

NC STATE UNIVERSITY

Department of Nuclear Engineering
Campus Box 7909
Raleigh, NC 27695-7909

919.515.7294
919.513.1276 (fax)
URL: www.ne.ncsu.edu/NRP/reactor_program.html

15 March 2002

US Nuclear Regulatory Commission
Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

SUBJECT: Technical Specification Violations on Operability of the Radiation Monitoring System Recorder and Failure to Report a Reportable Event

Technical Specification Violations

Two violations of Technical Specifications occurred and are being reported in writing by this letter. The first involved Technical Specification 3.5.c on 21 February 2002. The second involved Technical Specification 6.7.1 on 22 February 2002 and 7 March 2002.

On 22 February 2002 it was discovered that the radiation monitoring system recorder was on but failed to record data from 8:10 AM 21 February 2002 to 7:54 AM 22 February 2002. The reactor was operated on 21 February 2002 from 8:27 AM to 3:02 PM. Technical Specification 3.5.c requires that the radiation rack recorder be operable or that readings be recorded manually every 30 minutes if the recorder is not operable. Radiation monitor readings were recorded manually every hour as required by the PULSTAR Operations Manual on 21 February 2002 from the radiation monitoring ratemeters. As a result, Technical Specification 3.5.c was not met on 21 February 2002.

Upon being informed of this event, an investigation was begun and the recorder failure could not be duplicated. Actions taken on 22 February 2002 included restart of the trending mode of the recorder and verbal instructions to all Reactor Operators to check the radiation monitoring system recorder operation prior to and during reactor operation. This event was discussed by the Acting Associate Director with two Senior Reactor Operators on 22 February 2002 and the determination was incorrectly made that this was not a reportable event under Technical Specifications 6.7.1 and 1.22. This is a violation of Technical Specification 6.7.1 since failure to meet a Limiting Condition for Operation is a reportable event under Technical Specification 1.22.c.ii. As a result, the 24 hour report by telephone and 14 day written response to the US Nuclear Regulatory Commission were not informed as required by Technical Specification 6.7.1.

A020
JE22

Description of Circumstances

On 22 February 2002 it was discovered that the radiation monitoring system recorder was on but failed to record data from 8:10 AM 21 February 2002 to 7:54 AM 22 February 2002 during performance of the reactor start up checklist. During this time, the reactor was operated on 21 February 2002 from 8:27 AM to 3:02 PM. Failure to recognize that the radiation monitoring system recorder had stopped recording was due to a lack of attention to detail created by logistical factors, recorder operating characteristics, and the lack of a check item in the Operation Log.

The radiation monitoring system recorder is located above the radiation monitoring channel ratemeters at head height and on the left side of the operating console. Radiation recordings are updated every two minutes at a chart speed of 2 inches per hour on the recorder. Other recorders are used for power levels and primary water temperature. There are two power and one water temperature recorders which are operated from reactor start up to the time when the reactor is shut down. The power and water temperature recorders are located at eye level on the reactor console and have continuous stylus movement with chart speeds of approximately 30 cm per hour. The power and water temperature recorders are considered to be part of the measuring channels per Technical Specifications 1.1 and 3.3 and are therefore required to be operable for reactor operation. The radiation monitoring system recorder is also required for operation and is checked prior to operation for trending and agreement of the recorded values with the ratemeter values. The radiation monitoring system recorder is left on for continuous recording.

All recorders are expected to be checked for operation by the Reactor Operator assigned to the console while the reactor is being operated. Because of their location, recording motion and chart speed, and the fact that they are turned on and off for reactor operations, the power and water temperature recorders are more noticeable to the reactor operator than the radiation monitoring system recorder. Data is recorded from the instrument displays rather than the recorders on an Operation Log form. As a result, the Limiting Condition for Operation for operation of the radiation monitoring system recorder was not checked or noticed after reactor start up.

Failure to recognize the requirement to report the violation of Technical Specification 3.5.c as required by Technical Specification 6.7.1 was due to a lack of attention to detail caused by a lack of managerial oversight. The concern on 22 February 2002 was focused on restoring the radiation monitoring channel and determining if an undetected release of radioactive material had occurred. Also, there is no formal procedure in place for determining if an operational event is reportable or not. Other events, such as exceeding an emergency action level or 10 CFR 20 limits are discussed in applicable procedures and include appropriate notifications and reports. At our facility, individuals are accustomed to using procedures to address routine and abnormal situations rather than reviewing the facility license or federal regulations, e.g. use of the emergency procedures rather than the Emergency Plan for response to exceeding an emergency action level. As a result, the review of the Technical Specifications regarding failure of the radiation monitoring system recorder was inadequate in this instance and the reporting requirement was missed.

Safety Assessment and Consequences

Radiation monitoring channel annunciation, confinement system actuation, and building evacuation horns signals are generated by the ratemeters, not the recorder. The recorder is a peripheral output device and provides a complete documented record of the radiation monitoring channel readings when operable. Thus, no alarms or protective actions were lost by the inoperability of the radiation monitoring system recorder.

The manually recorded readings of the radiation monitoring channel ratemeters taken every hour indicated normal operational radiation levels. Experiments performed on 21 February 2002 used the rotating exposure ports at a steady state power of 900 kW for neutron activation analysis and transmutation doping. (The rotating exposure ports are located in the reactor pool at the East face of the reactor core.) All of the irradiated samples were relocated within the reactor pool after reactor shutdown to a secure location for decay. None of the radiation monitoring annunciators were activated, nor was the confinement and evacuation system activated on 21 February 2002. Based on the experiments performed, the lack of any alarms or protective actions, and hourly recordings taken on 21 February 2002, it is concluded that it is unlikely that any elevated external exposure or airborne release occurred.

Although the safety impact caused by inoperability of the radiation monitoring system recorder was concluded to be negligible in this event, it is recognized that this may not always be the case. Additionally, it is recognized that failure to identify a reportable event and to make timely reports may have potential safety implications which may prolong or cause recurrence of an inadequate condition.

Corrective Actions and Notifications

Actions taken on 22 February 2002 included restart of the trending mode of the radiation monitoring system recorder and verbal instructions to all Reactor Operators to check recorder operation prior to and during reactor operation.

The violation of Technical Specification 3.5.c was discussed with the Reactor Safety and Audit Committee (RSAC) on 22 February 2002 and with the University Radiation Safety Committee (RSC) on 11 March 2002 at their respective scheduled meetings. The discussions included the actions taken to date and consideration of procedure changes.

On 12 March 2002, the violation of Technical Specification 3.5.c was reported by telephone to the US Nuclear Regulatory Commission. During that telephone conversation, the violation of Technical Specification 6.7.1 became apparent and was reported to the US Nuclear Regulatory Commission as well.

On 13 March 2002, the Operation Log was changed to include a form for recording readings from the radiation monitoring system and a check on the operation of all recorders every 30 minutes while the reactor is not shut down. This action is expected to heighten awareness and prevent recurrence of a similar Technical Specification violation. Specifically, Technical Specifications 3.3 and 3.5.c are the Limiting Conditions for Operation addressed by this action.

On 13 March 2002, the specific events and responses and Technical Specifications 1.22, 3.5.c, and 6.7.1 were reviewed by two Senior Reactor Operators and the Acting Associate Director. The remaining Senior Reactor Operator and other Reactor Operators will receive this review upon reporting to work beginning 18 March 2002. This action is

expected to heighten awareness and to prevent recurrence of violating Technical Specification 6.7.1.

The violation of Technical Specification 6.7.1 was reported to the RSAC Chair and RSC Chair on 13 March 2002. Procedure change(s) on evaluating reportable events will be prepared as a result of this violation of Technical Specification 6.7.1. The Technical Specification violations and response, including the Operation Log form and any procedure change(s), will be discussed at their next scheduled meetings.

Closing Comments

Both violations of Technical Specifications should not have occurred and are regrettable. By completion of the corrective actions identified above, it is believed that similar violations will be prevented.

I declare under penalty of perjury that the foregoing is true and correct. Executed on 15 March 2002.

Sincerely,



Gerald D. Wicks, CHP
Acting Associate Director, Nuclear Reactor Program

cc: Alexander Adams Jr.
US Nuclear Regulatory Commission