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TU ELECTRIC

August 12, 1992

William J. Cahill, Jr.  
Group Vice President

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES) - UNIT 2  
DOCKET NO. 50-446  
REQUEST FOR ADDITIONAL INFORMATION ON ME215,  
SAPCAS COMPUTER CODE

Gentlemen:

Per your request for additional information on the subject computer codes,  
the following enclosures are provided for your review as follows:

- (1) Introduction of computer program ME215. This write-up provides a brief description of the three documents included in this transmittal.
- (2) The "User and Theory Manual". (proprietary)
- (3) The "Validation Manual", computer outputs of validation problems are not included in the verification manual. (proprietary)
- (4) Comanche Peak No. 2 GENX Calculation No. 2-NP-GENX-544. This GENX calculation is prepared to resolve the technical issue regarding the automatically generated element size at the pipe near a pad. This GENX calculation satisfactorily resolved the concern.
- (5) The response to the NRC's questions arising from the review made at Bechtel's Gaithersburg office.
- (6) A complete copy of microfiche of ME215 and ANSYS output (total 49 sheets). (proprietary)
- (7) Bechtel Application for Withholding Proprietary Information with Accompanying Affidavit, Proprietary Information Notice and Copyright Notice.

As portions of this submittal contains information proprietary to Bechtel, it is supported by an affidavit signed by Bechtel, the owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10CFR2.790.

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Accordingly, it is respectfully requested that the information which is proprietary to Bechtel be withheld from public disclosure in accordance with 10CFR2.790. Correspondence with respect to the proprietary aspects of the Application for Withholding should reference the supporting Bechtel affidavit and be addressed to Mr. G. L. Lusbaugh, Bechtel Project Engineer, Comanche Peak Steam Electric Station, P.O. Box 1002, Farm Road 56 Mail Zone C07, Glen Rose, Texas 76043.

Sincerely,

*William J. Cahill, Jr.*  
William J. Cahill, Jr.

By: *Roger D. Walker*  
Roger D. Walker  
Manager of Regulatory  
Affairs for NEO

CEJ/tg  
Enclosures

c - Mr. J. L. Milhoan, Region IV w/o encl  
Mr. B. E. Holian, NRR, w/encl  
Resident Inspectors, CPSES (2) w/o encl

## PRODUCTION OF COMPUTER PROGRAM ME215, VERSION 1.0

### 1. INTRODUCTION

ME215 is a special purpose finite element computer program for calculating the membrane and membrane-plus-bending stress intensities (S.I.) at pipes, pads, attachments, and welds. The piping components can be a circular run pipe, elbow, or a square tubular steel. The attachment can be a circular pipe, rectangular tube, or rectangular solid lug.

The structural analysis solver of the ME215 program is based on the SOLID SAP and SAP-IV. ME215 element library contains quadrilateral plate element of SAP-IV, 3D solid (brick) element of SOLID-SAP, and 3D beam element of SAP-IV.

The program utilizes a minimum set of free format, engineering based input commands and keywords. It then automatically generates a finite element mesh to model the user defined piping attachment. Some control parameters are available for the user to adjust the modeling of the attachment. By default, the minimum element size at the attachment interface will be about the run pipe thickness, or the pad thickness if applicable.

Local stress calculations for Comanche Peak Unit 2 integral welded attachments are evaluated and qualified using computer program ME214. ME214 is based on the Welding Research Council (WRC) Bulletin No. 107, ASME Code Cases, and Comanche Peak Design Criteria 2EP-5.12 and 2EP-5.13. If a local stress calculation can not be qualified using ME214 due excessive conservatism or if the attachment being evaluated is beyond the program limitations, then ME215, if applicable, may be used for the qualification of local stress calculation. ME215 will provide a realistic solution of local piping stress as compared to the more conservative approach used in computer program ME214.

### 2. USER AND THEORY MANUAL

The user and theory manual of ME215 provides the following information:

- a. Theoretical basis of the computer program and its references.
- b. Program capability, limitation and assumption.
- c. Preparation of input data
  - Defines the coordinate systems

- Identifies the geometric configuration of integral welded attachment on a run pipe
- Describes the attachment/pipe dimensions
- Describes load input

d. Output Interpretation

Describes the format of output. Two tables listing the maximum 25 stress points are reported for the whole finite element model. One table is sorted according to the membrane plus bending stress intensity and the other according to the membrane stress intensity.

- Printouts of model geometry, nodal displacements and rotations.
- Printouts of the detailed element stresses for each plate or brick elements.

### 3. VALIDATION MANUAL

The ME215 Validation Manual revision 0 covers 14 validation problems. A checklist explains which of the various features were validated by each of the validation problems. The validation problems are numbered as VER-E1, VER-E2,... VER-B1,... VER-A1, etc. The problems selected are based on their numerical sensitivities, system characteristics, unique features, available solutions, program capacities, built-in criteria, defaulted values, etc. In this report, ME215 results have been compared against the commercially available computer program ANSYS, simplified closed form or conservative methodology, the standard benchmark problem from the ASME and/or other technical publications.

Tables or charts show typical values extracted from the ME215 computer output compared with the results from one of the references listed in the previous section. The results compared are typical of the results for numerical figures ranging from low to high values for these problems.

### 4. GENX CALCULATION 544 - Reconciliation of Local Evaluation Using ME215 Analysis

In the ME215 analysis, the element mesh size is generated automatically. During a TU audit on ME215, it was concluded that the generated element sizes are adequate at welds, attachments, pads, and piping near attachments. However, a concern was raised relative to the adequacy of the element size at the pipe near a pad.

To assess this concern a GENX calculation was prepared in which the adequacy of ME215 mesh size in this region was addressed further using additional comparisons with ANSYS. The GENX calculation demonstrates the acceptability of usage of ME215 relative to the concern raised.

#### 5. FUTURE PROGRAM RELEASES

Version 2.0 of the program (currently being documented) will further enhance the automatic mesh generation feature for pipe elements near a reinforcement pad. Options to vary the size of elements will also be available. The preliminary validation runs of version 2.0 show close correlation with the results of ANSYS. The new version of ME215 is intended for issuance in the near future.