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RECIP. NAME RECIPIENT AFFILIATION

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SUBJECT: Submits rev to Tech Specs for upgraded ECCW sys for Oconee Nuclear Station, Units 1, 2 & 3. Revised new & replacement equipment evaluation packages for new equipment associated with Unit 2 Oconee ECCW upgrade project encl.

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Vice President

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October 15, 1998

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

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
Revision to Technical Specifications for the
Upgraded ECCW System
License Amendments 229, 230, 226
License Condition #1

In a letter dated April 24, 1998, the NRC issued Amendment Nos. 229, 230, and 226 to Facility Operating License DPR-38, DPR-47, and DPR-55 respectively. As stated in the change to Appendix C of the amended licenses, License Condition 1 was created which required Duke Energy Corporation (Duke) to:

- 1) provide comparisons of critical characteristics for the new equipment that is being installed by the ECCW upgrade with data from testing or from recorded earthquakes, in accordance with Section 2.3.4, Part 1 of GIP-2 and Section I.2.3.4, paragraphs 2, 3, and 4 of the staff's SSER dated May 22, 1992, or
- 2) qualify the new equipment using the existing methods in Section 3 of the Oconee UFSAR. This condition required that this information be provided to the NRC by July 15, 1998.

On June 30, 1998, Duke supplied NARE (New and Replacement Equipment) evaluation packages for new equipment associated with the Unit 2 Oconee ECCW upgrade project. The data was presented on forms using the then-current guidance provided by the SQUG Steering Committee in its paper "Requirements for Use of the GIP for New and Replacement Equipment and Parts (NARE)".

Following receipt of this information, the NRC Staff discussed the format with Duke and an agreement was reached that the NARE data-sheet would be revised, with concurrence

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Document Control Desk
Date: October 15, 1998
Page 2

from the SQUG Steering Committee, and the Unit 2 data resubmitted using the revised format.

The revised NARE evaluation packages for new equipment associated with the Unit 2 Oconee ECCW upgrade project were submitted by letter dated September 16, 1998.

During review by the NRC Staff, questions were raised as to the clarity of some of the data presented. During a telephone conference on October 13, 1998, Duke personnel agreed to re-submit the NARE evaluation packages after revising wording on the forms to clarify and explain some of the site specific information. The format of the NARE data-sheets was not affected by this revision.

The revised NARE evaluation packages for new equipment associated with the Unit 2 Oconee ECCW upgrade project are submitted as Attachment 1.

As described in prior correspondence, NARE packages for new equipment associated with the Units 1 & 3 ECCW system upgrades will be provided within 60 days of completion of refueling outages 3EOC17 and 1EOC18. It is anticipated that the Unit 1 and 3 packages will also use the revised format. License Condition 1 contained in License Amendments 229 and 226 of Facility Operating Licenses DPR-38 and DPR-55, respectively, will be considered complete when the NARE evaluation packages are submitted for each unit.

If there are any questions regarding this submittal, please contact Randy Todd at (864) 885-3418.

Very truly yours,



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

Attachment

Document Control Desk

Date: October 15, 1998

Page 3

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ATTACHMENT 1

Oconee Unit 2 ECCW Upgrade Project

NARE (New and Replacement Equipment) Evaluation Packages

2ESV1 Unit 2 ESV Cabinet No. 1

2ESVLCP1 Unit 2 ESV Local Control Cabinet No. 1

2ESVPU0001 Unit 2 ESV Vacuum Pump No. 1

2ESVPU0002 Unit 2 ESV Vacuum Pump No. 2

2ESVPU0003 Unit 2 ESV Vacuum Pump No. 3

**Seismic Adequacy Evaluation
Checklist for Application of the GIP Methodology
to New and Replacement Equipment**

1. Equipment Description:

Essential Siphon Vacuum Pumps (2ESVPU0001,2 & 3) Manufacturer: Siemens Model No.: 2BE1152

**2. GIP, Appendix B, Equipment Class Applicable to Equipment?
If No, go to 10.**

Yes ☒ No ☐

3. Applicable GIP Equipment Class.

Class 05, Horizontal Pumps

4. Identify Licensing Basis Documents(s) which indicate that GIP is an Acceptable Method for Demonstrating Seismic Adequacy

Oconee FSAR Section 3.9.2.2 in conjunction with the Duke Energy Corp. Docket No 50-269, Amendment to Facility License Dated April 24, 1998.

5. A. Basis for Equipment Seismic Capacity

- ☒ Earthquake experience
☐ GERS
☐ Existing Seismic Qualification Capacity Data
(Attach copy of capacity data to this checklist)

B. Basis for Equipment Seismic Demand

- ☐ In-Structure response spectra approved for USI A-46
☐ 1.5 x SSE ground response spectra
☒ Other (Describe)

The ESV pumps are judged to have a Natural Frequency \gg 8 Hz. Per Table 4.1 of the GIP, Capacity vs Demand comparison should be made using Method A (Bounding Spectra compared to Oconee Overburden Ground Response).

(Attach a copy of seismic demand spectrum to this checklist)

C. Equipment seismic capacity exceeds demand?

Yes ☒ No ☐

If No go to 10.

Seismic Adequacy Evaluation
Checklist for Application of the GIP Methodology
to New and Replacement Equipment

8. Installed Equipment Free of Significant, Credible Seismic Interaction Concerns? Yes ☒ No ☐

If Yes, go to No. 9.
If No, go to 10.

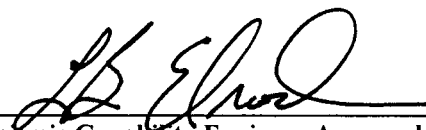
9. Complete Seismic Adequacy documentation per GIP and applicable plant Quality Assurance/Quality Control Procedures. Confirm review and approval by Seismic Capacity Engineers (signatures below) and attach applicable documentation to this checklist. Seismic Adequacy Evaluation Complete.
10. Use other acceptable methods per plant licensing basis. Describe alternate method. Attach applicable documentation

N/A



Seismic Capability Engineer Approval

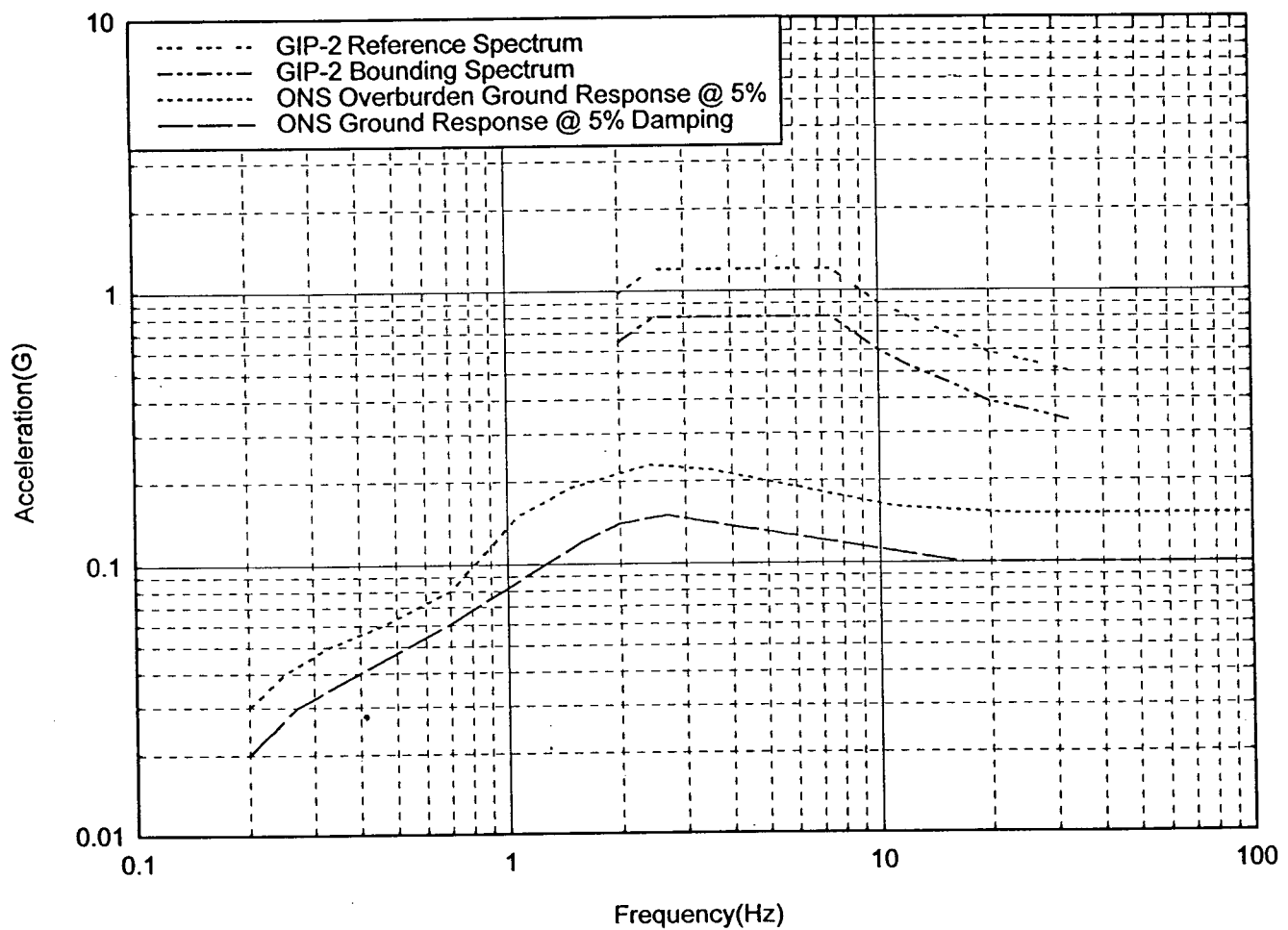
10/15/98
Date



Seismic Capability Engineer Approval

10/15/98
Date

ONS Ground Responses vs GIP-2 Bounding & Reference Spectrums



SCREENING EVALUATION WORK SHEET (SEWS)

Revision 2, Corrected, 6/28/91

Status Y N U

Sheet 1 of _____

Rev. 3

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 N/A

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 | <u>796'+6"</u> |
| 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. Rev.2: Final walkdown reveals no interaction concerns. Rev. 3 addresses details of inclusion rules for BS caveat #1. This SEWS envelopes 2ESVPU0002 & 2ESVPU0003.

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

The ESV pumps are judged to meet the inclusion rules for a Hydraulic Horizontal Pump as represented in the GIP equipment class 05- Horizontal Pumps. They are single stage pumps utilizing a rotary impeller mounted on a common drive shaft driven by an electric motor rated at 25 Hp. Both motor and pump are mounted on a common skid.

The ESV pumps are a double suction, horizontal, centrifugal pump 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 continuous 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) Rev.2: Installed lines have adequate slack.

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 the 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. Rev. 2: Final walkdown reveals no interaction concerns.

SCREENING EVALUATION WORK SHEET (SEWS)

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

Equipment Description Essential Siphon Vacuum Pump No.1

RELAY WALKDOWN

1. Does spot check of essential relays indicate relays present and properly mounted?

Y N U [N/A]

2. Are essential relays required to function during earthquake screened out?

Y N U [N/A]

If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.

3. No other relay concerns?

Y N U [N/A]

Requirements for relays satisfied?

Y N U [N/A]

SYSTEMS INTERACTION EFFECTS?

1. No potential sources could flood or spill onto cabinet?

[Y] N U N/A

IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCLUDING RELAY CHATTER?

YES X NO ____

IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER INVESTIGATION? YES X NO ____

SCREENING EVALUATION WORK SHEET (SEWS)

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

Equipment Description Essential Siphon Vacuum Pump No.1

Evaluated by:

R. P. Childs

R.P.Childs

Date: 08/08/98

L.B.Elrod

L.B.Elrod

Date: 08/08/98



-----Sketch 1-----

SCREENING EVALUATION WORK SHEET (SEWS)

Revision 2, Corrected, 6/28/91

Status Y N U

Sheet 1 of _____

Rev. 1

Equip. ID No. 2ESVPU0002 Equip. Class 05 - Horizontal Pumps

Equipment Description Essential Siphon Vacuum Pump No.2

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

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

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

SEISMIC CAPACITY VS DEMAND

- | | | |
|----|---|-----------|
| 1. | Elevation where equipment receives seismic input | |
| 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: | DOC |
| | Existing Documentation | BS |
| | Bounding Spectrum | ABS |
| | 1.5 x Bounding Spectrum | AB |
| | GERS | GERS |
| 5. | Demand based on: | GRS |
| | Ground Response Spectrum | AGRS |
| | 1.5 x Ground Response Spectrum | CRS |
| | Conserv. Des. In-Str. Resp. Spec. | RRS |
| | Realistic M-Ctr. In-Str. Resp. Spec. | |

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. 2ESVPU0002 Equip. Class 05 - Horizontal Pumps

Equipment Description Essential Siphon Vacuum Pump No.2

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

See 2ESVPU0001 for complete SEWS evaluation

SCREENING EVALUATION WORK SHEET (SEWS)

Equip. ID No. 2ESVPU0002 Equip. Class 05 - Horizontal Pumps

Equipment Description Essential Siphon Vacuum Pump No.2

RELAY WALKDOWN

1. Does spot check of essential relays indicate
relays present and properly mounted? Y N U N/A

2. Are essential relays required to function
during earthquake screened out? Y N U N/A

If no, attach list of relays with locations in
cabinet and general dimensions, thicknesses and
details of mounting plates that support relays
for later analysis.

3. No other relay concerns? Y N U N/A

Requirements for relays satisfied? Y N U N/A

SYSTEMS INTERACTION EFFECTS?

1. No potential sources could flood or spill onto
cabinet? Y N U N/A

IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCLUDING
RELAY CHATTER?

YES X NO ____

IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER
INVESTIGATION? YES X NO ____

SCREENING EVALUATION WORK SHEET (SEWS)

Equip. ID No. 2ESVPU0002 Equip. Class 05 - Horizontal Pumps

Equipment Description Essential Siphon Vacuum Pump No.2

Evaluated by:

R. P. Childs

R.P.Childs

Date: 08/08/98

L.B.Elrod

L.B.Elrod

Date: 08/08/98

-----Sketch 1-----

SCREENING EVALUATION WORK SHEET (SEWS)

Revision 2, Corrected, 6/28/91
 Status Y N U
 Sheet 1 of _____
 Rev. 1

Equip. ID No. 2ESVPU0003 Equip. Class 05 - Horizontal Pumps

Equipment Description Essential Siphon Vacuum Pump No.3

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

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

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

SEISMIC CAPACITY VS DEMAND

- | | |
|--|-----------|
| 1. Elevation where equipment receives seismic input | |
| 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. 2ESVPU0003 Equip. Class 05 - Horizontal Pumps

Equipment Description Essential Siphon Vacuum Pump No.3

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

See 2ESVPU0001 for complete SEWS evaluation.

SCREENING EVALUATION WORK SHEET (SEWS)

Equip. ID No. 2ESVPU0003 Equip. Class 05 - Horizontal Pumps

Equipment Description Essential Siphon Vacuum Pump No.3

RELAY WALKDOWN

1. Does spot check of essential relays indicate
relays present and properly mounted? Y N U N/A

2. Are essential relays required to function
during earthquake screened out? Y N U N/A

If no, attach list of relays with locations in
cabinet and general dimensions, thicknesses and
details of mounting plates that support relays
for later analysis.

3. No other relay concerns? Y N U N/A

Requirements for relays satisfied? Y N U N/A

SYSTEMS INTERACTION EFFECTS?

1. No potential sources could flood or spill onto
cabinet? Y N U N/A

IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCLUDING
RELAY CHATTER?

YES X NO

IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER
INVESTIGATION? YES X NO

SCREENING EVALUATION WORK SHEET (SEWS)

Equip. ID No. 2ESVPU0003 Equip. Class 05 - Horizontal Pumps

Equipment Description Essential Siphon Vacuum Pump No.3

Evaluated by:

R.P. Childs

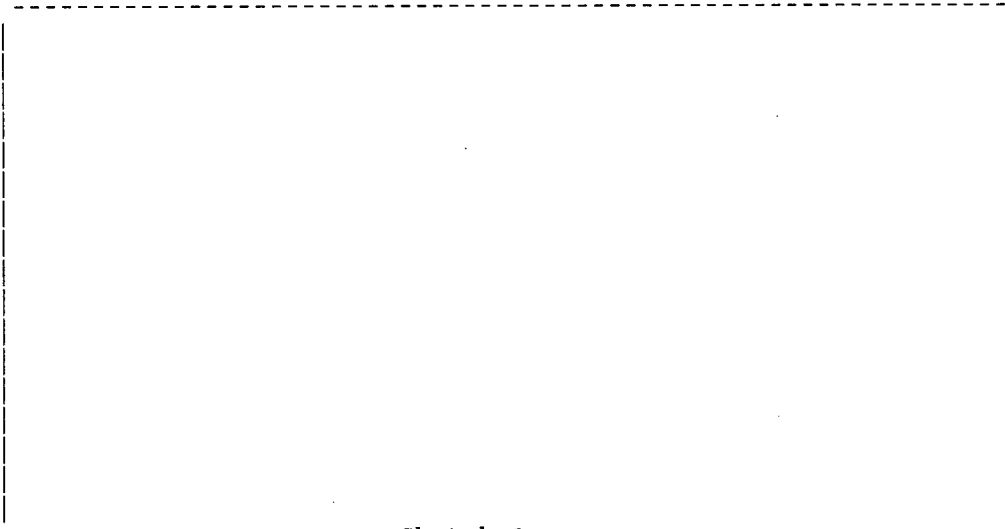
R.P. Childs

Date: 08/08/98

L.B. Elrod

L.B. Elrod

Date: 08/08/98



-----Sketch 1-----

**Seismic Adequacy Evaluation
Checklist for Application of the GIP Methodology
to New and Replacement Equipment**

1. Equipment Description:

Emergency Siphon Vacuum Cabinets (2ESV1) Cabinets are Hoffman A-603624FS.

2. GIP, Appendix B, Equipment Class Applicable to Equipment? Yes ☒ No ☐
If No, go to 10.

3. Applicable GIP Equipment Class.
20- Instrumentation & Control Panels

4. Identify Licensing Basis Documents(s) which indicate that GIP is an Acceptable Method for Demonstrating Seismic Adequacy

Oconee FSAR Section 3.10.2 in conjunction with the Duke Energy Corp. Docket No 50-269, Amendment to Facility License Dated April 24, 1998.

5. A. Basis for Equipment Seismic Capacity

- ☒ Earthquake experience
☐ GERS
☐ Existing Seismic Qualification Capacity Data
(Attach copy of capacity data to this checklist)

B. Basis for Equipment Seismic Demand

- ☒ In-Structure response spectra approved for USI A-46
☐ 1.5 x SSE ground response spectra
☐ Other (Describe)

Demand is based on Instructure Response Spectra for the Auxiliary Bldg. @ Elev. 796' +6" at 5% Damping. The ESV cabinets are assumed to have a natural frequency < 8 Hz. Per Table 4.1 of the GIP, Capacity vs Demand comparison must be made using Method B (1.5x Bounding Spectra compared to Instructure Response Spectra).

(Attach a copy of seismic demand spectrum to this checklist)

C. Equipment seismic capacity exceeds demand? Yes ☒ No ☐

If No go to 10.

Seismic Adequacy Evaluation

Checklist for Application of the GIP Methodology to New and Replacement Equipment

6. A. Does the item satisfy the applicable GIP equipment class inclusion rules and caveats? Yes ☒ No ☐

Comments:

Cabinets are Hoffman A-603624FS. The new cabinets were compared to similar existing Hoffman cabinets at Oconee which had been previously evaluated per the GIP and found to be seismically adequate.

- B. For each of the following design attributes, determine if there are any design differences that would have an adverse impact on seismic adequacy. Use the following guidance in completing this portion of the NARE evaluation.

- If there are no adverse conditions note that in the comment area and check the Yes box.
- If there are design differences but they **do not** adversely impact seismic adequacy, document the difference and the adequacy determination in the comment area and check the Yes box.
- If there are design differences and they **do** adversely impact seismic adequacy, document the difference and the adverse impact in the comment area and check the No box.

1. Has the mass of the item relative to its attachment or anchorage been evaluated? Yes ☒ No ☐

Comments:

The cabinet mass and anchorage is bounded by the equipment class.

2. Has the structural stiffness of the item's internal anchorage been evaluated (e.g. the foot of a pump or the base of a cabinet)? Yes ☒ No ☐

Comments:

Bottom of cabinet is stiffened with inverted channel. Bottom of cabinet is sandwiched between back of channel web and floor. This effectively stiffens the base of the cabinet.

3. Has the item strength as affected by materials, section properties, and construction been evaluated? Yes ☒ No ☐

Comments:

The 1997 Hoffman catalog was compared to the October 1976 Hoffman catalog to ensure that no significant design or material variations existed. 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.

**Seismic Adequacy Evaluation
Checklist for Application of the GIP Methodology
to New and Replacement Equipment**

4. Has the item anchorage method (footprint, support location, etc.) been evaluated? Yes ☒ No ☐

Comments:

Anchored with 4 HN 1230 sleeve anchors. Anchors were installed per QA procedure MP/0/A/1800/35.

5. Has the strength of the item's load path to the major internals been evaluated? Yes ☒ No ☐

Comments:

The structural load path of Hoffman type enclosures is similar 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.

6. Have the natural frequencies, if they affect seismic capacity/demand comparison been considered? Yes ☒ No ☐

Comments:

The Capacity vs Demand comparison utilized in-structure response spectra compared to the Reference Spectra. Natural frequencies do not affect this determination. GIP in-cabinet amplification factors were used to evaluate internal components.

7. Have attachments (tubing, cables, electrical leads, etc.) to the item been evaluated? Yes ☒ No ☐

Comments:

Cables penetrate at the top of the cabinet. Cables are well supported by cabletray.

8. Have moveable sub-assemblies in the appropriate equipment classes as discussed in Appendix B of the GIP been considered? Yes ☒ No ☐

Comments:

There are no drawers or equipment on slides in the cabinets. All internal components required to function either during or after a seismic event have been evaluated as required per UFSAR 3.10.

9. Have other significant attributes that could affect seismic performance been evaluated? Yes ☒ No ☐

Comments:

No other significant attributes were identified.

Seismic Adequacy Evaluation
Checklist for Application of the GIP Methodology
to New and Replacement Equipment

Conclusion:

Yes ☒ No ☐

If Yes to all the design attributes go to No. 7.

If No to any of the design attributes go to No. 10.

No design differences were identified which could adversely affect seismic adequacy of this equipment.

7. **A. Equipment anchorage uses existing bolt pattern?** Yes ☐ No ☒

If Yes, proceed to No. 7.A.(1), below.

If No, proceed to No. 7.A.(2), below.

- (1) **Anchorage adequate for GIP methodology utilizing GIP rules for anchorage capacity?** Yes ☐ No ☐

If Yes, proceed to No. 7.B.

If No, complete Nos. 10.

- (2) **Anchorage adequate for GIP methodology utilizing current licensing criteria factors of safety for anchorage?** Yes ☒ No ☐

If Yes, proceed to No. 8.

If No, complete No. 10.

- B. Anchorage meets GIP installation requirements?** Yes ☐ No ☐

If Yes, go to No. 8.

If No, complete No. 10.

8. **Installed Equipment Free of Significant, Credible Seismic Interaction Concerns?** Yes ☒ No ☐

If Yes, go to No. 9.

If No, go to 10.

Seismic Adequacy Evaluation
Checklist for Application of the GIP Methodology
to New and Replacement Equipment

9. Complete Seismic Adequacy documentation per GIP and applicable plant Quality Assurance/Quality Control Procedures. Confirm review and approval by Seismic Capacity Engineers (signatures below) and attach applicable documentation to this checklist. Seismic Adequacy Evaluation Complete.
10. Use other acceptable methods per plant licensing basis. Describe alternate method. Attach applicable documentation

N/A



Seismic Capacity Engineer Approval

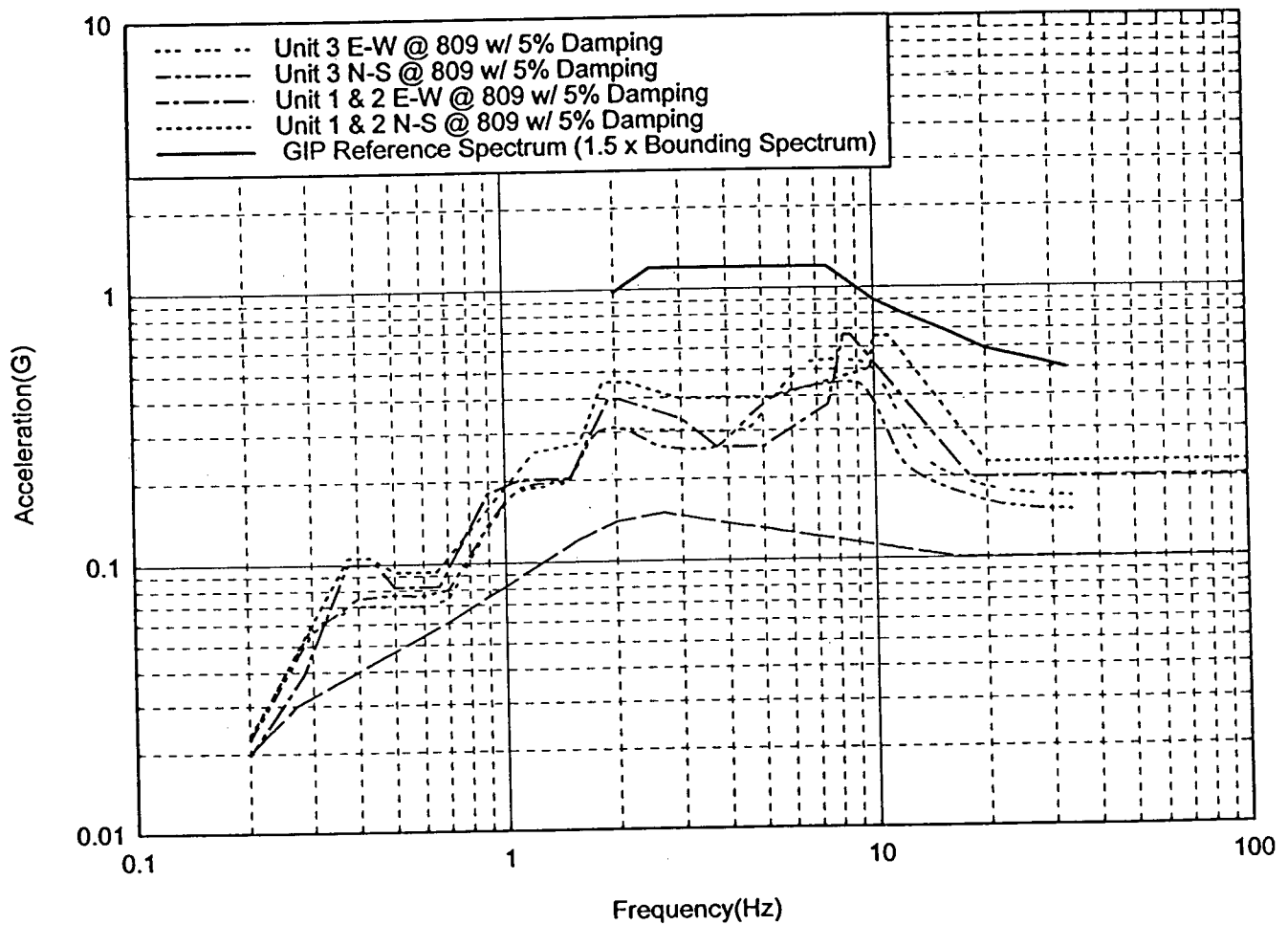
10/15/98
Date



Seismic Capacity Engineer Approval

10/15/98
Date

In-Structure Response Spectra vs GIP Reference Spectra (1.5 x Bounding)



SCREENING EVALUATION WORK SHEET (SEWS)

Revision 2, Corrected, 6/28/91
 Status Y N U
 Sheet 1 of _____
 Rev. 4

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	<u>796'+6"</u>
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. Rev. 1: Final walkdown reveals no interaction concerns. All internal components are present and properly mounted. All relays are assumed to be essential unless determined otherwise. Rev. 2 Adds details for inclusion rule evaluation in support of BS caveat #1

COMMENTS FROM SEISMIC CAPACITY VS DEMAND

3 Assumed to be < 8 Hz

Does capacity exceed demand? Demand based on 5% damped instructure resonance spectra @ 796' +6" in the AB

COMMENTS OF CAVEATS - BOUNDING SPECTRUM

1

The ESV panels are judged to meet the inclusion rules for Enclosed Switchboards as listed below. The cabinets are free standing and consist of a steel frame with sheet metal panels. Internal components are mounted on the front face and on the interior walls. The front of the panel consist of a double swing door.

All internals were not present at inspection. Final inspection to be performed prior cabinet being declared operational. Rev 1: Final inspection performed per rev 1. All relays present and properly mounted.

6 There are no drawers or equipment on slides in the cabinets

10 All internal components required to function either during or after a seismic event have been evaluated as required per UFSAR 3.10. Field mounting of relays to be inspected prior to start up of system. Rev. 1: Final inspection of cabinet reveals that all relays are present and properly mounted.

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 effectively stiffens the base of the cabinet.

Are anchorage requirements met? See calculation in OSC-6040.

COMMENTS OF INTERACTION EFFECTS

2 There is a 5/8 gap between the North lifting lug and existing conduit. gap is acceptable based on low accelerations and stiffness of cabinet about strong axis. 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. Rev 1: Final walkdown reveals no interaction concerns.

SCREENING EVALUATION WORK SHEET (SEWS)

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

Equipment Description Essential Siphon Vacuum Cabinet No.1

RELAY WALKDOWN

1. Does spot check of essential relays indicate
relays present and properly mounted? Y N U [N/A]

2. Are essential relays required to function
during earthquake screened out? Y N U [N/A]

If no, attach list of relays with locations in
cabinet and general dimensions, thicknesses and
details of mounting plates that support relays
for later analysis.

3. No other relay concerns? Y N U [N/A]

Requirements for relays satisfied? Y N U [N/A]

SYSTEMS INTERACTION EFFECTS?

1. No potential sources could flood or spill onto
cabinet? [Y] N U N/A

The fire protection system for the equipment room
is a dry type - deluge system. This system is
controlled by a locked manual gate valve located
outside the equipment room door.

IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCLUDING
RELAY CHATTER?

YES X NO ____

IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER
INVESTIGATION? YES X NO ____

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:

R.P. Childs

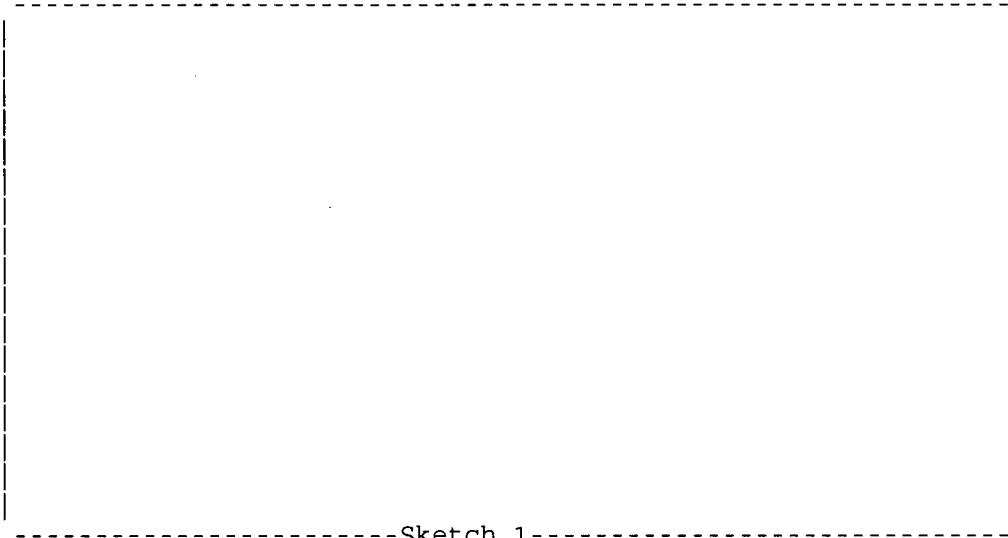
R.P. Childs

Date: 10/14/98

L.B. Elrod

L.B. Elrod

Date: 08/08/98



-----Sketch 1-----

Seismic Adequacy Evaluation
Checklist for Application of the GIP Methodology
to New and Replacement Equipment

1. Equipment Description:

Emergency Siphon Vacuum Local Control Panels. (2ESVLCPI) Cabinets are Hoffman A-727224FSD.

2. GIP, Appendix B, Equipment Class Applicable to Equipment?
If No, go to 10.

Yes ☒ No ☐

3. Applicable GIP Equipment Class.

20- Instrumentation & Control Panels

4. Identify Licensing Basis Documents(s) which indicate that GIP is an Acceptable Method for Demonstrating Seismic Adequacy

Oconee FSAR Section 3.10.2 in conjunction with the Duke Energy Corp. Docket No 50-269, Amendment to Facility License Dated April 24, 1998.

5. A. Basis for Equipment Seismic Capacity

☒ Earthquake experience

☐ GERS

☐ Existing Seismic Qualification Capacity Data
(Attach copy of capacity data to this checklist)

B. Basis for Equipment Seismic Demand

☒ In-Structure response spectra approved for USI A-46

☐ 1.5 x SSE ground response spectra

☐ Other (Describe)

The ESV building is a single story structure founded on a slab foundation that is resting on overburden. The Oconee UFSAR contains a site seismic ground response for overburden. This overburden spectra defines the seismic input to the slab foundation. The ESVLCP cabinets are anchored to the slab foundation. Therefore, the Oconee Overburden Ground Response Spectra defines the Instructure Response Spectra for the ESV building at it's foundation. The ESVLCP cabinets are assumed to have a natural frequency < 8 Hz. Per Table 4.1 of the GIP, Capacity vs Demand comparison must be made using Method B (1.5x Bounding Spectra compared to Instructure Response Spectra). Conservatively, the Overburden Ground Response Spectra was treated as a Realistic Median Centered Instructure Response Spectra for Demand and conservatively compared to the Bounding Spectra, in lieu of the required Reference Spectra per Method B of table 4.1

(Attach a copy of seismic demand spectrum to this checklist)

C. Equipment seismic capacity exceeds demand?

Yes ☒ No ☐

If No go to 10.

Seismic Adequacy Evaluation

Checklist for Application of the GIP Methodology

to New and Replacement Equipment

6. A. Does the item satisfy the applicable GIP equipment class inclusion rules and caveats? Yes ☒ No ☐

Comments:

Cabinets are Hoffman A-727224FSD. The new cabinets were compared to similar existing Hoffman cabinets at Oconee which had been previously evaluated per the GIP and found to be seismically adequate.

- B. For each of the following design attributes, determine if there are any design differences that would have an adverse impact on seismic adequacy. Use the following guidance in completing this portion of the NARE evaluation.

- If there are no adverse conditions note that in the comment area and check the Yes box.
- If there are design differences but they **do not** adversely impact seismic adequacy, document the difference and the adequacy determination in the comment area and check the Yes box.
- If there are design differences and they **do** adversely impact seismic adequacy, document the difference and the adverse impact in the comment area and check the No box.

1. Has the mass of the item relative to its attachment or anchorage been evaluated? Yes ☒ No ☐

Comments:

The cabinet mass and anchorage is bounded by the equipment class.

2. Has the structural stiffness of the item's internal anchorage been evaluated (e.g. the foot of a pump or the base of a cabinet)? Yes ☒ No ☐

Comments:

Bottom of cabinet is stiffened with inverted channel. Bottom of cabinet is sandwiched between back of channel web and floor. This effectively stiffens the base of the cabinet.

3. Has the item strength as affected by materials, section properties, and construction been evaluated? Yes ☒ No ☐

Comments:

The 1997 Hoffman catalog was compared to the October 1976 Hoffman catalog to ensure that no significant design or material variations existed. 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.

Seismic Adequacy Evaluation

Checklist for Application of the GIP Methodology to New and Replacement Equipment

4. Has the item anchorage method (footprint, support location, etc.) been evaluated? Yes ☒ No ☐

Comments:

Anchored with 12 HN 1230 sleeve anchors. Anchors were installed per QA procedure MP/0/A/1800/35.

5. Has the strength of the item's load path to the major internals been evaluated? Yes ☒ No ☐

Comments:

The structural load path of Hoffman type enclosures is similar 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.

6. Have the natural frequencies, if they affect seismic capacity/demand comparison been considered? Yes ☒ No ☐

Comments:

The Capacity vs Demand comparison utilized in-structure response spectra as defined in item #5 on sheet 1, compared to the Reference Spectra. Natural frequencies do not affect this determination. GIP in-cabinet amplification factors were used to evaluate internal components.

7. Have attachments (tubing, cables, electrical leads, etc.) to the item been evaluated? Yes ☒ No ☐

Comments:

Cables penetrate the top of the cabinet. Cables are well supported by cabletray.

8. Have moveable sub-assemblies in the appropriate equipment classes as discussed in Appendix B of the GIP been considered? Yes ☒ No ☐

Comments:

There are no drawers or equipment on slides in the cabinets. All internal components required to function either during or after a seismic event have been evaluated as required per UFSAR 3.10. Final walkdown reveals that all relays are present and properly mounted.

Seismic Adequacy Evaluation
Checklist for Application of the GIP Methodology
to New and Replacement Equipment

9. Have other significant attributes that could affect seismic performance been evaluated?

Yes ☒ No ☐

Comments:

Programable Controlers, PC1(ON2ESVPC0001A) & PC2(ON2ESVPC0001B) are mounted in this cabinet. They are GE/FANUC 90-30 PLC's. The PLC's are not required to function during or after a seismic event. There are no consequences to either spurious actuation or non-actuation. Therefore no seismic capacity evaluation is required for the PLC's. Both are well mounted inside the cabinet and will remain inplace following a seismic event. The PLC's will not adversely affect the function of the cabinet or it's other internal components.

Conclusion:

Yes ☒ No ☐

If Yes to all the design attributes go to No. 7.

If No to any of the design attributes go to No. 10.

No design differences were identified which could adversely affect seismic adequacy of this equipment.

7. A. Equipment anchorage uses existing bolt pattern?

Yes ☐ No ☒

If Yes, proceed to No. 7.A.(1), below.

If No, proceed to No. 7.A.(2), below.

- (1) Anchorage adequate for GIP methodology utilizing GIP rules for anchorage capacity?

Yes ☐ No ☐

If Yes, proceed to No. 7.B.

If No, complete Nos. 10.

- (2) Anchorage adequate for GIP methodology utilizing current licensing criteria factors of safety for anchorage?

Yes ☒ No ☐

If Yes, proceed to No. 8.

If No, complete No. 10.

- B. Anchorage meets GIP installation requirements?

Yes ☐ No ☐

If Yes, go to No. 8.

If No, complete No. 10.

**Seismic Adequacy Evaluation
Checklist for Application of the GIP Methodology
to New and Replacement Equipment**

8. Installed Equipment Free of Significant, Credible Seismic Interaction Concerns? Yes ☒ No ☐

If Yes, go to No. 9.

If No, go to 10.

9. Complete Seismic Adequacy documentation per GIP and applicable plant Quality Assurance/Quality Control Procedures. Confirm review and approval by Seismic Capacity Engineers (signatures below) and attach applicable documentation to this checklist. Seismic Adequacy Evaluation Complete.

10. Use other acceptable methods per plant licensing basis. Describe alternate method. Attach applicable documentation

N/A



Seismic Capability Engineer Approval

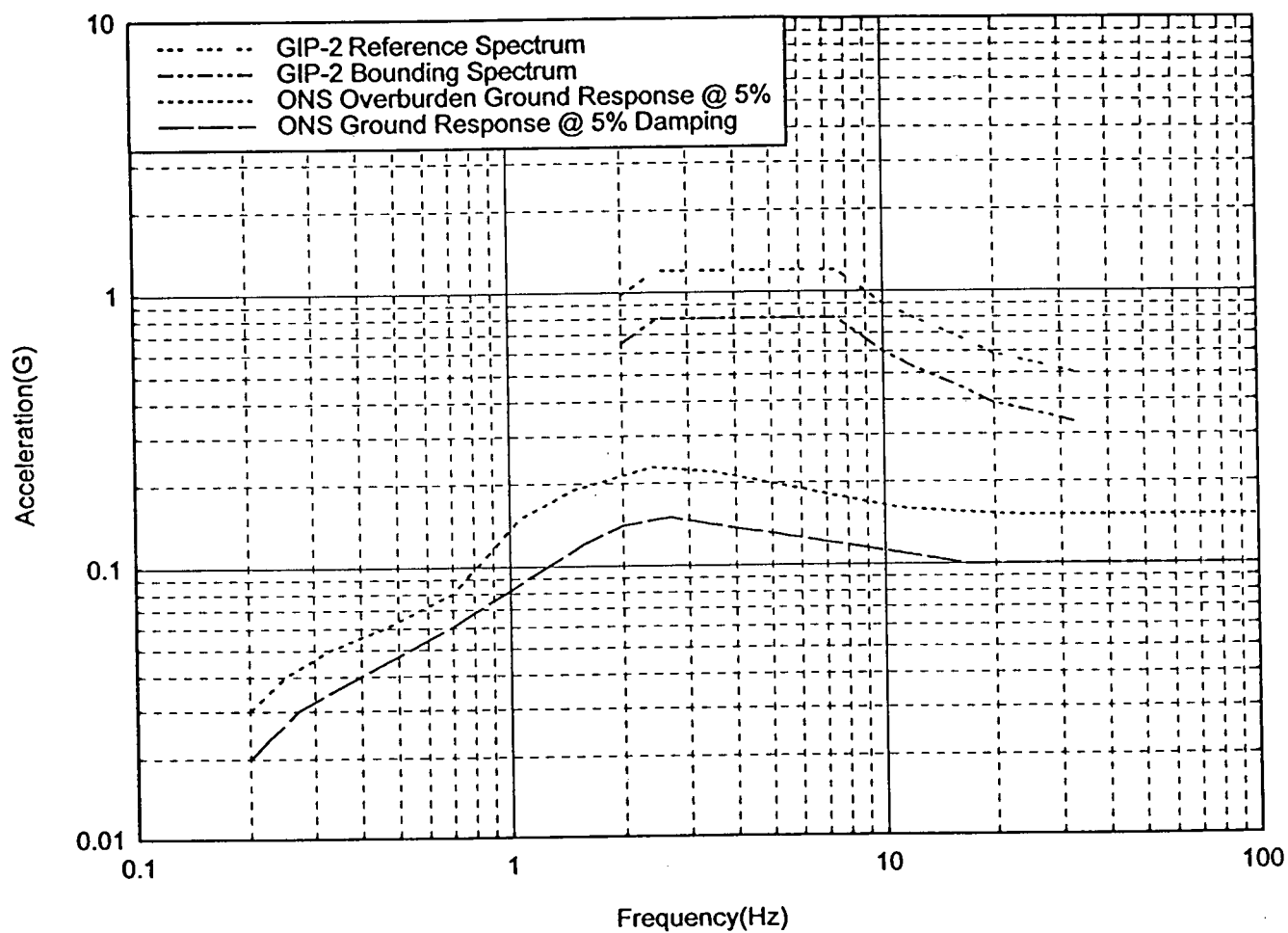
10/15/98
Date



Seismic Capability Engineer Approval

10/15/98
Date

ONS Ground Responses vs GIP-2 Bounding & Reference Spectrums



SCREENING EVALUATION WORK SHEET (SEWS)

Revision 2, Corrected, 6/28/91

Status Y N U

Sheet 1 of _____

Rev. 4

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 N/A

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

SEISMIC CAPACITY VS DEMAND

1. Elevation where equipment receives seismic input	<u>796'+6"</u>
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. 2ESVLCPI 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. Rev.1: Final walkdown reveals that all relays are present and properly mounted and no interaction concerns. All relays are assumed to be essential unless noted otherwise. Rev. 2 Adds details for inclusion rule evaluation in support of BS caveat #1

COMMENTS FROM SEISMIC CAPACITY VS DEMAND

3 Assumed to be < 8 Hz.

Does capacity exceed demand? The ESV building is a single story structure founded on a slab foundation that is resting on overburden. The Ocone UFSAR contains a site seismic

ground response for overburden. This overburden spectra defines the seismic input to the slab foundation. The ESVLCP cabinets are anchored to the slab foundation. Therefore, the Oconee Overburden Ground Response Spectra defines the Instructure Response Spectra for the ESV building at it's foundation. The ESVLCP cabinets are assumed to have a natural frequency < 8 Hz. Per Table 4.1 of the GIP, Capacity vs Demand comparison must be made using Method B (1.5x Bounding Spectra compared to Instructure response spectra). Conservatively, the Overburden Ground Response Spectra was treated as a Realistic Median Centered Instructure Response Spectra and conservatively compared to the Bounding Spectra, in lieu of the required Reference Spectra per Method B of Table 4.1.

COMMENTS OF CAVEATS - BOUNDING SPECTRUM

1

The ESVLCP cabinets are judged to meet the inclusion rules for *Enclosed Switchboards* as listed below. The cabinets are free standing and consist of a steel frame with sheet metal panels. Internal components are mounted on the front face and on the interior walls. The front of the panel consist of a double swing door.

All internals were not present at inspection. Final inspection to be performed prior cabinet being declared operational. Rev .1 addresses final inspection. All components were present and properly mounted.

2 Rev 1: 2 programable Controlers, PC1(ON2ESVPC0001A) & PC2(ON2ESVPC0001B) are mounted in this cabinet. They are GE/FANUC 90-30 PLC's. The PLC's are not required to function during or after a seismic event. There are no consequences to either spurious actuation or non-actuation. Therefore no seismic capacity evaluation is required for the PLC's. Both are well mounted inside the cabinet and will remian inplace following a seismic event. The PLC's will not adversely affect the function of the cabinet or it's other internal components.

5 Adjacent ESVLCP panels are ~12" away .

6 There are no drawers or equipment on slides in the cabinets

10 All internal components required to function either during or after a seismic event have been evaluated as required per UFSAR 3.10. Field mounting of relays to be inspected prior to start up of system. Rev. 1: Final walkdown reveals that all relays are present and properly mounted.

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. Rev. 1: Final walkdown reveals no interaction concerns.

SCREENING EVALUATION WORK SHEET (SEWS)

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

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

RELAY WALKDOWN

1. Does spot check of essential relays indicate
relays present and properly mounted? Y N U [N/A]

2. Are essential relays required to function
during earthquake screened out? Y N U [N/A]

If no, attach list of relays with locations in
cabinet and general dimensions, thicknesses and
details of mounting plates that support relays
for later analysis.

3. No other relay concerns? Y N U [N/A]

Requirements for relays satisfied? Y N U [N/A]

SYSTEMS INTERACTION EFFECTS?

1. No potential sources could flood or spill onto
cabinet? Y N U [N/A]

IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCLUDING
RELAY CHATTER?

YES X NO

IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER
INVESTIGATION? YES X NO

SCREENING EVALUATION WORK SHEET (SEWS)

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

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

Evaluated by:

R. P. Chubb

R.P.Childs

Date: 10/14/98

LB Elrod

L.B.Elrod

Date: 10/14/98

-Sketch 1