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ARKANSAS NUCLEAR ONE, UNIT 2 (ANO-2)

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ANO-2 CPC AND CEAC
DATA BASE LISTING

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ABSTRACT

This document provides the data base constants for the Core Protection Calculator System consistent with the functional design described in the CPC Functional Design Specification (Reference 1), the CEAC Functional Design Specification (Reference 2), the certified CPC FORTRAN Simulation Code, the CPC/CEAC software Modification for SONGS Units 2 and 3 (Reference 3), the CPC/CEAC Software Modification for System 80 (Reference 4) and the CPC methodology change for ANO-2 cycle 5 (Reference 5). The data base constants are contained in data files in Section 3.1. These files use nomenclature and vector location numbers consistent with the CPC FORTRAN Simulation Code. Section 3.2 contains a cross-reference table which correlates the CPC FORTRAN Simulation Code nomenclature to the CPC and CEAC Functional Design Specification nomenclature. In addition to the data base constants, initialization criteria are contained in Section 3.3.

The constants contained in this document are applicable to the Revision 05 to the ANO-2 CPC/CEAC System Software. This revision is applicable to ANO-2 Cycle 5.

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is:

- (1) To specify the CPC and CEAC data base constants applicable to the ANO-2 Rev. 05 Software described by the CPC Functional Design Specification, the CEA Calculator Functional Design Specification, the CPC/CEAC Software Modification for, SONGS 2 and 3 and System 80, and the CPC methodology change for ANO-2, Reference 1,2,3,4, and 5 respectively.
- (2) To serve as the design interface document between C-E engineering groups responsible for the specification and implementation respectively, of the CPC/CEAC design.

1.2 SCOPE

The CPC/CEAC system, as functionally described in References 1, 2 and as modified by References 3 and 4, is implemented both in assembler language and as a FORTRAN simulation. The applicability of References 1, 2, 3 & 4 to ANO-2 cycle 5 is documented in Reference 5. This document provides:

- (1) Data base values for the protection system algorithm constants denoted by References 1, 2, 3, 4 and 5, for use in the assembly language implementation and
- (2) Selected data base values for those protection system algorithm and simulation associated constants required by the FORTRAN Simulation Code, and
- (3) Initialization criteria required by the system implementation group and specified in References 1, Section 3.6.

1.3 APPLICABILITY

The data base constants specified by this document are applicable to:

- (1) the CPC and CEAC protection systems described in References 1, 2, 3, 4 and 5.
- (2) the ANO-2 CPC FORTRAN Simulation Code.

1.4 REFERENCES

- 1.4.1 Functional Design Specification For a Core Protection Calculator, CEN-147(S)-NP, January, 1981.
- 1.4.2 Functional Design Specification for a Control Element Assembly Calculator, CEN-148(S)-NP, January, 1981.
- 1.4.3 CPC/CEAC Software Modifications for San Onofre Nuclear Generation Station Units No. 2 and 3, CEN-281 (S)-NP, Revision 01, November 1984.
- 1.4.4 Dockets STN-50-470F, Enclosure 1-NP to LD-82-039, CPC/CEAC Software Modifications for System 80, March, 1982.
- 1.4.5 CPC methodology change for Arkansas Nuclear One Unit 2 Cycle 5, CEN-288(A)-NP, Revision 00, October 1984.

SUMMARY

This document contains a compilation of CPC and CEAC constants. These constants are applicable to ANO-2 operation. The sources of these constants and their bases are included in the References section. These References reside in the CPC design file.

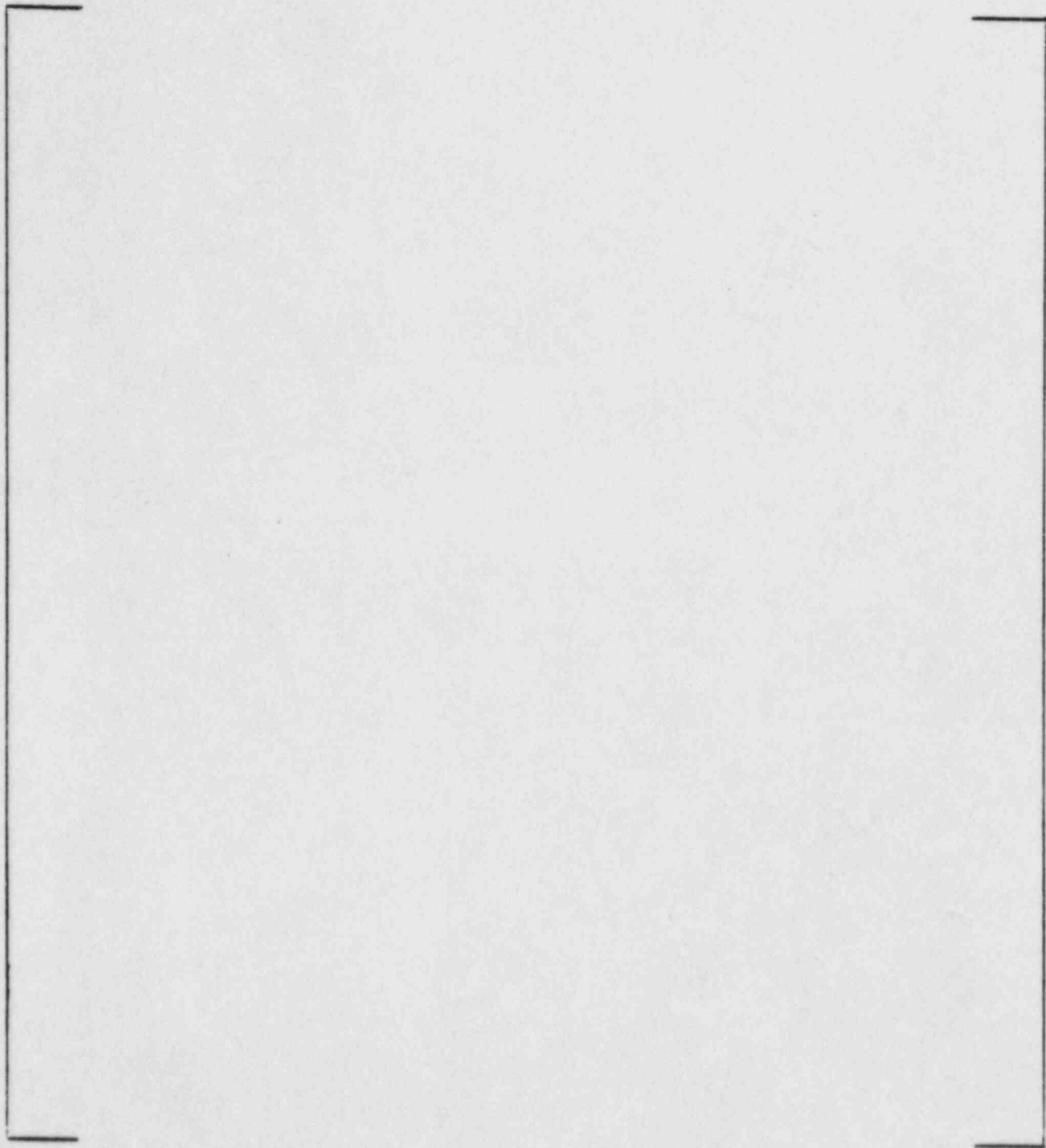
The data base constants contained within this section define a FORTRAN data file []. In some cases, data arrays in the data file exceed the dimensions specified by References 1, 2, 3, 4 and 5. This is done to allow for possible expansion of some data constants at a future date.

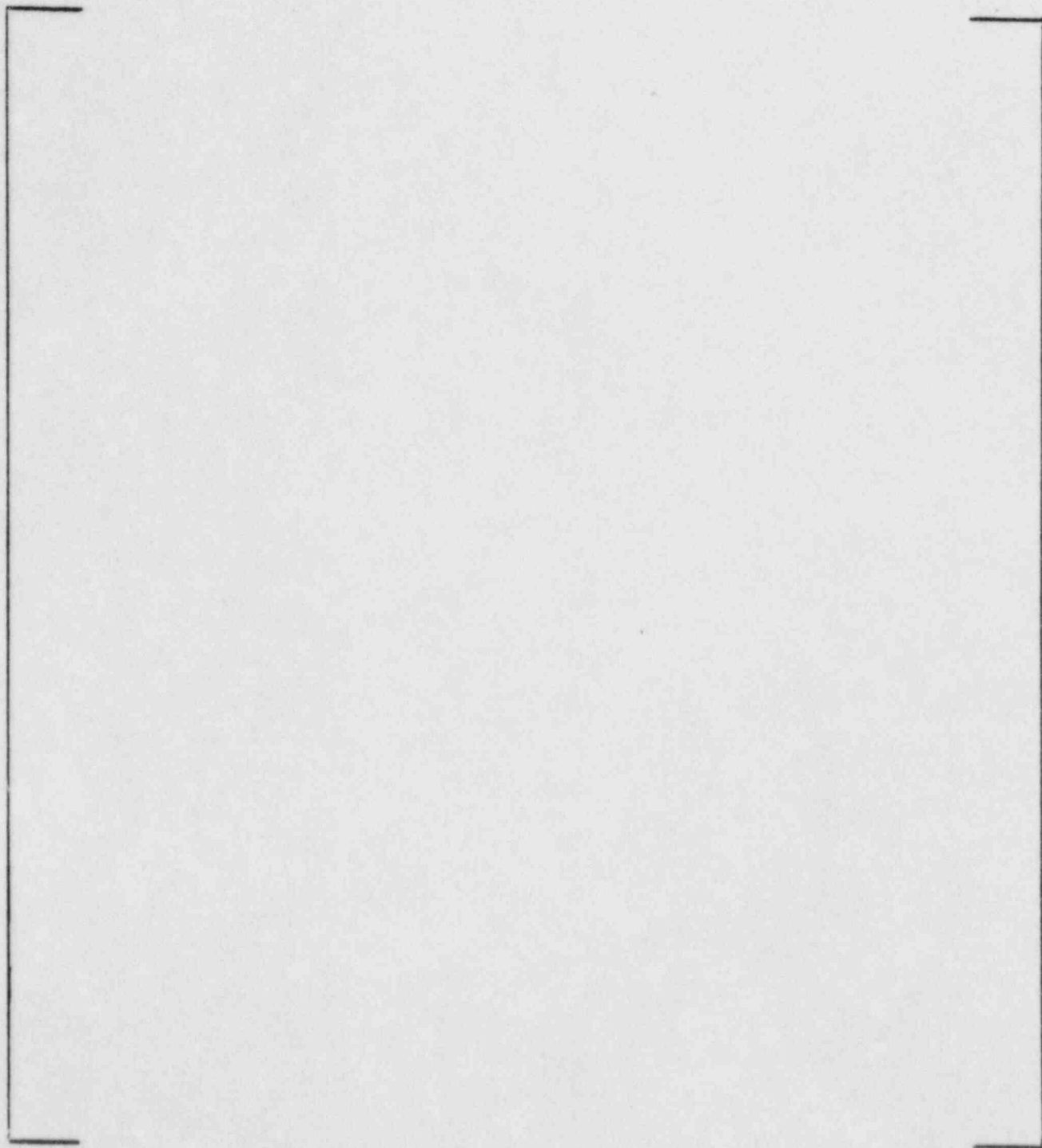
Section 3.2 contains a cross-reference list. This list is provided to assure consistency between the system functional design nomenclature and the FORTRAN Simulation Code nomenclature. The left hand column contains FORTRAN constant names as found in the data file in Section 3.1. The middle column contains the vector location associated with the FORTRAN file. The right hand column contains the corresponding constant name as found in the functional design specifications, References 1, 2 and as modified by References 3, 4 and 5.

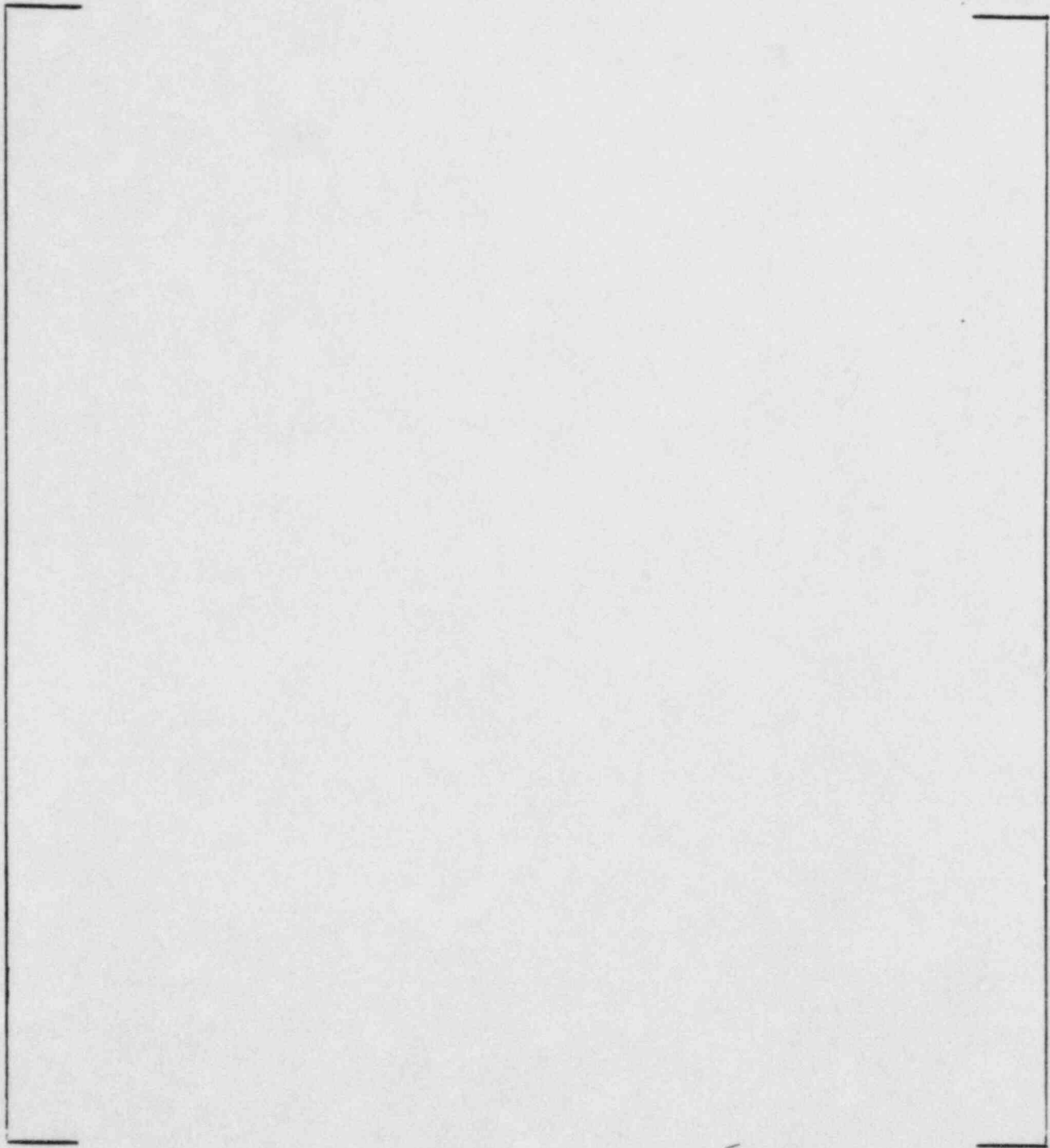
It is noted that the CPC FORTRAN Simulation Code requires additional constants to simulate certain hardware and executive system features. Corresponding constants are not required by the CPC and CEAC functional design specifications. This is reflected in the data base listing. The only constants which are relevant to the protection system algorithms, as described by References 1, 2, 3, 4 and 5, are the constants which have a symbolic name in the right hand column of Section 3.2.

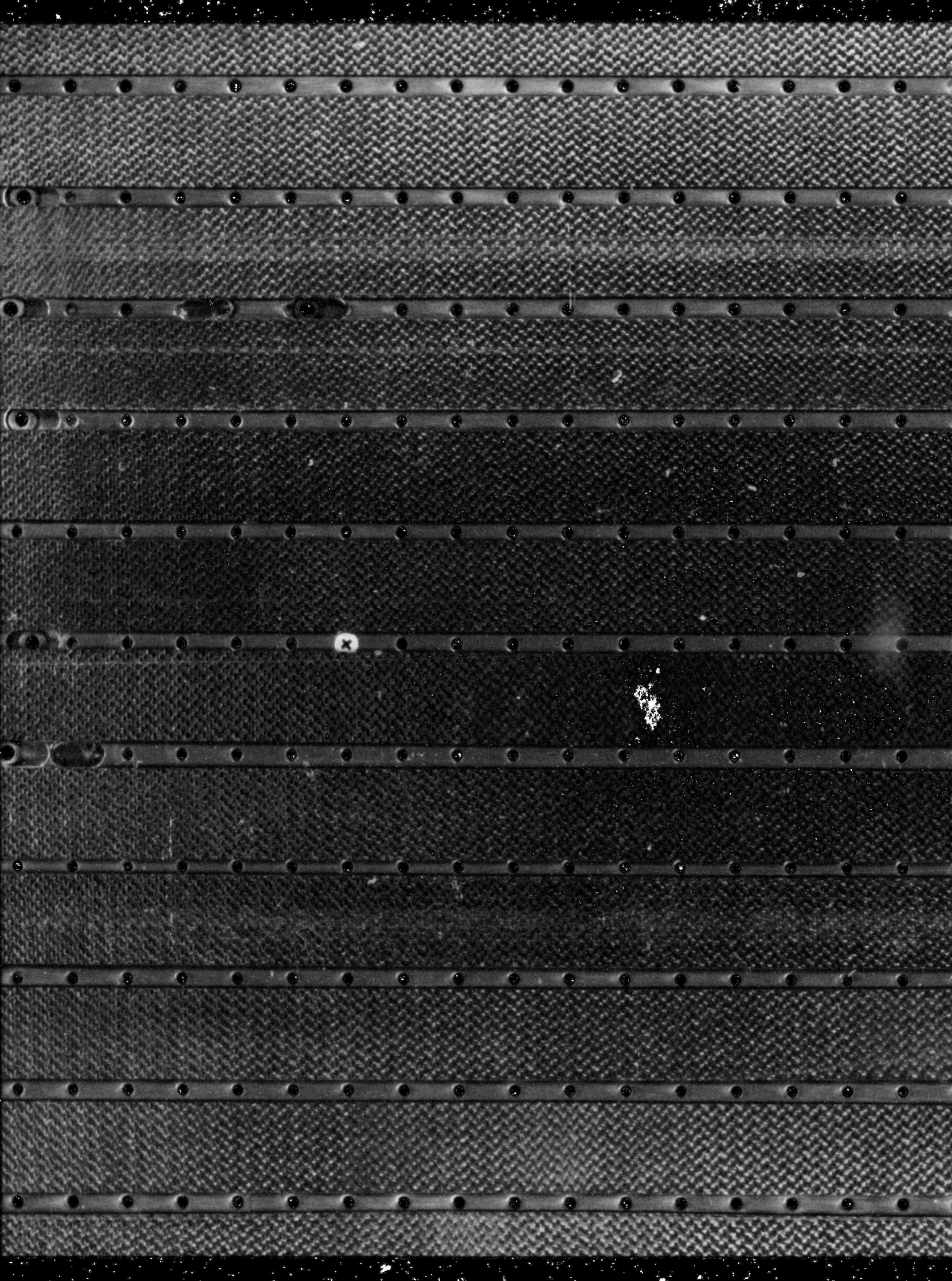
3.1 DATA FILE

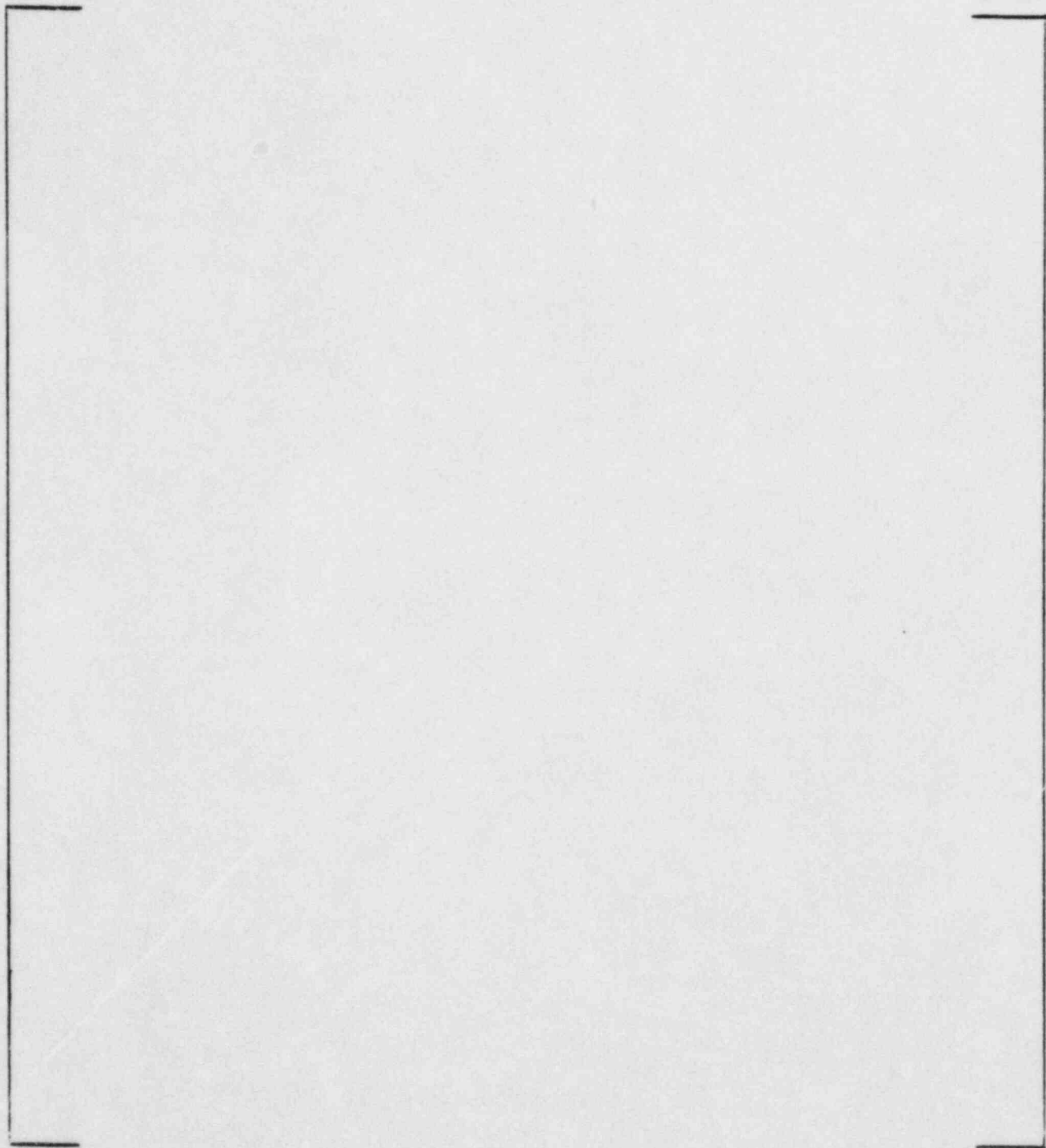
.





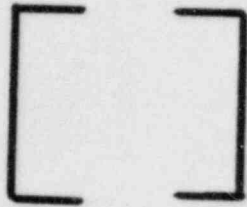






3.3 INITIALIZATION CRITERIA

Section 3.6 of Reference 1 defines initialization and initialization criteria. The values for the initialization constants are:



During initialization, the variables to which the above constants apply always approach steady-state from the conservative direction.

3.4

3.4.1

The constants contained in Section 3.1 have been prepared in accordance with Quality Assurance of Design Procedures with the exception of:

(1) Part-Loop Pump Dependent Constants

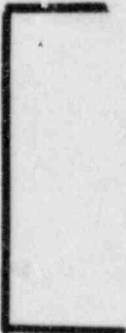
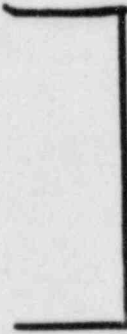
Constant

Vector Location



3.4.2 Conversion Factors

Certain constants are required for execution of the CPC FORTRAN Simulation Code. These constants are not required for input to the CPC Software Design implementation process, but are quality assured within the scope of this document.

<u>Constant</u>	<u>Vector Location</u>
	

3.4.3 Multiply - Defined Constants

Several constants are specified in more than one data base location. These constants either use the same variable name and memory location, or have different variable names and memory locations due to individual program usage. These constants are listed below, so that if one of these constants is changed, all locations using this constants will be corrected.

CONSTANT	VECTOR LOCATION	PROGRAM	COMMENT
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