Research Reactor
University of Missouri

MU Research Reactor
1513 Research Park Drive
Columbia, MO 65211
PHONE 573-882-4211
WEB murr.missouri.edu

September 30, 2025

10 CFR 50.90

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

Subject: License Amendment Request to Revise the Technical Specifications for the Addition of Ancillary Exhaust Systems

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

Pursuant to 10 CFR 50.90, the University of Missouri Research Reactor (MURR) requests a license amendment to revise the MURR Technical Specifications (TS). This proposed change will reflect planned addition to and modification of ventilation exhaust systems supporting radiological activities at the MURR facility.

Specifically, this application requests approval of revisions or additions to the following portions of the MURR Technical Specifications:

- Revision to Technical Specification (TS) 3.7, “Radiation Monitoring Systems and Airborne Effluents,”
- Revisions to TS 3.10 and TS 4.10, “Iodine-131 Processing Hot Cells,”
- Creation of new TS 3.11, “Radiation Monitoring Systems and Airborne Effluents for Ancillary Exhaust Systems,”
- Creation of new TS 4.11, “Ancillary Exhaust Systems.”

The Enclosure provides a description and assessment of the proposed changes, the existing TS marked up to show the proposed changes, and revised (clean) TS pages. These proposed changes have been reviewed by the Reactor Advisory Committee (RAC) in accordance with MURR TS 6.2.a(4).

The proposed amendment does not include any new or revised commitments.

If there are any questions regarding this license request, please contact Thomas Forland, Associate Director, Nuclear Regulatory Affairs, at (573) 882-7498 or Thomas.Forland@Missouri.edu.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on _____

Matthew R. Sanford
Facility Director

Research Reactor
University of Missouri

MU Research Reactor
1513 Research Park Drive
Columbia, MO 65211
PHONE 573-882-4211
WEB murr.missouri.edu

Enclosure: License Amendment Request to Revise the Technical Specifications for the Addition of Ancillary Exhaust Systems

cc: Mrs. Jessica Lovett, U.S. Nuclear Regulatory Commission
Mr. Edward Helvenston, U.S. Nuclear Regulatory Commission
Mr. Andrew Waugh, U.S. Nuclear Regulatory Commission
MURR Reactor Advisory Committee
MURR Reactor Safety Subcommittee

Docket 50-186
September 30, 2025

License Amendment Request to Revise the Technical Specifications for the Addition of Ancillary Exhaust Systems

1. Summary Description

The University of Missouri Research Reactor (MURR) is requesting the creation of a new Technical Specification (TS) Limiting Condition for Operation (LCO) 3.11, "Radiation Monitoring Systems and Airborne Effluents for Ancillary Exhaust Systems," and corresponding Surveillance Requirement (SR) 4.11, "Ancillary Exhaust Systems." These proposed additions will establish conditions for operating the ventilation exhaust systems in MURR facilities not serviced by the existing facility exhaust systems and establish the surveillance requirements of the equipment needed to safely operate those systems. MURR Ancillary Exhaust System ducting will be independent from the reactor building and laboratory building ventilation systems, and thus, requires its own monitoring requirements to ensure that MURR remains in compliance with established airborne effluent limits.

Summary of the proposed changes:

1. TS 3.7.b is revised to account for the total discharge rate of gaseous effluents through the reactor off-gas system and all MURR ancillary ventilation systems.

2. TS 3.10.c is revised to refer to the Iodine-131 Processing Hot Cells ventilation system generically, while maintaining the same monitoring requirements.

3. TS 3.11 is added to establish appropriate controls for performing activities with the potential for radioactive releases in areas serviced by MURR Ancillary Exhaust Systems, and for monitoring those potential release pathways.

4. TS 4.10.d is revised to allow for monthly channel checks, in-lieu of monthly radiation source checks, for radiation monitors that support this function, in alignment with the requirement facility radiation monitors required by TS 3.7.

5. TS 4.11 is added to establish surveillance requirements for the equipment needed to operate the Ancillary Exhaust Systems.

2. Detailed Description

2.1. System Design and Operation

The MURR facility ventilation system is described within Chapter 9.1 of the MURR Safety Analysis Report (SAR). The principal functions of the MURR facility ventilation system are to:

- Maintain the reactor containment and laboratory buildings at a slightly negative pressure with respect to the surrounding environment to prevent the spread of radioactive contamination;

- Provide the necessary air exchanges to ensure that concentrations of radioactive gases in the laboratory and reactor containment buildings are maintained at levels which are below the limits of 10 CFR 20, Appendix B, Table 1 for restricted areas;

- Ensure that maximum dilution of potentially contaminated air is attained, resulting in minimum concentrations of radioactive gases being released to the environment; and
- Continuously monitor all radioactive gases discharged through the facility ventilation exhaust stack.

These principal functions are accomplished through control of the supply and exhaust to the reactor containment building and laboratory building, and by monitoring the exhaust for radiation through a common exhaust plenum.

While these controls are not impacted by the proposed amendment, they serve as a framework for the new Ancillary Exhaust Systems, in that, the MURR SAR will be revised to account for the ancillary exhaust systems. The principal functions of the new exhaust systems are to:

- Maintain the areas serviced by the ancillary exhaust system(s) at a slightly negative pressure with respect to the surrounding environment to prevent the spread of radioactive contamination;
- Provide the necessary air exchanges to ensure that concentrations of radioactive gases in the areas serviced by the ancillary exhaust system(s) are maintained at levels which are below the limits of 10 CFR 20, Appendix B, Table 1 for restricted areas;
- Ensure that maximum dilution of potentially contaminated air is attained, resulting in minimum concentrations of radioactive gases being released to the environment; and
- Continuously monitor all radioactive gases discharged as effluent through the ancillary exhaust system.

The ancillary exhaust systems are intended to primarily service laboratories and support buildings within the MURR site boundary. The ancillary exhaust systems are not intended to interface directly with the existing reactor building or laboratory building exhaust systems (i.e., they are not backup systems to the existing reactor building or laboratory building exhaust systems). The ancillary exhaust systems are not intended to be credited in or relied upon in response to any MURR reactor accidents.

2.2. Current Technical Specifications Requirements

TS LCO 3.4/SR 4.4/Design Feature 5.5, “Reactor Containment Building,” are not impacted by the proposed change, and correspondingly, revisions are not proposed.

TS LCO 3.7/SR 4.7, “Radiation Monitoring Systems and Airborne Effluents,” requires that radiation monitoring information is available to the reactor operator during reactor operations, exposure to the public resulting from the radioactivity released from the reactor facility be limited by 10 CFR 20, and specifies the radiation monitoring equipment and limits required to accomplish these tasks.

TS LCO 3.10/SR 4.10, “Iodine-131 Processing Hot Cells,” exists to reasonably ensure that the health and safety of the staff and the public is not endangered as a result of processing iodine-131 and specifies the equipment needed to do so.

2.3. Reason for the Proposed Change

While the current facility (reactor and laboratory) ventilation and exhaust system is appropriately sized for the loads within the reactor and laboratory buildings, it does not have sufficient additional capacity to support continued expansion of radiological research and isotope production.

Performing radiological activities in MURR facilities that are separate from the reactor building or laboratory building requires a ventilation exhaust system to ensure that the radiological safety requirements for MURR personnel and the public remain met. Potential radioactive release from these ventilation exhaust systems can contribute to the facility’s total radiation release. Thus, MURR proposes that the TS be revised to ensure appropriate controls are placed upon these systems and releases.

2.4. Description of the Proposed Change

Adding TS 3.11, “Radiation Monitoring Systems and Airborne Effluents for Ancillary Exhaust Systems”:

The addition of ventilation exhaust systems for the MURR facility introduces a new release point for radioactive gaseous effluent. A new technical specification is required to ensure that sufficient radiation monitoring information is available when activities with the potential for release of radioactive effluents are performed within the spaces served by the associated ventilation system. The intermittent (i.e., not sustained) nature of these types of activities is similar in nature to the I-131 processing activities that occur at the MURR facility.

MURR proposes a new TS LCO to ensure the operability of the radiation monitoring systems associated with the ancillary exhaust sytems. The new TS is similar to the TS LCO 3.10 for the I-131 Processing Hot Cells, which requires that the associated exhaust and radiation monitoring systems be operable when performing activities with the potential for release of radioactive effluents. The requirements in the proposed TS LCO will ensure MURR staff have sufficient information to ensure gaseous radioactive effluents remain below the associated facility effluent limits contained within TS LCO 3.7.b.

Adding TS 4.11, “Ventilation Exhaust Systems”:

The ventilation exhaust system in a MURR facility is required to be operable to maintain personnel safety when conducting activities with the potential for radiological releases.

MURR proposes a new TS SR to provide reasonable assurance that the ventilation exhaust system equipment is operable. This TS is similar to the scope and objective of TS SR 4.10, which provides reasonable assurance of the proper operation of the equipment needed to safely process iodine-131.

Revising TS 3.7.b, “Radiation Monitoring Systems and Airborne Effluents”:

As a consequence of the proposed addition of TS LCO 3.11/SR 4.11 MURR is also requesting an administrative change to TS LCO 3.7 "Radiation Monitoring Systems and Airborne Effluents." This change will revise the LCO to account for the addition of new effluent ventilation exhaust systems. Changing the language of this TS LCO is required to ensure that MURR remains in compliance with the airborne effluent limits for activities taking place under the MURR Reactor License. The change to this specification will ensure the total effluent concentration discharged through the ventilation exhaust systems do not exceed the previously established limits, as identified within this TS LCO 3.7.b.

Revising TS 3.10.c, "Iodine-131 Processing Hot Cells":

As a further consequence of the proposed addition of TS LCO 3.11/SR 4.11, MURR is proposing an administrative change to TS LCO 3.10 "Iodine-131 Processing Hot Cells." This change will revise the LCO to generically refer to facility "ventilation exhaust," rather than the current wording of "exhaust stack" and "Off-gas (stack)," which are terms tied to the existing reactor building exhaust off-gas stack. This change makes no alterations to the operability requirements or monitoring capabilities for the iodine-131 ventilation or monitoring systems.

The iodine-131 processing hot cells ventilation system is currently connected to the existing reactor stack exhaust system. The purpose of this change is to account for a future change wherein the TS LCO 3.10 exhaust would be relocated from the existing reactor building off-gas stack to an alternate/ancillary exhaust system. The administrative change to TS LCO 3.11/SR 4.11 allows such a change to be reviewed based upon its own merits, rather than as a tie to specific TS wording alone. That is, subsequent facility modification would require separate evaluation through the facility's 10 CFR 50.59 process, and potential NRC review, prior to implementation.

Revising TS 4.10.d, "Iodine-131 Processing Hot Cells":

While investigating the prior proposed changes to the TS it was identified that the monthly operability checks for radiation monitors associated with the existing facility exhaust and the existing iodine-131 processing hot cells slightly differed. Specifically, the allowance for a channel check for the iodine-131 in-cell radiation monitors is not included as an option for the monthly operability test. This option is allowed for the facility ventilation radiation monitoring controlled under the separate TS 4.7, "Radiation Monitoring Systems and Airborne Effluents."

The option for a channel check under TS 4.7.a was added to the MURR TS during the facility license renewal process. A similar allowance for performing a channel check under TS 4.10.d in-lieu of a radiation source check would continue to meet the intent of the specification. The basis for this understanding is derived from the discussion contained in MURR's License Renewal Safety Evaluation Report (SER) (ML16124A885), in Section 11.2.2, "Radioactive Waste Controls." Specifically, under the subsection "TS 4.7 Radiation Monitoring Systems and Airborne Effluents," it states:

> *TS 4.7, Specification a, requires the radiation monitoring instrumentation required by TS 3.7, Specification a, to be verified operable by monthly radiation source checks or channel tests. The*

> *NRC staff finds that this specification helps to ensure that the radiation monitors are operable by performing monthly source checks or channel checks. The surveillance method and surveillance interval are consistent with the guidance in NUREG-1537 and ANSI/ANS-15.1-2007. Based on the information provided above, the NRC staff concludes that TS 4.7, Specification a, is acceptable.*

At the time of the license renewal SER, the similar TS 4.10.d requirement covering the iodine radiation monitoring systems had existed within the MURR TS for less than one year. It is believed by MURR staff that similar wording as that which exists within TS 4.7.a would have been incorporated into TS 4.10.d at the time of license renewal, had this slight difference been identified at that time. A review of the correspondence related to TS 4.10 and MURR's License Renewal identified no explicit conflicts to this understanding. As such, MURR proposes that this change be incorporated into the TS 4.10 requirements while related changes are being made to the facility radiation monitoring requirements to help ensure consistency across MURR ventilation and radiation monitoring systems.

3. Technical Evaluation

As discussed in the MURR SAR Appendix B, argon-41 (Ar-41) is the primary radioactive gaseous effluent from the site, with over 90% of the radioactivity released through the reactor exhaust stack being from Ar-41. It is produced within the reactor facility during operation by neutron activation of Ar-40 in the air inside of the MURR containment building. The Ar-41 is released to the atmosphere through the reactor facility exhaust stack.

With the exception of the reactor itself, there are no substantial sustained sources of thermal neutrons in use at the MURR facility, and as a result, generation of Ar-41 in areas external to the containment building, and the subsequent release of the generated Ar-41, is not a concern for the ancillary ventilation systems. Therefore, the addition of new buildings within the facility boundary having their own associated ventilation exhaust system will not result in a change to MURR's generation or release of Ar-41 and the restrictions on the maximum concentration limits currently defined in TS 3.7.b are not proposed to be changed.

With respect to the requirements for ancillary ventilation systems and their associated radiation monitoring systems, section 2.1 of this request provides the principal functions these systems will be designed to meet. The ancillary ventilation systems and associated radiation monitoring under construction currently at the MURR facility are being designed to meet or exceed the requirements of ANSI N13.1-2021 "Sampling and Monitoring of Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities" (Reference 1).

Since the proposed change will not impact the existing reactor and laboratory building ventilation systems, and the ancillary ventilation systems will not interface with the reactor containment building, TS LCO 3.4, SR 4.4, and Design Feature 5.5 all for "Reactor Containment Building" are not proposed to be revised. There are no impacts on the reactor containment building as a result of this change and those gaseous effluents associated with the operation of the reactor will continue to be discharged through the containment building ventilation exhaust. Per TS 5.5, these gaseous effluents are exhausted at an

elevation 55 feet or above the containment building grade level. A separate design features specification is not required for the ancillary ventilation systems as they do not provide any supporting function for operation of the reactor. Effluent points associated with ancillary ventilation systems will be analyzed separately for their exhaust rate, elevation, and contents, to ensure that the requirements of TS 3.7.b for effluent concentration limits, remain met, and appropriate descriptions of these systems will be added to the facility SAR.

4. Regulatory Evaluation

4.1. Applicable Regulatory Requirements/Criteria

The new TS LCO/SR are being requested in accordance with the guidance of NUREG 1537, Part 1, Revision 0, Standard Format and Content of Technical Specifications, Section 3.7.2 "Radiation Monitoring Systems and Effluents," wherein it states "If the applicant proposes to limit release to 10 CFR Part 20 limits at the point of release, then the analysis of effluents in the safety analysis report is sufficient and no technical specifications need be proposed." The current MURR TS and SAR do not enforce this limitation but instead provide separate criteria. This amendment request supports taking a consistent methodology for evaluation, monitoring, and release of gaseous radioactive effluents across all effluent points operating under the reactor license, rather than establishing separate criteria for each.

10 CFR 20 provides the limitations and standards for protection against ionizing radiation on the public and radiation workers. The MURR SAR, Chapter 11, "Radiation Protection Program and Waste Management," in concert with MURR TS LCO 3.7 and the MURR Radiation Protection Program (required by MURR TS 6.3), describes the means by which the MURR facility meets the requirements of 10 CFR 20. MURR's Radiation Protection Program meets or exceeds the requirements of ANSI/ANS-15.11, "Radiation Protection at Research Reactor Facilities," 2004.

The revisions proposed to TS 3.10/4.10 remain consistent with the guidance of NUREG-1537 and ANSI/ANS-15.1 "The Development of Technical Specifications for Research Reactors," 2007.

The proposed change does not affect compliance with these regulations or guidance and ensures that the lowest functional capabilities or performance levels of equipment required for safe operation are met.

4.2. Precedent

No precedent license amendments were identified for the proposed change.

4.3. No Significant Hazards Consideration Determination Analysis

The University of Missouri Research Reactor (MURR) has evaluated whether or not a significant hazards consideration is involved with the proposed amendment using the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The addition of new ventilation systems at MURR does not increase the amount of radioactive inventory or power output of the MURR reactor. There are no accidents previously evaluated that are changed by the inclusion of the new ventilation exhaust systems or effluent release points, as the added systems are not credited to function in response to any previously evaluated accident. The areas serviced by the new ventilation systems are separate from the areas where experiments or reactor operations associated with other previously evaluated accidents occur. The new systems do not serve as initiators of any accident previously evaluated. The existing and added Technical Specifications will ensure that any reactivity effects associated with the activities conducted in the areas served by the new ventilation systems remain within levels which pose no safety risk.

   The related changes to the facility Technical Specifications for radiation monitoring systems remain in alignment with the applicable regulatory guidance documents previously utilized for the facility and have no corresponding accident impacts.

   Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No

   The areas served by the new ancillary ventilation systems are external to the reactor containment building and do not directly interface with the existing reactor and laboratory ventilation systems relied upon within the MURR accident analysis. The new systems are entirely separated from the operation of the reactor, which provides the source term for radiological accidents previously evaluated. The separation of existing and new ventilation systems ensures that new or different kinds of radiological accidents from those previously evaluated are not created by the proposed change. NUREG 1537, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors,” Part 1, Revision 0, Chapter 13, “Accident Analysis,” provides a listing of postulated accident event categories and the guidelines for consideration of these events. The provided listing has been evaluated within Chapter 13 of the MURR Safety Analysis Report (SAR) and the evaluation provided therein remains bounding for any event which could occur within the non-reactor areas served by the ancillary ventilation systems.

   The related changes to the facility Technical Specifications for radiation monitoring systems remain in alignment with the applicable regulatory guidance documents previously utilized for the facility and do not create or affect any accident initiators.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No

   The proposed change does not impact the radioactive inventory or operations of the MURR reactor. The proposed revisions will implement similar controls for the non-reactor portions of the facility as those controls which are applied to the reactor portions of the facility for areas where radioactive material handling may take place. The effluent limits contained in Technical Specification Limiting Condition of Operation 3.7 remain unchanged and the reporting limits and requirements for the effluent monitoring program remain the same. No design basis values or safety limits associated with operation of the reactor are affected by the proposed change.

   The related changes to the facility Technical Specifications for radiation monitoring systems remain in alignment with the applicable regulatory guidance documents previously utilized for the facility and ensure the same degree of safety remains in place.

   Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, MURR concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.4. Conclusions

Based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5. Environmental Consideration

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10

CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6. References

1. NUREG 1537, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors,” Part 1, Revision 0
2. Safety Evaluation Report, “Renewal of the Facility Operating License for the University of Missouri-Columbia Research Reactor, License No. R-103, Docket No. 50-186,” January 2017 (ML16124A885)
3. ANSI N13.1, “Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities,” 2021
4. ANSI/ANS-15.1, “The Development of Technical Specifications for Research Reactors,” 2007.
5. ANSI/ANS-15.11, “Radiation Protection at Research Reactor Facilities,” 2004.

7. Attachments

1. Technical Specification Page Markups
2. Retyped Technical Specification Pages

Docket 50-186
September 30, 2025
Attachment 1

License Amendment Request to Revise the Technical Specifications for the Addition of Ancillary Exhaust Systems

Attachment 1

Technical Specification Page Markups

(6 pages follow)

3.7 **Radiation Monitoring Systems and Airborne Effluents** - Continued

b. The maximum total discharge rate through all ~~the~~ ventilation exhaust systems ~~stack~~ shall not exceed the following:

Type of Radioactivity	**Max. Concentration Averaged Over One Year**
Particulates and halogens with half-lives greater than 8 days	AEC
All other radioactive isotopes	350 AEC

AEC = Air Effluent Concentration as listed in Appendix B, Table 2, Column 1 of 10 CFR 20, "Standards for Protection Against Radiation."

c. An environmental monitoring program shall be carried out and shall include, as a minimum:

(1) Analysis of samples from surface waters from the surrounding areas, and vegetation or soil,

AND

(2) Placement of film badges, thermoluminescent dosimeters, or other devices at control points.

Bases:

a. The radiation monitors provide information of an impending or existing danger from radiation so that corrective action can be initiated to prevent the spread of radioactivity to the surroundings and so that there will be sufficient time to evacuate the facility should it be necessary to do so.

Isolation of the reactor containment building at 10 times the normal previously established radiation levels is necessary to allow for sample handling within the reactor pool or when removing samples from the pool. Normal pool surface radiation levels are approximately 20 mR/h while those at the containment building exhaust plenum are around 0.15 mR/h. Operational experience has demonstrated that the 10 times factor provides sufficient margin to minimize inadvertent reactor scrams without allowing for the potential of unacceptable exposure rates to personnel in containment. Ten times the routine dose rates equate to 200 mrem at the bridge monitor and 1.5 mrem at the exhaust plenum. Dose rates at this level do not constitute an unreasonable risk and would not go unidentified for any significant period of time.

3.10 Iodine-131 Processing Hot Cells

Applicability:
This specification applies to the equipment needed to safely process iodine-131.

Objective:
The objective of this specification is to reasonably assure that the health and safety of the staff and public is not endangered as a result of processing iodine-131.

Specification:

a. The facility ventilation exhaust system shall be operable when processing iodine-131 in the iodine-131 processing hot cells.

b. The facility ventilation exhaust system shall maintain the iodine-131 processing hot cells at a negative pressure with respect to the surrounding areas when processing iodine-131.

c. Processing of iodine-131 shall not be performed in the iodine-131 processing hot cells unless the following minimum number of radiation monitoring channels are operable.

	Radiation Monitoring Channel	**Number**
1.	~~Off-Gas (Stack)~~ Ventilation Exhaust Radiation Monitor	1
2.	Iodine-131 Processing Hot Cells Radiation Monitor	1[(1)]

[(1)] Exception: When the required radiation monitoring channel becomes inoperable, then portable instruments may be substituted for the normally installed monitor in Specification 3.10.c.2 within one (1) hour of discovery for a period not to exceed one (1) week.

d. At least three (3) charcoal filter banks each having an efficiency of 99% or greater shall be operable when processing iodine-131 in the iodine-131 processing hot cells.

Bases:

a. Specification 3.10.a requires that the facility ventilation exhaust system is in operation when processing iodine-131 in the iodine-131 processing hot cells to ensure proper dilution of effluents to prevent exceeding the limits of 10 CFR 20 Appendix B.

b. Specification 3.10.b assures that the iodine-131 processing hot cells are maintained at a negative pressure with respect to the surrounding areas ensures safety for the facility staff.

3.10 **Iodine-131 Processing Hot Cells** - Continued

c. Specification 3.10.c assures that the radiation monitors provide information to operating personnel regarding routine release of radioactivity and any impending or existing danger from radiation. Their operation will provide sufficient time to take the necessary steps to prevent the spread of radioactivity to the surroundings. The ~~Stack~~ Ventilation Exhaust Radiation Monitor continuously monitors the air exiting the facility through the exhaust ~~stack~~ system for airborne radioactivity. The Iodine-131 Processing Hot Cells Radiation Monitor is a six (6) detector system; two (2) detectors serving each one of the three (3) hot cells. For each hot cell, one (1) detector is located at the processor's work area where the hot cell manipulators are installed and the other is located in the bay above the hot cell next to the exhaust charcoal filters.

ci. The potential radiation dose to staff and individuals at the Emergency Planning Zone boundary and beyond have been calculated following an accidental release of iodine-131 activity. These calculations are based on the facility ventilation exhaust system directing all iodine-131 processing hot cell effluents through charcoal filtration with an efficiency of 99% or greater prior to being released through the facility exhaust stack.

3.11 Radiation Monitoring Systems and Airborne Effluents for Ancillary Exhaust Systems

Applicability:
This specification applies to the equipment needed to safely conduct activities with the potential for release of radioactive effluents through Ancillary Exhaust Systems.

Objective:
The objective of this specification is to reasonably assure that the health and safety of the staff and public is not endangered as a result of conducting radioactive material handling with the potential for gaseous effluent release.

Specification:

a. Activities with the potential for release of airborne radioactive effluents shall only be conducted in the facility if the associated exhaust system is operable and maintaining a negative pressure in the handling area with respect to the surrounding areas.

b. At least one (1) of the radiation monitors for an ancillary exhaust system shall be operable when the ancillary exhaust system is operating.

   i. If the required radiation monitoring channel becomes inoperable, portable instruments may be substituted for the normally installed monitor in Specification 3.11.b within one (1) hour of discovery for a period not to exceed one (1) week.

Bases:

a. Specification 3.11.a requires that the ancillary exhaust system is in operation and capable of maintaining a negative pressure with respect to the surrounding areas when activities that have the potential for radioactive effluent release are being conducted. This ensures proper monitoring of any effluent release to prevent the facility from exceeding the limits of 10 CFR 20, Appendix B, and ensures the safety of facility staff in the case of an inadvertent radioactive effluent release. Activities involving non-radioactive material are not restricted by operation of the associated ancillary exhaust system.

b. Specification 3.11.b ensures that there is equipment in place to provide information to operating personnel regarding routine or unexpected release of radioactivity. Consistent with Specification 33.7.a, which requires monitors to be available when the reactor is operating, at least one (1) of the associated radiation monitors shall be operable during periods of ancillary exhaust system operation. This provides sufficient time for facility staff to take the necessary steps to prevent the spread of radioactivity to the surroundings. Radiation monitors are included for each ventilation exhaust system and capable of detecting radioactive particulate,,noble gases, and iodine.

4.10 Iodine-131 Processing Hot Cells

Applicability:
This specification applies to the surveillance requirements of the equipment needed to safely process iodine-131.

Objective:
The objective of this specification is to reasonably assure proper operation of the equipment needed to safely process iodine-131.

Specification:

a. An operability test of the facility ventilation exhaust system shall be performed monthly.

b. A channel check of the facility ventilation exhaust system to maintain the iodine-131 processing hot cells at a negative pressure with respect to the surrounding areas shall be verified daily prior to any process.

c. The radiation monitors as required by Specification 3.10.c shall be calibrated on a semiannual basis.

d. The radiation monitors as required by Specification 3.10.c shall be checked for operability with a radiation source or channel check at monthly intervals.

e. The efficiency of the iodine-131 processing hot cells charcoal filter banks shall be verified biennially or following major maintenance. It shall be verified that the charcoal filter banks have a removal efficiency of 99% or greater for iodine.

Bases:

a. Experience has shown that monthly tests of the facility ventilation exhaust system are sufficient to assure proper operation.

b. Verifying that the iodine-131 processing hot cells are at negative pressure with respect to the surrounding areas prior to use ensures personnel safety.

c. Semiannual channel calibration of the radiation monitoring instrumentation will assure that long-term drift of the channels will be corrected.

d. Experience has shown that monthly verification of operability of the radiation monitoring instrumentation is adequate assurance of proper operation over a long time period.

e. Biennial verification of the filter banks ensures that the filters will perform as analyzed.

4.11 Ancillary Exhaust Systems

Applicability:
This specification applies to the surveillance requirements of the equipment needed to safely conduct activities with the potential for release of radioactive effluents through Ancillary Exhaust Systems

Objective:
The objective of this specification is to reasonably assure that the health and safety of the staff and public is not endangered as a result of conducting radioactive material handling with the potential for gaseous effluent release.

Specification:

a. An operability test of each ancillary ventilation Exhaust system shall be performed monthly.

b. The radiation monitors as required by Specification 3.11.b shall be calibrated on a semiannual basis.

c. The radiation monitors as required by Specification 3.11.b shall be checked for operability monthly by radiation source checks or channel tests.

Bases:

a. Experience on similar ventilation exhaust systems has shown that monthly tests of the systems are sufficient to assure proper operation.

b. Semiannual channel calibration of radiation monitoring instrumentation will assure that long-term drift of the channels will be corrected.

c. Experience has shown that monthly verification of operability of radiation monitoring instrumentation is adequate assurance of proper operation over a long time period.

Docket 50-186
September 30, 2025
Attachment 2

License Amendment Request to Revise the Technical Specifications for the Addition of Ancillary Exhaust Systems

Attachment 2

Retyped Technical Specification Pages

(6 pages follow)

3.7 **Radiation Monitoring Systems and Airborne Effluents** - Continued

b. The maximum total discharge rate through all ventilation exhaust systems shall not exceed the following:

Type of Radioactivity	**Max. Concentration Averaged Over One Year**
Particulates and halogens with half-lives greater than 8 days	AEC
All other radioactive isotopes	350 AEC

AEC = Air Effluent Concentration as listed in Appendix B, Table 2, Column 1 of 10 CFR 20, "Standards for Protection Against Radiation."

c. An environmental monitoring program shall be carried out and shall include, as a minimum:

(1) Analysis of samples from surface waters from the surrounding areas, and vegetation or soil,

AND

(2) Placement of film badges, thermoluminescent dosimeters, or other devices at control points.

Bases:

a. The radiation monitors provide information of an impending or existing danger from radiation so that corrective action can be initiated to prevent the spread of radioactivity to the surroundings and so that there will be sufficient time to evacuate the facility should it be necessary to do so.

Isolation of the reactor containment building at 10 times the normal previously established radiation levels is necessary to allow for sample handling within the reactor pool or when removing samples from the pool. Normal pool surface radiation levels are approximately 20 mR/h while those at the containment building exhaust plenum are around 0.15 mR/h. Operational experience has demonstrated that the 10 times factor provides sufficient margin to minimize inadvertent reactor scrams without allowing for the potential of unacceptable exposure rates to personnel in containment. Ten times the routine dose rates equate to 200 mrem at the bridge monitor and 1.5 mrem at the exhaust plenum. Dose rates at this level do not constitute an unreasonable risk and would not go unidentified for any significant period of time.

3.10 **Iodine-131 Processing Hot Cells**

Applicability:
This specification applies to the equipment needed to safely process iodine-131.

Objective:
The objective of this specification is to reasonably assure that the health and safety of the staff and public is not endangered as a result of processing iodine-131.

Specification:

a. The facility ventilation exhaust system shall be operable when processing iodine-131 in the iodine-131 processing hot cells.

b. The facility ventilation exhaust system shall maintain the iodine-131 processing hot cells at a negative pressure with respect to the surrounding areas when processing iodine-131.

c. Processing of iodine-131 shall not be performed in the iodine-131 processing hot cells unless the following minimum number of radiation monitoring channels are operable.

	Radiation Monitoring Channel	**Number**
1.	Ventilation Exhaust Radiation Monitor	1
2.	Iodine-131 Processing Hot Cells Radiation Monitor	1[(1)]

[(1)] Exception: When the required radiation monitoring channel becomes inoperable, then portable instruments may be substituted for the normally installed monitor in Specification 3.10.c.2 within one (1) hour of discovery for a period not to exceed one (1) week.

d. At least three (3) charcoal filter banks each having an efficiency of 99% or greater shall be operable when processing iodine-131 in the iodine-131 processing hot cells.

Bases:

a. Specification 3.10.a requires that the facility ventilation exhaust system is in operation when processing iodine-131 in the iodine-131 processing hot cells to ensure proper dilution of effluents to prevent exceeding the limits of 10 CFR 20 Appendix B.

b. Specification 3.10.b assures that the iodine-131 processing hot cells are maintained at a negative pressure with respect to the surrounding areas ensures safety for the facility staff.

3.10 **Iodine-131 Processing Hot Cells** - Continued

c. Specification 3.10.c assures that the radiation monitors provide information to operating personnel regarding routine release of radioactivity and any impending or existing danger from radiation. Their operation will provide sufficient time to take the necessary steps to prevent the spread of radioactivity to the surroundings. The Ventilation Exhaust Radiation Monitor continuously monitors the air exiting the facility through the exhaust system for airborne radioactivity. The Iodine-131 Processing Hot Cells Radiation Monitor is a six (6) detector system; two (2) detectors serving each one of the three (3) hot cells. For each hot cell, one (1) detector is located at the processor's work area where the hot cell manipulators are installed and the other is located in the bay above the hot cell next to the exhaust charcoal filters.

ci. The potential radiation dose to staff and individuals at the Emergency Planning Zone boundary and beyond have been calculated following an accidental release of iodine-131 activity. These calculations are based on the facility ventilation exhaust system directing all iodine-131 processing hot cell effluents through charcoal filtration with an efficiency of 99% or greater prior to being released through the facility exhaust stack.

3.11 Radiation Monitoring Systems and Airborne Effluents for Ancillary Exhaust Systems

Applicability:
This specification applies to the equipment needed to safely conduct activities with the potential for release of radioactive effluents through Ancillary Exhaust Systems.

Objective:
The objective of this specification is to reasonably assure that the health and safety of the staff and public is not endangered as a result of conducting radioactive material handling with the potential for gaseous effluent release.

Specification:

a. Activities with the potential for release of airborne radioactive effluents shall only be conducted in the facility if the associated exhaust system is operable and maintaining a negative pressure in the handling area with respect to the surrounding areas.

b. At least one (1) of the radiation monitors for an ancillary exhaust system shall be operable when the ancillary exhaust system is operating.

    i. If the required radiation monitoring channel becomes inoperable, portable instruments may be substituted for the normally installed monitor in Specification 3.11.b within one (1) hour of discovery for a period not to exceed one (1) week.

Bases:

a. Specification 3.11.a requires that the ancillary exhaust system is in operation and capable of maintaining a negative pressure with respect to the surrounding areas when activities that have the potential for radioactive effluent release are being conducted. This ensures proper monitoring of any effluent release to prevent the facility from exceeding the limits of 10 CFR 20 Appendix B and ensures the safety of facility staff in the case of an inadvertent radioactive effluent release. Activities involving non-radioactive material are not restricted by operation of the associated ancillary exhaust system.

b. Specification 33.11.b ensures that there is equipment in place to provide information to operating personnel regarding routine or unexpected release of radioactivity. Consistent with Specification33.7.a, which requires monitors to be available when the reactor is operating, at least one (1) of the associated radiation monitors shall be operable during periods of ancillary exhaust system operation. This provides sufficient time for facility staff to take the necessary steps to prevent the spread of radioactivity to the surroundings. Radiation monitors are included for each ventilation exhaust system and capable of detecting radioactive particulate,,noble gases, and iodine.

4.10 **Iodine-131 Processing Hot Cells**

Applicability:
This specification applies to the surveillance requirements of the equipment needed to safely process iodine-131.

Objective:
The objective of this specification is to reasonably assure proper operation of the equipment needed to safely process iodine-131.

Specification:

a. An operability test of the facility ventilation exhaust system shall be performed monthly.

b. A channel check of the facility ventilation exhaust system to maintain the iodine-131 processing hot cells at a negative pressure with respect to the surrounding areas shall be verified daily prior to any process.

c. The radiation monitors as required by Specification 3.10.c shall be calibrated on a semiannual basis.

d. The radiation monitors as required by Specification 3.10.c shall be checked for operability with a radiation source or channel check at monthly intervals.

e. The efficiency of the iodine-131 processing hot cells charcoal filter banks shall be verified biennially or following major maintenance. It shall be verified that the charcoal filter banks have a removal efficiency of 99% or greater for iodine.

Bases:

a. Experience has shown that monthly tests of the facility ventilation exhaust system are sufficient to assure proper operation.

b. Verifying that the iodine-131 processing hot cells are at negative pressure with respect to the surrounding areas prior to use ensures personnel safety.

c. Semiannual channel calibration of the radiation monitoring instrumentation will assure that long-term drift of the channels will be corrected.

d. Experience has shown that monthly verification of operability of the radiation monitoring instrumentation is adequate assurance of proper operation over a long time period.

e. Biennial verification of the filter banks ensures that the filters will perform as analyzed.

4.11 **Ancillary Exhaust Systems**

Applicability:
This specification applies to the surveillance requirements of the equipment needed to safely conduct activities with the potential for release of radioactive effluents through Ancillary Exhaust Systems

Objective:
The objective of this specification is to reasonably assure that the health and safety of the staff and public is not endangered as a result of conducting radioactive material handling with the potential for gaseous effluent release.

Specification:

a. An operability test of each ancillary ventilation Exhaust system shall be performed monthly.

b. The radiation monitors as required by Specification 3.11.b shall be calibrated on a semiannual basis.

c. The radiation monitors as required by Specification 3.11.b shall be checked for operability monthly by radiation source checks or channel tests.

Bases:

a. Experience on similar ventilation exhaust systems has shown that monthly tests of the systems are sufficient to assure proper operation.

b. Semiannual channel calibration of radiation monitoring instrumentation will assure that long-term drift of the channels will be corrected.

c. Experience has shown that monthly verification of operability of radiation monitoring instrumentation is adequate assurance of proper operation over a long time period.