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POWER SYSTEMS

Docket No: STN-50-470F

October 14, 1981
LD-81-070

Mr. Chris Grimes, Project Manager
Standardization and Special Projects Branch
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: CESSAR-F, Chapter 3, Round 1 Question Responses

References: (A) C-E letter, A. E. Scherer to C. I. Grimes, dated July 31, 1981

(B) C-E letter, A. E. Scherer to D. G. Eisenhut, dated October 8, 1981

Dear Mr. Grimes:

Reference (A) transmitted the meeting minutes of the MEB/C-E meeting on Chapter 3 of CESSAR-F held at Windsor, Ct. from June 22-25, 1981. Responses to NRC staff questions on Chapter 3 were provided in Attachment 3 of that letter. One response, however, was inadvertently omitted. The response to the "general question" found on page A-5 of Attachment 1 was not included in Attachment 3. This question and associated response are therefore provided with this letter. The CESSAR-F revisions required as a result of this question have previously been transmitted as Enclosure 1 to Reference (B) but are also included within this letter for completeness.

If you have any questions regarding this issue, please contact me or Mr. J. B. Kingseed of my staff at (203)688-1911, Extension 3797.

Very truly yours,

COMBUSTION ENGINEERING, INC.

A. E. Scherer
Director
Nuclear Licensing

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1/1

AES:cw

Attachments

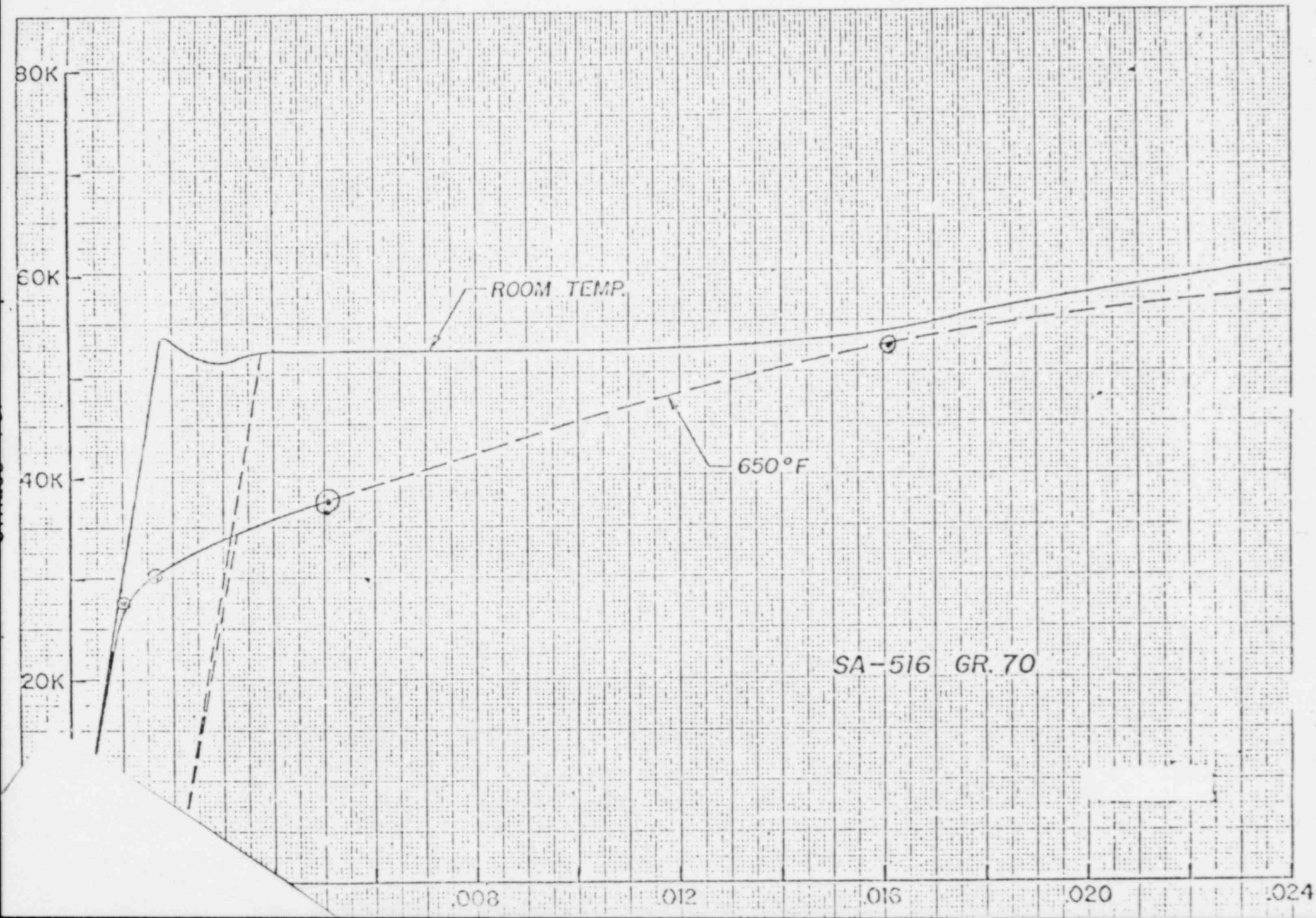
Question

Provide assurance that the functional capability of all ASME Class 1, 2, and 3 piping systems essential to plant safety is maintained under all designated loading conditions.

Response

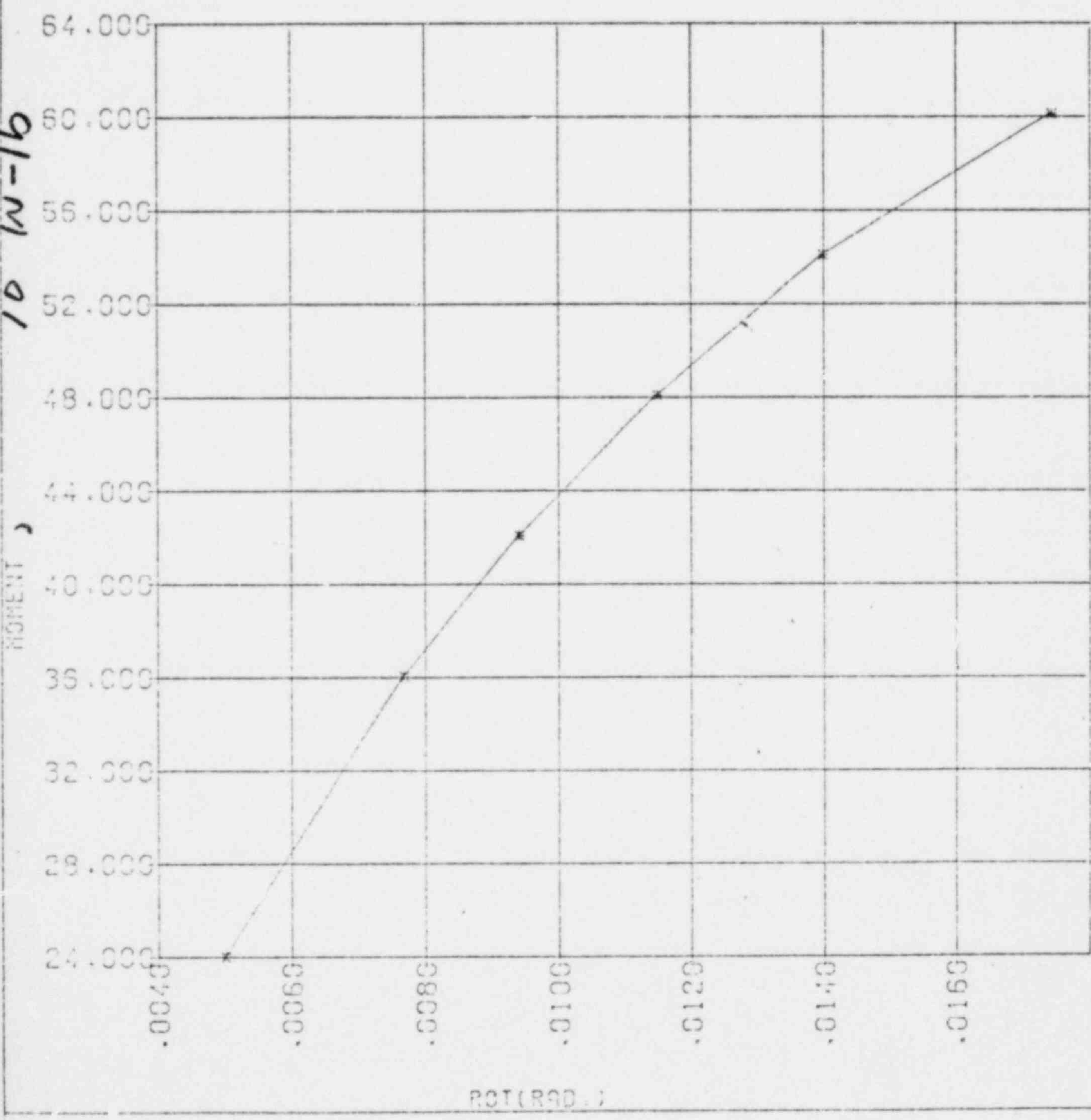
The only piping system within CESSAR scope is the ASME Class 1 RCS main loop piping. Information on the main loop piping is provided on the following pages. The information to be added to CESSAR-F is also provided within for completeness although this information has been previously submitted to the NRC as Enclosure 1 to Reference (B).

The attached stress strain curve for SA 516 Gr 70 at 650F was obtained by conventional testing in the CE Metallurgy Laboratory in Chattanooga. This curve was judged to be typical for this material by the Laboratory Staff. The MARC computer program uses a multi-linear representation of the curve as input for plasticity analysis. The input for the pipe ovalization analysis was based on straight lines between the circled points shown in the Figure. The maximum strain resulting from the analysis was 0.007 in/in.


80K
60K
40K
20K
ROOM TEMP.
650°F
SA-516 GR. 70
.008
.012
.016
.020
.024

SHELL (IN PLANE) 5 INC
TOTAL MOMENT

VERSUS
ROT AT NODAL PT 66 OR 72



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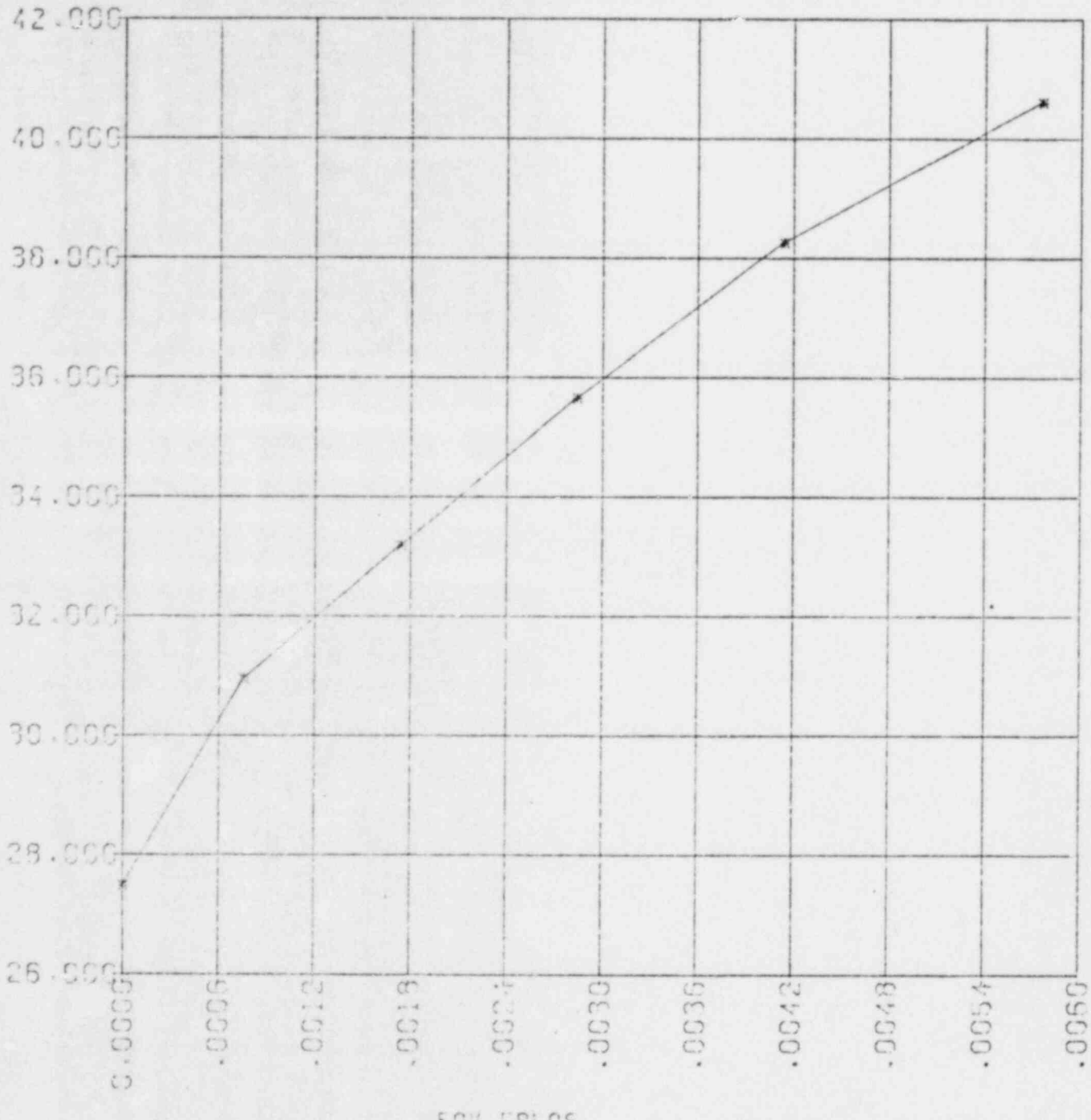
DATA PLOTTED BY-
ULCCC1[illegible] 07/07/81

SHELL (IN PLANE) S INC
ELEM NUM INT NUM LAYER NUM
30 6 3

VERSUS

ELEM NUM INT NUM LAYER NUM
30 5 3



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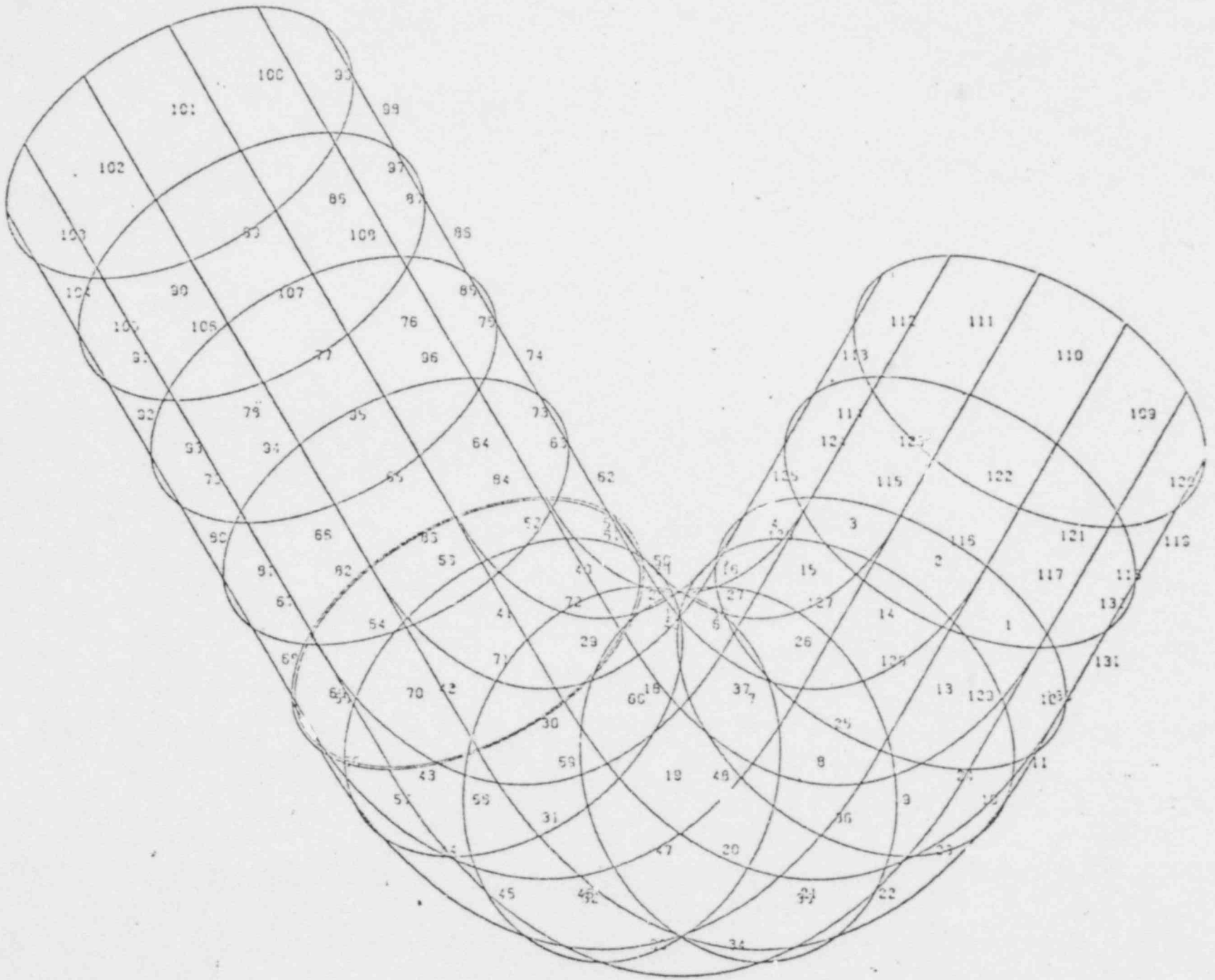
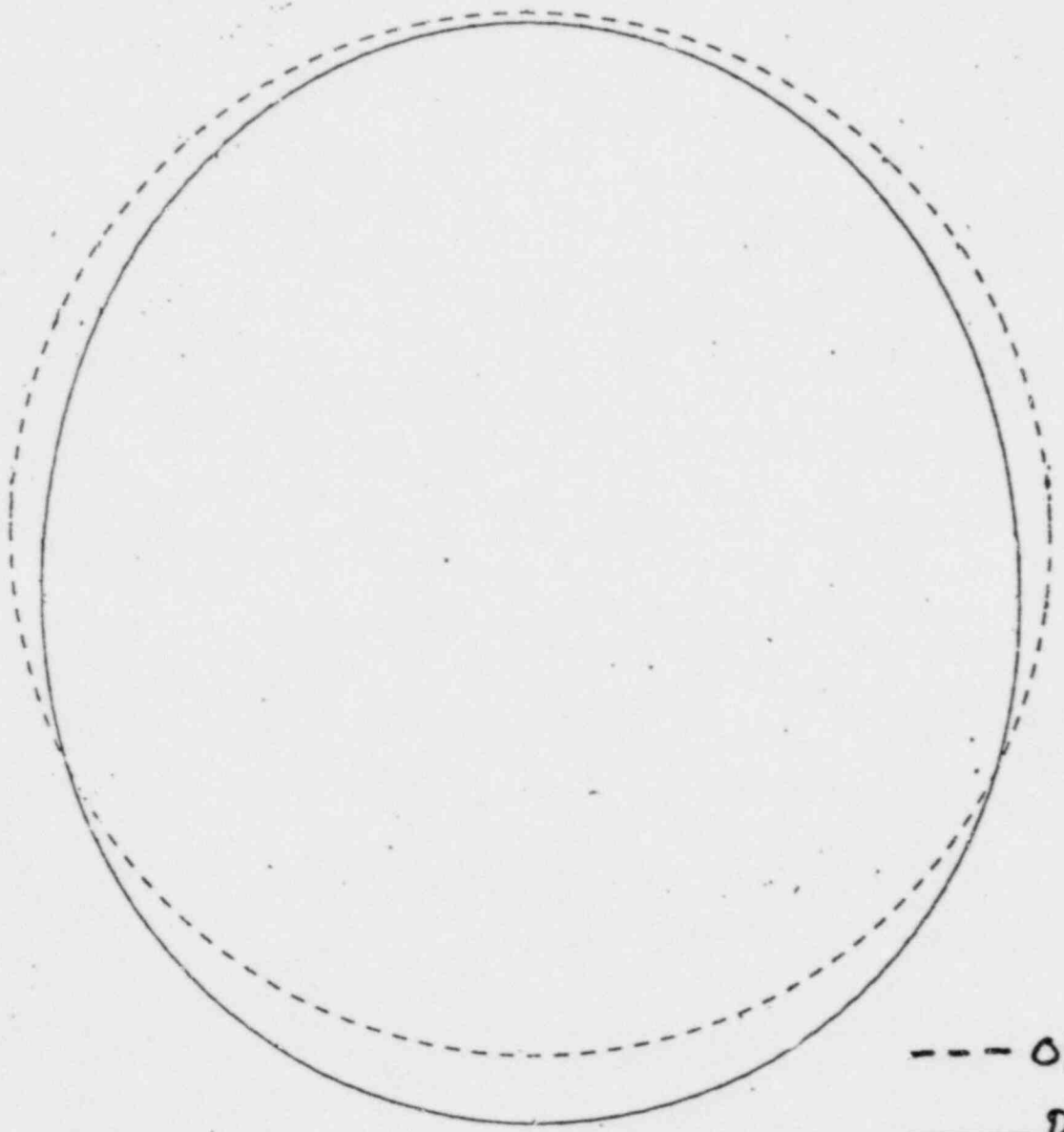


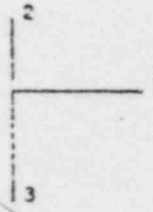
SUCTION LEG ELBOW AT PUMP (SHELL ELEMENT)



--- ORIGINAL SHAPE

____ DEFORMED SHAPE

EXAGGERATED BY A FACTOR OF 5



SUCTION ELBOW TOTAL DISP. AT MIDDLE SECTION

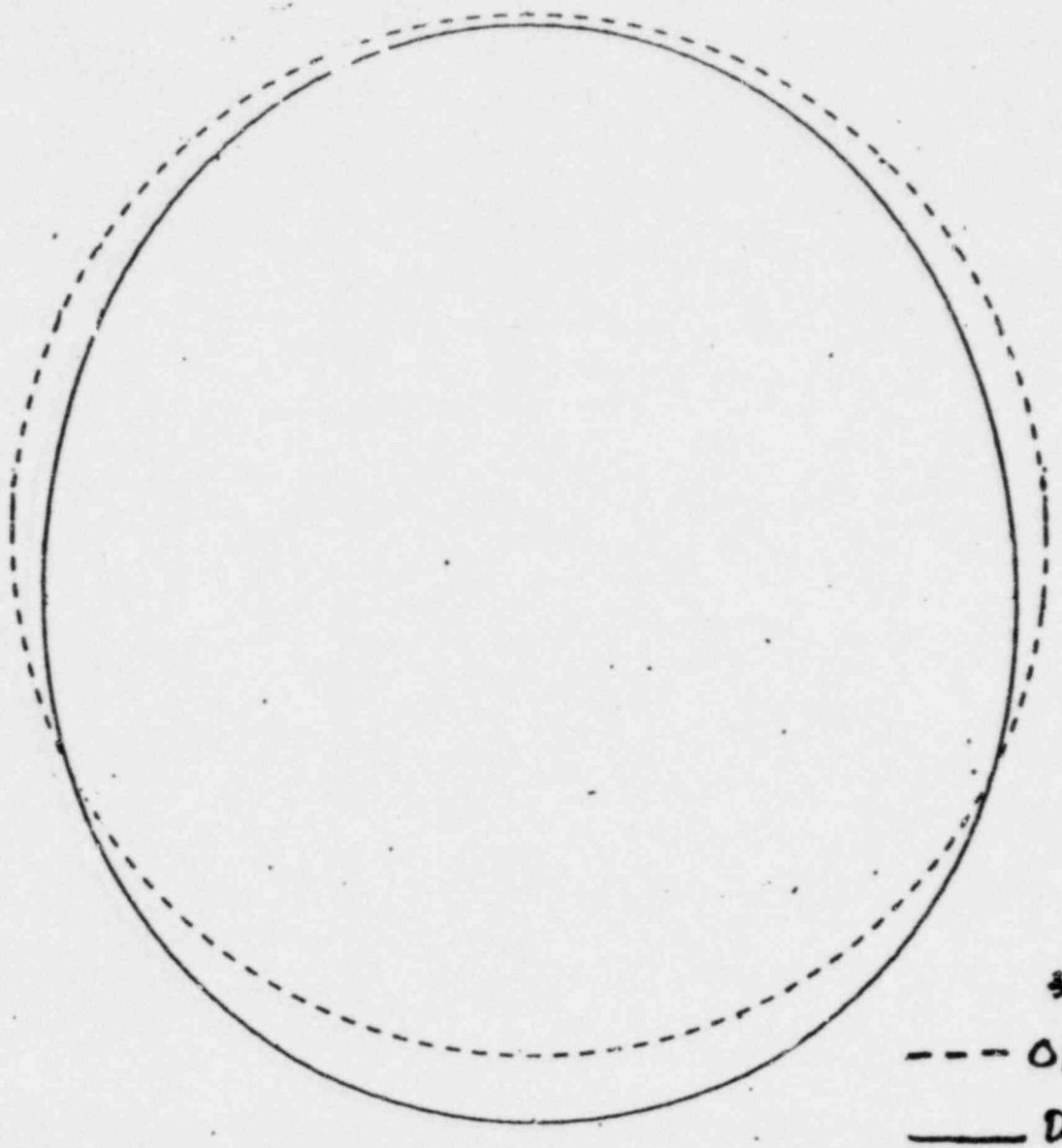
EFFECT OF MOMENT OF 60.2×10^6 IN-lb

The following pages are revised CESSAR-F text pages.

Table 3.9.3-2

Add Note:

The deformation resulting from the application of a moment in excess of the maximum Level D moment, determined on an elastic basis, (56.7×10^6 in-lb) permitted by NB 3656 of Section III of the ASME Code has been calculated to demonstrate piping functionability following postulated pipe rupture. The calculated deformation is shown in Figure 3.9.3-1.



NEW FIGURE

~~30 INCH ID PIPE~~

--- ORIGINAL SHAPE

___ DEFORMED SHAPE

EXAGGERATED BY A FACTOR OF 5

SUCTION ELBOW TOTAL DISP. AT MIDDLE SECTION

SYSTEM 80 DEFORMATION DUE TO A MOMENT OF 60.2×10^6 IN-lb ON RCS HOT LEG ELBOW

FIGURE 3.9.3-1