

# REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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 FACIL: 50-361 San Onofre Nuclear Station, Unit 2; Southern California 05000361  
 50-362 San Onofre Nuclear Station, Unit 3, Southern California 05000362  
 AUTH. NAME AUTHOR AFFILIATION  
 \* Southern California Edison Co.  
 RECIP. NAME RECIPIENT AFFILIATION  
 BAER, R.L. Light Water Reactors Branch 2

SUBJECT: Forwards slides presented at NRC 790426 meeting re fuel structural design in response to 790522 request. Info partially withheld (ref 10CFR2.790).

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INTERNAL:	<u>01 REG FILE</u>	1	1	02 NRC PDR	1	1
	06 I & E	2	2	08 OPERA LIC BR	1	1
	09 GEUSCIEN BR	4	4	10 QAB	1	1
	11 MECH ENG BR	1	1	12 STRUC ENG BR	1	1
	13 MATL ENG BR	2	2	15 REAC SYS BR	1	1
	16 ANALYSIS BR	1	1	17 CORE PERF BR	1	1
	18 AUX SYS BR	1	1	19 CONTAIN SYS	1	1
	20 I & C SYS BR	1	1	21 POWER SYS BR	1	1
	22 AD SITE TECH	1	0	26 ACCONT ANALYS	1	1
	27 EFPL TRT SYS	1	1	28 RAD ASMT BR	1	1
	29 KIRKWOOD	1	1	AD FOR ENG	1	0
	AD PLANT SYS	1	0	AD REAC SAFETY	1	0
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*Southern California Edison Company*

P. O. BOX 800  
2244 WALNUT GROVE AVENUE  
ROSEMEAD, CALIFORNIA 91770

June 28, 1979

Director, Office of Nuclear Reactor Regulation  
Attention: Mr. Robert L. Baer  
LWR Branch 2, DPM  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Gentlemen:

Subject: Docket Nos. 50-361 and 50-362  
San Onofre Nuclear Generating Station  
Units 2 and 3

In responding to your May 22, 1979 telecon request for copies of the slides used in the April 26, 1979 fuel meeting, a substantial amount of proprietary information must be presented. SCE agreed to submit this proprietary information to the NRC staff in accordance with 10 CFR Part 2.

Enclosed are 1) five (5) copies (Nos. 0004 through 0008) of the complete response to your request, including proprietary information, 2) two (2) copies of the nonproprietary version of the response, and 3) an affidavit setting forth the basis on which the information may be withheld from public disclosure by the Commission and addressing specifically the considerations listed in paragraph (b)(4) of Section 2.790 of the Commission's regulations.

Accordingly, it is respectfully requested that the information which is proprietary to Combustion Engineering, Inc. be withheld from public disclosure in accordance with 10 CFR Section 2.790 of the Commission's regulations. If you should have any questions concerning the proprietary nature of material transmitted herewith, please address these questions directly to

Mr. A. E. Scherer  
Licensing Manager (9438-401)  
Combustion Engineering, Inc.  
1000 Prospect Hill Road  
Windsor, Connecticut 06095

*"Note: No  
Affidavit Rec'd*

*Boo! SE 1/1*

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S. V. TASHJIAN

AD12-ALM  
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AE07-ALM

SAN ONOFRE UNITS 2 AND 3  
DOCKETS 50-361 and 50-362

*Songs 213*

SLIDES PRESENTED AT THE APRIL 26, 1979,  
NRC MEETING REGARDING FUEL STRUCTURAL DESIGN

NON-PROPRIETARY VERSION

MAY 30, 1979

COMBUSTION ENGINEERING, INC.  
NUCLEAR POWER SYSTEMS  
POWER SYSTEMS GROUP  
WINDSOR, CONNECTICUT

RECEIVED  
JUN 04 1979

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b. Assumes any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method or process disclosed in this response.

## CRITERIA FOR PROPRIETARY INFORMATION

Information contained in this report which is delimited by means of surrounding brackets is proprietary to Combustion Engineering, Inc. Code Number 1-6 have been placed in the vicinity of such brackets to classify this proprietary information. The following list identifies the classification criteria associated with these code numbers.

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2	The information reveals data or material concerning Combustion Engineering or customer funded research or development plans or programs of substantial present or potential competitive advantage to Combustion Engineering, Inc.
3	The use of the information by a competitor would substantially decrease his expenditures, in time or resources, in designing, producing or marketing a similar product.
4	The information consists of test data or other similar data concerning a process, method or component, the application of which results in a substantial competitive advantage to Combustion Engineering, Inc.
5	The information reveals special aspects of a process, method, component or the like, the exclusive use of which results in a substantial competitive advantage to Combustion Engineering, Inc.
6	The information contains ideas for which patent protection is likely to be sought.

## AGENDA

FUEL MEETING - APRIL 26, 1979

- I. INTRODUCTION
- II. REVIEW
- III. GRID STRENGTH
- IV. DISCUSSION

# SAN ONOFRE-SEISMIC

## ITEM

## ESAR

## REMARKS

ANALYSIS METHODS

3.7.3.14

DESCRIBES METHODOLOGY

REFERENCES CENPD-178

CRITERIA

ASSEMBLY COMPONENTS 4.2.1.1.1

(1) DESIGN STRESS INTENSITIES-ASME

CODE, APPENDIX F

(2) STRESS LIMITS

NON ZIRC - CODE

ZIRC - CODE METHOD

GRIDS 4.2.3.1.3

CALCULATED LOAD < GRID STRENGTH

RESULTS

ASSEMBLY COMPONENTS 4.2.3.1.2

DEC. 14 MEETING SLIDES

GRIDS 4.2.3.1.3

DEC. 14 MEETING SLIDES

# SAN ONOFRE-LOCA

## ITEM

## ESAR

## REMARKS

ANALYSIS METHODS

3.9.2,5

DESCRIBES METHODOLOGY

INCLUDES DETAIL CORE MODEL

AMENDING FOR VESSEL MOTION EFFECTS

CRITERIA

ASSEMBLY COMPONENTS 4.2.1.1.1

SAME AS SEISMIC

GRIDS 4.2.3.1.3

SAME AS SEISMIC

RESULTS

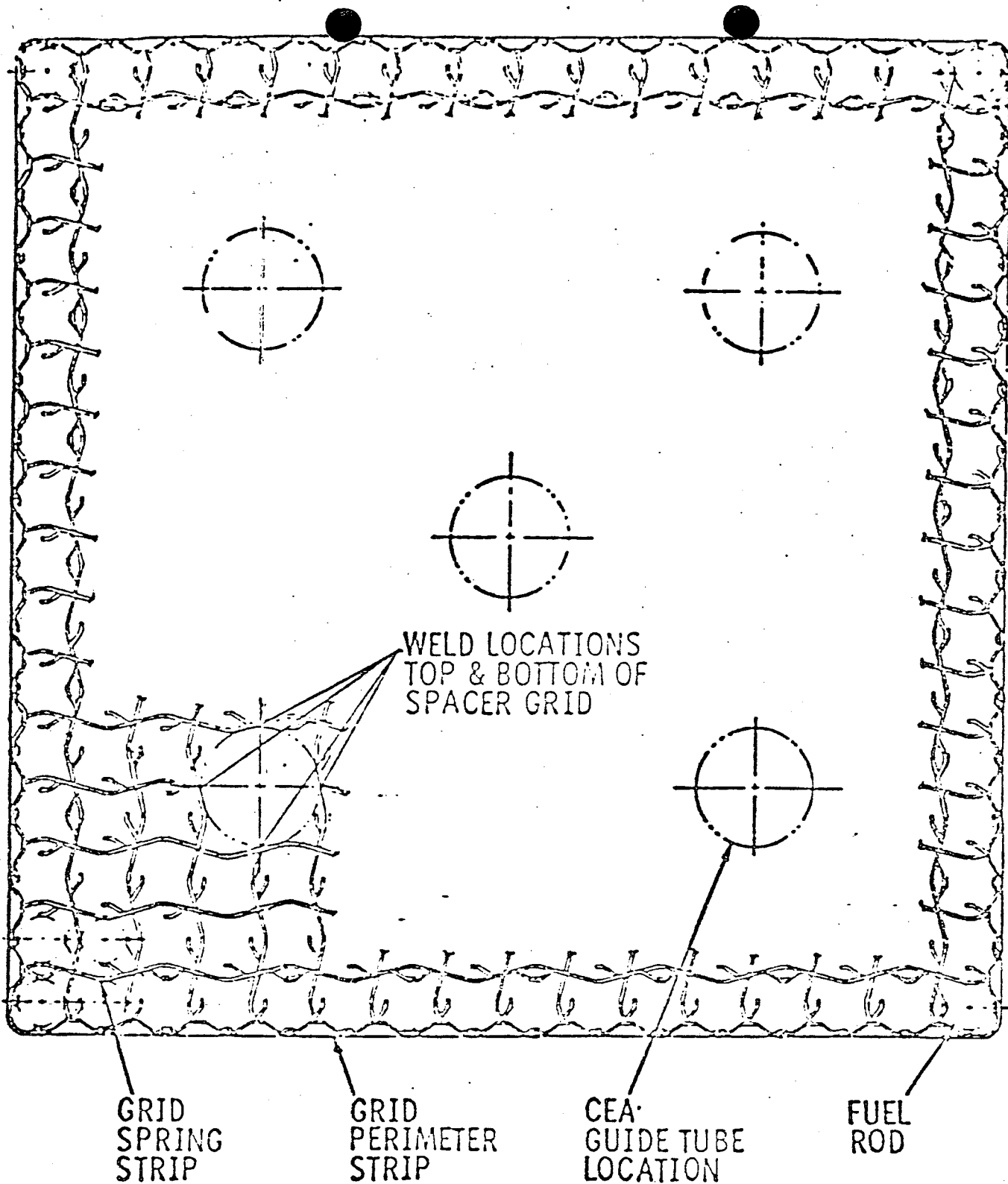
ASSEMBLY COMPONENTS 4.2.3.1.2

DEC. 14 MEETING SLIDES

GRIDS 4.2.3.1.3

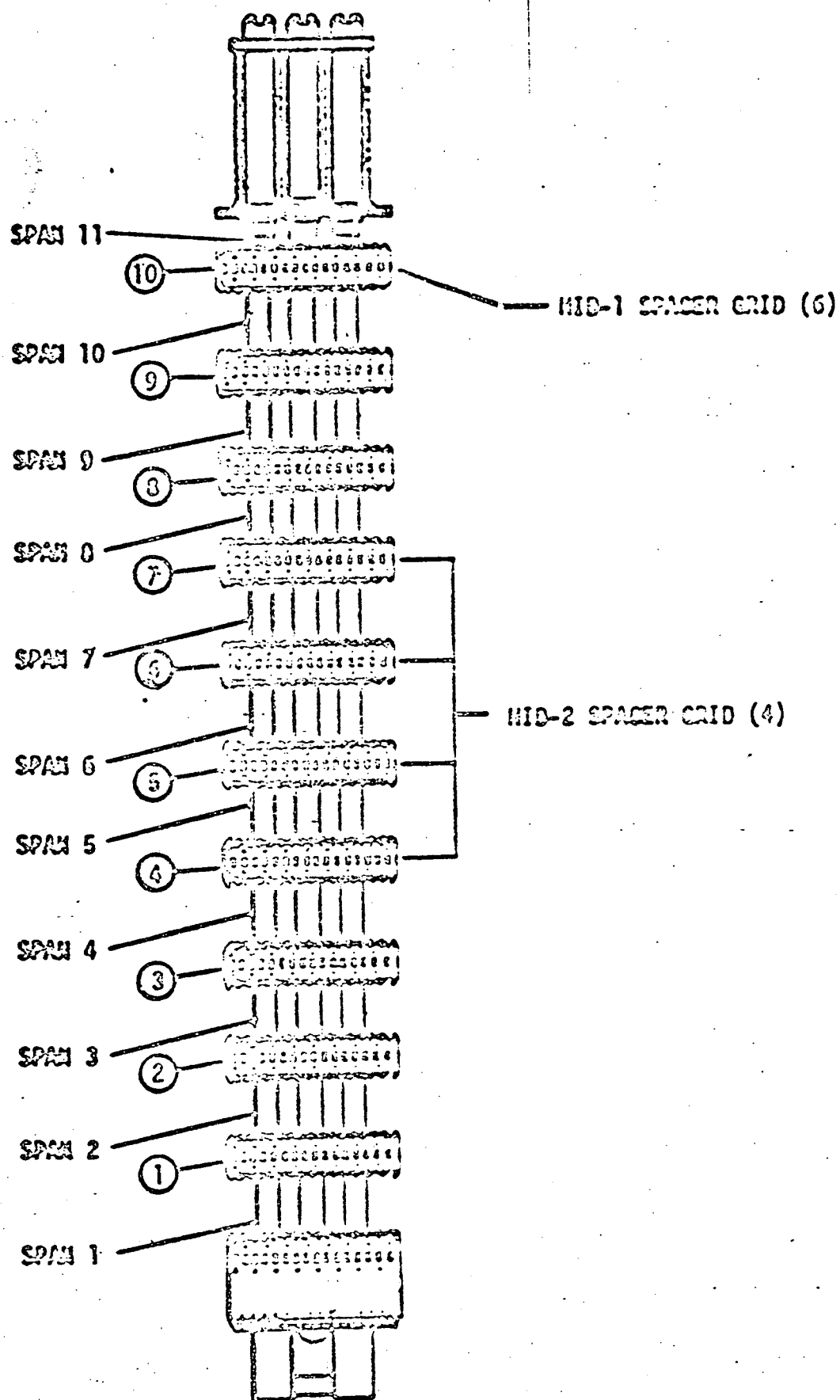
APRIL 26 MEETING SLIDES





SAN ONOFRE  
NUCLEAR GENERATING STATION  
Units 2 & 3

FUEL SPACER GRID



# DRAFT BRANCH TECHNICAL POSITION

## I. RESPONSE ANALYSIS

- A. METHODS-STRUCTURAL REPRESENTATION
- B. STANDARD PROBLEM-AUDIT ANALYSIS
- C. SENSITIVITY
- D. SAFETY FACTOR
- E. LOAD COMBINATION

## II. STRENGTH OF COMPONENTS

- A. OTHER THAN GRIDS
- B. GRIDS
- C. DEFORMATION OF GRIDS

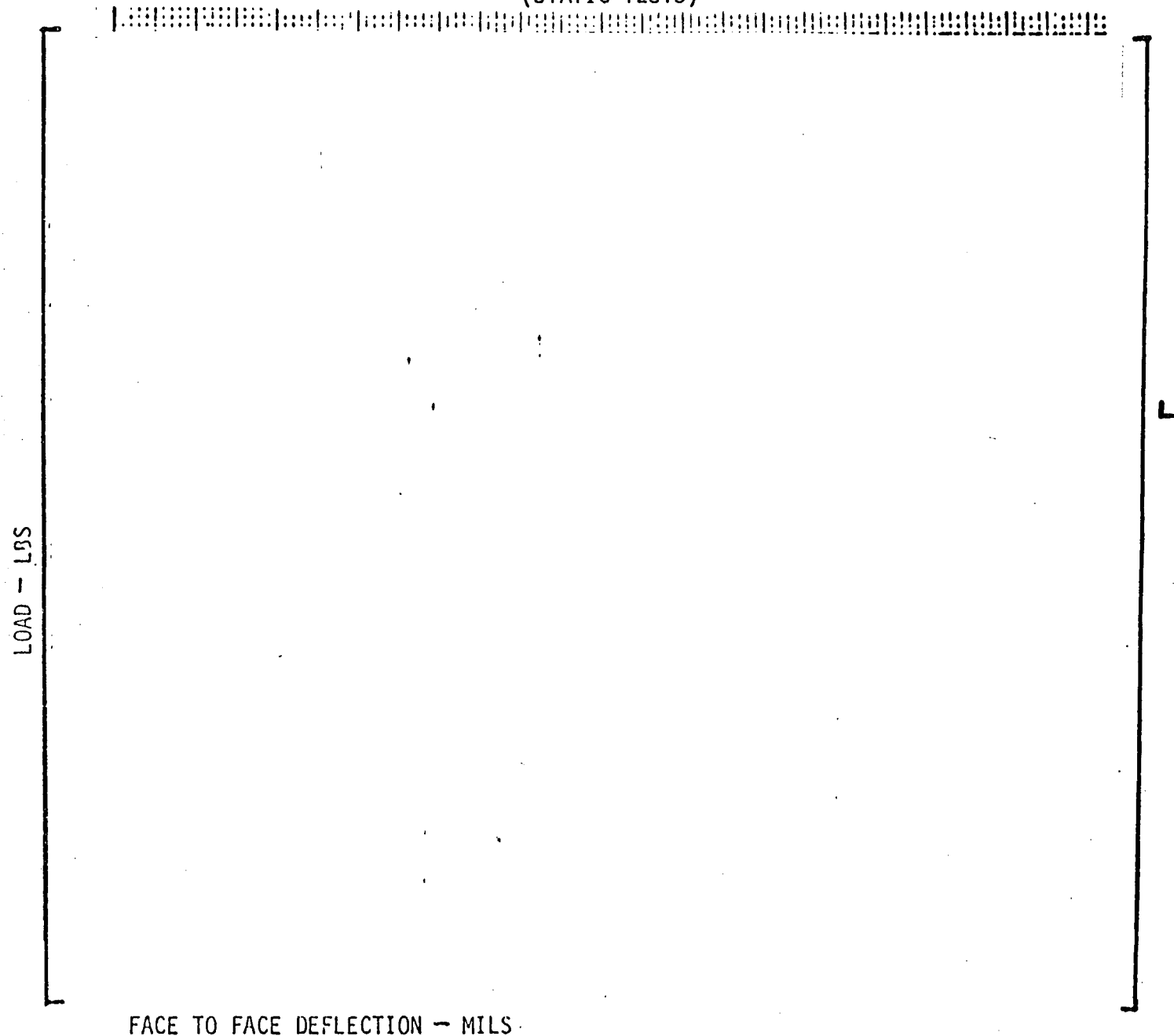
## III. ACCEPTANCE CRITERIA

- A. OTHER THAN GRIDS
- B. GRIDS

PROPRIETARY INFORMATION

GRID STRENGTH DEPENDENCY ON YIELD STRENGTH

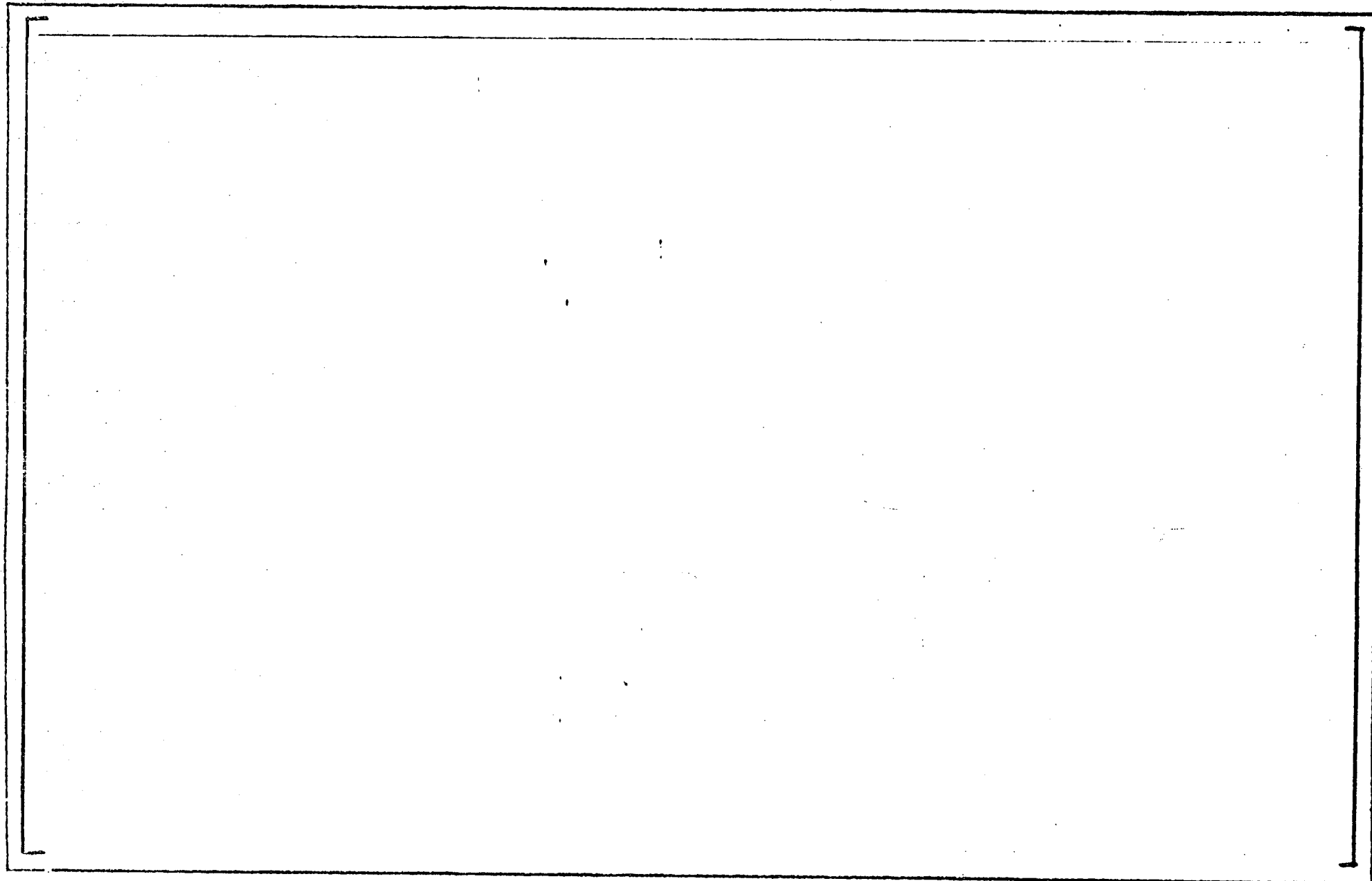
(STATIC TESTS)



SCE DETAILED CORE MODEL LOCA RESULTS

(ONE ROW OF 17 FUEL ASSEMBLIES)

FIXED VESSEL-PEAK THROUGH GRID IMPACT LOADS

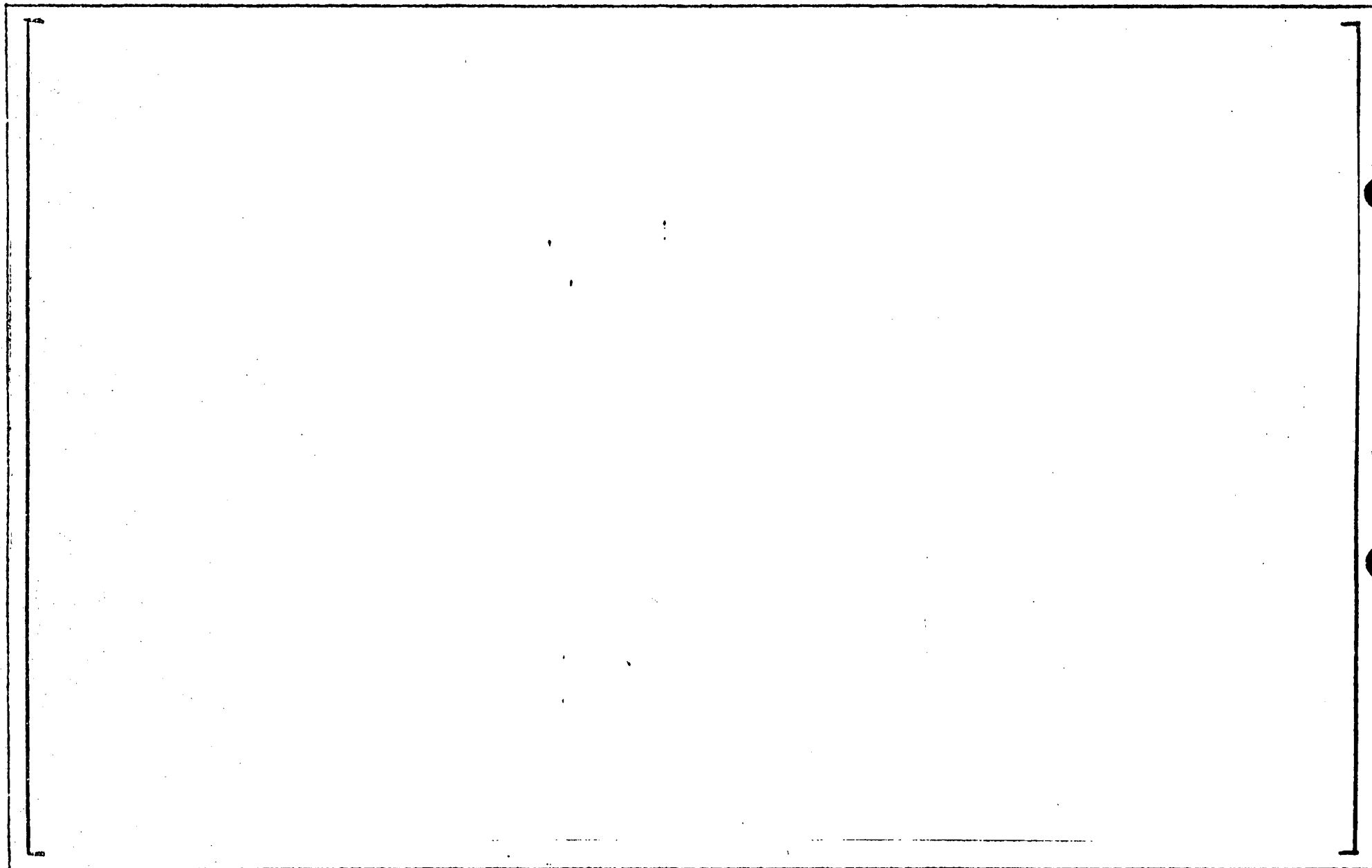


515

SCE DETAILED CORE MODEL LOCA RESULTS

(ONE ROW OF 17 FUEL ASSEMBLIES)

FIXED VESSEL-PEAK ONE SIDED IMPACT LOADS

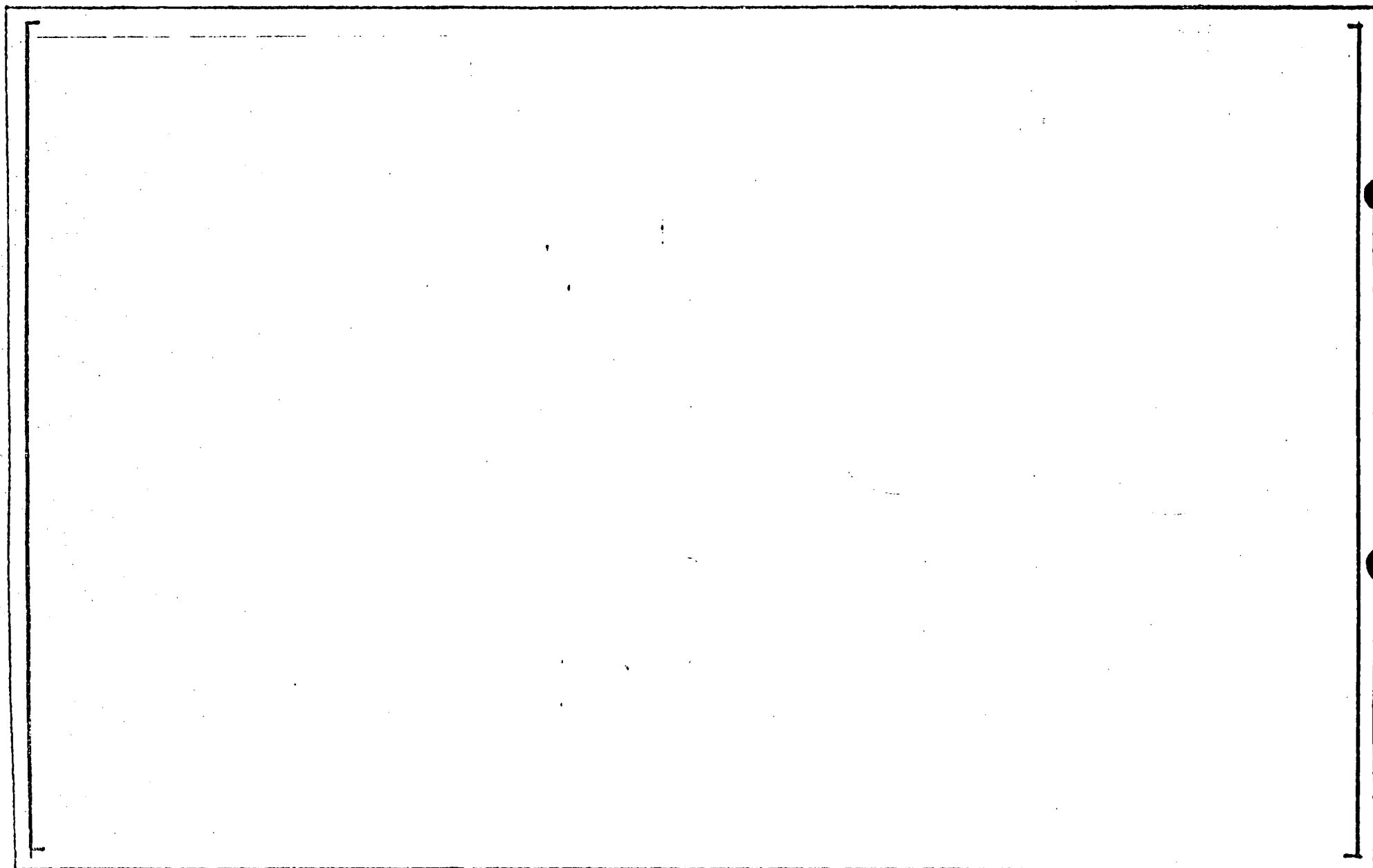


54

# SCE DETAILED CORE MODEL LOCA RESULTS

(ONE ROW OF 17 FUEL ASSEMBLIES)

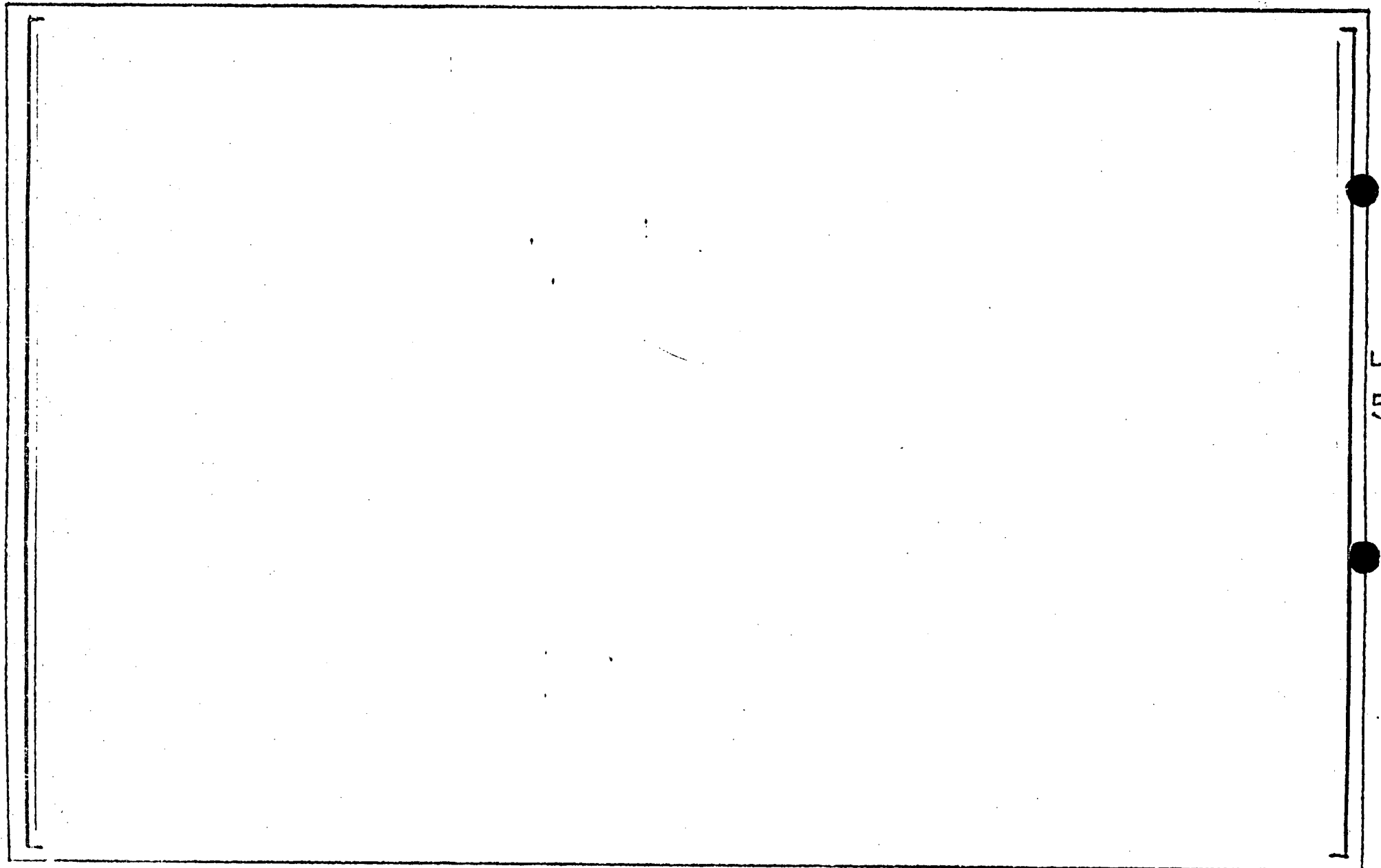
VESSEL MOTION-PEAK THROUGH GRID IMPACT LOADS



SCE DETAILED CORE MODEL LOCA RESULTS

(ONE ROW OF 17 FUEL ASSEMBLIES)

VESSEL MOTION-PEAK ONE SIDED IMPACT LOADS



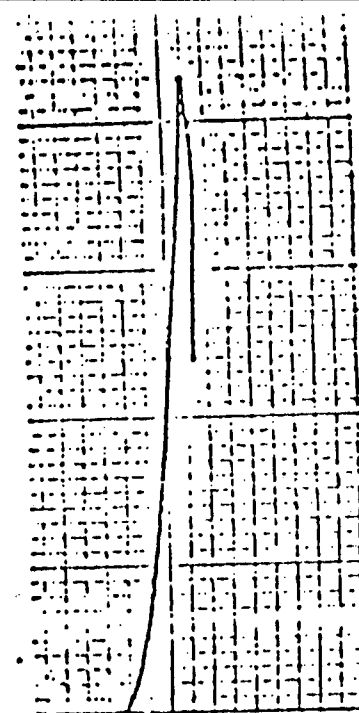
5



LOAD  
DEFLECTION

4

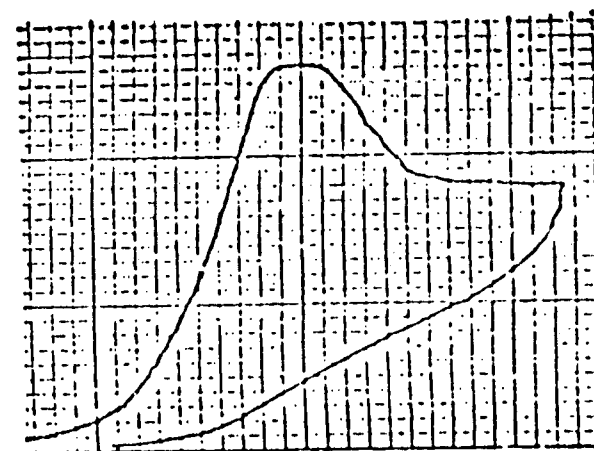
FIRST  
LOADING



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4

SECOND  
LOADING

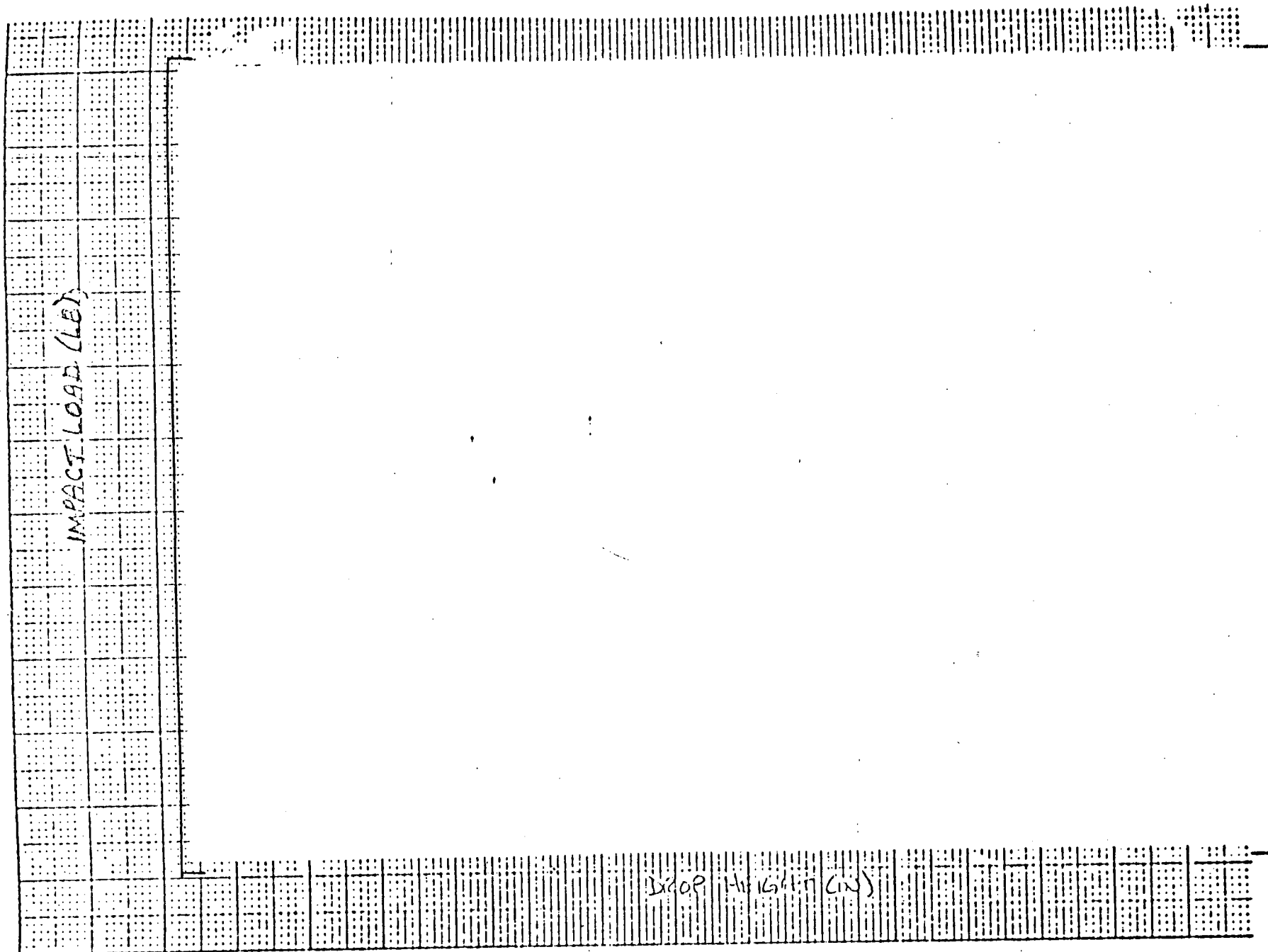


(60)

C-E ZIRCALOY WAVY STRIP GRID

STRAIGHT STRIP INCONEL GRID

COMPARISON OF TYPICAL LOAD DEFLECTION  
CHARACTERISTICS



4,  
5

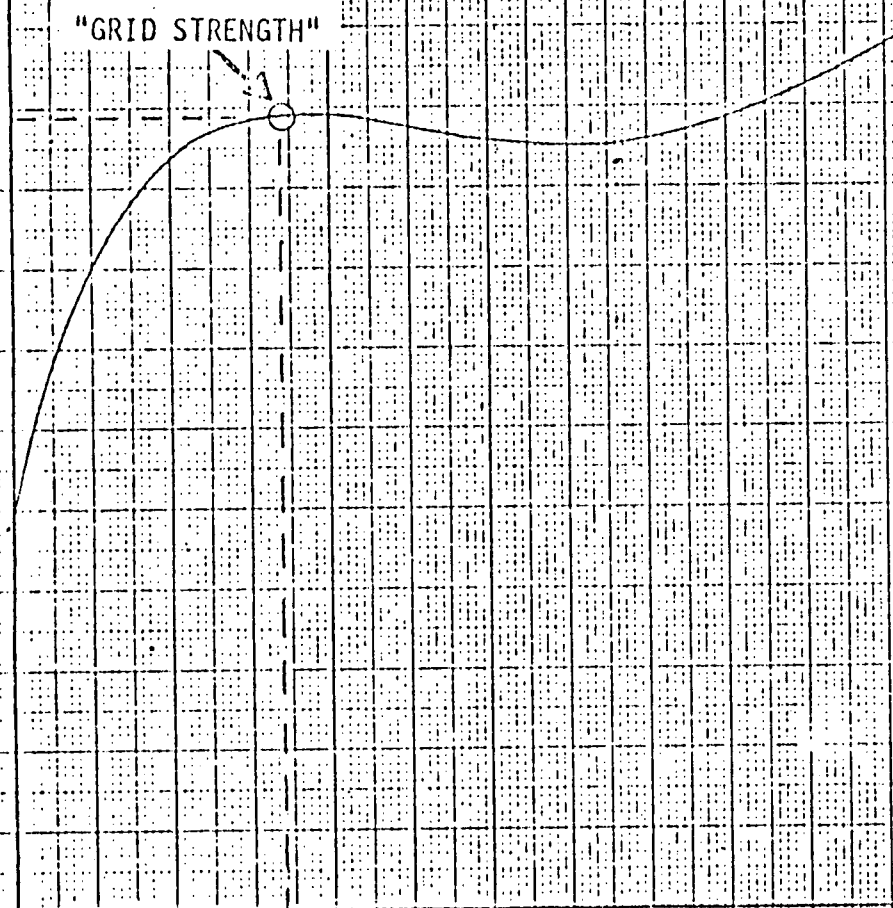
HID-1 ONE SIDED IMPACT

LOAD

"GRID STRENGTH"

PLASTIC DEFORMATION

TYPICAL SPACER GRID DYNAMIC  
LOADING CURVE (SUCCESSIVE IM-  
PACT - IMPACTING PULSED)



FUEL LOCA ANALYSIS  
SENSITIVITY TO INPUT FREQUENCY

GRID IMPACT LOAD - LB.

HID-1

HID-2

INPUT

ONE SIDE

THRU

ONE SIDE

THRU

$.9T_0$

$T_0$

$1.1T_0$

[ 4 ]