



***LWR Fuel Rod Contents for  
Transnuclear-Ft. St. Vrain (TN-FSV) Cask  
(COC USA/9253/B(U)F-85)***

**Scott Edwards, PACTEC**

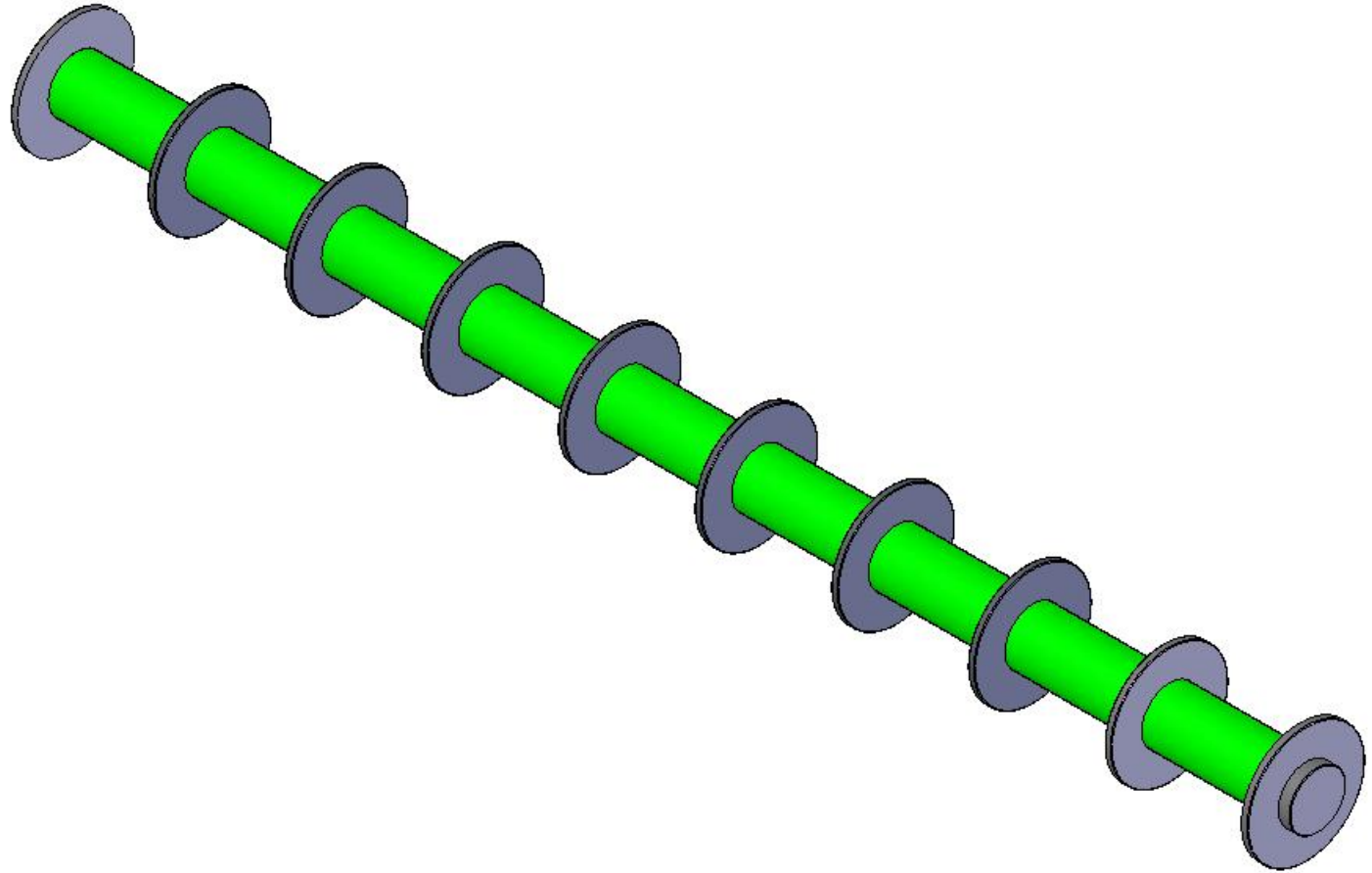
**August 30, 2006**

- ▶ **Current TN-FSV Cask Authorized Contents:**
  - ◆ **HTGR Fuel Elements within fuel storage container (Configuration #1)**
  - ◆ **Irradiated Fuel Parts and/or intact Peach Bottom Unit 1 fuel elements within Oak Ridge Container (Configuration #2)**
- ▶ **Department of Energy's (DOE) Idaho National Laboratory (INL) frequently examines irradiated fuel rods and core materials**
  - ▶ **Transportation on a case-by-case basis**
  - ▶ **Limited number of cask options**

## *Proposed New Contents for TN-FSV*

- ▶ **New internal lead-shielded canister**
- ▶ **4 PWR Fuel Rods**
  - ◆ 75 GWD/MTU burnup
  - ◆ 180 day cooling time
  - ◆ 350 W decay heat
- ▶ **2 BWR Fuel Rods**
  - ◆ 75 GWD/MTU burnup
  - ◆ 180 day cooling time
  - ◆ 300 W decay heat

## *Internal Shielded Container*



- ▶ **New Internal Shielded Canister:**
  - ◆ **304 SS inner and outer shells, each 1/4" thick**
  - ◆ **4-1/2" I.D., 8-5/8" O.D.**
  - ◆ **2" lead shielding on walls**
  - ◆ **Four 1-1/2" diameter tubes**
  - ◆ **Closure Shield plug is 6" thick 304 SS**
- ▶ **Preliminary Shielding Evaluation**
  - ◆ **Bounding PWR source term used**
  - ◆ **Cask Surface Dose Rate = 86 mrem/hr (200 mrem/hr limit)**
  - ◆ **2 meter Dose Rate = 9.6 mrem/hr (10 mrem/hr limit)**

- ▶ **Maximum TN-FSV payload is 5000 pounds in COC #9253**
- ▶ **Empty Shielded Container:**
  - ◆ **Weighs approximately 4300 pounds**
  - ◆ **Leaves 700 pounds for contents, adequate for 4 fuel rods**
  - ◆ **Uses spacer disks to spread load along inner shell**
    - **1" thick, approximately 21" apart**
    - **Coincide with Oak Ridge Canister support disks**
- ▶ **Structural performance of TN-FSV with new canister is bounded by existing analysis**

- ▶ **COC allows up to 360 W of decay heat**
- ▶ **Proposed Contents have 350 W decay heat maximum in a similar distribution**
- ▶ **No change to thermal design basis**

## *Criticality Evaluation*

- ▶ **Proposed contents can be demonstrated to remain subcritical without relying on container design**
- ▶ **New contents are within the safety envelope of the existing criticality evaluation**



## ***Containment Evaluation***

- ▶ **Configuration 1 leak rate criterion of  $1 \times 10^{-3}$  ref cc/sec adequate for intact fuel rods**
- ▶ **Fuel rod segments or damaged rods will require more containment**
  - ◆ **Configuration 2 “leak-tight” TN-FSV butyl seals**
  - ◆ **Will be overpacked into canisters**

- ▶ **Proposed changes are not significant with respect to:**
  - ◆ **TN-FSV Design**
  - ◆ **TN-FSV Operating Characteristics**
  - ◆ **Safe Performance of Containment System**
  - ◆ **Prevention of Criticality**
- ▶ **Modifications to Package satisfy 10 CFR 71 requirements**
- ▶ **Amendment to existing -85 COC**

## *Licensing Questions*

- ▶ **Is an amendment to the existing -85 COC feasible or would an -96 application be required?**
- ▶ **If so, must fabrication of the inner shielded canister be completed by December 31, 2006?**

# *Discussion and Questions*