

INSPECTION

WATTS BAR NUCLEAR PLANT

UNIT 1

BASELINE INSPECTION OF EXTRACTION STEAM PIPING

AND HIGH-PRESSURE MOISTURE SEPARATOR

REHEATER VENT LINES

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Introduction

A baseline ultrasonic test (UT) inspection was performed on the subject piping before startup of the unit. The necessity of this inspection originated from concerns pertaining to failures and/or wall degradation in similar piping at other TVA operating facilities, and industry-wide. Information obtained from this inspection and future inspections will permit accurate monitoring of the progression of steam erosion damage and facilitate necessary corrective actions to preclude unanticipated piping failures.

Discussion

Seventeen piping locations were selected for the unit 1 baseline inspection. These locations consisted of 11 extraction steam piping areas and 6 high-pressure moisture separator reheater (MSR) vent line areas. The selection of these areas was based on the thermodynamic and hydraulic conditions of the system. The MSR vent lines that were selected were originally undersized and are believed to be more subject to steam erosion damage. This problem is currently being addressed by the Office of Engineering personnel.

The piping was grided and ultrasonically tested in accordance with Technical Instruction 31.13. The results of the UT did not reveal any preoperational damage. All wall thickness values recorded were nominal for the given pipe diameter and schedule.

Attached in Table I is a list of the areas examined, the design parameters for the system, and the calculated minimum wall acceptance value. Also attached in the appendix are the mechanical drawings showing the grid locations.

Conclusion and Recommendation

The baseline inspection demonstrated that the subject piping is suitable for service. Also, the inspection did not show any evidence of fabrication defects such as laminations or inclusions. It is recommended that the piping be ultrasonically tested during the first refueling cycle to document the condition. Also, visual inspections should be performed on the crossaround piping and areas downstream of selected level control valves where two phase mixtures are known to exist. The visual inspections performed on this additional piping will help determine whether UT of that piping is warranted.

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TABLE I
EXTRACTION STEAM PIPING AND MOISTURE SEPARATOR REHEATER
VENT LINES LOCATIONS AND DESIGN PARAMETERS

No. 1 Extraction

Grid Nos. 11 and 12
Location (See 47W410-1 attached)
Design T - 460°F
Design P - 475 psig
Diameter - 16 inch
Nominal wall - standard weight
Material Specifications - ASTM A106 GRB
TVA Class - H
Corrosion Allowance - 0.062 inch
Calculated Minimum Wall Value = $0.2502 + 0.062 = 0.3122$ inch

Grid Nos. 13 and 14
Location (See 47W410-1 attached)
Design T - 460°F
Design P - 475 psig
Diameter - 12 inch
Nominal wall - standard weight
Material Specifications - ASTM A106 GRB
TVA Class - H
Corrosion Allowance - 0.062 inch
Calculated Minimum Wall Value = $0.1993 + 0.062 = 0.2613$ inch

No. 3 Extraction

Grid Nos. 1, 2, 3, and 4
Location (See 47W410-1 and 47W410-3 attached)
Design T - 375°F
Design P - 250 psig
Diameter - 20 inch
Nominal wall or schedule - standard weight
Material Specifications - ASTM A106 GRB
TVA Class - H
Corrosion Allowance - 0.062 inch
Calculated Minimum Wall Value = $0.1656 + 0.062 = 0.2276$ inch

Grid No. 5
Location (See 47W410-1 attached)
Design T - 375°F
Design P - 250 psig
Diameter - 28 inch
Nominal wall or schedule - 0.375 inch
Material Specifications - ASTM A155, KC70, Class 2
TVA Class - H
Corrosion Allowance - 0.088 inch
Calculated Minimum Wall Value = $0.1989 + 0.088 = 0.2869$ inch

No. 2 Extraction

Grid Nos. 6 and 7
Location (See 47W410-1 attached)
Design T - 420°F
Design P - 325 psig
Diameter - 20 inch
Nominal wall - standard weight
Material Specifications - ASTM A106 GRB
TVA Class - H
Corrosion Allowance - 0.062 inch
Calculated Minimum Wall Value = $0.2148 + 0.026 = 0.2768$ inch

MSR Vent Lines

Grid Nos. 8, 9, 10, 15, 16, and 17
Location (See 47W410-1 and 47W425-4 attached)
Design T - 600°F
Design P - 1,185 psig
Diameter - 2-1/2 inch
Nominal wall or schedule - Sch 80
Material Specifications - ASTM A106 GRB
TVA Class - H
Corrosion Allowance - 0.061 inch
Calculated Minimum Wall Value = $0.1101 + 0.061 = 0.1711$ inch

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Attachment
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