogged, therefore its operability is not required. The danger tag installation was resolved by demonstrating that they had been installed to provide a safety boundary for hot functional testing. Pipe hanger caution tags had been installed to indicate that the hanger turnover was not complete. The last concern resolved during the audit was that the coupling and thermocouple had been removed. Thus was resolved by demonstrating that they were removed to facilitate a cracked pump seal replacement.

There were four concerns that were not resolved; trip and throttle valve operability, pump turbine end seal was cracked, the governor was not qualified and an unqualified modification had been made to the turbine steam piping.

One of the main concerns identified during the component walkdown was that the turbine trip and throttle valve installation was not made in a way that allowed easy operation by a plant operator. The installation had two problems. The first is that the manual operated valve was installed at an elevation that would not allow the operator to deliver a great deal of torque to the handwheel. The second is that the valve was installed in a confined space where only one operator would have access to the handwheel and then in close quarters, this makes operating the valve even more difficult. The applicant could not provide information that demonstrated

whether or not the valve installation would cause operation to be difficult. The licensee committed to perform testing that would demonstrate the ease of valve operation and then evaluate the results and requirements.

Another problem that was found during the walkdown was that the auxiliary feedwater pump turbine end seal had been cracked and was in the process of being changed. Upon questioning it was found that the cause of the failure had not been determined. The applicant has committed to determining the cause of the failure and taking steps to prevent a recurrence should any be required.

The third concern identified during the walkdown was that the turbine governor had a hold tag attached to it. The questioning determined that the governor had been qualified, then a modification had been made that made its operation a little easier, however, the modification had removed the qualification status. The hold tag had been installed indicating that the qualification had not been completed. The applicant has committed to providing confirmation that the governor qualification is complete prior to fuel load.

The fourth concern found during the walkdown was that an unqualified pipe installation had been made at the governor end of the auxiliary feedwater pump turbine. The questioning determined that during earlier testing, a great deal of steam leakage had been experienced from steam pipe drains. The installation was made to provide a method of sealing the leakage to prevent it from being vented to the Emergency Feedwater Pump House atmosphere. The applicant was not sure that the installation would work as designed, it is their intent to demonstrate operability during pump testing. If the installation works, the licensee will seismically qualify the installation, however, if the installation does not work, it will be removed and another modification tried. The applicant has committed to providing a description of the final installation and confirmation that it meets qualification requirements.

2.2.2.3 Document Review. The review of the qualification documents[32-37] indicated that qualification of this component was addressed by a combination of tests and analyses.

There were two concerns identified during the document review, one was left open as a confirmatory issue and one resolved during the audit.

During the document review, it was found that the applicant's qualification of the Terry turbine did not address turbine operation when there is moisture in the turbine driving steam. The applicant has committed to evaluating moisture in the turbine driving steam and providing confirmation that their installation will work as intended.

The second concern identified during the document review was that the seismic testing performed by Wyle Laboratories identified some mounting bolts inside of the turbine as being bolts that could work loose during a seismic event. Terry Corporation performed an evaluation and determined that the bolts of concern required torquing at least once every five years with an application of Loktite 277. The applicant was questioned about whether or not this requirement had been addressed. A draft maintenance package was provided. Upon review, it was found that the torquing requirement had not been identified. The applicant then described the methodology used to develop the maintenance requirements. The methodology demonstrated that the torquing requirement would have been identified during the maintenance package development and sign off, which was found acceptable.

2.2.2.4 Findings. During the review of this component, five items were found to be of concern:

1. Turbine trip and throttle valve operability

2. Pump seal failure evaluation

3. The turbine governor was not qualified

4. Steam pipe drain modification was not qualified

5. Turbine qualification did not address moisture in the steam.

Each item is described in detail in Sections 2.2.2.2 or 2.2.2.3.

2.2.3 Primary Component Cooling Water Radiation Monitor Isolation Valve, CC-V-975 (Audit Status: Closed)

2.2.3.1 Component Description. This component is a one inch plug valve manufactured by Tufline/Xomox (Model CL-150) which has a G. H. Bettes Corporation pneumatic operator (Model CB 4205R60). The component is a valve in the primary component cooling water system supply line to a radiation monitor and is located in the Primary Auxiliary Building. This valve is normally open to allow water flow. The valve's safety function is to isolate the radiation monitor from the component cooling water system when non-essential components are not required. Thus providing more component cooling to the essential equipment when required and helps maintain boundary integrity of the essential portion of the primary component cooling water system.

2.2.3.2 Component Walkdown. The walkdown of this component identified four minor anomalies, all of which were resolved prior to tne close of the audit. The minor deficiencies involved a hold tag on the valve's local control panel, valve position switch that was not wired into service, holes in the bottom of the electrical junction boxes, and covers out of place on a conduit union and main wiring box.

The applicant demonstrated that the hold tag on the control panel was the result of a light cover having been broken and then replaced. The tag had not been removed as QA had not inspected the replacement. The applicant investigated the switch that had not been wired into service. They determined and provided evidence that the switch was not required but was provided with the valve assembly package as a normal part and therefore, left in place. The applicant researched the holes in the bottom

of the junction boxes and found that they had been provided to allow moisture to be removed. The connections inside are waterproof, therefore, the holes did not have a direct impact on operability. The last deficiency was investigated and it was found that wires for other installations as well as this component were run through the conduit and junction box. Work was being performed on the other components, which was the reason the covers had been removed. The applicant indicated that the covers would be replaced when the work was complete.

2.2.3.3 Document Review. The review of the qualification documents[38-47] revealed that operability had been addressed by the combination of tests and analyses.

The document review identified one concern which was addressed before the end of the audit. The concern was that the solenoids on the valve had been replaced. The investigation determined that the solenoids had been replaced as those provided by the vendor were not the correct ones.

2.2.3.4 Findings. No specific operability concerns remained after the evaluation of this component.

2.2.4 Feedwater Isolation Valve, FW-V-48 (Audit Status: Closed)

2.2.4.1 Component Description. This component is an eighteen inch gate valve manufactured by Borg-Warner (Model 73890) with a pneumatic-hydraulic operator manufactured by Borg-Warner (Model 37951). The component is part of the main feedwater system and is located in the MSFW Pipe Chase. The valve's normal position is open to allow feedwater flow to steam generator RC-E-11C. The safety function of this component is to close and isolate the main feedwater system.

2.2.4.2 Component Walkdown. During the walkdown of this component, two minor concerns were identified which were resolved prior to the close of the audit. The concerns involved some grounding cables that were missing. During discussions with the applicant it was identified that the

valve had been removed, overhauled and replaced. The applicant determined that the grounding cables were not required in accordance with design. In addition, the applicant indicated that the valve had been removed and overhauled in accordance with manufacturer's five year maintenance requirements.

2.2.4.3 Document Review. The review of the qualification documents[48-52] indicated that qualification of this component was addressed by a combination of analyses and tests.

The document review identified one concern which was resolved before the end of the audit. The item involved oil-changing requirements. During testing of this valve in a high moisture environment, the valve operation exceeded operability criteria. The problem was researched and it was found that moisture accumulating in the oil caused valve operation to slow down. To address the problem, the applicant in agreement with the operator manufacturer has initiated maintenance requirements which will monitor the moisture content of the oil. Review of the maintenance procedure indicated that the applicant intends to change oil every two years and analyze the oil for moisture whenever operating time exceeds operating limits.

2.2.4.4 Findings. No specific operability concerns remained after evaluation of this component.

2.2.5 Primary Component Cooling Automatic Containment Isolation Valve, CC-V-122 (Audit Status: Closed)

2.2.5.1 Component Description. This component is a 12-inch butterfly valve manufactured by Posi-Seal International (Model 150) with an air actuator manufactured by Matryx (Model 260725R60). The component is located in the mechanical penetration area at the 6 ft level. The valve's normal position is open to pass cooling water flow. The safety function is to close and provide system isolation on a "P" containment isolation signal or a low-low head tank water level signal.

The valve position is indicated on the MCB by status light and can be operated remotely by the manual control from the MCB and the remote safe shutdown panel. In case of loss of air, the valve closes to its safe position. In the event of signal loss, the valve fails as is.

2.2.5.2 Component Walkdown. The walkdown of this component revealed three minor concerns; the valve nameplate data tag was unreadable, actuator air supply lines were not clamped to the holddown brackets and there was water leaking from the valve flanges.

Upon investigation of the nameplate data tag, the system test engineer (STE) pointed out that an identification number had been stamped into the valve body. This stamped number could be referenced back to the valve's name plate information.

The STE also investigated the lack of attachment of the air supply lines to the hold down brackets. He explained that the lines were loose to provide easy access for the on-going system tests during the start-up test program. The lines will be permanently supported before the compartment walkdown program starts.

Investigation of the water leakage problem identified the cause as a faulty gasket. Reviewing the documentation confirmed that a work request had been issued to correct the problem.

2.2.5.3 Document Review. The review of the qualification documents[53-70] indicated that this component has been qualified by a combination of tests and analyses.

During the document review, two concerns were identified, both of which were adequately resolved during the audit. The first concern was that the fundamental frequency was found to be 11 hz. Further review found that the low frequency was the result of the actuator having a large overhanging section. To increase the fundamental frequency above 33 hz, the applicant had installed an additional support to the overhanging

section. This was found to be acceptable. The second concern was that the air supply solenoid valves had been replaced. It was found that the solenoid valves originally had 120 VAC solenoids installed where 120 VDC was required. The change was made to correct the deficiency.

The preoperational leak test procedures were reviewed and found to be adequately prepared. There were no concerns identified during this review.

The final area investigated during the component document review was the aging evaluation. There were three aging mechanisms identified; thermal, wear and radiation. These mechanisms impacted two portions of the valve and actuator assembly, the solenoid valves and valve seals. The replacement of these components was addressed in replacement procedures.

2.2.5.4 Findings. No specific operability concerns remained after the evaluation of this component.

2.2.6 Cooling Tower Pump, SW-P-110A, (Audit Status: Closed Pending Resolution by the Applicant)

2.2.6.1 Component Description. This component is a two stage, vertical, centrifugal pump manufactured by Johnston Pump Company (Model 33 NLC) and is driven by a vertical, induction, 800 HP motor manufactured by General Electric Company (Model 5K6339XC179A). The pump is located in the cooling tower at the 46 ft level. The pump's normal state is standby for auto-start. Its safety function is to provide cooling water from the ultimate heat sink, a 4 million gallon basin that is completely independent of the circulating water tunnels and Atlantic Ocean. Transfer of heat loads to the ultimate heat sink can be performed manually from the main control board or by a low pressure signal indicative of a low-low service water pumphouse level. The pump is required to be operable for 720 hours post accident.

2.2.6.2 Component Walkdown. The walkdown of this component revealed several equipment tags attached to the motor and pump, all of which were satisfactorily explained by plant personnel. Numerous arc strikes on the

pump discharge head, as well as some carbon contamination, were discovered during the construction phase. The appropriate non-conformance reports were written and work was done to restore the material to its original qualified state. A tag attached to the bearing cooling line specified inspection of the thermocouples to verify proper resistance of the temperature elements. Documentation indicated that this work has been completed. The work specified by these tags also involves other plant equipment. All tags will be removed when the remaining work has been completed.

2.2.6.3 Document Review. The review of the qualification documents[71-80] revealed that the qualification of this component was addressed by a combination of tests, analysis, and operating experience. The motor was qualified for mechanical load conditions by analysis. Qualification of the motor for aging and environmental conditions was demonstrated by similarity, using generic type test results. The pump was qualified by stress analysis, shop tests, and pre-operational tests. Review of the stress report revealed that the stress levels were within acceptable limits, but were different than the values reported in the FSAR. UE&C personnel explained that a correction in the computer program as well as revised load conditions accounted for the apparent discrepancy.

During the pre-operational tests the measured flow and head of the installed pump was 13000 gpm at 160 feet compared to the factory test values of 13000 gpm at 170 feet. The corrective action taken by UE&C was to establish limits for the average basin water temperature as well as for the minimum basin water level. In addition, UE&C engineers had determined that the flow requirements during accident conditions are 9560 gpm through the primary component cooling heat exchanger and 1800 gpm through the diesel generator heat exchanger. With the 7 percent ASME Section XI wear margin included, the cooling tower pump can deliver 9660 gpm and 1800 gpm, respectively. The FSAR and other service water system documents will be revised to reflect the reduced flow conditions. Long-term operability was demonstrated by a 168 hour continuous run. Vibration readings, taken at the start and end of the run, did not detect any significant change. The

vibration readings were taken in 2 horizontal directions at the top and bottom of the motor casing. The applicant's response to IE Bulletin 79-15 "Long Term Operability of Deep Draft Pumps" was reviewed and found to meet the Licensing Review Group-II (LRG-II) guidelines, endorsed by NRC-EQB staff. Discussion of the deep draft pump operability issue is presented in more detail in Section 2.3.2.

One concern was identified at the conclusion of the audit, which requires resolution by the applicant. Lateral movement of the pump column is controlled by two brackets approximately 22 feet apart. The circumferential gap between the pump column and each lateral support is controlled by identical O-rings. The maintenance program did not specify the procedures and schedule for replacement of the O-rings. In order to resolve this issue, the applicant must provide the following information prior to fuel load.

a. Provide a copy of the maintenance procedures which specify the replacement of the O-rings. Include any special considerations necessary for handling the two O-rings.

b. Confirm that the maintenance program for the service water pumps includes similar procedures for replacement of their O-rings.

2.2.6.4 Findings. Except for the maintenance of the O-rings mentioned above, no other specific operability concerns remained after the evaluation of this component.

2.3 Other Equipment Qualification Issues

This section summarizes the status of other issues relating to pump and valve operability that were addressed by the PVORT. The following discussions combined with the detailed review of selected equipment provide additional basis for PVORT's conclusions concerning the applicant's overall program.

2.3.1 Safety Evaluation Report (SER) Items (Status: Closed)

The PVORT reviewed the Seabrook FSAR and formulated questions and concerns that appeared in the preliminary SER dated October 10, 1982. Additional comments were presented at the pre-audit meeting held August 7, 1985. At that meeting, the PVORT requested the applicant to provide additional information in order to better clarify his program as well as to detect and address any major deficiencies. Table 2 summarizes the status of the ten SER items. Four of these items (1, 4, 5, and 6) were addressed adequately by the applicant in a response dated September 24, 1985.[a] In this letter, the applicant committed to provide the requested information in the form of new or amended tables and expanded discussion in the appropriate sections of the FSAR. The remaining six items (2, 3, 7, 8, 9, 10) were addressed during the site audit November 5 to 8, 1985.

Items 2, 3, 7, 8, 9, 10 were resolved during the on-site audit. Regarding Item 2, the applicant committed to provide new tables and text in his forthcoming Amendment to the FSAR. SER Item 3 was not addressed during the audit and, therefore, it appears as generic issue 2 which the applicant has committed to resolve in a future FSAR amendment. Regarding Item 7, the applicant stated that he did not use the guidelines of the draft standards. The applicant did, however, state that he would evaluate these standards when they were approved. It is the PVORT's belief that Seabrook's pumps and valves do meet the requirements of the codes and standards that were in effect at the time of purchase and that the applicant's reluctance to review draft standards does not constitute a licensing issue. Regarding Items 8 and 9, the information requested is

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a. Letter from R. Sweeney, Bethesda office manager, Seabrook Station Group Number SBB-85-203 to V. Nerses, NRC/DL/LB3 Seabrook Project Manager, "Advance Copies of Annotated FSAR pages and System Turnover Status List", September 24, 1985.

TABLE 2. STATUS OF SEABROOK SER ITEMS FOR PUMP AND VALVE OPERABILITY ASSURANCE

SER Items[a]	Finding/ Resolution	Status
1. It is not clear that the applicant has completely qualified the emergency feedwater and fuel oil transfer pumps, based on the summaries provided the appropriate information in each table to demonstrate that these pumps are qualified in a manner consistent with Section 3.9(B).3.2a. (Amendment 53)	Satisfactory	Closed[b]
2. It is not clear from examining Table 3.9(B)-2 and Section 3.9(B).3.1 (Amendment 48) that LOCA loads have been specified in the design load combinations for BOP class 1 components and supports. The applicant should confirm that LOCA loads have been applied to the appropriate BOP equipment in a manner similar to Section 3.9(N)1.6 for NSSS equipment.	Satisfactory	Closed[c]
3. Section 3.9(B).3.2b (Amendment 48) describes operability assurance for active BOP valves two inches and larger. The applicant should include all sizes of active BOP valves in his operability assurance program.	Satisfactory	Closed[c]
4. The applicant should provide specific information for the BOP pumps and valves in a manner similar to the information provided in Tables 3.9(N)-10 and -11 for NSSS pumps and valves.	Satisfactory	Closed[b]
5. Table 3.9(B)-2 (Amendment 47) summarizes the load combinations for Class 1, 2 and 3 BOP components and supports. The applicant should identify the stress criteria used to qualify Class 1 BOP valves.	Satisfactory	Closed[b]
6. Tables 3.9(B)-3 and 3.9(N)-7 provide the stress criteria for Class 2 and 3, non-active, BOP and NSSS pumps, respectively. The applicant should identify these non-active pumps.	Satisfactory	Closed[b]

TABLE 2. (continued)

SER Items[a]	Finding/ Resolution	Status
7. The applicant should clearly show the extent to which the regulatory positions and guidelines of RG 1.148, ANSI/ASME N551.1 draft standards, and ANSI B16.41 are met.	Satisfactory	Closed[c]
8. The applicant should clarify the methods used for qualification. Specific information should be presented in the FSAR, and be available for review at the site. The applicant should demonstrate a) The extent to which operational testing is performed at design basis conditions (full flow, pressure, temperature, etc.) b) The technical basis for qualifying equipment by similarity analysis and prototype testing. c) Qualification of the equipment as an assembly rather than individual components.	Satisfactory	Closed[c]
9. The applicant should clearly show how implementation of the initial test program, maintenance and surveillance, in-service inspection, and quality assurance programs will maintain equipment operability throughout the 40-year plant life. Specific criteria should be presented in the FSAR, and be available for review at the site.	Satisfactory	Closed[c]
10. The following actions by the applicant would enhance the staff's understanding of the plant. a) The applicant should define the Terms "DSL" and "LOCA DISPL," which are used in Table 3.9(B)-6 (Amendment 48).	Satisfactory	Closed[b]

TABLE 2. (continued)

SER Items[a]	Finding/ Resolution	Status
b) The applicant should specify the seismic accelerations discussed in Section 3.9(B)3.2a and describe how they were used to qualify "rigid" and "flexible" BOP pumps.		
c) Sections 3.9(B)3.2b and 3.9(N)3.2a(2) describe BOP and NSSS programs for testing valves of various designs and sizes during simulated faulted conditions. The applicant should describe the criteria used to select the valves for testing and specify the range of sizes that are covered.		
d) The applicant should confirm that the evaluation of NSSS check valves will include "stress analysis of critical parts which may affect operability, including faulted condition loads," as is the case for BOP check valves.		

a. The Seabrook SER items for pump and valve operability assurance were identified in an earlier SER dated October 10, 1982, and were supplemented by specific comments presented at a pre-audit meeting on August 7, 1985.

b. This item was adequately resolved based on information submitted by the applicant in a letter "Advance Copies of Annotated FSAR Pages and System Turnover Status", memorandum from R. Sweeney, Bethesda Office Manager, Seabrook Station, to V. Nerses, NRC/DL/LB3, Seabrook Project Manager, Seabrook Group Number S88-85-203, September 24, 1985.

c. This item was adequately resolved based on information reviewed by the staff during the site audit November 5-8, 1985. The applicant committed to close out this item in a manner and time frame that is acceptable to the staff.

indirectly referenced in FSAR Chapter 14 (Start-up Testing) and Chapter 16 (Plant Technical Specifications). The applicant explained that the extent of full flow tests is difficult to describe in general terms, and must be examined on a component level. The PVORT reviewed the preoperational test procedures for selected components within the context of the audit. The applicant further described inservice test (IST) activities that cover the flow test concerns. Although the IST procedures were unavailable for review, the applicant stated that they will comply with the ASME Section XI requirements and will be referenced in the FSAR. Regarding Item 10, the PVORT reviewed the methods of qualification for various components, and found them to be satisfactory. The applicant's reluctance to present the methodology in extensive details in the FSAR does not constitute a licensing issue. In summary, the PVORT believes that the applicant has, by way of appropriate commitments and clarifications, adequately addressed all ten SER items as they relate to pump and valve operability.

2.3.2 Long-Term Operability of Deep Draft Pumps, (Status: Closed)

IE Bulletin 79-15 was issued July 11, 1979 as the result of industry-wide problems associated with the long-term operation of deep draft pumps. Plants under construction were required to identify such pumps, provide operating history, and verify the pump's ability to operate without incurring vibration-induced problems. At the time of the bulletin, Seabrook was in a position only to identify the types of pumps used, since operating history was unavailable. As a followup to their original response, the PVORT asked the applicant to review and compare his deep draft pump qualification program to the NRC's suggested guidelines contained in a memorandum regarding the Licensing Review Group-II Issue 9-RSB. The applicant stated that long-term operability of the service water and cooling tower pumps is demonstrated by (1) using the vendor recommended installation procedures; (2) testing and verifying design features; (3) an extensive running period (2000 hours) of the cooling tower pumps and the continuous operation of the service water pumps; and (4) the ability to perform post-accident maintenance and repair of these pumps. Monthly surveillance testing and vibration measurements

for each pump will be conducted following completion of the preoperational tests. Subsequent to an OL issuance, the surveillance testing and vibration measurements will be conducted per ASME Section XI inservice test requirements. Long term operability (over 168 hours continuous run) has already been achieved for both cooling tower pumps without any significant degradation of design parameters. The two service water pumps will be similarly operated for routine system flush tests and start-up activities prior to fuel load. In summary, the PVORT believes that the program described by the applicant meets the intent of the NRC's suggested guidelines for long-term operability of deep draft pumps.

2.3.3 Implementation of the Overall Program, (Status: Closed Pending Resolution by Applicant)

The PVORT's evaluation of the applicant's overall qualification program was based on many factors, including the FSAR review, resolution of SER items, pre-audit correspondence, and the on-site review of selected equipment. Another important factor was the follow-up evaluation of the applicant's administrative programs that are linked to equipment qualification. The PVORT evaluated these programs during the on-site audit. This evaluation enabled the PVORT to gain a better perspective of the programmatic scope and implementation of the applicant's overall equipment qualification program. For example, the PVORT's questions concerning the equipment tags observed during the walkdown, resulted in a brief discussion of the applicant's tag management procedures and system turnover log. Similarly, the PVORT's concern about deep draft pump operability led to discussions of the applicant's in-service test procedures, preventive maintenance procedures, and quality control program. Throughout the audit, it was apparent that the applicant's document control system was sufficiently complete and organized to retrieve the documents necessary to support these discussions. The programs mentioned above enhance the PVORT's confidence that the applicant's overall program can ensure all pumps and valves important to safety will operate as required for the life of the plant.

The PVORT's evaluation of the applicant's overall program was not entirely absent of qualification issues, however. The PVORT did identify five generic issues that the applicant must resolve prior to fuel load. All issues were discussed with the applicant at the exit meeting and are presented below.

The overall equipment qualification and operability program provides the mechanism for sharing information between various administrative, design, operations, maintenance, and quality control programs. Seabrook personnel described the maintenance program as a comprehensive network involving procurement, test control, and design control. Implementation of the maintenance program is accomplished by a variety of subprograms such as preventive and corrective maintenance, tag management, station staff work requests, and utilization of the incomplete items list (IIL). However, at the time of the audit, the PVORT was unable to review a complete set of maintenance procedures for any of the equipment selected. Consequently, the first generic issue requires the applicant to provide examples of the complete maintenance procedures for several equipment, at least one of which was reviewed during the PVORT audit. The procedures should clearly describe how limited life components will be addressed in order to ensure that the equipment will remain qualified for the life of the plant.

The second generic issue, which the applicant must confirm, is that all active safety-related BOP valves smaller than two inches are included in the overall equipment qualification program in place at the conclusion of the site audit.

Regarding the third generic issue, it was apparent at the conclusion of the audit, that the Seabrook active valve list was not totally up-to-date. In order to illustrate this concern, a brief discussion of the pre-audit preparation is presented here. Two months prior to the audit, the PVORT reviewed the Seabrook FSAR, as well as the Master List of safety-related equipment. Numerous discrepancies were identified, most of which could be attributed to the normal delay in updating FSAR amendments.

After some clarification by Seabrook, the PVORT compiled a list of 10 components to be audited. However, the status of three of these items was changed by Seabrook less than a month before the site audit. First, the 3-inch Lonergan relief valve, CC-V-120, was declared to be no longer safety-related. Second, the 18-inch Velan check valve, FW-V-38, had been replaced with a Rockwell control closure check valve in order to reduce the potential for water hammer. Third, the 3-inch air operated globe valve, LCV-460, was declared to be no longer safety-related by Seabrook. The PVORT did not review this component or any replacement, but instead investigated the reasons why the status of equipment was not yet complete. Seabrook explained that an independent consulting firm had been contracted to perform a consistency review of the plant equipment. This review compared the original classification and qualification of all components with the latest industry practices, and recommended any changes such as those mentioned above. All of the mechanical equipment have undergone this consistency review, while the electrical equipment consistency review will be completed later this year. Very few changes have been identified by the consistency review to date. However, the PVORT believes that the entire review should have been completed before the site audit was held, since three of the 10 PVORT components were directly affected. Therefore, the third generic issue is that the applicant must provide a complete list of active safety-related valves in the FSAR prior to fuel load.

Regarding the fourth and fifth generic issues, the staff requires that all equipment important to safety be properly qualified prior to fuel load. However, the PVORT audit was conducted months in advance of the expected fuel load date before the applicant had been able to qualify, test, and install all of his equipment. The applicant did provide evidence that the documentation and installation was complete for approximately 85 percent of the Seabrook equipment at the time of the audit. The remaining 15 percent is scheduled to be completed prior to fuel load. Similarly, some preoperational tests remained to be completed. The hot functional tests were still in progress at the conclusion of the audit and were scheduled for completion in late November.

Therefore, the fourth generic issue, for which the applicant must provide written confirmation, is that all pre-service tests required to be completed before fuel load have been performed.

Finally, the fifth generic issue is that all pumps and valves important to safety are properly qualified prior to fuel load. Complete qualification includes, but is not limited to, confirmation that (a) the associated documentation is complete and readily accessible, (b) the equipment is properly installed, and (c) the appropriate administrative procedures have been performed as required. The applicant has agreed at the conclusion of the audit to update the FSAR prior to fuel load, which will resolve the remaining SER issues and site audit concerns.

Section 3 summarizes the five generic issues mentioned above as well as the five specific concerns mentioned in Sections 2.2.1, 2.2.2, and 2.2.6.

3. CONCLUSION

The Equipment Qualification personnel for Seabrook are dealing with the equipment qualification issue in a positive manner. The PVORT has reached this conclusion because the applicant has: (a) provided adequate documentation to demonstrate qualification of a representative sample of pumps and valves important to safety, (b) established administrative programs to determine, monitor, and maintain equipment operability for the life of the plant, (c) demonstrated an adequate central file system by the timely retrieval of information requested by the staff, (d) demonstrated that he corresponds closely with the NSSS vendor, architect-engineer, and equipment suppliers concerning details of construction, design, maintenance, utility policy, and plant operation, and (e) demonstrated overall accountability by committing the appropriate personnel to implement these policies and programs.

Based on the results of the on-site audit, the PVORT concludes that an appropriate Pump and Valve Operability Assurance Program has been defined and is being implemented at Seabrook. The continued implementation of this program should provide adequate assurance that all pumps and valves important to safety will perform their safety-related functions as required for the life of the plant.

Table 3 presents a summary of the audit results. By the close of the on-site audit, all but five specific and five generic concerns have been resolved. These concerns were identified to the applicant and he committed to resolve them prior to fuel load. The following is a list of all unresolved pump and valve operability concerns and the applicant's commitments:

Equipment Specific Confirmatory Issues:

1. The applicant shall confirm that the auxiliary feedwater pump (FW-P-37A) turbine operability is addressed regarding the potential of having moisture in the driving steam.

TABLE 3 SUMMARY OF PVORT AUDIT

Plant I.D. Number	Description	Safety Function	Findings	Resolutions	Status	Remarks
FW-P-37A (BOP)	Turbine driven auxiliary feed-water pump	To provide feedwater to the steam generator in the event normal feedwater is not available.	Note[a,b,c]	Note[d]	Open[e]	Turbine operation needs to addressed when there is moisture in the steam. Turbine trip and throttle valve operation after a trip needs to be addressed. The turbine end pump seal was found to be cracked. The reason for the failure needs to be investigated and resolved.
FW-V-331 (BOP)	Main feed water to steam generator "B" isolation check valve	To isolate the feed-water header in the event of loss of feedwater	Note[f]	Note[d]	Open[e]	Operating time of this valve is important to safety Timing requirements were not addressed.
CC-V-975 (BOP)	Primary component cooling water to radiation monitor isolation valve	To isolate the radiation monitor when full PCCW flow is required by safety grade equipment.			Closed	Specific concerns were resolved during the audit.
FW-V-48 (BOP)	SG "C" feedwater containment isolation valve	Closes on containment isolation signal.			Closed	Specific concerns were resolved during the audit.
CC-V-122 (BOP)	Primary component cooling water return isolation from non-safety grade components	Closes on isolation signal.			Closed	Specific concerns were resolved during the audit.
SW-P-110A (BOP)	Cooling tower pump A	To provide cooling water flow when the cooling tower is used as the ultimate heat sink.	Note[g]	Note[d]	Open[e]	Two O-rings are used to control lateral support of pump column. The O-rings should be maintained for the life of the plant.
CS-P-2B (NSSS)	Centrifugal charging pump B	To provide borated water and makeup as well as high head safety injection.			Closed	Specific concerns were resolved during the audit.

TABLE 3. (continued)

Plant I.D. Number	Description	Safety function	Findings	Resolutions	Status	Remarks
RC-V-456A (NSSS)	Pressurizer PORV	Opens to prevent a reactor trip due to overpressure of pressurizer.			Closed	Specific concerns were resolved during the audit.
RH-V-14 (NSSS)	Cold leg injection RHR return line isolation valve	Closes for containment isolation and hot leg recirculation.			Closed	Specific concerns were resolved during the audit.
--	ALL PUMPS AND VALVES IMPORTANT TO SAFETY	Operate as required during the life of the plant under normal and accident conditions.	Note[h,i,j,k,l]	Note[d]	Open[e]	None.

a. (SPECIFIC ISSUE) Turbine operation when moisture is mixed with the steam was not investigated. Turbine operation with moisture in the steam needs to be investigated and addressed.

b. (SPECIFIC ISSUE) The turbine trip and throttle valve installation was not made in a way that assured easy operation. Easy operation of the trip and throttle valve with a maximum differential pressure across the valve (for example, a turbine overspeed condition) was not demonstrated. Easy operation of the trip and throttle valve needs to be investigated.

c. (SPECIFIC ISSUE) The turbine end pump seal was found cracked. The cause of the cracked pump seal needs to be investigated and resolved.

d. At the conclusion of the site audit, the staff summarized the remaining open issues. The applicant was informed of the appropriate actions necessary to resolve the specific and generic confirmatory issues prior to fuel load.

e. The qualification status will be "closed" upon resolution of the specific and generic issues.

f. (SPECIFIC ISSUE) This valve was changed from a swing check to a control check that has specific opening and closing times. The operating times were not addressed in the startup, testing, or operating procedures. The applicant shall confirm that the operating times have been investigated and the timing requirements identified and met.

g. (SPECIFIC ISSUE) The maintenance program did not include procedures for replacing the O-rings per manufacturer's recommendations. The maintenance program should include procedures for maintaining the qualification status of the O-rings for the life of the plant.

h. (GENERIC ISSUE) Maintenance procedures were in a draft form and generally not available for review. The applicant shall confirm that all final maintenance procedures are consistent with manufacturer's requirements. Applicant shall describe how limited life components are identified. The applicant shall provide examples of maintenance procedures for review.

i. (GENERIC ISSUE) BOP valves smaller than two inches were not included in the FSAR active valve list. The applicaat shall confirm that the FSAR BOP list addresses valves less than two inches.

TABLE 3. (continued)

j. (GENERIC ISSUE) The active valve lists in the FSAR were not complete. The applicant shall confirm that all active pumps and valves are included in the FSAR active component lists.

k. (GENERIC ISSUE) All pre-service tests have not been completed. The applicant shall confirm that all pre-service tests that are required before fuel load have been completed.

l. (GENERIC ISSUE) The applicant has not completed the qualification of all pumps and valves important to safety. The applicant shall confirm that all pumps and valves important to safety are qualified prior to fuel load.

2. Prior to the audit, the turbine end of the auxiliary feedwater pump (FW-P-37A) was found to have a cracked seal. The cause of the seal failure had not been determined nor had steps been taken to prevent a recurrence. The applicant shall confirm that this failure is investigated and resolved.

3. Operation of the auxiliary feedwater pump (FW-P-37A) turbine trip and throttle valve was not investigated when a maximum differential pressure existed across the valve such as a turbine overspeed trip condition. The applicant shall confirm that the trip and throttle valve can be operated easily during an emergency condition.

4. Check valve (FW-V-331) was changed from a swing check to a control check that has specific opening and closing times. The operating times for this control check valve were not addressed in the startup, testing or operating procedures. The applicant shall confirm that the operating times have been investigated and the timing requirements identified and met.

5. The maintenance procedures for the cooling tower pump (1-SW-P-110A) were still in draft form at the time of the audit. The procedures did not address the two O-rings located at the lateral supports for the pump column. The applicant shall confirm that the final maintenance procedures specify the special handling and replacement of the O-rings.

Generic Confirmatory Issues:

1. At the time of the audit, the maintenance procedures were available for review in draft form only. The applicant shall confirm that the final maintenance procedures will be consistent with the component manufacturer's recommendations. The applicant shall describe how limited life components are identified, and how the equipment will be maintained in an operable and qualified

state for the life of the plant. The applicant shall provide several examples (at least 1 pump and 1 valve) of the final maintenance procedures for review.

2. The applicant shall provide written confirmation in the FSAR that all active BOP valves are covered by the Seabrook pump and valve operability assurance program. In particular, the applicant shall confirm that BOP valves smaller than two inches have been included.

3. At the conclusion of the PVORT audit, it was apparent that a complete list of active valves had not been provided in the FSAR. The applicant shall confirm that all active valves are correctly identified in the FSAR.

4. At the time of the audit, most construction tests had already been completed. However, the hot functional tests were still in progress. The applicant shall confirm that all pre-service tests that are required before fuel load have been completed.

5. At the time of the audit, approximately 10 to 15 percent of all pumps and valves important to safety had not been qualified. The applicant shall confirm that all pumps and valves important to safety are properly qualified and installed. In addition, the applicant shall provide written confirmation that the original loads used in tests or analyses to qualify pumps and valves important to safety are not exceeded by any new loads, such as those imposed by a LOCA (hydrodynamic loads) or as-built conditions.

4. NSSS REFERENCES

CENTRIFUGAL CHARGING PUMP, CS-P-2B

1. Westinghouse, Lubricant and Bearing Report for Medium, Large, and Chempump Motors, NS-I&CSL-82146, June 22, 1983.

2. Crane Packing Company, Seal Performance Testing for Nuclear Power Plant Safety Injection Systems, Bulletin 3472.

3. Westinghouse, Auxiliary Pump Motors, 677474 Revision 0, March 3, 1972.

4. Westinghouse, E-Spec Class 2 Pumps, 678815 Revision 2, September 6, 1973.

5. Westinghouse, Class 2 Pumps for NAH, 952470 Revision 2, October 6, 1975.

6. Westinghouse, Auxiliary Pump Motors for NAH, 952347 Revision 2, April 18, 1975.

7. Westinghouse, Thermal Transient Test, MED-PVE-3840, October 15, 1985.

8. Westinghouse, 100 Hour Endurance Test, MED-PVE-3840, October 15, 1985.

9. Pacific Pumps, Nuclear Service Pump Design Analysis Report, K-435 Revision 2, October 25, 1978.

10. Westinghouse Large Motor Division, Seismic Analysis of Centrifugal Charging Pump Motors, Seismic S.O. 76F60176, March 23, 1977.

11. Pacific Pumps, Natural Frequency Test Report, Pump Serial 51669, July 26, 1977.

12. Westinghouse, Equipment Qualification Test Report W LMD Motor Insulation, WCAP 8687 Supplement 2 A02A, July 1981.

13. Westinghouse, Equipment Qualification Data Package-Large Pump Motors (Outside Containment), WCAP 8587 EQDP-AE-2, March 1982.

14. Westinghouse MM&G, Gear Seismic Analysis Certificate of Applicability, 76261075, November 15, 1977.

15. Westinghouse, Class 2 Pumps - Based on ASME BP&V Code Section III Rules for Construction of Nuclear Power Plant Components, 678815, Revision 2, November 12, 1971.

16. Westinghouse, Class 2 Centrifugal and Positive Displacement Pumps (Seabrook 1 & 2), 952470 Attachments to E-Spec 678815 Rev. 2, February 7, 1974.

POWER OPERATED RELIEF VALVE RC-V-456A

17. Westinghouse, Power Operated Relief Valve E-Spec, 955245 Revision 0, September 17, 1980.

18. Westinghouse, Equipment Qualification Data Package for PORV Solenoid Pilot Valve and PID, WCAP-8587 and EQDP-HE-9, January 1985.

19. Westinghouse, Equipment Qualification Test Report for PORV Solenoid Pilot Valve and PID, WCAP-8687 Supplement 2-H09A, January 1985.

20. Garrett, Design Report Stress Analysis of the PORV, 41-28708, December 9, 1981.

21. Garrett, Seismic Qualification Operability Tests for PORV, 41-4402A, May 21, 1984.

22. Garrett, Class 1 Design Report for PORV, 41-3256, December 4, 1981.

COLD LEG INJECTION/RHR RETURN LINE ISOLATION VALVE, RH-V-14

23. Westinghouse, Project Specification, 952272 Revision 4, February 3, 1984.

24. Westinghouse, General Specification, G-678852 Revision 2, March 14, 1977.

25. Westinghouse, Stress Report for Westinghouse Class 1 6" and Larger Gate Valves, EM-5405 Revision 1, May 27, 1980.

26. Westinghouse, Operability Test Report for Westinghouse Nuclear Gate Valves, EM-4995, January 28, 1977.

27. Westinghouse/Limitorque, Equipment Qualification Test Report, Limitorque Electric Motor Operator (Environmental and Seismic Testing-Outside Containment, Non-HELB Environments), WCAP 8687 Supplement 2-H04A Revision 1, March 1983.

28. Westinghouse/Namco, NAMCO Externally Mounted-Limit Switches-Environmental and Seismic Testing, WCAP 8687 Supplement 2 H03A/H06A, March 1983.

5. BOP REFERENCES

FEEDWATER SYSTEM CONTROL/CED CHECK VALVE, FW-V-331

21. United Engineers and Constructors, Feedwater System P&I Diagram, Report No. 9763-F-202079, October 30, 1984.

22. United Engineers and Constructors, MS & FW Pipe Chase-Feedwater System LN4607 Fabrication and Support Isometric, Report No. 9763-F-202397, January 9, 1985.

23. Rockwell International, Control Closure Check Valve 18 x 16 18-FIG2092 (WCC) BJQTY, Report No. FP97789-04 DWG No. D84-30371-07, May 29, 1985.

24. Rockwell International, Design Report for Size 18 x 16 x 18 Figure 2092 Controlled Closure Check Valve, Report No. FP97794-01 and Report No. RAL-4124, March 8, 1985.

25. Rockwell International, Performance Calculations for Size 18 x 16 x 18 Fig. 2092 Controlled Closure Check Valve, Report No. FP97792-01 and Report No. RAL-1071, March 8, 1985.

26. United Engineers and Constructors, Specification for Controlled Closure Check Valves, Report No. 9763-006-248-85, January 8, 1985.

27. United Engineers and Constructors, Seismic Requirements for PSNH, Report No. 9763-SD-248-85, January 10, 1984.

28. Kirk, M. J. & Gradle, R. J., A Model for Check Valve/Feedwater System Water Hammer Analysis, ASME 80-C2/PVP-27, March 17, 1980.

29. Rockwell International, Hydrostatic and Seat Closure Test Procedure for Size 18 x 16 x 18 Figure 2092 (WCC) BJQTY Controlled Closure Check Valves, Method Speculation 7098, May 16, 1985.

30. United Engineers and Constructors, Statement on Valve Failure Mode Analysis (by J. J. Parisand), November 7, 1985.

31. United Engineers and Constructors, Temperature/Pressure Conditions for Valve V331, Design Data Sheet 9763.006.

TURBINE DRIVE AUXILIARY FEEDWATER PUMP, FW-P-37A

32. Polytechnic Design Co., Inc./Ingersoll-Rand Company Structural Integrity and Operability Analysis of 4 x 9NH-10 Turbine Driven Feedwater Pump, FP 22810-03 Report No. EAS-TR-8001 Review, November 19, 1984.

33. Structural Integrity and Operability Analysis of 4 x 9NH-10 Turbine Driven Pump, F.P. 23812-01 Document No. EAS-TR-8001 Revision 0, November 5, 1984.

34. United Engineers and Constructors, Specification for Emergency Feedwater Pumps, 9763-006-238-10 Revision 10, September 15,1977.

35. United Engineers and Constructors, Seismic Specification for PSNH, 9763-SD-238-10 Revision 3, September 15, 1977.

36. Terry Corporation, GS-2N Qualification Report for Ingersoll-Rand-Cameron F-41062/F-41063 and Wyle Test Report 58038, F.P. 22719-02 Report No. TM-105 Revision 0, August 7, 1980.

37. Woodward Governor Company, Pressure Actuated Shutdown Assembly, Bulletin 36651A, 1965.

38. G. H. Bettes Corporation, Seismic Analysis Robotarm Actuator Model CB420-SR60, F.P. 97623-01 Report No. 1062-67 Revision A, January 26, 1984.

39. Xomox Corporation, Valve Operability Procedure, F.P. 97580-02 Procedure Number 399-.8000-00 Revision 0, January 23, 1984.

40. Xomox Corporation, Design and Seismic Report for 1 inch Figure 166, CL 150 Plug Valve 66, with Bettis CB420 SR60 Actuator, F.P. 97639-01 Procedure Number 384-18000 Revision 0, January 30, 1984.

41. Tufline Division of Xomox Corporation, Seismic Analysis, F.P. 91420-02 Report No. 1-1366-78 Revision A, April 9, 1979.

42. United Engineers and Constructors Inc., Specification for Plug Valves, 9763-006-248-29 Revision 3, November 15, 1977.

43. G. H. Bettis Corporation, Nuclear Qualification Test Report, F.P. 61940-4 37274 Revision 3, May 10, 1983.

44. Automatic Switch Company, Qualification Test of Solenoid Valves, F.P. 97647-01 AQS-21678/TR Revision A, February 3, 1984.

45. Namco Controls, Qualification of EA 740 Series Limit Switches for Use in Nuclear Power Plants, F.P. 93639-01 QTR-111 Revision 0, December 14, 1982.

46. Automatic Switch Company, Report on Qualification of Automatic Switch Company (ASCO) Catalog NP-1 Solenoid Valve, F.P. 61958-03 AQR-67368 Revision 0, October 10, 1983.

47. United Engineers and Constructors, Specification for Actuators for Valves and Dampers, 9763-006-248-13 Revision 6, May 23, 1980.

FEEDWATER ISOLATION VALVE, FW-V-48

48. Borg-Warner Corporation, Seismic Analysis of 18 inch, 900 lb Carbon Steel Pneumatic-Hydraulic Operator Gate Valve, F.P. 2245-07 Document NSR-73890 Revision D, July 22, 1982.

49. Borg Warner Corporation, Operability Test Procedure for 18 inch Feedwater Station Valve, F.P. 21233-03 Document OTP-73890 Revision A, December 29, 1980.

50. United Engineers and Constructors, Specification for Feedwater Isolation Valves, 9763-006-248-36 Revision 2, August 28, 1980.

51. United Engineers and Constructors, Seismic Requirements for P.S.N.H., 9763-SP-248-36 Revision 0, November 4, 1984.

52. Borg-Warner Corporation, IEEE Qualifications Report for a Hydraulic Operator BWFC P/N 37951, F.P. 23756-02 Report No. 2064 Revision A, August 12, 1985.

PRIMARY COMPONENT COOLING AUTOMATIC CONTAINMENT ISOLATION VALVE, CC-V-122

53. Seabrook Station, Preoperational Test Procedure, 1-PT(I)-37.2, October 16, 1985.

54. Yankee Atomic Electric Company, (YAEC), Nonconformance/LWA Report-Seabrook Station, Report No. NCR 82-284, November 2, 1984.

55. Seabrook Station, Phase 1 System Test Package, TPI-51-F01, August 22, 1985.

56. UE&C, Specification for Butterfly Valves, Report 9763-006-248-45, August 16, 1976.

57. UE&C, Seismic Requirements, Report 9763-SD-248-45, September 22, 1975.

58. Posi-Seal International, Actuator Mathematical Model, Report F.P. 91742-2 Revision 0 11473, October 27, 1983.

59. NAMCO/ACME, Limit Switch IEEE Qualification Report, Report No. F.P. 91908-1 Revision 1 EA-470, May 22, 1980.

60. Posi-Seal International, Hydrostatic Shell Testing, Report No. F.P. 90350-1, Revision 1 TP900, April 2, 1976.

61. Posi-Seal International, Cycle Testing, Report No. F.P. 90349-1 Revision 0 11473 TP-2, April 2, 1976.

62. Posi-Seal International, Leak Testing Bubble Formation Method, Report No. F.P. 90815-1 QCS-004, April 27, 1977.

63. Posi-Seal International, Leak Testing, Hydrostatic, Report No. F.P. 90816-1 Revision 0 QCS-005, April 27, 1977.

64. Posi-Seal International, Hydrostatic Seat Testing, Report No. F.P. 90348-1 Revision 0 11473.TP-1, April 2, 1976.

65. NORDAN, Seismic Vibration Test Report, Report No. F.P. 90614-01 Revision 0 2060-0001, December 28, 1976.

66. WYLE/POSI-SEAL, Seismic Vibration Test Report, Report No. F.P. 90615-2 Revision 0 54598, October 23, 1985.

67. Posi-Seal International, Seismic Certificate of Compliance, Report No. F.P. 93535-2 Revision 0, February 23, 1983.

68. Posi-Seal International, Nuclear Seismic and LOCA Analysis, Report No. F.P. 91157-8 Revision B 11473, August 5, 1985.

69. ASCO/ISOMEDIX, Qualification Test for Solenoid Valve, Report No. 91904-2 Revision 0 AQS-21678-TR, January 4, 1982.

70. Posi-Seal International, Cycle Testing of Valves, Report No. F.P. 9222-1-01 Revision 0 11473-TP-3, April 17, 1982.

COOLING TOWER PUMP, SW-P-110A

71. United Engineers and Constructors, Specification for Service Water Cooling Tower Pumps, 9763-006-238-20 Revision 5, July 7, 1977.

72. United Engineers and Contractors, Seismic Requirements for P.S.N.H., 9763-SD-238-20 Revision 6, March 7, 1980.

73. McDonald Engineering Analysis Company, Seismic Stress Analysis of ASME Section III Class 3 Pumps, F.P. 55828-03 Document ME-772, January 4, 1984.

74. McDonald Engineering Analysis Company Inc., Seismic Stress Analysis of 800 HP Service Water Cooling Tower Pump Motor, F.P. 51589-04 Document ME-266, March 15, 1977.

75. General Electric, Topical Report on GE Vertical Induction Motor for Class IE Nuclear Service Water Pump and Cooling Tower Pump, F.P. 51880-05, February 27, 1970.

76. Johnston Pumps, Service Water Cooling Tower-Pumps, F.P. 50628-11, October 10, 1985.

77. Johnston Pumps, SWCTP-Data Sheets and Curves, FP 52275 Issue 01, January 27, 1977.

78. United Engineers and Constructors, Letter-Possible 10CFR50.55(e) Deficiency Service Water Pumps (Cooling Tower Pumps), SBU-94362, June 28, 1985.

79. Johnston Pump, SWCTP Operating and Maintenance Manual, F.P. 53040 Issue 08, October 27, 1983.

80. General Electric, SWP and SWTCP Motor Instruction Manual, F.P. 51911 Issue 01, May 12, 1976.

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13. ABSTRACT (200 words or less)

The Seabrook Station Unit 1 was audited November 5 to 8, 1985 to determine the adequacy of their Pump and Valve Operability Assurance Program. Ten concerns (five specific and five generic), which could not be resolved by the close of the audit, were identified to the applicant; he committed to address these concerns prior to fuel load. The results of this audit indicate that the applicant has established and is implementing a program that will track all pumps and valves important to safety from manufacture and in-shop testing through qualification, installation, testing, maintenance, and surveillance for the purpose of assuring continued operability of these components over the life of the plant.

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