MANDATORY APPENDIX II
EXPERIMENTAL STRESS ANALYSIS AND DETERMINATION OF STRESS INTENSIFICATION FACTORS

ARTICLE II-1000
EXPERIMENTAL STRESS ANALYSIS

II-1100  INTRODUCTION AND SCOPE
Throughout this Article, wherever the word component or components is used, it shall be understood to include portions thereof, and also appurtenances and portions thereof.

The rules of this Article are applicable to Section III Division 1, Division 3, and Division 5 construction.

II-1110  GENERAL REQUIREMENTS
II-1111  When Experimental Stress Analysis Is Required
The critical or governing stresses in parts for which theoretical stress analysis is inadequate or for which design rules are unavailable shall be substantiated by experimental stress analysis.

II-1112  When Reevaluation Is Not Required
Reevaluation is not required for configurations for which there are available detailed experimental results that are consistent with the requirements of this Article.

II-1113  Discounting of Corrosion Allowances
The test procedures followed and the interpretation of the results shall be such as to discount the effects of material added to the thickness of members, such as corrosion allowance, or of other material which cannot be considered as contributing to the strength of the part.

II-1114  Inspection and Reports
Tests conducted in accordance with this Article need not be witnessed by the Inspector. However, a detailed report of the test procedure and the results obtained shall be included with the Design Report (NCA-3551). The report shall show that the instrumentation used was within calibration.

II-1115  Temperature Limits
Experimental methods shall not be used to justify exceeding applicable temperature limits.

II-1200  PERMISSIBLE TYPES OF NONCYCLIC TESTS AND CALCULATION OF STRESSES
II-1210  TESTS FOR DETERMINING GOVERNING STRESSES
Permissible types of tests for the determination of governing stresses are strain measurement tests and photoelastic tests. Brittle coating tests may be used only for the purpose described in II-1310.

II-1220  TESTS FOR DETERMINING COLLAPSE LOAD
Strain measurement tests may be used for the determination of collapse load. Distortion measurement tests may be used for the determination of collapse load, if it can be clearly shown that the test setup and the instrumentation used will give valid results for the configuration on which the measurements are made.

II-1221  Fatigue Tests for Evaluation of Cyclic Loading
Fatigue tests as described in II-1500 may be used to evaluate the adequacy of a component for cyclic loading.

II-1230  TESTS TO DESTRUCTION
Results of tests to destruction are not acceptable except as provided for piping in NB-3649.

II-1240  CALCULATION OF STRESSES
A modified Poisson’s ratio is given by XIII-2500 and identified as being applicable only to local thermal stresses. It should be noted that some situations can arise in which the use of the modified value of Poisson’s ratio is