

March 15, 2018

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-37
Washington, DC 20555-0001

REFERENCE: Docket No. 50-186
 University of Missouri-Columbia Research Reactor
 Renewed Facility Operating License No. R-103

SUBJECT: Written communication as required by University of Missouri Research
 Reactor Technical Specification 6.6.c.(3) regarding a deviation from
 Technical Specification 3.6.a.

The attached document provides the University of Missouri-Columbia Research Reactor (MURR) Licensee Event Report (LER) for an event that occurred on March 4, 2018, that resulted in a deviation from MURR Technical Specification 3.6.a.

If you have any questions regarding this report, please contact Bruce A. Meffert, the facility Reactor Manager, at (573) 882-5118.

Sincerely,

 For Matt Sanford

Matthew R. Sanford
Interim Reactor Facility Director

MRS:jlm

Enclosure

xc: Reactor Advisory Committee
 Reactor Safety Subcommittee
 Dr. Mark McIntosh, Vice Chancellor for Research, Graduate Studies and Economic
 Development
 Mr. Geoffrey Wertz, U.S. Nuclear Regulatory Commission
 Mr. Johnny Eads, U.S. Nuclear Regulatory Commission

*ADD
NRR*

Licensee Event Report No. 18-01 – March 4, 2018
University of Missouri Research Reactor

Introduction

On March 4, 2018, with the reactor operating at 10 MW in the automatic control mode, a Reactor Operator Trainee (ROT) during a routine facility patrol inadvertently switched the Emergency Power Generator (EPG) out of automatic control for approximately 10 to 15 seconds before returning the EPG back to automatic control. During the approximate 10 to 15 seconds with the EPG not in the automatic mode and the reactor operating, MURR deviated from Technical Specification (TS) 3.6.a, which states, “*The reactor shall not be operated unless the emergency electrical power system is operable.*” TS 1.15 states, “*Operable means a component or system is capable of performing its intended function.*” When the EPG was placed out of automatic control, the emergency electrical power system would not have been able to supply electrical power to the facility on a loss of normal electrical power, which is its intended function.

Description of the Emergency Electrical Power System

As described in Section 8.2, Emergency Electrical Power Systems, of the MURR Safety Analysis Report (SAR), the emergency electrical power system is designed to provide electrical power to essential reactor components in order to monitor systems and assure personnel safety should the facility suffer a loss of normal electrical power. Emergency power is supplied by a 275-kW diesel generator located in the southwest area of the laboratory building (Room 231E). Electrical power is supplied to the selected loads through an Automatic Transfer Switch (ATS) which transfers source power from the normal electrical power system to the emergency electrical power system.

As described in Section 8.2.5, Description of Operation, of the SAR, operation of the EPG and the transfer of electrical power from the normal source to the emergency power source are automatic. The EPG starts approximately one second after a loss of the normal electrical power source. After reaching rated voltage and frequency, it will assume the emergency electrical load after the ATS shifts to the emergency power bus.

Detailed Event Description

On March 4, 2018, at 03:08, an alarm condition was received in the Control Room from the Emergency Generator Alarm Panel. The on-shift Lead Senior Reactor Operator (LSRO) quickly proceeded to the EPG room to investigate this alarm condition. The ROT on routine facility patrol had inadvertently switched the EPG out of automatic control for approximately 10 to 15 seconds before returning the EPG back to automatic control. Upon entering the EPG room, the LSRO met the ROT who was performing the weekly EPG preoperational checklist and gathering the weekly environmental data which included EPG total run hours. The ROT then informed the

LSRO that the EPG had been placed out of the automatic mode by accidentally pressing the wrong button while attempting to gather the EPG engine run hours from the EPG controller.

During the approximate 10 to 15 seconds with the EPG not in the automatic mode and the reactor operating, MURR deviated from TS 3.6.a, which states, "*The reactor shall not be operated unless the emergency electrical power system is operable.*" TS 1.15 states, "*Operable means a component or system is capable of performing its intended function.*" When the EPG was placed out of automatic control, the emergency electrical power system would not have been able to supply electrical power to the facility on a loss of normal electrical power, which is its intended function.

While in the EPG room, the LSRO verified the EPG was correctly lined up for automatic control ensuring emergency electrical power system operability. Later, the LSRO sent another licensed reactor operator to conduct the entire EPG preoperational checklist. As required by TS 6.6.c(2) and TS 6.6.c(4), the Interim Reactor Facility Director was notified of the Abnormal Occurrence and gave permission to return to normal reactor operations.

Safety Analysis

As described in Section 8.2.1, Introduction, of the SAR, the design of the MURR does not require electrical power to safely shut down the reactor or to maintain an acceptable shutdown condition. In addition, the emergency electrical power system is not required for protection of the integrity of the fuel elements. A loss of normal electrical power and a subsequent failure of the EPG to start (i.e., complete loss of electrical power to the facility) is analyzed in Chapter 13, Accident Analyses, of the SAR.

The emergency electrical power system is designed to provide electrical power to essential reactor components in order to monitor systems and assure personnel safety should the facility suffer a loss of normal electrical power. SAR Section 8.2.4, Emergency Electrical Loads, states that the emergency electrical power system feeds the following emergency electrical loads:

1. Facility Exhaust Fan EF-13;
2. Facility Exhaust Fan EF-14;
3. Diesel Generator Room Distribution Panel;
4. Emergency Power Panel:
 - a. Emergency Air Compressor;
 - b. Electric-motor-driven Containment Isolation Doors 504 and 505;
 - c. West Pneumatic Tube Blower;
 - d. Emergency Lighting Panel No. 2 (through a 10-kVA transformer);
 - e. Waste Heat Pump No. 2; and
 - f. Emergency Lighting Panel (through a 15-kVA transformer):
 - 1) Exit Lights;
 - 2) Stairway Lights;

- 3) Fan Failure Alarm;
 - 4) Intercommunications System;
 - 5) Off-Gas Stack Monitor;
 - 6) Evacuation/Isolation Alarm System; and
 - 7) Emergency Lighting Panel No. 1;
5. 120 VAC Loads through 3 Distribution Panels:
- a. Area Radiation Monitoring System (ARMS);
 - b. Annunciator Panel;
 - c. Neutron and Process Monitoring Instruments; and
 - d. Reactor Control Power (Control Rods, Rod Run-In System, Reactor Safety System, Servo Amplifier).

Though the operability of the emergency electrical power system is a TS requirement for reactor operation, it is not required for safe operation of the reactor. In the event of a loss of the normal electrical power supply and the inoperability of the emergency electrical power system during reactor operation, the reactor would automatically shut down due to the fail-safe design of the reactor. As stated earlier, the emergency electrical power system is not required to maintain an acceptable shutdown condition of the MURR.

Corrective Actions

One cause of this event was the lack of knowledge and skill of the ROT to properly obtain the EPG hourly readings from the EPG controller without affecting the operating condition of the EPG. Another cause was the ROT's lack of appreciation for the human performance tool of 'stop when unsure' or 'do not proceed in the face of uncertainty.' Finally, a contributing factor was the practice of obtaining the EPG run hours for the environmental report while the reactor was operating. Since the EPG control panel must be manipulated to obtain the EPG run hours, there is a risk of pushing the wrong button during the data retrieval.

Training on proper performance of the EPG preoperational checklist and human performance error prevention tools has been provided to the ROT. The ROT now thoroughly understands the concepts of 'stop when unsure' and 'never proceed in the face of uncertainty.'

Since MURR conducts a reactor pre-startup checklist every week, MURR has decided to obtain the EPG run hours during performance of the reactor pre-startup checklist. That way, if a human error occurs and places the EPG out of automatic control during data retrieval, MURR will not deviate from TS 3.6.a. because the reactor will be shutdown.

Additionally, this event has been entered into the MURR Corrective Action Program as CAP No. 18-0017. Any additional improvements or corrective actions will be considered and documented in that CAP entry.

Attachment
U.S. Nuclear Regulatory Commission
March 15, 2018

If there are any questions regarding this LER, please contact me at (573) 882-5118. I declare under penalty of perjury that the foregoing is true and correct.

Sincerely,



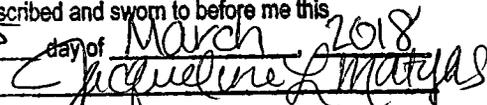
Bruce A. Melfert
Reactor Manager

ENDORSEMENT:

Reviewed and Approved,



Matthew R. Sanford
Interim Reactor Facility Director

State of Missouri
County of Boone
Subscribed and sworn to before me this
15 day of March 2018

JACQUELINE L. MATYAS, Notary Public
My Commission Expires: March 26, 2019



JACQUELINE L. MATYAS
My Commission Expires
March 26, 2019
Howard County
Commission #15634308