

From: Shanlai Lu *NLL*
To: Undine Shoop; Yuri Orechwa *NLL*
Date: Mon, Mar 25, 2002 12:17 PM
Subject: Re: PBMR RAI's

Yuri,

I am adding more RAI's. Any questions? Let me know.

Shanlai

>>> Undine Shoop 03/22/02 10:17AM >>> *NLL*
Yuri,

Attached are my RAI's for the PBMR design and heat removal preliminary description.

Undine

CC: Amy Cabbage; Ralph Caruso

01/59

RAI's for PBMR design and heat removal description

1. It has been indicated that the power level is controlled through Helium Inventory Control System. If the system has been designed, please provide detailed system descriptions, design limits and operational interactions with the reactor control rod/sphere absorber system and the turbine/generator load control system.

If the system has not been designed, please provide the design criteria, expected system interactions and the considerations regarding the normal Helium inventory loss through the system leaks.

It has been known that maintaining the Helium inventory is a big burden for operating a HTGR. Have any considerations been given to develop a program to monitor, verify and compensate the helium loss through the system leaks during the normal operation?

2. Two turbine/compressor units and a turbine/generator unit will be used according to the current PBMR design. Traditionally, the turbine/compressor system operation characteristics are not the main focus of NRC's interest. However, the operational characteristics of these three turbine systems have significant impact on the reactor side control and response. Therefore, please provide the following design information about these three units:

a). Operational characteristics of these units, eg, inlet/outlet temperature/pressure versus power level, rotational speed of the turbine/compressor units versus power.

b). Turbine/compressor bearing and seal design. The duration of the operation could be significantly affected by the performance of this part of the design. The allowable leakage flow rate may also affect the cycle efficiency and the balance of the plant.

c). Turbine rotational speed control system information. Particular for the turbine/generator unit.

3. Control Rod/Spherical Absorber Reactivity Worth Analysis.

Please provide detailed information regarding the methodology of calculating the reactivity worth considering the possible hollow holes, partially inserted adjacent control rods and the core outlet hollow flow path in the graphite.

4. Please provide detailed design information regarding the reactor core conditioning system. If it has not been designed, please provide all the design criteria and the basis.