**NE 795-014 Advanced Reactor Materials and Materials Performance**

**Exam 2**

Please provide your responses to the following questions. Point values indicated expected depth of response.

1. Describe some of the beneficial safety features of SFRs. (8 pts)
2. Why do we alloy uranium for fuels? (8 pts)
3. Why must metallic fuel systems include a relatively low smear density and large plenum? (10 pts)
4. What is constituent redistribution in metallic fuels? Why does it occur? What are the concerns associated with it? (15 pts)
5. How does the thermal conductivity vary as a function of burnup in metallic fuels? What phenomena drive this behavior? (8 pts)
6. For metallic fuel: What is FCCI? What are the adverse effects of FCCI? What are the primary fuel and cladding species participating in FCCI? (15 pts)
7. Describe restructuring in MOX fuels, including why it happens. (12 pts)
8. How does Pu and O concentration vary spatially in a MOX pin? (8 pts)
9. What is JOG? Why does it occur? (8 pts)
10. Discuss the means which sodium corrosion occurs in SFRs. (8 pts)