



REACTOR FACILITY

November 12, 1996

To: Nuclear Regulatory Commission
Document Control Desk
Washington DC 20555

Marvin Mendonca, Senior Project Manager, NRC

From: Stephen Frantz, Reed Reactor Facility, Docket 50-288

Re: Request for Additional Information (TAC No. M90497)

This is a response to an NRC request dated September 10, 1996 for additional information concerning a proposed revision to the Reed Reactor Facility Emergency Plan. The paragraph in question is reproduced below:

8.5 Communications Systems

RRF telephones and the facility intercom system located throughout the facility, may be utilized during emergency conditions. In addition, word of mouth communications will provide a backup for internal communications to campus, and emergency radiotelephone communications. Also there is a semi-annual update and verification of the emergency notification call list.

[Comment: the intercom was removed during recent renovations]

The following is the Reed Reactor Facility's response to the eight specific requests for additional information:

1. Explain the locations, functions, capabilities and emergency uses of the intercom system.

The intercom was used for communication between the reactor operator at the control console and the pneumatic transfer system operator at the pneumatic transfer system terminus. The pneumatic transfer system is commonly referred to as the "rabbit" and that terminology will be used here. As can be seen in the enclosed floor plan, the old rabbit terminus was two rooms away from the control console with three doors in between. The intercom was necessary to allow the reactor operator and the rabbit operator to coordinate inserting and removing rabbit samples to and from the reactor. The intercom was originally a two station wired push-to-talk off-the-shelf system. Several years ago that system failed and was replaced by a wireless headset arrangement sold by Radio Shack. Since the rabbit terminus was removed in 1992 as part of extensive renovations, the headsets have been used for other purposes. The intercom never served any emergency function; it was listed in the Emergency Plan for completeness as another possible form of communication.

2. Explain the operations of the intercom system as compared to the public address system.

The intercom was used for communication between the control console and the rabbit terminus as described in Answer #1. The public address system consists of a microphone at the control

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console that broadcasts only in the reactor room. It is a standard desktop microphone and 110 VAC amplifier with a single speaker on the west wall of the reactor room. The public address system would be used for evacuation or other announcements for personnel in the reactor room.

3. Explain the operations of the intercom system as compared to the radiotelephone system.

The intercom was used for communication between the control console and the rabbit terminus as described in Answer #1. The radiotelephone system is used by Reed Campus Community Safety for communications between their patrols (Community Safety Officers) and their base unit in the Greywood Building on the Reed Campus. There is not normally a radio in the reactor facility; it would be available when a CSO arrived at the reactor as part of their emergency response. The radio is used by the CSOs for communication with their base unit. It could be used as backup communications once the CSO arrived if the phones in the reactor facility failed. Personnel could use the radio to contact the base unit, who could then call off campus on their phones.

4. Sections 7.1 and 7.3 refer to the intercom. Provide correction or indication of appropriate intercom and use. Ensure that other references in the Emergency Plan and associated documents are characterized.

This was an oversight during the revision of the Emergency Plan. The intercom should also have been removed from sections 7.1 and 7.3. Note also that the radio referred in these sections is not a "short wave" radio; it is the two way radio described in Answer #3. The words "short wave" will be removed at this time. Enclosed please find a corrected version of Sections 7.1 and 7.3.

5. Although section 7.5.4 and the Emergency Implementation Procedures do not rely on the intercom for evacuation, sections 7.6.4 and 7.7.4 only specify to use the Emergency Procedures. Explain the significance of this difference. Provide which communications systems are to be used for which action level if they are different.

There is no difference between the communication systems used in section 7.5.4 and sections 7.6.4 and 7.7.4. The difference in wording was unintentional. Identical communications systems are to be used for all action levels. To clarify this, section 7.6.4 will be changed to match section 7.5.4. Enclosed please find a revision to section 7.6.4 which matches the wording of 7.5.4. Section 7.7.4 still refers to 7.6.4 so it does not need revision.

6. Provide a description of or reference to an available document for the surveillance requirements for the public address and other communications systems, or alarms that ensure proper facility evacuation.

The public address system and evacuation alarm are the only systems used to ensure proper facility evacuation. The public address system is tested every day that the reactor is operated as part of SOP 1, *Startup Checklist*, enclosed. The evacuation alarm is tested every two months as part of SOP 61, *Evacuation Alarm Test*, enclosed.

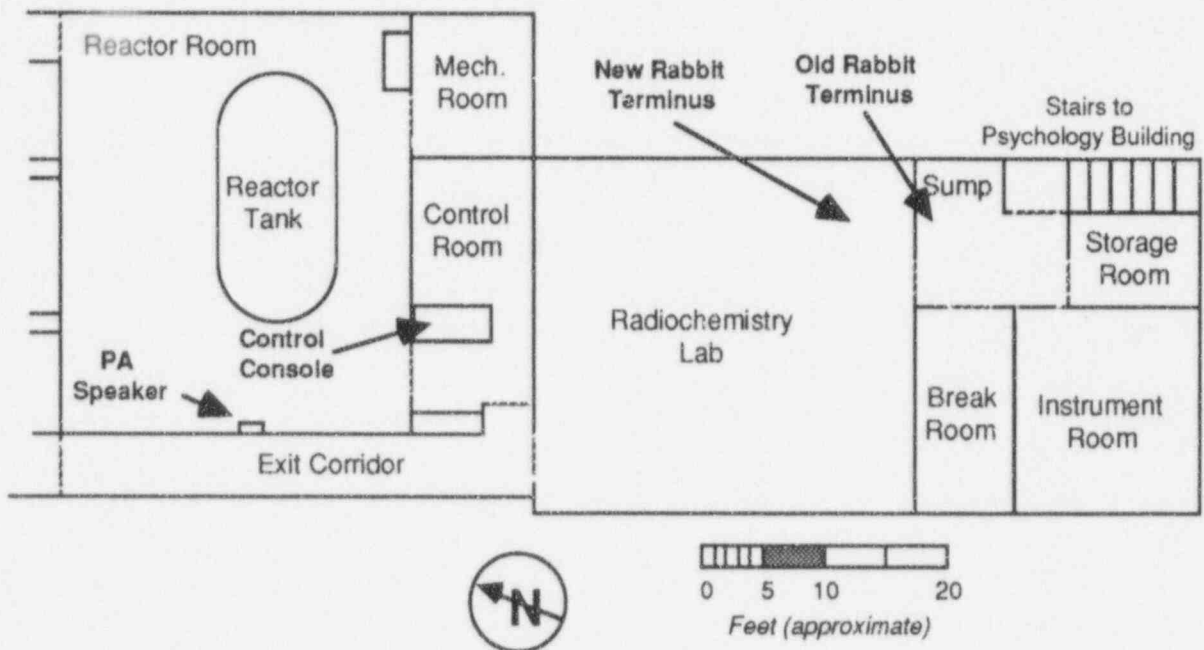
7. Explain how the removal of the intercom does not slow the response time for evacuation.

The intercom was only used for coordination between the control console and the rabbit terminus. It was never intended for use during an evacuation. Evidently it was listed in the

original Emergency Plan simply for completeness since it was an additional method of communication. Evacuation has been, and is, initiated by the evacuation alarm augmented by the public address system.

8. Explain how removal of the intercom system does not decrease the effectiveness of the Emergency Plan.

The intercom was only used for coordination between the control console and the rabbit terminus. It was never intended for use during an emergency. Evidently it was listed in the original Emergency Plan simply for completeness since it was an additional method of communication. The intercom has no use during an emergency, therefore its removal does not decrease the effectiveness of the Emergency Plan.



It should be noted that a new intercom was installed in October 1996 in anticipation of restoration of the pneumatic transfer system. The installed intercom is a two station push-to-talk system that serves no emergency or security function.

Sincerely,

Stephen G. Frantz
Director, Reed Reactor Facility

7.0 EMERGENCY RESPONSE

7.1 Activation of the RRF Emergency Organization

The Emergency Coordinator shall be responsible for initiating the emergency procedures and for notifying and mobilizing the emergency organization. During periods of time when RRF is unattended and an emergency is detected by Reed Community Safety, appropriate RRF staff will be contacted as per the Emergency Notification Call List (ENCL) by the Reed Operator. There is an operator on duty 24 hours per day insuring that in the event of an emergency RRF personnel on the ENCL will be notified. Additionally, the Offsite Support Organizations are available 24 hours per day. Communication during emergency situations may be by telephone, word of mouth, radio, or public address system, as appropriate.

7.2 Protective Action Values

Every attempt shall be made to maintain radiation exposures to emergency personnel within the limits of 10 CFR 20 and/or the Protective Action Guides (PAGs) of 1 Rem DDE or 5 Rem thyroid CDE. However, an Emergency Coordinator who is also a member of the ENCL with the concurrence of the Reactor Health Physicist, or a qualified alternate Health Physicist such as a State of Oregon Emergency Response Team Member, may authorize exposures in excess of these values to facilitate rescue of injured personnel or take corrective actions which will mitigate the consequences of the emergency event. The exposure and intake limit for life saving or corrective action that mitigates the consequences or reduces the severity of the emergency event is 25 Rem Total Effective Dose Equivalent (TEDE). TEDE is the sum of the Deep Dose Equivalent (DDE) plus the Committed Effective Dose Equivalent (CEDE). The exposure is authorized for nonpregnant adults on a once-in-a-lifetime basis with preference given to the eldest able-bodied volunteers.

7.3 Health Physics Emergency Response Program

The Reactor Health Physicist shall be responsible for determining radiation dose rates and contamination levels both onsite and offsite. The Reactor Health Physicist may request assistance from RRF personnel, State of Oregon Emergency Response Personnel, and other Offsite Support Organizations as necessary to carry out radiological assessment of the accident. This information will be relayed by face-to-face communication, telephone communication, or radio to the individual responsible for accident assessment. In addition, these individuals shall provide for isolation and supervise access control to restricted areas to minimize personnel exposures and the spread of radioactive contamination.

7.4 Reporting of Emergencies

Copies of the ENCL are posted in the facility, the Emergency Support Center (ESC), and the Chemistry Secretary's Office. Telephone numbers are listed for RRF personnel. Copies of this plan with notification procedures for all offsite support agencies are located in the control room, emergency grab bag, ESC, and Chemistry Secretary's Office. Initial and follow-up emergency messages to the Oregon Office Of Energy and the NRC and, if applicable, to other offsite government agencies should, to the extent known, include the following:

1. Name, title, and telephone number of caller, and the location of the incident.
2. Description of the emergency event and emergency class.
3. Date and time of incident initiation.

7.6.3 Corrective Actions for Notification of Unusual Events

In the event that a Notification of Unusual Event is dictated by assessment of radiological levels, the reactor facility may be evacuated pending an evaluation of the problem and identification of the probable source. The Emergency Coordinator shall confer with the Reactor Health Physicist and shall control access to the reactor facility until radiation and airborne activity levels have been restored to normal. All personnel will be verified present at the designated assembly area and unnecessary personnel will assemble in the training classroom to be available for assistance.

For bomb threats with possible radiological release implications, RRF Management, the Portland Police Bureau, and Reed Community Safety shall be notified. The police will initiate appropriate procedures following their Emergency Plan to insure the protection of personnel and property. The reactor shall be shutdown and all personnel evacuated to the ESC.

In case of prolonged fire or explosion within the facility, the Portland Fire Bureau shall be summoned, the first available member of the ENCL and RRF Management shall be notified. The Reactor Health Physicist shall be notified of fire in areas where radioactive materials are located. In addition, the Emergency Coordinator shall shutdown the reactor and evacuate personnel from the RRF and the basement of the Psychology Building. Teams will be dispatched to check for injured personnel. The Emergency Coordinator will monitor the extent of the fire and brief fire bureau personnel upon their arrival.

In case of Pool Level Alarm and visual indication of abnormal loss or gain of pool water, the Emergency Coordinator shall shutdown the reactor, secure the primary and secondary water systems, and isolate the pool through appropriate valve changes. The Emergency Coordinator shall insure that a preliminary radiation survey is performed and appropriate personnel protective measures instituted (e.g. evacuation, radiation area warning, protective clothing required, electrical hazard). The Reactor Health Physicist, the first available member of the ENCL, and RRF Management shall be notified.

7.6.4 Protective Actions for Notification of Unusual Events

For this emergency class the reactor facility may be evacuated. Evacuation shall be initiated by sounding the evacuation alarm, and notifying all personnel by way of public address system and word of mouth. All personnel shall be verified present by roll call in the designated assembly area, and those individuals who exited the reactor bay will be surveyed for contamination using portable instruments from the Emergency Grab Bag or the ESC. Those who are contaminated shall be segregated. The Emergency Coordinator is responsible for controlling access to the reactor bay; such access shall be limited to rescue and emergency response operations.

Facility air and area radiation monitors shall be used to assess the radiological emergency. In addition to these, other sources of information are available from Offsite Support Organizations. The Emergency Coordinator with support from Health Physics personnel is responsible for minimizing personnel exposure and spread of contamination. Emergency exposure levels for personnel shall be in accordance with Section 7.2.

7.7 Emergency Response for an Alert

7.7.1 Activation of the Emergency Organization for an Alert

The Emergency Coordinator shall activate that portion of the emergency organization necessary to respond to the emergency situation. In addition, RRF management and Oregon Office Of Energy shall be notified and kept informed of the emergency status.

SOP 01

Start-up Checklist

Effective: February 1995



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Standard Operating Procedure

1.1 Scope

This procedure provides for the completion of the Startup Checklist, as required by the Administrative Procedures and the Technical Specifications.

1.2 Schedule

Except for continuous or discontinuous operations extending beyond midnight, the Startup Checklist shall be completed daily before any operation of the reactor begins, on days when operation is planned.

1.3 Personnel Requirements

Any member of the reactor staff may act as "Checker" to fill out the Start-up Checklist, but the Checklist-supervising operator shall certify, by signing the Checklist, the completeness and accuracy of the entries. A Senior Reactor Operator must sign the checklist to certify that he or she will be present on campus and agrees to act as SRO as required by the Administrative Procedures.

1.4 Prerequisites

Before filling in the Start-up Checklist, the reactor operator shall review the Procedure Change Notice (PCN) Log, Notice to Operators (NTO), and the Main Log as far back as the last time he or she operated the reactor.

1.5 Precautions

The reactor operator should pay particular attention to experiments previously loaded, if any, and equipment temporarily out of service, if any.

1.6 Order

While the order of procedure listed on the Checklist is recommended, an experienced operator may find it desirable to modify this order. However, the Daily Radiation Survey should be done at the outset.

1.7 Procedure

1.7.1 Preliminary

1.7.1.1 Determine checklist number by reviewing the control room calendar, the logbook, and the previous checklist (if available). Note the current checklist number on the wall calendar under the current date.

1.7.1.2 Turn the console power on and record this in the main log.

1.7.1.3 Turn on the Public Address system (PA) via the switch on the PA located at the foot of the reactor console. Verify that the PA works.

1.7.1.4 Note whether the primary cooling system is turned on. This may be done either by listening for the sound of the pump or entering the mechanical room. If it is necessary to enter the mechanical room to determine this, it is advised that the Daily Radiation Survey, below, be done first. If the primary system is not on, and it is decided not to turn it on, then record that it is off and proceed.

1.7.1.5 If the primary system is on, record the Inlet and Outlet temperatures from the temperature meters on the console.

1.7.1.6 Verify that the Hand and Foot monitors located at the exit from the Reactor Bay are on and functional by using a test source. If it is not functional, it shall be marked as such with a red tag and a portable GM detector shall be used in its place as necessary to check for personnel contamination.

1.7.1.7 Check all portable radiation survey instruments in the control room and the reactor room with a source, whether or not their use during the checklist is anticipated. A minimum of one GM and one ionization chamber is necessary to operate the Facility. Any non-functional portable survey instruments shall be placed on the south wall shelves and clearly labeled with red tags as being non-functional, with the date, a supporting explanation, and the name of the person declaring them out of service. Record the unique RRF ID# or the manufacturer, model, and serial number of each working instrument on the startup checklist.

1.7.2 Daily Radiation Survey

1.7.2.1 Measure and record radiation levels for each of the areas listed on the checklist. Any other suspect areas shall be monitored and recorded on the checklist. In addition to the specific areas that must be surveyed each time, at least two other areas chosen by the checker must be surveyed.

1.7.2.2 Areas where no radiation levels above background are expected should be monitored with a GM survey meter. The lead cave, ion exchange tanks, and storage cave shall be all monitored with an ion chamber survey meter as non-background readings are to be anticipated at these points and the dose rate is of concern.

1.7.2.3 If the dose rate exceeds 5 mR/hr at 30 cm from the radiation source, samples should either be moved, shielded, or as a last resort, the entire area clearly labeled as a "Radiation Area."

1.7.2.4 If the dose rate exceeds 100 mR/hr at 30 cm from the radiation source, the area shall be clearly labeled as a "High Radiation Area," the area shall be roped off, and all personnel shall stay out of that area, as required by SOP 21, *High Radiation Areas*. Notify the supervisor of any High Radiation Area.

1.7.2.5 Any above background reading at the room entrance, Lazy Susan removal area, or other potentially contaminated area shall be followed immediately by a wipe test as per SOP 23, *Health Physics Wipe Tests*. In this context, "above background" means a localized area on a surface exceeding 0.05 mR/hr above the ambient radiation levels; i.e., if the ambient radiation levels is 0.03 mR/hr, then above background means above 0.08 mR/hr. If contamination is found, the area shall be roped off or decontaminated as per SOP 22, *Decontamination*, before proceeding with the checklist.

REED REACTOR FACILITY
STARTUP CHECKLIST

Date: _____ Checker(s) Name(s): _____ Checklist #: _____

Preliminary

Console Power On (*Record in Log*) (✓) _____ PA On and Operational (✓) _____
Console Primary Water Data (*If On*) (✓): Primary On? (y/n) _____ Inlet _____ °C Outlet _____ °C

Hand and Foot Monitors On and Operational (y/n) _____

ID # (*or manufacturer, model, and serial number*)

Portable Monitor Operational Check: 1. _____
(Including any in reactor bay) 2. _____
3. _____
4. _____
5. _____
6. _____

Daily Radiation Survey

1.	Entrance Floor to Reactor Room	_____ mR/hr	meter # _____
2.	Lazy Susan Removal Area	_____ mR/hr	meter # _____
3.	Lead Cage Area	_____ mR/hr	meter # _____
4.	Ion Exchange Tanks	_____ mR/hr	meter # _____
5.	Storage Cave	_____ mR/hr	meter # _____
6.	_____	_____ mR/hr	meter # _____
7.	_____	_____ mR/hr	meter # _____

Comments: _____ Portable Meters Off (✓) _____

Radiation Monitors

Radiation Area Monitor (RAM):

Current Reading: _____ mR/hr

Failsafe Setpoint: _____ mR/hr

Alarm Setpoint: _____ mR/hr

Setpoints $\pm 50\%$ of posted (y/n): _____

Operational (y/n): _____ *

Continuous Air Monitor (CAM):

Reading (before filter change): _____ cpm Filter Changed(✓): _____ Air Flow: _____ cfm (≈ 6.5)

Check Failsafe Setpoint: _____ kcpm Setpoints $\pm 50\%$ of posted (y/n): _____

Check Alarm Setpoint: _____ kcpm Isolation Reset (✓): _____ Operational (y/n): _____ *

Gaseous Stack Monitor (GSM):

Reading: _____ cpm Posted Alarm Set Pt: _____ cpm Operational (y/n): _____ *

Air Particulate Stack Monitor (APM):

Reading (Before filter change): _____ cpm Posted Alarm Set Pt: _____ kcpm

Filter Changed(✓): _____ Air Flow: Out = _____ cfm In = _____ cfm (> 5.5 cfm)

SOP 61

Evacuation Alarm Test

Effective: January 1995



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Standard Operating Procedure

61.1 Scope

This procedure concerns the functional test of the facility evacuation alarm.

61.2 Schedule

A functional test of the evacuation alarm shall be completed once every two months and at intervals not to exceed ten weeks.

61.3 Personnel Requirements

Any individual designated by the Reactor Supervisor may perform this procedure. A reactor operator must be present during the test of the evacuation alarm.

61.4 Prerequisites

There should be no reactor operations during the functional test of the evacuation alarm.

61.5 Precautions

Notify anyone in the reactor facility and associated radiochemistry laboratory that a test of the evacuation alarm is taking place.

61.6 Order

The steps should be performed in the order listed.

61.7 Procedure

The evacuation alarm can be activated from the red button on the north wall next to the console or from the red button on the south wall of the reactor bay. The test/reset button is located on the west wall of the mechanical room to the south of the circuit box.

61.7.1 Activate the alarm from console room by depressing the red button. There is a small black button located on top of the plunger housing. Depressing this button will temporarily silence the alarm in the reactor bay. Verify this.

61.7.2 Verify that the alarm activates properly in the following locations:

- a) Loud buzzer in reactor bay
- b) Light on south wall of radiochemistry lab

61.7.3 Reset the alarm. Activate the evacuation alarm from the reactor bay. Certify that the alarm activates properly in the locations listed in §61.7.2.

61.7.4 Reset the alarm.

61.8 Logging Requirements

If this procedure is being conducted as part of the bimonthly checklist, then the appropriate portions of the checklist shall be signed. If carried out independently of the bimonthly checklist, the fact that the evacuation alarm was checked shall be recorded in the main log.

61.9 Special

If the functional test of the evacuation alarm fails for any reason the supervisor shall be notified immediately.

61.10 Acceptance Criteria

This procedure is complete when the evacuation alarm has been certified functional.