

Docket 50-361
CEN-302(S)-NP

CPC IMPROVEMENT PROGRAM

Detailed Presentation to NRC

April 1985

Combustion Engineering, Inc.
Nuclear Power Systems
Power Systems Group
Windsor, Connecticut

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INTRODUCTION

The COLSS/CPC Oversight Committee, consisting of Arizona Nuclear Power Project, Arkansas Power and Light Company, Louisiana Power and Light Company and Southern California Edison, with Combustion Engineering as its technical consultant, was formed to address common analysis and software issues related to the Combustion Engineering digital monitoring and protection systems - the Core Operating Limit Supervisory System (COLSS) and the Core Protection Calculator System (CPCS). The Committee will attempt to provide a standardized approach to resolution of problems and implementation of improvements to the digital monitoring and protection systems, an information mechanism for sharing operating experience and a feedback mechanism for the software designer.

The COLSS/CPC Oversight Committee will meet with the NRC on April 18, 1985 to present a detailed description of the CPC Improvement Program, a program of CPC Modifications and Methodology Improvements scheduled to be implemented in 1986 and 1987. An initial presentation of concepts was provided on November 8, 1984. The schedule for implementation of the program was presented to the NRC on March 8, 1985. The April 18 meeting will provide a detailed presentation of the portions of the program scheduled for implementation in early 1986. This document provides the NRC with copies of the slides to be presented at this meeting.

The objective of the presentation is to provide a detailed description of the CPC Improvement Program in order to initiate the NRC review process, to solicit feedback from the NRC to guide in program development and to assist the NRC in meeting the implementation schedule. A schedule for presentations, documentation and implementation will be presented at the meeting.

The CPC Improvement Program consists of three major areas:

- Part A - Optimization of CPC/CEAC Software for Reloads
- Part B - CEAC Desensitization to Spurious Signals
- Part C - Reload Data Block Constants

This presentation will cover details of Parts A and B, scheduled to be implemented in early 1986. Part C, scheduled to be implemented initially in late 1986, will be presented in August 1985.

The program to be described in this presentation will apply in whole or part to Arkansas Nuclear One Unit 2 (ANO-2); Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2 and 3; San Onofre Nuclear Generating Station (SONGS) Units 2 and 3; and Waterford Unit 3.

This report is being presented on the SONGS Unit 2 docket since it is scheduled as the lead plant for implementation of the CPC Improvement Program.

CPC IMPROVEMENT PROGRAM

PLANS FOR CPC MODIFICATIONS
AND METHODOLOGY IMPROVEMENTS

DETAILED PRESENTATION TO NRC

APRIL 18, 1985

ARIZONA NUCLEAR POWER PROJECT
ARKANSAS POWER AND LIGHT COMPANY
COMBUSTION ENGINEERING, INC.
LOUISIANA POWER AND LIGHT COMPANY
SOUTHERN CALIFORNIA EDISON

AGENDA

NRC - COLSS/CPC OVERSIGHT COMMITTEE MEETING

APRIL 18, 1985

CPC IMPROVEMENT PROGRAM

- o INTRODUCTION
- o PROGRAM GOALS
- o PROGRAM APPROACH
- o DESCRIPTION OF PROGRAM
- o SCHEDULE FOR PRESENTATIONS,
DOCUMENTATION AND IMPLEMENTATION
- o SUMMARY

CPC IMPROVEMENT PROGRAM

PRESENTATION OBJECTIVE:

TO PROVIDE A DETAILED DESCRIPTION OF A PLANNED
IMPROVEMENT PROGRAM FOR THE CORE PROTECTION
CALCULATOR (CPC) SYSTEM IN ORDER TO INITIATE THE
NRC REVIEW PROCESS, TO SOLICIT FEEDBACK FROM THE
NRC TO GUIDE IN PROGRAM DEVELOPMENT, AND TO ASSIST
THE NRC IN MEETING THE IMPLEMENTATION SCHEDULE.

CPC IMPROVEMENT PROGRAM

PROGRAM GOALS

- o AVOID FUTURE CPC SOFTWARE CHANGES
 - REDUCE RELOAD EFFORT, CALENDAR TIME AND NEED FOR NRC REVIEWS
- o REDUCE UNNECESSARY PLANT TRIPS
 - AVOID TRANSIENTS CAUSED BY UNNECESSARY PLANT TRIPS
 - IMPROVE PLANT AVAILABILITY
- o SIMPLIFY RELOAD ANALYSES
 - REDUCE RELOAD EFFORT AND CALENDAR TIME
- o MAINTAIN MARGINS TO SAFETY

CPC IMPROVEMENT PROGRAM

PROGRAM APPROACH



CPC IMPROVEMENT PROGRAM

DESCRIPTION OF PROGRAM

A. OPTIMIZATION OF CPC/CEAC SOFTWARE FOR RELOADS

- IMPLEMENT IN EARLY 1986

B. CEAC DESENSITIZATION TO SPURIOUS SIGNALS

- IMPLEMENT IN EARLY 1986

C. RELOAD DATA BLOCK CONSTANTS

- DETAILS TO BE PRESENTED IN AUGUST 1985

- IMPLEMENT IN LATE 1986

CPC IMPROVEMENT PROGRAM

A. OPTIMIZATION OF CPC/CEAC SOFTWARE FOR RELOADS

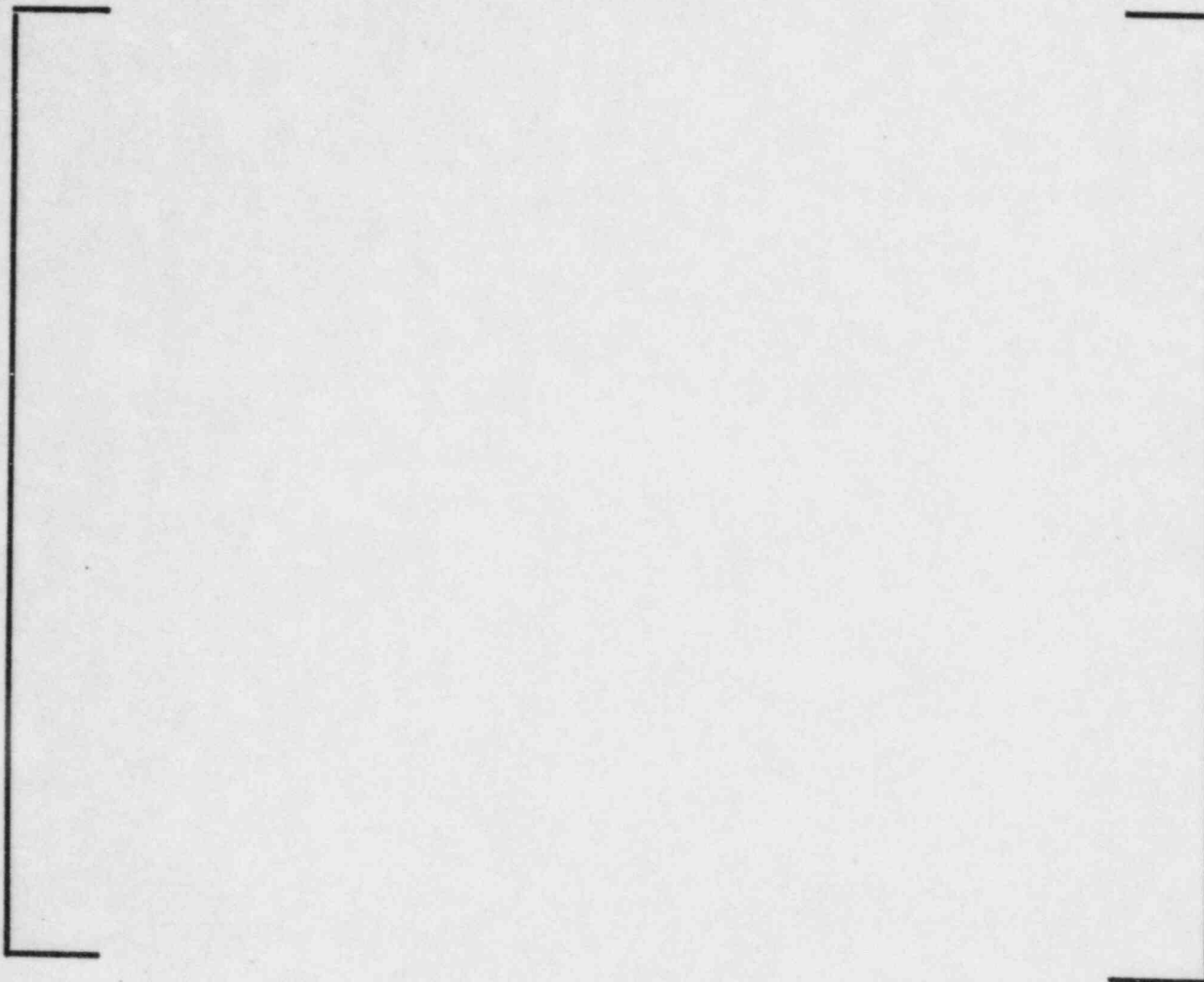


CPC IMPROVEMENT PROGRAM

A. OPTIMIZATION OF CPC/CEAC SOFTWARE FOR RELOADS (CONT'D)



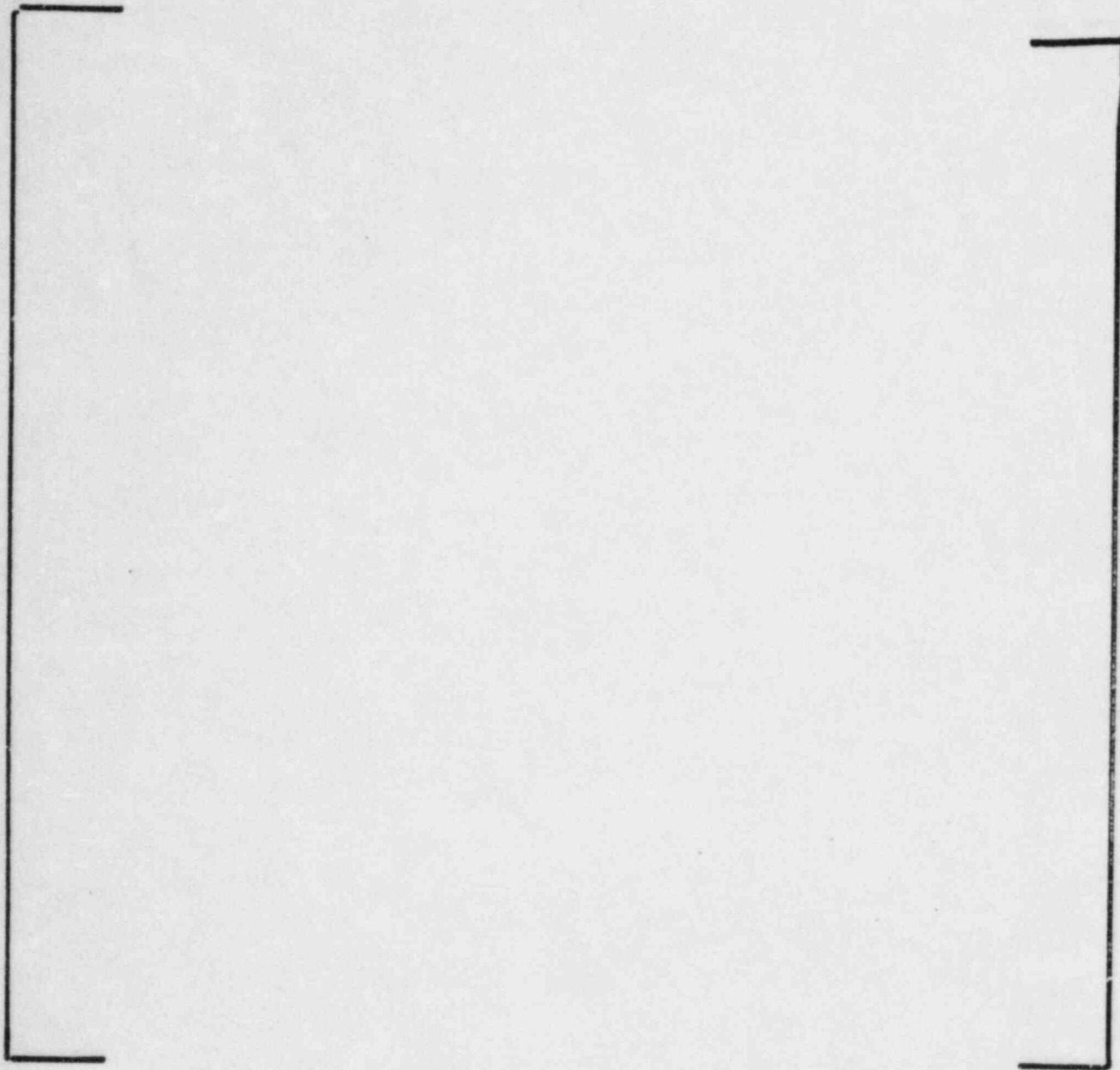
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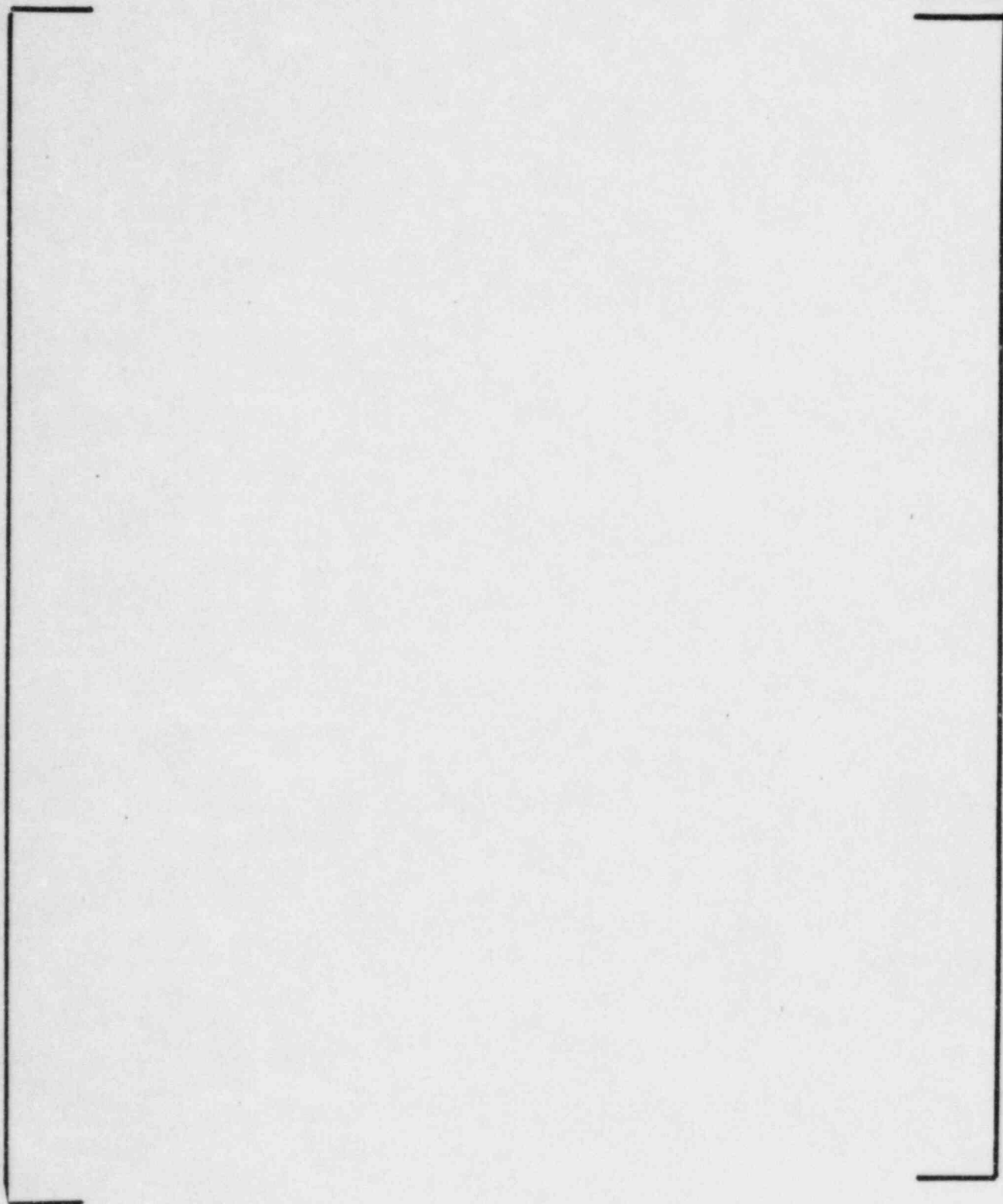
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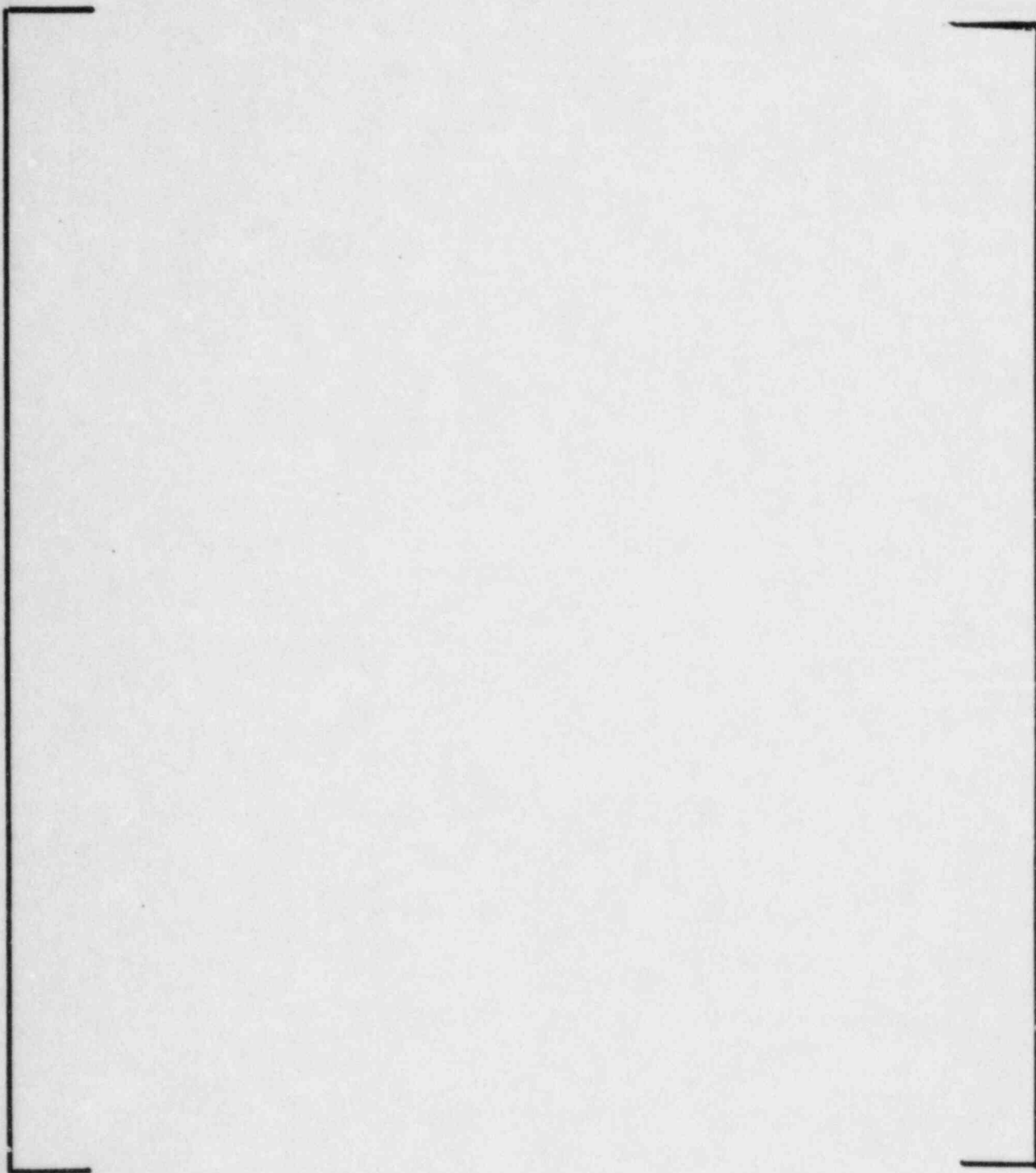
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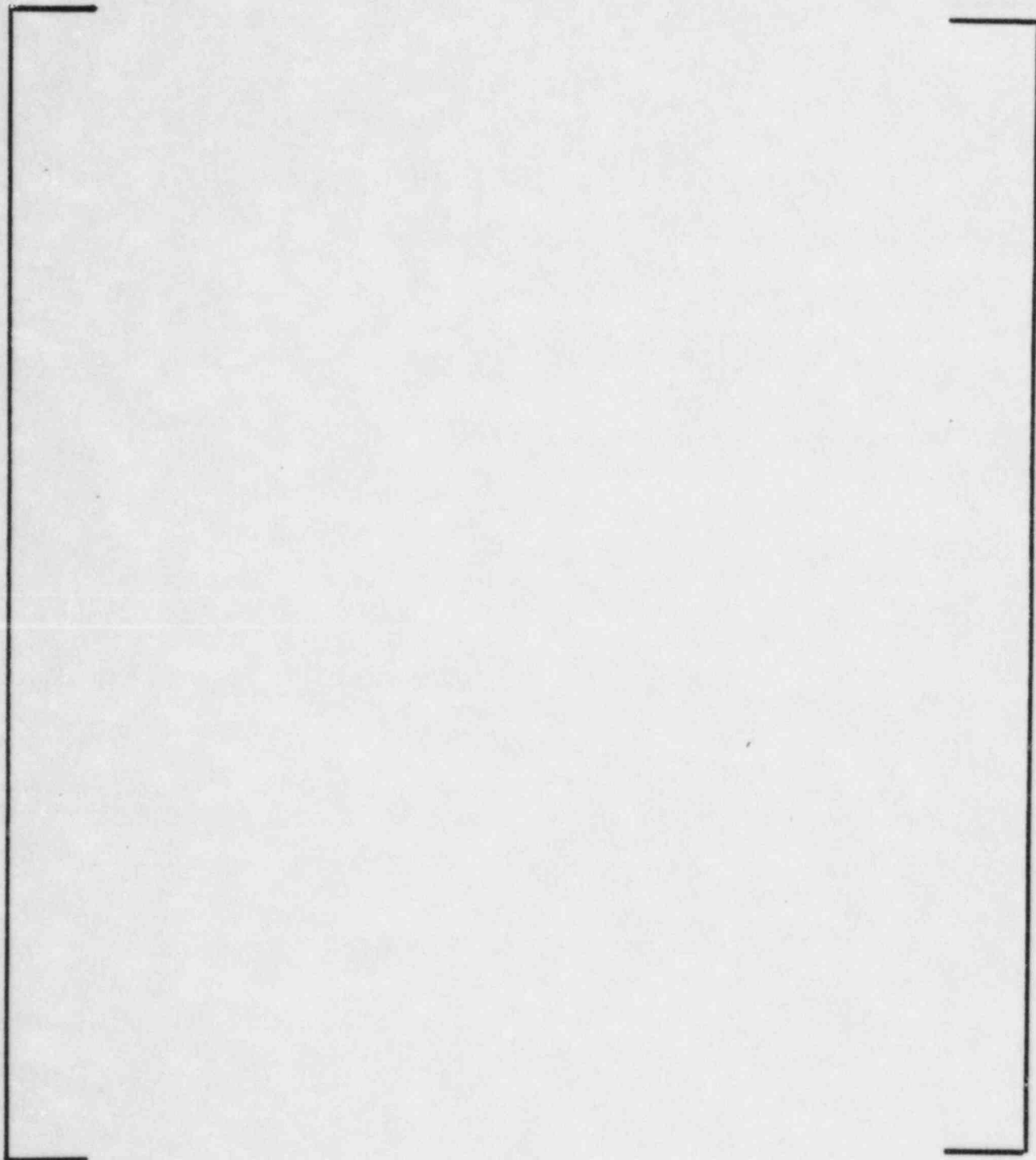
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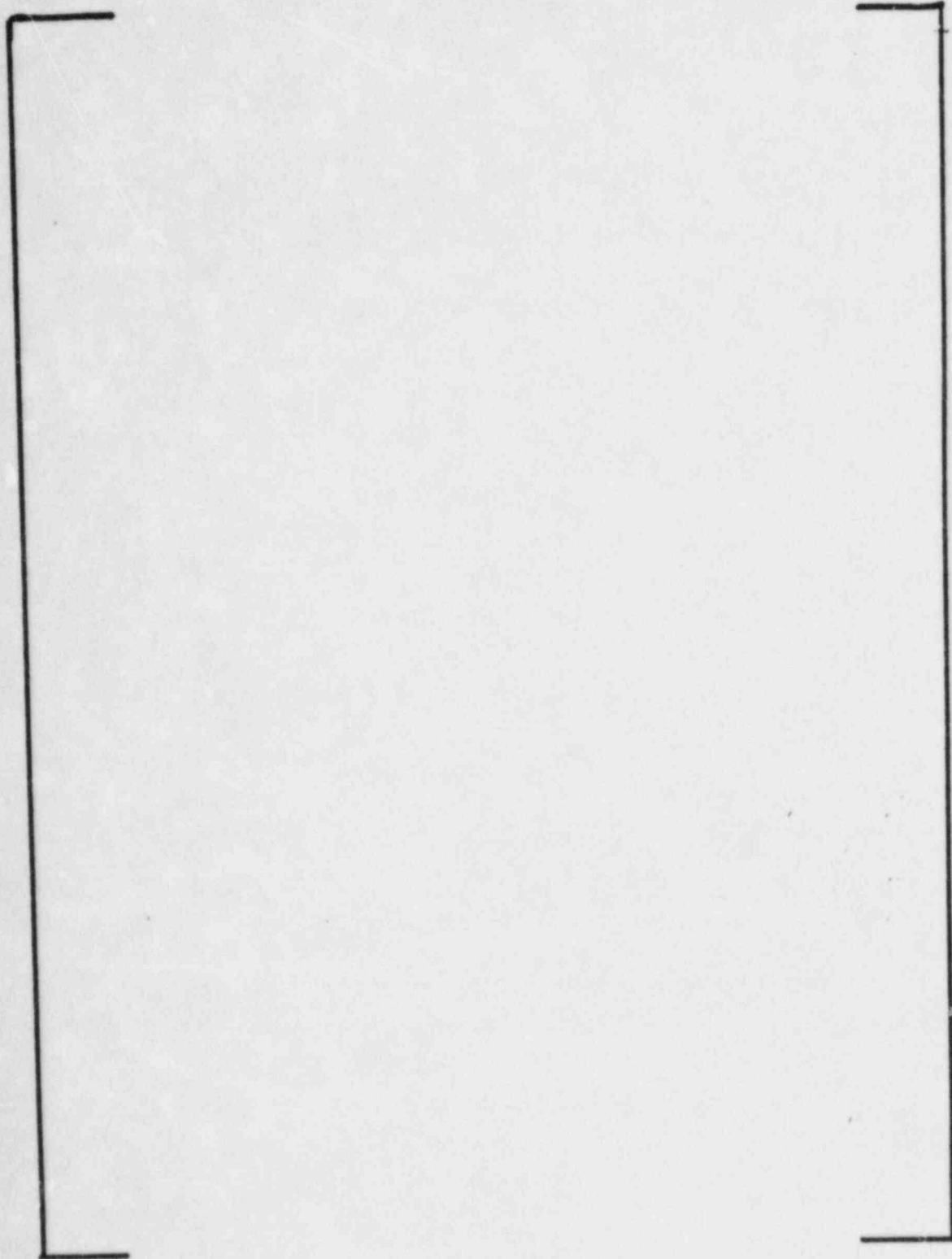


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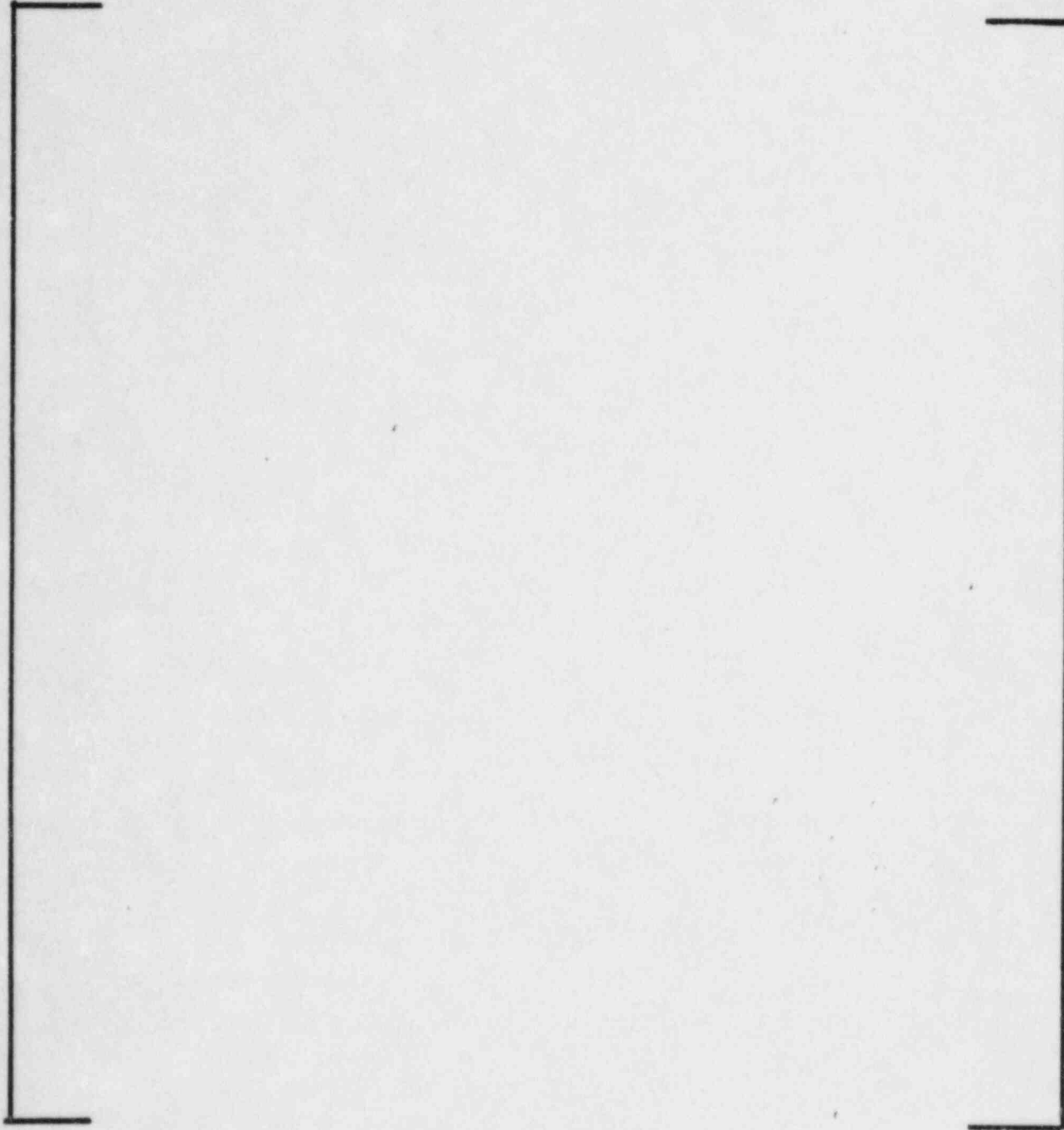
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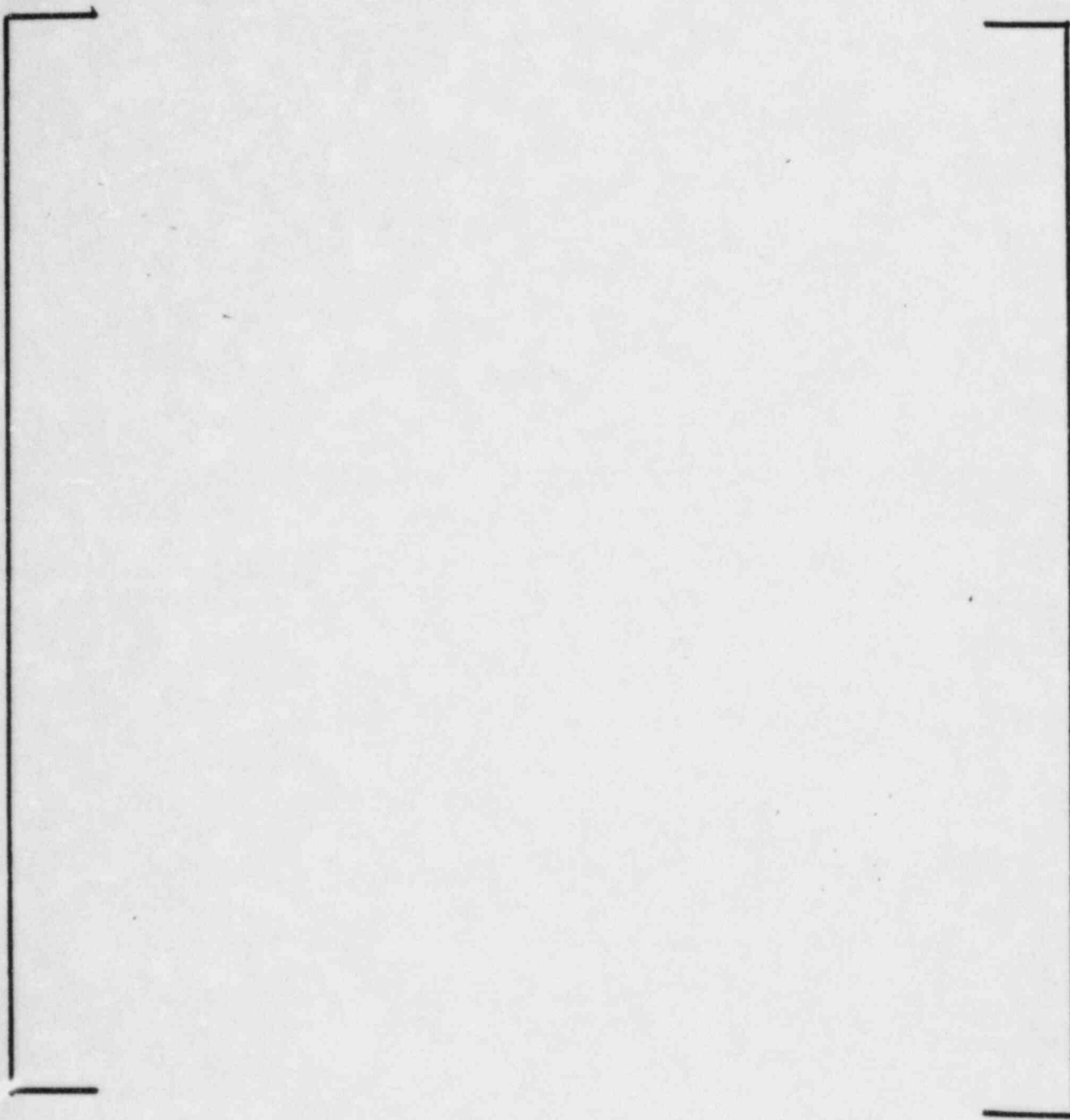


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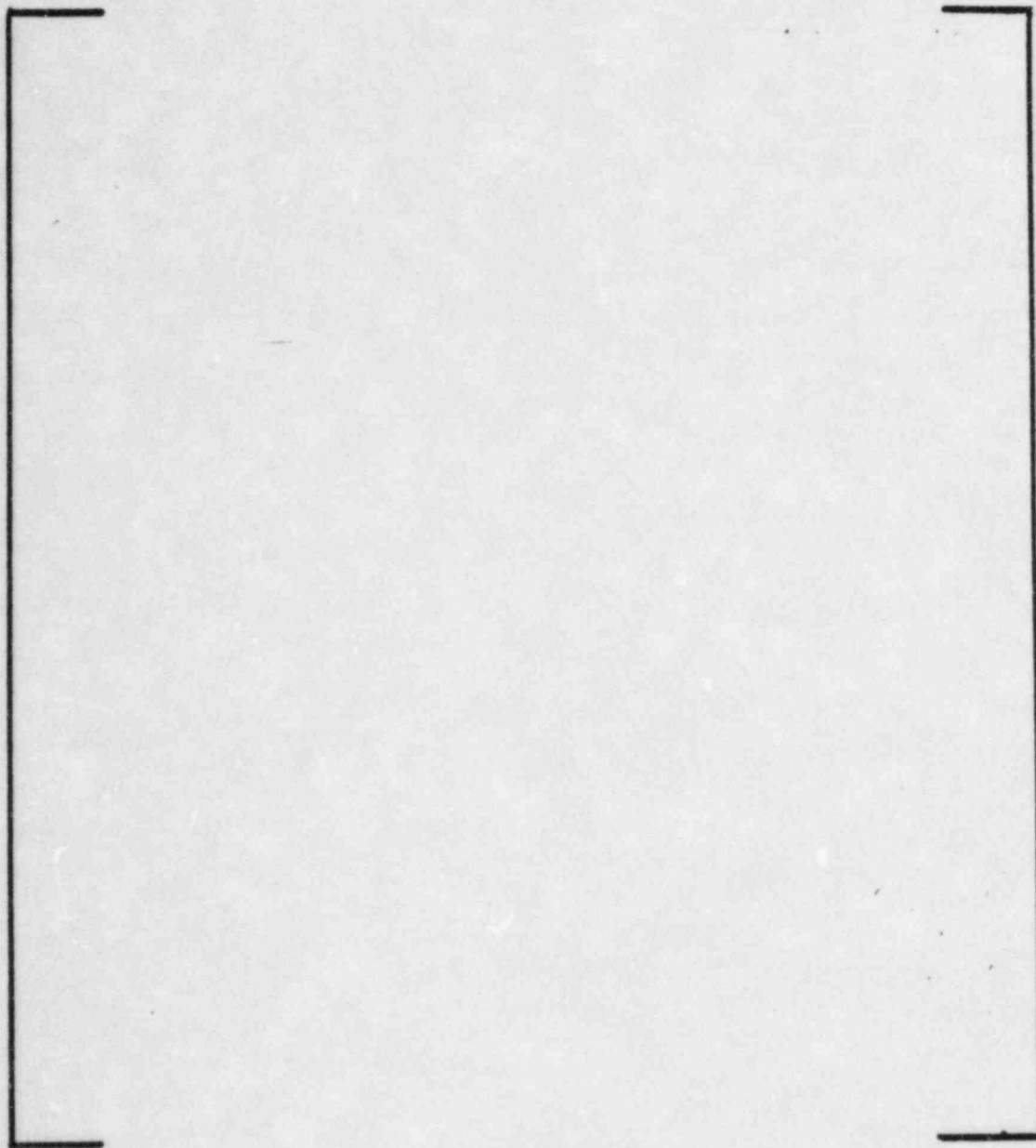
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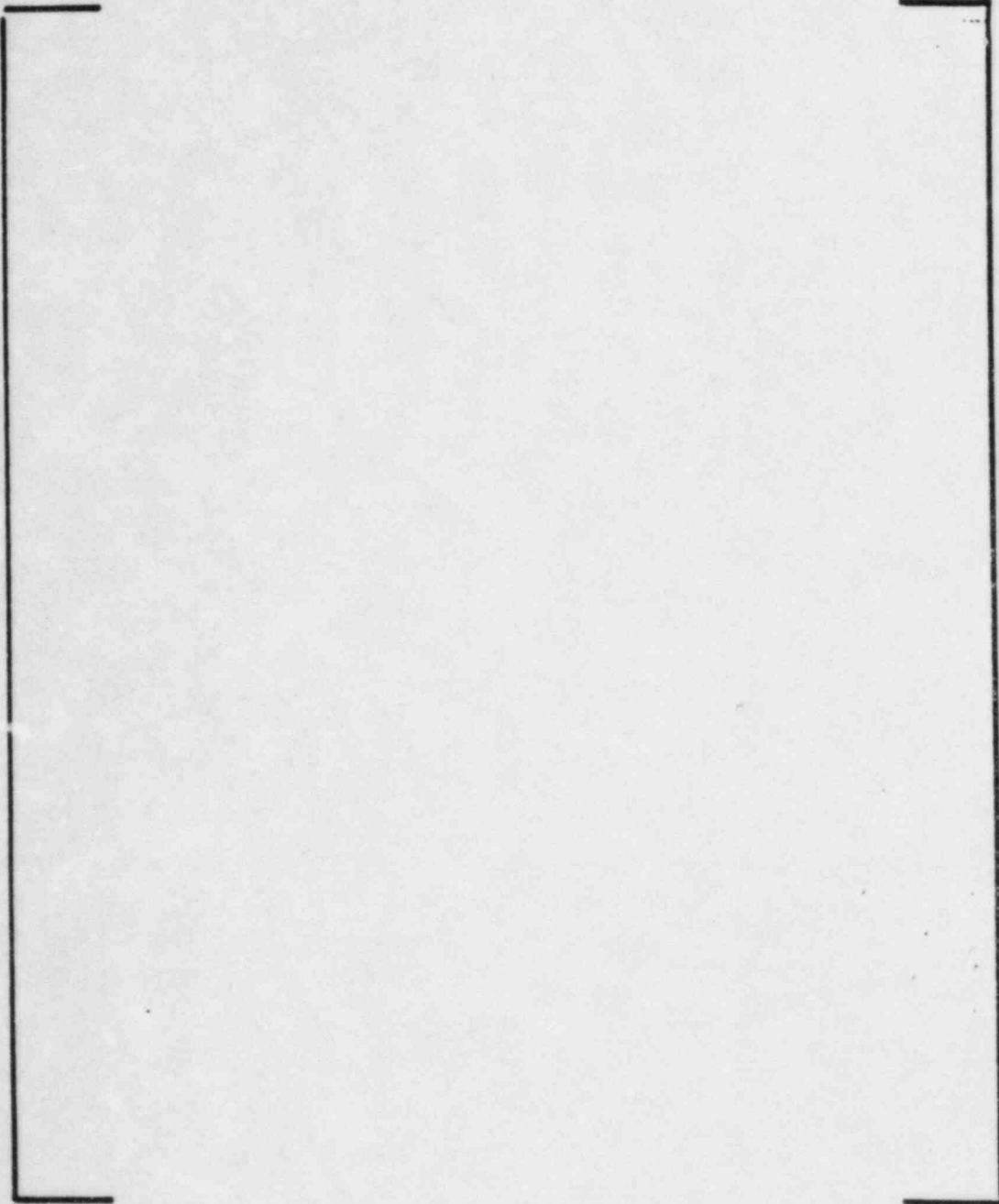
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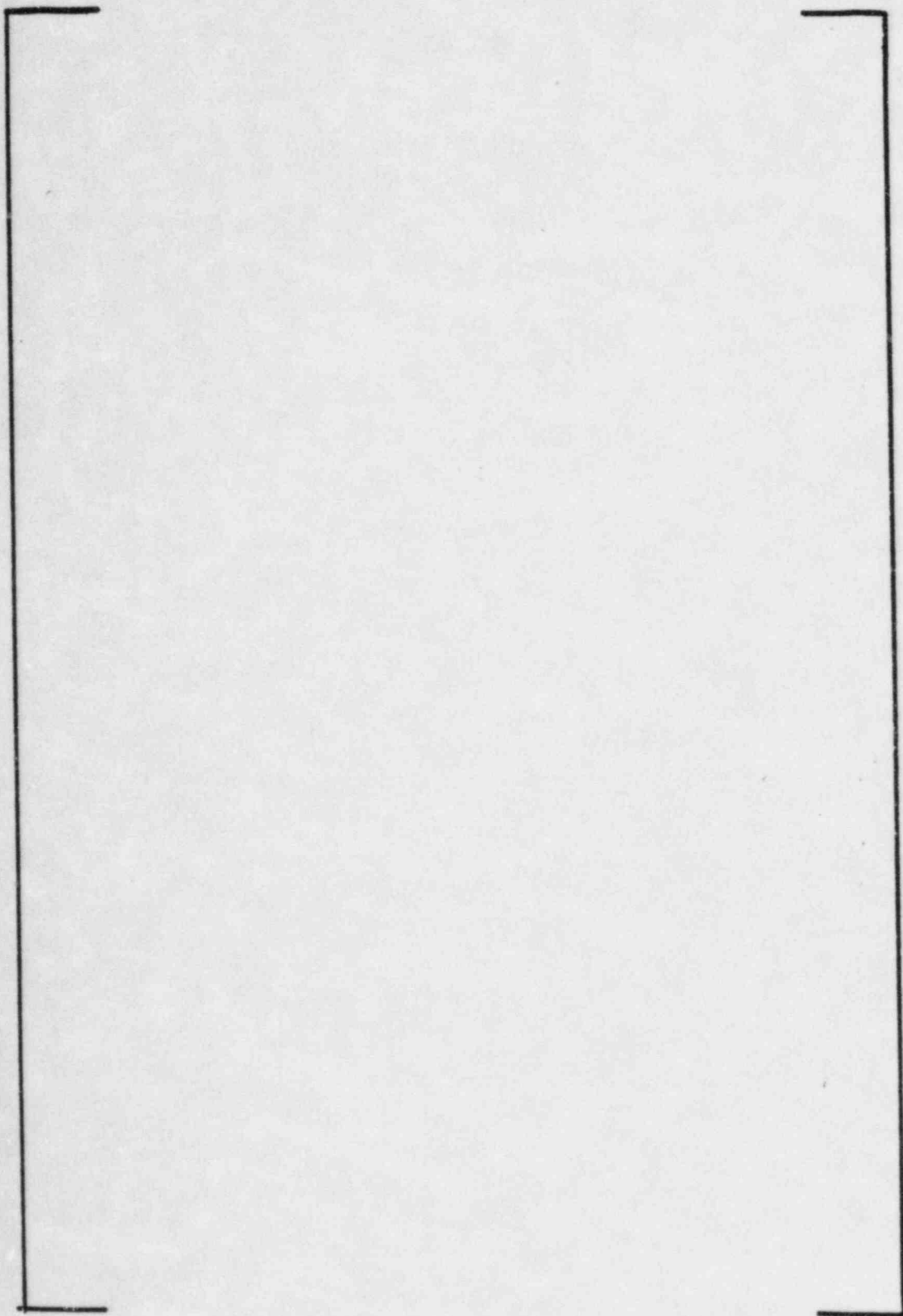
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CPC IMPROVEMENT PROGRAM

A. OPTIMIZATION OF CPC/CEAC SOFTWARE FOR RELOADS (CONTINUED)

CPC IMPROVEMENT PROGRAM

A. OPTIMIZATION OF CPC/CEAC SOFTWARE FOR RELOADS (CONTINUED)

CPC IMPROVEMENT PROGRAM

DESCRIPTION OF PROGRAM

A. OPTIMIZATION OF CPC/CEAC SOFTWARE FOR RELOADS

- IMPLEMENT EARLY 1986

B. CEAC DESENSITIZATION TO SPURIOUS SIGNALS

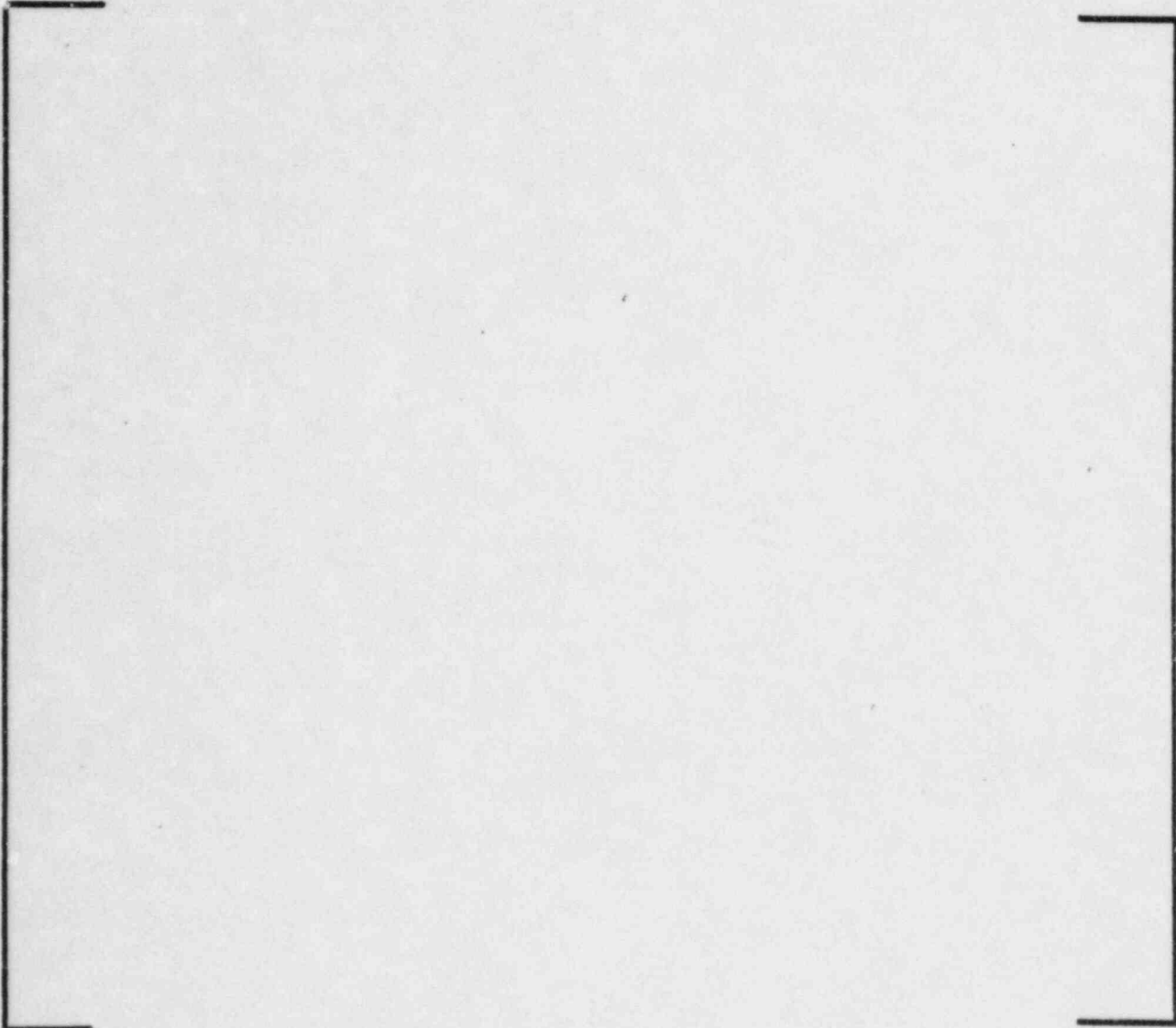
- IMPLEMENT EARLY 1986

C. RELOAD DATA BLOCK CONSTANTS

- DETAILS TO BE PRESENTED IN AUGUST 1985
- IMPLEMENT LATE 1986

CPC IMPROVEMENT PROGRAM

B. CEAC DESENSITIZATION TO SPURIOUS SIGNALS

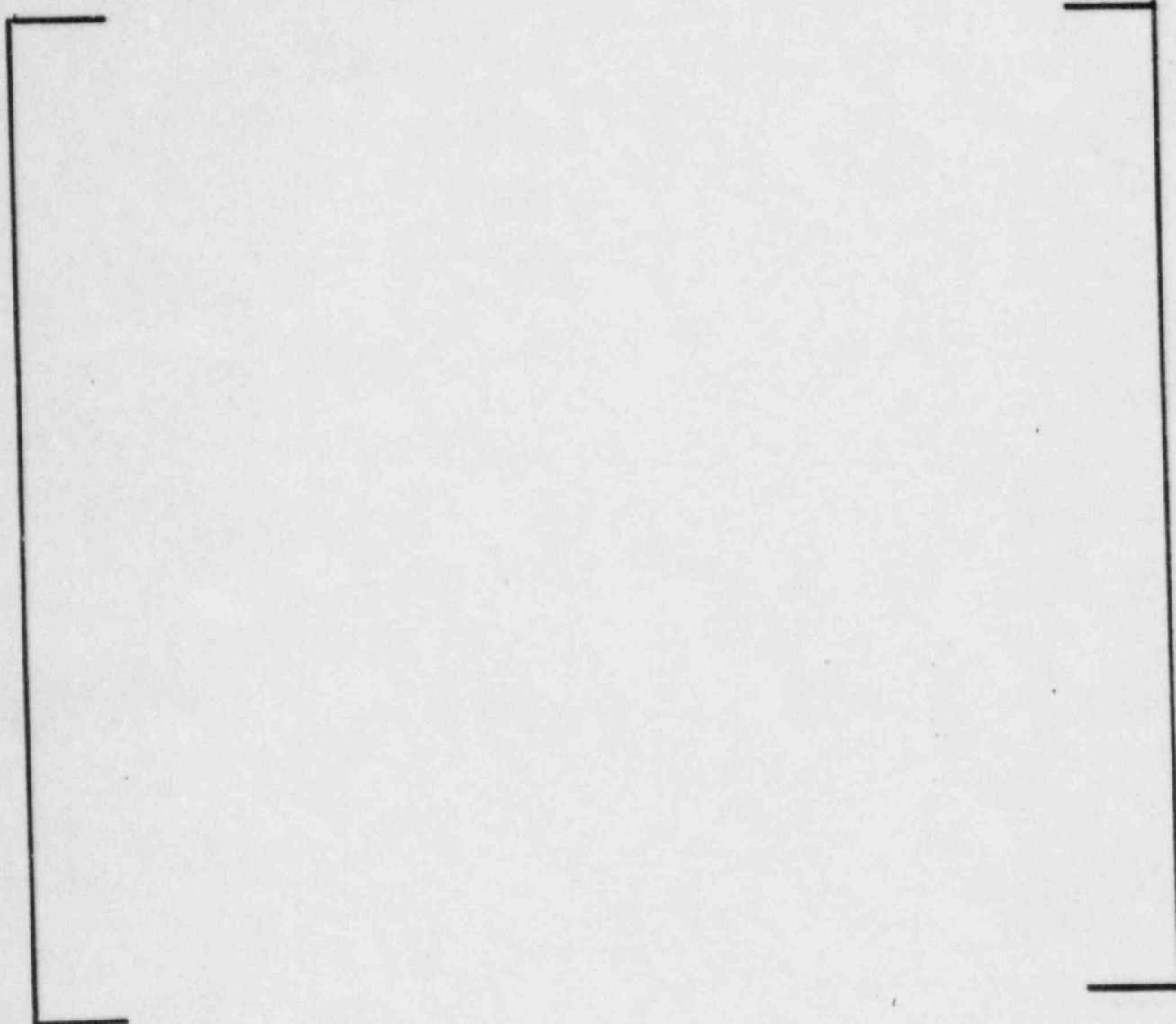


CPC IMPROVEMENT PROGRAM

B. CEAC DESENSITIZATION TO SPURIOUS SIGNALS (CONTINUED)

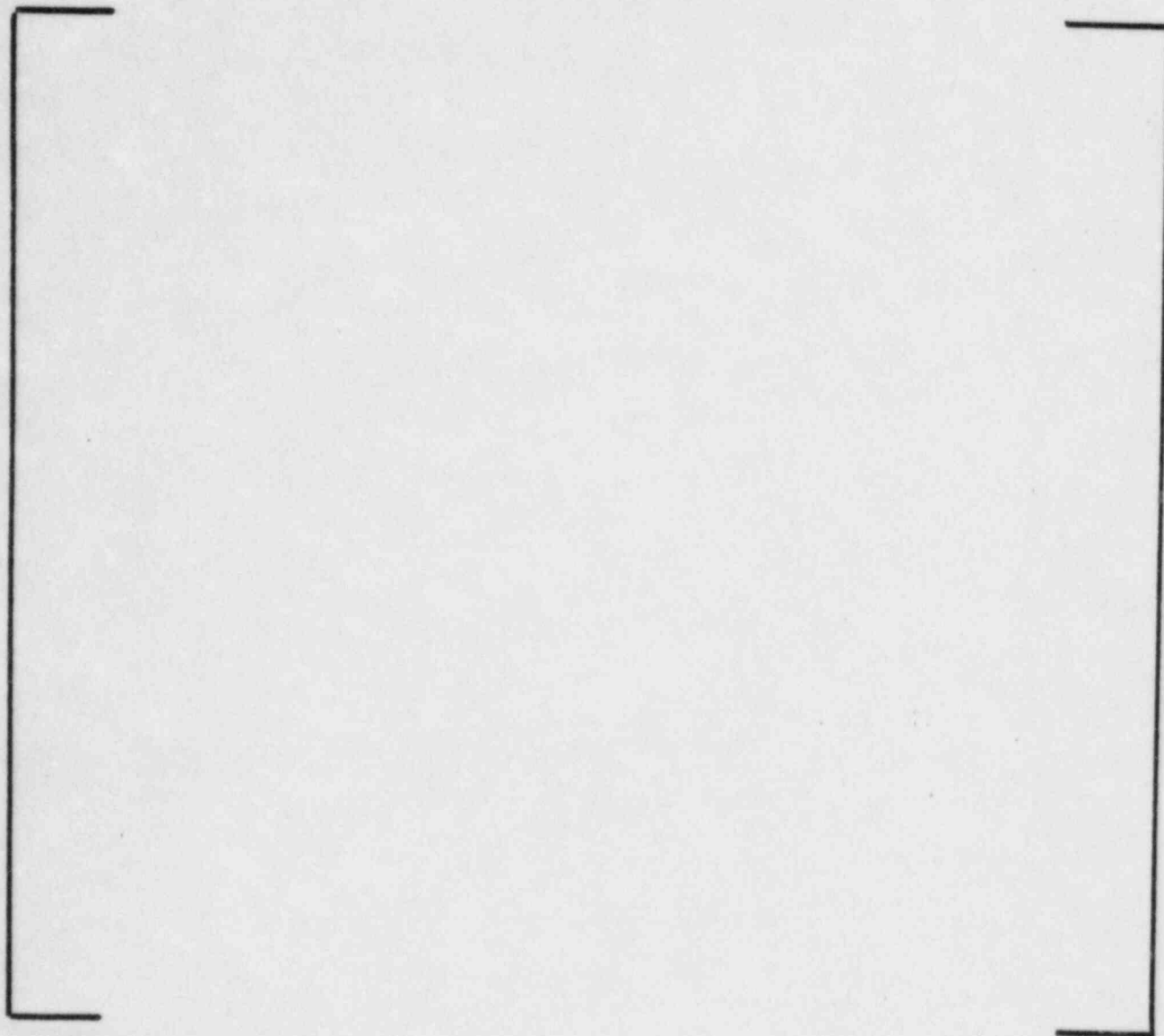
CPC IMPROVEMENT PROGRAM

B. CEAC DESENSITIZATION TO SPURIOUS SIGNALS (CONTINUED)



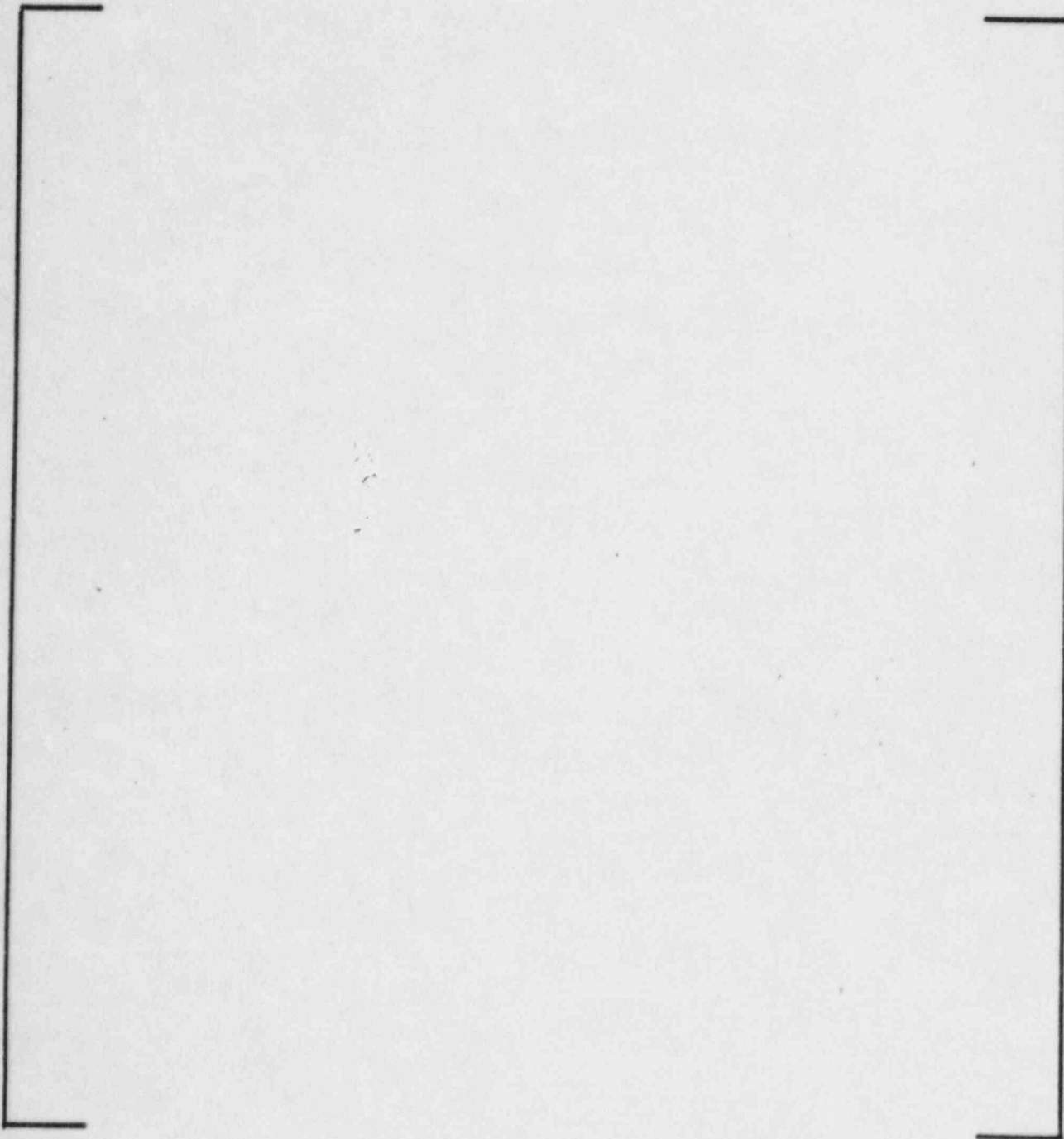
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B. CEAC DESENSITIZATION TO SPURIOUS SIGNALS (CONTINUED)



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CPC IMPROVEMENT PROGRAM

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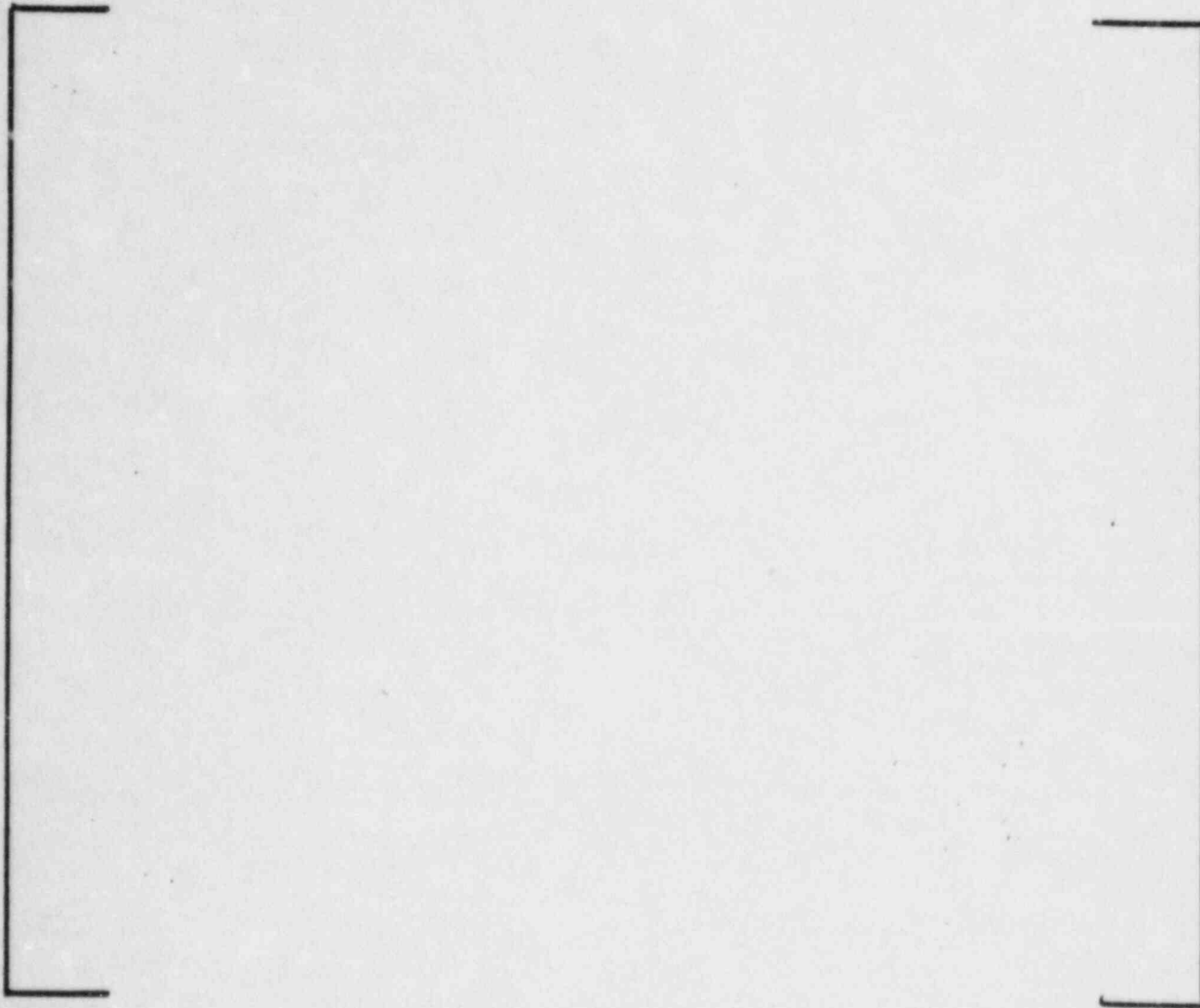
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CPC IMPROVEMENT PROGRAM

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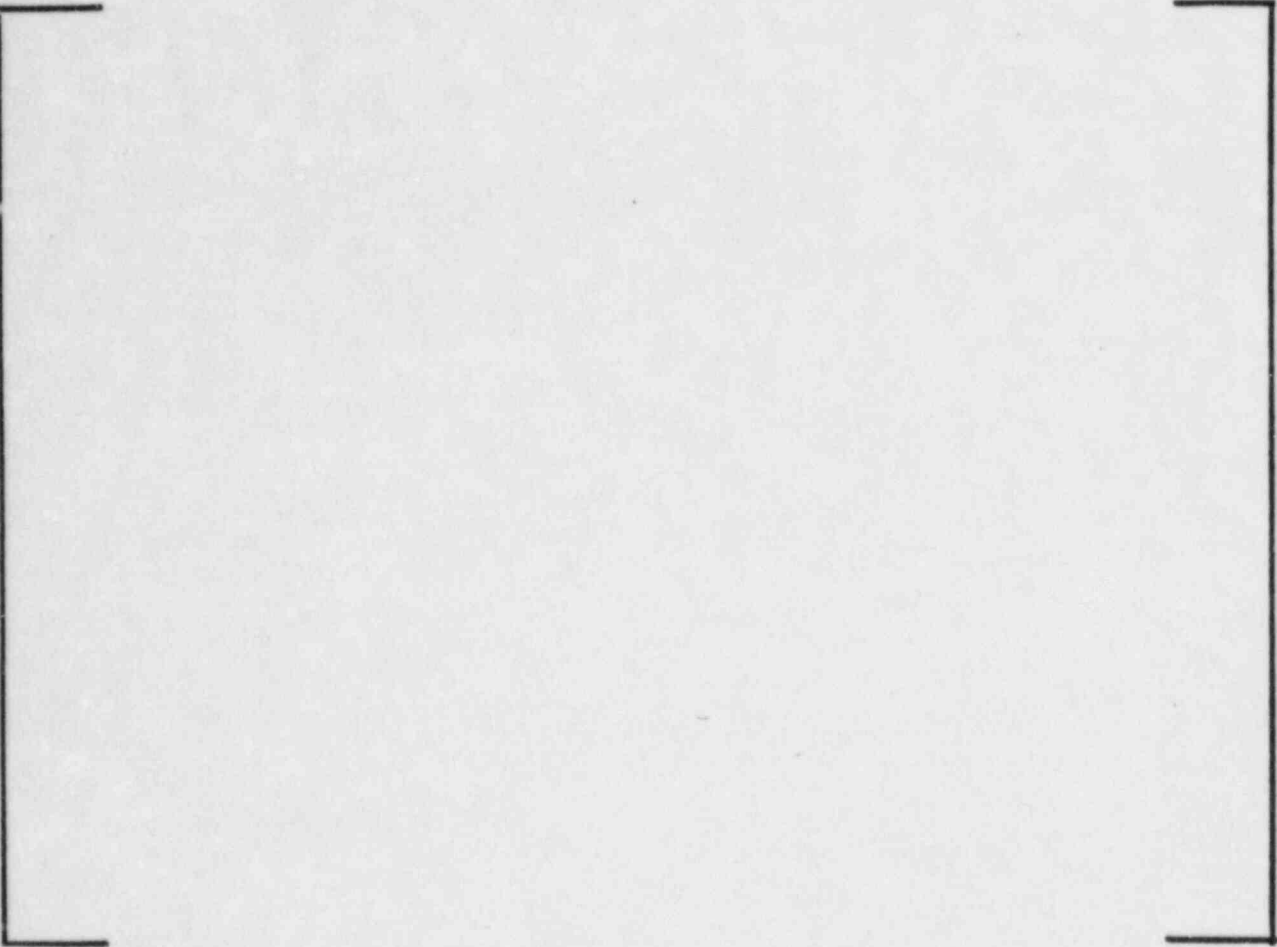


CPC IMPROVEMENT PROGRAM

C. RELOAD DATA BLOCK CONSTANTS (CONTINUED)



CPC IMPROVEMENT PROGRAM



CPC IMPROVEMENT PROGRAM

SCHEDULE FOR PRESENTATIONS, DOCUMENTATION AND IMPLEMENTATION

- NOV. 1984 - INITIAL PRESENTATION OF CONCEPTS
- MAR. 1985 - DETAILED PRESENTATION OF IMPLEMENTATION AND REVIEW SCHEDULE
- APR. 1985 - DETAILED PRESENTATION (PARTS A & B)*
- MAY 1985 - SONGS-2 CYCLE 3 "KICK-OFF" MEETING TO OUTLINE OVERALL LICENSING PLANS
- JUN. 1985 - COLSS TOPICAL REPORT (FOR INFORMATION)
- AUG. 1985 - DETAILED PRESENTATION (PART C PLUS UPDATE ON PARTS A & B)*
- CPC UPDATED FUNCTIONAL DESIGN SPECIFICATION (PRIOR TO PROGRAM - FOR INFORMATION)
- GENERIC SOFTWARE MODIFICATIONS AND METHODOLOGY DOCUMENTS (PARTS A & B)*
- PLANT SPECIFIC MODIFICATIONS AND METHODOLOGY DOCUMENTS, IF NEEDED (SONGS)
- REVISED SOFTWARE CHANGE PROCEDURE FOR RELOAD DATA BLOCK AND RDR CONSTANT CHANGE PROCEDURE (PART C)*
- SONGS-2 CYCLE 3 RELOAD ANALYSIS REPORT AND TECH SPEC CHANGE DOCUMENTATION

CPC IMPROVEMENT PROGRAM

SCHEDULE FOR PRESENTATIONS, DOCUMENTATION AND IMPLEMENTATION (CONT'D)

NOV. 1985	-	ANO-2 METHODOLOGY, ANALYSIS AND TECH SPEC CHANGE DOCUMENTATION
	-	PHASE I/II TEST REPORT (SONGS)
JAN. 1986	-	PHASE I/II TEST REPORTS (ANO-2)
MAR. 1986	-	SONGS-2 CYCLE 3 STARTUP (IMPLEMENT PARTS A & B)*
	-	ANO-2 MID CYCLE 5 IMPLEMENTATION (PARTS A & B)*
MAY 1986	-	GENERIC SOFTWARE MODIFICATION DOCUMENT (PART C)*
JUL. 1986	-	WATERFORD CYCLE 2 RELOAD ANALYSIS REPORT AND TECH SPEC CHANGE DOCUMENTATION
SEP. 1986	-	PHASE I/II TEST REPORT (WATERFORD)
	-	PVNGS-1 CYCLE 2 RELOAD ANALYSIS REPORT AND TECH SPEC CHANGE DOCUMENTATION
NOV. 1986	-	WATERFORD CYCLE 2 STARTUP (IMPLEMENT PARTS A, B & C)*
	-	PHASE I/II TEST REPORTS (PALO VERDE)
JAN. 1987	-	PVNGS-1 CYCLE 2 STARTUP (IMPLEMENT PARTS A, B & C)*

*PART A = OPTIMIZATION OF SOFTWARE FOR RELOADS

PART B = CEAC DESENSITIZATION TO SPURIOUS SIGNALS

PART C = RELOAD DATA BLOCK CONSTANTS

CPC IMPROVEMENT PROGRAM

SUMMARY

GOALS

- o AVOID FUTURE CPC SOFTWARE CHANGES
- o REDUCE UNNECESSARY PLANT TRIPS
- o SIMPLIFY RELOAD ANALYSES

PROGRAM

- o OPTIMIZATION OF CPC/CEAC SOFTWARE FOR RELOADS
- o CEAC DESENSITIZATION TO SPURIOUS SIGNALS
- o RELOAD DATA BLOCK CONSTANTS

PLAN FOR INITIAL IMPLEMENTATION

- o OPTIMIZATION OF SOFTWARE AND CEAC DESENSITIZATION FOR ANO-2 MID CYCLE 5 AND SONGS-2/3 CYCLE 3
- o RELOAD DATA BLOCK FOR WATERFORD-3 CYCLE 2 AND PVNGS-1 CYCLE 2

DOCUMENTATION FOR NRC REVIEW

- o DETAILED PRESENTATIONS OF CPC MODIFICATIONS AND METHODOLOGY
- o CPC MODIFICATIONS AND METHODOLOGY DOCUMENTS
- o PHASE I AND II TEST REPORTS

COMBUSTION ENGINEERING, INC.