



CA Record

TENNESSEE VALLEY AUTHORITY
Division of Nuclear Engineering



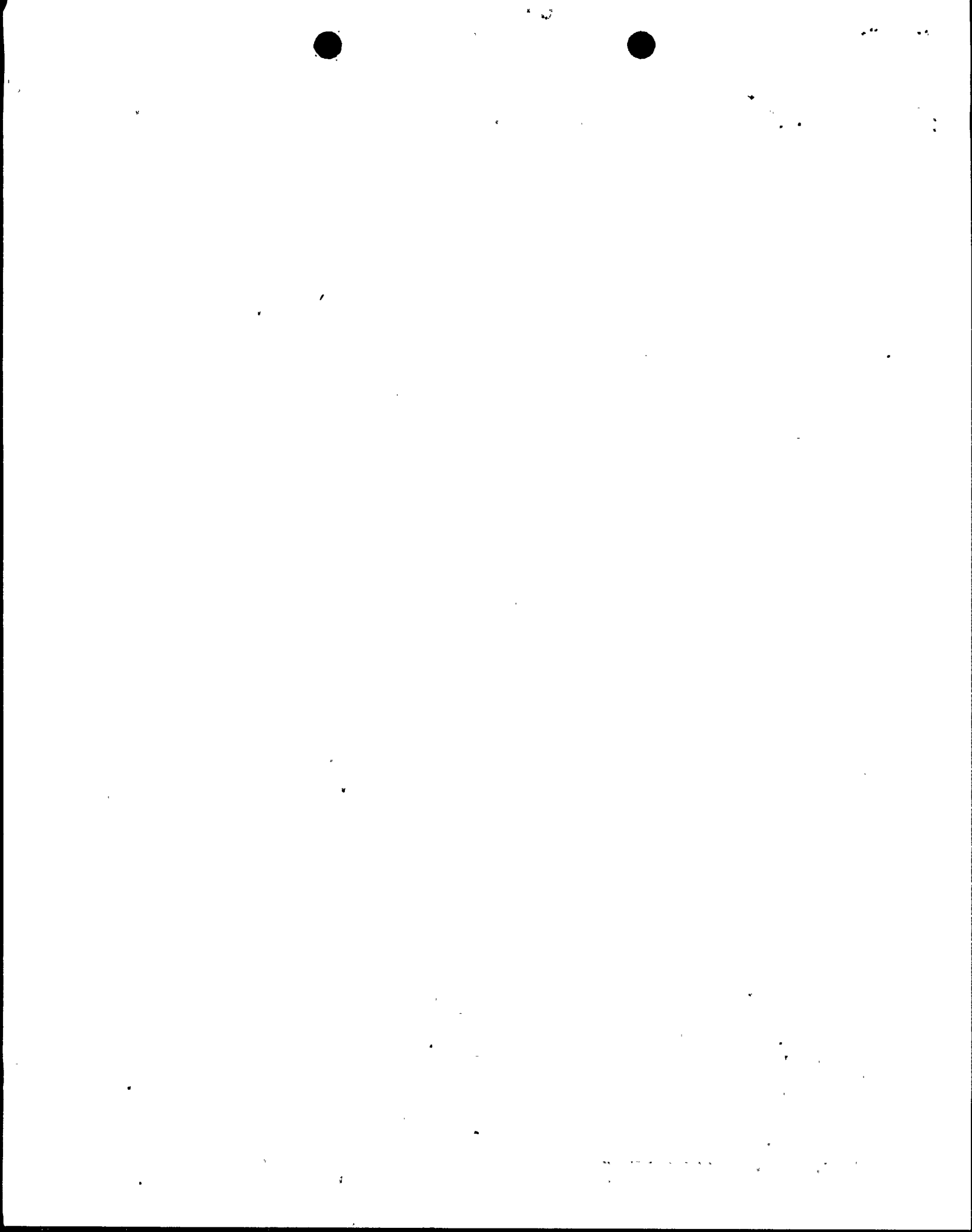
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CIVIL ENGINEERING BRANCH INSTRUCTION

CEB-CI 21.100

TITLE: BFN CLASS I HVAC DUCT AND DUCT SUPPORT SEISMIC QUALIFICATION
INTERIM OPERABILITY ACCEPTANCE CRITERIA

| | REVISION NO | R1 | R2 | R3 | R4 | R5 |
|------------|----------------------------------|----|----|----|----|----|
| ISSUE DATE | FEB 25 1988 | | | | | |
| PREPARED | <i>F.F.K. Lee</i> | | | | | |
| REVIEWED | <i>[Signature]</i> | | | | | |
| APPROVED | <i>Gen. R. Denton</i> Doc JEM | | | | | |



BFN CLASS I HVAC DUCT AND DUCT SUPPORT SEISMIC QUALIFICATION
 INTERIM OPERABILITY ACCEPTANCE CRITERIA

Title: _____

Revision: 0 R—Denotes review
 BRANCH (CEB) INSTRUCTIONS

A—Denotes approval

| ENGINEERING AND TECHNICAL SERVICES (E&TS) | | | | | | | | | | | | | | | |
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| PROJECT ENGINEERING (PR ENG) | | | | | | | | | | | | | | | |
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| SYS&EVAL | | SVS | | ADM | | | | PMS | | EI&C | | MSB | | RAM | |
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| STAFFS | | | | | | OTHER ORGANIZATIONS | | | | | | | | | |
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| BACS | | ERIS | | PSS | | | | | | | | | | | |
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BFN CLASS I HVAC DUCT AND DUCT SUPPORT SEISMIC QUALIFICATION
Title: INTERIM OPERABILITY ACCEPTANCE CRITERIA

REVISION LOG

CEB-CI 21.100

| Revision No. | DESCRIPTION OF REVISION | Date Approved |
|--------------|-------------------------|---------------|
| 0 | Original Issue | |

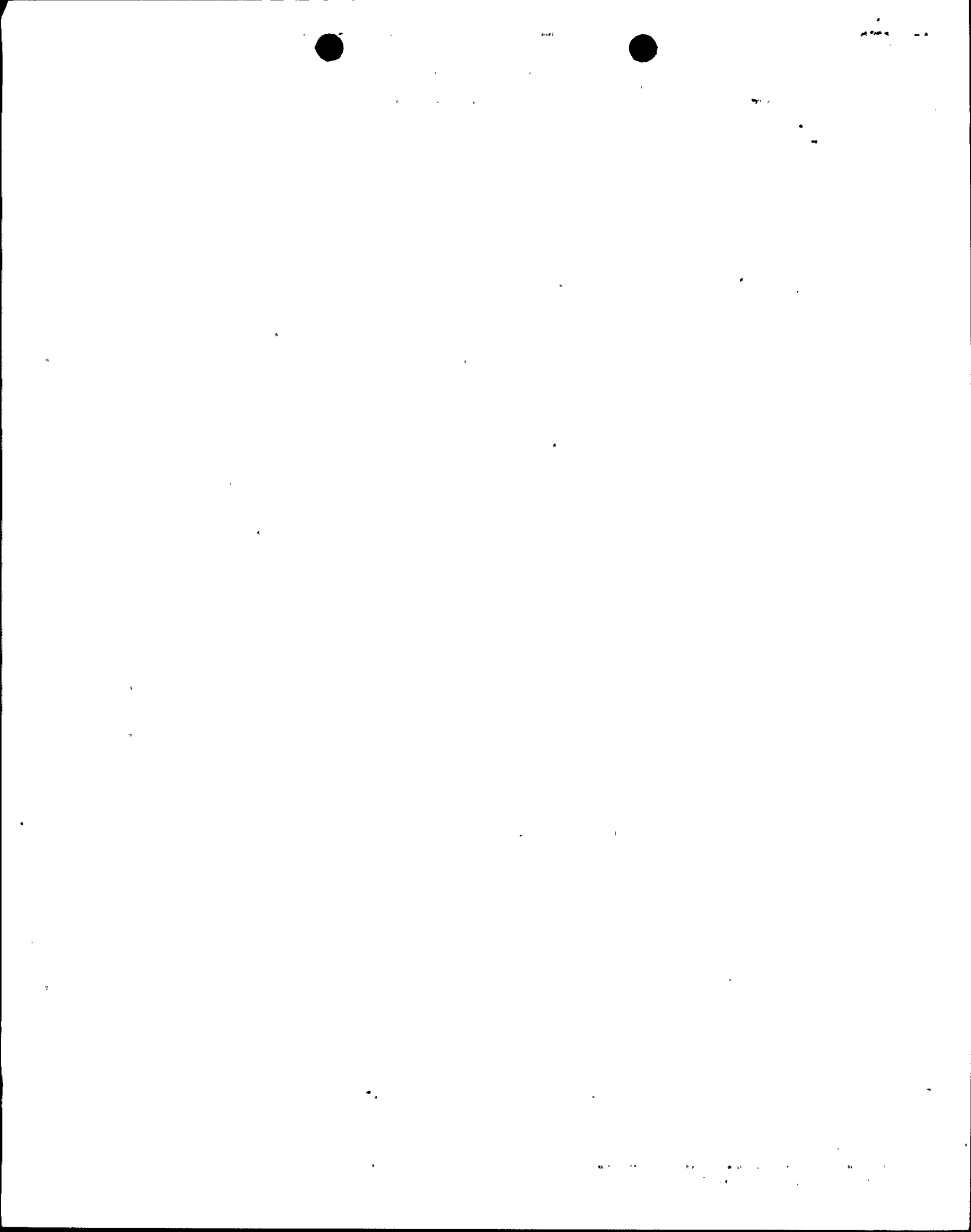


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1.0 PURPOSE

The purpose of this criteria is to provide a basis for interim acceptance of existing Class I HVAC ducts and duct supports which do not meet long-term design basis requirements. Ductwork and supports meeting requirements of this criteria shall be considered suitable for interim plant operation until physical modifications can be made.

2.0 SCOPE

This criteria applies to all existing BFN Class I HVAC ducts and duct supports which will require physical modification to meet the long-term design basis requirements given by Design Criteria BFN-50-C-7104, Attachment B.

3.0 POLICY

In general, Class I HVAC ductwork and duct supports shall be evaluated to requirements of Section 4.0 herein for interim acceptance. Specific exceptions may be approved on a case-by-case basis if thoroughly justified and documented by issued supporting calculations in accordance with NEP-3.1. Approved exceptions shall be recorded in Section 5.0 of this document. Each exception shall be assigned a subsection number (e.g., 5.1, 5.2, etc.) along with a brief descriptive title for the specific case to which it applies. Following this shall be a brief explanation of the rationale for allowing the exception, a statement of the specific requirements that vary from Section 4.0, and a reference to supporting calculations for the varied requirements. Issuance of exceptions shall be by revisions or CEB Interim Orders to this instruction in accordance with Civil Engineering Branch Instruction 21-CI 21.02.

Class I ductwork and duct supports which meet the interim acceptance criteria (including approved exceptions) shall be acceptable for interim plant operation; however, modifications to meet the long-term design basis requirements shall be scheduled and made as expeditiously as possible. Class I ductwork and duct supports failing to meet the interim acceptance requirements herein (including approved exceptions) shall not be allowed for plant operation until modifications are made to meet the long-term design basis requirements.

4.0 INTERIM ACCEPTANCE CRITERIA

Requirements of this section and/or Section 5.0 shall be met as the basis for interim acceptance of existing Class I HVAC ducts and duct supports. Figure 1 provides a logic diagram for applying this criteria.

4.1 DESIGN LOADS

Design loads shall be determined in accordance with requirements of Design Criteria BFN-50-C-7104, Attachment B; however, allowable stresses shall be as given below in subsection 4.2.





4.2 ALLOWABLE STRESSES

4.2.1 Ductwork

The maximum allowable stress in a duct section for load combinations involving the DBE seismic event shall be as follows (Reference 7.1):

- o Rectangular duct section stress \leq 12,000 psi.
- o Circular duct section stress \leq 15,000 psi

4.2.2 Support Members and Connections

The support member stresses shall not exceed the lesser of 1.2 F_y or 0.7 F_u for tensile and flexural stresses and 90 percent of the critical buckling stress as defined in AISC Specifications (Reference 7.2) for axial compression and compression in a flange due to bending. Shear stresses shall not exceed 60 percent of the allowable stresses for tension and flexure.

The stress allowables for bolting shall be the greater of 70 percent of the ultimate strength or the minimum specified yield stress of the bolt material.

4.2.3 Concrete Expansion Anchors

Anchorage to concrete shall be evaluated in accordance with interim allowables of Civil Design Standard DS-C1.7.1 where the minimum factor of safety shall be 2.0 for shell and wedge bolt type anchors.

5.0 EXCEPTIONS

No exceptions to the requirements of Section 4.0 have been taken as of the RO issue date.

6.0 DOCUMENTATION

Engineering evaluations performed to determine acceptability for interim operation shall be documented by calculations in accordance NEP-3.1. Modifications which may be postponed to after restart shall be tracked by marking "Post-Restart Modification Required" on the calculation cover sheet and on the calculation log.

7.0 REFERENCES

7.1 SWEC calculation No. CD-Q0000-871818, backup calculation for BFN-50-C-7104, RIMS No. B22880204128

7.2 AISC, Manual of Steel construction, 8th Edition

LOGIC - HVAC PROGRAM

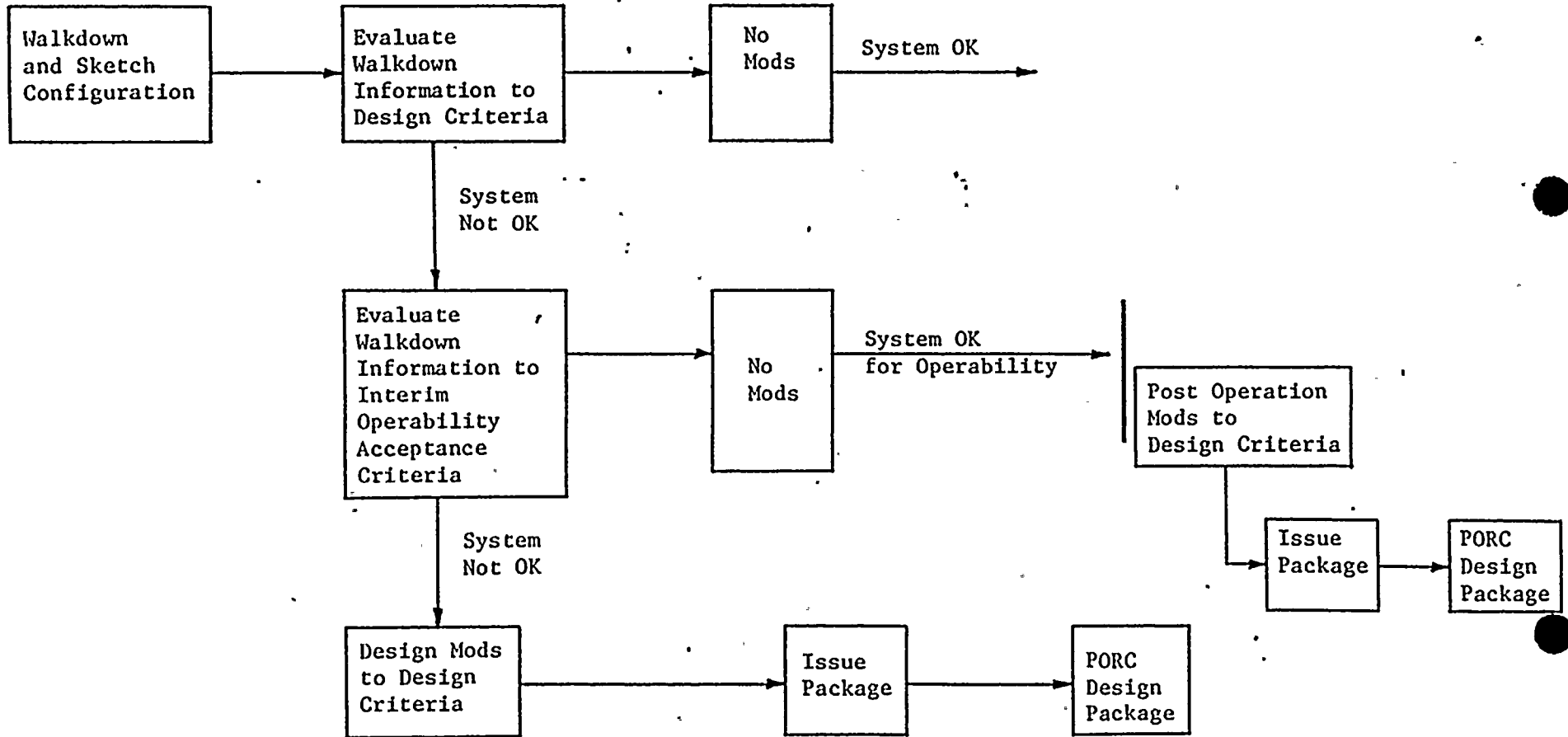


FIGURE 1