

# **10 CFR 830 Major Modification Determination for Advanced Test Reactor Remote Management Capability**

Project No. 31466

September 2015



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**September 2015**

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## Advanced Test Reactor

# 10 CFR 830 Major Modification Determination for Advanced Test Reactor Remote Management Capability


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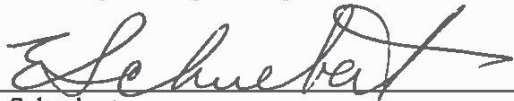
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## ACRONYMS

ATR	Advanced Test Reactor
CDS	console display system
CFR	Code of Federal Regulation
DCS	distributed control system
DOE	U.S. Department of Energy
EBR	emergency backup scram/reverse
ECC	emergency command center
EFIS	emergency firewater injection system
GFE	government-furnished equipment
HC	hazard category
IVPAMS	in-vessel post accident monitoring system
NQA	nuclear quality assurance
PC	performance category
PCS	primary coolant system
PLN	plan
PPS	plant protection system
RCR	reactor control room
RMC	remote management capability
SAR	safety analysis report
SOW	statement of work
SSC	structure, system, or component
TFR	technical and functional requirements
VVS	vessel vent system

## DEFINITIONS

*Major modification.* Modification to a U.S. Department of Energy (DOE) nuclear facility that is completed on or after April 9, 2001, that substantially changes the existing safety basis for the facility (10 CFR 830).

*Nuclear facility.* A reactor or a nonreactor nuclear facility, where an activity is conducted for or on behalf of DOE and includes any related area, structure, facility, or activity to the extent necessary to ensure proper implementation of the requirements established by 10 CFR 830 (10 CFR 830).

*Safety basis.* The documented safety analysis and hazard controls that provide reasonable assurance that a DOE nuclear facility can be operated safely in a manner that adequately protects workers, the public, and the environment (10 CFR 830).

*Simple modification.* Modification to a DOE nuclear facility that does not require a new or revised hazard analysis and accident analysis and new safety controls (DOE-STD-1189).

# **10 CFR 830 Major Modification Determination for Advanced Test Reactor Remote Management Capability**

## **1. INTRODUCTION**

The Advanced Test Reactor (ATR; TRA-670), which is located in the ATR Complex at Idaho National Laboratory, was constructed in the 1960s for the purpose of irradiating reactor fuels and materials. Other irradiation services, such as radioisotope production, are also performed at ATR.

While ATR is safely fulfilling current mission requirements, assessments are continuing. These assessments intend to identify areas to provide defense-in-depth and improve safety for ATR. One of the assessments performed by an independent group of nuclear industry experts recommended that a remote accident management capability be provided. The report stated that: “contemporary practice in commercial power reactors is to provide a remote shutdown station or stations to allow shutdown of the reactor and management of long-term cooling of the reactor (i.e., management of reactivity, inventory, and cooling) should the main control room be disabled (e.g., due to a fire in the control room or affecting the control room).”

This project will install remote reactor monitoring and management capabilities for ATR. Remote capabilities will allow for post scram reactor management and monitoring in the event the main Reactor Control Room (RCR) must be evacuated. The following typical functions must be monitored or managed:

- Reactivity
- Reactor coolant makeup
- Primary coolant system pressure
- Decay heat removal.

The following typical auxiliary supporting features and other auxiliary features must be monitored or managed:

- Electric power systems
- Component cooling water
- Service water
- Instrument air systems.

The location for providing remote capabilities is the ATR Emergency Command Center (ECC), which is located in building TRA-680. The ATR ECC is located 0.24 miles south of ATR in the southwest corner of the ATR Complex; this is the chosen location for relocation of the evacuating crew in the event the ATR building requires evacuation.

## **2. PROJECT DESCRIPTION**

This project description is based on Plan (PLN)-4090, “Mission Need Statement for the Advanced Test Reactor Near-Term Remote Monitoring and Management Project,” Statement of Work (SOW)-10253, “Statement of Work for the Advanced Test Reactor Remote Management Capability Final Engineering Design,” and Technical and Functional Requirements (TFR)-794, “Technical and Functional Requirements for the Advanced Test Reactor (ATR) – Remote Management Capability.”

The “ATR Upgraded Final Safety Analysis Report,” (SAR-153) facility-specific general design criteria were developed by adapting the U.S. Nuclear Regulatory Commission’s general design criteria in

10 CFR 50, Appendix A. While application of 10 CFR 50, Appendix A, to ATR was not explicitly required, the CFR was used as guidance in establishing principal design criteria for ATR. The SAR-153 discussion of general design criteria 19 for control room design states the following:

“A control room shall be provided from which actions can be taken to operate the ATR safely under normal conditions and to maintain it in a safe condition for Condition 2 and 3 incidents. Reactor controls shall be designed to achieve a safe condition under accident conditions, including loss-of-coolant accidents with minimum action prior to a required evacuation; facilities shall be provided to obtain essential safety information about the facility from an alternative habitable location.”

The ATR facility-specific general design criteria 19 is modified from the 10 CFR 50, Appendix A version to eliminate the requirement for control room habitability under all accident conditions. This revision was necessary because the control room is located within confinement and the control room is not designed to be habitable during all accident conditions. Under accident conditions, current controls are designed to achieve a reactor shutdown condition, with minimum action prior to a required evacuation.

Although the ATR RCR meets current design basis requirements, the approach for ensuring safe operation of nuclear facilities has evolved significantly since design of ATR and subsequent upgrades. Evaluation of the current safety basis against contemporary standards has identified the need for a remote accident management capability that would provide reactor monitoring and management under postulated accident conditions. The first step in this process and purpose of the mission need statement is to provide improved reactor management and monitoring capabilities at currently identified emergency response location(s) outside of ATR confinement. The second step addressed by SOW-10253 and TFR-794 is to develop a remote accident management standard and provide remote management capability (RMC) design upgrades as necessary to ensure habitability under postulated accident conditions. The second step of activities to engage in design upgrades to ensure habitability is not being pursued at this time.

ATR remote management capabilities will include the following:

- Remote console display system (CDS) workstation
- Remote process distributed control system (DCS) workstation
- Remote emergency firewater injection system (EFIS) actuation switch
- Remote EFIS pressure bypass switch
- Remote vessel vent system (VVS) actuation switch and valve indications
- Selected remote plant protection system (PPS) parameter indications
- Remote emergency backup scram and reverse (EBR) buttons
- Remote in-vessel post accident monitoring system (IVPAMS) workstation.

The ATR ECC currently possesses an IVPAMS workstation, but will require adding a CDS workstation, DCS workstation, VVS actuation switches, EFIS actuation and pressure bypass switches, EBR buttons, and PPS parameter indications. The existing IVPAMS workstation within the ECC will remain in its current location and a new workstation will be added to the ECC remote management room area. The IVPAMS information is also displayed and logged in TRA-670, Room 130.

A new remote management panel to house the EFIS actuation and pressure bypass switches, VVS actuation switch, PPS parameter indications, and EBR buttons will be installed in the ECC remote management room.

The EFIS actuation and pressure bypass and VVS actuation are features of ATR safety-related systems and are Quality Level 1. The remote CDS and DCS workstations are important-to-safety systems and are Quality Level 2. Table 1 presents all safety, quality level, and seismic qualifications for each related project capability.

The remote CDS, DCS, and IVPAMS workstation hardware configuration, application software, and software revisions will be implemented according to project specific Nuclear Quality Assurance (NQA)-1 project requirements. The remote CDS, DCS, and IVPAMS require configuration management for both equipment and software. The design process includes engineering change control that requires configuration management and documentation to ensure that the design process, testing, verification, and turnover are completed correctly.

Table 1. ATR remote management capability safety, quality level, and seismic qualifications.

Capability	Remote Location	Safety	Quality Level	Seismic <sup>a</sup>
Remote CDS Workstation	ECC	Important-to-safety	2	PC-2
Remote DCS Workstation	ECC	Important-to-safety	2	PC-2
Remote EFIS Actuation	ECC	Safety-related	1	PC-4
Remote EFIS Pressure Bypass	ECC	Safety-related	1	PC-4
Remote VVS Actuation	ECC	Safety-related	1	PC-4
Remote VVS Valve Position	ECC	Non-safety	2	NA
Remote PPS Parameter Indications: (EFIS Lower Vessel Level and Firewater Injection Pressure)	ECC	Non-safety	2	NA
Remote Reactor Shutdown (EBR)	ECC	Non-safety	1	NA
Remote IVPAMS Workstation	ECC	Non-safety	2	NA

a. Improvements to building TRA-680 in order to meet seismic criteria are not included in this project scope. Seismic design of RMC components supports future seismic qualification in conjunction with building improvements.

Project scope includes the facility modifications necessary to provide the following ATR-specific remote management and monitoring capabilities for each post scram reactor management and monitoring function:

1. One CDS workstation in the ECC remote management room area:
  - a. Reactivity: neutron level, fission break, and wide range neutron level indications
  - b. Reactor pressure control: primary coolant system (PCS) vessel inlet and outlet pressure indications
  - c. Decay heat removal: vessel inlet and outlet temperature indications.
  - d. Reactor coolant makeup: secondary coolant system, emergency coolant pumps, and vessel level
2. One DCS workstation in the ECC remote management room area:
  - a. Reactor pressure control: PCS valve control and reactor pressurizing system control
  - b. Reactor coolant makeup: primary coolant pumps and emergency coolant pumps
  - c. Auxiliary features: utility cooling water system, high-pressure air system, and diesel generator charging indication.
3. Six PPS parameter indications in the ECC remote management room:

- a. Reactor coolant makeup: three EFIS lower vessel level (Component # LI-535-X) indications
  - b. Reactor pressure control: three firewater injection pressure (Component # PI-534-X) indications.
4. EFIS actuation switch in the ECC remote management room area:
  - a. Reactor coolant makeup.
5. EFIS pressure bypass switch in the ECC remote management room area:
  - a. Reactor pressure control.
6. VVS actuation switch in the ECC remote management room area:
  - a. Reactor pressure control.
7. EBR buttons in the ECC control room area:
  - a. Reactivity: EBR actuation.
8. New IVPAMS workstation in the ECC remote management room area:
  - a. Reactivity: log N power indication
  - b. Reactor pressure control: PCS reactor inlet and outlet pressure
  - c. Reactor coolant makeup: PCS emergency flow, EFIS flow, and vessel level (in-vessel probe)
  - d. Decay heat removal: building water levels, canal level, and vessel inlet and outlet temperature.
9. Facility modifications necessary to provide an integrated and consolidated remote management room in the ECC (i.e., lighting; heating, ventilation, and air conditioning and security).
10. Design and layout of a remote management panel to house the EFIS actuation switches, VVS actuation switches, VVS indication, PPS parameter indications, and EBR buttons in the ECC.
11. Design and layout of a battery backup system for the new equipment in TRA-680.
12. Design and layout of housing for the CDS, DCS, and IVPAMS workstations in the ECC.
13. Extend new cabling to be routed between TRA-670 and TRA-680.

When completed, the ATR Near-Term Remote Monitoring and Management Project will provide a location outside of the RCR for a monitoring and management capability under postulated accident conditions.

### **3. HAZARDS DISCUSSION**

#### **3.1 Material-at-Risk**

The ATR material-at-risk consists of the reactor core, radioactive materials (i.e., irradiated fuel elements and other hardware) stored in the canal, isotope production targets, and experiments containing fuel and non-fueled components. ATR is a Category A reactor with an operating power level up to 250 MW<sub>t</sub> and, as such, has a radioactive material inventory with potential for significant offsite consequences. This proposed project has no effect on the quantity of material at risk.

#### **3.2 Fires and/or Explosions**

The new RMC project instrumentation and control equipment required to interface with the existing equipment does not introduce any new fire/explosion hazards. Although the additional backup battery system for the VVS includes inherent fire/explosion hazards, they will be minimized through proper design and selection of construction materials. Recharging of batteries introduces an explosion hazard

associated with hydrogen generation. Any fire or explosion associated with these components will not introduce any new mechanism for release of radioactive material from ATR.

### **3.3 Natural Phenomena Hazards**

Natural phenomena hazards, including earthquakes (i.e., seismic events), extreme wind, tornado, flood, volcanic, and lightning, are potential hazards to the facility that could cause building damage and/or failure of safety-related operational equipment. These natural phenomena hazards were evaluated in SAR-153 for existing facilities in support of current operations. ATR control system components that are relied on during or following a seismic event are designed to survive a safe shutdown earthquake without subsequent performance degradation (as defined in SAR-153). The remote VVS and EFIS actuation capabilities, including VVS pressure bypass, interface with existing safety-related systems, inherit their Performance Category (PC)-4 classifications, and must be protected from possible interaction from non-seismic-rated equipment. The remote CDS and DCS workstation capabilities interface with the existing important-to-safety systems, will be designed with PC-2 classifications, and must be protected from possible interaction from non-seismic-rated equipment. Based on this criterion, the specific remote capabilities shall meet the seismic design criteria shown in Table 1 and the new cabling to be routed between TRA-670 and TRA-680 shall meet PC-4 seismic design criteria. The remaining remote capabilities (i.e., remote VVS valve position indication, remote PPS parameter indication, remote EBR activation, and remote IVPAMS workstation) are not identified as systems that must survive an earthquake because other systems will scram the reactor in the event of an earthquake.

## **4. MAJOR MODIFICATION EVALUATION CRITERIA**

DOE-STD-1189-2008, "Integration of Safety into the Design Process," was developed to provide consistent DOE complex-wide criteria to be used in determining if a change constitutes a major modification. The standard includes Table 8-1, "Major Modification Evaluation Criteria," which provides a methodology for evaluating a project against 10 CFR 830, "Nuclear Safety Management," major modification evaluation criteria and was used as a basis for this major modification determination. Table 8-1 from 10 CFR 830 is reproduced in this document as Table 2. The purpose of Table 2 is to focus on the nature of the modification and the associated impact on the existing facility safety basis for ATR.

Major modifications are defined as those changes that "substantially change the existing safety basis for the facility." Guidance for applying the table states that in applying the criteria, the intent is not to automatically trigger the need for a preliminary documented safety analysis if one or more of the criteria are met. Rather, it is intended that each criterion be assessed individually and then an integrated evaluation be performed based on the collective set of individual results. In performing this evaluation, the focus should be on the nature of the modification and its associated impact on the existing facility safety basis. Even a project that results in changes that ripple through the safety basis documents does not "substantially change the existing safety basis for the facility" solely because many parts or pages of the safety basis documentation need to be revised.

A major modification requires development of a preliminary documented safety analysis per 10 CFR 830.206, following the facility modification process.

Table 2. Major modification evaluation criteria.

Major Modification Evaluation Criteria (DOE-STD-1189, Table 8-1)			
<p><u>Project Information</u></p> <p>The proposed project will install new equipment, remote management panels, workstations, and cabling associated with RMC for ATR. This evaluation considers the impact of RMC on the ATR safety basis with respect to the major modification evaluation criteria from DOE-STD-1189. A proposed facility modification that is determined to be a major modification requires application of the integration of safety into the design provisions of DOE-STD-1189.</p> <p>The scope of this task is to install new remote management equipment into a redundant and secure platform of commercially available equipment that meets the requirements for single failure and separation with a workstation design life of 10 years. The RMC equipment interfaces with existing analog and digital signals without interfering with the functional and safety characteristics of the existing system components. The remote management equipment includes the capability to scram the reactor and is available following reactor shut down to perform additional non-safety-related functions. However, the remote VVS and EFIS actuation equipment have safety-related components at the interface with existing safety-related equipment in TRA-670. Essentially, parallel remote reactor shutdown and management equipment are desired to be operable at a location outside of the ATR reactor building confinement.</p>			
Evaluation Criterion No.	Evaluation Criteria	DOE-STD-1189 Discussion	Remote Management Capability
1	Add a new building or facility with a material inventory greater than or equal to Hazard Category (HC) 3 limits or increase the HC of an existing facility?	A new building may be a structure within an existing facility segment. That structure may or may not have direct process ties to the remainder of the segment/process. The requirements of DOE-STD-1027-92, Change Notice 1, September 1997, are used in evaluating HC impacts.	No. The ATR Complex's ATR is a DOE Category A reactor. As such, it is classified as a DOE HC 1 nuclear facility. The proposed modification to add equipment and cabling associated with the ATR RMC does not add any new buildings or material inventory that challenges HC 3 limits and does not impact the HC of the existing facility.



Evaluation Criterion No.	Evaluation Criteria	DOE-STD-1189 Discussion	Remote Management Capability
2	Change the footprint of an existing HC 1, 2, or 3 facility with the potential to adversely affect any safety-class or safety-significant safety function or associated structure, system and component (SSC)?	A change in the footprint of an existing facility requires identification and evaluation of any potential adverse impacts on safety-class or safety-significant safety functions or associated SSCs (e.g., structural qualification, evacuation egress path, or fire suppression spray pattern) or safety analysis assumptions. Changes that may involve adverse impacts require careful attention to maintaining adherence to applicable engineering standards and nuclear safety design criteria.	<p>No. The ATR building footprint will not be changed. The remote management capability will provide additional defense-in-depth that is not credited as a safety-related function in the safety basis. The proposed RMC equipment will be installed in two locations.</p> <p>New equipment will fit in or adjacent to the existing TRA-670 ATR building.</p> <p>The proposed CDS, DCS and IVPAMS workstations, network switches, printers, and remote management panel with EBR, VVS, and EFIS actuation and pressure bypass and PPS indication will be installed within the existing TRA-680 ECC building.</p> <p>The new equipment cabinets are designed to be floor anchored to meet the equipment PC-2 and PC-4 seismic requirements and to prevent interaction with other equipment during a seismic event. The weight of the RMC equipment cabinet and all internal components are designed to not exceed the rated ATR floor loading of 100 lb/ft<sup>2</sup>. The connectivity of the new equipment cabinets to existing PPS cabinets are required to follow separation and isolation requirements in order to protect the PPS safety-related circuits.</p> <p>The new conduit and cabling will be designed to be PC-4 compliant and will extend the existing low-voltage electrical power and instrumentation/controls network between buildings TRA-670 and TRA-680 for the CDS, DCS, EFIS, VVS, IVPAMS, and PPS management and indication.</p> <p>Power supply to the new equipment will be provided from new power supplies to be installed in ECC as part of this project. This project adds an additional power source, located in the ECC remote management room, that can power the vessel vent solenoids as an extra level of defense-in-depth.</p>

Evaluation Criterion No.	Evaluation Criteria	DOE-STD-1189 Discussion	Remote Management Capability
3	Change an existing process or add a new process resulting in the need for a safety basis change requiring DOE approval?	A change to an existing process may negatively affect the efficacy of an approved set of hazard controls for a given event or accident. Likewise, potential safety concerns associated with a new process may not be adequately addressed by the existing approved control sets. In this case, it is assumed that the existing analyses addressed the hazards associated with the new or revised process, but the specified control set(s) may no longer be valid. The evaluation of any new hazards introduced by the revised or new process should be addressed via Criterion 6.	<p>No. The RMC project enhances the current capability to shutdown ATR and manages some features from outside the RCR. As such, this new capability will require procedure revision and training but does not represent a significant change to existing facility processes or any change to the safety basis other than minor changes to identify the new capabilities and those components that interface with existing safety-related components.</p> <p>SAR-153 currently states that the RCR is not designed for long-term habitability following some postulated accidents, but this does not present a significant safety deficiency because limited actions from the RCR are required once the safety rods have been inserted into the reactor. RMC installation does not affect the existing safety-related actions performed in conjunction with a postulated RCR evacuation or the supporting facility safety basis.</p> <p>Near-term RMC implementation does not include safety-related reliance on system function; however, the system design considers possible future safety-related application. Therefore, single failure and separation design criteria need to be applied to the RMC final design. Electrical isolation (per IEEE-384) of the remote EFIS and VVS signals from the PPS is included in the design. Separation of signal cabling is to be provided to prevent interference with safety-related equipment.</p> <p>See Criterion 6 for evaluation of any new hazards introduced by addition of the proposed RMC equipment that may affect the hazards addressed in the current facility safety basis.</p>

Evaluation Criterion No.	Evaluation Criteria	DOE-STD-1189 Discussion	Remote Management Capability
4	Utilize new technology or government furnished equipment (GFE) not currently in use or not previously formally reviewed/ approved by DOE for the affected facility?	This assessment should include consideration of the impact that use of new technology (including technology scale-up issues) or GFE may have on the ability to specify the applicable nuclear safety design criteria with a high degree of certainty in the early stages of the project. Additionally, refer to GFE discussion in Section 8.3. GFE may have a technical baseline that is not directly and fully supportive of the project functional and performance requirements. An example would be employing a new technology for removal of certain nuclides from a waste stream.	<p>No. The RMC project will not utilize new technology or GFE not previously formally reviewed and approved by DOE for use at ATR. The equipment is composed of commercial, industrial-grade components that meet the applicable environmental and seismic requirements configured in Electrical Industries Association Standard 19.</p> <p>The workstations are to be integrated with the existing plant hardware, software, and network system and provide access to the same displays and applications as available to the RCR operators. The RMC hardware, software, and network components are to be integrated into the existing system and are not new technology.</p>
5	Create the need for new or revised safety SSCs?	Consideration should be given to the relative complexity of the controls and ease with which the controls can be implemented. The use of a complicated multi-channel safety-class seismically qualified instrumented system to provide multiple interlock and alarm functions would typically pose a higher risk to the project than the use of a safety-significant passive design feature. The degree of design and regulatory uncertainty should be addressed for this criterion for the development, review, and approval of new or revised safety analysis and attendant controls (e.g., presence of multiple regulatory/ technical agencies on a single project).	<p>Yes. However, the introduction of RMC equipment and connectivity does not create the need for new or revised safety basis controls due to new processes or SSCs. A change to SAR-153 to describe the new system and capabilities is anticipated.</p> <p>The current DOE-approved safety basis already addresses the use of EFIS, VVS, CDS, and DCS. The EFIS and VVS are safety-related systems as listed in SAR-153, Chapter 3, Appendix A, “Master List of Safety Related Equipment.” The CDS and DCS are classified as important-to-safety. The safety classification for these SSCs will not change with the proposed RMC project.</p> <p>The new components that interface between the existing safety-related equipment and the new non-safety-related equipment will be considered safety-related as boundary components with the existing equipment. These consist of relays, hand switches, fuses, and diodes that provide isolation of electrical signals between the new equipment and the existing plant equipment.</p> <p>RMC project activities are considered Quality Level 1 for EFIS, VVS, and EBR actuation and Quality Level 2 for CDS, DCS, and IVPAMS workstations and PPS indications as documented by safety software determinations.</p>

Evaluation Criterion No.	Evaluation Criteria	DOE-STD-1189 Discussion	Remote Management Capability
6	Involve a hazard not previously evaluated in the documented safety analysis?	Hazards can include the introduction of an accident or failure mode of a different type from that previously analyzed in addition to radiological or toxicological hazards. The need to address a new hazard early in the design process may lead to some degree of uncertainty related to the proper specification of applicable nuclear safety design criteria. In such cases, this uncertainty should be addressed within this evaluation.	<p>No. The RMC design and non-safety-related application do not introduce a new accident or failure mode of a different type from those previously analyzed in the safety basis. No new system functions or capabilities are introduced by the proposed modification. In addition, the proposed RMC design includes the following features:</p> <ul style="list-style-type: none"> <li>• Keyed locks on the remote management panels located in the ECC remote management room</li> <li>• An alarm in the RCR that is initiated when the remote management panel in the ECC remote management room is activated</li> <li>• An interlock feature in the ECC remote management panel that initiates a reactor scram when activated</li> <li>• Card reader access control restricts and records personnel access to the ECC remote management room. Only authorized personnel will have access to the room(s) containing the remote management capability. This is an existing requirement for both physical and cyber security that is required by the ATR site security plan because it applies to locations containing safety-related and important-to-safety computer systems, control panels, and electronic equipment.</li> </ul>
<p><u>Summary and Recommendation:</u> One criterion was tripped in this major modification determination. The RMC project challenges Criterion 5 by adding SSCs at the boundary between the existing safety-related equipment and the new non-safety-related equipment. Guidance in DOE-STD-1189-2008 recommends that the focus of the determination should be on the nature of the modification and its associated impact on the existing facility safety basis. Based on the findings and focus, it is concluded that this project does not involve a major modification and, therefore, no preliminary documented safety analysis is required. The proposed facility modification will be pursued through the unreviewed safety question and existing facility change processes.</p>			

## 5. CONCLUSION

Evaluation of the proposed RMC concluded that the ATR facility modification does not represent a major modification. This conclusion is based on evaluation of the RMC project and its impact on the existing facility safety basis. One of the six criteria was triggered. The answer to Criterion 5 acknowledges that implementation of the RMC project will result in new safety-related SSCs at the boundary between the existing safety-related equipment and the new non-safety-related equipment. The results of the evaluation demonstrate that the changes imposed by the proposed RMC modification do not substantially change the existing safety basis for the facility.

## 6. REFERENCES

- 10 CFR 50, Appendix A, "General Design Criteria for Nuclear Power Plants," *Code of Federal Regulations*, Office of the Federal Register.
- 10 CFR 830, Subpart B, "Nuclear Safety Management," *Code of Federal Regulations*, Office of the Federal Register, January 14, 2015.
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