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MCCOLLUM,W.R. Duke Power Co.
RECIP.NAME RECIPIENT AFFILIATION
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SUBJECT: Forwards response to 980402 RAI re proposed TS modifying emergency condenser circulating water (ECCW) sys,dtd 970828. Licensee requests that staff completer review of subject TS amend & design features description by 980420.

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W. R. McCollum, Jr.
Vice President

April 6, 1998

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
Proposed Revision to Technical Specifications
for the Upgraded ECCW System
Technical Specification Change # 96-09
Supplemental Information Letter #4

In a letter to the staff dated August 28, 1997, Duke Energy Corporation (Duke) submitted a proposed amendment to the Oconee Nuclear Station Technical Specifications to modify the Emergency Condenser Circulating Water (ECCW) System. The August 28, 1997, Duke submittal also included a final design description of the ECCW System upgrade. It has been Duke's understanding that the review and approval of this licensing amendment will include a review of the design features of the ECCW System upgrade.

Accordingly, in letters dated January 22, 1998, February 19, 1998, and March 19, 1998, Duke provided additional information to support the staff's review of the proposed ECCW System Technical Specification amendment and design features description.

In a letter dated April 2, 1998, the staff requested additional information in support of its review of the proposed Technical Specifications for the upgraded ECCW System. The responses to the staff's questions in the April 2, 1998, letter are provided in Attachment 1.

To support operability of Unit 2's upgraded ECCW System, Duke requests that the staff complete its review of the proposed ECCW System Technical Specification amendment and design features description by April 20, 1998. Accordingly, Duke is committed to supporting the staff as necessary to meet this proposed schedule.

Please address any questions to David Nix at (864) 885-3634.

Very truly yours,

W. R. McCollum, Jr.
Oconee Site Vice President

Attachments

cc: Mr. L. A. Reyes
Regional Administrator, Region II

Mr. M. A. Scott
Senior Resident Inspector

Mr. D. E. Labarge
ONRR, Project Manager

Mr. M. Batavia
DHEC

ATTACHMENT 1
RESPONSES TO STAFF QUESTIONS

Question #1:

Identify or list the new or replacement equipment in the ECCW system for the safe shutdown path for which Generic Implementation Procedure, Revision 2 (GIP-2) was applied, since it is unclear which equipment is existing and which is new or replacement.

RESPONSE #1:

The ECCW System is required for safe shutdown of an Oconee Unit in the event of a loss of offsite power. The ECCW System equipment listed below, to which GIP-2 methodology has been applied, is required for safe shutdown. The GIP-2 methodology was applied on a very limited basis for the new equipment within the scope of the ECCW System.

Existing Equipment:

- High Pressure Service Water Pump Suction Filters
- Condenser Circulating Water Crossover Valves

New Equipment:

- Essential Siphon Vacuum (ESV) Pumps
- Various Electrical Enclosures / Components
  * ESV Cabinets (1ESV1,2ESV1)
  * ESV Panels (3ESV1,3ESV2,3ESV3)
  * ESVLCP (local control panel) Cabinets (1ESVLCP1,2ESVLCP1,3ESVLCP1)

Replacement Equipment:

GIP-2 was not applied to any replacement equipment in the ECCW System.

Question #2:

You identified eight new Safe Shutdown Equipment List (SSEL) cabinets, which were divided into two groups. Within the group, are the cabinets exactly identical? If not, identify their differences, and how the differences among equipment in the same group were addressed in regard to establishing their seismic adequacy. What is an ESV cabinet/ESVLCP cabinet? What internal components do they contain? Do they contain any relays or contactors? Describe how the internal components were evaluated for their seismic adequacy.

RESPONSE #2:

The ECCW modification has introduced a total of eight new SSEL enclosures which have been seismically reviewed using the GIP-2. There are basically two types of enclosures. The first type is the ESV, which is a remotely located cabinet. The second type is the ESVLCP, which is a locally located cabinet. The ESV can be further subdivided based on size, mounting and location. There are three groups of enclosures that can be classified as identical. Listed below are these three enclosure groups and their characteristics.

The ESV and the ESVLCP are standard Hoffman cabinets. Additional details regarding the enclosure characteristics are provided within the three typical SEWS forms which are provided in Attachments 3, 4, and 5.

The internal contents of each of the three enclosure groupings is also listed below. The contents of these cabinets are seismically qualified in accordance with IEEE 344-1975. For those enclosures reviewed to GIP-2, the internal component qualification includes amplification of the ground motion up to the component mounting location (floor response spectrum + GIP in-cabinet amplification factors). The appropriate factors were included in determining this demand for cabinets 1ESV1, 2ESV1, 3ESV1, 3ESV2 and 3ESV3 considering they are located within a structure where the existing in-structure response spectra have been declared Median-Centered. The appropriate factors were also included in determining the demand for cabinets 1ESVLCP, 2ESVLCP,

and 3ESVLCP considering they are located within a structure where the input is determined by the overburden spectra. The qualification addresses the necessary component functions as well as the component mountings. The final component mountings are controlled in accordance with Duke Power Company instructions. These instructions are reviewed for conformance with seismic qualification requirements and methods to ensure that IEEE 344-1975 is met.

The following statements apply to all cabinets listed below:

- All relays were assumed to perform essential functions for the purpose of seismic evaluation.
- All internal components are not yet installed. A final walkdown will be performed for mounting of internal components prior to declaring the system operational.

1ESV1 & 2ESV1

Enclosure Type:
- Freestanding Hoffman A-603624FS cabinets.

Location:
- Unit 1 & 2 Oconee Equipment Room @ 796' in the Auxiliary Building.

Seismic Input:
- Demand for these cabinets was based on the in-structure response spectrum at the location.

Design Difference Evaluation:
- See Attachment 3 for design Differences Evaluation contained in SEWS.

Contents:
- Control components such as terminal blocks, relays & timers.

3ESV1, 3ESV2 & 3ESV3

Enclosure Type:
- Wall mounted Hoffman A-363612LP cabinets.

Location:
- Unit 3 Oconee Equipment Room @ 796' in the Auxiliary Building.

Seismic Input:

- Demand for these cabinets was based on the in-structure response spectrum at the location.

Design Difference Evaluation:

- See Attachment 4 for design Differences Evaluation contained in SEWS.

Contents:

- Control components such as terminal blocks, relays & timers.

1ESVLCP, 2ESVLCP & 3ESVLCP

Enclosure Type:

- Freestanding Hoffman A-727224FSD cabinets.

Location:

- Oconee ESV building @ 796'.

Seismic Input:

- Overburden Ground Response Spectrum.

Design Difference Evaluation:

- See Attachment 5 for design Differences Evaluation contained in SEWS.

Contents:

- Typical instrumentation & control components such as alarm transmitters, square root extractors, instrument power supplies & voltage regulator and relays.

Question #3 a & b:

For each piece of new or replacement equipment (NARE) identified in our request for additional information (RAI) dated March 2, 1998, where GIP-2 was used for assessing its seismic adequacy:

a. As stated in GIP-2, identify whether the equipment is "identical (like for like)" or "non-identical (alternate item)." Describe the specific method used to assess the adequacy of the equipment of concern.

b. As stated in SSER-2, describe how you ensured that design changes in each equipment such as construction of the equipment, new parts, new materials, etc., have not reduced its seismic capacity from that reflected by the database, i.e., describe how you compared the new or replacement equipment with experience database equipment beyond just meeting the applicable equipment caveats given in GIP-2.

RESPONSE #3 (General):

As described in response to Question #1 of this document, the High Pressure Service Water Pump Suction Filters and the Condenser Circulating Water Crossover Valves are existing equipment. The ESV pumps and the electrical enclosures/components are the only new equipment for which GIP-2 was applied. There is no replacement equipment for which GIP-2 was applied. Accordingly, the following response addresses only the new equipment (ESV pumps and electrical enclosures/components) for which GIP-2 was applied to assess seismic adequacy.

RESPONSE #3a:

GIP-2 was not applied to any replacement equipment. Therefore, an assessment of "identical (like for like)" or "non-identical (alternate item)" does not apply.

RESPONSE #3b:

In completing the SEWS documentation, additional information was assessed and included within the SEWS form to address any

potential design changes for the new equipment with respect to the existing database of equipment supporting GIP-2. This assessment is entitled 'Design Differences Evaluation' and is found within the Comments section of the respective SEWS form. The SEWS forms are provided in Attachments 2 through 5.

One SEWS form for each unique piece of equipment is being provided. Unique SEWS forms have been generated to address each piece of equipment. The equipment in the same group is identical, however, the equipment is in different locations. Therefore, the form provided in this response is virtually identical to each other SEWS form for each piece of equipment in the same group. The only potential difference in a SEWS form for these identical pieces of equipment would result if the assessment of potential seismic interaction is different.

Since the contents of the enclosure are qualified to IEEE 344-1975, a design difference evaluation is not required.

Question #3c:

From a quality assurance perspective, (i) identify the items that are commercial-grade, (ii) identify whether each commercial-grade item is "Like-for-Like" or "Alternate Item," and (iii) describe both the seismic and non-seismic critical design attributes/characteristics for each item.

RESPONSE #3c(i):

The ESV pumps and the electrical enclosures were purchased as new equipment under the commercial grade dedication program. The filters and crossover valves are existing equipment.

RESPONSE 3c(ii):

Since the ESV pumps and the electrical enclosures were purchased as new equipment. The assessment of "identical" (like for like) or "non-identical" (alternate item) applies to replacement equipment. Therefore, this type of assessment does not apply to the ESV pumps and electrical enclosures.

RESPONSE 3c(iii):

The ESV pumps and the electrical enclosures were purchased as new equipment under the commercial grade dedication program. For these items, the seismic and non-seismic critical design attributes/characteristics are summarized below.

Hoffman Electrical Enclosures
Critical Characteristics for Design/Acceptance
Reference Commercial Grade Package CGD-3015.01-01-0001

Markings and Identification

- Manufacturer Name
- Part Number

Materials/Physical Properties

- Material verification
- Verification of weld quality
- Verification of finish coating
- Mounting Hardware
- Panel Thickness

Dimensions

- General Configuration (as described by supplier's catalog and product description)

Certification to National Codes/Standards

- NEMA/UL classification

Acceptance Methods

- Method 1 - Test and Inspections
  Verify at Receipt Inspection:
  - Model Number
  - Part Number
  - Configuration
  - Panel thickness
- Method 2 - Commercial Grade Survey of Supplier
- Method 4 - Acceptable Supplier/Item Performance

ESV Pumps
Critical Characteristics for Design/Acceptance
Reference Commercial Grade Package CGD-2255.10-00-0001

Markings and Identification

- Model Number
- Serial Number
- Part Number

Materials/Physical Properties

- Mill Test Reports (for all pressure boundary items)

Dimensions

- General Configuration (as described by supplier's catalog and product description)

Mechanical Functional Attributes

- Design Pressure (15 psig)
- Design Temperature (120°F)
- Design Suction Pressure (0 psia or 29 inches Hg vacuum)
- Pump Safety Factor (flow capacity >2)

Certification to National Codes/Standards

- DIN Standards for Materials
- ISO 9001 Certification for Manufacturing
- Siemens Standards for hydrostatic testing
- PNEUROP Standard for performance testing

Conditioning

- None required

Environmental Qualification Parameters

- Not applicable to pump

Seismic Qualification

- The pump is required to be functional following, but not during, the design basis earthquake.

Acceptance Methods

- Method 1 - Special Tests and Inspections

Verify at Receipt Inspection:

- Pump Model Number
- Unique Serial Number
- Mill Test Reports received as required
- Configuration
- Name plate data
- Hydrostatic and performance test reports received as required

- Documentation review to assure information provided in test and material reports complies with purchase order requirements

- Method 3 - Source Verification
- Performance Test
- Hydrostatic Test

Question #4:

Describe, in general, the evaluation performed regarding the acceptability of the NARE in the ECCW System in relation to the guidelines provided by the generic letters (GLs) identified below. Discuss the result of the evaluation for each of the items requested in our RAI of March 2, 1998:

- GL 89-09, "ASME Section III Component Replacements."
- GL 91-05, "Licensee Commercial-Grade Procurement and Dedication Programs."
- GL 89-02, "Actions to Improve the Detection of Counterfeit and Fraudulently Marketed Products."

RESPONSE #4:

Oconee ECCW System components that were purchased as commercial grade were done so under an established program as defined in the Duke QA Topical Report which states in part:

> "Critical characteristics for the dedication of Commercial Grade Items are determined by engineering technical sponsors and approved by the responsible engineering personnel based on the manufacturer's published specifications and the intended safety function for the items. Critical characteristics used for acceptance and dedication of commercial grade items are selected to provide reasonable assurance that the items will meet their catalog or manufacturer specifications and will perform the necessary safety functions in the intended applications. Verification of critical characteristic acceptability will be by manufacturer/supplier survey, manufacturing surveillance, receipt tests or inspections, or post installation testing. Historical data, when documented, will represent industry wide experience."

In addition, more specific guidance is provided in other Duke Power directives and procedures. Nuclear Procurement

Engineering Program (NPEP) Procedure, NPP-220, *Commercial Grade Items*, specifies the requirements of the commercial grade program. At Oconee and the other Duke nuclear sites, the commercial grade program was recently reviewed by an NRC inspection in 1997 and was found to be an acceptable program.

Of the list of items provided, two new components were assessed for seismic adequacy using GIP-2. These two components, electrical enclosures and ESV pumps, were procured in accordance with the Duke Power Commercial Grade program. The following table lists the four equipment categories and indicates the applicability of specific items as requested:

ITEM	Commer-cial Grade	GIP-2 Appli-cable	Replace-ment Item	Like-for-like	89-02 Appli-cable	89-09 Appli-cable	91-05 Appli-cable
Filters	NO[4]	NA	NA	NA	NA	NA	NA
Valves	NO[4]	NA	NA	NA	NA	NA	NA
Enclo-sures	YES[2]	YES	NO	NO (New Item)	YES[1]	NO[5] (Non ASME Sec. III)	YES[6]
ESV Pumps	YES[3]	YES	NO	NO (New Item)	YES[1]	NO[5] (Non ASME Sec. III)	YES[6]

Table Notes:

[1] Duke Power complies with requirements of GL 89-02 through implementation of its Receipt and Inspection

Test Program as enumerated in NPP-311, *Receipt Inspection and testing of QA Condition Commodities*. A portion of Receipt Inspector training and certification requirements is devoted to identification of fraudulent and counterfeit items.

[2] The technical documentation for the commercial grade acceptance of the electrical enclosures is contained within document CGD-3015.01-01-0001.

[3] The technical documentation for the commercial grade acceptance of the ESV pumps is contained within CGD-2255.01-00-0001.

[4] Existing equipment.

[5] GL 89-09 *ASME Section III Component Replacements*, these components are non-ASME Section III. Therefore, GL 89-09 does not apply.

[6] Duke's implementing documents, as described previously, ensure that Duke's Commercial Grade Program is in accordance with the guidance provided in GL 91-05, *Licensee Commercial-Grade Procurement and Dedication Programs*.

Question #5:

The licensee provided only one Screening Evaluation Work Sheet (SEWS) (for the ESV pumps); you should have SEWSs for each item of equipment evaluated. In our previous RAI, we requested you to provide equipment-specific SEWS for four items. We request the SEWS forms for all requested equipment.

RESPONSE #5:

Duke agrees with the staff that there are four general groups/items for which GIP-2 was applied. However, for two of the four groups, the items do not require completion of a GIP SEWS form. The items to which the GIP SEWS form is not applicable are; 1) the existing HPSW pump suction filter, and 2) the existing Condenser Circulating Water System crossover valves. These items do not require a SEWS form because they are are passive, in-line components. SEWS forms are applicable to the other two items; 1) the ESV pumps and 2) the various electrical enclosures/components. For these items, the SEWS forms are provided in the attachments as specified in the detailed equipment description provided below.

The SEWS forms are only partially complete in some cases. This is because some of the ECCW equipment is not yet fully installed. A complete GIP-2 assessment cannot be made on the equipment which is not fully installed. However, the partially completed SEWS forms are provided to demonstrate that adequate GIP-2 assessments will be completed.

- **ESV Pumps**

  The SEWS form is provided in Attachment 2.

- **High pressure Service Water Pump Suction Filter**

  A memo to file is provided in Attachment 6. This memo to file was used to address the High Pressure Service Water Pump Suction Filters. The evaluation addresses the seismic ruggedness of the strainer. Section 3.1.2 of GIP-2 states that "The following equipment types need not be identified for seismic evaluation ",

"passive equipment such as piping; filters; and electrical penetration assemblies". The memo to file was generated to ensure completeness and documentation. No SEWS form is required for these items. The strainers and their associated piping have been rigorously analyzed with the strainers treated as unanchored, in-line components, and assuming vertical support only from strainer pedestals. All associated pipe stresses were found to be within design limits. The strainer shims for 0HPSFL0003 will be replaced.

- **Various Electrical components required for the new system**

  1ESV1 & 2ESV1

  The SEWS form is provided in Attachment 3.

  3ESV1, 3ESV2 & 3ESV3

  The SEWS form is provided in Attachment 4.

  1ESVLCP, 2ESVLCP & 3ESVLCP

  The SEWS form is provided in Attachment 5.

- **Condenser Circulating Water Crossover Valves**

  The memo to file is provided in Attachment 7. A memo to file addresses the GIP-2 evaluation of the CCW Crossover Isolation Valves. In addition, this memo to file also addresses the CCW Pump Discharge Valves and the Condenser Outlet Valves. The CCW Crossover Isolation valves are passive, manual valves and are not required to change state following a seismic event. Field walkdowns of these valves were not required per Section 3.1.2 of GIP-2. Section 3.1.2 states that valves of this type "need not be identified for seismic evaluation". The memo to file was generated for completeness and documentation.

Question #6:

In the fourth paragraph, Section 4.6, "ESV System Design Criteria" of your submittal dated August 28, 1997, it is stated that "...Where QA-1 cable supports/trays have been added, a seismic review has been performed. This review addresses the potential for any interaction of non-seismic equipment with the new QA-1 cable support/trays..." Besides the potential II/I seismic interaction issue which was evaluated for the new QA-1 cable supports/trays, discuss the methodology and criteria used in qualifying the seismic adequacy of the QA-1 cable supports/trays.

RESPONSE #6:

All new QA-1 cable supports/trays were seismically qualified by analysis utilizing the static equivalent method. GIP-2 methodology was not applied to QA-1 cable supports/trays.

SCREENING EVALUATION WORK SHEET (SEWS)

Status Y N U
Sheet 1 of _____
Rev. 1

Attachment #2

Equip. ID No. 2ESVPU0001 Equip. Class 05 - Horizontal Pumps

Equipment Description Essential Siphon Vacuum Pump No.1

Location: Bldg. ESV Floor El. 796'+6" Room, Row/Col _____

Manufacturer, Model, Etc. (optional) Seimens 2BE1152

Horsepower/Motor Rating (opt.) 25 RPM (opt.) ____ Head (opt.) _____ Flow Rate (opt.) _____

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input		796'+6"
2.	Elevation of seismic input below about 40' from grade		[Y] N U
3.	Equipment has fundamental frequency above about 8 Hz		[Y] N U N/A
4.	Capacity based on:	Existing Documentation	DOC
		Bounding Spectrum	[BS]
		1.5 x Bounding Spectrum	ABS
		GERS	GERS
5.	Demand based on:	Ground Response Spectrum	[GRS]
		1.5 x Ground Response Spectrum	AGRS
		Conserv. Des. In-Str. Resp. Spec.	CRS
		Realistic M-Ctr. In-Str. Resp. Spec.	RRS

Does capacity exceed demand? [Y] N U *

CAVEATS - BOUNDING SPECTRUM (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	[Y] N U N/A *
2.	Driver and pump connected by rigid base or skid	[Y] N U N/A *
3.	No indication that shaft does not have thrust restraint in both axial directions	[Y] N U N/A *
4.	No risk of excessive nozzle loads such as gross pipe motion or differential displacement	[Y] N U N/A *
5.	Base vibration isolators adequate for seismic loads	Y N U [N/A]
6.	Attached lines (cooling, air, electrical) have adequate flexibility	[Y] N U N/A *
7.	Anchorage adequate (See checklist below for details)	[Y] N U N/A
8.	Relays mounted on equipment evaluated	Y N U [N/A] *
9.	Have you looked for and found no other adverse concerns?	[Y] N U N/A

Is the intent of all the caveats met for Bounding Spectrum? [Y] N U N/A

ANCHORAGE

1.	Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation)	[Y] N U N/A
2.	Type of anchorage covered by GIP	[Y] N U N/A *
3.	Sizes and locations of anchors determined	[Y] N U N/A
4.	Adequacy of anchorage installation evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	[Y] N U N/A

SCREENING EVALUATION WORK SHEET (SEWS)

Equip. ID No. 2ESVPU0001 Equip. Class 05 - Horizontal Pumps

Equipment Description Essential Siphon Vacuum Pump No.1

ANCHORAGE (Cont'd)

5.	Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking	[Y]	N	U	N/A
6.	For bolted anchorages, gap under base less than 1/4-inch	Y	N	U	[N/A]*
7.	Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors	[Y]	N	U	N/A
8.	Base has adequate stiffness and effect of prying action on anchors considered	[Y]	N	U	N/A
9.	Strength of equipment base and load path to CG adequate	[Y]	N	U	N/A
10.	Embedded steel, grout pad or large concrete pad adequacy evaluated	[Y]	N	U	N/A

Are anchorage requirements met? [Y] N U *

INTERACTION EFFECTS

1.	Soft targets free from impact by nearby equipment or structures	[Y]	N	U	N/A
2.	If equipment contains sensitive relays, equipment free from all impact by nearby equipment or structures	Y	N	U	[N/A]
3.	Attached lines have adequate flexibility	[Y]	N	U	N/A
4.	Overhead equipment or distribution systems are not likely to collapse	[Y]	N	U	N/A
5.	Have you looked for and found no other adverse concerns?	[Y]	N	U	N/A

Is equipment free of interaction effects? Y N [U]*

IS EQUIPMENT SEISMICALLY ADEQUATE Y N [U]

COMMENTS

The ESV pumps are not required to function during a seismic event per system engineer Henry Harling, therefore relay chatter is not a concern. Pumps are seismically adequate pending final walkdown for interaction.

COMMENTS FROM SEISMIC CAPACITY VS DEMAND
Does capacity exceed demand? Ground Response for .15g Overburden Spectra is fully enveloped by the Bounding Spectrum

COMMENTS OF CAVEATS - BOUNDING SPECTRUM
1

Design Difference Evaluation:

The ESV pumps are a double [redacted]ction, horizontal, centrifuga[redacted]ump rated at 25 HP. The Siemens design uses flat port plates which have much more clearance than the cone plate designs of manufacturers such as Nash. The use of these flat plates will not introduce any seismic vulnerability concerns.
The motor and frame are mounted on a common skid located in the ESV Bldg. Total weight for the Pump + motor + frame is 1100 lbs.

The ESV pumps are similar in size and layout to the pumps shown in Figure 5-4 of EPRI-7149-D, "Summary of Seismic Adequacy of Twenty Classes of Equipment Required for Safe Shutdown of Nuclear plants" Per EPRI-7149-D page 5-4, there were four sites which experience seismic damage to horizontal pumps that affected functionality. The primary cause of these failures were differential displacements between the pump and connected components or poorly supported piping adjacent to the pump. The piping associated with the ESV pumps has been rigorously analyzed and supported for seismic loads. The pump and motor are on a common skid located on a continous foundation pad. No hard spots with adjacent equipment exist.

2 The driver and pump are on a common skid which will bolt to a steel and concrete pedestal and grouted underneath. Ref. TN//5/A/3000/0/CM3
3 Thrust bearings are provided (multiple radial/thrust combination)
4 Reference piping analysis OSC-6817 prob. 4-ESV-03
6 The sealing water line to the pump is seismically qualified in OSC-6648 (Piping analysis for Siphon seal water system in the ESV Building, Prob. 4-SSW-04). The electrical lines will be installed per SI/O/A/5120/002 WHICH REQUIRES A MINIMUM OF 8" SLACK (Sect. 3.1.8.A.1)
8 No relays are mounted on the pump

COMMENTS OF ANCHORAGE
2 Anchorage supplied by 3/4" Dia. embedded studs with 3/4" thick, 3 1/4" dia. heads.
6 The base anchorage will be grouted as directed by installation procedure TN//5/A/3000/0/CM3
Are anchorage requirement met? Reference anchorage calculation OSC-6564 for anchorage qualification.

COMMENTS OF INTERACTION EFFECTS
Is equipment free of interaction effects? The ESV vacuum pumps are installed in thr ESV building. The building is designed to QA4 standards and is seismically qualified. No interaction concerns were noted. Final walkdown to be performed prior to start up.

SCREENING EVALUATION WORK SHEET (SEWS)

Equip. ID No. 2ESVPU0001 Equip. Class 05 - Horizontal Pumps

Equipment Description Essential Siphon Vacuum Pump No.1

Evaluated by:

Date: 04/15/98

Date: 04/15/98

Sketch 1

SCREENING EVALUATION WORK SHEET (SEWS)

Status Y N U
Sheet 1 of _____
Rev.

Attachment #3

Equip. ID No. 2ESV1 Equip. Class 20 - Instr. & Control Panels & Cabinets

Equipment Description Essential Siphon Vacuum Cabinet No.1

Location: Bldg. AB Floor El. 796'+6" Room, Row/Col EQ.ROOM

Manufacturer, Model, Etc. (optional) Hoffman A-603624FS

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input		796'+6"
2.	Elevation of seismic input below about 40' from grade		[Y] N U
3.	Equipment has fundamental frequency above about 8 Hz		Y [N] U N/A *
4.	Capacity based on:	Existing Documentation	DOC
		Bounding Spectrum	BS
		1.5 x Bounding Spectrum	[ABS]
		GERS	GERS
5.	Demand based on:	Ground Response Spectrum	GRS
		1.5 x Ground Response Spectrum	AGRS
		Conserv. Des. In-Str. Resp. Spec.	CRS
		Realistic M-Ctr. In-Str. Resp. Spec.	[RRS]

Does capacity exceed demand? [Y] N U *

CAVEATS - BOUNDING SPECTRUM (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	[Y] N U N/A *
2.	No computers or programmable controllers	[Y] N U N/A
3.	No strip chart recorders	[Y] N U N/A
4.	Steel frame and sheet metal structurally adequate	[Y] N U N/A
5.	Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or panels, are bolted together if they contain essential relays	Y N U [N/A]
6.	Drawers and equipment on slides restrained from falling out	Y N U [N/A] *
7.	All doors secured by latch or fastener	[Y] N U N/A
8.	Attached lines have adequate flexibility	[Y] N U N/A
9.	Anchorage adequate (See checklist below for details)	[Y] N U N/A
10.	Relays mounted on equipment evaluated	Y N [U] N/A *
11.	Have you looked for and found no other adverse concerns?	[Y] N U N/A

Is the intent of all the caveats met for Bounding Spectrum? Y N [U] N/A

ANCHORAGE

1.	Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation)	[Y] N U N/A
2.	Type of anchorage covered by GIP	[Y] N U N/A *
3.	Sizes and locations of anchors determined	[Y] N U N/A

SCREENING EVALUATION WORK SHEET (SEWS)

Equip. ID No. 2ESV1 Equip. Class 20 - Instr. & Control Panels & Cabinets

Equipment Description Essential Siphon Vacuum Cabinet No.1

ANCHORAGE (Cont'd)

4.	Adequacy of anchorage installation evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	[Y] N U N/A *
5.	Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking	[Y] N U N/A
6.	For bolted anchorages, gap under base less than 1/4-inch	[Y] N U N/A
7.	Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors	[Y] N U N/A
8.	Base has adequate stiffness and effect of prying action on anchors considered	[Y] N U N/A *
9.	Strength of equipment base and load path to CG adequate	[Y] N U N/A
10.	Embedded steel, grout pad or large concrete pad adequacy evaluated	Y N U [N/A]

Are anchorage requirements met? [Y] N U N/A *

INTERACTION EFFECTS

1.	Soft targets free from impact by nearby equipment or structures	[Y] N U N/A
2.	If equipment contains sensitive relays, equipment free from all impact by nearby equipment or structures	Y N [U] N/A
3.	Attached lines have adequate flexibility	[Y] N U N/A
4.	Overhead equipment or distribution systems are not likely to collapse	[Y] N U N/A
5.	Have you looked for and found no other adverse concerns?	[Y] N U N/A

Is equipment free of interaction effects? Y N [U]*

IS EQUIPMENT SEISMICALLY ADEQUATE Y N [U]

COMMENTS

Cabinet is seismically adequate pending acceptable interaction and internal component mounting walkdown.

COMMENTS FROM SEISMIC CAPACITY VS DEMAND
3 Assumed to be < 8 Hz
Does capacity exceed demand? Demand based on 5% damped instructure resonse spectra @ 796' +6" in the AB

COMMENTS OF CAVEATS - BOUNDING SPECTRUM
1

Cabinets are Hoffman A-603624FS. The new cabinets were compared to similar existing Hoffman cabinets at Oconee and the 1997 Hoffman catalog was compared to the October 1976 Hoffman catalog. Both new and old cabinets are made of 12 gauge steel, all seams are continuously welded and there are no holes or knockouts. All door hinges and internal frame structures were found to be identical. Both new and existing doors have 3 point latching door handles. These cabinets were found to be identical in construction to existing Hoffman cabinets.
The structural load path of Hoffman type enclosures is similiar to that shown for Enclosed Switchboards in Fig. 20-2 of EPRI NP-7149-D. Overall construction of the Hoffman cabinets is judged to be equivalent to typical Control and Instrumentation Panels & Cabinets represented in the earthquake experience database.

All internals were not present at inspection. Final inspection to be performed prior cabinet being declared operational.
6 There are no drawers or equipment on slides in the cabinets
10 All seismically sensitive internal components have been evaluated to IEEE 344-075 standards. Field mounting of relays to be inspected prior to start up of system.

COMMENTS OF ANCHORAGE
2 Anchored with 4 HN 1230 sleeve anchors.
4 Anchors were installed per QA procedure MP/0/A/1800/35.
8 Bottom of cabinet is stiffened with inverted channel. Bottom of cabinet is sandwiched between back of channel web and floor. This effectivly stiffens the base of the cabinet.
Are anchorage requirements met? See calculation in OSC-6040.

COMMENTS OF INTERACTION EFFECTS
Is equipment free of interaction effects? Cabinet must be walked for interaction prior to putting into service. All adjacent equipment may not have been installed at the time of this assesment.

SCREENING EVALUATION WORK SHEET (SEWS)

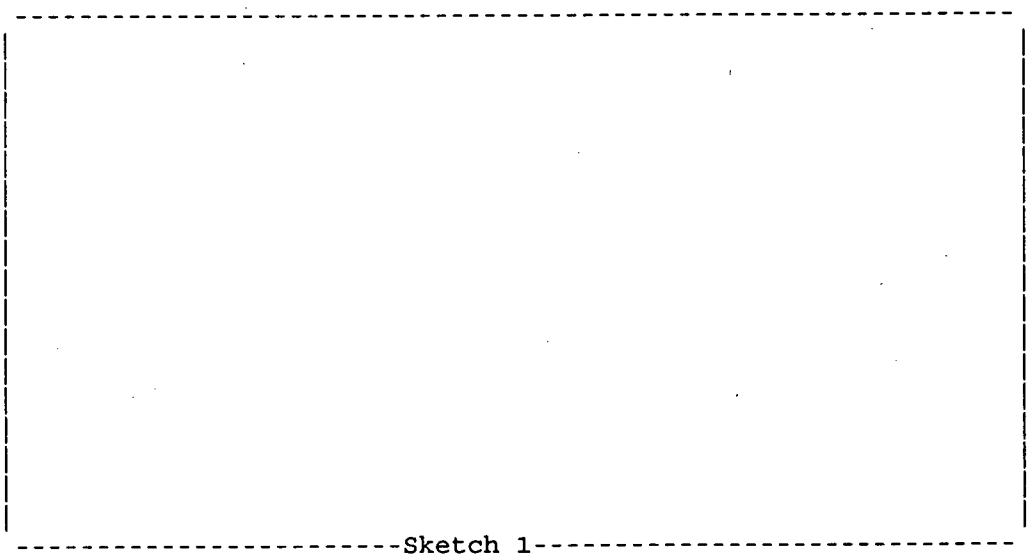
Equip. ID No. 2ESV1 Equip. Class 20 - Instr. & Control Panels & Cabinets

Equipment Description Essential Siphon Vacuum Cabinet No.1

Evaluated by:

Date: 04/01/98

Date: 04/01/98



Sketch 1

SCREENING EVALUATION WORK SHEET (SEWS)

Status Y N U
Sheet 1 of _____
Rev.
Attachment #4

Equip. ID No. 3ESV1 Equip. Class 20 - Instr. & Control Panels & Cabinets

Equipment Description Essential Siphon Vacuum PanelNo.1

Location: Bldg. AB Floor El. 796'+6" Room, Row/Col EQ.ROOM

Manufacturer, Model, Etc. (optional) Hoffman A-363612LP

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input		796'+6"
2.	Elevation of seismic input below about 40' from grade		[Y] N U
3.	Equipment has fundamental frequency above about 8 Hz		Y [N] U N/A *
4.	Capacity based on:	Existing Documentation	DOC
		Bounding Spectrum	BS
		1.5 x Bounding Spectrum	[ABS]
		GERS	GERS
5.	Demand based on:	Ground Response Spectrum	GRS
		1.5 x Ground Response Spectrum	AGRS
		Conserv. Des. In-Str. Resp. Spec.	CRS
		Realistic M-Ctr. In-Str. Resp. Spec.	[RRS]

Does capacity exceed demand? [Y] N U *

CAVEATS - BOUNDING SPECTRUM (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	[Y] N U N/A *
2.	No computers or programmable controllers	[Y] N U N/A
3.	No strip chart recorders	[Y] N U N/A
4.	Steel frame and sheet metal structurally adequate	[Y] N U N/A
5.	Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or panels, are bolted together if they contain essential relays	Y N U [N/A]
6.	Drawers and equipment on slides restrained from falling out	Y N U [N/A] *
7.	All doors secured by latch or fastener	[Y] N U N/A
8.	Attached lines have adequate flexibility	[Y] N U N/A
9.	Anchorage adequate (See checklist below for details)	[Y] N U N/A
10.	Relays mounted on equipment evaluated	Y N [U] N/A *
11.	Have you looked for and found no other adverse concerns?	[Y] N U N/A

Is the intent of all the caveats met for Bounding Spectrum? Y N [U] N/A

ANCHORAGE

1.	Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation)	[Y] N U N/A
2.	Type of anchorage covered by GIP	[Y] N U N/A *
3.	Sizes and locations of anchors determined	[Y] N U N/A

SCREENING EVALUATION WORK SHEET (SEWS)

Equip. ID No. 3ESV1 Equip. Class 20 - Instr. & Control Panels & Cabinets

Equipment Description Essential Siphon Vacuum PanelNo.1

ANCHORAGE (Cont'd)

4.	Adequacy of anchorage installation evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	[Y]	N	U	N/A *
5.	Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking	[Y]	N	U	N/A
6.	For bolted anchorages, gap under base less than 1/4-inch	[Y]	N	U	N/A
7.	Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors	[Y]	N	U	N/A
8.	Base has adequate stiffness and effect of prying action on anchors considered	[Y]	N	U	N/A
9.	Strength of equipment base and load path to CG adequate	[Y]	N	U	N/A
10.	Embedded steel, grout pad or large concrete pad adequacy evaluated	Y	N	U	[N/A]

Are anchorage requirements met? [Y] N U N/A *

INTERACTION EFFECTS

1.	Soft targets free from impact by nearby equipment or structures	[Y]	N	U	N/A
2.	If equipment contains sensitive relays, equipment free from all impact by nearby equipment or structures	Y	N	[U]	N/A
3.	Attached lines have adequate flexibility	[Y]	N	U	N/A
4.	Overhead equipment or distribution systems are not likely to collapse	[Y]	N	U	N/A
5.	Have you looked for and found no other adverse concerns?	[Y]	N	U	N/A

Is equipment free of interaction effects? Y N [U]*

IS EQUIPMENT SEISMICALLY ADEQUATE Y N [U]

COMMENTS

Cabinet is seismically adequate pending acceptable interaction and internal component mounting walkdown.

COMMENTS FROM SEISMIC CAPACITY VS DEMAND
3 Assumed to be < 8 Hz
Does capacity exceed demand? Demand based on 5% damped instructure resonse spectra @ 796' +6" in the AB

COMMENTS OF CAVEATS - BOUNDING SPECTRUM
1

Design Difference Evaluation:

Cabinets are Hoffman A-363612LP. The new cabinets were compared to similar existing Hoffman cabinets at Oconee and the 1997 Hoffman catalog was compared to the October 1976 Hoffman catalog. Both new and old cabinets are made of 12 gauge steel, all seams are continuously welded and there are no holes or knockouts. All door hinges and internal frame structures were found to be identical. Both new and existing doors have 3 point latching door handles. These cabinets were found to be identical in construction to existing Hoffman cabinets.
The structural load path of Hoffman type enclosures is similiar to that shown for Enclosed Switchboards in Fig. 20-2 of EPRI NP-7149-D. Overall construction of the Hoffman cabinets is judged to be equivalent to typical Control and Instrumentation Panels & Cabinets represented in the earthquake experience database.

All internals were not present at inspection. Final inspection to be performed prior cabinet being declared operational.
6 There are no drawers or equipment on slides in the cabinets
10 All seismically sensitive internal components have been evaluated to IEEE 344-075 standards. Field mounting of relays to be inspected prior to start up of system.

COMMENTS OF ANCHORAGE
2 Anchored with 4 HN 3817 sleeve anchors.
4 Anchors were installed per QA procedure MP/0/A/1800/35.
Are anchorage requirements met? See calculation in OSC-6040.

COMMENTS OF INTERACTION EFFECTS
Is equipment free of interaction effects? Cabinet must be walked for interaction prior to putting into service. All adjacent equipment may not have been installed.

SCREENING EVALUATION WORK SHEET (SEWS)

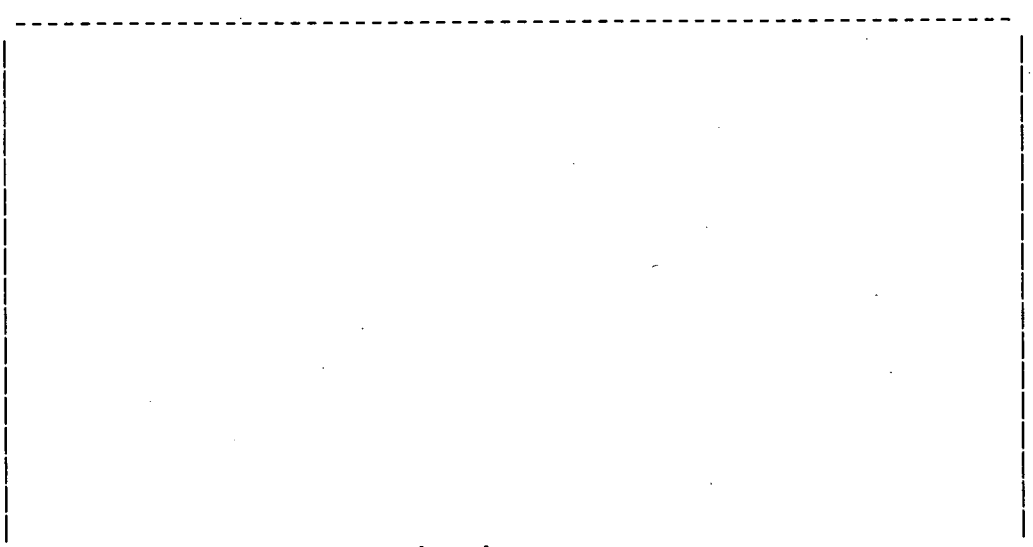
Equip. ID No. 3ESV1 Equip. Class 20 - Instr. & Control Panels & Cabinets

Equipment Description Essential Siphon Vacuum PanelNo.1

Evaluated by:

Date: 04/01/98

Date: 04/01/98



Sketch 1

SCREENING EVALUATION WORK SHEET (SEWS)

Status Y N U
Sheet 1 of _____
Rev.

Attachment #5

Equip. ID No. 2ESVLCP1 Equip. Class 20 - Instr. & Control Panels & Cabinets

Equipment Description Essential Siphon Vacuum Local Control Panel Cabinet No.1

Location: Bldg. ESV Floor El. 796'+6" Room, Row/Col _____

Manufacturer, Model, Etc. (optional) Hoffman A-727224FSD

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input		796'+6"
2.	Elevation of seismic input below about 40' from grade		[Y] N U
3.	Equipment has fundamental frequency above about 8 Hz		Y [N] U N/A *
4.	Capacity based on:	Existing Documentation	DOC
		Bounding Spectrum	[BS]
		1.5 x Bounding Spectrum	ABS
		GERS	GERS
5.	Demand based on:	Ground Response Spectrum	[GRS]
		1.5 x Ground Response Spectrum	AGRS
		Conserv. Des. In-Str. Resp. Spec.	CRS
		Realistic M-Ctr. In-Str. Resp. Spec.	RRS

Does capacity exceed demand? [Y] N U *

CAVEATS - BOUNDING SPECTRUM (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in earthquake experience equipment class	[Y] N U N/A *
2.	No computers or programmable controllers	[Y] N U N/A
3.	No strip chart recorders	[Y] N U N/A
4.	Steel frame and sheet metal structurally adequate	[Y] N U N/A
5.	Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or panels, are bolted together if they contain essential relays	Y N U [N/A] *
6.	Drawers and equipment on slides restrained from falling out	Y N U [N/A] *
7.	All doors secured by latch or fastener	[Y] N U N/A
8.	Attached lines have adequate flexibility	[Y] N U N/A
9.	Anchorage adequate (See checklist below for details)	[Y] N U N/A
10.	Relays mounted on equipment evaluated	Y N [U] N/A *
11.	Have you looked for and found no other adverse concerns?	[Y] N U N/A

Is the intent of all the caveats met for Bounding Spectrum? Y N [U] N/A

ANCHORAGE

1.	Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation)	[Y] N U N/A
2.	Type of anchorage covered by GIP	[Y] N U N/A *
3.	Sizes and locations of anchors determined	[Y] N U N/A

SCREENING EVALUATION WORK SHEET (SEWS)

Equip. ID No. 2ESVLCP1 Equip. Class 20 - Instr. & Control Panels & Cabinets

Equipment Description Essential Siphon Vacuum Local Control Panel Cabinet No.1

ANCHORAGE (Cont'd)

4.	Adequacy of anchorage installation evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	[Y]	N	U	N/A *
5.	Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking	[Y]	N	U	N/A
6.	For bolted anchorages, gap under base less than 1/4-inch	[Y]	N	U	N/A
7.	Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors	[Y]	N	U	N/A
8.	Base has adequate stiffness and effect of prying action on anchors considered	[Y]	N	U	N/A *
9.	Strength of equipment base and load path to CG adequate	[Y]	N	U	N/A
10.	Embedded steel, grout pad or large concrete pad adequacy evaluated	Y	N	U	[N/A]

Are anchorage requirements met? [Y] N U N/A *

INTERACTION EFFECTS

1.	Soft targets free from impact by nearby equipment or structures	[Y]	N	U	N/A
2.	If equipment contains sensitive relays, equipment free from all impact by nearby equipment or structures	Y	N	[U]	N/A
3.	Attached lines have adequate flexibility	[Y]	N	U	N/A
4.	Overhead equipment or distribution systems are not likely to collapse	[Y]	N	U	N/A
5.	Have you looked for and found no other adverse concerns?	[Y]	N	U	N/A

Is equipment free of interaction effects? Y N [U]*

IS EQUIPMENT SEISMICALLY ADEQUATE Y N [U]

COMMENTS

Cabinet is seismically adequate pending acceptable interaction and internal component mounting walkdown.

COMMENTS FROM SEISMIC CAPACITY VS DEMAND
3 Assumed to be < 8 Hz.
Does capacity exceed demand? Demand based on overburden ground response.

COMMENTS OF CAVEATS - BOUNDING SPECTRUM
1

Design Differences Evaluation:

Cabinets are Hoffman A-727[redacted]FSD. The new cabinets were com[redacted]ed to similar existing Hoffman cabinets at Oconee and the 1997 Hoffman catalog was compared to the October 1976 Hoffman catalog. Both new and old cabinets are made of 12 gauge steel, all seams are continuously welded and there are no holes or knockouts. All door hinges and internal frame structures were found to be identical. Both new and existing doors have 3 point latching door handles. These cabinets were found to be identical in construction to existing Hoffman cabinets.
The structural load path of Hoffman type enclosures is similiar to that shown for Enclosed Switchboards in Fig. 20-2 of EPRI NP-7149-D. Overall construction of the Hoffman cabinets is judged to be equivalent to typical Control and Instrumentation Panels & Cabinets represented in the earthquake experience database.

All internals were not present at inspection. Final inspection to be performed prior cabinet being declared operational.
5 Adjacent ESVLCP panels are ~12" away .
6 There are no drawers or equipment on slides in the cabinets
10 All seismically sensitive internal components have been evaluated to IEEE 344-075 standards. Field mounting of relays to be inspected prior to start up of system.

COMMENTS OF ANCHORAGE
2 Anchored with 12 HN 1230 sleeve anchors.
4 Anchors were installed per QA procedure MP/0/A/1800/35.
8 Bottom of cabinet is stiffened with inverted channel. Bottom of cabinet is sandwiched between back of channel web and floor. This effectivly stiffens the base of the cabinet.
Are anchorage requirements met? See calculation in OSC-6040.

COMMENTS OF INTERACTION EFFECTS
Is equipment free of interaction effects? Cabinet must be walked for interaction prior to putting into service. All adjacent equipment may not have been installed.

SCREENING EVALUATION WORK SHEET (SEWS)

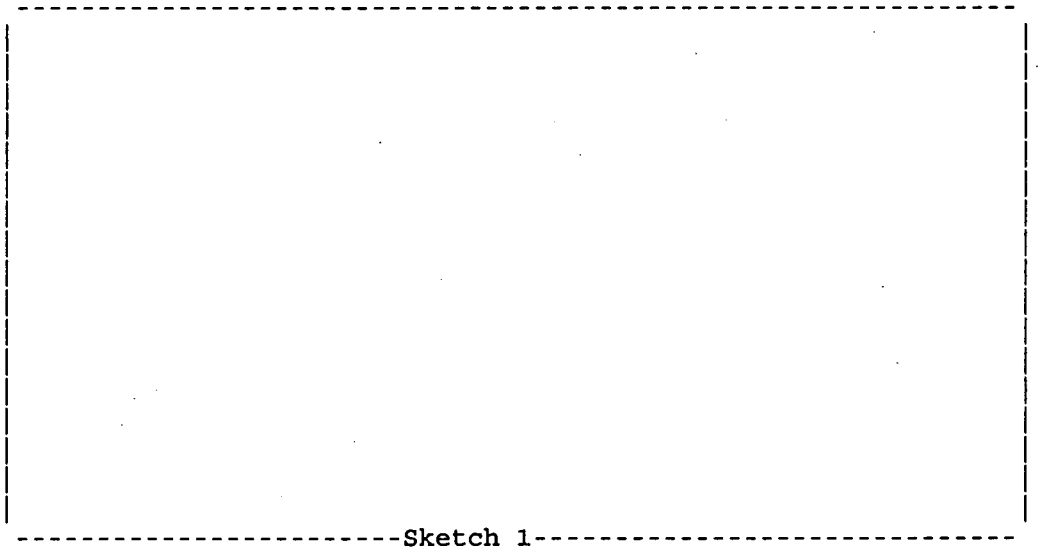
Equip. ID No. 2ESVLCP1 Equip. Class 20 - Instr. & Control Panels & Cabinets

Equipment Description Essential Siphon Vacuum Local Control Panel Cabinet No.1

Evaluated by:

Date: 04/01/98

Date: 04/01/98



Sketch 1

Attachment #6

January 15, 1998

Memo to File

Re: Oconee Nuclear Station Units 1,2 and 3
HPSW System Piping Upgrade
Upgrade to Piping Class D
NSM-53003, Part BM1
File No: OS-190

The purpose of this letter is to document the seismic adequacy review of the equipment listed below, using USI-A46 (SQUG) methodology, to support an upgrade of the piping class to Class D.

Seismic qualification of mechanical equipment is addressed in Section 3.9.2.2 of the Oconee FSAR. Within this section, ONS seismic documentation can be founded on either testing (shaker or impact) or analysis. ONS current licensing basis on testing is general enough to envelope the option of using seismic experience data (SQUG) to meet the testing option. Furthermore, the NRC's Safety Evaluation Report (SER) dated May 22, 1992 on the SQUG Generic Implementation Procedure (GIP) confirms this methodology for seismic adequacy verification.

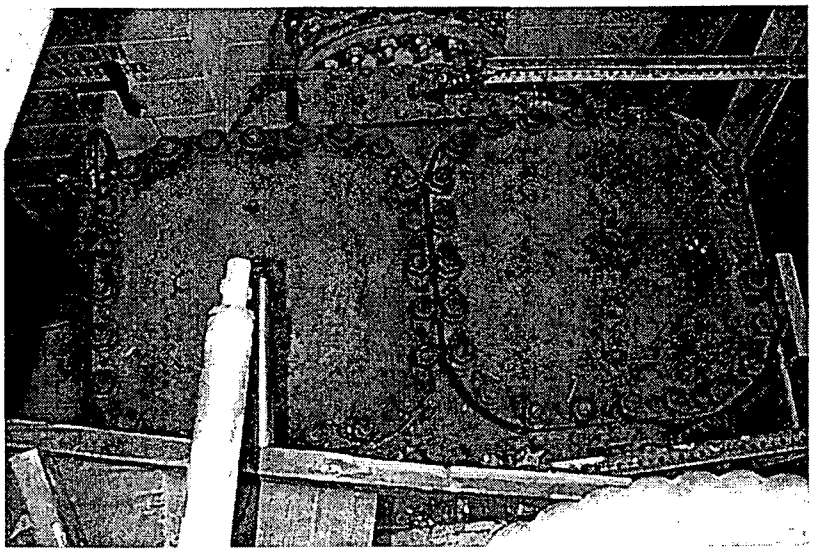
A field inspection of the subject equipment was conducted by members of the ONS Site SQUG team on January 13, 1998. The results are as follows:

Items listed below are all passive in-line equipment. Seismic qualification status follows the equipment listing:

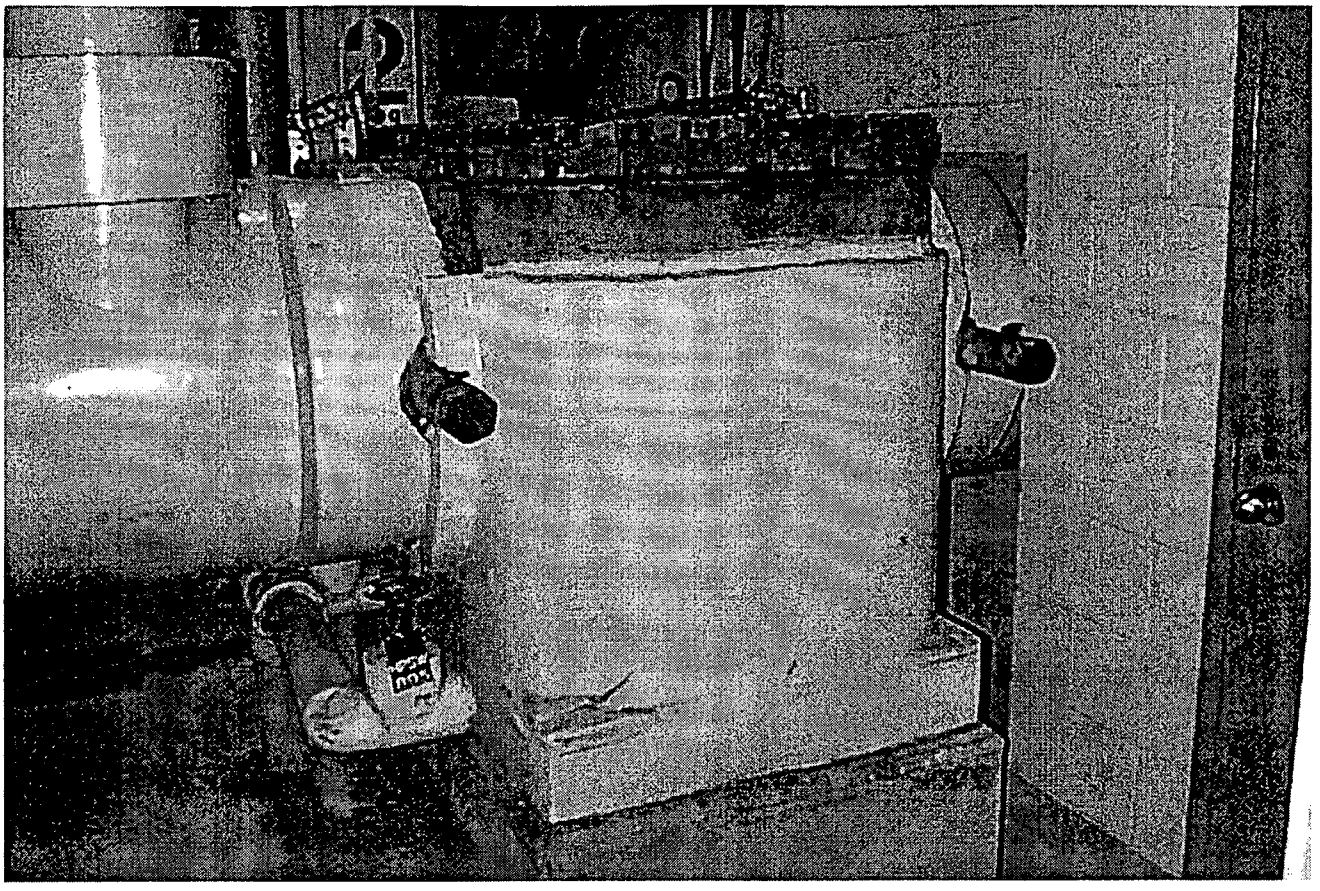
Equipment	Flow Diagram	Manufacturer Drawing
0HPSFL0001	OFD-124C-1.1 (I-4)	OM 240-4
0HPSFL0002	OFD-124C-1.1 (B-4)	OM 240-4
0HPSFL0003	OFD-124C-1.1 (F-4)	OM 240-4

0HPSFL0001 AND 0HPSFL0002 are strainers provided on the 20" diameter piping (input) for HPSW pumps "A" and "B", respectively. 0HPSFL003 is the strainer provided on the 8" diameter piping (input) for the HPSW jockey pump. All of these strainers are located in the turbine building basement and are mounted in-line.

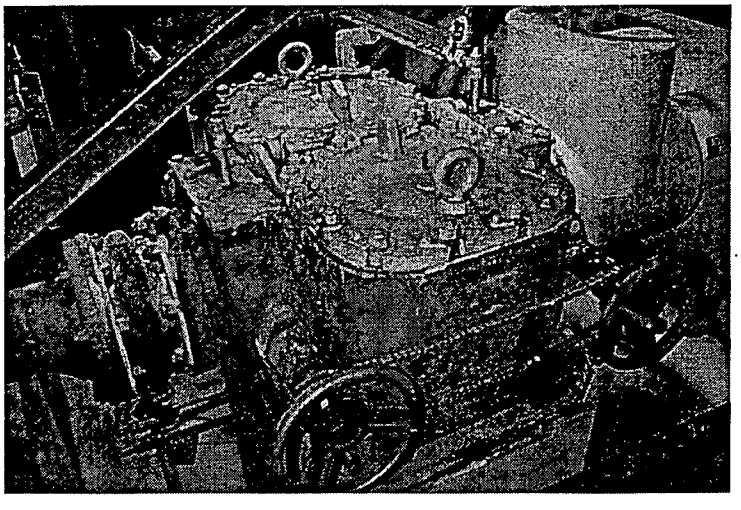
Shown below are photographs of each of these strainers:

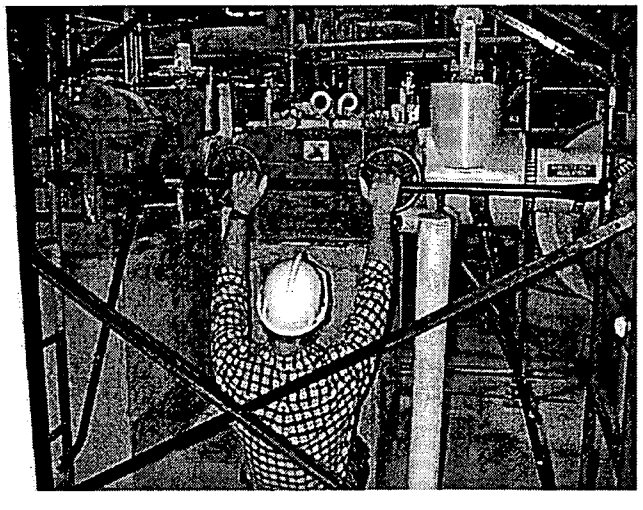


0HPSFL0001



0HPSFL0002





0HPSFL0003

The strainers are also shown on OM-240-4. These strainers are constructed of cast iron material. ONS Systems Engineer (Jean Robinson) indicates that strainers 0HPSFL0001 AND 0HPSFL0002 weigh approximately 13,200 lbs (wet) and strainer 0HPSFL0003 weighs approximately 2100 lbs. (wet). The strainer assembly also includes two gate valves which are attached directly to the strainer housing.

Strainers 0HPSFL0001 AND 0HPSFL0002 are unanchored and rest on top of the concrete pedestal. Strainer 0HPSFL003 is bolted to the pedestal. There are also some plate shims provided under this strainer. These shim plates are severely corroded, most likely due to the constant moist environment which has resulted from condensation on the bottom of the strainer. The anchorage of the strainers (or absence of positive anchorage as in the case of strainers 0HPSFL0001 AND 0HPSFL0002) is currently being evaluated and qualified by the OSW Project Team (ref.: calculation # OSC-2195- Vol. 2). The piping is also being rigorously analyzed by the OSW Project Team. For the purposes of this evaluation, it is assumed that the strainers are an in-line equipment item. It is assumed that the piping stresses due to the maximum hypothetical earthquake (MHE) are within allowable limits and that the strainers will remain intact on the pedestals following the MHE. The evaluation being performed by the OSW Project Team should ensure both of the above.

The strainer assembly is of rugged construction and is at least as rugged as the connecting piping. Based on inspection and low seismic input at this elevation (bedrock), these strainers are determined to be a seismically rugged, in-line passive component; at least as rugged as a manual valve. SQUG Generic Implementation Procedure (GIP) Manual , Section 3.3.5 of Part II discusses the fact that manual valves are inherently rugged. In other words, these types of valves are not seismically sensitive to local accelerations experienced over a broad range of earthquakes and therefore are not evaluated to the specific characteristics as other equipment is within the GIP. The USI/A46 SER confirms that manual valves are inherently rugged. A walkdown of these type items is not required as they are passive items, however a walkdown was performed here as a means of double verification. No Seismic Evaluation Walkdown Sheet (SEWS) form is required.

It should be noted here that the strainer bodies are made of cast iron. This includes the bodies of the gate valves which are located on either side, and attached to, the strainer body. SQUG experience has compiled data which indicates that cast iron valves with heavy operators at their end are subject to brittle failure modes. However, these two valves are gate valves and have no heavy operators and will receive low seismic input due to installation location (4 ft. above bedrock (o.1g ZPA)).

In summary, based on SQUG experience database, the strainers are considered to be seismically rugged, in-line passive components.

Brant Elrod
Senior Engineer
ONS MCE Engineering, SQUG Team

R.P Childs
Senior Engineer
ONS MCE Engineering, SQUG Team

cc: Henry Harling, Cliff Davis, Ray McCoy

The strainers are also shown on OM-240-4. These strainers are constructed of cast iron material. ONS Systems Engineer (Jean Robinson) indicates that strainers 0HPSFL0001 AND 0HPSFL0002 weigh approximately 13,200 lbs (wet) and strainer 0HPSFL0003 weighs approximately 2100 lbs. (wet). The strainer assembly also includes two gate valves which are attached directly to the strainer housing.

Strainers 0HPSFL0001 AND 0HPSFL0002 are unanchored and rest on top of the concrete pedestal. Strainer 0HPSFL003 is bolted to the pedestal. There are also some plate shims provided under this strainer. These shim plates are severely corroded, most likely due to the constant moist environment which has resulted from condensation on the bottom of the strainer. The anchorage of the strainers (or absence of positive anchorage as in the case of strainers 0HPSFL0001 AND 0HPSFL0002) is currently being evaluated and qualified by the OSW Project Team (ref.: calculation # OSC-2195- Vol. 2). The piping is also being rigorously analyzed by the OSW Project Team. For the purposes of this evaluation, it is assumed that the strainers are an in-line equipment item. It is assumed that the piping stresses due to the maximum hypothetical earthquake (MHE) are within allowable limits and that the strainers will remain intact on the pedestals following the MHE. The evaluation being performed by the OSW Project Team should ensure both of the above.

The strainer assembly is of rugged construction and is at least as rugged as the connecting piping. Based on inspection and low seismic input at this elevation (bedrock), these strainers are determined to be a seismically rugged, in-line passive component; at least as rugged as a manual valve. SQUG Generic Implementation Procedure (GIP) Manual , Section 3.3.5 of Part II discusses the fact that manual valves are inherently rugged. In other words, these types of valves are not seismically sensitive to local accelerations experienced over a broad range of earthquakes and therefore are not evaluated to the specific characteristics as other equipment is within the GIP. The USI/A46 SER confirms that manual valves are inherently rugged. A walkdown of these type items is not required as they are passive items, however a walkdown was performed here as a means of double verification. No Seismic Evaluation Walkdown Sheet (SEWS) form is required.

It should be noted here that the strainer bodies are made of cast iron. This includes the bodies of the gate valves which are located on either side, and attached to, the strainer body. SQUG experience has compiled data which indicates that cast iron valves with heavy operators at their end are subject to brittle failure modes. However, these two valves are gate valves and have no heavy operators and will receive low seismic input due to installation location (4 ft. above bedrock (o.1g ZPA)).

In summary, based on SQUG experience database, the strainers are considered to be seismically rugged, in-line passive components.

Brant Elrod
Senior Engineer
ONS MCE Engineering, SQUG Team

R.P Childs
Senior Engineer
ONS MCE Engineering, SQUG Team

cc: Henry Harling, Cliff Davis, Ray McCoy

December 6, 1995

Attachment #7

Memo to File

Re: Oconee Nuclear Station Units 1,2 and 3
CCW discharge, condenser oulet and crossover isolation valves
PIP 0-095-1160
File No: OS-190

The purpose of this letter is to document the seismic evaluation of the valves listed below to support resolution of PIP 1-95-1160.

1,2,3CCW-10 through 13, CCW pump discharge valves (On the SQUG list).
1,2,3CCW-20 though 25, condenser outlet valves (AOV).
1CCW-40, 2CCW-41, 3CCW-42, 3CCW-94, crossover isolation valves(Manual Valve).

Seismic qualification of mechanical equipment is addressed in Section 3.9.2.2 of the Oconee FSAR. Within this section, our seismic documentation can be founded on either testing (shaker or impact) or analysis. Our current licensing basis on testing is general enough to envelope the option of using seismic experience data (SQUG) to meet the testing option. Furthermore, the NRC's Safety Evaluation Report (SER) dated May 22, 1992 on the SQUG Generic Implementation Procedure (GIP) confirms this methodology for seismic adequacy verification.

Within the GIP, Section 3.3.5 of Part II discusses the fact that manual valves are inherently rugged. In other words, these types of valves are not seismically sensitive to local accelerations experienced over a broad range of earthquakes and therefore are not evaluated to the specific characteristics as other equipment is within the GIP. This SER confirms that manual valves are inherently rugged. A walkdown of valves 1CCW-40,2CCW-41,3CCW-42 & 3CCW-94 is not required as they are passive, manual valves and their position is not required to change following a seismic event.

Valves 1,2,3CCW-20 thru 25 were field walked by a Seismic Review Team (SRT) consisting of Russell Childs and Brant Elrod. The seismic review addresses the valves seismic vulnerability with respect to pressure boundary only and does not address any controls associated with the valve. These valves were found to be seismically acceptable to maintain their pressure boundry based on GIP methodology. Attached is the Seismic Evaluation Walkdown Sheet (SEWS) documenting the seismic walkdown of these valves.

Valves 1,2,3CCW-10 through 13 were field walked as part of the SQUG (A-46/IPEEE) program and were found to be seismically acceptable based on GIP methodology.

This letter supports that wording found in DBD OSS-0254.00-00-1000, Section 20.3.4.

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.cc D.A.Kelley, Carlton Burrell