An Analysis Of A Spent Fuel Transportation Cask Under Severe Accident Conditions

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Introduction

- Baltimore Tunnel Fire
- Spent Fuel Transportation Cask
- Preliminary Results
- Conclusions and Future Work

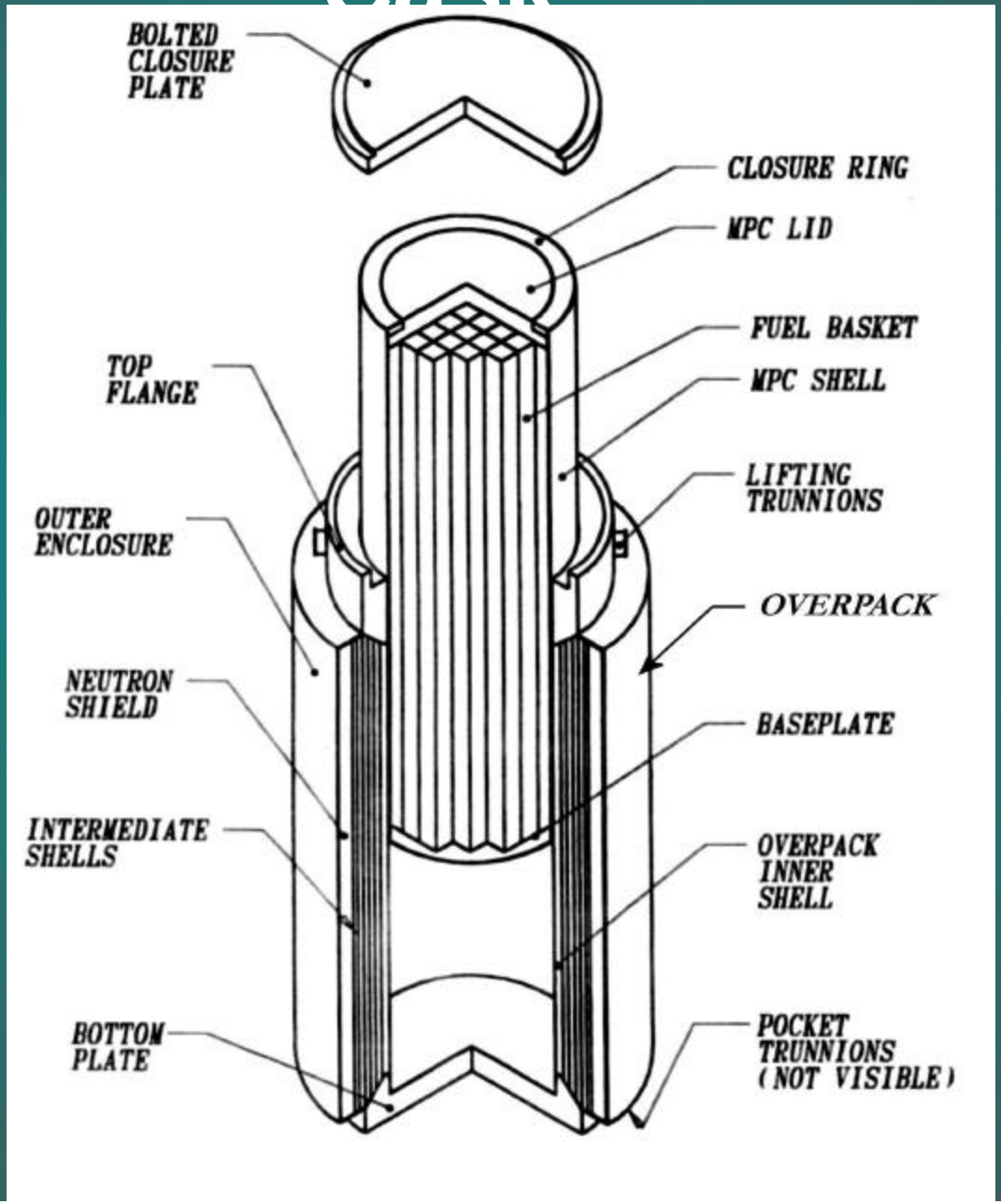
Baltimore Tunnel fire

- July 18th, 2001
- Howard Street Tunnel
- CSX Freight Train
- Derailment and Fire
  - Tripropylene

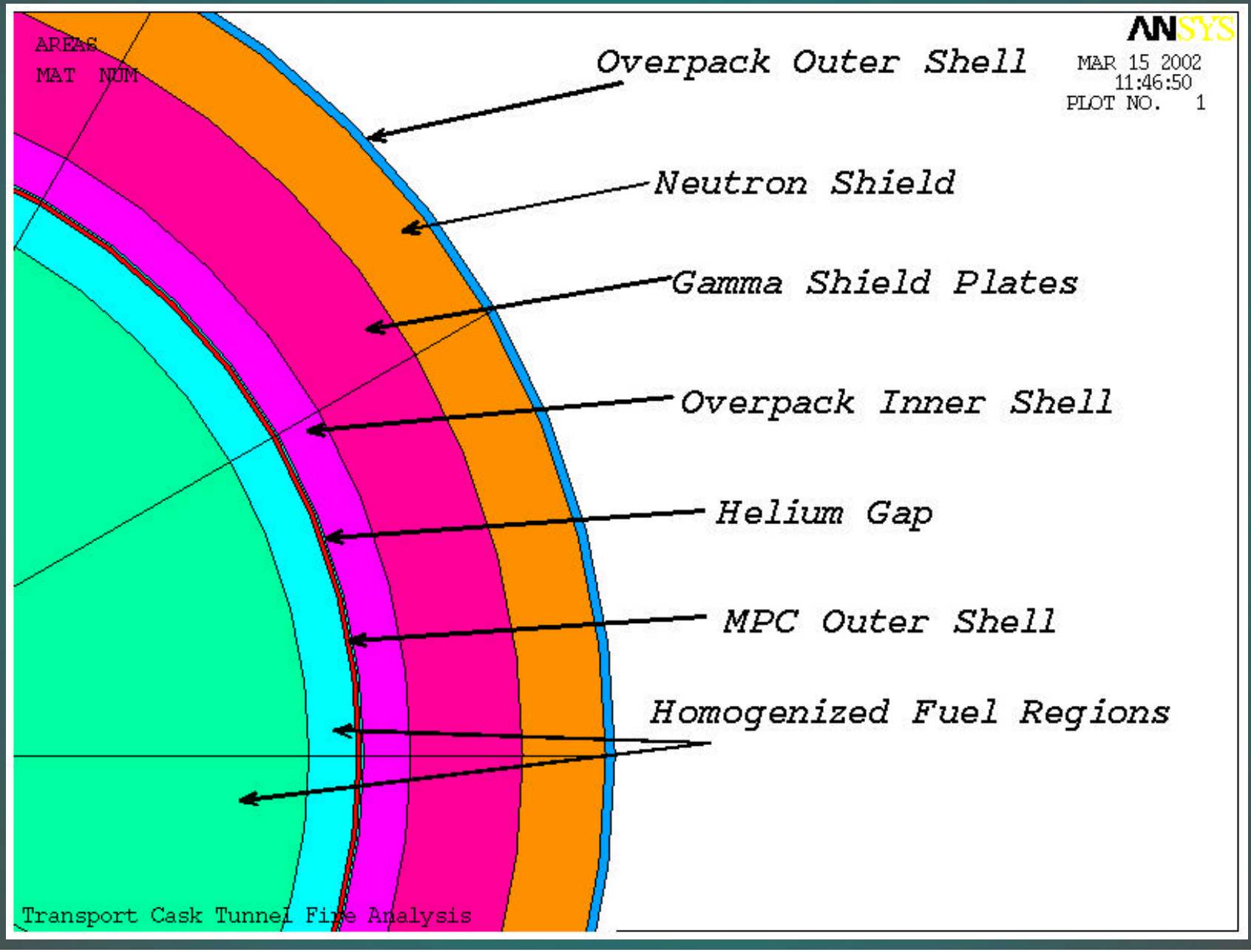
Spent Fuel Transportation Cask

- 10 CFR 71.73 Fire Accident
- Cask Performance
- Finite Element (ANSYS®) Model

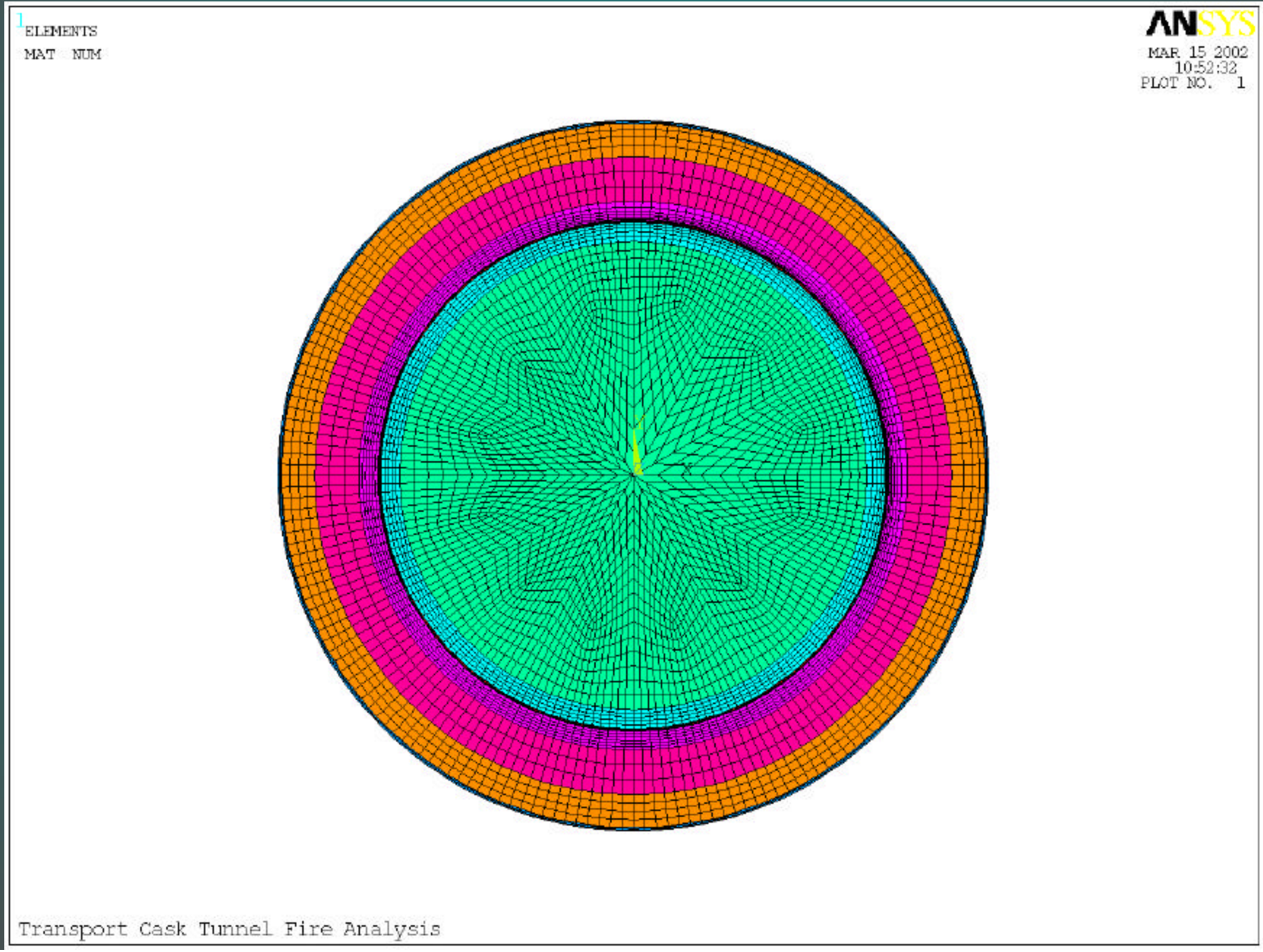
Spent Fuel Transportation Cask



ANSYS® Model


AREAS
MAT NUM
ANSYS
MAR 15 2002
11:46:50
PLOT NO. 1
Overpack Outer Shell
Neutron Shield
Gamma Shield Plates
Overpack Inner Shell
Helium Gap
MPC Outer Shell
Homogenized Fuel Regions
Transport Cask Tunnel Fire Analysis

ANSYS® Model Mesh

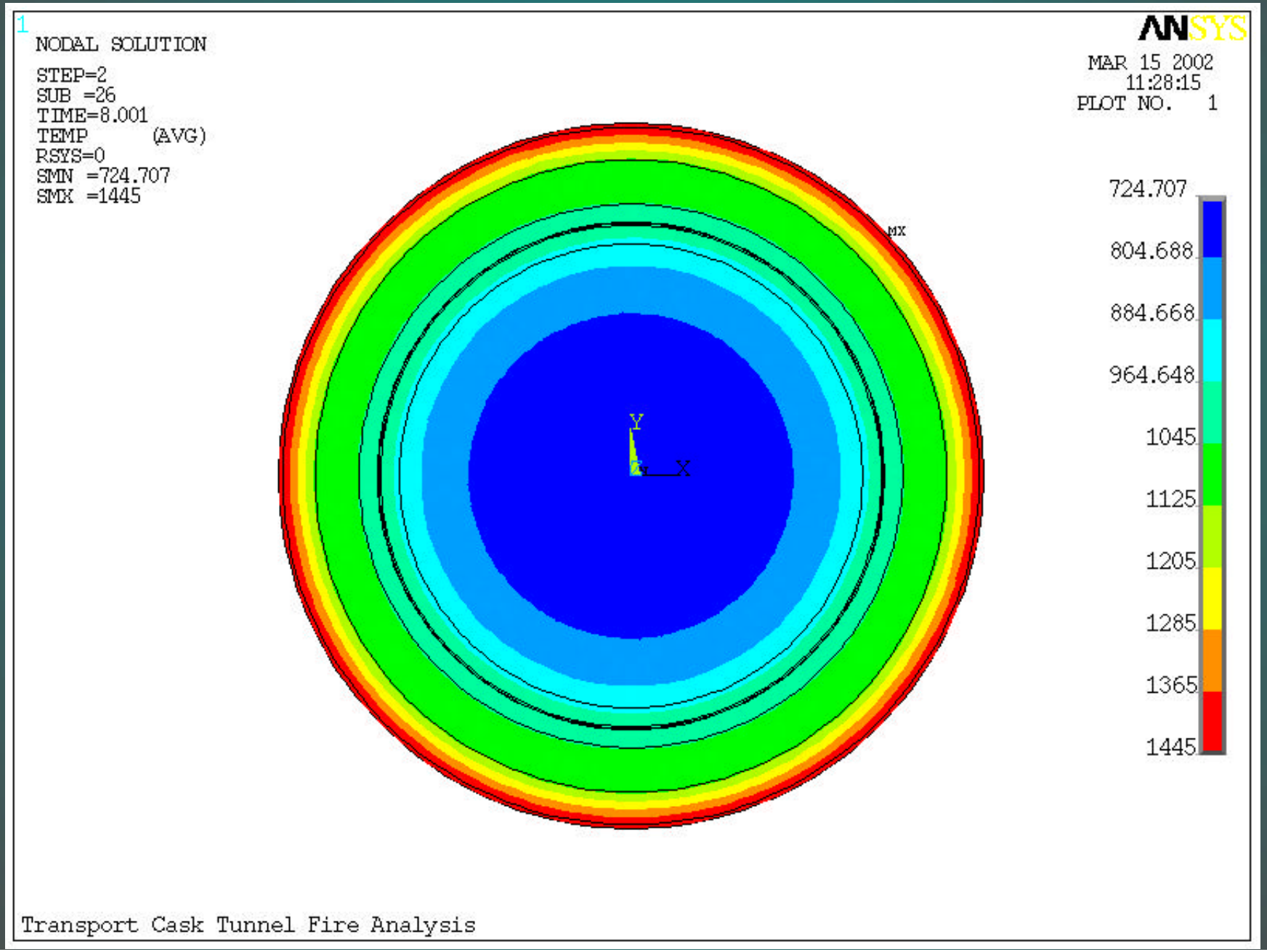


Boundary Conditions

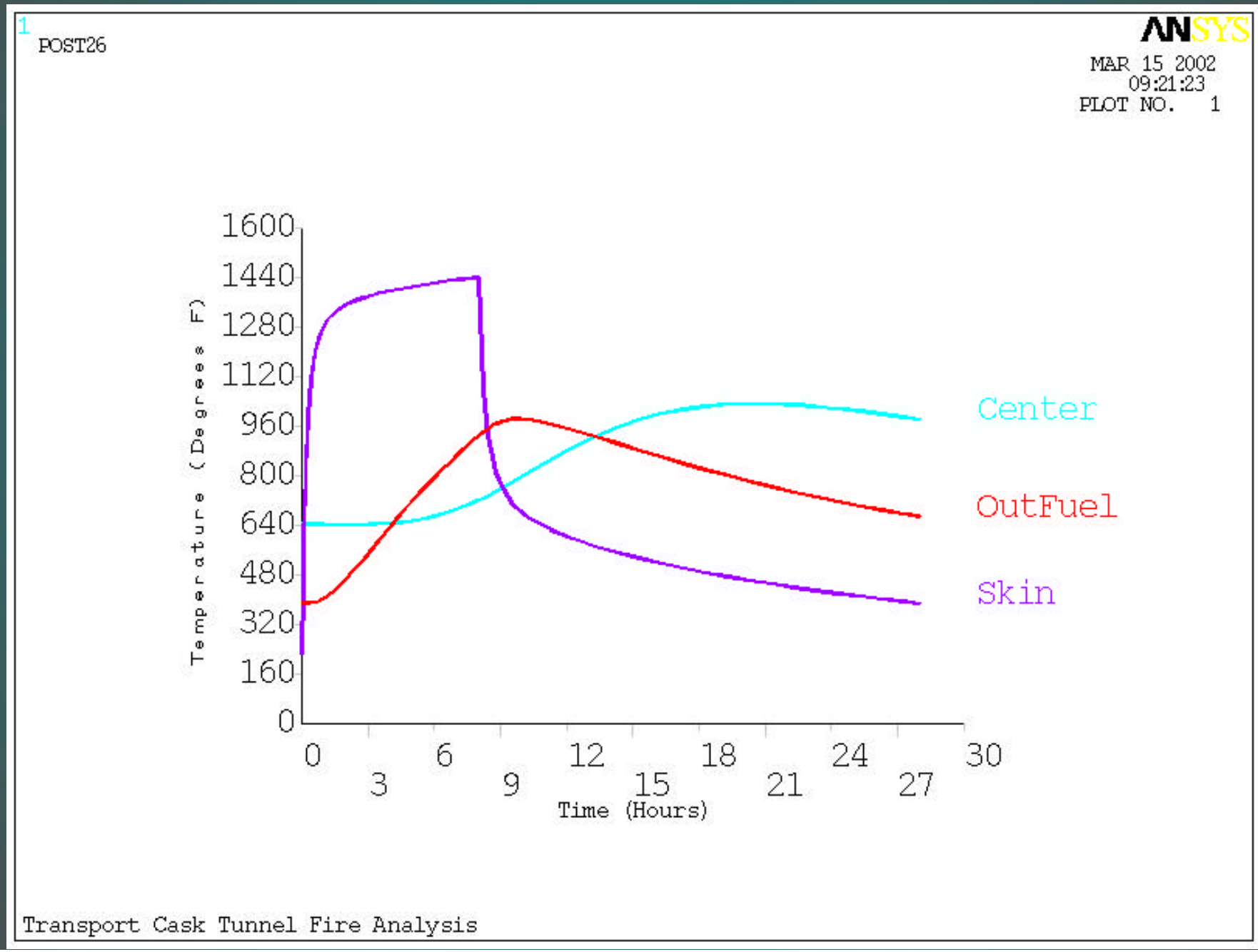
- Heat Transfer Mechanisms
- Initial Conditions
- Fire conditions

Normal Condition Temperature Profile

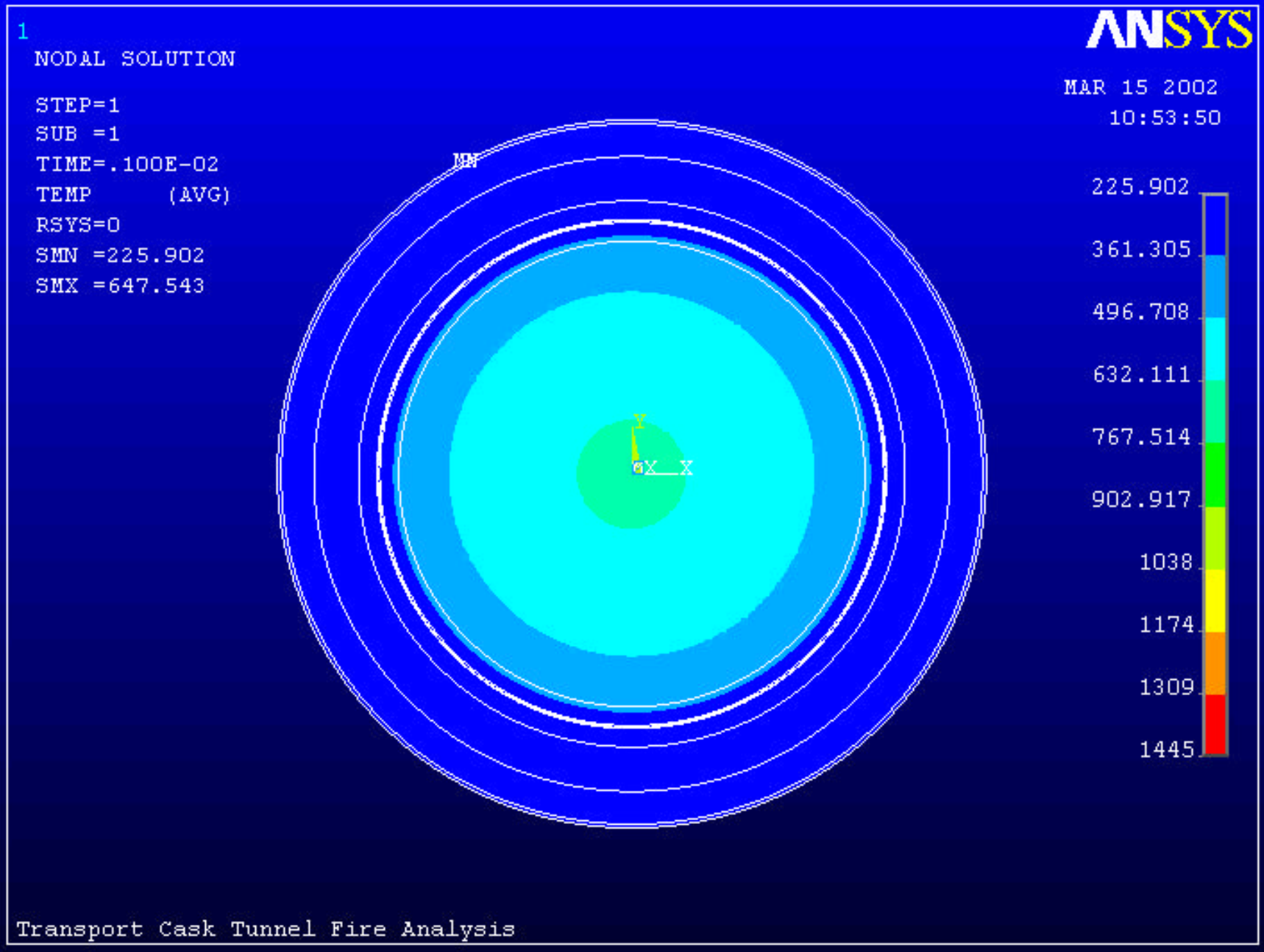
8 Hour Fire Temperature Profile



Cask Component Time vs.Temperature Plot



8 Hour Fire with 20 Hour Cooldown



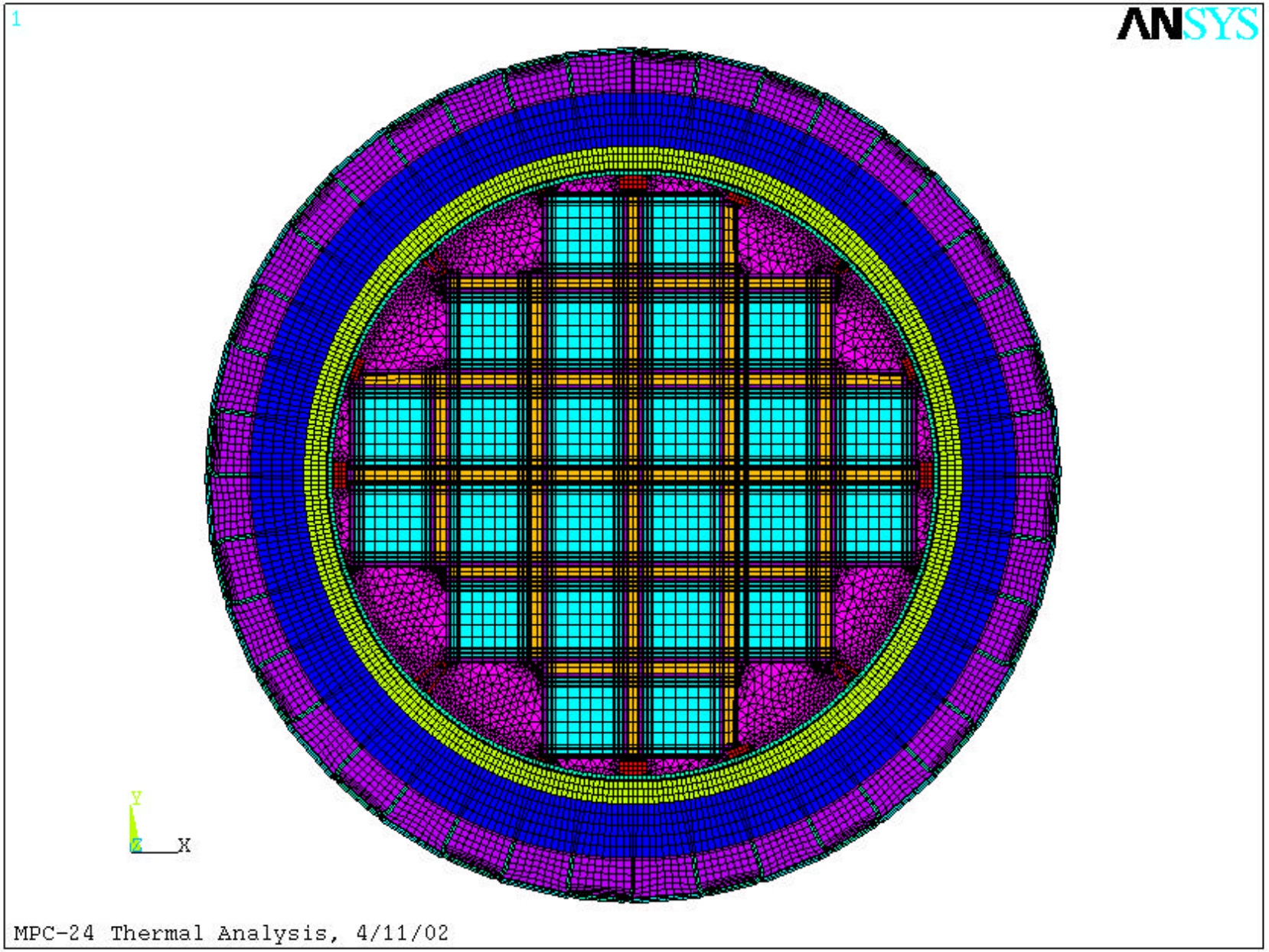
Preliminary Results

- **Fuel Cladding Temperature Limits**
- **Conservative Assumptions**

Conclusions and Future Work

- Cask Performance
- Refined Cask Model
- Model Tunnel and Railcar
- NIST Tunnel Fire Model
- Revise Boundary Conditions

Refined Cask Model



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