

From: "George Miller" <gemiller@uci.edu>
To: "Marvin Mendonca" <MMM@nrc.gov>
Date: 3/18/02 12:19PM
Subject: Reactor FTR scram failure

Marvin:

Attached is a brief report on an incident with the UCI reactor. I hope this may be able to comply with the "immediate report" requirements. Please let me know if I need to place a phone call or telex in addition. Our Tech Specs do not anticipate the existence of e-mail. Had this problem had a real safety significance, you can be assured we would have given notification instantly rather than proceeding to a partial diagnosis before reporting. In this case this seemed more helpful.

George E. Miller, Dept of Chemistry, UCI
949-824-6649, FAX 949-824-8571
Home: 949-854-1525; FAX 949-854-1525
e-mail gemiller@uci.edu

Dept of Chemistry, UC Irvine, Irvine CA 92697-2025
UCI Reactor Website: <http://chem.ps.uci.edu/~gemiller/reactor.html>
Science Education website: <http://sep.uci.edu>

CC: <sjholmes@nrc.gov>

Abnormal Occurrence Report:

UCI Reactor Fast Transient Rod (FTR) Failure to Scram Promptly Incident

On Thursday, March 14th 2002, the operator noticed that there appeared to be a rather sluggish SCRAM response by the FTR on shutting down the reactor. Further trials over the weekend on March 16-17th indicated that the rod drop time was very variable, including the possibility of not dropping within several minutes. During these tests, no other rods were raised so the reactor has remained fully shut down since the discovery. Since the scram potential for this rod could be considered an "engineered safety feature" its failure to scram promptly has been declared an "abnormal occurrence" and is hereby reported in accordance with Tech Specs section 1.13.c. and 6.7.b.3. However as noted below this failure does not constitute any threat whatsoever to the safety of the reactor system or its control.

However it should be noted that the total worth of this rod in the current core configuration is only \$0.66, whereas the total worth of remaining rods is \$8.24. Core excess at this time is \$2.73. Thus the reactor control systems meet all requirements for reactor shutdown and control without the use of this rod (which was designed only to add pulsing capability to the reactor). Thus there is NO safety significance for the reactor as a whole as a result of this failure. The reactor would remain fully compliant with or without this control element inserted.

Preliminary diagnosis suggests that there has been a failure of a small, polyethylene plastic, underwater piston which works within a specially designed dashpot to decelerate the rod's upward travel. Such a failure occurred with similar symptoms before, reported December 12th 1989, and follow-up on December 18th 1989. In both incidents, the rod drive 'sticks' only in the upper few inches of travel and falls freely below that. Thus we anticipate no failure of the control element itself, only the drive mechanism. The rod and drive mechanism will be removed from core during the next few days for inspection and repair, at which time this diagnosis can be confirmed, and the piston replaced. Because of the large shutdown margin provided by the other control rods, no fuel removal is needed to work safely on this rod drive.