



Washington State University

Nuclear Radiation Center

Pullman, WA 99164-1300

509-335-6641

FAX 509-335-4433

October 3, 1995

Marvin Mendonca  
Sr. Project Manager  
U.S. Nuclear Regulatory Commission  
Office of Non-Power Reactors  
MS 0-11-B-20  
Washington, DC 20666

Dear Mr. Mendonca:

I understand that relicensing now requires a consideration of the reliability of previously used reactor components. Attached is a draft of a brief document on this subject for the WSU TRIGA reactor. Is this analysis adequate or is something more detailed required?

Sincerely,

W.E. Wilson  
Consultant

170019

9510180056 951003  
PDR ADOCK 05000027  
P PDR

AD20

APPLICATION FOR TEN YEAR LICENSE EXTENSION  
FOR FACILITY LICENSE NO. R-76  
FOR THE WASHINGTON STATE UNIVERSITY  
MODIFIED TRIGA NUCLEAR REACTOR

CONSIDERATION OF RELIABILITY OF EXISTING  
PREVIOUSLY UTILIZED REACTOR COMPONENTS

It is not possible to accurately quantify or predict the reliability of the various components of the WSU modified TRIGA Reactor which was converted to a TRIGA 1,000 KW type reactor in 1967. Over the years the reactor systems have been upgraded a number of times to improve performance and insure reliability as follows.

- 1) 1967 - MT plate type fuel replaced with TRIGA rod type fuel in 4-rod clusters. Pool cooling system installed allowing operation up to a power level of 1,000 MW. Pulse rod added to center of core and control system modified to allow pulsing operation.
- 2) 1972 - New Argon-41 monitoring system designed and installed.
- 3) 1972 - General Atomic wide range channel added to control system replacing old GE startup channel and Long-N and period channel. Old GE linear channel replaced with new Keithly channel.
- 4) 1976 - Replaced seven (7) TRIGA Standard 4-rod fuel clusters in the center of the core with FLIP HEU fuel rods. Replaced old 3-rod standard cluster containing pulse rod with a new FLIP 3-rod fuel cluster. Standard fueled instrumented fuel rod replaced with FLIP fueled instrumented fuel rod. Core now contains 35 FLIP fuel rods.
- 5) 1977 - Replaced entire control system and console with new one designed and installed by reactor staff.
- 6) 1980 - Replaced additional four (4) standard fuel 4-rod clusters with 4-rod FLIP fuel rods adding 16 FLIP fuel rods. Core now contains a total of 51 FLIP fuel rods.
- 7) 1983 - Secondary and primary cooling water mechanical pressure indication system replaced with transducing with electrical readout in the control room.
- 8) 1985 - FLIP instrumented fuel element replaced with a new one due to failure of thermocoupled in the IFR installed in 1976.
- 9) 1987 - Pool room ventilation upgraded with new fans and central heating within ventilation system for pool room. OIS unit heating on walls of pool room removed.
- 10) 1988 - New CIC installed on safety channel #2. Core optimized increasing thermal neutron flux in rotator row by 30%.
- 11) 1991 - Computer interface installed to allow computer monitoring of reactor power level.
- 12) 1992 - Power supply for wide range channel installed.
- 13) 1993 - New wide range channel purchased to be installed in the future. New air monitoring system purchased to be installed in the future.

In order to insure the reliability and adequate performance of all portions of the WSU TRIGA reactor system, a very extensive and comprehensive preventative maintenance program has been conducted at the facility for a number of years. A copy of SOP #3 which covers the preventative maintenance program is attached. This program has proven to be more than adequate to preclude operation of the reactor with a faulty or inoperative portion of the system.

DRAFT