TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT
UNIT 1

Steam Dryer Analysis

August 7, 2009

Steam Dryer Stress Analysis

- Low Flow Noise Included
- Re-analyzing Steam Dryer Stress to Show SR > 2.0
  - As built steam dryer at 110% OLTP
  - Modified steam dryer at 120% OLTP

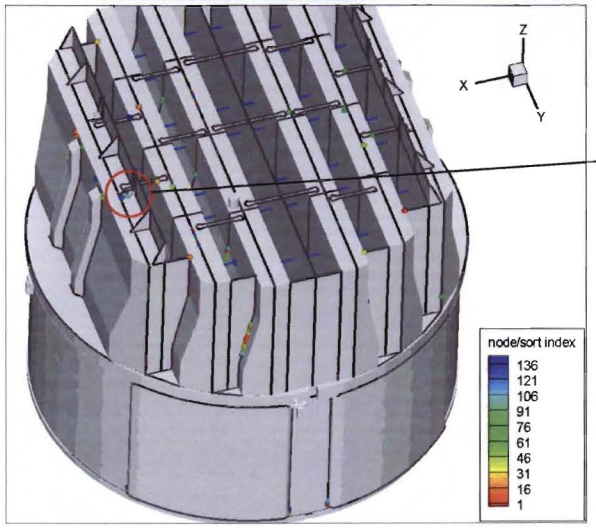
Steam Dryer Stress Analysis

- 110% OLTP Based on CDI 08-15P (March 2009) with:
  - Low flow noise included
  - Adjusted bump-up for 110% v^2 & 110% resonance
  - Same steam dryer configuration
  - Utilization of ASME Table NG 3352-1
  - SR > 2.0

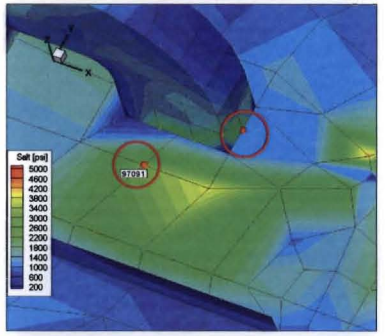
Steam Dryer Stress Analysis

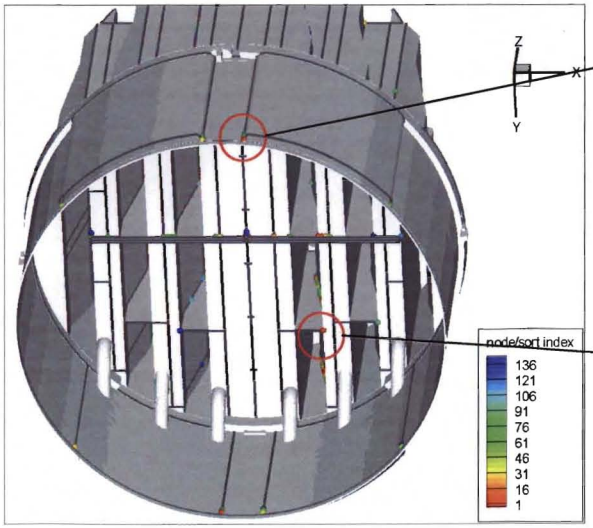
- 120% OLTP Based on CDI 08-15P (March 2009) with:
  - Low flow noise included
  - Additional steam dryer modifications
  - Revision of two submodels
    - 1 SIA - 1 CDI
  - Utilization of ASME Table NG 3352-1
  - SR > 2.0

Steam Dryer Stress Analysis

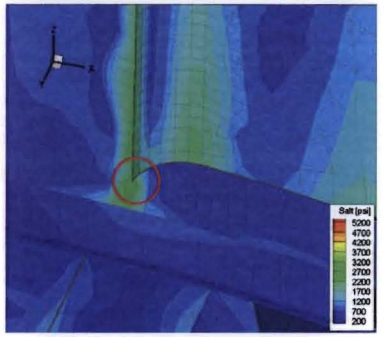


Outer Hood – Old Bar & Lock Gussets Group I

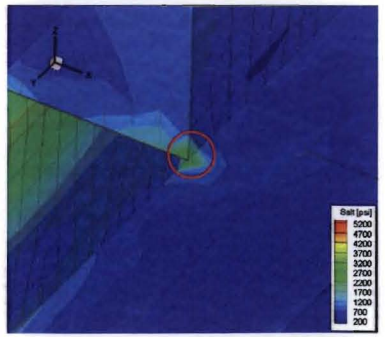




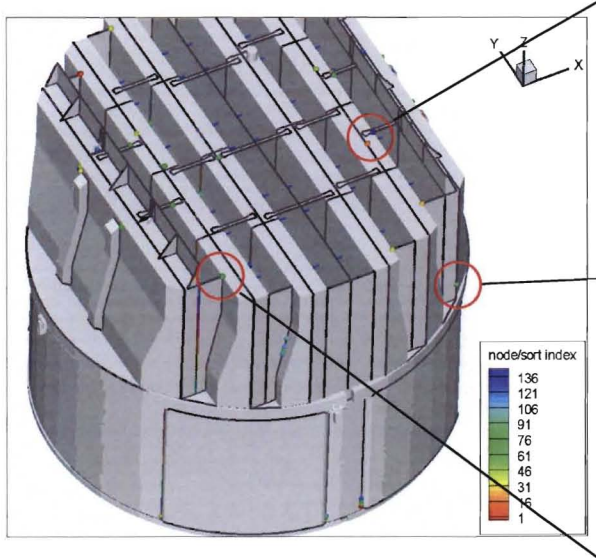
Drain Channels Group III



Inner Hood Stiffeners Group II



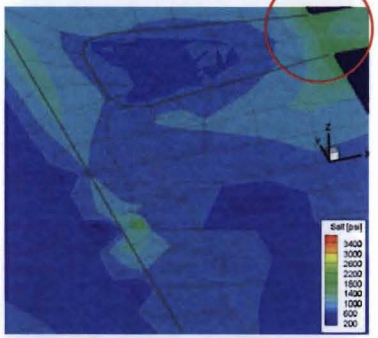
Steam Dryer Stress Analysis

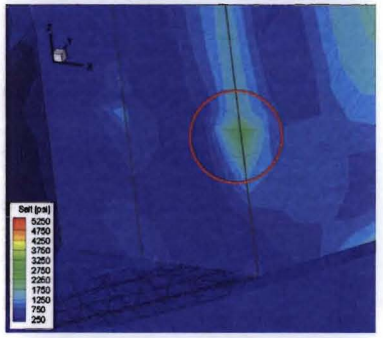


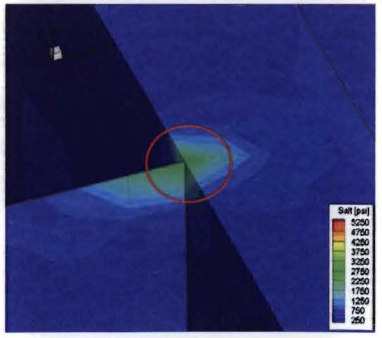
Middle Hood/F&T Tie Bar
Group IV

Outer Hood Side Panel /
Vane Bank End Wall
Group V

Outer Bank Discharge End panel /
Middle Hood / Top Cover
Group VI



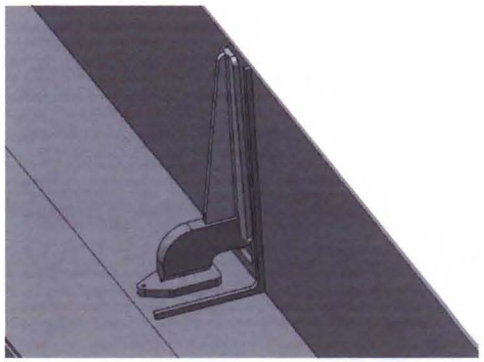




Steam Dryer Stress Analysis

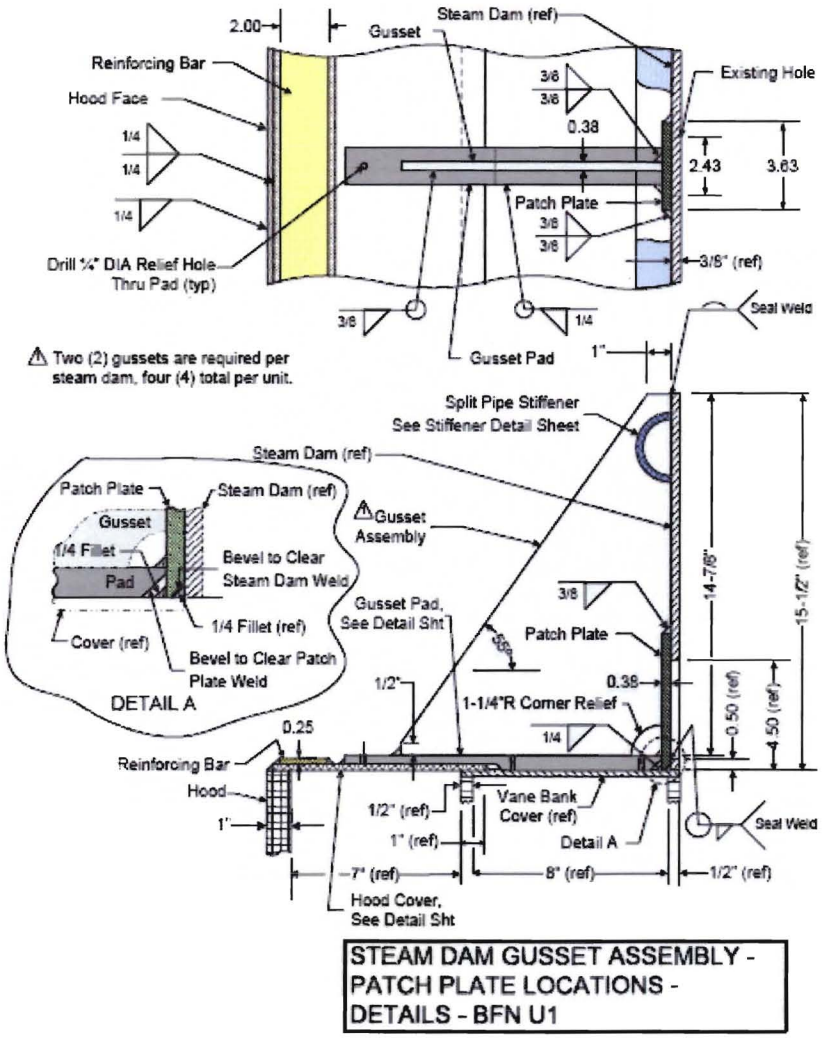
Noise Retained Modifications

Old Tie Bar/Lock Gusset – Replace with TVA Gusset Group I



Existing Configuration at 4 Locations, Where Old TB Remnant and Lock Gusset Were Retained. Stress Intensities Seen in Base Plate, TB Connection & Lock Gusset Connections.

Mod Removes this Configuration and Replaces with Revised Gusset as Found in all other Locations, Stiffens the top of Steam Dam with a ½ Pipe Section, & Reinforces the ¼" Thick Outer Hood Cover.



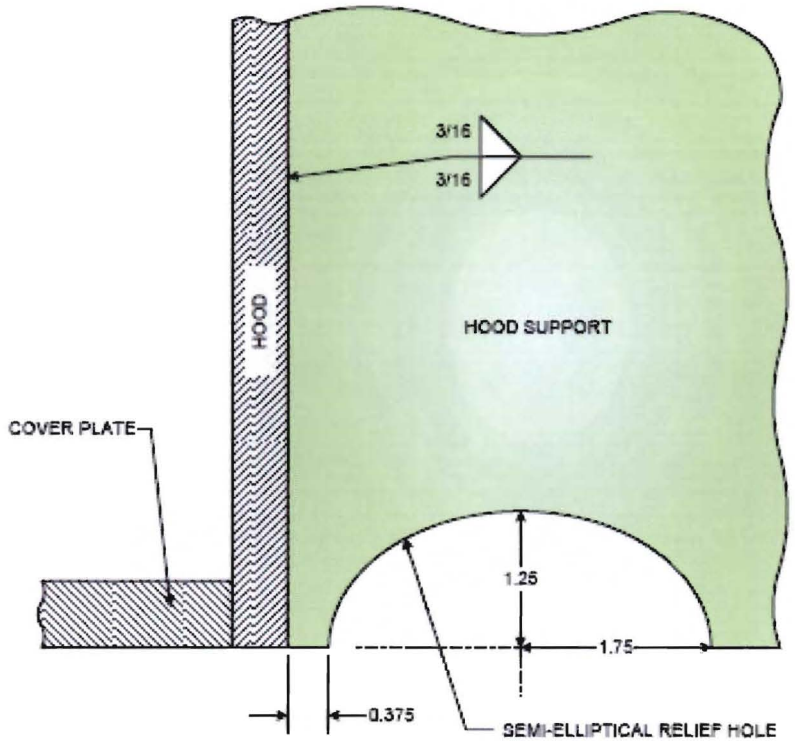
Steam Dryer Stress Analysis

Noise Retained Modifications

Inner Hood Stiffeners – Group II

Limiting stress location is at bottom corner of Hood Stiffener 2 sided fillet weld. Addition of stress relief semi-circular hole reduces stress acting on weld and adds flexibility to corner.

Modifications provide a resultant SRF = .53



HOOD-TO-HOOD SUPPORT RELIEF HOLE
BASELINE DIMENSIONS

Previous Solid Sub Model Revised to Evaluate Stress Relief and Resultant SRF

Steam Dryer Stress Analysis

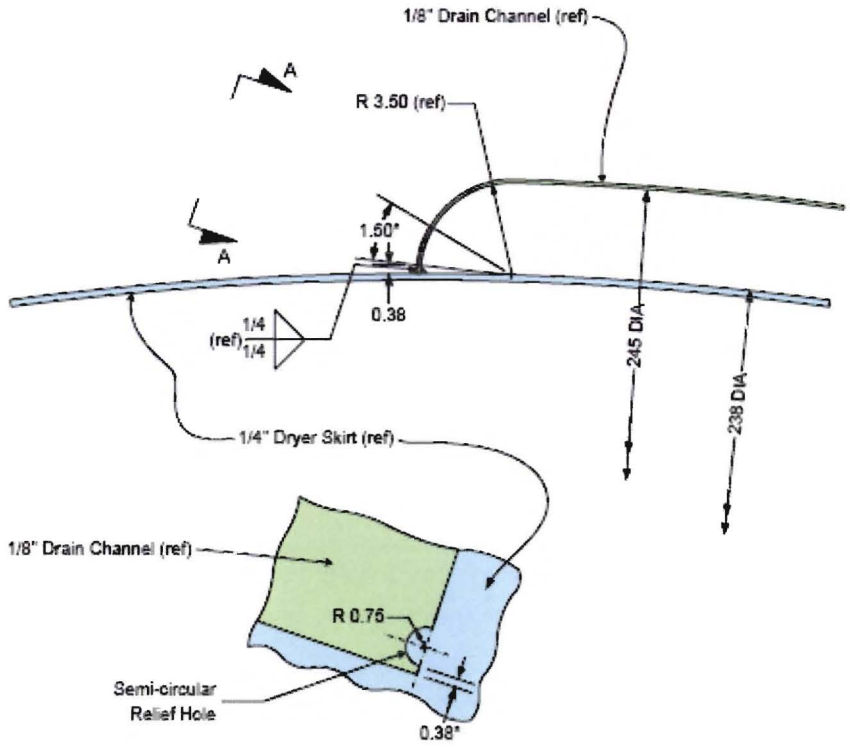
Noise Retained Modifications

Drain Channels – Group III

DC Follow the Dryer Skirt Modal Response. Limiting Stress Location is at Bottom of Drain Channel Weld, that has been Already Reinforced and Wrapped Underneath the DC. Addition of Stress Relief Semi-circular Hole Reduces Stress Acting on Weld and Adds Flexibility to Corner.

Modifications Provide SRF = .43

Previous Solid Sub Model Revised to Evaluate Stress Relief and Resultant SRF



DRAIN CHANNEL END RELIEF HOLE CONCEPT

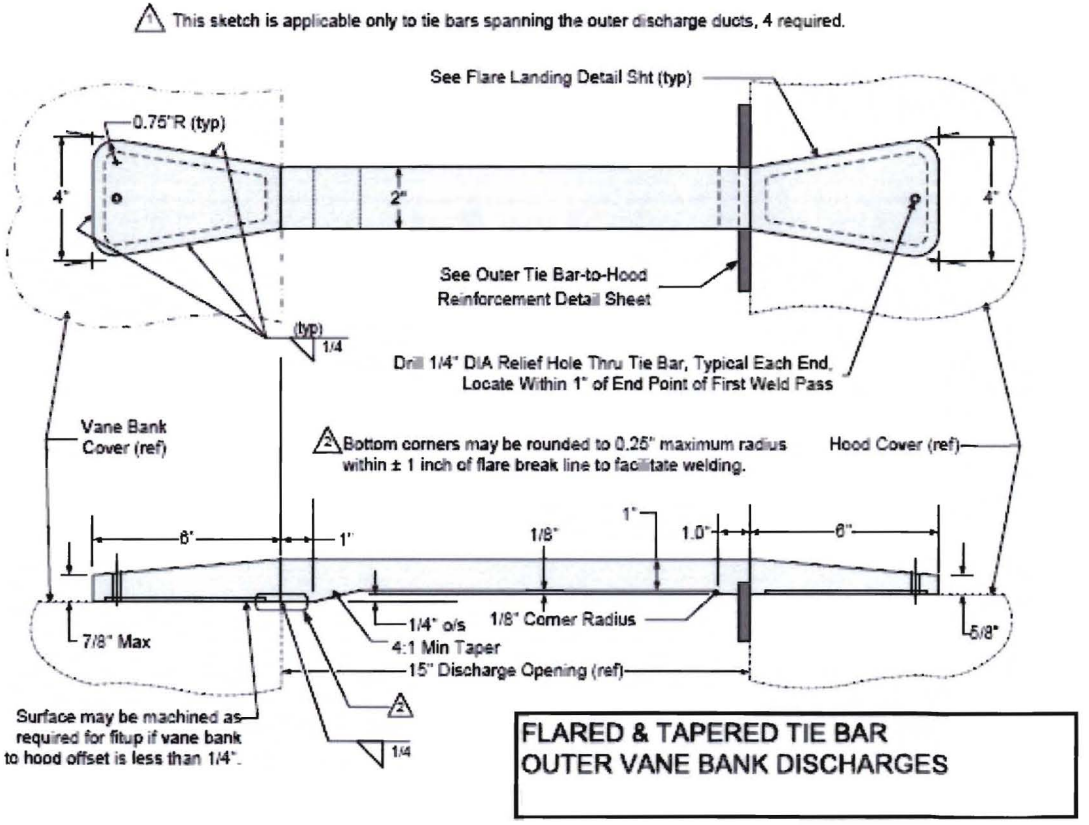
Steam Dryer Stress Analysis

Noise Retained Modifications

Middle Hood/F&T Tie Bar - Group IV

One location, between outer and middle banks, has a high stress located under the tie bar in the weld to the hood section. Additional reinforcement using a reinforcing plate and additional welds is to be added.

A total of four (4) symmetrical locations will be modified.

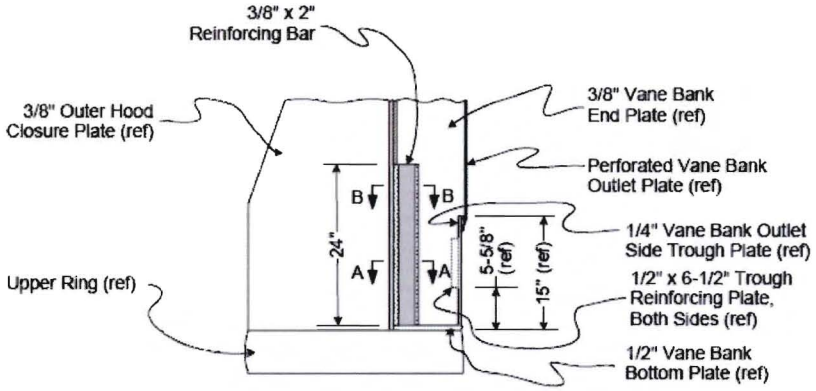


Steam Dryer Stress Analysis

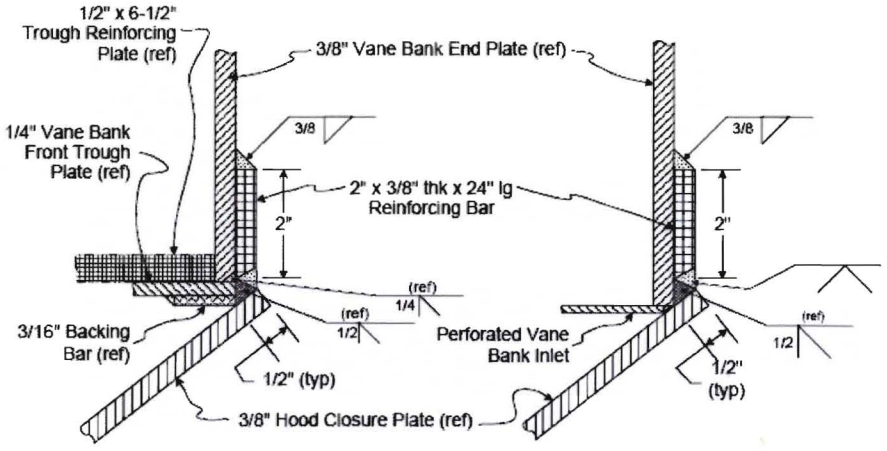
Noise Retained Modifications

Outer Hood Side Panel
/ Vane Bank End Wall
Group V

Limiting Component is the 3/8" thick Vane Bank End Closure Plate. Structural Thickness Changes Of Drain Trough, behind Plate, Contribute to Stress Intensity. Mod Provides Reinforcement to Distribute Stress



End View – Outer Hood Closure-to-Vane



Section A-A (Cut Thru Trough)

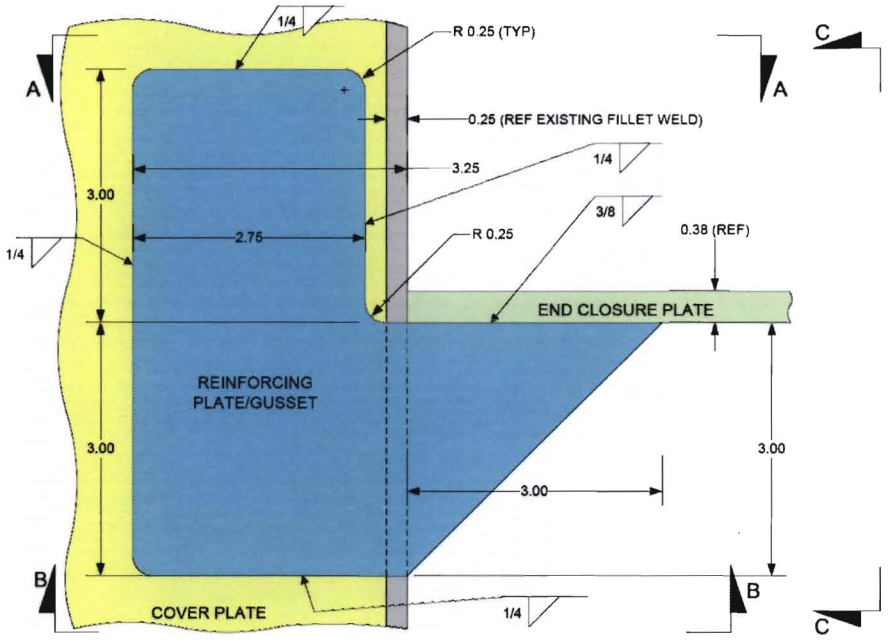
Section B-B (Cut Thru Perforated Plate)

Steam Dryer Stress Analysis

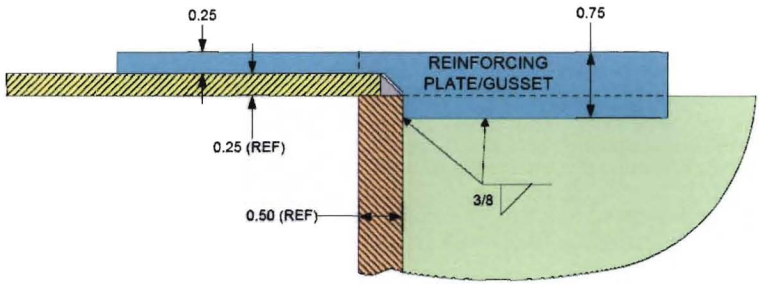
Noise Retained Modifications

Outer Bank Discharge End panel
/Middle Hood/ Top Cover
Group VI

Limiting stress is in the ¼" thick hood cover plate and ¼" attachment fillet weld. Mod provides additional reinforcement, additional weldment, and stiffening.



MIDDLE HOOD/COVER PLATE/END CLOSURE REINFORCING GUSSET



SECTION B-B

Steam Dryer Stress Analysis

- Interim Operation at Limited Power
  - Based on stress analysis at 110% OLTP with currently modified steam dryer
    - Low flow noise included
    - SR > 2.0
  - Implement mid-cycle
- Operation at 120% OLTP after Additional Steam Dryer Modifications
  - Based on stress analysis at 120% OLTP with additional modifications to steam dryer
    - Low flow noise included
    - SR > 2.0
  - Implement modifications Fall 2010

Steam Dryer Stress Analysis

Planned Submittals

- 110 % OLTP
  - Load report
  - Stress report
  - Limit curves
- 120% OLTP
  - Load report
  - Stress report
  - Limit curves
  - Submodels
- Submittal by August 28