ARIZONA PUBLIC SERVICE COMPANY

CEN-251(V)-NP
Revision 00

PVNGS-1 CYCLE 1

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) and the CEAC Functional Design Specification (Reference 2). 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. Initialization criteria are contained in Section 3.3.

The constants contained in this document are applicable to the first fuel cycle operation of the PVNGS-1 plant.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 PURPOSE

The purposes of this document are:

(1) To specify the CPC and CEAC data base constants applicable to the PVNGS-1 Cycle 1 software described by References 1, the CPC Functional Design Specification, and Reference 2, the CEA Calculator Functional Design Specification.

(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.

This CPC and CEAC Data Base Listing supersedes Reference 4.

1.2 SCOPE

The CPC/CEAC system, as functionally described in References 1 and 2, is implemented in assembly language and also exists as a FORTRAN simulation. This document provides:

(1) Data base values for the protection system algorithm constants denoted by References 1 and 2 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 Reference 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, and 2.

(2) the PVNGS-1 Cycle 1 Verification and Certification of the CPC FORTRAN Simulation Code.

1.4 REFERENCES

1. Functional Design Specification for a Core Protection Calculator, CEN-147(S)-NP, January, 1981.

2. Functional Design Specification for a Control Element Assembly Calculator, CEN-148(S)-NP, January, 1981.

3. CPC/CEAC Software Modification for Waterford-3, CEN-197(C)-NP, March, 1982.

4. PVNGS-1 Cycle 1 CPC and CEAC Data Base Document, CEN-226(V)-NP, January, 1983.

2.0 SUMMARY

This document contains a compilation of CPC and CEAC constants. These constants are applicable to PVNGS-1 Cycle 1 operation. The sources of these constants and their bases are included in the Reference section. These references reside in the CPC design file.

3.0 DATA BASE CONSTANTS

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 and 2. 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 and 2.

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. Only the constants that are relevant to the protection system algorithms, as described by References 1 and 2, have a symbolic name in the right hand column of Section 3.2.

ANPP PALO VERDE UNIT 1 INITIAL CORE
CPC/CEAC CONSTANTS (JUNE 20,1983)

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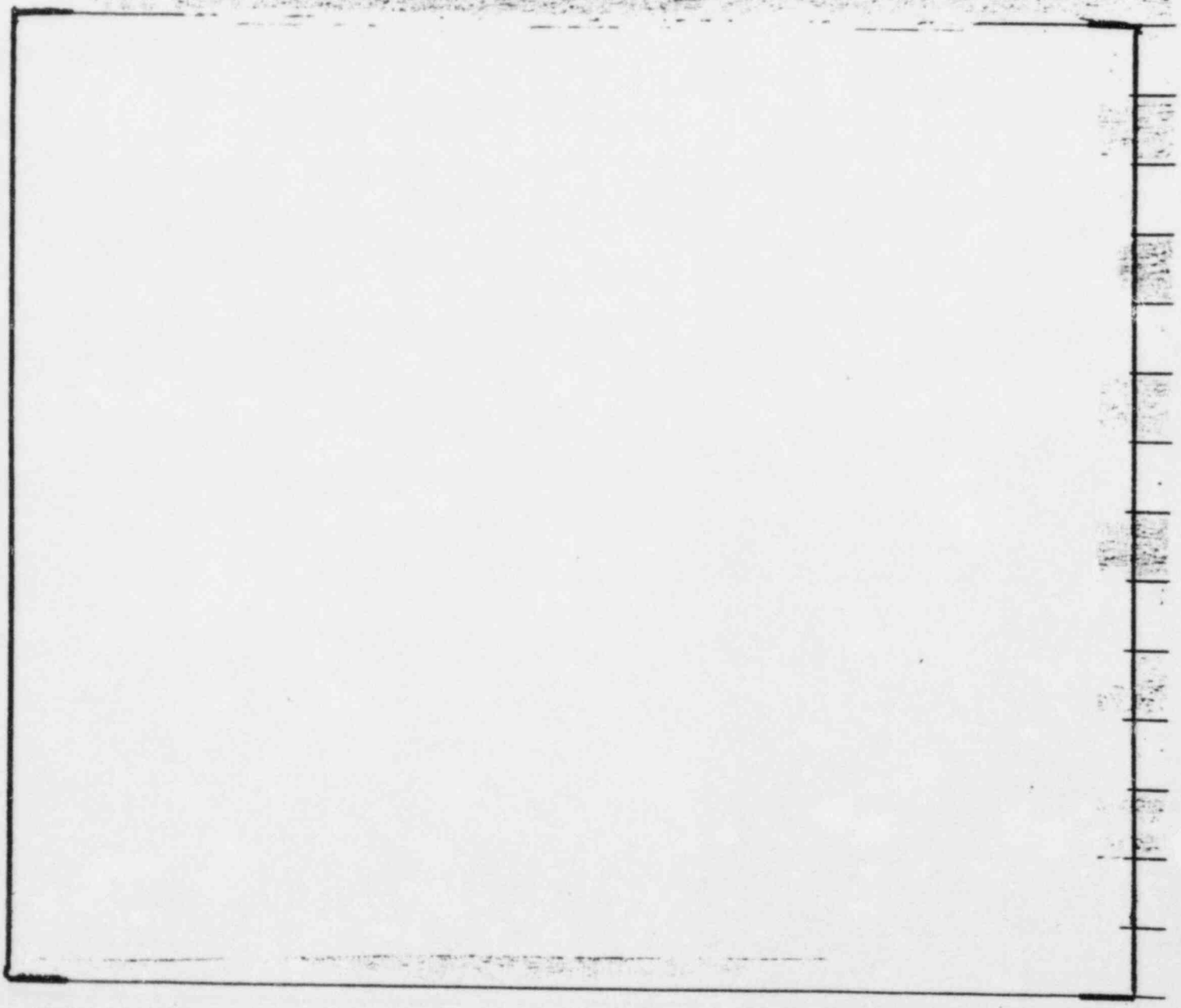

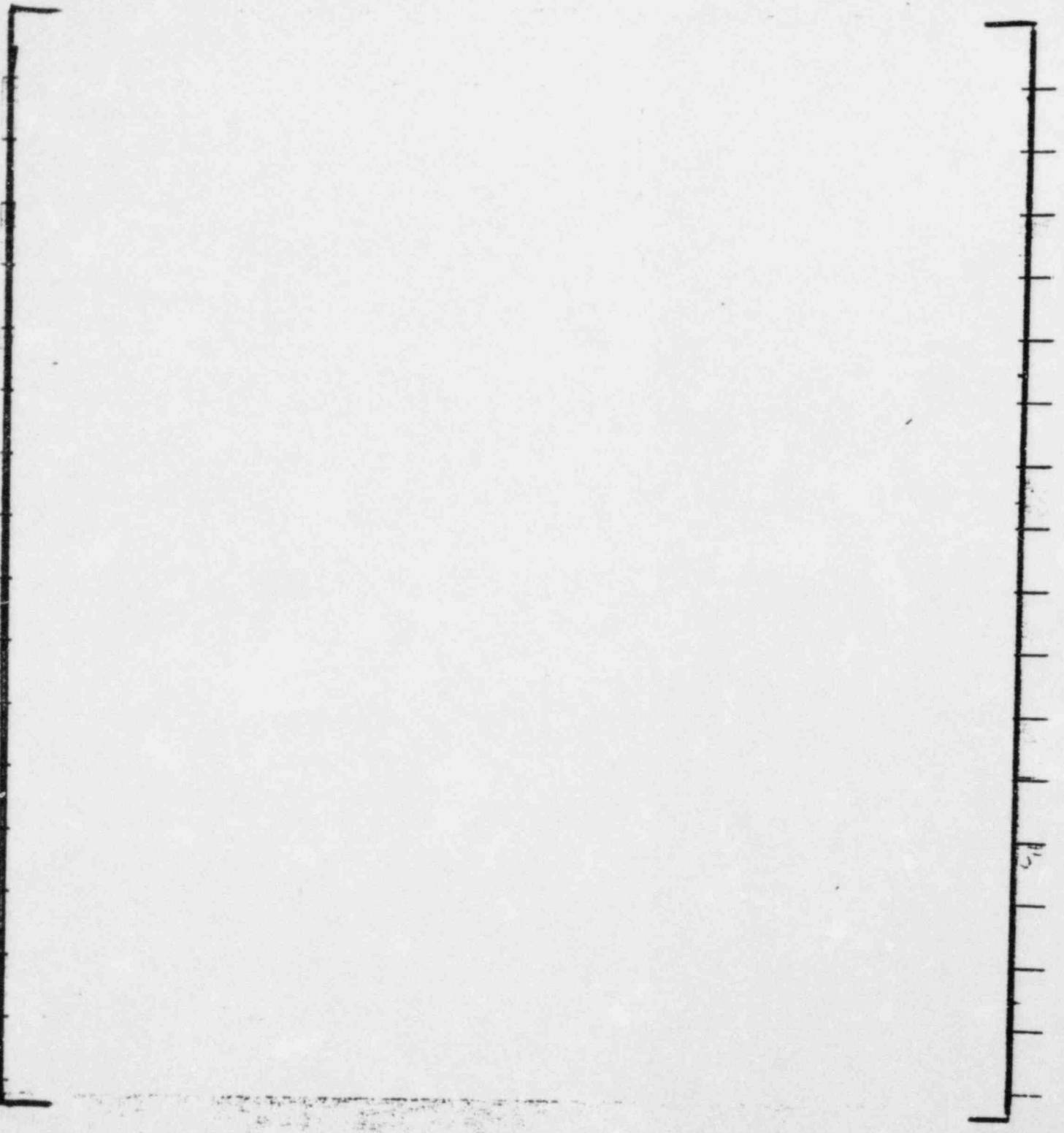

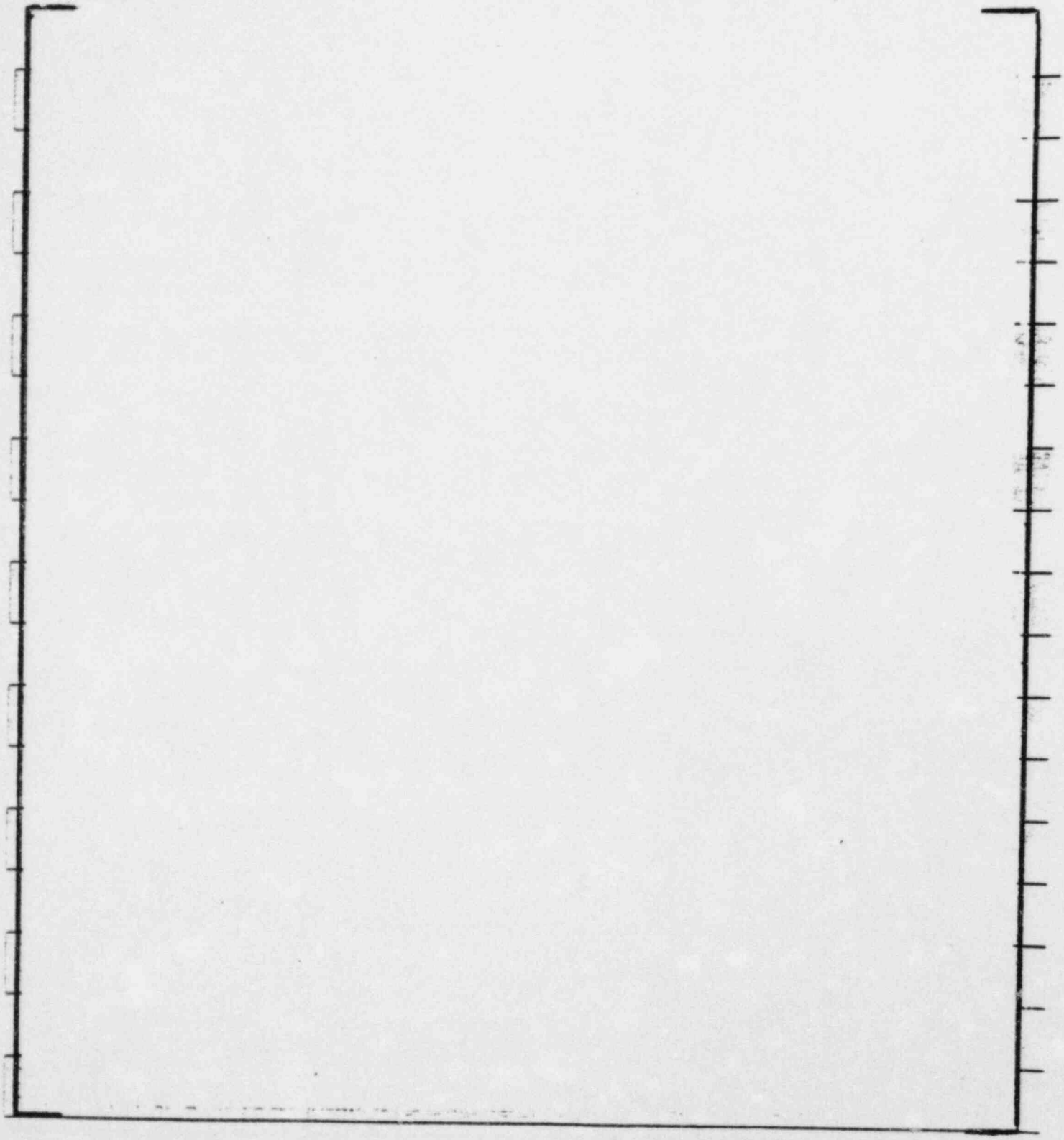

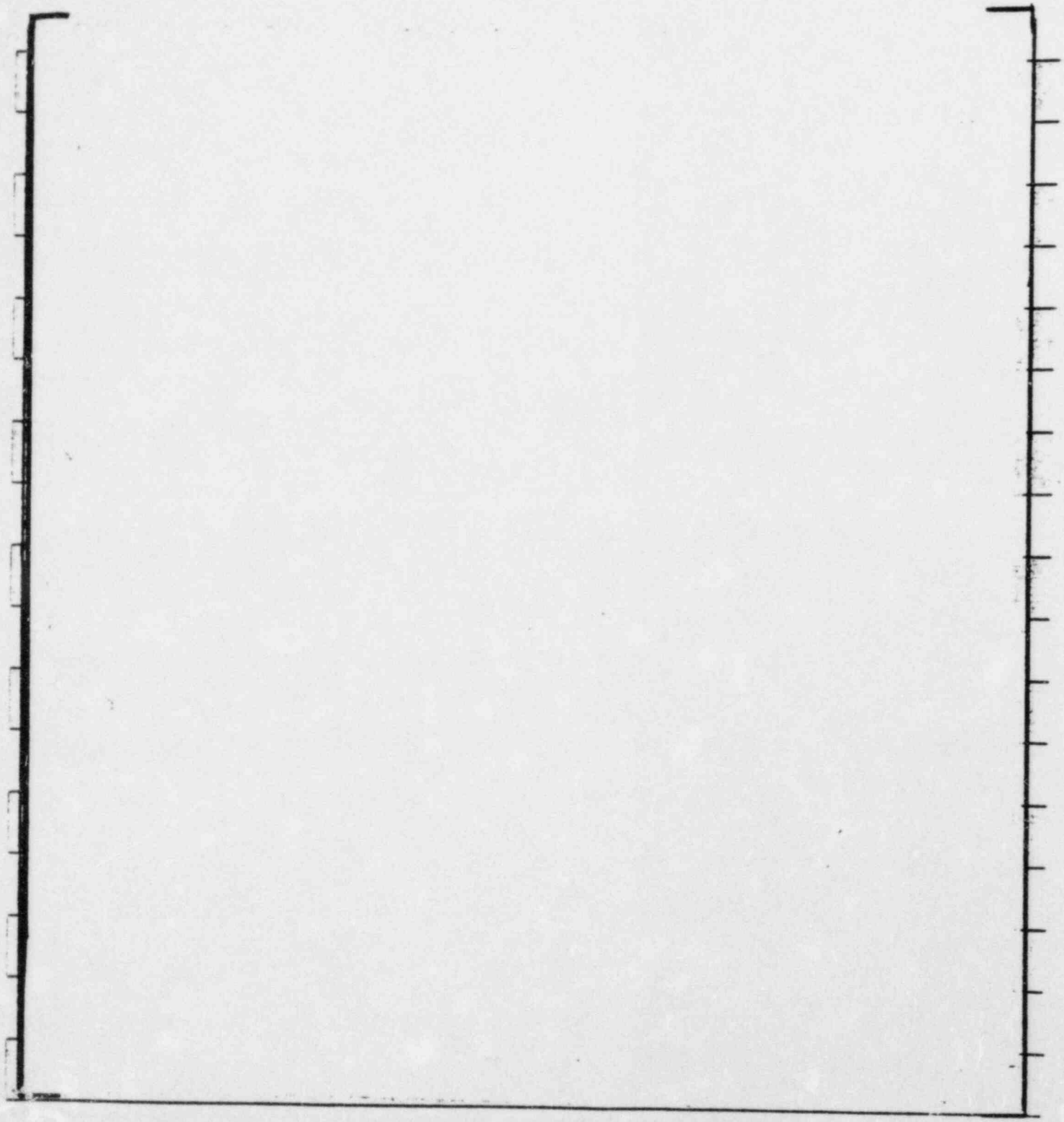

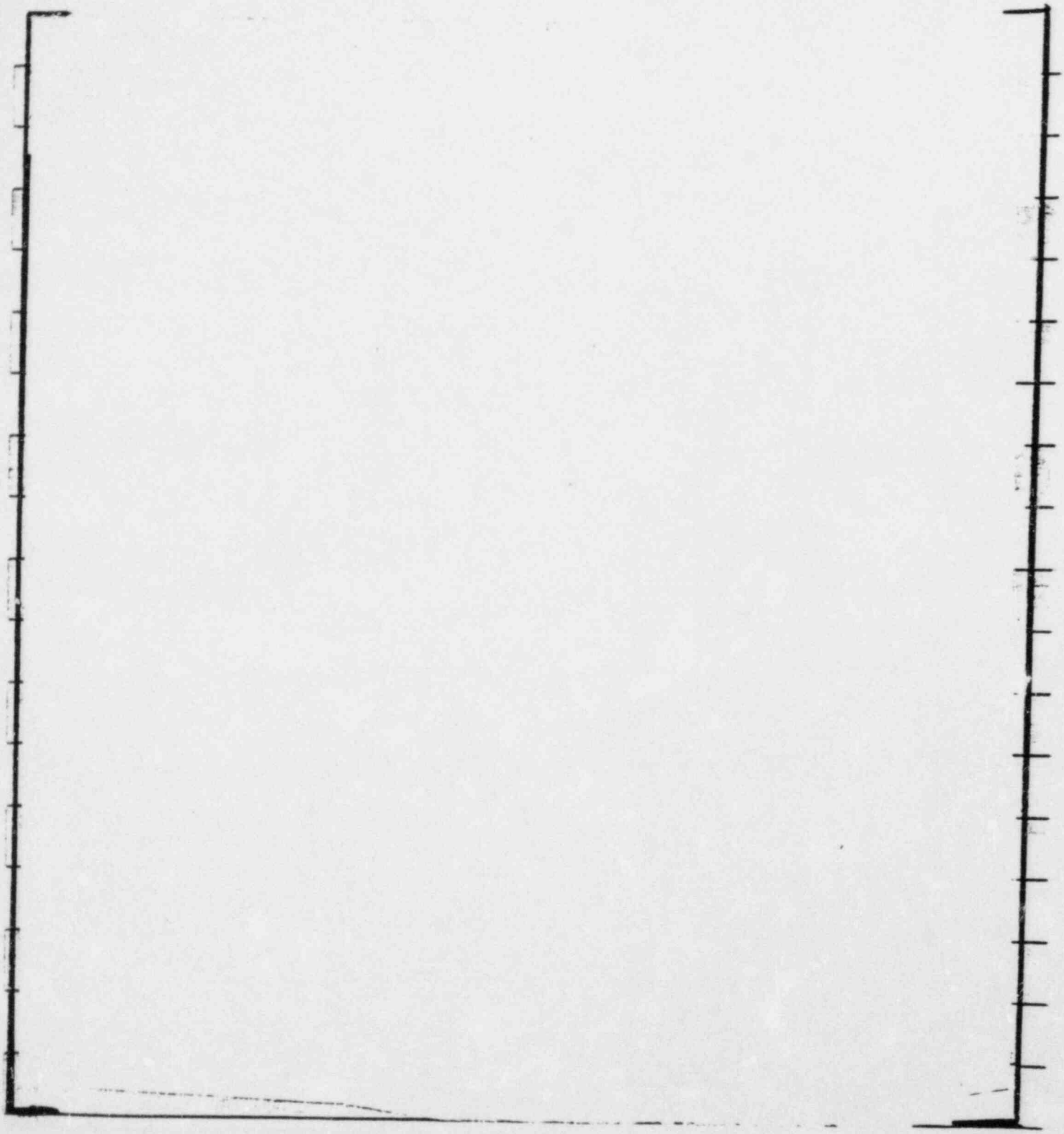

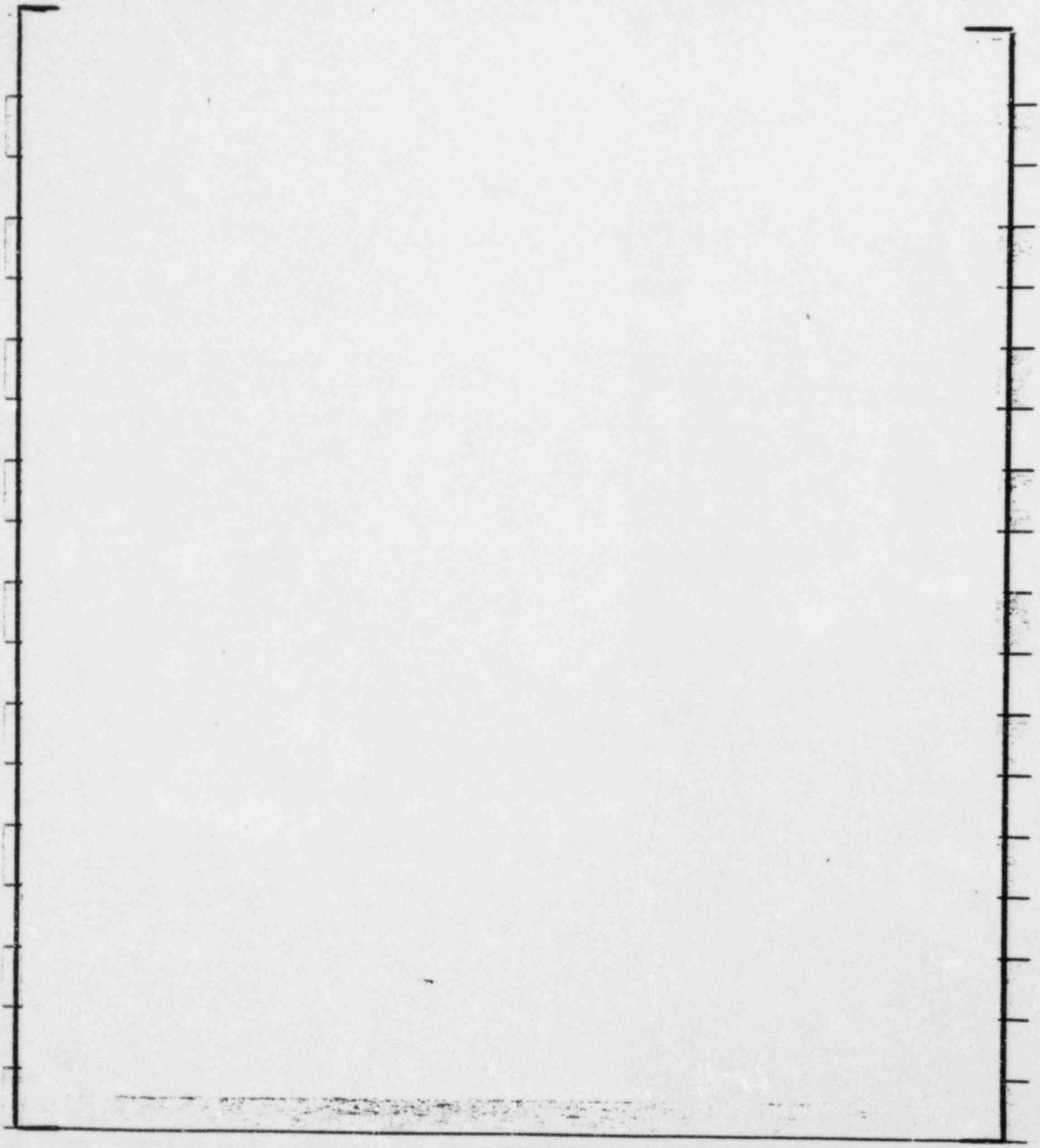

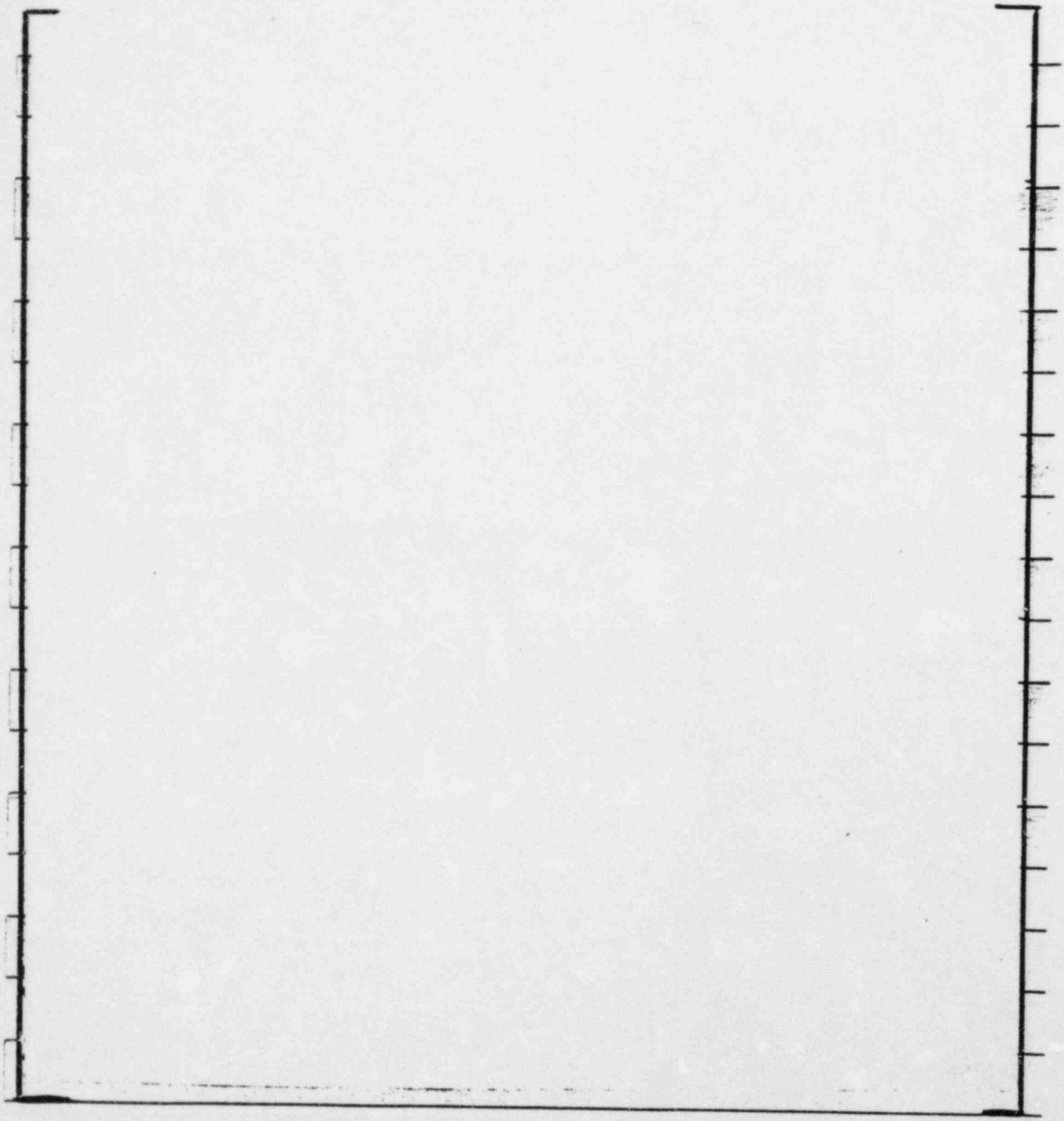

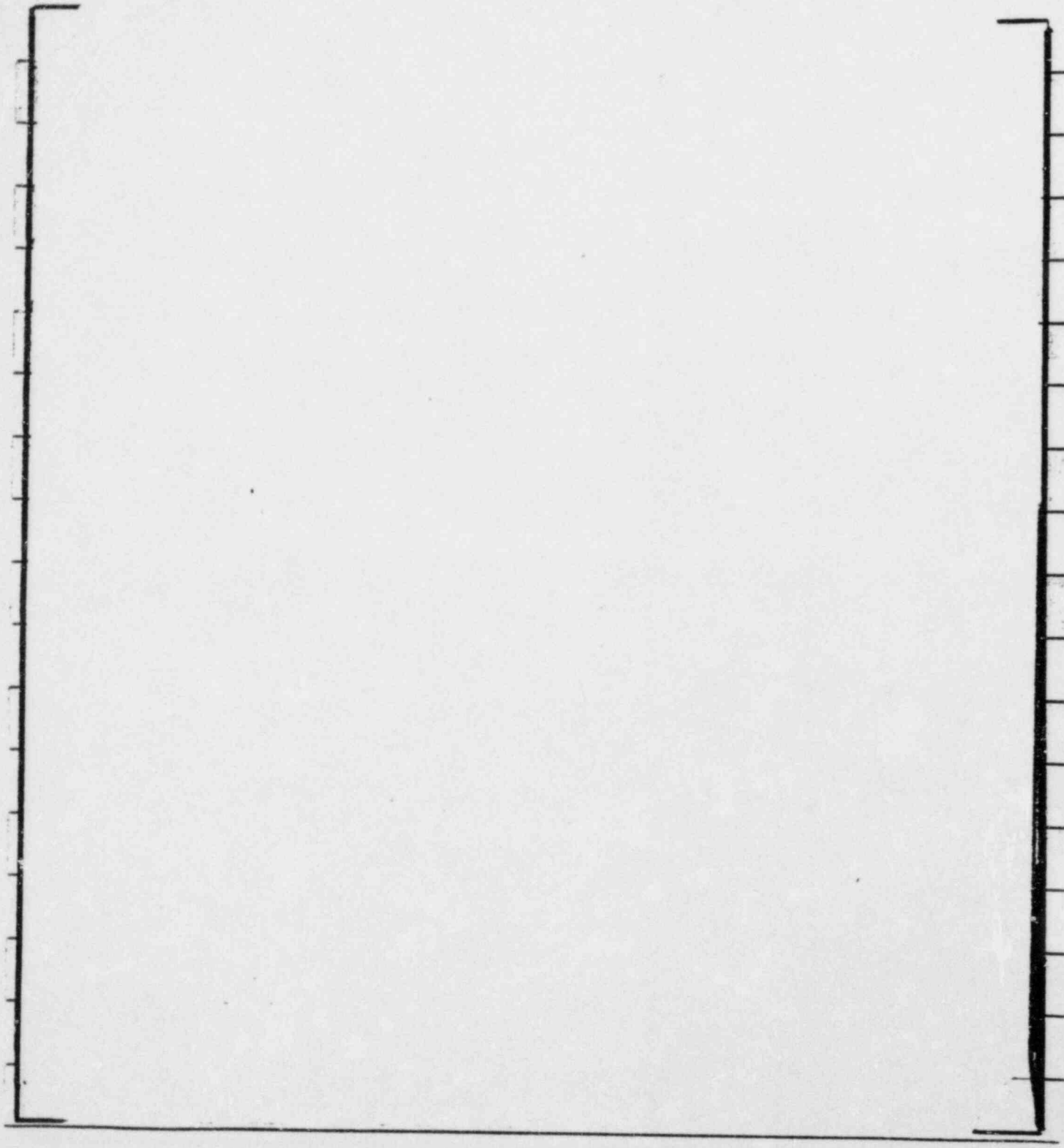

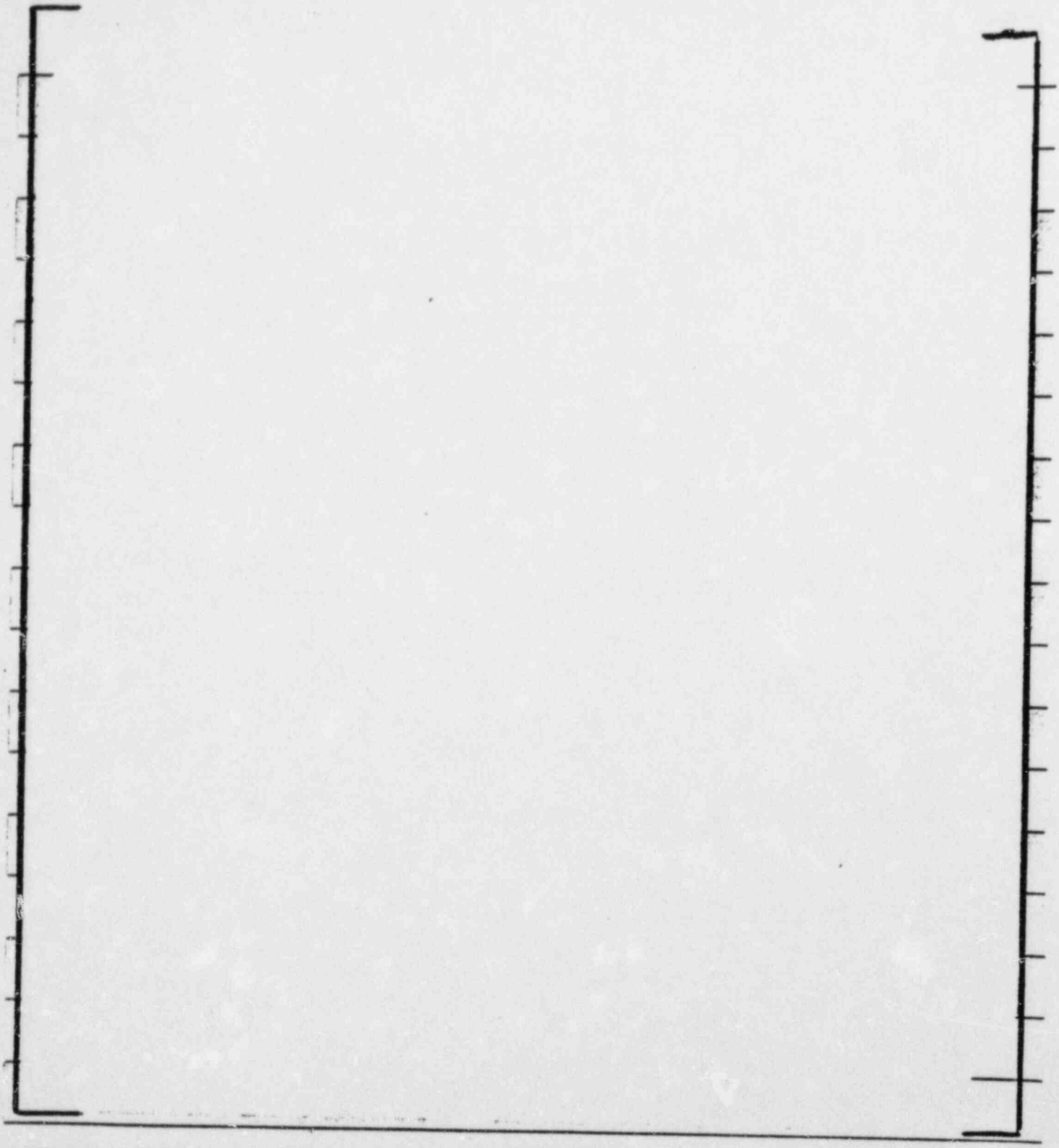

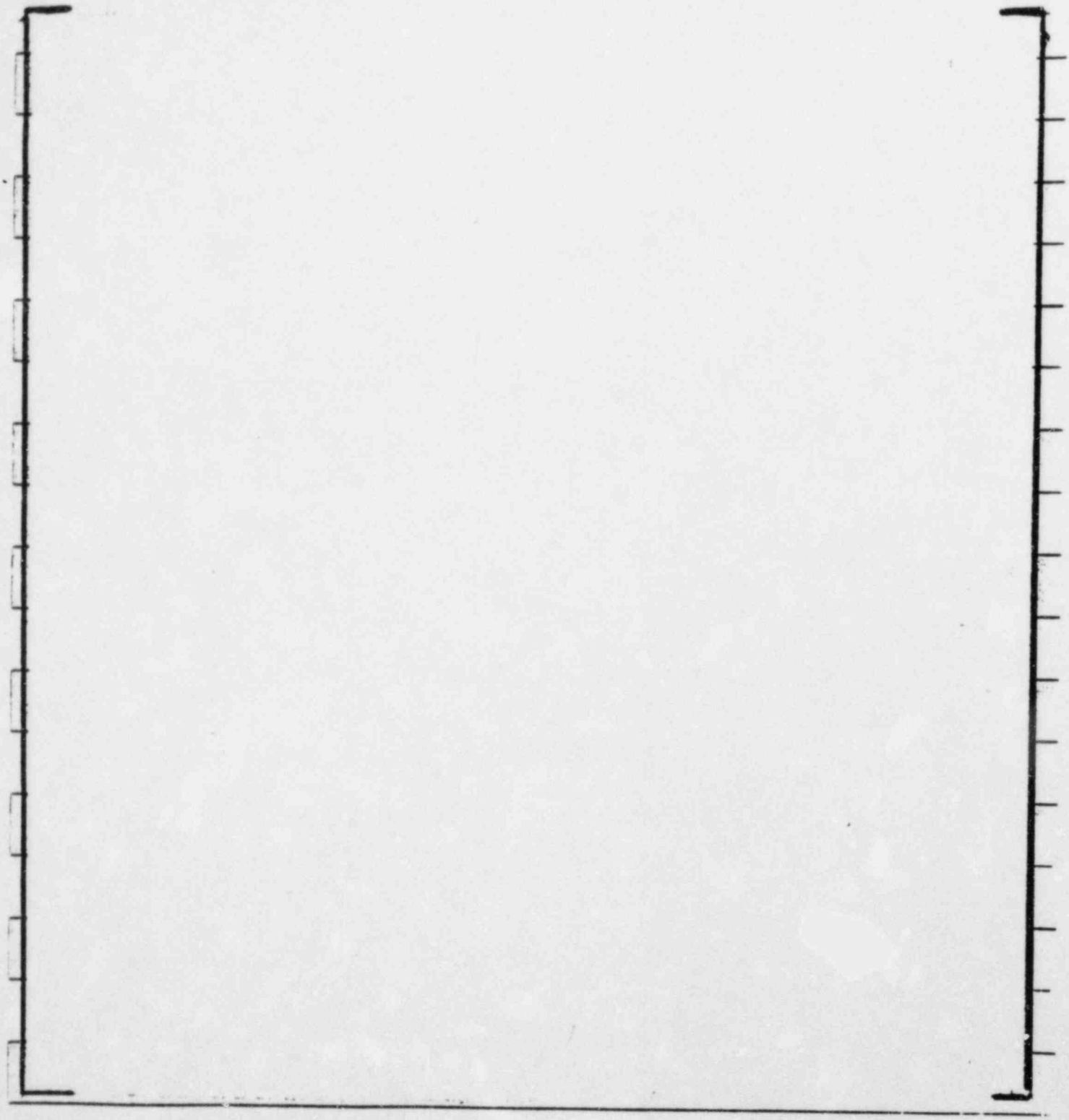

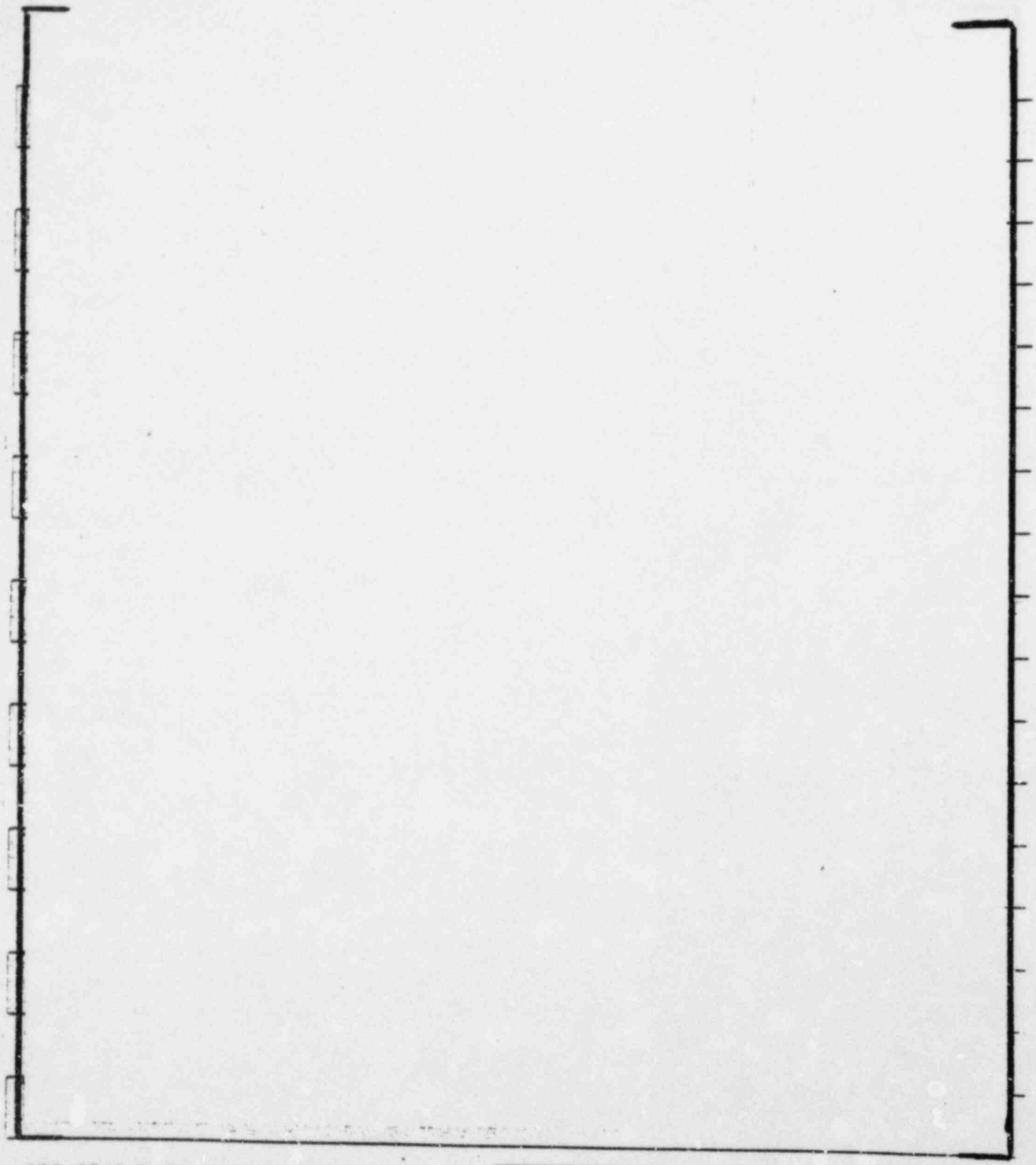

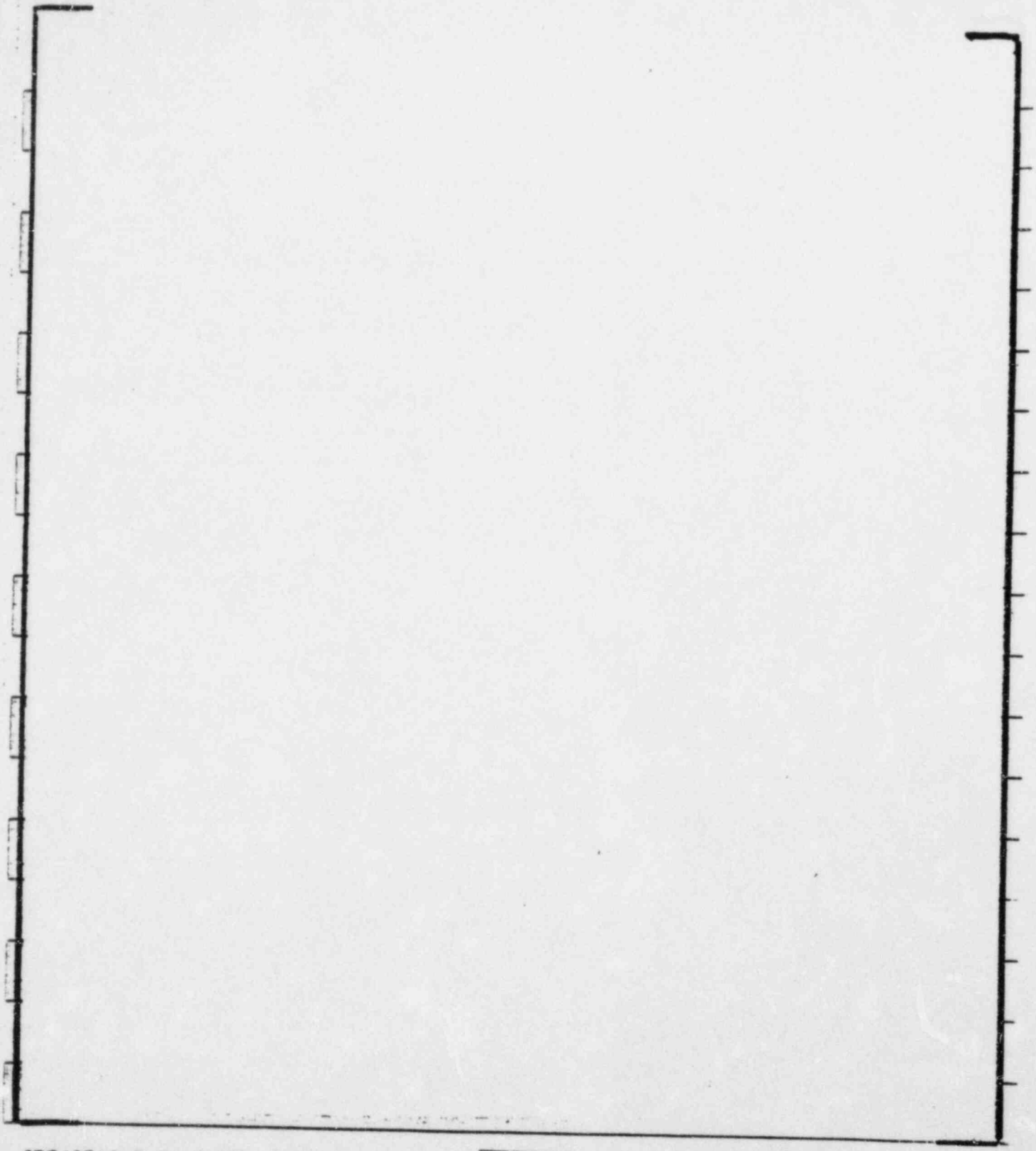

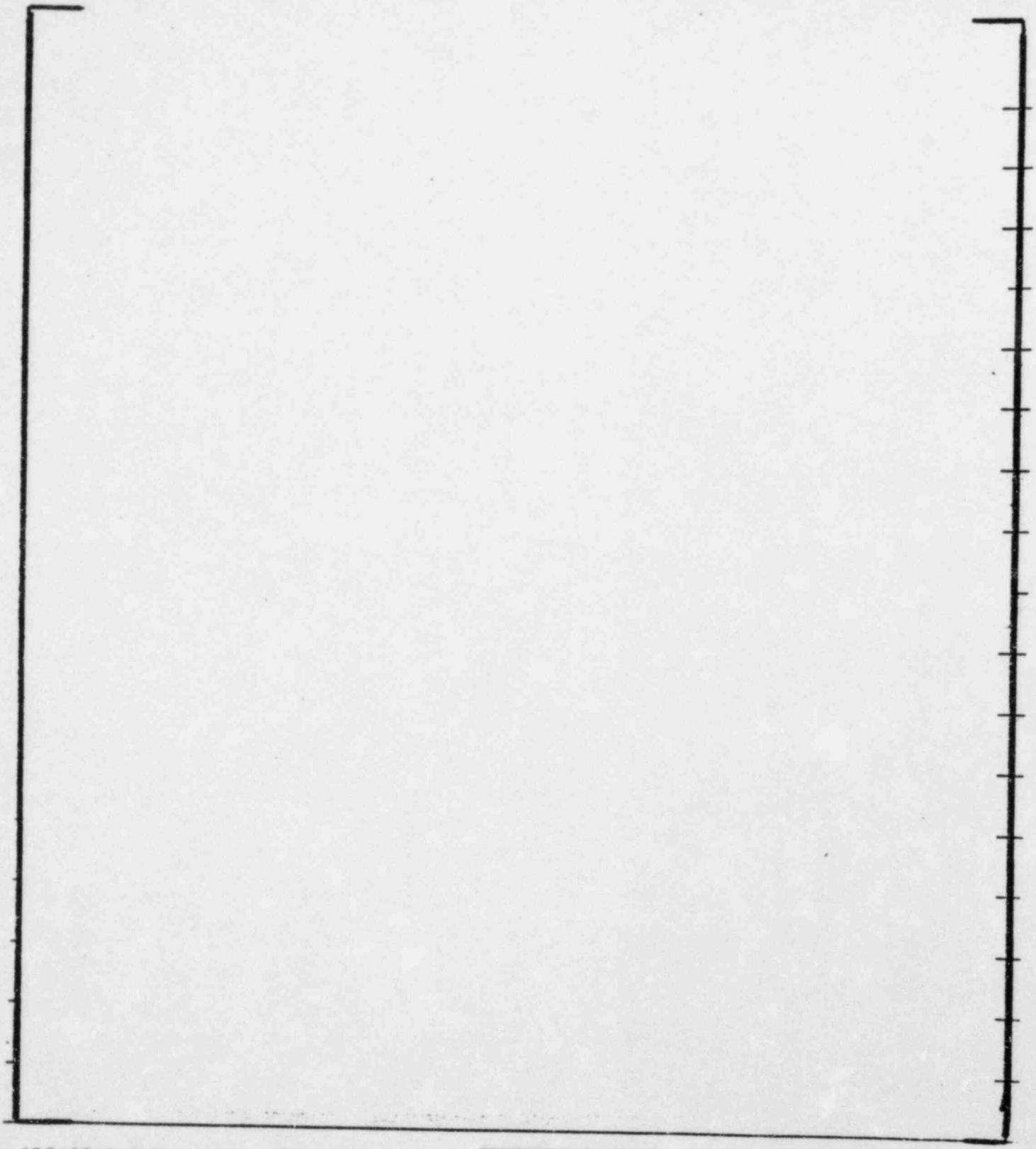

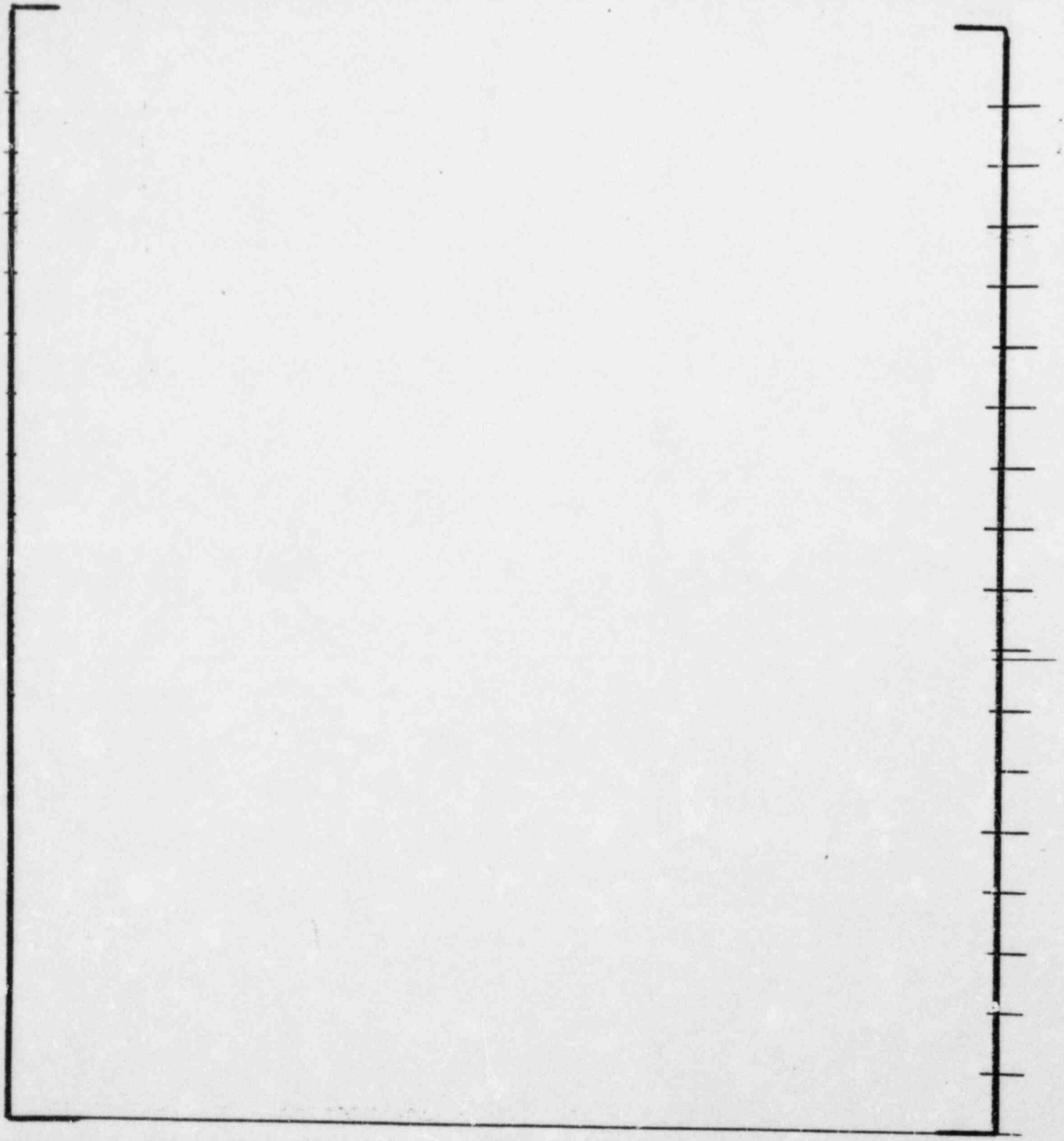

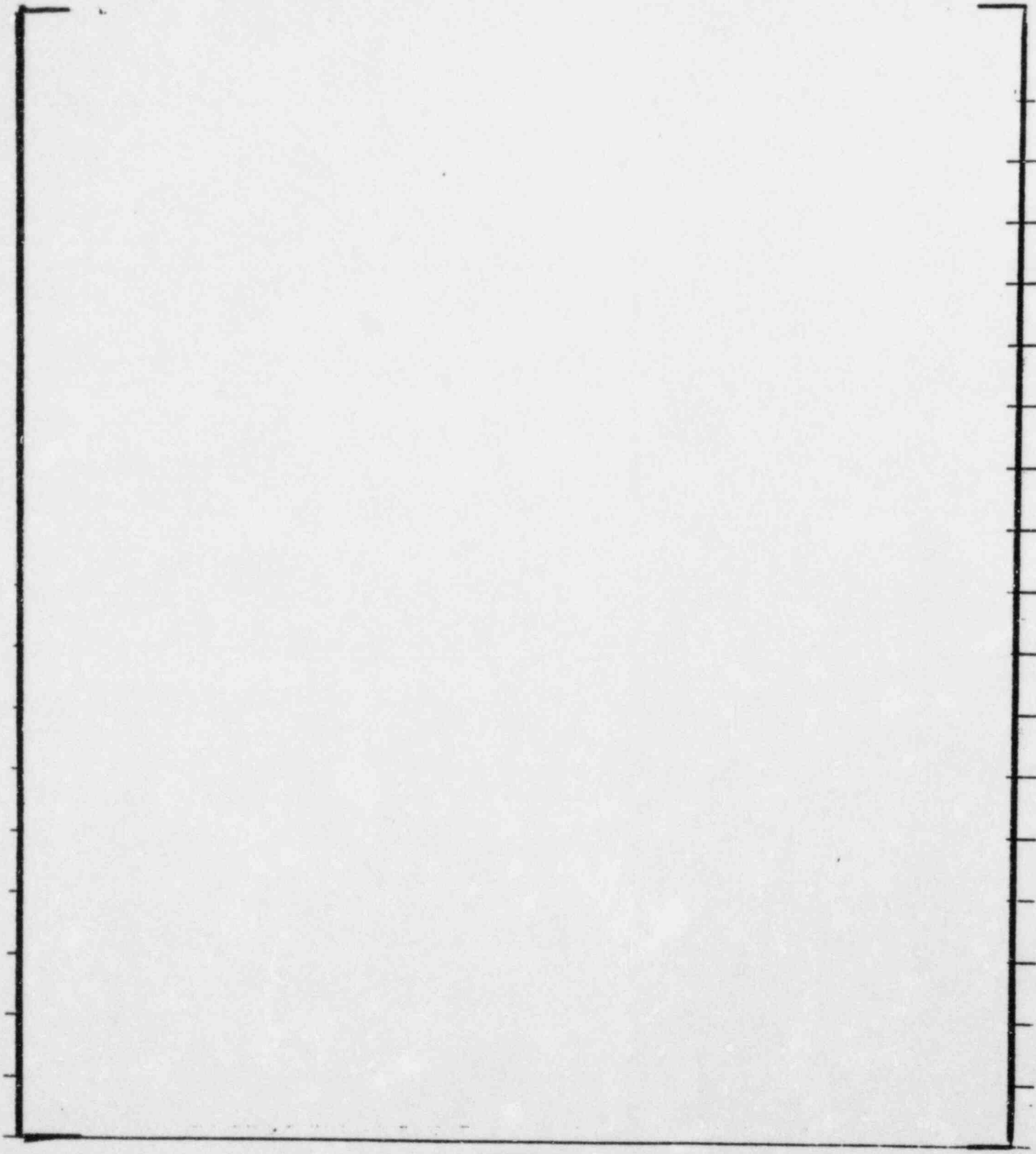

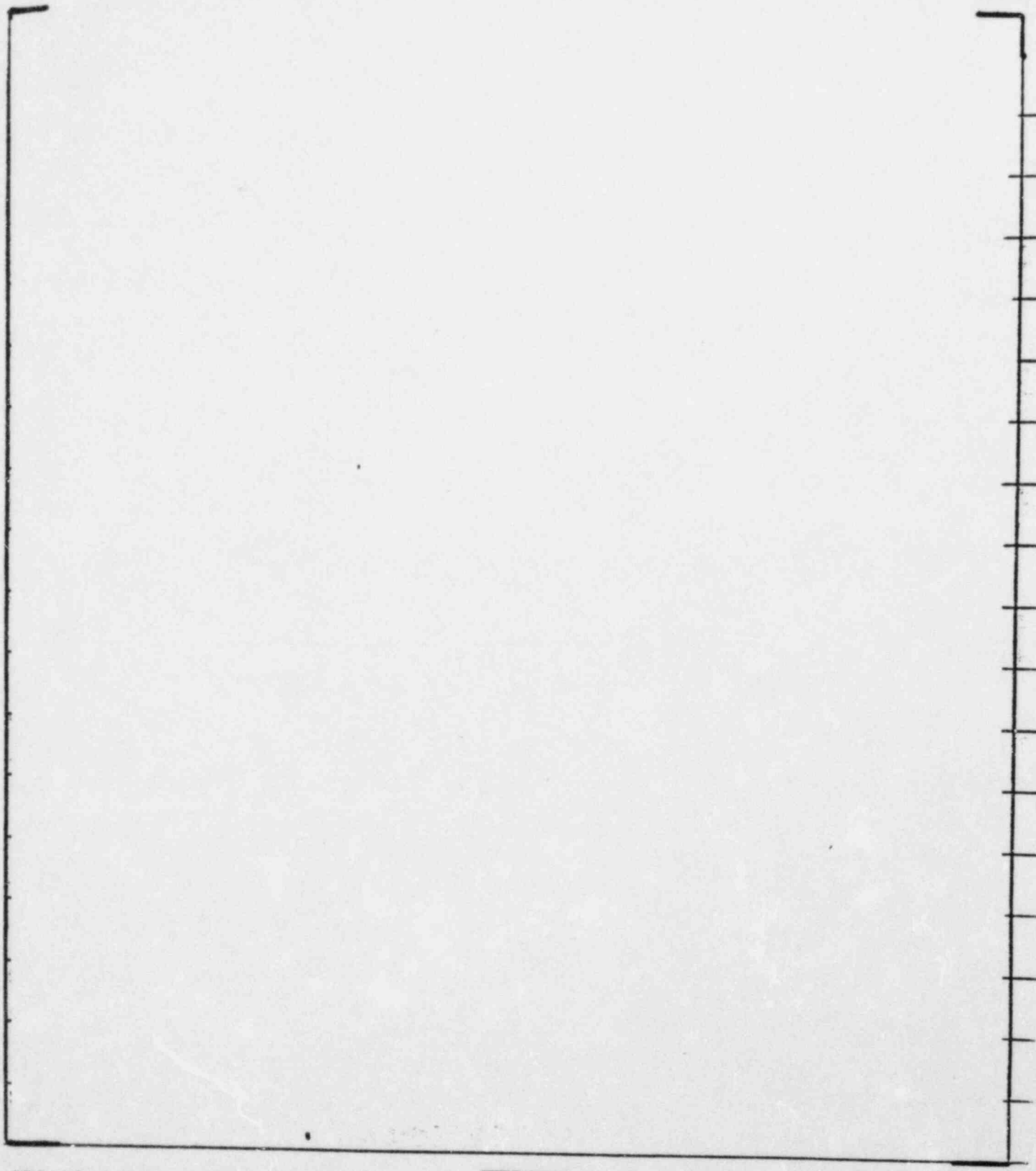

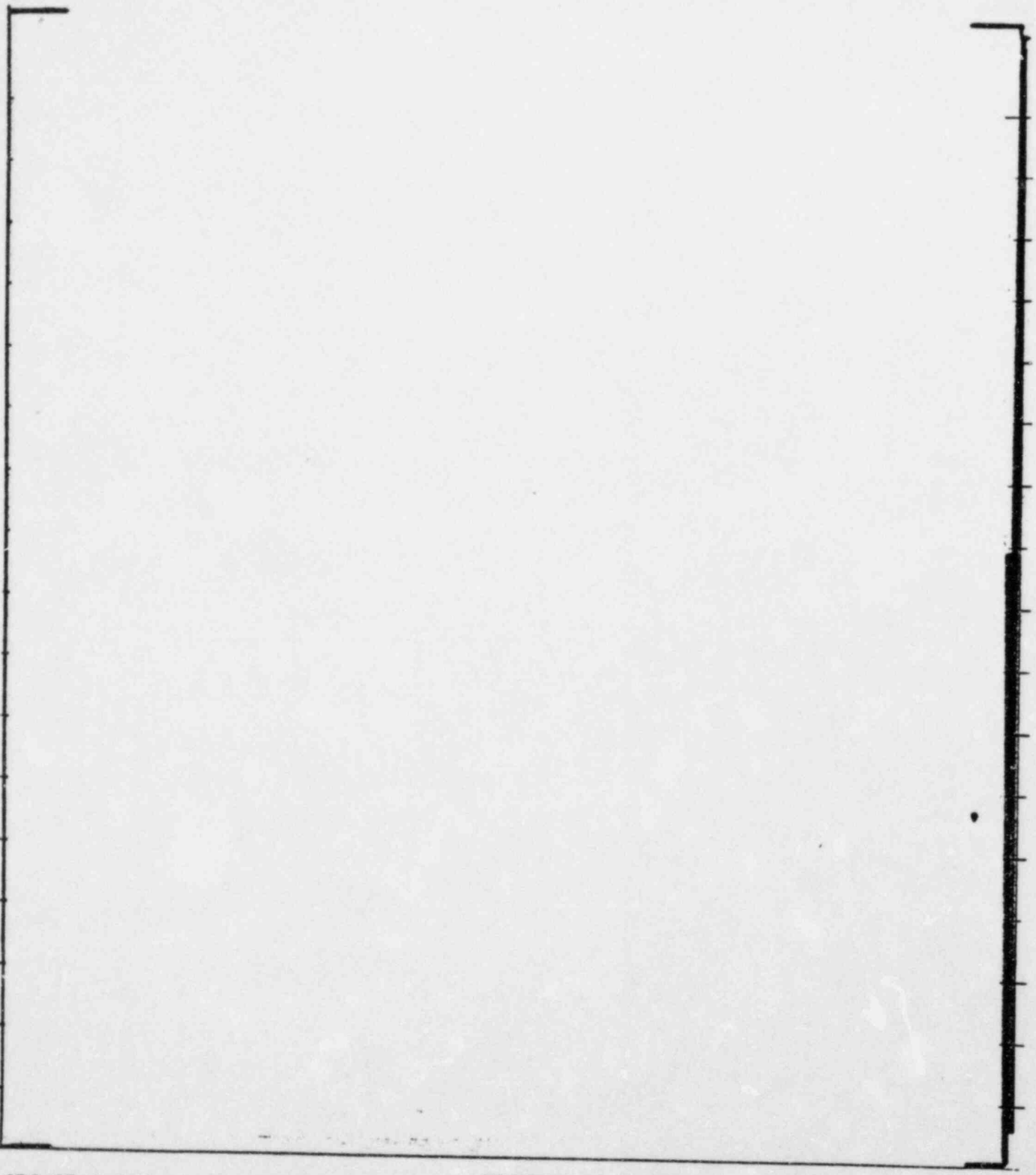

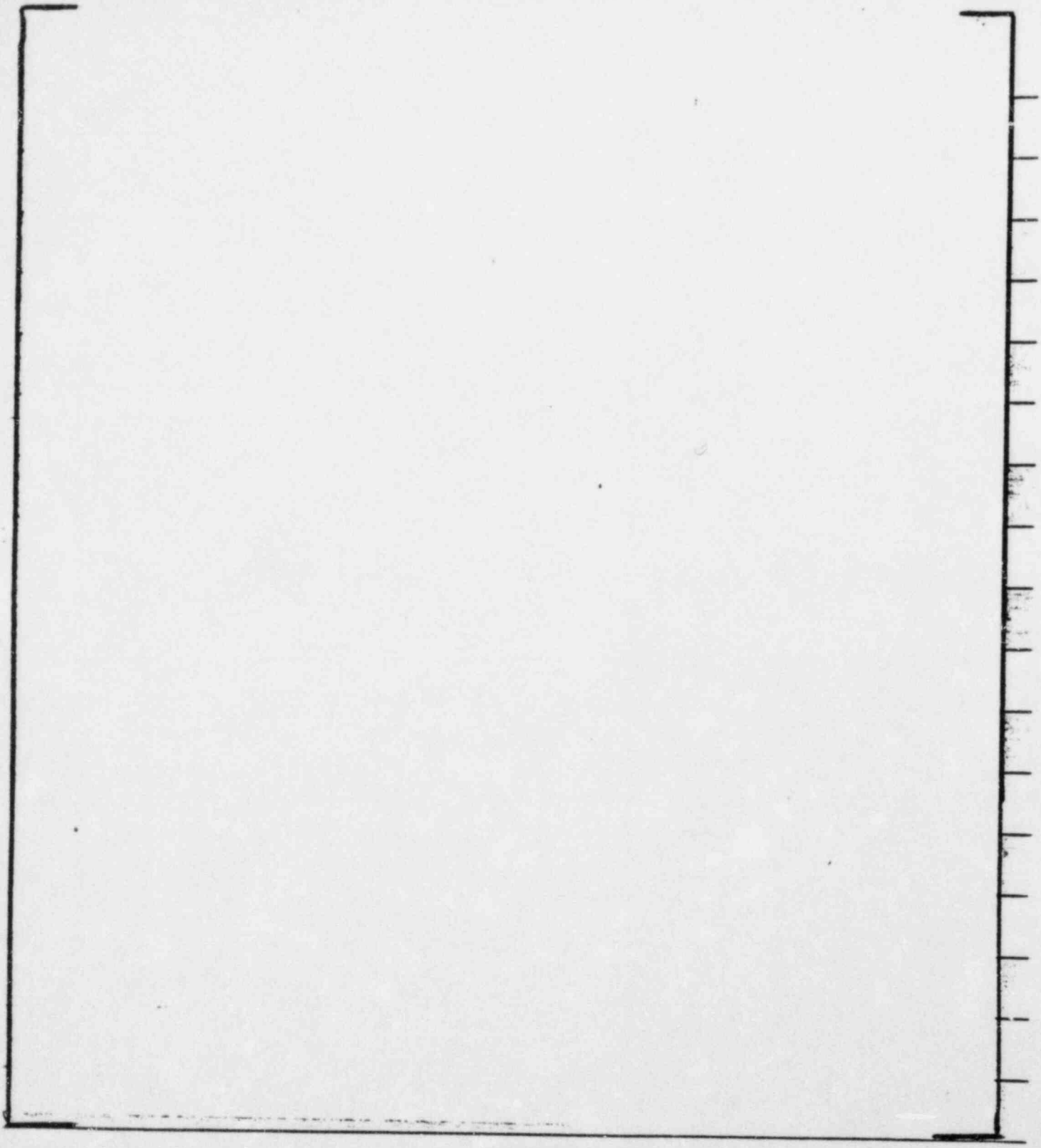

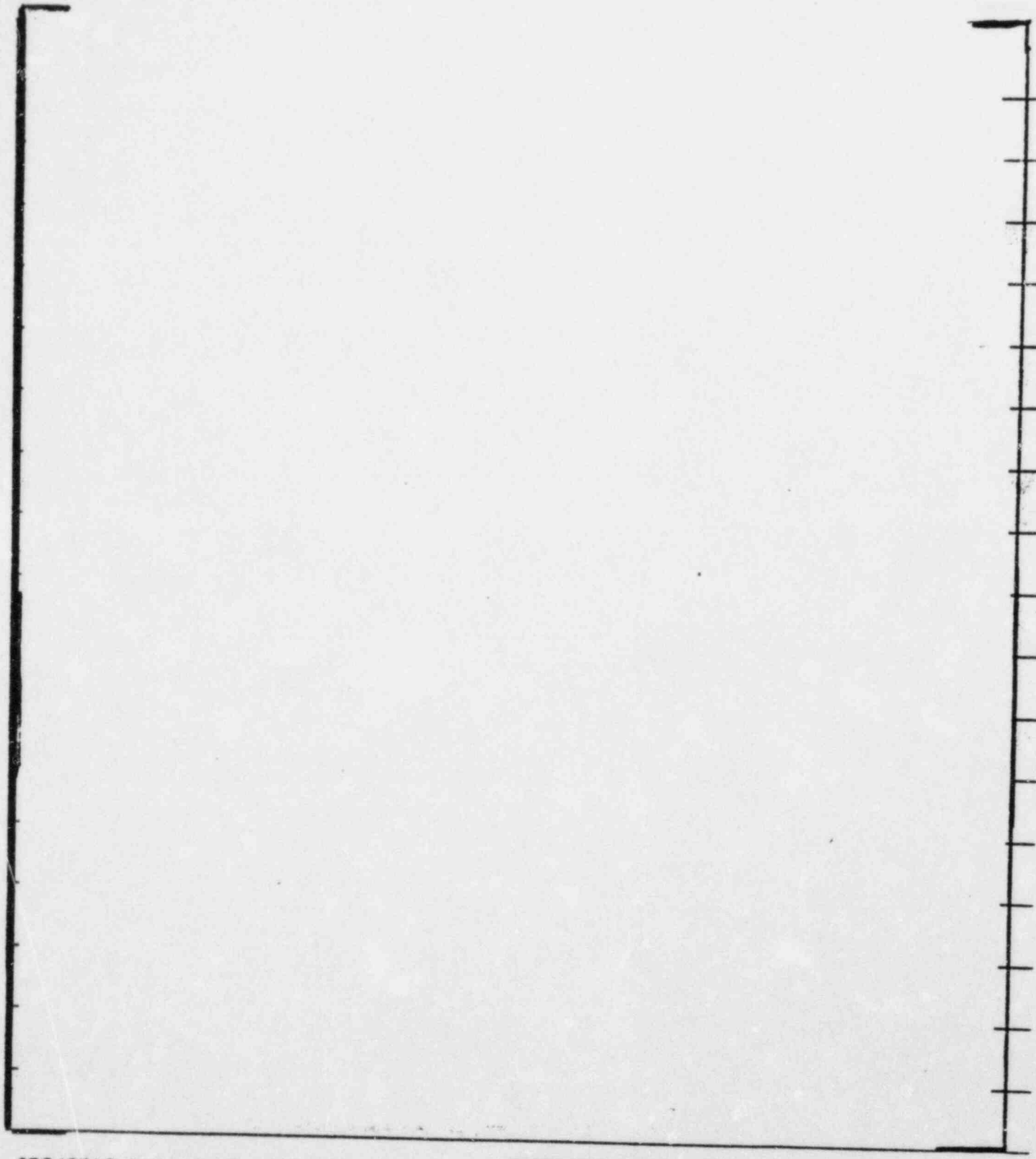

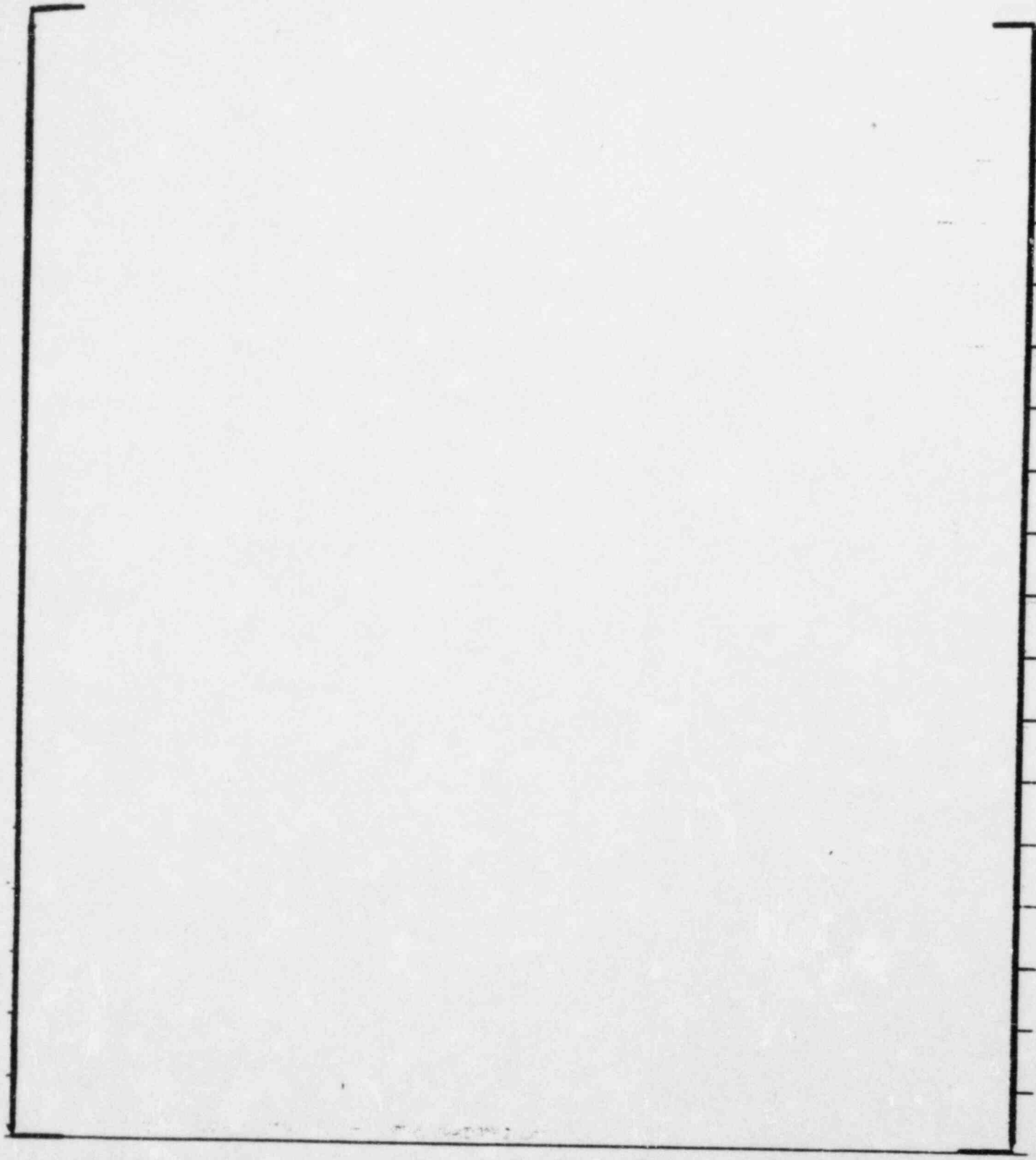

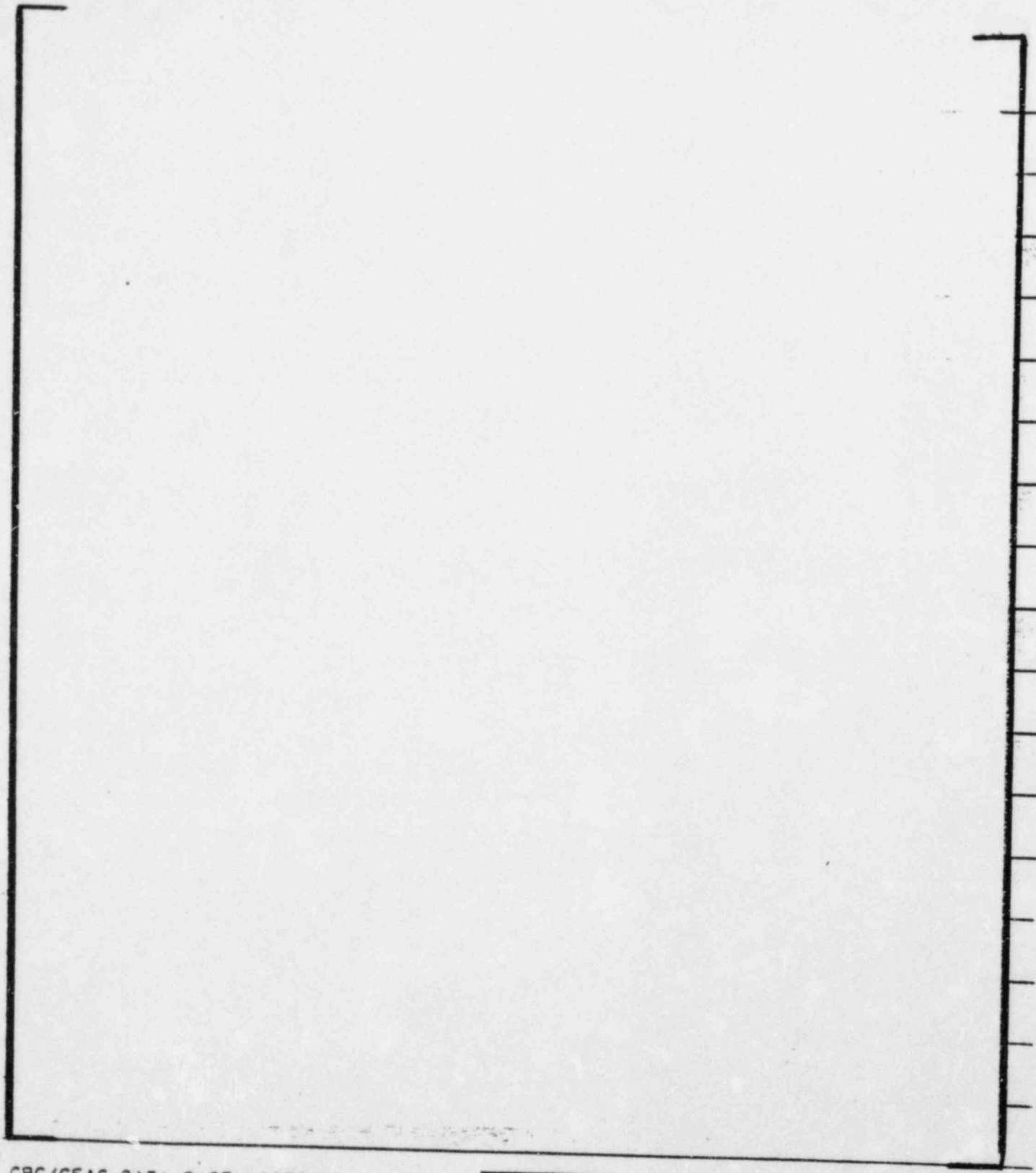

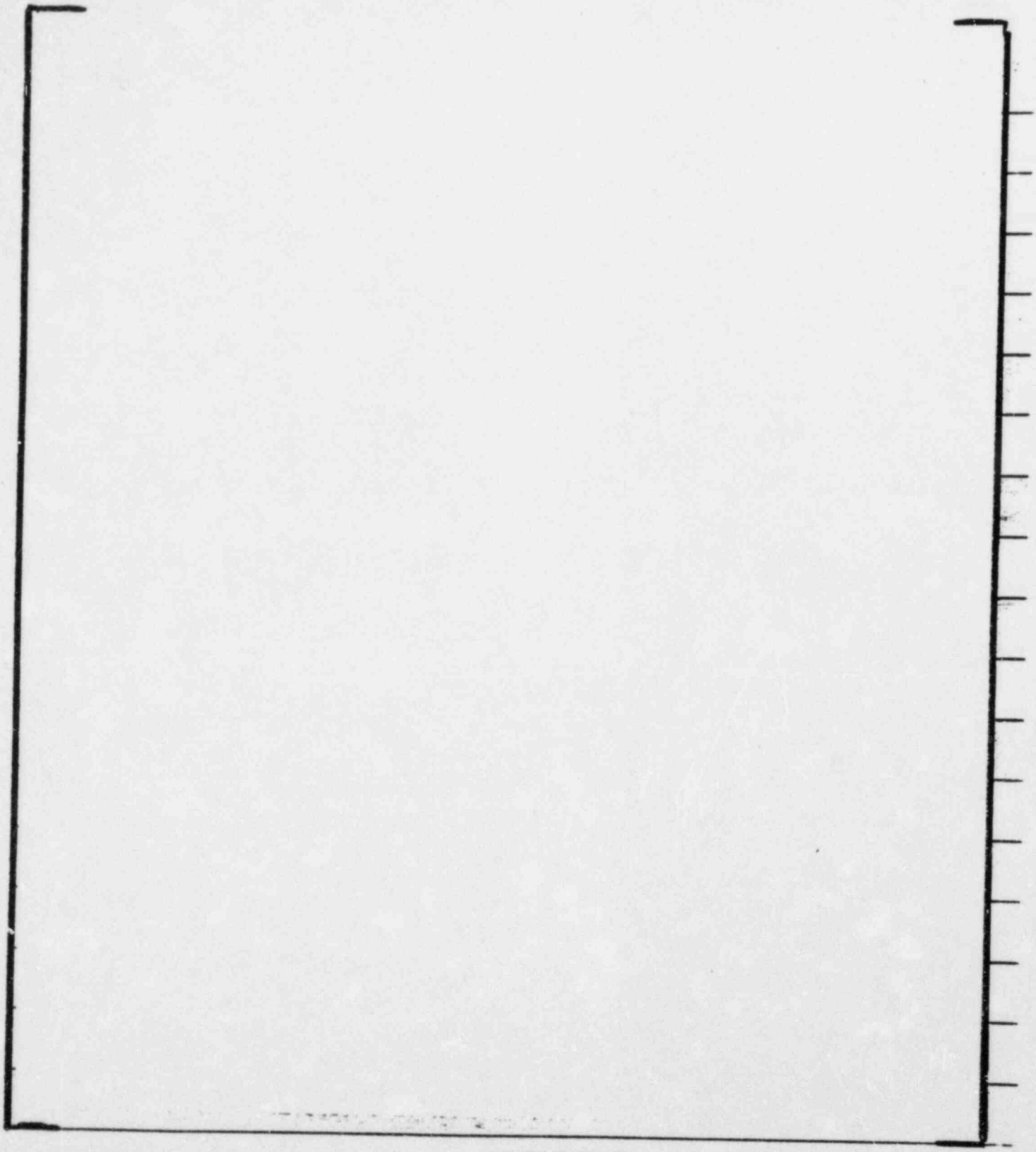

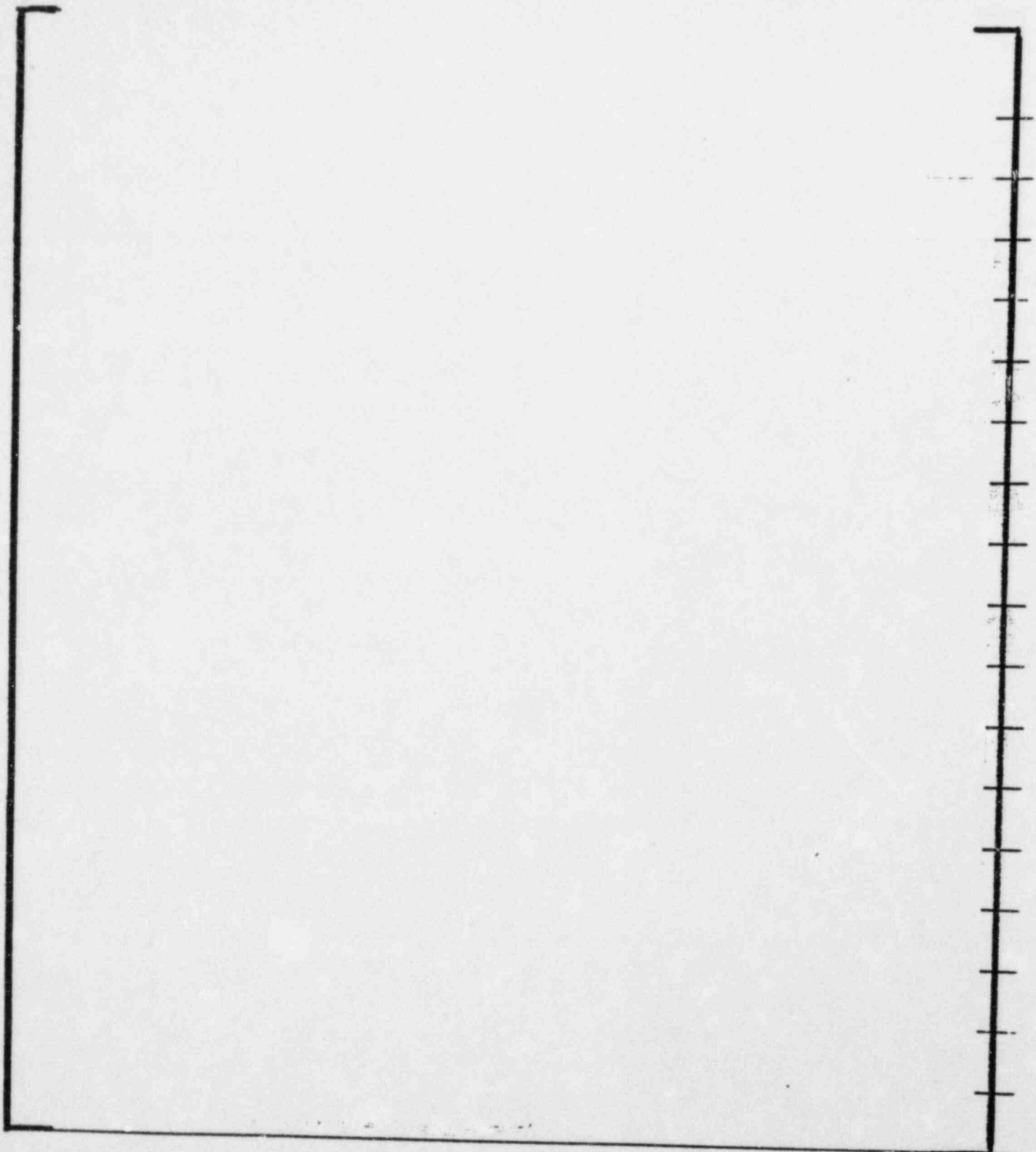

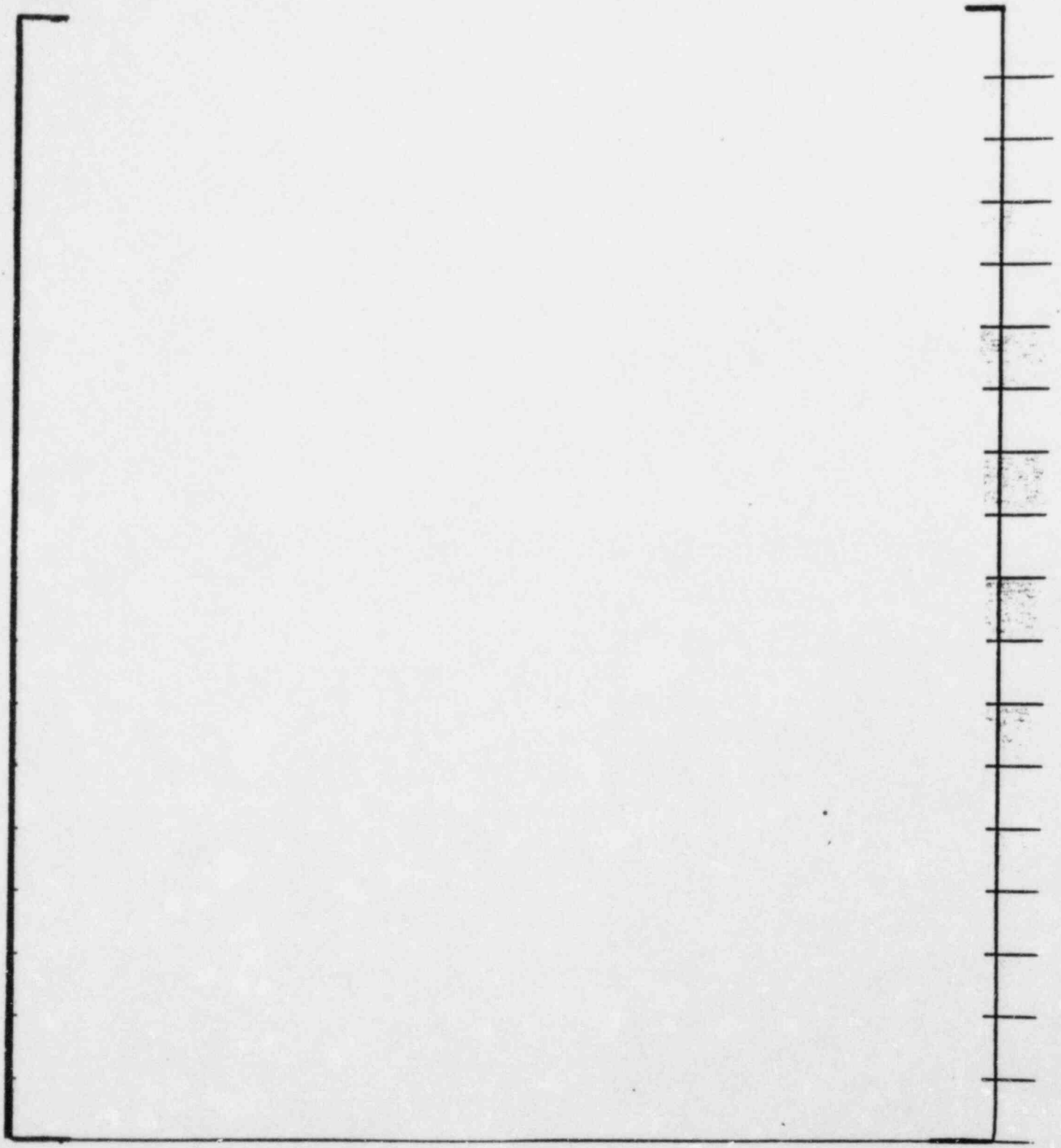

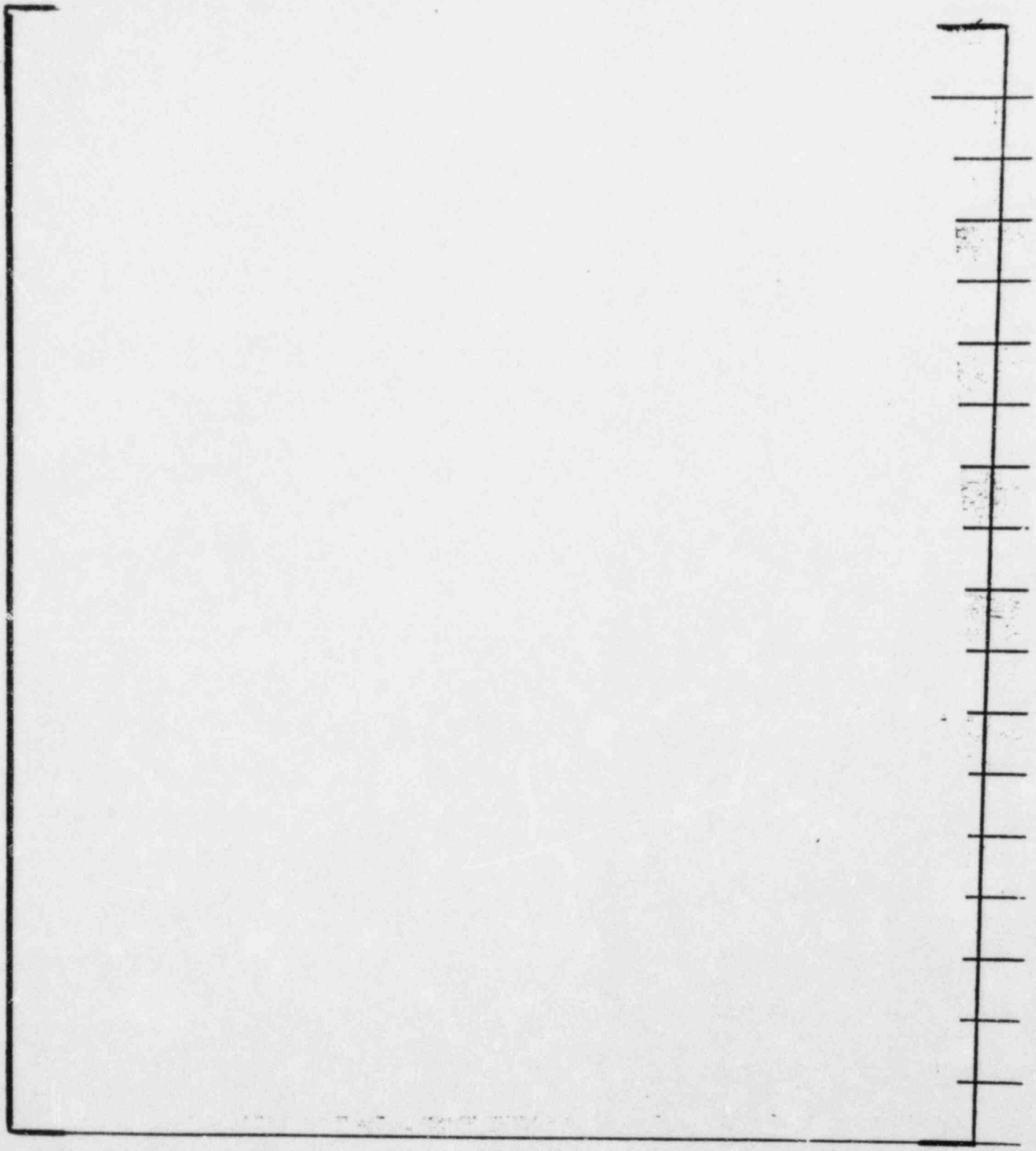

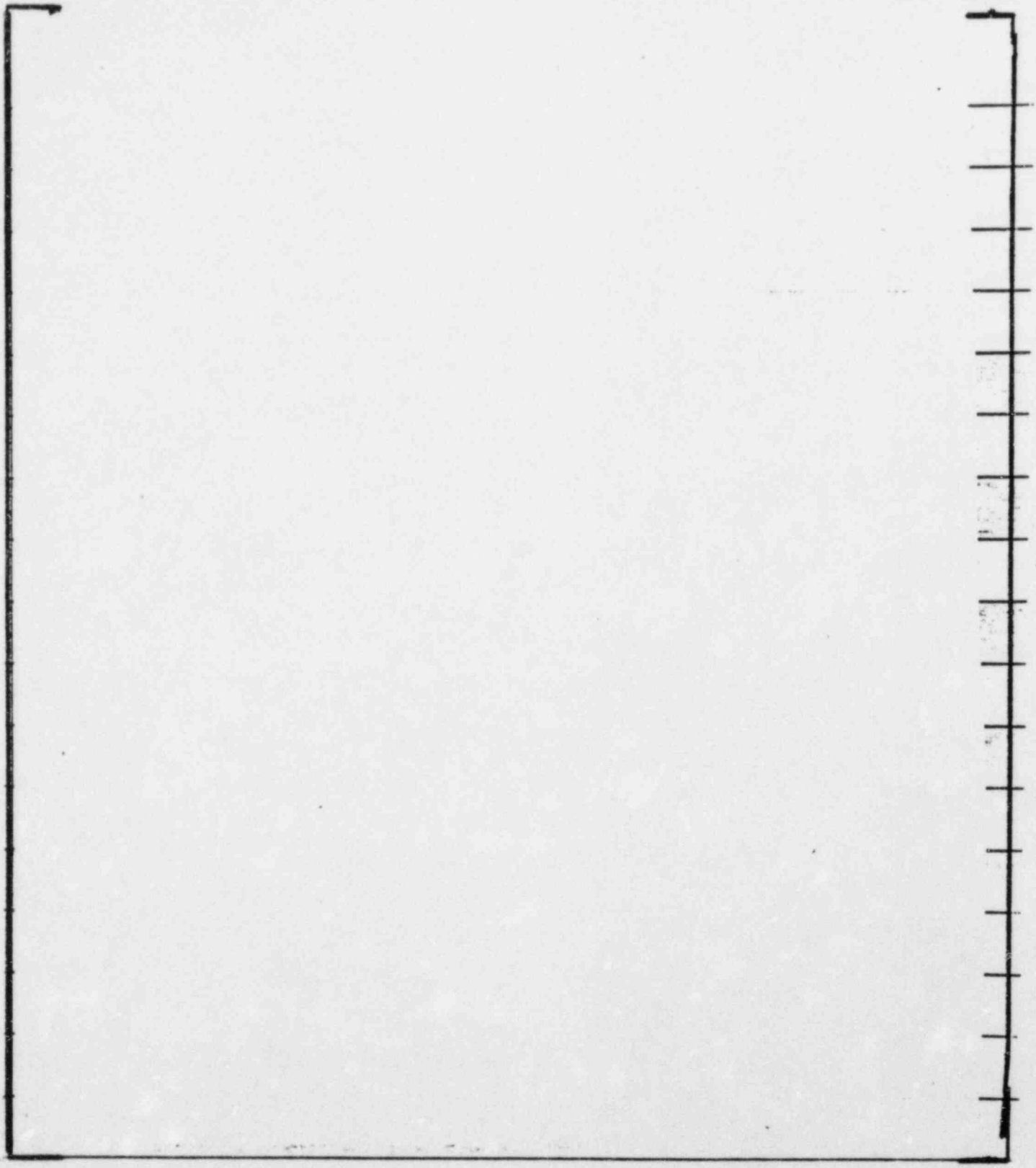

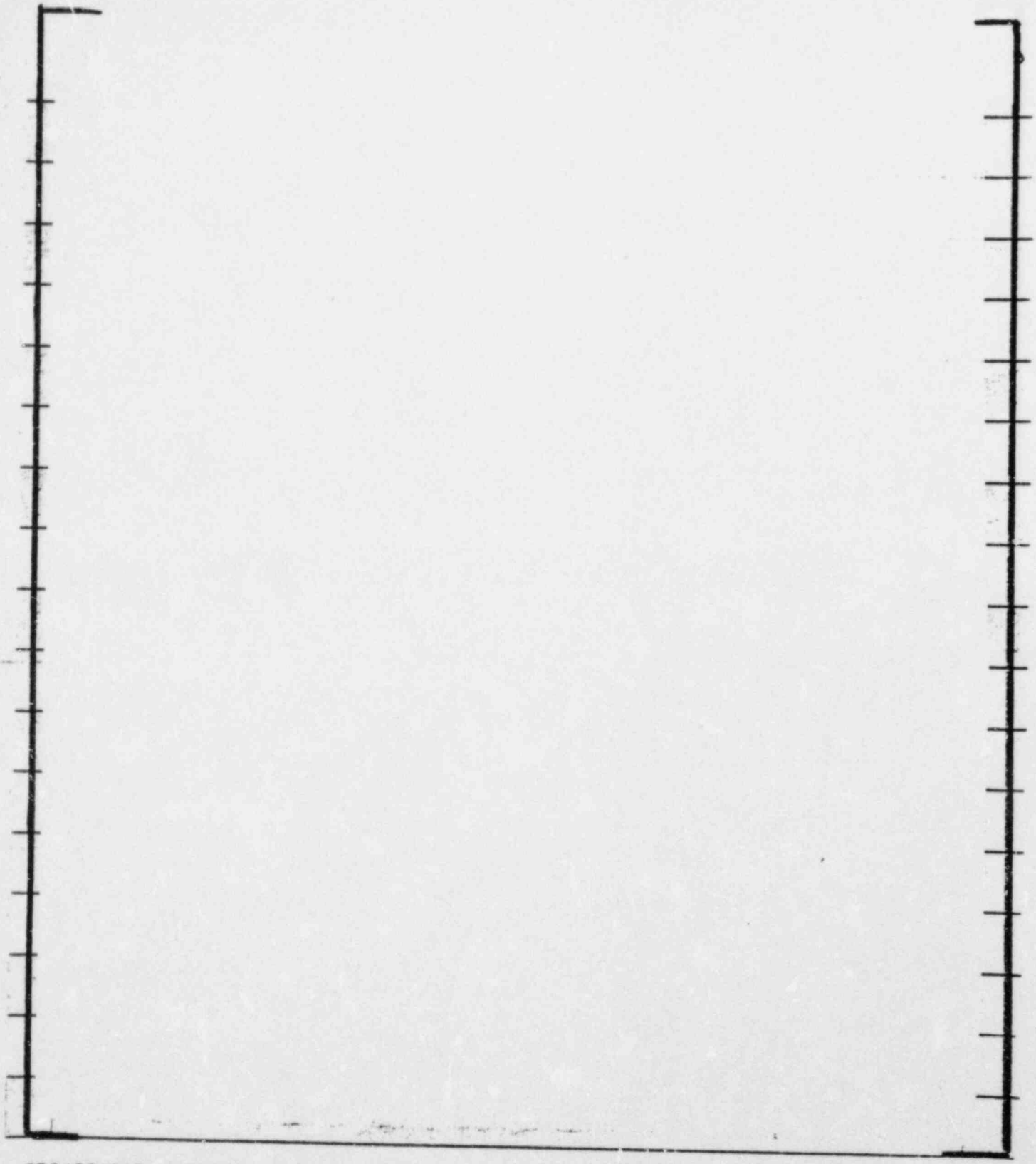

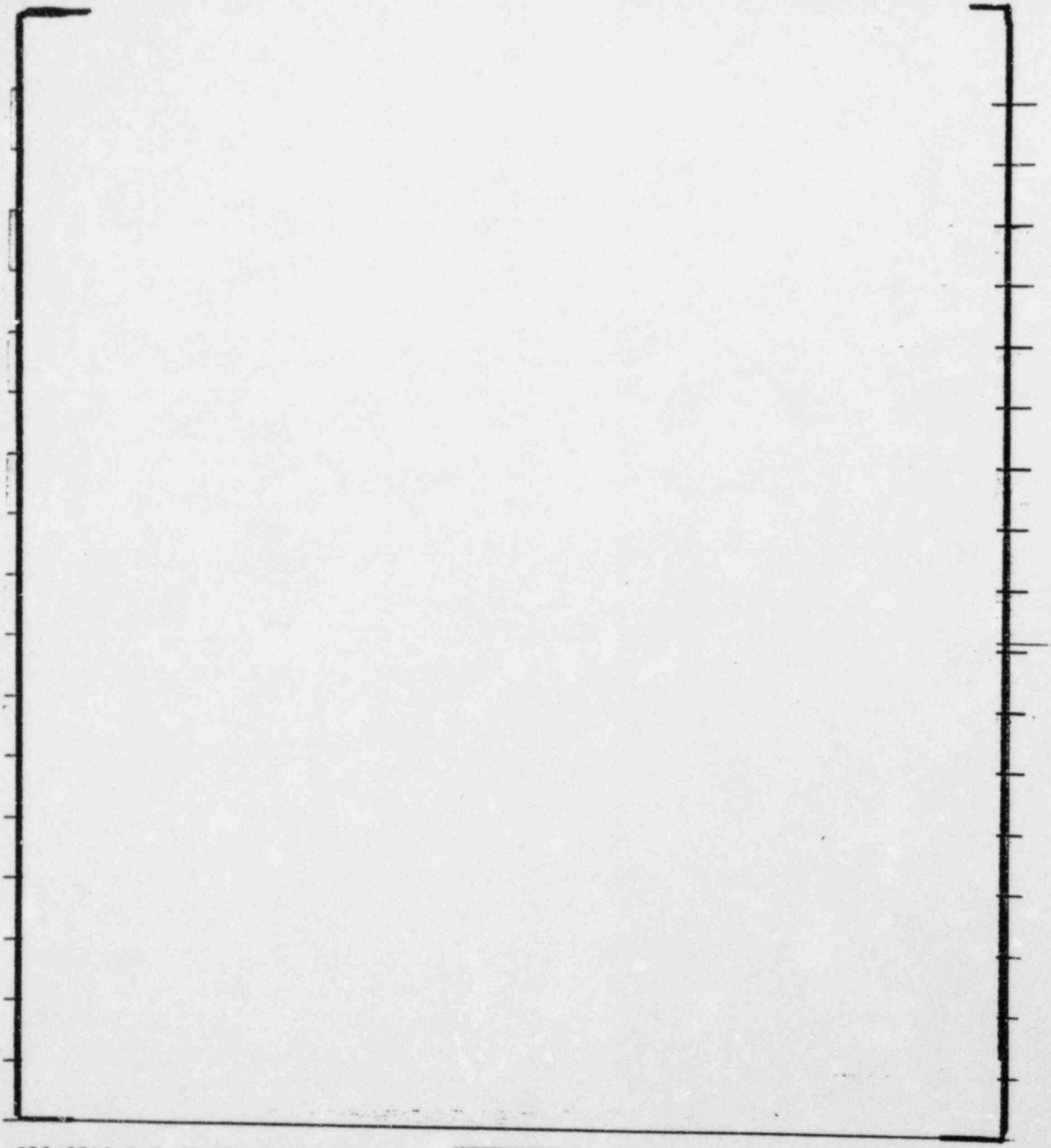

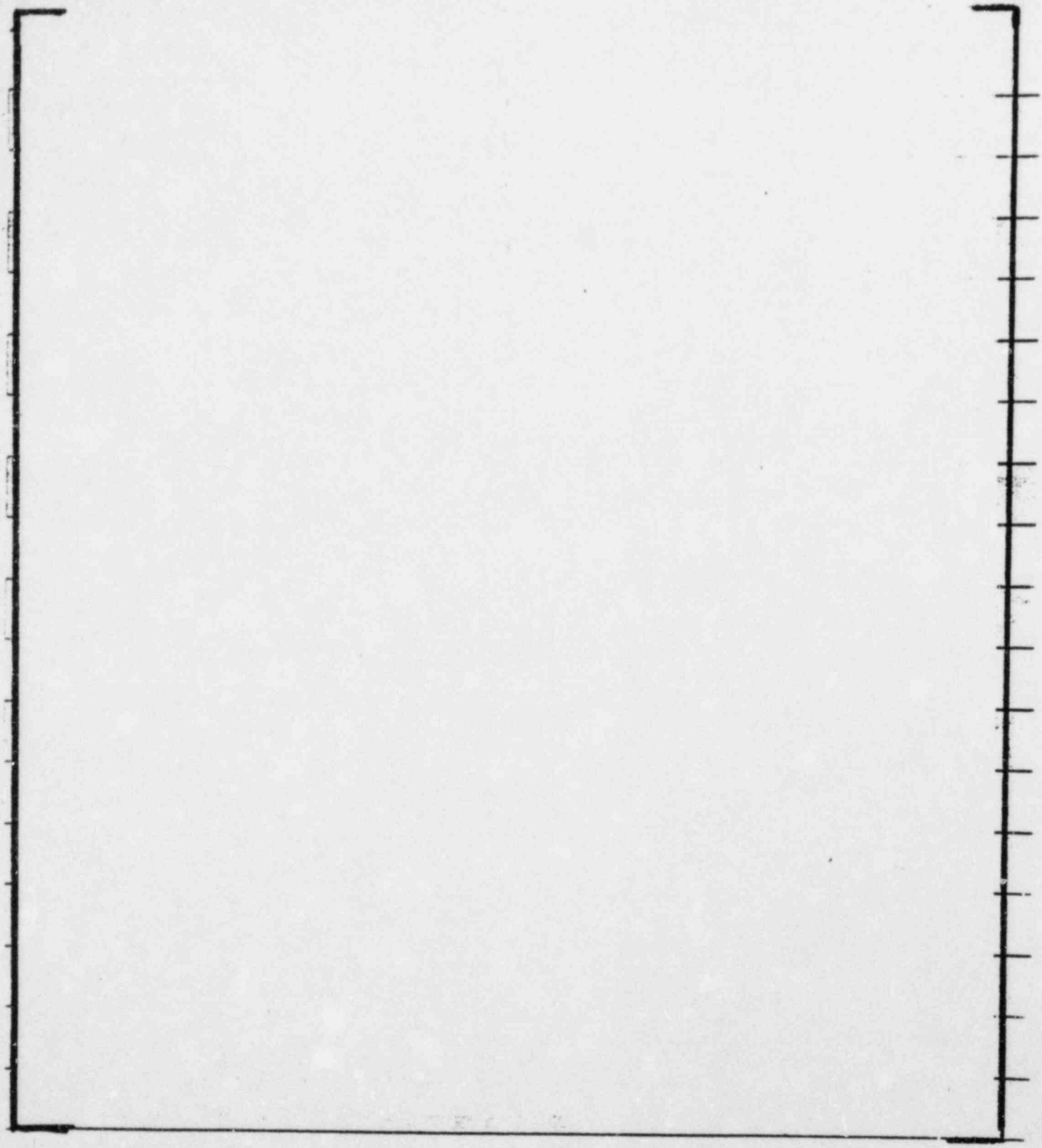

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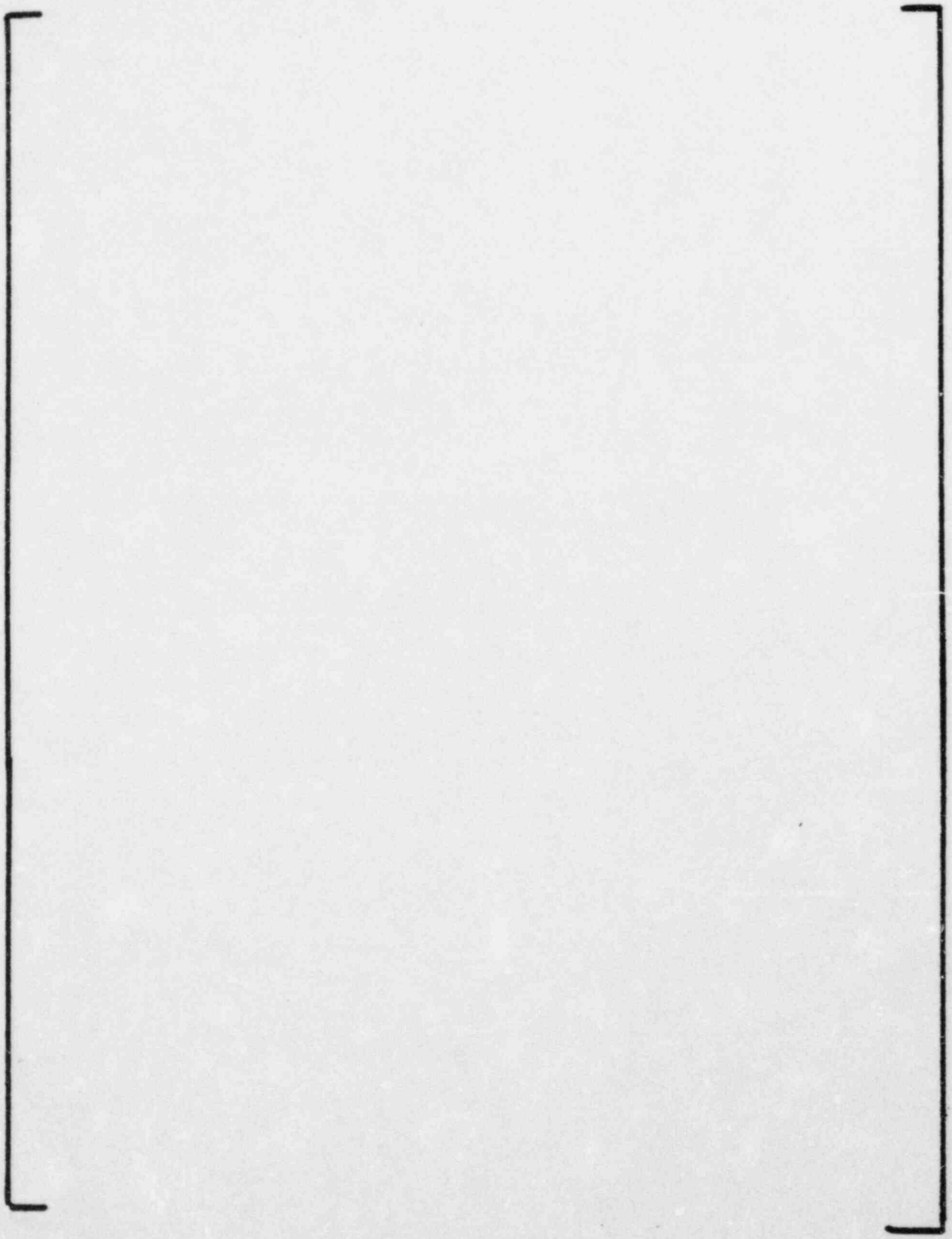
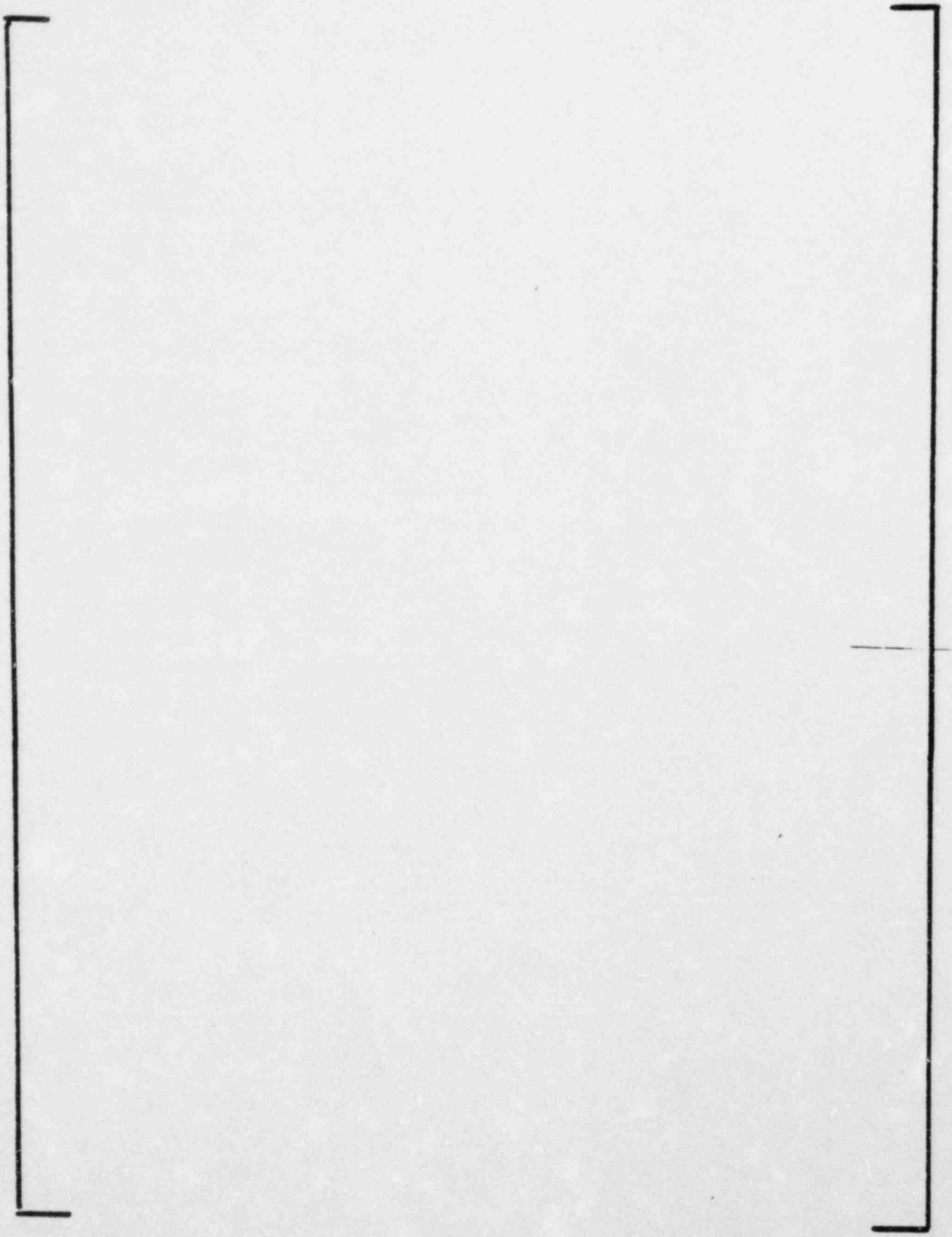
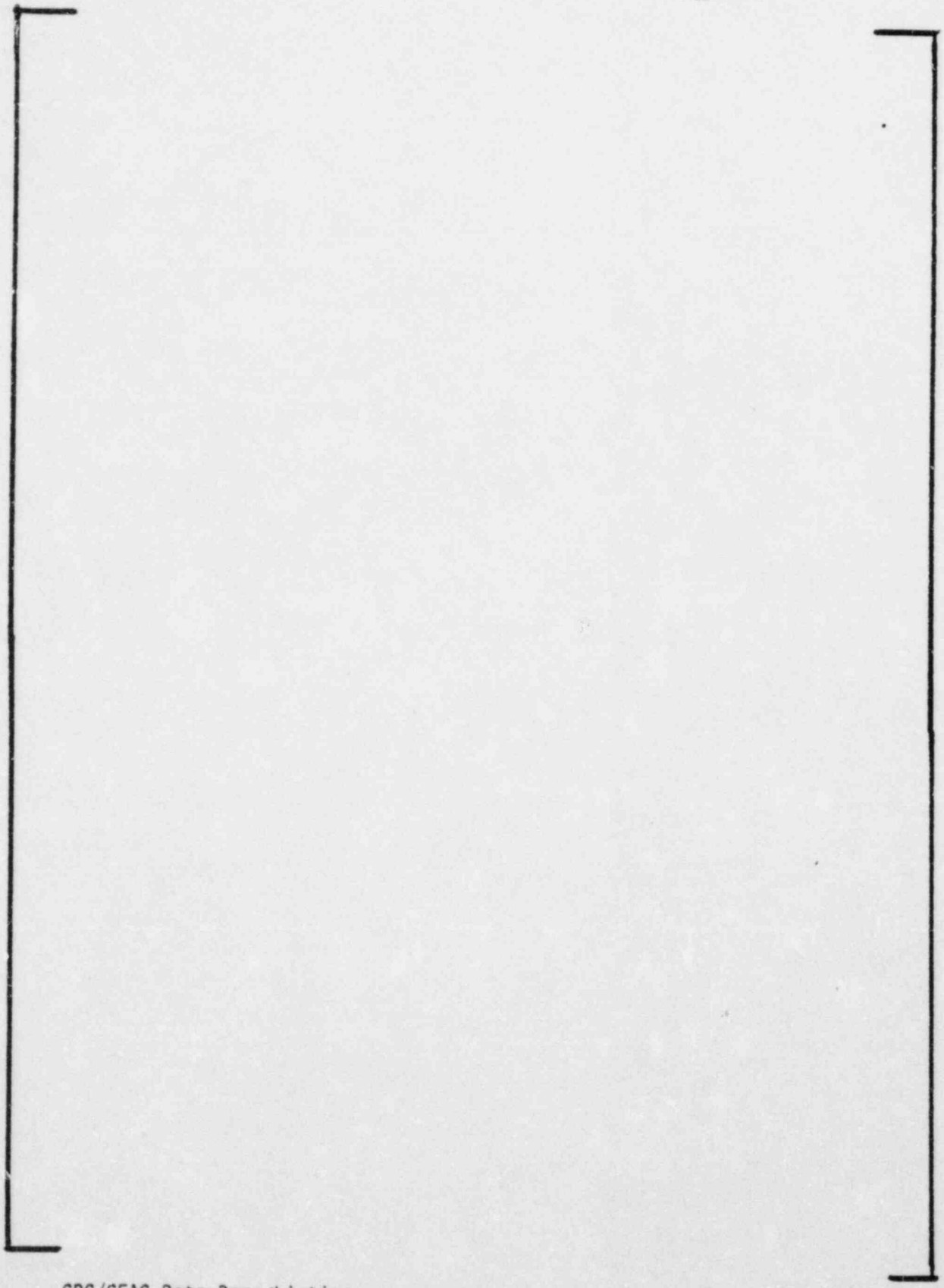
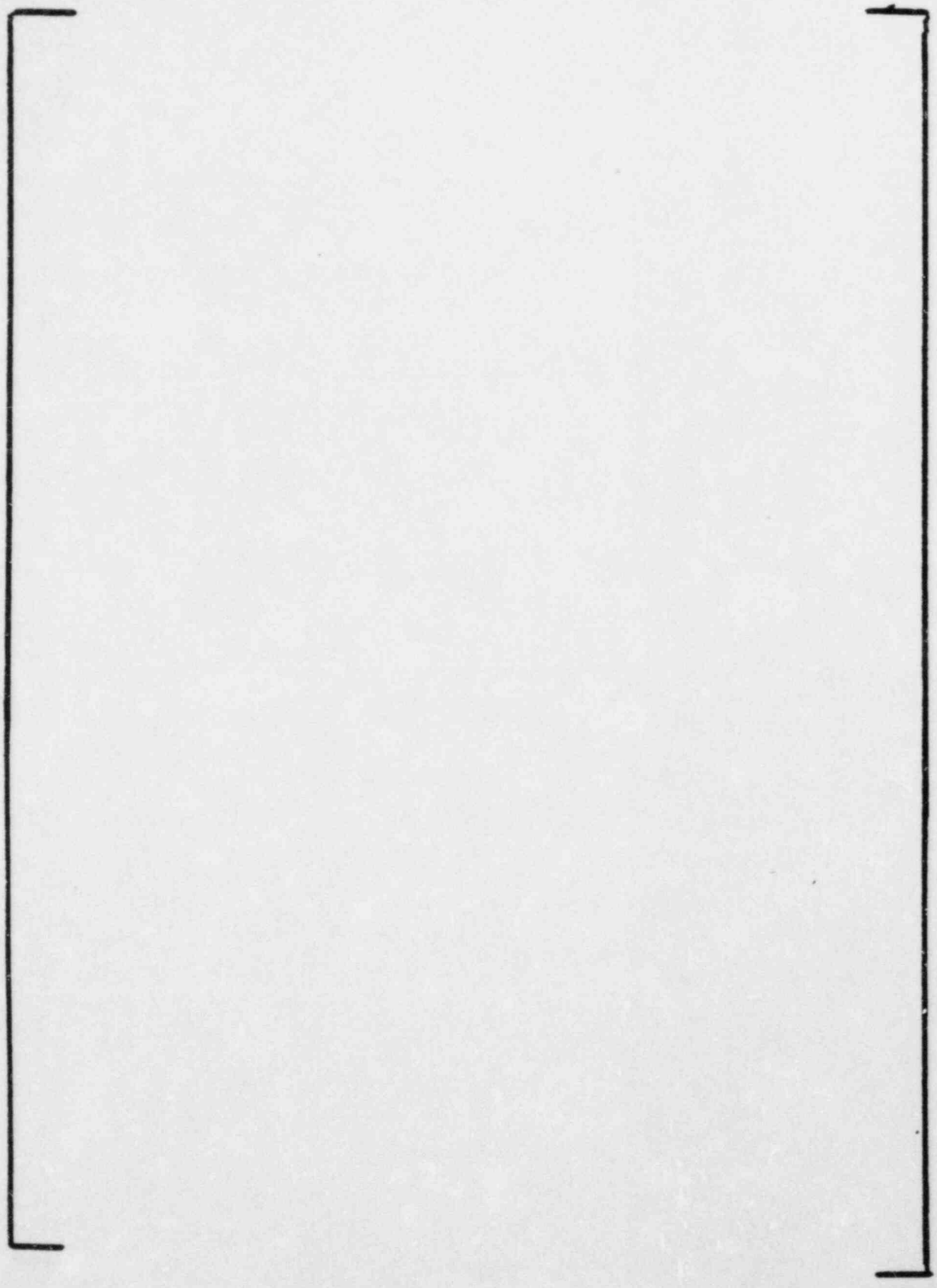
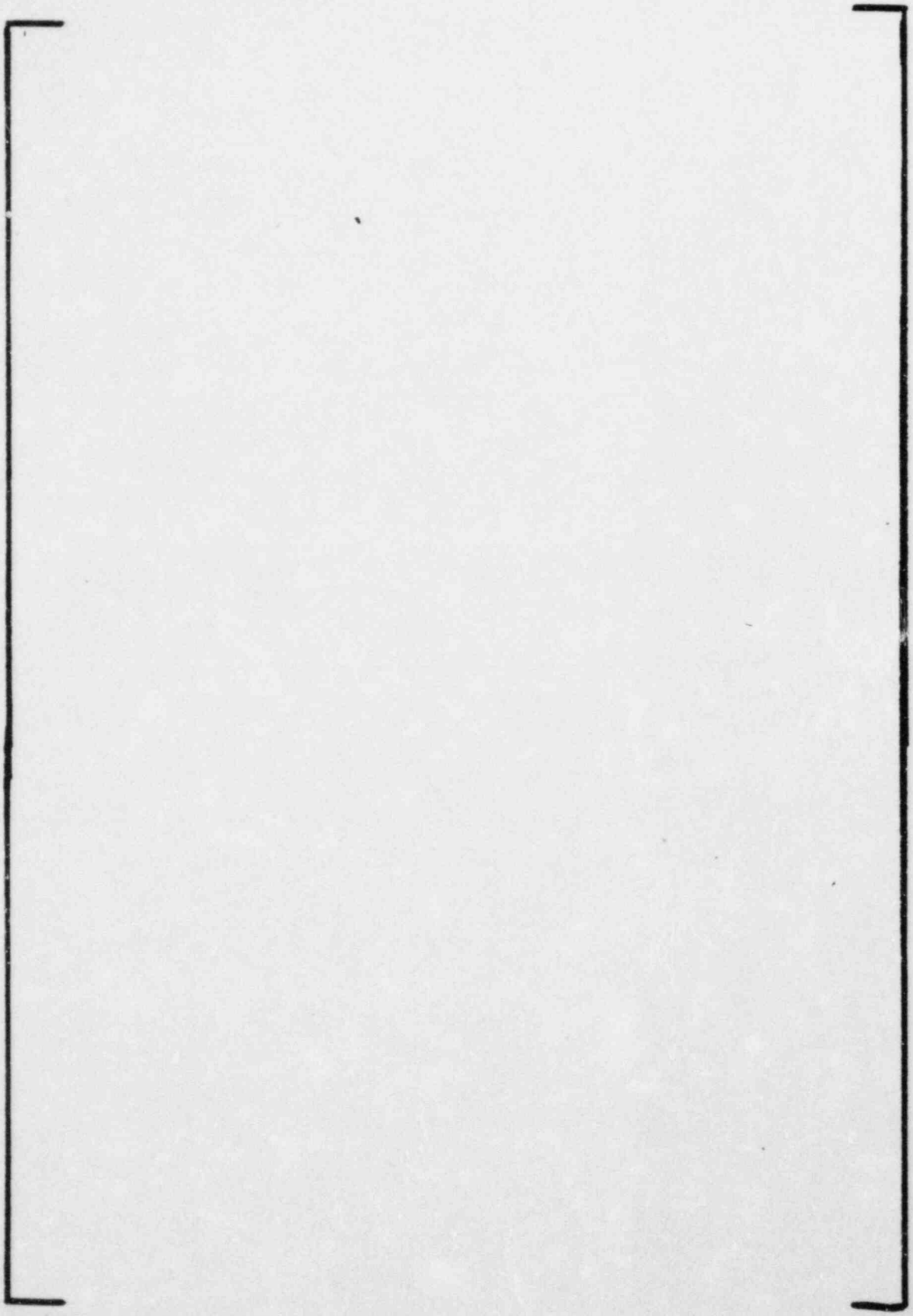
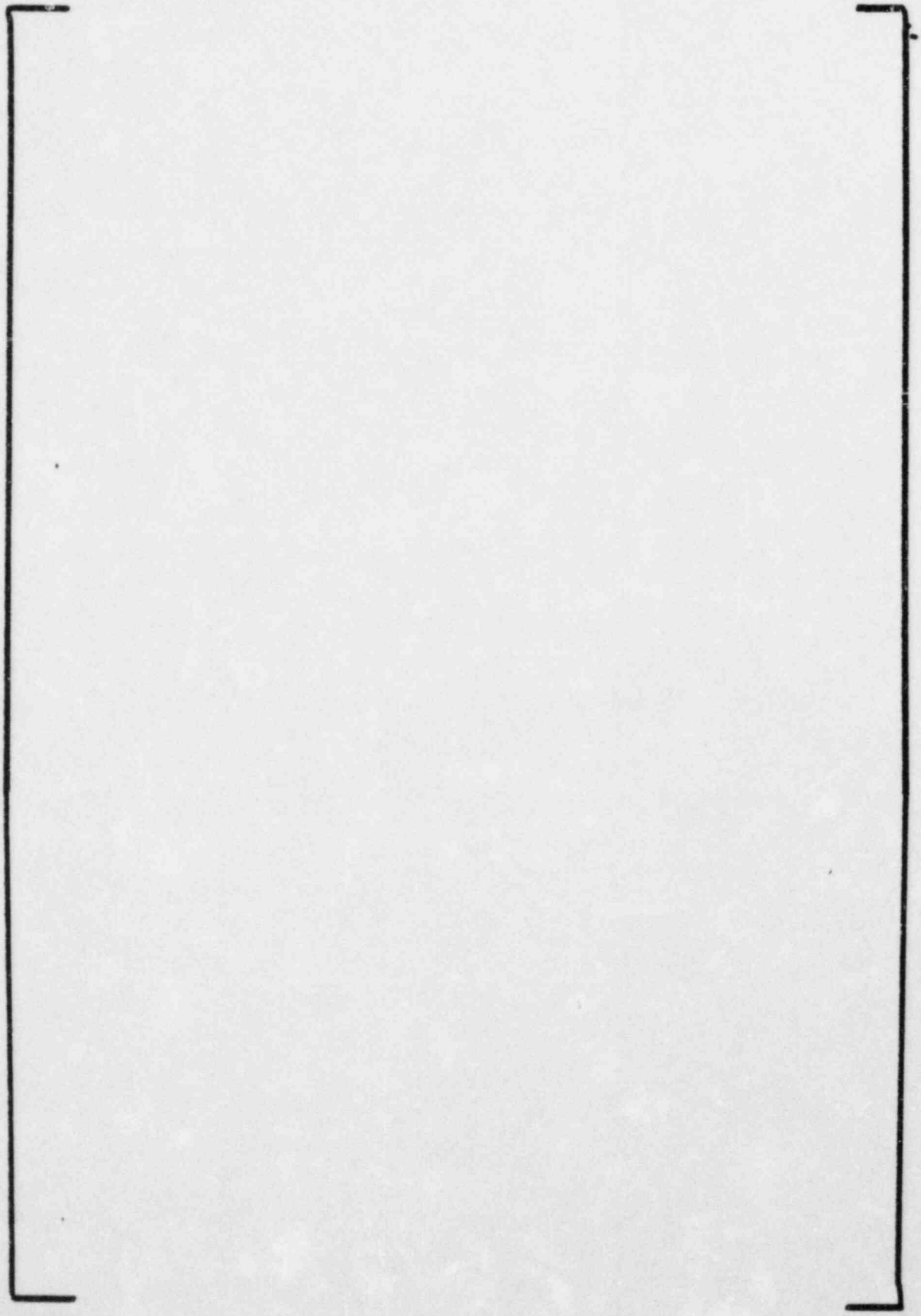


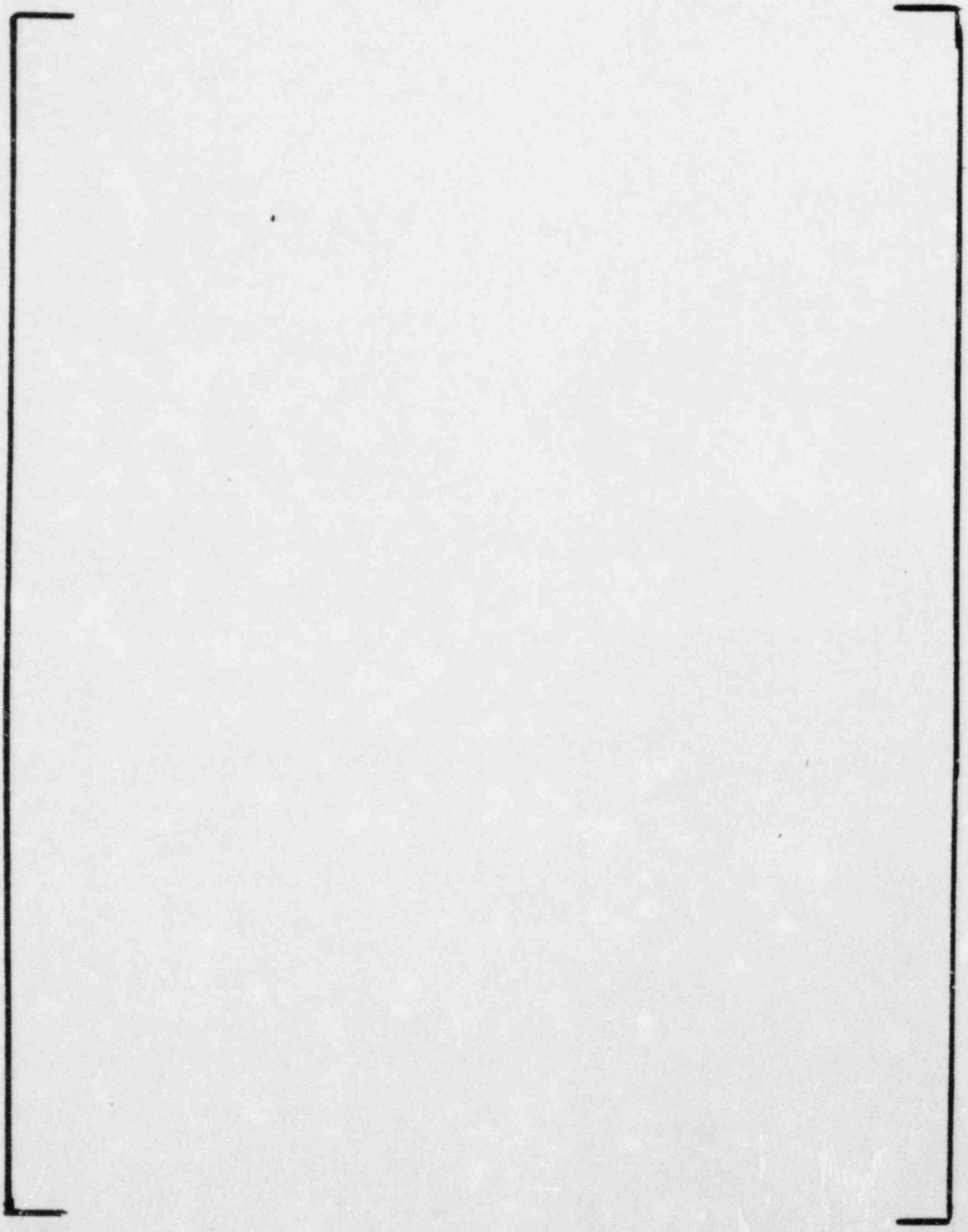


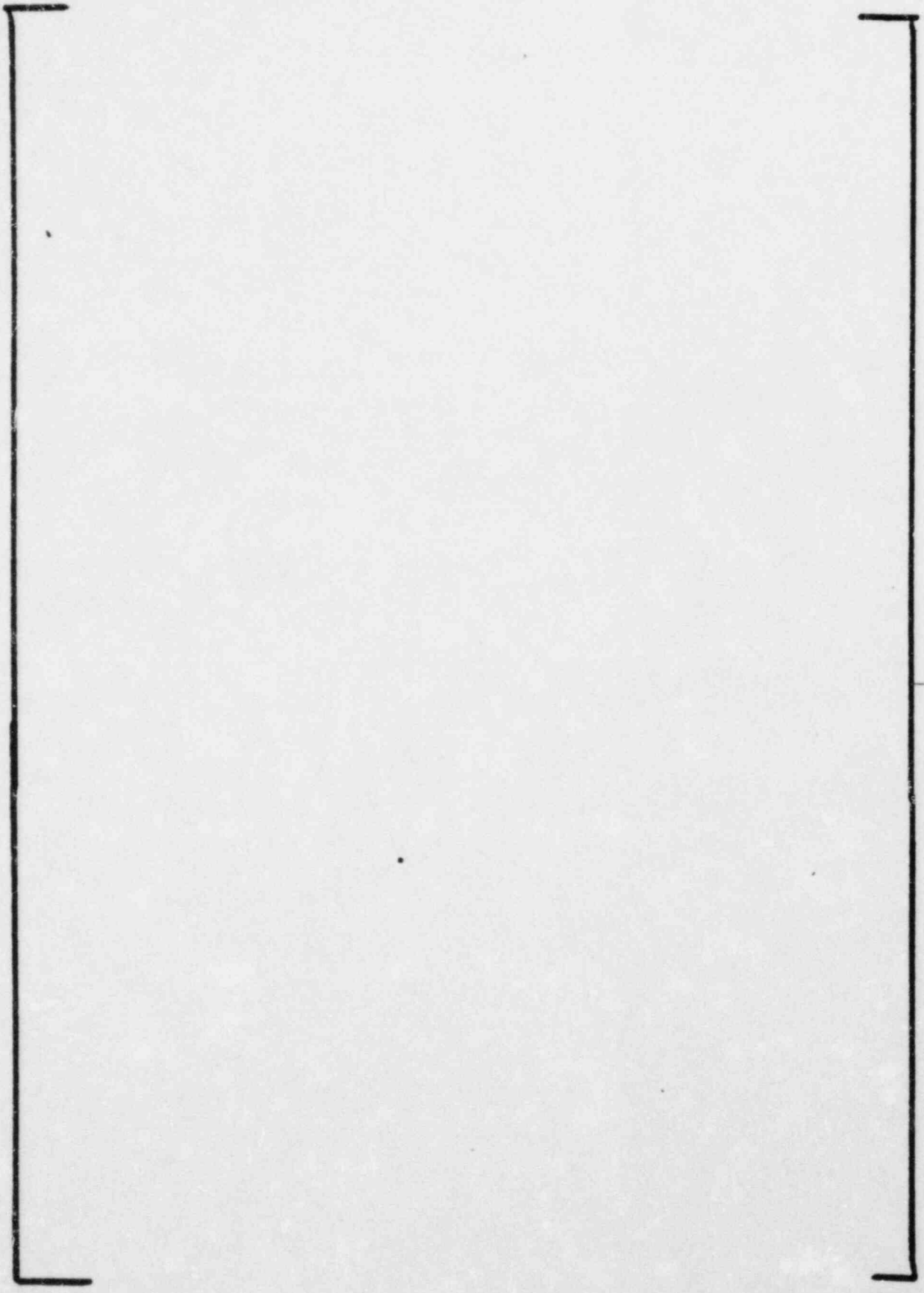


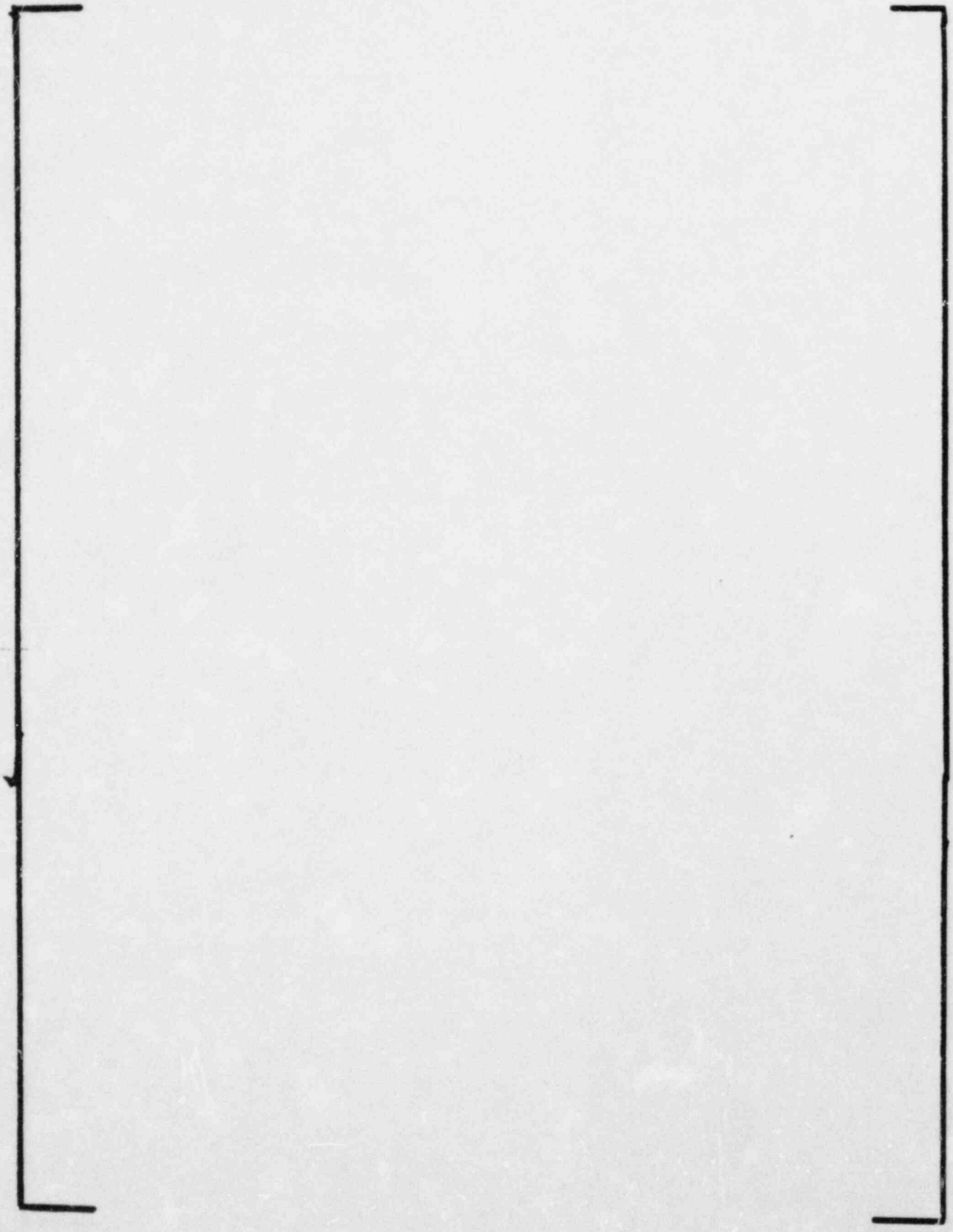


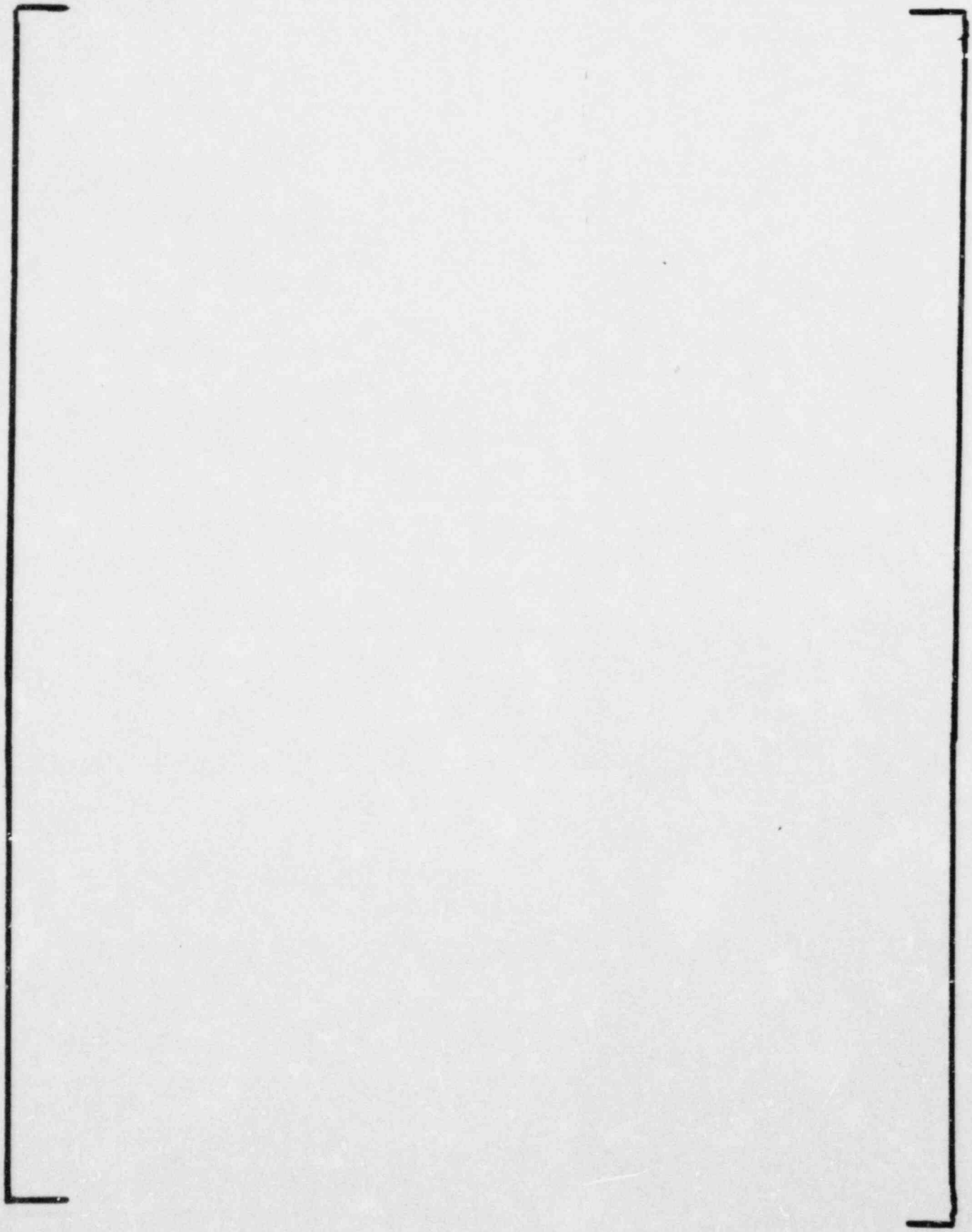


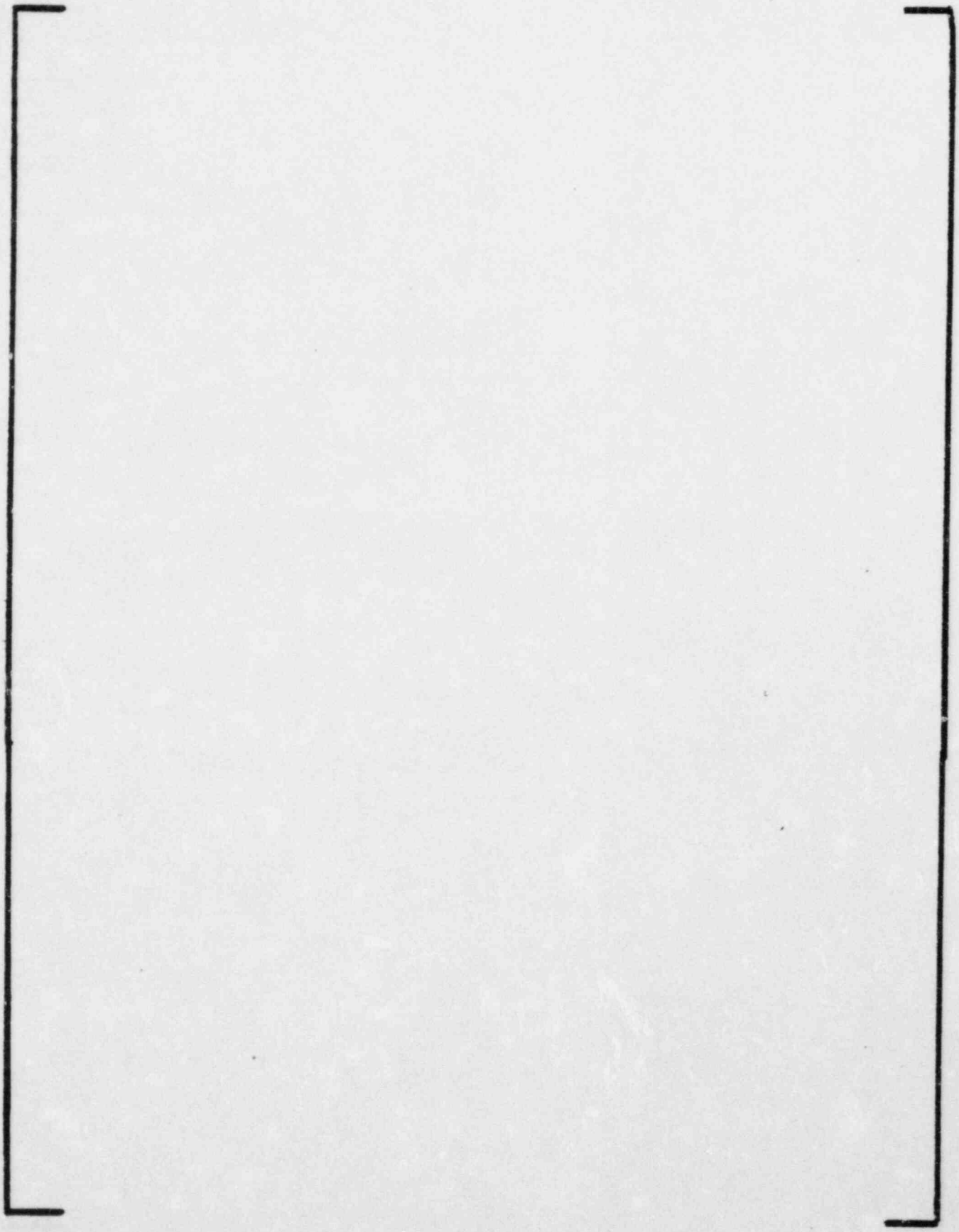


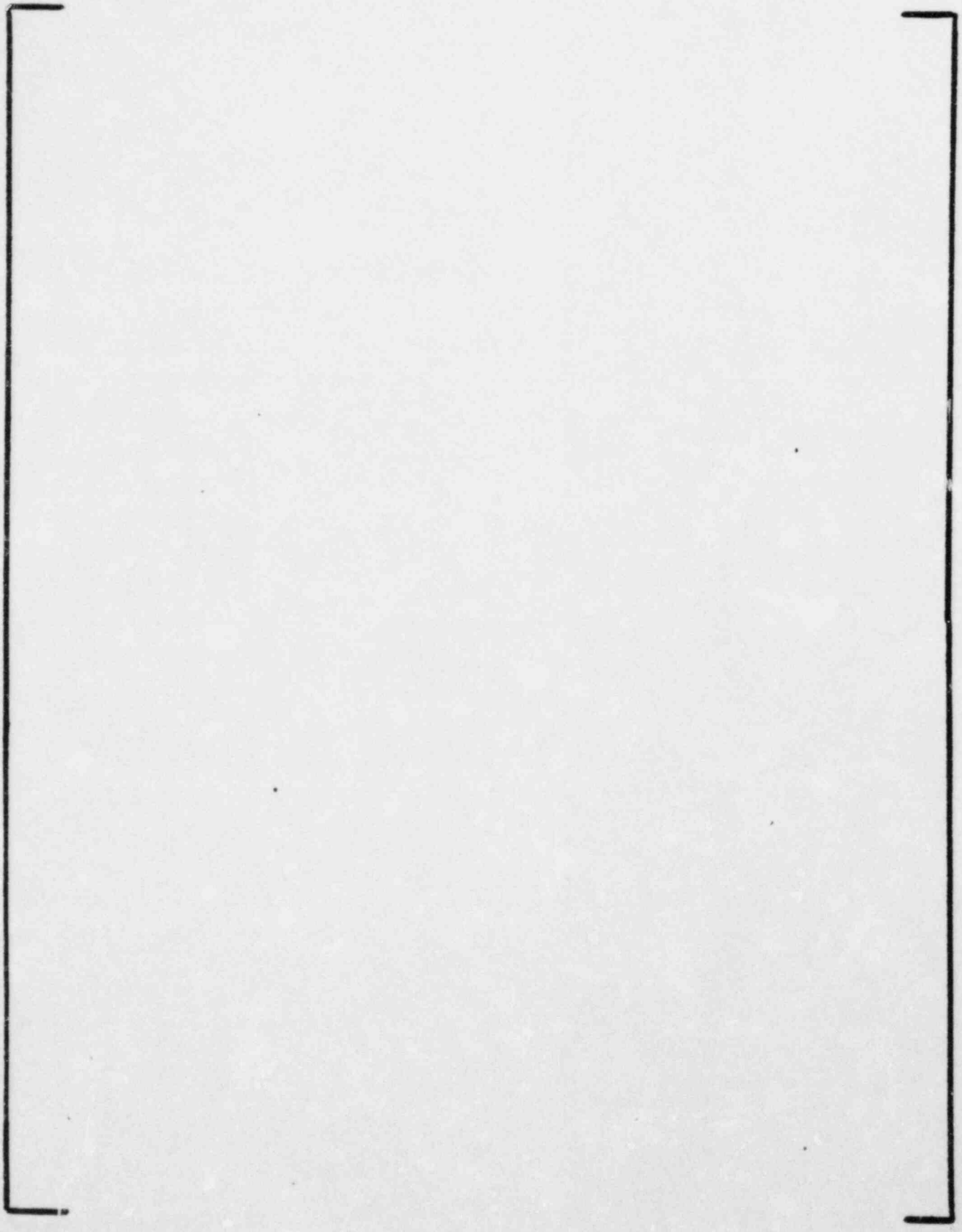


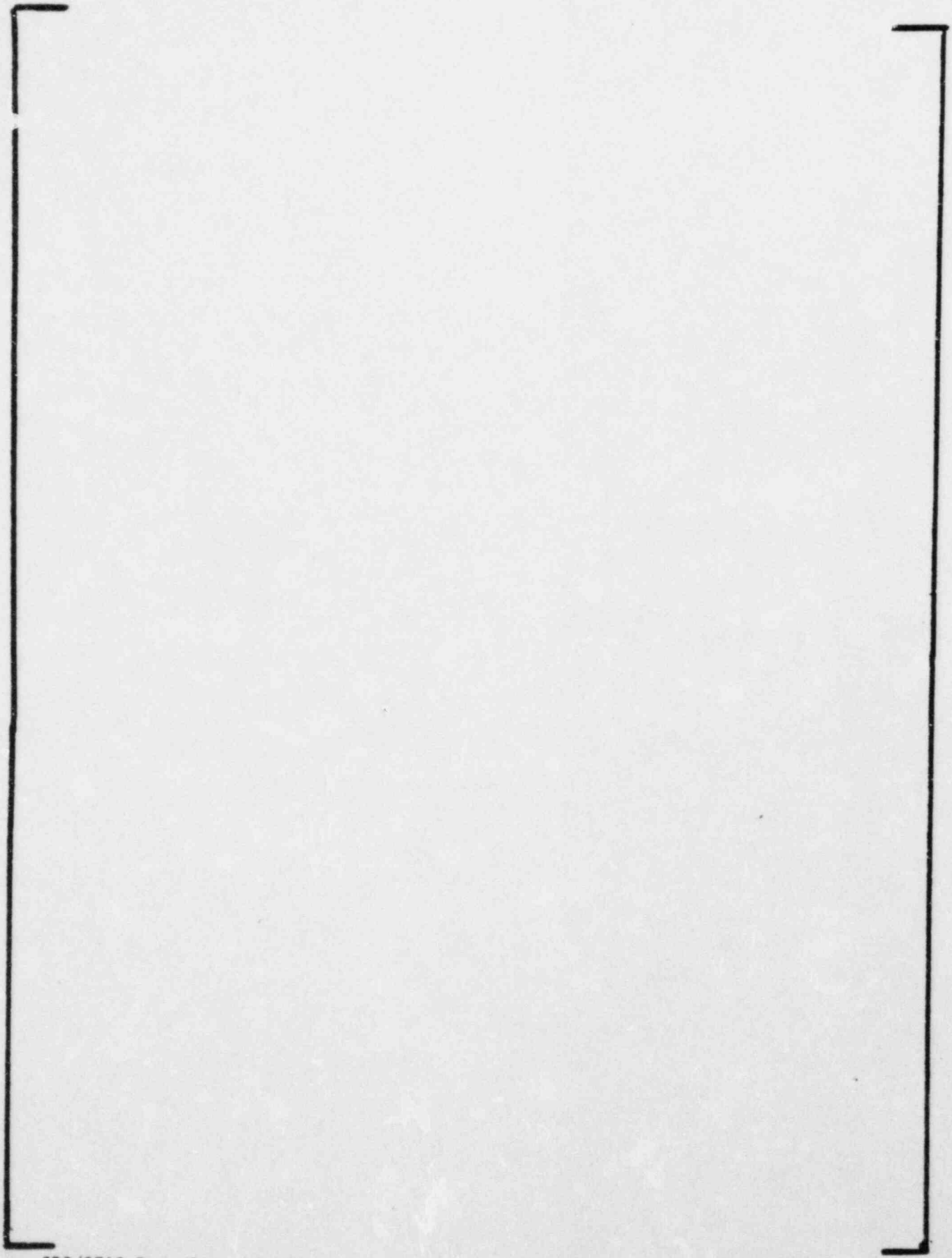


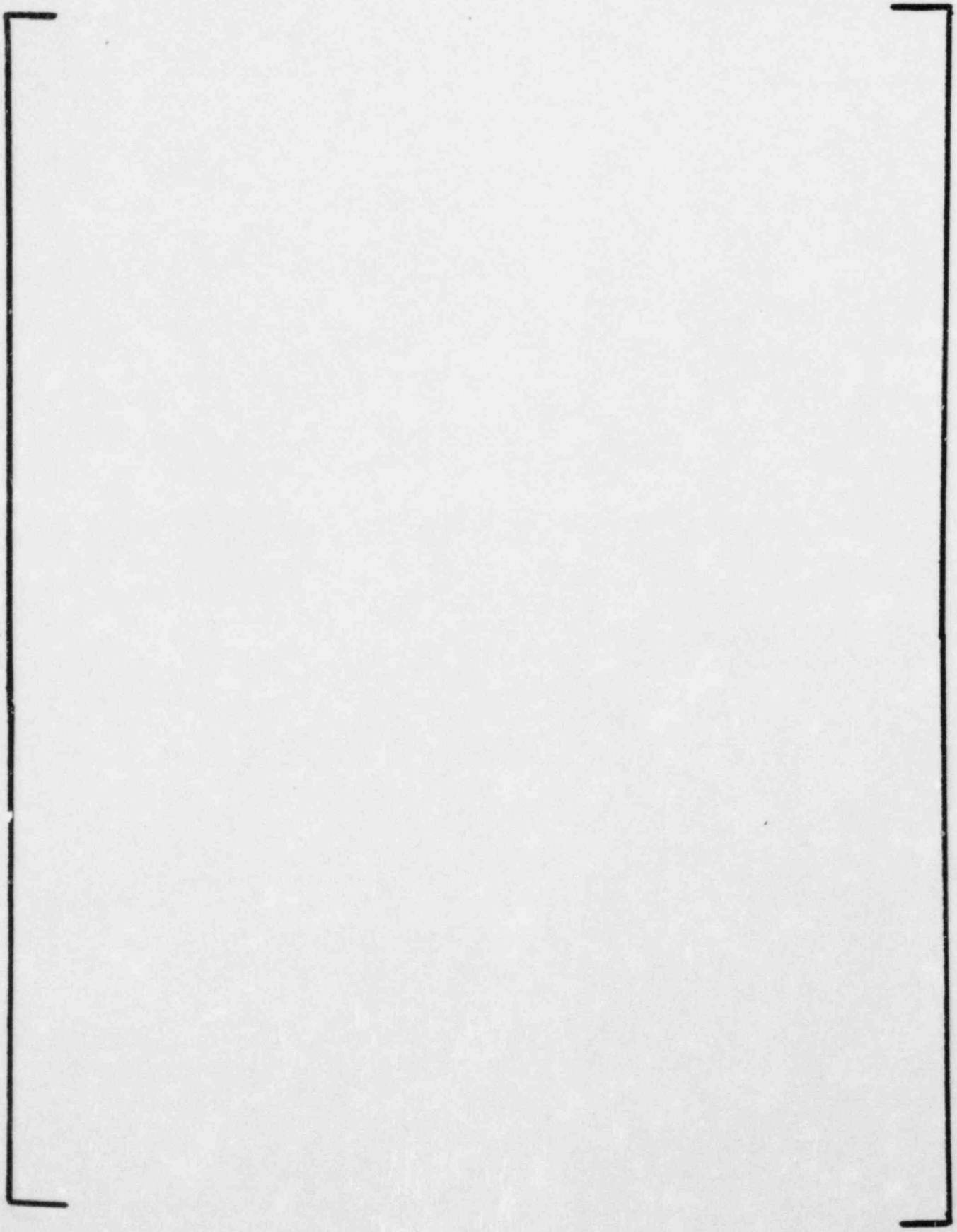


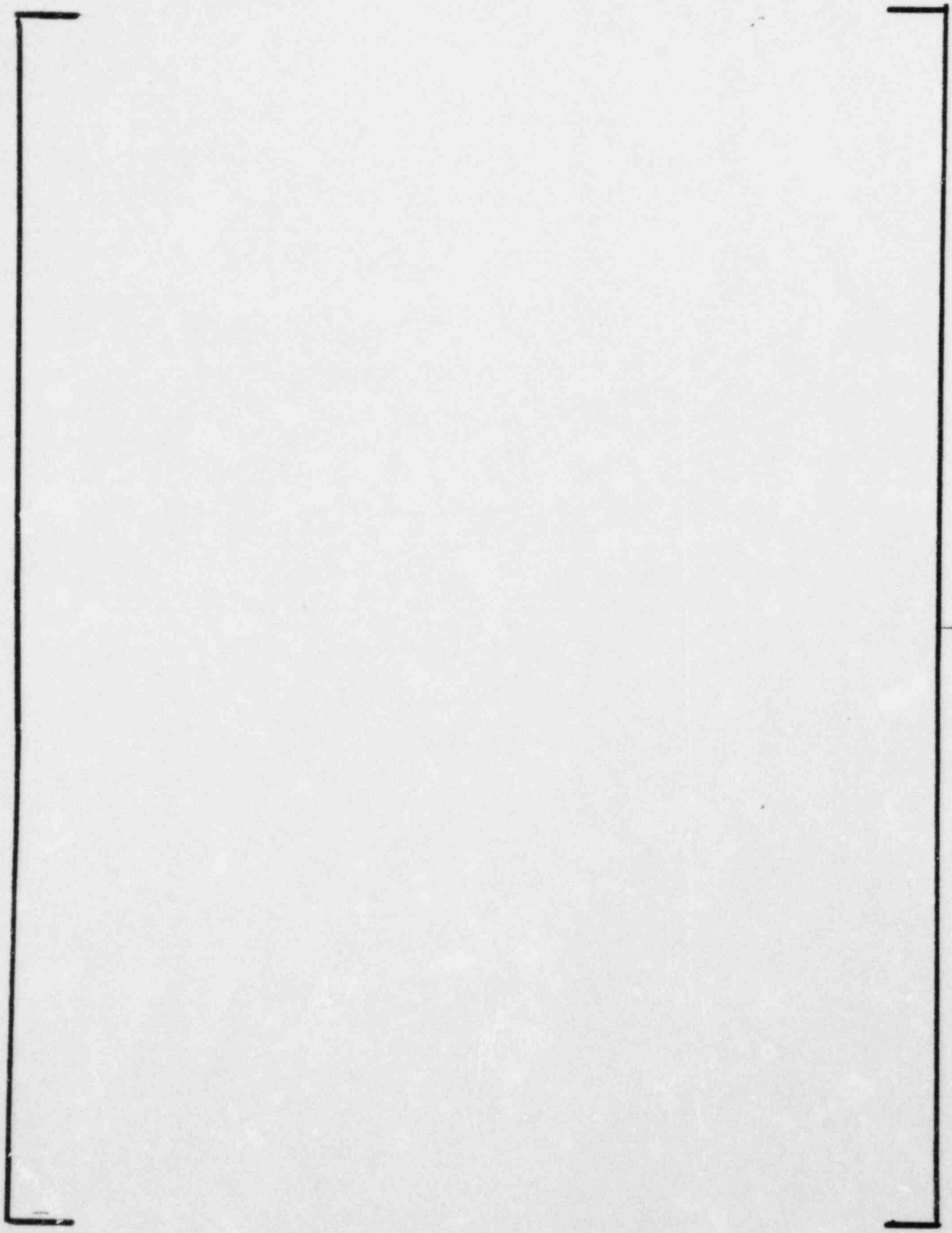


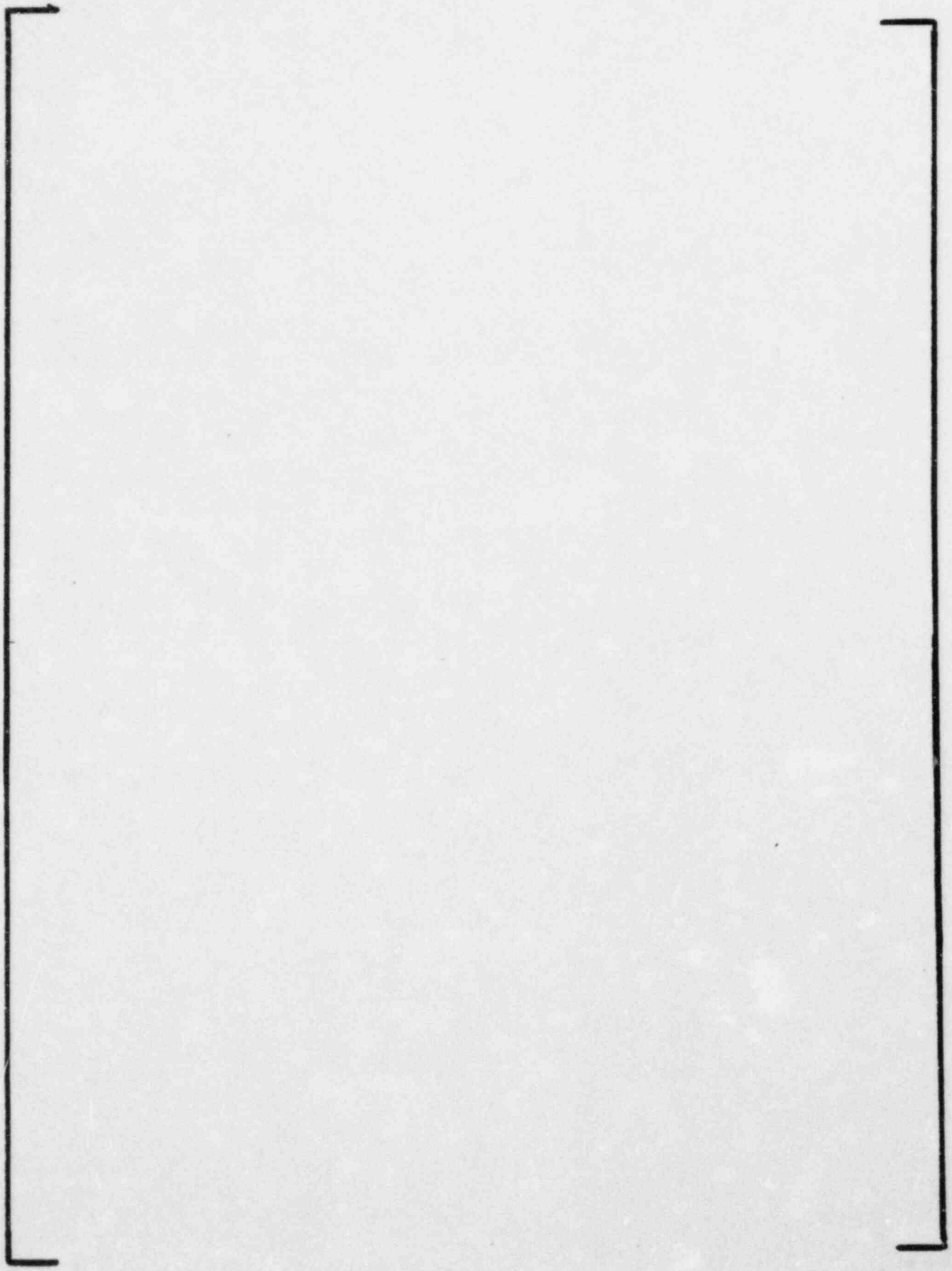


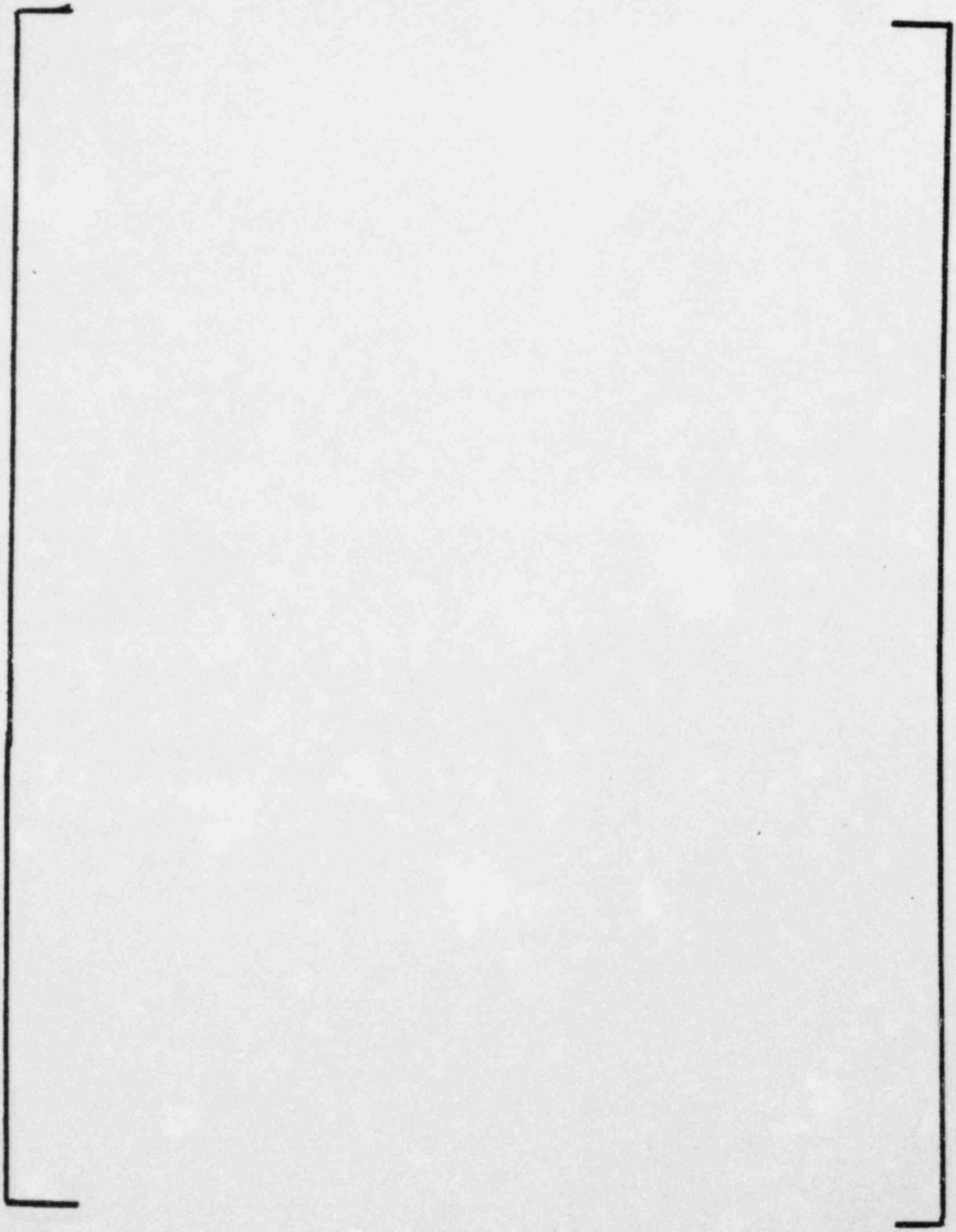






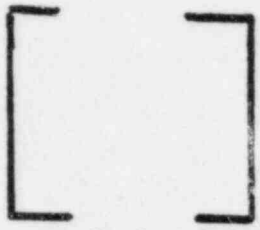






3.3 INITIALIZATION CRITERIA

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



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

3.4 ADDITIONAL COMMENTS

3.4.1 Determination of Constants

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

(1) Additional Flow Related Constants

Constant	Vector Location
[	]

With respect to Item 1 above, the CPC software design includes the flexibility to use these constants to accommodate future expansion of system capabilities. Because these constants do not effect the present design, they are not required to be quality assured.

[ ]

[redacted]

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.

Constant Vector Location

[redacted]

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 here to ensure that if one of these constants is changed, all locations using the specified constants are changed. The multiply - defined constants are:

CONSTANT	VECTOR LOCATION	PROGRAM	COMMENT