Wayne Hodges had a question that he wants me to answer. The question is how much heat does the tripropylene put out? I assume this is the heating valus multiplied by the amount of fuel.

I'm assuming a heat of combustion of 44,000 kJ/kg
That is, every kg of fuel releases 44,000 kJ of energy
(kW=kJ/s)
So if you are burning .01 kg/s of fuel, your fire is 440 kW.

The second question is how much heat is absorbed by the bricks...since there is a large volume of brick lining the tunnel, it would absorb a certain amount of heat. Any heat absorbed by the brick will not be absorbed by the cask...so can we quantify the absorption by the brick? Do you model the brick material properties in your fire model?

FDS does a 1-D heat transfer calc into the walls. I'm
assuming that the brick
has a density of 1,900 kg/m^3, specific heat of 835 J/kg/K,
conductivity of 0.7 W/m/K
Of course, I vary these to see what sensitivity there is.
The heat lost to the
walls depends on when you ask. Most heating of the walls is
due to thermal radiation,
which is highest early on when the wall is cold. When
steady-state is achieved and
the wall is just slightly cooler than the gas, there's
little heat lost to the walls.
This is why you have brick ovens.