Component	Dimension	Material	Composition (wt%)	Density (g/cm^3)
Central Coolant (inside flow tube)	4.60 cm radius	Light Water	100% H_2O	variable
Flow Tube	4.60 cm inner radius (IR) 0.1 cm thick	Zr-modified 310 Stainless Steel (Zr-mod SS)	C:0.034; Si:0.51; Mn:0.74; P:0.016; S:0.0020; Ni:20.82; Cr:25.04; Fe:51.738; Mo:0.51; Zr:0.59	7.90
Inner Pins (32)	0.415 cm radius 5.4 cm pitch circle radius no displacement angle	15 wt% PuO_2/ThO_2	Pu:13.23; Th:74.70; O:12.07	9.91
Outer Pins (32)	0.440 cm radius 6.575 cm pitch circle radius no displacement angle	12 wt% PuO_2/ThO_2	Pu:10.59; Th:77.34; O:12.08	9.87
Cladding	0.06 cm thick	Zr-mod SS	As above	7.90
Coolant	n/a	Light Water	100% H_2O	variable
Liner Tube	7.20 cm IR 0.05 cm thick	Zr-mod SS	As above	7.90
Insulator	7.25 cm IR 0.55 cm thick	Zirconia (ZrO_2)	Zr:66.63; Y:7.87; O:25.5	5.83
Outer Liner	7.80 cm IR 0.05 cm thick	Excel (Zirconium Alloy)	Sn:3.5; Mo:0.8; Nb:0.8; Zr:94.9	6.52
Pressure Tube	7.85 cm IR 1.2 cm thick	Excel (Zirconium Alloy)	Sn:3.5; Mo:0.8; Nb:0.8; Zr:94.9	6.52
Moderator	25 cm square lattice pitch	D_2O	99.833 D_2O; 0.167 H_2O	variable (1.0851, nominal)
na	na	Rg-Pu	Pu-238:2.75; Pu-239:51.96; Pu-240:22.96; Pu-241:15.23; Pu-242:7.10 [5]	

Hi Folks:

Not everyone is included in this email (don't have everyone's emails handy) so please forward as appropriate.

I had a look at the CVR without the zirconium hydride layer. It turns out we're in good shape with a central flow tube that is similar (not exactly the same) as we had previously (fuel assembly specs are in table below).

I did some calcs based on a slight mod of our benchmark cold zero power (CZP), hot zero power (HZP) and hot full power (HFP) conditions in a single channel fresh fuel SERPENT model (I can provide the input files if anyone wants). Reactivity changes are as follows:

- CZP CVR = 58 mk (so if we lose coolant when the reactor is at zero power, there's a 58 mk reactivity insertion)

- HZP CVR = -8 mk (so if we are at zero power and lose coolant, CVR is negative)

- HFP CVR = -14 mk (ditto negative CVR when operating).

What about other transients?

- Going from CZP to HZP gives +58 mk insertion (so during startup we need to cover this positive reactivity with poisons / absorbers – is this an issue?)

- Going from HZP to HFP gives +0.5 mk insertion (I think that is manageable)

- Flooding due to turbine trip (which I think is equivalent to transition from HFP to HZP?) gives -0.5 mk reactivity insertion

So, based on above, I think that:

- The large negative reactivity was never really a problem.

- We can proceed with the large central flow region.

Lesson learned: we need to identify the important transients and test them, not just CVR.
Comments and feedback would very much be appreciated.
Thanks,

jer