

## ATTACHMENT 1

### Piping Material Stress Analysis Inputs

Pipe material, size and thickness are modeled as listed below.

#### Main Steam Model

- Material
  - Header Piping: P22 (Ref.4)
  - SRV Valves: P11 (Ref.10)
  - SRV Discharge: A106 Gr.B (Assumed)
- BOP Header Piping
  - OD: 22" (Ref.4)
  - Thickness: 3.35" (Ref. 3)
    - Design thickness 3.125" MW (Ref.4)
    - Code allowable variation: +16% by mass, +15/-12.5% Thickness (for nominal), +/-1% OD
    - UT reading in SWEC report (Ref.3) is 3.35" at bottom of riser bend.
    - Average UT reading in Teledyne report (Ref.12) is 3.39" (Ref.12 provided for Revision 0, confirms thickness used is accurate)
- BOP Branch Piping
  - OD: 16.5" (Ref.4)
  - Thickness: 2.58"
    - Design thickness 2.35" MW (Ref.4)
    - Average UT reading in Teledyne report (Ref.12) is 2.64" (Ref.12 provided for Revision 0, confirms thickness used is accurate)
    - Used thickness corresponding to 8% increase in mass above minimum wall (half of 16% allowed per code A999).
- Superheater Header
  - OD: 23.25" (Ref.1)
  - Thickness: 5.5" (Ref.2)
    - Design thickness: 4.375" min wall (Ref.1)
    - The average thickness reading from APTECH's 1993 UT results were modeled in lieu of the design minimum wall thickness due to the large discrepancy.
- Riley External Piping
  - OD: 22.75" (Ref. 5)
  - Thickness: 3.75" (Ref.3)
    - Design thickness is 3.815" per Teledyne report (Ref.12)
    - UT reading in SWEC report (Ref.3) is 3.75".
    - Average UT readings in Teledyne report (Ref.12) is 3.78" (Ref.12 provided for Revision 0, confirms thickness used is accurate)
- Turbine Lead Piping
  - OD: 7.625" (Ref.7)

- Thickness: 1.125" MW (Ref.7)
- Steam Chest
  - OD: 24"
  - Thickness: 4.0"
    - No legible information for the steam chest was provided. The OD was estimated by scaling of Westinghouse drawings (Ref.7). 4" thick P22 pipe was assumed based on minimum wall thickness code calculation, however this is not confirmed and stress analysis results on the steam chest may not be meaningful.

#### Hot Reheat Model

- Material
  - Header Piping: P22 (Ref. 4)
  - SRV Discharge: A106 Gr.B (Assumed)
- BOP Header Piping
  - OD: 30.0" (Ref.4)
  - Thickness: 1.25"
    - Design thickness=1.150" MW (Ref.4)
    - Used thickness corresponding to 8% increase in mass above minimum wall (half of 16% allowed per code A999).
    - Average UT readings in Teledyne report (Ref.12) is 1.3" (Ref.12 provided for Revision 0, confirms thickness used is accurate)
- BOP Branch Piping
  - OD: 24.0" (Ref.4)
  - Thickness: 0.98"
    - Design thickness = 0.90" MW (Ref.4)
    - Used thickness corresponding to 8% increase in mass above minimum wall (half of 16% allowed per code A999).
    - Average UT readings in Teledyne report (Ref.12) is 0.98" (Ref.12 provided for Revision 0, confirms thickness used is accurate)
- Boiler Reheat Outlet Header A
  - OD: 30.0" (Ref.1)
  - Thickness: 3.3" (Ref.2)
    - Design thickness: 2.125" min wall (Ref.1)
    - The average thickness reading from APTECH's 1993 UT results were modeled in lieu of the design minimum wall thickness due to the large discrepancy.
- Boiler Reheat Outlet Header B
  - OD: 31.75" (Ref.1)
  - Thickness: 4.0" (Ref.2)
    - Design thickness: 3.50" min wall (Ref.1)

- The average thickness reading from APTECH's 1993 UT results were modeled in lieu of the design minimum wall thickness due to the large discrepancy.
- Riley External Piping
  - OD: 29.25" (Ref.5)
  - Thickness: 2.0"
    - S&W NDE report (Ref.3) references a design thickness of 1.94".
    - Average UT readings in Teledyne report (Ref.12) is 2.03" (Ref.12 provided for Revision 0, confirms thickness used is accurate)
- Turbine Lead Piping
  - OD: 16"
  - Thickness: 1.0" (Ref.9)
    - The pipe OD and thicknesses were not provided and area assumed based on previous stress analyses by S&W.

#### Cold Reheat Model

- Material
  - Header Piping: A106 Gr.C (Ref.4)
  - SRV Discharge: A106 Gr.B (Assumed)
- BOP Header Piping
  - OD: 24.0" (Ref.4)
  - Thickness: Schedule 30 (0.562" Nominal) (Ref.4)
    - Actual thickness readings match design (Ref.8)
    - Note the wall thickness is very near the minimum allowed per ASME B31.1, and doesn't appear to consider corrosion.
- BOP Header Elbows
  - OD: 24.0" (Ref.4)
  - Thickness: 0.812 (Ref.8)
    - Design thickness provided in Reference 8. Actual thickness readings match design.
- Boiler Reheat Inlet Header
  - OD: 24.0" (Ref.1)
  - Thickness: 1.56" min wall (Ref.3)
    - Design thickness: 1.375" min wall (Ref.1) (Nominal thickness is approximately equal to thickness chosen)
    - SWEC UT reading at the eastern boiler header to branch outlet connection is 1.57" (Ref.3)
    - Assumed header is the same pipe thickness as Riley External Piping (see below)
- Riley External Piping
  - OD: 24.0" (Ref.5)
  - Thickness: 1.56" (Ref.12)

- Design thickness is 1.56" per hand written note on the piping arrangement drawings (Ref.13), provided for Rev.0.
- Average UT reading in Teledyne report (Ref.12) at one location is 1.806" (Insufficient data to assume piping is consistently thicker than design)

**Extraction Steam Model**

- Material
  - All: A106 Gr.A (Ref.9)
- OD and Thickness (Ref.9)
  - Turbine Outlet: 20" S-STD
  - Deaerator: 16" S-20
  - Deaerator Take-off: 6" S-STD
  - BFWP Header: 12" S-20
  - BFWP Branches: 10" S-20
  - BFWP Connections: 12" S-40