

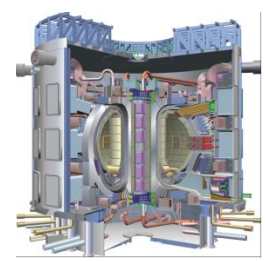
ELM COIL

THERMAL ANALYSIS TEMPERATURES

July 16, 2010

OBJECTIVES

- **PROVIDE STEADY STATE TEMPERATURES**
 - ASSUMPTIONS:
 1. OPERATION WITH COOLING (6 m/sec)
 2. OPERATION WITH COOLING & FAR FIELD RADIATION
 3. MGO Revised Conductivity 2.363 W/m/k



STEADY STATE TEMPERATURE ANALYSIS

FULL OPERATING CONDITIONS

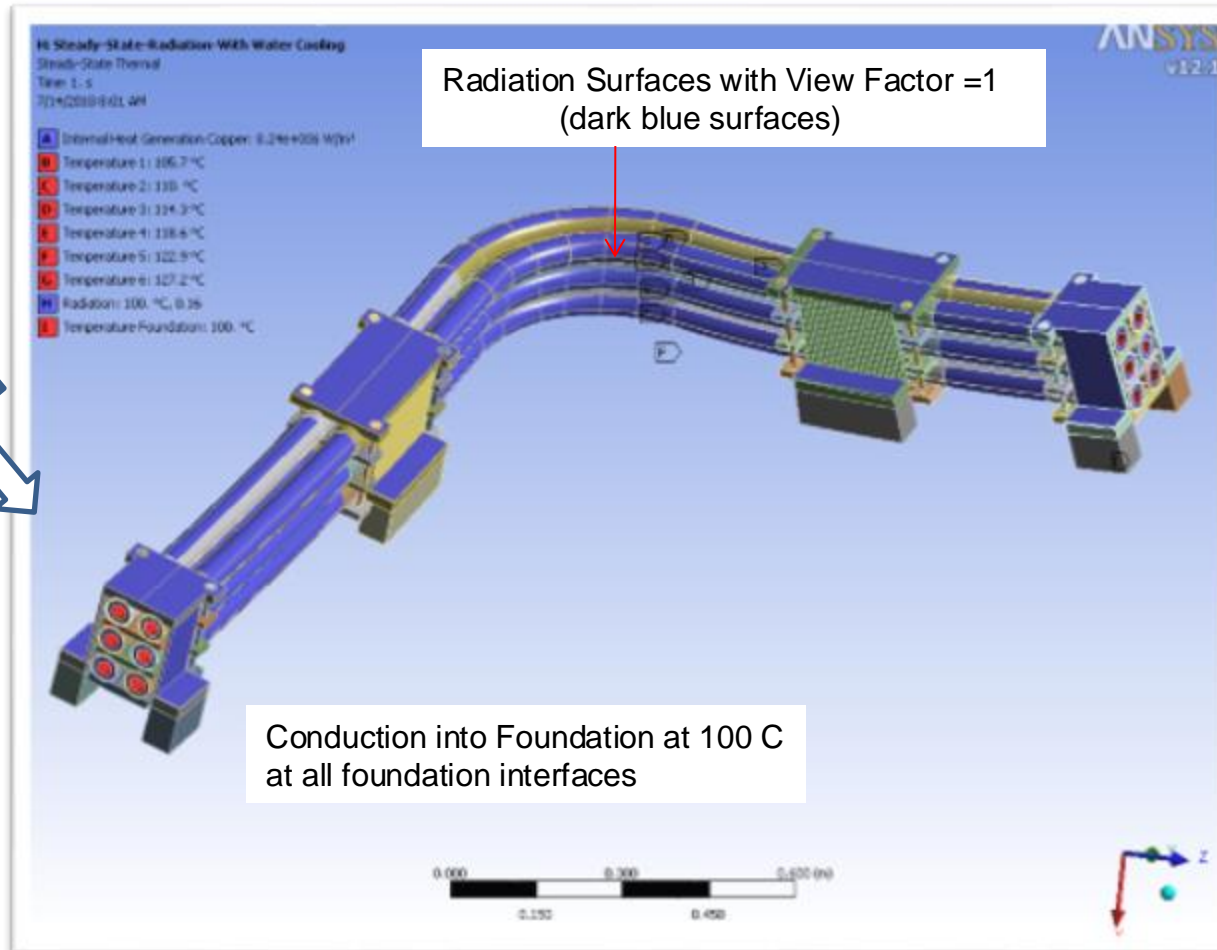
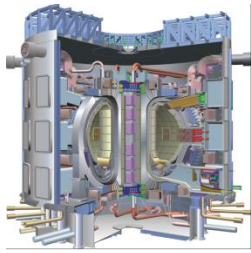
Resistive Heat Generation; 8.24 Mw /M^3

Nuclear Heat Generation; Original Functions

Cooling Water Applied 6 m/sec

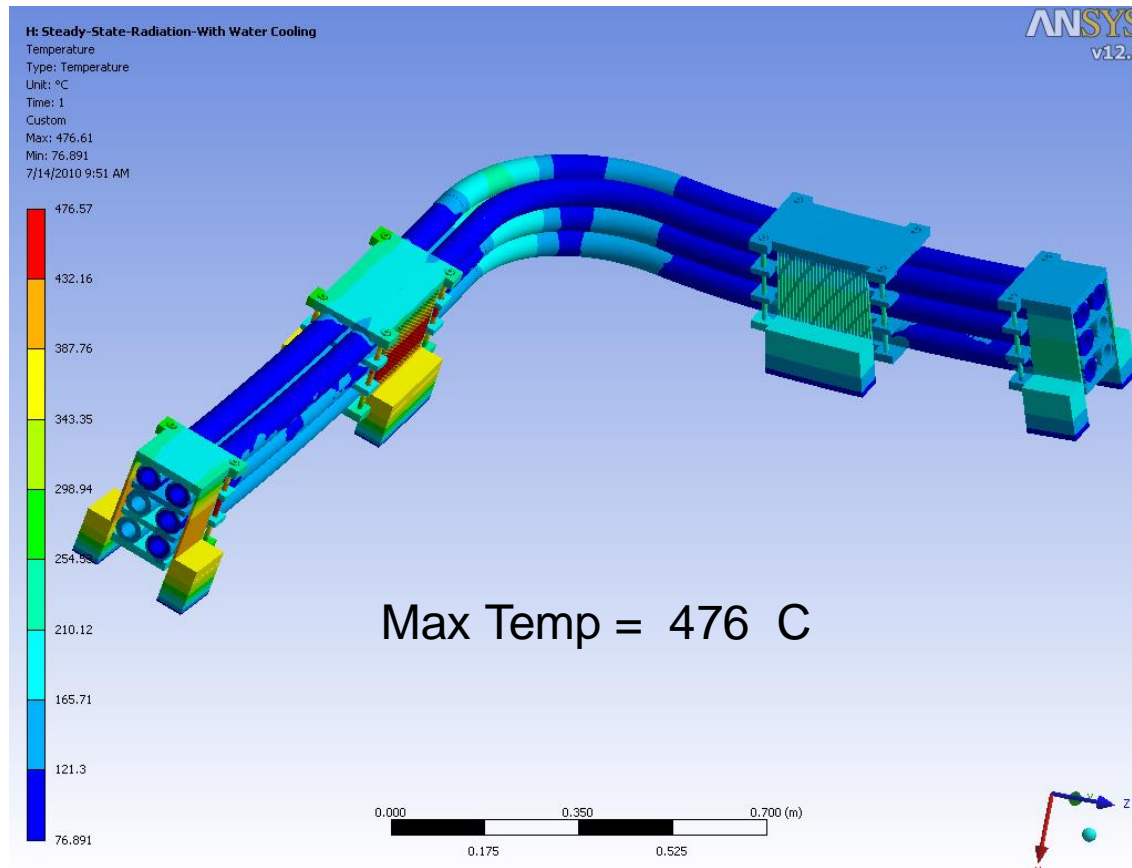
Far Field Radiation to Surface at 100 C

THERMAL BOUNDARY CONDITIONS



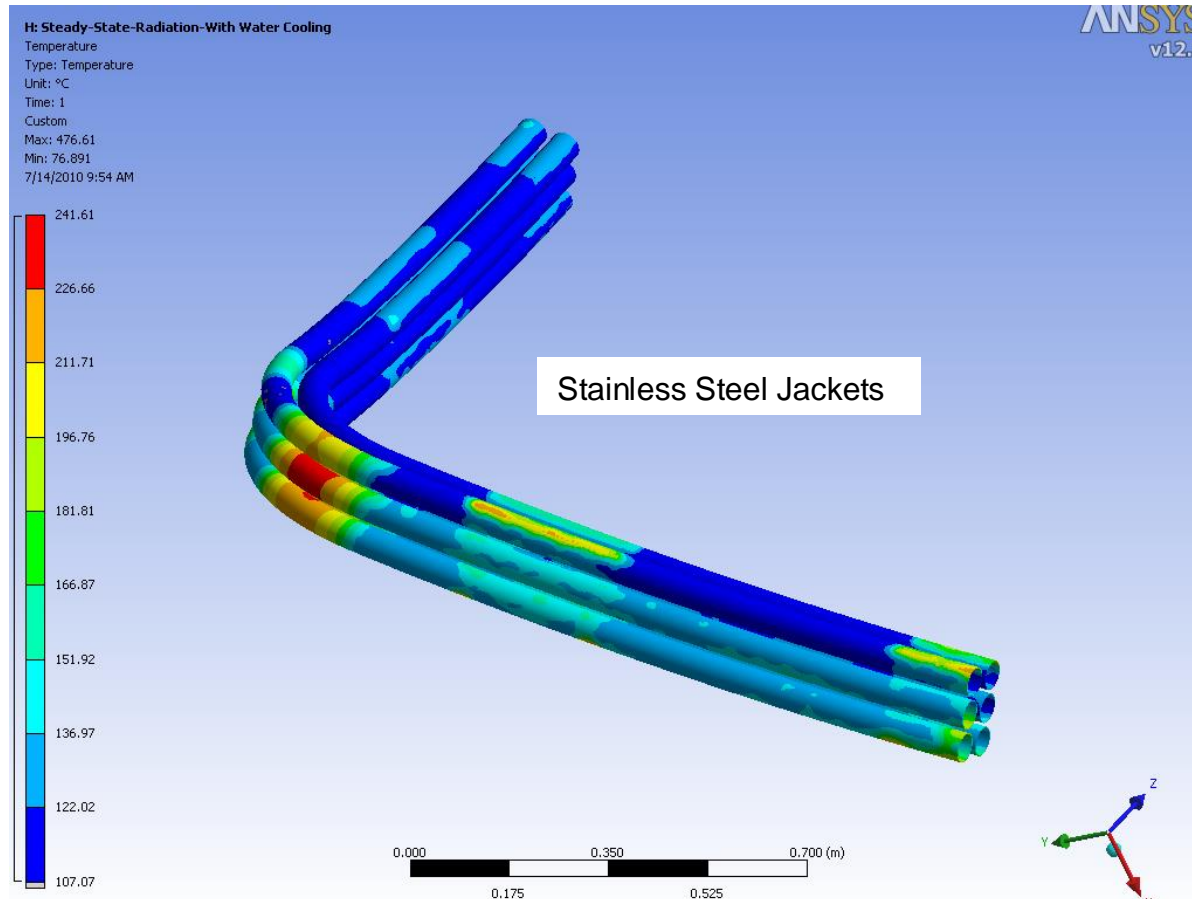
The Copper Coil Temperatures are Specified on the Inner Diameter Based on the COIL Resistive Heat Energy

Steady State Temperatures With Heat Generation ; 6 m/s Water Cooling Radiation to Far Field 100 C



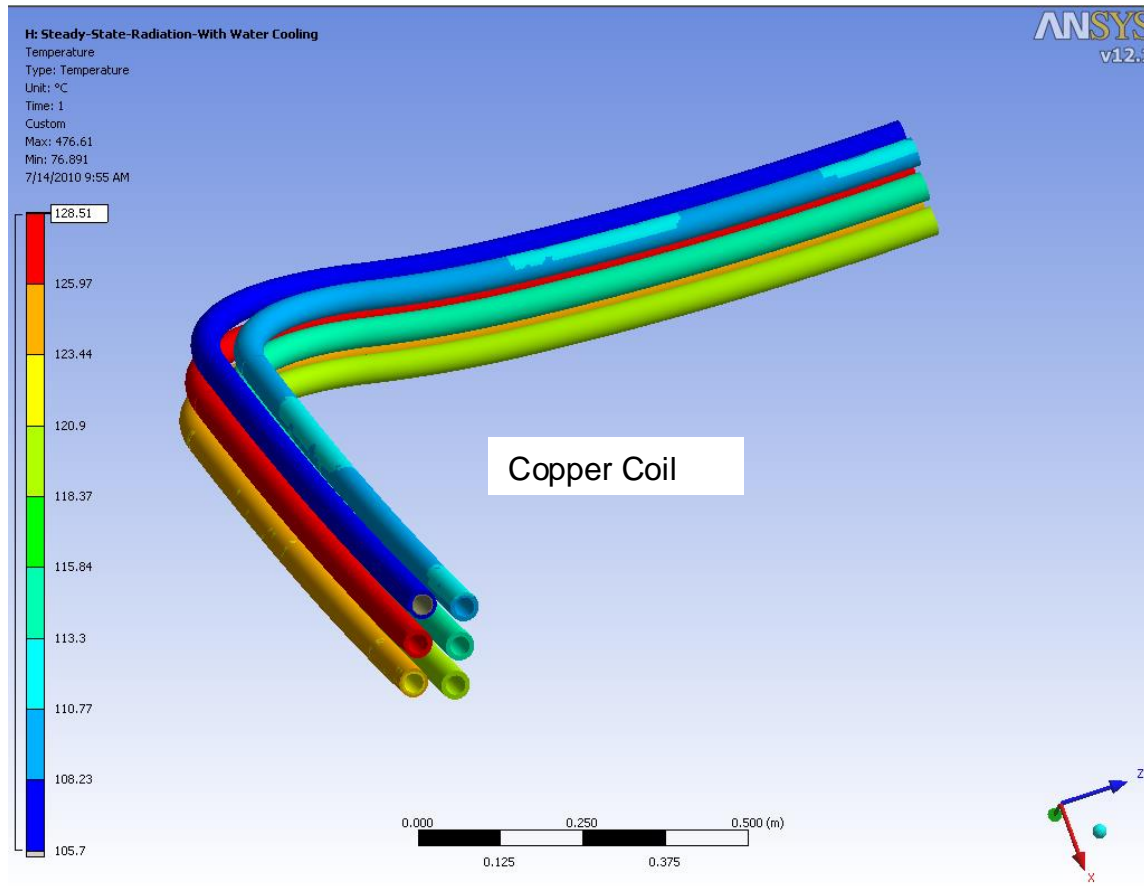
TEMPERATURES ARE WITHIN OPERATING LIMITS OF MATERIALS

Steady State Temperatures With Heat Generation ; 6 m/s Water Cooling Radiation to Far Field 100 C



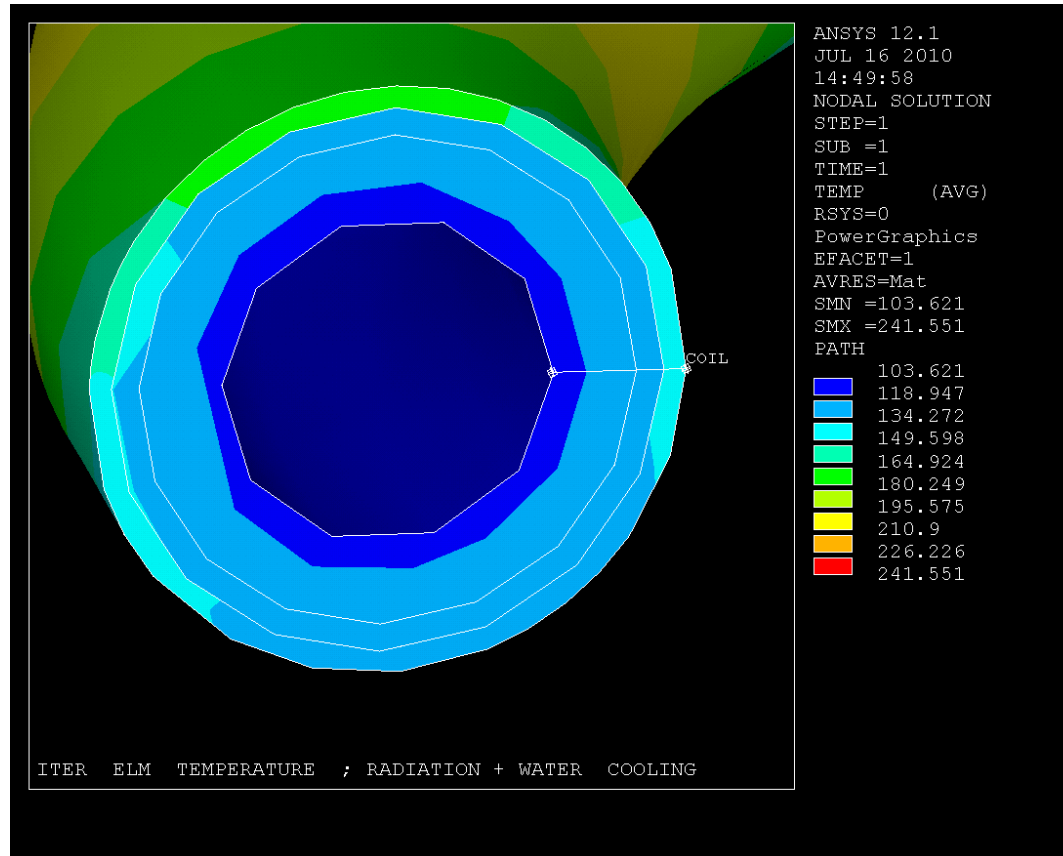
Max Temperatures (472 C = F) are within the limits of Stainless Steel
With Cooling Water

Steady State Temperatures With Heat Generation ; 6 m/s Water Cooling Radiation to Far Field 100 C



Max Temperatures (128.5 C) are Consistent with Hand Calculations

Steady State Temperatures With Heat Generation ; 6 m/s Water Cooling Radiation to Far Field 100 C



SECTION PLOT OF COIL TEMPERATURES