

**Office of Enterprise Assessments
Assessment of the DOE Readiness Assessment
Process for Restart of the Transient Reactor Test
Facility at the Idaho National Laboratory**



November 2017

**Office of Nuclear Safety and Environmental Assessments
Office of Environment, Safety and Health Assessments
Office of Enterprise Assessments
U.S. Department of Energy**

Table of Contents

Acronyms	ii
Executive Summary	iii
1.0 Purpose	1
2.0 Scope	1
3.0 Background	1
4.0 Methodology	2
5.0 Results	3
5.1 Requirements Applicable to DOE Readiness Assessments	3
5.2 Verification of Core Requirements	5
5.2.1 Core Requirement 3: Training and Qualification	6
5.2.2 Core Requirement 8: Configuration Control/Modifications	8
5.2.3 Core Requirement 9: Procedures	9
5.2.4 Core Requirement 12: Conduct of Operations	10
5.2.5 Core Requirement 14: Contractor Assurance System/Feedback and Improvement ..	12
5.3. DOE Oversight of the Process for Verifying Readiness to Restart the TREAT Facility	13
6.0 Findings	15
7.0 Opportunities for Improvement	15
Appendix A: Supplemental Information	A-1
Appendix B: Key Documents Reviewed, Interviews, and Observations	B-1

Acronyms

BEA	Battelle Energy Alliance, LLC
CAS	Contractor Assurance System
CM	Configuration Management
CR	Core Requirement
CRA	Contractor Readiness Assessment
CRAD	Criteria and Review Approach Document
CRD	Contractor Requirements Document
DOE	U.S. Department of Energy
DOE-ID	DOE Idaho Operations Office
DOE RA	DOE Readiness Assessment
EA	Office of Enterprise Assessments
EJ	Engineering Job
INL	Idaho National Laboratory
IP	Implementation Plan
KPI	Key Performance Indicator
LWP	Laboratory-Wide Procedure
MCP	Management Control Procedure
MFC	Materials and Fuels Complex
NE	DOE Office of Nuclear Energy
OFI	Opportunity for Improvement
ORPS	Occurrence Reporting and Processing System
PDD	Program Description Document
PM	Preventive Maintenance
POA	Plan of Action
RA	Readiness Assessment
RR	Readiness Review
RTS	Reactor Trip System
RTTP	Resumption of Transient Testing Program
SAA	Startup Authorization Authority
SAR	Safety Analysis Report
SNR	Startup Notification Report
SP	Standard Practice Manual
SSC	Structures, Systems, and Components
TREAT	Transient Reactor Test
TS	Technical Specification
WI	Work Instruction
WO	Work Order

Office of Enterprise Assessments
Assessment of the DOE Readiness Assessment Process for
Restart of the Transient Reactor Test Facility at the Idaho National Laboratory

EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE) Office of Nuclear Safety and Environmental Assessments, within the Office of Enterprise Assessments (EA), conducted an independent assessment of the readiness assessment process used by the DOE Idaho Operations Office to verify readiness to restart the Transient Reactor Test (TREAT) Facility at the Idaho National Laboratory. Battelle Energy Alliance, LLC (BEA) is the prime contractor for the Laboratory, which includes the TREAT Facility. The DOE Idaho Operations Office manages operations for both the Office of Environmental Management and the Office of Nuclear Energy at the Idaho site.

EA conducts facility and operational assessments to evaluate site processes for oversight of contractor operations to ensure their continued capability to reliably operate their facilities. EA evaluated the Federal readiness assessment process in three specific areas: requirements applicable to DOE readiness assessments, verification of core requirements, and DOE oversight of the process for verifying readiness to restart the TREAT Facility. This assessment was conducted during the DOE readiness assessment from July 31 to August 10, 2017.

Overall, EA determined that: (1) the DOE Idaho Operations Office appropriately verified that the preparations for conducting the Federal readiness assessment for restart of the TREAT Facility have been sufficiently completed and approved; (2) the DOE readiness assessment team did a notable job executing a thorough, detailed readiness assessment; and, (3) the DOE Idaho Operations Office has performed sufficient oversight of the contractor's process for verifying readiness to restart the TREAT Facility.

The DOE readiness assessment team members observed by EA were knowledgeable of the subject matter they were assigned, conducted a thorough review of the governing documents, attentively observed operations and work evolutions, and asked thoughtful questions.

While verifying that the core requirements were met, EA found one area where BEA's activities and process constitute a best practice worthy of emulation on other DOE projects: the TREAT Facility managers developed a strong conduct-of-operations culture from the ground up, by working directly with new hires and working level staff to instill a self-sustaining culture in which personnel self-correct in a supportive manner.

Office of Enterprise Assessments
Assessment of the DOE Readiness Assessment Process for
Restart of the Transient Reactor Test Facility at the Idaho National Laboratory

1.0 PURPOSE

The U.S. Department of Energy (DOE) Office of Nuclear Safety and Environmental Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of the effectiveness of the DOE process for verifying readiness to restart transient testing at the Transient Reactor Test (TREAT) Facility at the Idaho National Laboratory (INL). The purpose of this EA assessment was not to verify that the contractor had successfully demonstrated readiness to restart transient testing, which was the primary job of the DOE readiness assessment (DOE RA) team. Rather, EA evaluated the DOE RA team's process in order to independently verify the contractor's and the DOE field office's state of readiness to restart operations at the TREAT Facility. EA conducted this assessment at the TREAT Facility concurrently with the DOE RA from July 31 to August 10, 2017.

2.0 SCOPE

EA evaluated the effectiveness of the TREAT DOE RA as a vital step in verifying readiness to restart the TREAT Facility, after an extended shutdown lasting over 20 years. The EA team evaluated selected elements of the RA process using objectives and criteria derived from the requirements listed in DOE Order 425.1D, *Verification of Readiness to Startup or Restart Nuclear Facilities*, specifically paragraphs 4.e, 4.f, and 4.g of the order. The EA assessment evaluated selected parts of the readiness verification process, including the readiness verifications performed during the DOE RA. Specifically, EA focused on three key elements of the readiness process: evaluating the DOE process for verification that the prerequisites for performing a Federal RA had been completed; observation and independent verification of a sampling of the core requirements (CRs) listed in the approved plan of action (POA); and review of portions of the DOE process for verifying readiness to restart the TREAT Facility.

EA selected, observed, and independently reviewed a sample of the CRs to evaluate the conduct of the readiness assessment, specifically:

- CR 3, Training and Qualification
- CR 8, Configuration Control/Modifications
- CR 9, Procedures
- CR 12, Conduct of Operations
- CR 14, Contractor Assurance System/Feedback and Improvement.

3.0 BACKGROUND

The TREAT Facility is located near the Materials and Fuels Complex (MFC) and is maintained and operated by Battelle Energy Alliance, LLC (BEA), the prime contractor for the INL. The TREAT nuclear reactor is an air-cooled, graphite-moderated thermal reactor, designed primarily for operation in the transient or pulsed mode for testing of prototypic reactor fuels. The TREAT Facility has been in a cold standby configuration since 1994, when program work ceased. Since then, regular facility maintenance and inspections have been performed, including inspections of the reactor and reactor systems to ensure that the reactor remains in a safe standby condition.

A recent resurgence of interest in developing innovative nuclear technologies has restored the demand for transient testing. INL's Resumption of Transient Testing Program (RTTP) is working to re-establish the transient test capability at the TREAT Facility, with the goal of receiving DOE approval for resuming operations by late calendar year 2017. RTTP activities include establishment of a compliant documented safety analysis that supports operation of the reactor, refurbishment and/or replacement of key reactor systems and components, recovery of system knowledge, re-establishment of configuration management, updates to procedures and baseline description documents, and training and qualification of personnel for establishing operational readiness for reactor operations.

As the operating contractor for INL, BEA is responsible for the RTTP activities. The DOE Idaho Operations Office (DOE-ID) provides direction and oversight for the design and operation of the INL nuclear facilities, including the TREAT Facility, under the auspices of the DOE Office of Nuclear Energy (NE). DOE-ID assembled an independent team of reviewers with the necessary knowledge, skills, and abilities to conduct the DOE RA. The DOE-ID Deputy Manager for Operations Support is the designated Startup Authorization Authority (SAA) for the TREAT Facility.

4.0 METHODOLOGY

The DOE independent oversight program is described in, and governed by, DOE Order 227.1A, *Independent Oversight Program*. EA implements the independent oversight program through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. Organizations and programs within DOE use varying terms to document specific assessment results. In this report, EA uses the terms "deficiencies, findings, and opportunities for improvement (OFIs)" as defined in DOE Order 227.1A. It should be noted that EA did not identify any deficiencies or findings during the assessment, but did include one OFI for DOE-ID's consideration.

As identified in the assessment plan, *Plan for the Office of Enterprise Assessments Assessment of the DOE Readiness Assessment Process for Restart of the Transient Reactor Test Facility at the Idaho National Laboratory*, dated July 2017, this assessment considered the requirements of DOE Order 425.1D when establishing the objectives and criteria for the specified scope. EA does not have a specific criteria and review approach document (CRAD) addressing the scope of this review and therefore added the objectives and criteria for the assessment as Appendix C of the assessment plan.

In assessing the effectiveness of the DOE RA process, EA examined key documents, including the POA developed by the DOE RA team, IFM-MFC-17-002, *Department of Energy, Idaho Operations Office (DOE-ID) Readiness Assessment Plan of Action for the Transient Reactor Test Facility Restart of Transient Testing Activity*, and the corresponding implementation plan (IP), DOE-RA-IP-TREAT, *Department of Energy Readiness Assessment Implementation Plan for the Transient Reactor Test Facility Restart*. EA verified completion of the RA prerequisites and interviewed and observed RA team members during the conduct of the RA. EA also verified that DOE-ID had performed adequate oversight of the contractor's readiness process leading up to the DOE RA.

EA performed an independent verification of CRs 3, 8, 9, 12, and 14, as described in the POA, and reviewed the contractor's program descriptions, work packages, procedures, manuals, plans, and records that provide evidence that the CRs are fully met. EA also observed DOE RA team-led interviews of key contractor personnel responsible for developing and executing the restart of the TREAT Facility. EA accompanied the DOE RA team on tours and walkdowns of significant portions of the TREAT Facility and during observations of contractor evolutions simulating facility operations and training activities.

The members of the EA review team, the Quality Review Board, and EA management responsible for this assessment are listed in Appendix A. A detailed list of the documents EA reviewed, personnel interviews that EA observed and conducted, and operational evolutions, maintenance activities, and other activities that EA observed during this assessment, relevant to the conclusions of this report is provided in Appendix B. EA has not conducted any recent assessments at the TREAT Facility, so there were no items for follow-up. However, EA is planning to conduct operational awareness visits and independent assessments at TREAT after it becomes operational.

5.0 RESULTS

The following sections discuss the results of EA's document reviews and observations during the planning and conduct of the TREAT DOE RA.

5.1 Requirements Applicable to DOE Readiness Assessments

Objective:

- *Preparations for conducting the DOE RA have been completed and approved, using the graded approach. (DOE Order 425.1D, 4.e)*

Criteria:

- *The DOE RA is based on a graded approach.*
- *DOE line management has developed an approved Plan of Action (POA) for the DOE RA that includes all applicable core requirements, and lists the prerequisites for starting the DOE RA.*
- *The DOE RA team leader and members have adequate expertise, knowledge, and independence to adequately perform the RA and avoid conflicts of interest.*
- *The DOE RA team has developed an approved Implementation Plan for the DOE RA that provides the evaluation criteria and review approaches for the full scope of the RA, as defined in the POA.*
- *All prerequisites for the DOE RA were met before it began.*
- *Approval to begin the DOE RA was received from the SAA.*
(DOE Order 425.1D, 4.e)

DOE-ID uses the process described in work instruction (WI) 03.WI.04.10, *Verification of Readiness to Startup or Restart Nuclear Facilities*, for implementing the requirements of DOE Order 425.1D. Table 1 of this work instruction adequately summarizes the requirements for readiness reviews for startup and restart of hazard category 1, 2, or 3 facilities under various conditions in accordance with the DOE order. According to the table, both contractor and DOE readiness assessments are required for restart of a hazard category 1 or 2 nuclear facility, activity, or operation after an extended shutdown. TREAT is a hazard category 2 nuclear reactor, and the TREAT Restart of Transient Testing Activity is a hazard category 2 activity.

Plan of Action

The DOE RA team leader, along with key personnel in DOE-ID, developed the POA, IFM-MFC-17-002, *Department of Energy, Idaho Operations Office (DOE-ID) Readiness Assessment Plan of Action for the Transient Reactor Test Facility Restart of Transient Testing Activity*, to identify the purpose and extent of independent verification of readiness necessary to restart the TREAT Facility critical reactor operations and in-core experiments. The POA appropriately identified the breadth and depth of the RA, based on the applicable CRs from DOE Order 425.1D, and also designated the RA team leader responsible for

conducting the RA. The POA adequately described the depth of the evaluation of the CRs using a graded approach based on the complexity of the TREAT Facility, the proposed transient testing activities, and the hazards associated with those activities. The POA also appropriately specified the prerequisites that must be met before the DOE RA begins.

RA Team Qualifications

In accordance with 03.WI.04.10 and DOE Order 425.1D, the DOE Associate Principal Deputy Assistant Secretary in NE selected the RA team leader and the RA team senior advisor more than a year before the anticipated date of the DOE RA. The DOE-ID Deputy Federal Program Director for the Resumption of Transient Testing Program developed a proposed roster for the DOE RA team, which the DOE RA team leader and DOE RA team advisor then finalized. Based on information gathered during document reviews and interviews, team selection was appropriately based on the desired skill set, previous assessment experience, availability during the anticipated dates of the DOE RA, and assurance of no conflicts of interest. Local DOE-ID personnel were selected to the extent possible, to save costs and add flexibility. (Note: Some evolutions, such as a large-scale emergency drill conducted a month before the DOE RA, were considered important for certain members of the DOE RA team to observe, if at all possible. Having local team members allowed the appropriate members to observe and evaluate this advance activity.)

The specific education, experience, independence, and other selection criteria for the RA team necessitated adding a few team members from outside DOE-ID but within the DOE complex. The resulting DOE RA team consisted of 12 team members, in addition to the DOE RA team leader and DOE RA team senior advisor. EA reviewed the DOE RA team members' education, experience, and qualifications, and interviewed the DOE RA senior advisor and a selection of DOE RA team members. EA also observed members of the DOE RA team during the conduct of interviews, observation of work, and other RA activities, and concluded that the DOE RA team has adequate technical knowledge of their review area, previous assessment experience, and sufficient independence to perform the DOE RA without any apparent conflicts of interest.

Implementation Plan

DOE-ID and the DOE RA team leader developed the Implementation Plan (IP), DOE-RA-IP-TREAT, in accordance with DOE-STD-3006-2010, *Planning and Conducting Readiness Reviews*, and 03.WI.04.10 to describe the process to be used for verification of readiness based on the breadth and depth of the review listed in the POA. The IP presents a methodical and well-managed approach to conducting the DOE RA, with sufficient details for the team's use in conducting and documenting the assessment. The IP appropriately described the TREAT Facility, reiterated the prerequisites for the DOE RA, and identified the specific CRADs to be used to guide the verification of the CRs. The CRADs listed in the IP covered multiple CRs, or portions of a single CR, but there was no crosswalk included to verify that the IP adequately addressed each CR in the POA.

Both DOE Order 425.1D, 4.e.(4) and 03.WI.04.10 state: "the IP must include the full RA scope defined in the DOE POA." Table 6.1 of the POA lists each of the 17 CRs and includes procedures management as a key element under CR 1. However, the IP does not include a similar list of the CRs, mentions only 14 CRs in discussing the breadth of the assessment, and does not specifically identify procedures management. (See **OFI-DOE-ID-2017-1**.) Although there is no mention of the other 3 CRs in the body of the IP, all 17 of the CRs, including procedures management were in fact adequately covered in the attached CRADs, and the CRADs provided adequate guidance for the DOE RA team to ensure that the RA evaluated the entire scope of the POA.

Prerequisites for the DOE RA

Both the POA and the IP identify ten prerequisites that were required to be completed and verified as completed by DOE-ID line management before conducting the DOE RA. These prerequisites include, but were not limited to, completion of the contractor RA (CRA); designation of the findings as either pre- or post-start; development of a corrective action plan for resolution of the findings; and, completion or verification of other activities leading up to the DOE RA. In addition, some specific DOE readiness activities were included as prerequisites. After the contractor completed the CRA and declared readiness to proceed, DOE-ID conducted a line management assessment, documented in NE-ID-BEA-2016-012, *Line Management Assessment for the Restart of Transient Testing Activity at the Transient Reactor Test (TREAT) Facility*, to verify that the prerequisites for the DOE RA had been satisfactorily completed. The DOE-ID line management self-assessment verified closure of pre-start findings, assessed DOE-ID's ability to provide oversight at the TREAT Facility, and appropriately concluded that the prerequisites for starting the RA had been satisfied, resulting in a recommendation to the SAA to authorize the commencement of the DOE RA.

Startup Authorization Authority

For an extended shutdown of a hazard category 2 nuclear facility, such as the TREAT Facility, DOE Order 425.1D designates the Cognizant Secretarial Officer or designee as the SAA. In a memorandum dated January 14, 2013, the DOE Assistant Secretary for Nuclear Energy delegated authority to DOE-ID to approve restart of nuclear facilities, including TREAT. The DOE-ID Deputy Manager for Operations Support was specifically designated as the SAA for the TREAT Facility. EA verified that the SAA approved the readiness-to-proceed memorandum to commence the DOE RA on July 27, 2017.

Conclusions for Applicable Requirements

Based on the documents reviewed, EA concludes that DOE-ID appropriately used the process described in 03.WI.04.10, in accordance with the requirements of DOE Order 425.1D, to verify that the preparations for conducting the RA for restart of the TREAT Facility were sufficiently completed and approved.

5.2 Verification of Core Requirements

As previously indicated, a key part of EA's assessment of the effectiveness of the DOE RA process involved independently evaluating a sample of the CRs from DOE Order 425.1D to assess whether the RA team's approach and methodology adequately verified the readiness of personnel, procedures, programs, and equipment within the scope of the DOE RA to safely start nuclear operations. Accordingly, EA reviewed:

- CR 3, Training and Qualification
- CR 8, Configuration Control/Modifications
- CR 9, Procedures
- CR 12, Conduct of Operations
- CR 14, Contractor Assurance System/Feedback and Improvement.

Before the DOE RA began, EA reviewed documents to become familiar with the specific objectives for the selected CR and ascertain whether the contractor's demonstration of readiness was sufficiently documented. While on site, EA further evaluated the DOE RA process by observing the DOE RA team conduct interviews of TREAT personnel, observe maintenance and calibration activities, and observe

simulated work evolutions to verify operational readiness. EA assessed the DOE RA team's performance by monitoring the team counterparts during these interviews and evolutions and by interviewing selected team members and discussing issues they discovered or may have missed. EA discussed additional issues identified during document reviews, interviews, or evolutions with the DOE RA team members after they had completed their review, as appropriate.

Objective:

Evaluation of the Core Requirements has verified the readiness of personnel, procedures, programs, and equipment within the scope of the Readiness Review to safely start nuclear operations. (DOE Order 425.1D, 4.f)

5.2.1 Core Requirement 3: Training and Qualification

Objective:

- *The selection, training, and qualification programs for operations and operations support personnel have been established, documented, and effectively implemented.*
- *Training and qualification requirements for each position encompass the range of assigned duties and activities.*
- *The selection process and applicable position-specific training for managers ensures competence commensurate with their responsibilities.*
- *Modifications to the facility have been reviewed for potential impacts on training and qualification. Training has been performed to incorporate all aspects of these changes. (DOE Order 425.1D, 4.f(3))*

Criteria:

- *A training and qualification/certification process that meets INL requirements has been established, documented, and implemented.*
- *Training needs and requirements for TREAT staff members have been defined.*
- *Additional training needs of TREAT and support staff (including TREAT operators and supervisors, maintenance staff, safety analysts, and system engineers) are defined in a training matrix that has been reviewed and approved by TREAT management. This matrix addresses requirements for routine and abnormal/emergency operating conditions.*
- *Training and provisional qualification/certification requirements are appropriate for the range of duties and activities for TREAT and support staff, with sufficient compensatory measures in place until full qualification is obtained.*
- *The training and qualification program adequately describes the process for TREAT operators to attain full qualification.*
- *Competence commensurate with responsibility for managers and the required training and provisional qualification/certification necessary to support TREAT restart is complete and documented. (DOE Order 425.1D; IFM-MFC-17-002, Table 6.1; and DOE-RA-IP-TREAT, Appendix D)*

The general requirements for INL training programs are contained in laboratory-wide Manual 12, *Training and Qualification*. The training and qualification program for developing qualified and certified reactor operators and supervisors at TREAT in accordance with the requirements of DOE Order 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*, is described in Program Description Document (PDD)-218, *TREAT Nuclear Facility Training Program*. PDD-218 adequately details the selection, training, qualification, and certification of personnel performing the functions of management, operations, maintenance, and technical support at TREAT. It also lists the job positions at TREAT, identifies each qualified and certified position at TREAT and the

required education and experience for each, assigns a unique alpha-numeric code for tracking, and delineates the necessary training and qualification requirements. In addition, PDD-218 contains a detailed training implementation/compliance matrix listing each requirement in DOE Order 426.2 and identifying the document that implements the requirement at TREAT.

According to personnel interviews and document reviews, starting early in the program development, PDD-218 was repeatedly assessed and improved using applicable portions of DOE-STD-1070-94, *Criteria for Evaluation of Nuclear Facility Training Programs*. Those assessments identified deficiencies and weak areas, and the corrective actions implemented to address these deficiencies provided continuous improvements, resulting in a strong program. EA reviewed four recent assessments of the TREAT training and qualification program, as well as recent contractor evaluations of the training program performed by both the management self-assessment team and the CRA team that support this program development process.

TREAT has a performance-based training program that primarily uses on-the-job training, with classroom training on the basics. Since the TREAT reactor is not operational yet, QNTFPRRO, *Provisional Reactor Operator*, was developed to document and justify the “provisional” qualification of the reactor operators and senior reactor operators prior to startup of the TREAT reactor.

The training and qualification program also includes limited use of a glass-top simulator that was specially programmed to provide count rates corresponding to control rod movements. Although this simulator is designed for commercial nuclear reactors, it provided direct feedback on reactor response for trainees with minimal reactor operator experience. The simulator training was not credited in the operator qualification program and will not be needed for future operator training once the TREAT reactor is operational.

The TREAT training and qualification program incorporates the key safety parameters and implements the training and qualification requirements from TREAT Safety Analysis Report (SAR)-420, *Transient Reactor Test (TREAT) Facility FSAR*, and Technical Specification (TS)-420, *Technical Specifications for the TREAT Facility*. The TREAT training program is dynamic and is adapted for transient testing through continuing training on each experiment. Engineers conduct in-depth analysis of each experiment, leading to the development of an experiment safety analysis to document the safety basis and define the safety envelope. Additional training documents are prepared to address similarities and differences in each experiment and any unique hazards that may be introduced.

In addition to training for regular operations at TREAT, BEA has five trained Area Wardens who are prepared to perform specific duties in an emergency, and the shift supervisor at TREAT is qualified to perform the role of Building Emergency Director. Several drills have been conducted in preparation for the resumption of transient testing to ensure that the emergency response teams are sufficiently trained and prepared to respond when necessary. Lessons-learned and feedback provided by observers are collected after every drill and appropriately incorporated into the continuing training program.

As an example, several issues identified during the CRA, along with feedback on the recent emergency drills, were collected to develop a lesson plan for a “tailgate training” session. In late July, TGTF0054, *Tailgate Training on Modifications*, was conducted for the TREAT Operations organization. This tailgate training included refresher training on various conduct-of-operations practices, clarification of expectations for independent verifications, feedback on performance during recent emergency drills, and a brief summary of 14 major facility modifications. The tailgate training was conducted in a very timely manner to increase the effectiveness of the feedback.

Based on a sample of training documents that EA reviewed; interviews with the training manager, training instructors, and staff; and, observation of TREAT operations and maintenance personnel, the TREAT training and qualification program described in PDD-218 is a robust program and is effectively implemented. The program adequately addresses the requirements of DOE Order 426.2 and incorporates guidance from DOE-STD-1070-94. The DOE RA team member evaluating CR 3, Training and Qualification, was knowledgeable and well prepared, and performed a thorough review. The DOE RA team concluded that the selection, training and qualification for operations and operations support personnel meets the objectives for CR 3 with no outstanding issues. EA agrees with this conclusion.

5.2.2 Core Requirement 8: Configuration Control/Modifications

Objective:

- *The facility systems and procedures, as affected by facility modifications, are consistent with the description of the facility, procedures, accident analyses, and assumptions included in the safety documentation.*
- *A formal program is defined and implemented to control facility modifications. Authorized modifications within the scope of the Readiness Review have been completed and fully closed, or evaluated and determined not to affect the ability to safely start nuclear operations. (DOE Order 425.1D, 4.f (8))*

Criteria:

- *Configuration management (CM) is established for the Safety Related and Non-Safety Related Augmented Requirements structures, systems, and components (SSCs) identified in SAR-420/TS-420.*
- *Examine CM documents to determine whether the safety SSCs are identified in the documents.*
- *Review the safety-related equipment list to verify that the safety SSCs identified in SAR-420 have been included and that the safety function descriptions are consistent with the safety functions credited in SAR-420.*
- *TREAT systems and facility modifications are consistent with the description and accident analysis included in SAR-420.*
- *The engineering organization and associated programs are established and functioning to support the TREAT operations organization. The engineering functions, responsibilities, and reporting relationships are clearly defined, understood, and effectively implemented.*
- *Verify that the facility modification engineering jobs (EJs) and the TREAT Facility description in SAR-420 are consistent and as analyzed in SAR-420.*
- *On a smart sample basis, verify that work orders associated with EJs have been properly closed and that EJs have been completed and closed or evaluated and determined not to affect TREAT restart. (DOE Order 425.1D; IFM-MFC-17-002, Table 6.1; and DOE-RA-IP-TREAT, Appendix D)*

DOE Order 420.1C, *Facility Safety*, and DOE-STD-1073-2003, *Configuration Management Program*, delineate the requirements and acceptable methodology for a CM program. The TREAT CM program is implemented through a combination of INL sitewide processes and TREAT-specific processes. The INL sitewide CM program is described in PDD-10502, *INL Configuration Management Program*. Because no CM plan for the TREAT Facility was in place, BEA implemented PLN-4797, *TREAT Configuration Management Program Implementation Plan*, to identify each TREAT system and the associated level of CM required. As a result of the TREAT CM reconstitution effort, BEA developed LST-900, *TREAT Systems and Document Numbering Information*, which identifies the safety-related SSCs and the assigned cognizant system engineer. For each of the safety-related SSCs identified, a CM plan was developed that meets the requirements of DOE Order 420.1C and follows the acceptable methodology in DOE-STD-

1073-2003. For the purpose of this assessment, EA confirmed that the DOE RA team effectively reviewed the CM program described in these documents.

Concurrent with the DOE RA team activities, EA reviewed SCMP-174, *Control Rod System Configuration Management Program*, which is the CM plan for the TREAT compensation rods that act to start up and shut down the reactor. The CM plan addresses the five essential elements of a CM program as specified in DOE Order 420.1C and has signature lines for approval by the nuclear facility manager, the maintenance manager, and the engineering manager. Because the TREAT Facility has limited staffing, the engineering manager fills the role of the maintenance manager. Consequently, in the CM plan that EA reviewed, the same individual's signature was on the approval lines for the engineering manager and the maintenance manager. EA verbally conveyed to the site office that it could be beneficial to have another individual from either the engineering or maintenance organization review and approve the CM plan to provide another independent perspective. The DOE RA team member who reviewed this document also identified this issue and documented it in the RA report.

During the DOE RA, one of the RA team members identified an issue in the configuration of one of the control/shutdown rods. One rod was slightly different from the others, in that it had more lock washers installed on the tie rod plates than the other three control/shutdown rods. The DOE RA report characterized this issue as a formal observation, since that portion of the system was outside the safety boundary. The discovery of this issue shows that the DOE RA team conducted a careful, critical review.

The DOE RA report identified no findings in CM, consistent with EA's determination that the TREAT CM program is effective in ensuring proper control of the physical configuration of the facility. EA also found that the DOE RA team member who reviewed this area conducted a very detailed evaluation through interviews and document reviews.

5.2.3 Core Requirement 9: Procedures

Objective:

- *Adequate and accurate procedures and safety limits are approved and in place for operating the process systems and utility systems. The procedures include necessary revisions for all modifications that have been made to the facility. Facility processes ensure that only the most current revision to each procedure is in use. (DOE Order 425.1D, 4.f (9))*

Criteria:

- *Procedures are prepared, reviewed, and approved within the framework of the INL requirements system.*
- *Adequate and accurate procedures are approved and in place for operating TREAT processes and utility systems.*
- *Procedures and forms have been prepared and approved through the document control process.*
- *Procedures encompass normal, abnormal, and emergency conditions and implement SAR-420/TS-420 requirements. (DOE Order 425.1D; IFM-MFC-17-002, Table 6.1; and DOE-RA-IP-TREAT, Appendix D)*

The governing document for procedures at INL is laboratory-wide procedure (LWP)-9101, *INL Procedure Usage*. This procedure, along with laboratory guidance documents on writing procedures, provides general directions for developing and formatting laboratory instructions and procedures, and discusses INL philosophy and management expectations for procedure development and use. One key objective of LWP-9101 is that operations be conducted in a safe, deliberate, and controlled manner within the facility-specific safety envelope. BEA developed a TREAT-specific procedure, Management Control

Procedure (MCP)-9676, *TREAT Procedure Usage*, to provide facility/activity-specific directions for implementation of LWP-9101 at the TREAT Facility. MCP-9676 appropriately specifies that all operations at TREAT are to be performed in accordance with approved, written procedures. During reactor operations, procedural compliance is essential for maintaining personnel safety, protecting the environment, minimizing equipment damage, and ensuring that operations are consistently within the facility's safety envelope, as defined by the documented safety analysis. TREAT procedures are controlled in accordance with LWP-1201, *Document Management*, and the facility-specific document SP-50.0.2, *TREAT Document Management Supplement to LWP-1201 and LWP-21220*. Only controlled procedures are authorized for performing facility operations and activities and for making working copies.

The different types of procedures used at INL and TREAT are described in LWP-9600, *Conduct of Operations for the Idaho National Laboratory*. This document specifies details for procedure use during operations, such as whether steps are read in sequence, performed, then signed off; or only referenced as needed, and variations in between. LWP-9600 also requires the use of place-keeping methods, with only one action per block, for critical steps. TREAT reactor operating procedures and fuel handling procedures require the operator's strict attention when being performed, as observed during the calibrations, start-up evolutions and other safety-related operations.

MCP-9676 includes discussions on human performance improvement and reinforces the DOE complex-wide philosophy of taking a timeout or stopping work when unsure or encountering unexpected circumstances, as well as the practice of marking procedure steps for place-keeping to avoid skipping or duplicating steps.

During the TREAT DOE RA, the review of CR 9, Procedures, was conducted in conjunction with the review of CR 12, Conduct of Operations, since these elements are so closely interconnected. EA concurrently observed TREAT work evolutions with the DOE RA team. The EA team and DOE RA team observed TREAT operations and maintenance personnel performing several demonstrations, evolutions, calibrations, and maintenance activities. During each of these activities, EA observed that the TREAT personnel followed specific, detailed procedures while performing the work and used the circle-slash method of place keeping. The DOE RA team members exhibited a good questioning attitude, identified issues associated with work documents and procedures, and, when appropriate, raised issues to BEA management for resolution.

Overall, based on EA's independent review of procedures and applicable documents and observations during work evolutions and interviews, EA concluded that the DOE RA team members evaluating CR 9, Procedures, were knowledgeable of the subject matter, conducted a thorough review of the governing documents, attentively observed operations and work evolutions, and asked thoughtful questions. The DOE RA team performed an effective assessment of this CR, and concluded that adequate and accurate procedures for TREAT operations are in place and approved, and that the procedures accurately reflect the current facility configuration. EA did not find any issues that conflict with the DOE RA team's conclusions in this subject.

5.2.4 Core Requirement 12: Conduct of Operations

Objective:

- *The formality and discipline of operations are adequate to conduct work safely, and programs are in place to maintain this formality and discipline. (DOE Order 422.1, Conduct of Operations)*
- *Sufficient numbers of qualified personnel are available to conduct operations. (DOE Order 425.1D, 4.f(12))*

Criteria:

- *INL Conduct of Operations requirements are implemented in TREAT restart activities.*
- *TREAT staffing is adequate to safely and effectively conduct reactor operations.*
- *Sufficiently trained, provisionally qualified/certified staff is available to conduct TREAT restart operations. (DOE Order 425.1D; IFM-MFC-17-002, Table 6.1; and DOE-RA-IP-TREAT, Appendix D)*

GDE-9201, *Conduct of Operations Guidance for Laboratory Operations*, and MCP-3955, *Conduct of Operations for the Transient Reactor Test (TREAT) Facility*, describe the requirements for an acceptable conduct-of-operations program at INL and the TREAT Facility, respectively. EA evaluated the DOE RA process regarding CR 12, Conduct of Operations, by observing RA assessors as they observed TREAT workers performing several tasks, including system lineups, a simulated reactor transient, a loop handling cask evolution, and pre-job and post-job briefs. EA also observed the DOE RA team conducting interviews and performed independent reviews of the TREAT conduct-of-operations program documents and implementing procedures.

EA and DOE RA team members jointly observed TREAT operators performing equipment lineups in preparation for the reactor transient using procedures TREAT-OI-0705, *TREAT Air Systems*, TREAT-OI-0703, *Filtration/Cooling System*, and TREAT-OI-0702, *TREAT Hydraulic Systems*. Although the lineup operator executed the procedures very well, both EA and the DOE RA assessor noted that the work steps could have been organized more efficiently. The procedures adequately lined up the hydraulic, air, and filtration/cooling systems, but the sequence of operations required the operator to move from one room to another, and then back to previously occupied rooms multiple times. The procedures could have been written to minimize movement between rooms for a more efficient lineup process. The DOE RA assessor noted this inefficiency, and the BEA operator agreed.

During document reviews before the field assessment, EA determined that FRM-1813, *TREAT Weekly Rounds*, had a number of ambiguous log requirements. For example, the required log entry for a test of the voice announcement system lacked parameters for the operator to determine whether the test is satisfactory. Likewise, the diesel battery cable connections are supposed to be “verified tight,” but there were no parameters to guide the operator on how tight they should be, and the weekly round sheet had similar problems. The RA assessor observing an operator performing the weekly rounds discovered the same issues, and documented them as an observation in the RA report. EA agrees with the classification of this issue.

EA observed multiple pre- and post-job briefs and found them to be well organized and effective. The job brief leader cited operating experience from both INL and private industry and explained how these events directly related to the upcoming evolution. Participants were quizzed, including upper management, shift supervisors, operators, and technicians. Potential evolution upsets were discussed, and everyone’s responsibilities were addressed. During post-job briefs, everyone had an opportunity to provide input on how the evolutions could go better next time.

During observation of evolutions, EA noted excellent conduct-of-operations discipline by the contractor’s operators. Three-way communications were used consistently, operations were controlled, and circle/check place-keeping in procedures was effectively applied. When queried, both operators and supervisors stated that this was how operations were expected to be performed on a daily basis, not just for the benefit of the DOE RA and EA assessors.

The TREAT facility managers have a strong background in conduct of operations and have focused heavily on its implementation at TREAT and on building a conduct-of-operations culture to ensure safe reactor operations. They emphasized that operators, technicians, and shift supervisors need to be self-

policing/self-correcting and have communicated this philosophy to the workers. Having facility managers work directly with new hires and getting workers to self-correct instills a self-sustaining conduct-of-operations culture. Based on these observations, EA concluded that TREAT has developed from scratch an excellent conduct-of-operations culture, which is considered to be a **Best Practice**.

Overall, the DOE RA assessors were thorough and complete. They were well prepared for conducting the assessment, showed adequate familiarity with the applicable documents, independently identified the same issues as EA during the evolutions, and performed thorough interviews. The RA assessors exhibited a questioning attitude, identified issues associated with work documents and procedures, and raised issues to BEA management for resolution or to the RA team leader for documentation in the report where appropriate. The DOE RA team concluded that the formality and discipline of operations at TREAT were adequate and that conduct of operations requirements have been fully implemented at the TREAT Facility. EA agrees with the DOE RA team's conclusions for this CR.

5.2.5 Core Requirement 14: Contractor Assurance System/Feedback and Improvement

Objective:

- *An effective feedback and improvement process (i.e., contractor assurance system) has been established to identify, evaluate, and resolve deficiencies and recommendations made by contractor line management and independent contractor audit and assessment groups. The process also provides for resolution of issues and recommendations by external official review teams and audit organizations (e.g., DOE Order 226.1B, Implementation of Department of Energy Oversight Policy). (DOE Order 425.1D, 4.f(14) and Attachment 1, 2.f(14))*

Criteria:

- *The approved contractor assurance system is implemented for the restart of transient testing activity.*

BEA has established a contractor assurance system (CAS) described in PDD 171, *Contractor Assurance System* to implement the requirements of DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*. The INL Issues Management System (LabWay) is used at TREAT for identification, reporting, evaluation, and correction of a broad range of issues in accordance with LWP-13840, *Issues Management*. The LabWay program supports multiple methods of feedback and drives improvements in safety, quality and processes at TREAT. The TREAT CAS is in place and issues have been discovered, prioritized, and corrected since startup work commenced in recent years. However, to date there is little facility-specific CAS information since TREAT has been shut down for over 20 years.

EA reviewed the PDD and Key Performance Indicator (KPI) reports for several quarters. During document reviews, EA discovered numerous problems with poorly written metrics and milestones in the KPI report. The DOE RA assessor discovered the same issue, along with additional issues in the KPI report discovered during an interview with BEA management. BEA agreed that the report needed to be improved, and the DOE RA assessor included these issues as an observation in the DOE RA report. The DOE RA assessor also discovered that the Facility Representative was not being invited to the TREAT Operations Review Committee meetings, although he was attending other facility status meetings. This condition was corrected during the assessment.

EA also observed one DOE RA team member interviewing TREAT personnel. The DOE RA assessor was very thorough and had performed a comprehensive document review prior to commencing the field portion of the DOE RA. He had even requested the status of corrective actions for Occurrence Reporting and Processing System (ORPS) reports from 1990 to 1994 prior to shutdown, some of which were still applicable. For example, one ORPS report described a situation where the rod drives improperly reversed

direction during reactor shutdown. BEA did not know whether the situation had been corrected and had to research the situation to determine the status of the facility.

The DOE RA assessor exhibited a good questioning attitude, identified issues associated with CAS documents and processes, and raised issues to BEA management for resolution. In addition, the DOE RA assessor raised issues to the DOE RA team leader for documentation in the report when required.

Overall, the DOE RA assessor was thorough and complete. He was well prepared and familiar with the applicable documents at the beginning of the field assessment. The assessor identified the same issue as EA in addition to one other issue, raised issues to the DOE RA team leader where appropriate, and performed thorough interviews of TREAT personnel. The DOE RA team concluded that the CAS program for TREAT is effective for identifying, evaluating and resolving deficiencies and issues identified related to the CAS were minor. EA concurs with this conclusion.

Conclusions for Verification of Core Requirements

Overall, EA determined that the DOE RA team did a notable job in executing a thorough, detailed RA in accordance with DOE-ID procedure 03.WI.04.10.

As part of the assessment of the DOE RA process, EA independently evaluated five CRs to gauge the contractor's readiness to start operations. For each of the CRs evaluated, EA agreed with the DOE RA team that the objectives were met. Overall, based on the CRs that EA assessed, TREAT Facility operators, supervisors, and staff are properly trained and qualified; the contractor has established an adequate configuration control program; written procedures are adequate to perform safe operations and maintenance; operators and supervisors displayed excellent conduct of operations during evolutions; and the CAS is adequate to identify, process, and correct issues effectively. In addition, EA agrees with the DOE RA team's recommendation that BEA will be ready to begin operations at TREAT once the pre-start findings have been corrected. The facility has instilled a strong conduct-of-operations culture, and the process used to instill this culture is a best practice and merits consideration at other DOE facilities.

5.3 DOE Oversight of the Process for Verifying Readiness to Restart the TREAT Facility

Objective:

- *The responsible DOE field element line management has performed sufficient oversight of the contractor's process for verifying readiness to restart the TREAT Facility. (DOE Order 425.1D, 4.g)*

Criteria:

- *DOE field element reviewed and concurred with the contractor's procedures for implementing the requirements of the contractor requirements document (CRD).*
- *DOE field element ensured that the contractor properly implemented the requirements of the CRD:*
 - *Startup Notification Report (SNR) submitted*
 - *POA developed*
 - *Prerequisites for the Readiness Review (RR) identified*
 - *Qualifications for contractor's RR Team evaluated*
 - *SAA reviewed and approved the contractor's POA*
 - *Adequacy of contractor's RR evaluated*
 - *Adequacy of final report for contractor's RR evaluated*
 - *All prestart findings of the contractor RR adequately resolved*

- *SAA reviewed contractor's Readiness to Proceed Memorandum*
 - *Contractor and DOE have developed and implemented approved corrective action plans for post-start findings.*
- (DOE Order 425.1D, 4.g)

DOE Order 425.1D requires both a contractor and a DOE RA before restart of the TREAT Facility, since it is classified as a hazard category 2 nuclear facility and operations have been suspended for more than a year. Typically, the CRA is performed before the DOE RA, although DOE Order 425.1D allows for concurrent but separate reviews of specific events significant to the startup and restart process, such as emergency management exercises. The purpose of the CRA is to provide a high degree of confidence that facility operations will be conducted as intended by the design and safety basis. The CRA follows the same protocol as the DOE RA and is based on records review, observation of equipment and operations, and interviews with relevant personnel. Before the DOE RA can proceed, corrective action plans must be developed to resolve any identified issues from the contractor RA.

Contractor Procedure for Implementing DOE Order 425.1D

BEA's implementation of DOE Order 425.1D is contained in INL MCP-9902, *Verification of Readiness to Startup or Restart Nuclear Facilities*. This procedure outlines BEA's process for verifying that the TREAT Facility is ready for restarting operations. DOE Order 425.1D allows BEA to use a graded approach for the RA, and MCP-9902 provides guidance on the depth and breadth of the RA. For the TREAT Facility, the CRA consisted of a full-scope review of all areas identified in DOE Order 425.1D. DOE-ID reviewed and concurred with this procedure in September 2015. EA found this procedure to contain the applicable requirements of DOE Order 425.1D, in addition to the acceptable methods described in DOE-STD-3006. EA confirmed that the NE Program Secretarial Officer, the Chief Technical Authority, and DOE Office of Environment Health, Safety and Security representatives were copied on the SAA's approval of the contractor's procedures.

Startup Notification Report

DOE Order 425.1D requires that, on a quarterly basis, the contractor prepare and submit for DOE approval an SNR listing each projected startup of a nuclear facility for which an RA is required. The SNR contents include the facility being reviewed, whether an operational readiness review or RA is required, the SAA, and any updates to previously identified information. BEA submitted the initial SNR outlining the TREAT Facility restart in December 2015, and the SAA approved it in January 2016. BEA has continued to submit quarterly SNR updates with the latest TREAT restart schedule information. In the most recent SNR, the projected TREAT restart date has moved to an earlier date than previously identified.

Contractor Readiness Assessment Plan of Action

In accordance with DOE Order 425.1D, DOE-STD-3006 and MCP-9902, BEA developed a POA for the CRA, which documented the proposed RA scope, the prerequisites for starting the RA, the proposed RA team leader, and the proposed RA schedule. The POA identified numerous prerequisites that needed to be satisfied before the CRA could proceed. Following development of the POA, an IP was developed with more specifics on the conduct of the CRA, including identification of team members. The CRA team consisted of 16 individuals, including the team leader, with specialized experience in assigned review areas and free from conflicts of interest. EA verified that the CRA POA contained the requisite information, and that it was reviewed and approved by the SAA.

Contractor Readiness Assessment Report

The CRA, which was conducted over a period of two weeks in June 2017, evaluated TREAT safety-significant SSCs; operations and operations support personnel and procedures; and safety management programs germane to transient testing activity. The CRA team reviewed more than 600 documents, interviewed more than 70 personnel, and observed about 50 evolutions. The CRA team identified two pre-start findings and three post-start findings. DOE Order 425.1D requires all pre-start findings to be resolved prior to restart of the facility.

The first pre-start finding from the CRA was that the TREAT restart plan did not address the timing or approvals needed to remove installed poison assemblies from the reactor. Shortly after the identification of this finding, BEA revised the TREAT restart plan to include the removal of the poison assemblies. The second prestart finding was that two separate instances were identified where independent verifications were not required by the TREAT procedures nor performed for important instrument settings and calculations. BEA subsequently revised the procedures to include the independent verifications. Additionally, one post-start finding was able to be closed out along with the pre-start findings. This finding related to the radiation detectors' ability to effectively measure the types of radiation expected. BEA subsequently evaluated this issue and documented a technical justification to support the use of these radiation detectors. EA verified that the two pre-start findings and one post-start finding were properly closed out.

Overall, the CRA concluded that the TREAT Facility training, procedures, personnel, and equipment were in a satisfactory state to begin nuclear operations. After the CRA and closure of the pre-start findings, BEA sent a memo dated July 20, 2017, to DOE-ID stating that they were ready to proceed with the DOE RA. In the memo, BEA specified that the two remaining post-start findings have detailed corrective action plans, with proposed completion dates in the early stages of TREAT restart operations. DOE-ID subsequently conducted a line management assessment to verify that the CRA adequately verified readiness for the restart of the TREAT Facility and confirm that DOE-ID oversight processes and personnel are ready to oversee reactor and experiment operations at the TREAT Facility. The DOE-ID assessment did not identify any findings and concluded that the TREAT Facility was ready to proceed with the DOE RA. EA found that DOE-ID had comprehensively evaluated the CRA process.

Conclusions for DOE Oversight of the Readiness Verification Process

Overall, EA found that DOE-ID has performed sufficient oversight of the contractor's process for verifying readiness to restart the TREAT Facility in accordance with the applicable requirements of DOE Order 425.1D and the acceptable methods described in DOE-STD-3006. EA verified that BEA's CRA was planned and implemented in an effective manner and that the CRA report thoroughly reviewed TREAT readiness to restart. The two pre-start findings from the CRA were resolved before the DOE RA, and corrective action plans were developed for all post-start findings. EA confirmed that DOE-ID performed a thorough review of the CRA before authorizing the start of the DOE RA.

6.0 FINDINGS

EA identified no findings during this assessment.

7.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified one OFI to assist DOE-ID management in improving programs and operations. While OFIs may identify potential solutions to findings and deficiencies identified in appraisal reports, they may also

address other conditions observed during the appraisal process. EA offers this OFI only as a recommendation for line management consideration; it does not require formal resolution by management through a corrective action process and is not intended to be prescriptive or mandatory. Rather, it is a suggestion that may assist site management in implementing best practices.

OFI-DOE-ID-2017-1: DOE-ID should consider the following suggestions for improving future implementation plans:

- The review areas specified in the CRADs in the IP should match the CRs in the POA, or a crosswalk should be included which correlates the CRs to the CRADs.
- All 17 CRs in DOE Order 425.1D should be addressed, even if only to mention that they are not applicable. For example, IP Section 4.2, Breadth and Depth, states that “the 14 core requirements from DOE Order 425.1D that are applicable to the contractor will be evaluated.” There is no mention of the other 3 CRs, although EA determined that all 17 CRs were included within the scope of the CRADs provided in Appendix D.

Appendix A Supplemental Information

Dates of Assessment

Onsite Assessment: July 31 – August 10, 2017

Office of Enterprise Assessments (EA) Management

William A. Eckroade, Acting Director, Office of Enterprise Assessments
Thomas R. Staker, Director, Office of Environment, Safety and Health Assessments
William E. Miller, Deputy Director, Office of Environment, Safety and Health Assessments
C.E. (Gene) Carpenter, Jr., Director, Office of Nuclear Safety and Environmental Assessments
Kevin G. Kilp, Acting Director, Office of Worker Safety and Health Assessments
Gerald M. McAteer, Director, Office of Emergency Management Assessments

Quality Review Board

Steven C. Simonson
John S. Boulden III
Thomas R. Staker
William E. Miller
Michael A. Kilpatrick

EA Site Lead for the Idaho Site

Rosemary B. Reeves

EA Assessors

Rosemary B. Reeves – Lead
Jeff Snook
Kevin M. Witt

Appendix B

Key Documents Reviewed, Interviews, and Observations

Documents Reviewed

- ASMT 2017-0065, TREAT DOE STD 1070 94 Assessment, 02/15/2017
- ASMT 2017-0628, Final Report for Management Self-Assessment for the Readiness for the TREAT Restart of Transient Testing Activity, Rev. 0
- CCN-237207, Revision to Attachment 1 of Startup and Restart of Nuclear Facilities, Startup Notification Report, Quarterly Update, December 2015, 12/15/2015
- CCN-239991, Contractor Readiness Assessment Implementation Plan for the Transient Reactor Test Resumption of Transient Testing Activity at the Idaho National Laboratory, 2/24/2017
- CCN-240580, Startup and Restart of Nuclear Facilities, Startup Notification Report, Quarterly Update, June 2017, 6/12/2017
- CCN 240829, Readiness to Proceed Memorandum with DOE Readiness Assessment for the Transient Reactor Test Facility Restart, 7/27/2017
- DOE-ID Procedure 01.OD.01, Functions Responsibilities and Authorities, Rev. 13, 1/17/2017
- DOE-ID Procedure 03.WI.04.10 – Verification of Readiness to Startup or Restart Nuclear Facilities, Rev. 13, 12/7/2015
- DOE-ID Memorandum with Approval of INL Procedure - Startup and Restart of Nuclear Facilities, Revision 3 to MCP-9902 (OS-QSD-15-046), 9/10/2015
- DOE-RA-IP-TREAT, Department of Energy Readiness Assessment Implementation Plan for the Transient Reactor Test Facility Restart, Rev. 1, 07/17/2017
- FOR-298, TREAT Systems Functional and Operability Requirements, Rev. 3, 04/25/2017
- FRM-1813, TREAT Weekly Rounds, Rev. 4, 07/11/2017
- FRM-1887, TREAT Surveillance Checks Log, Rev. 1, 03/30/2017
- GDE-9101, Laboratory Instruction Writing Guide, Rev. 1, 07/21/2014
- GDE-9201, Conduct of Operations Guidance for Laboratory Operations, Rev. 0, 3/16/2010
- IAS151064, Independent Assessment - Transient Testing Program (TTP) Training Program Assessment, 4/15/2015
- IAS16907, Independent Assessment - Transient Reactor Test (TREAT) Facility Training 1070 Quarterly, 3/2/2016
- IAS16909, Independent Assessment - Transient Reactor Test (TREAT) Facility Training 1070 Quarterly, 5/17/2016
- IFM-MFC-17-002, Department of Energy, Idaho Operations Office Readiness Assessment Plan of Action for the Transient Reactor Test Facility Restart of Transient Testing Activity, Rev. 1, 2/22/2017
- INL/INT-15-35507, Final Report: Contractor Readiness Assessment (CRA) for TREAT Fuel Movement and Control Rod Drives Isolation, 06/04/2015
- INL/EXT-17-42207, Final Report for the Contractor Readiness Assessment of the Transient Reactor Test Facility Resumption of Transient Testing Activity at the Idaho National Laboratory, Rev. 0, 7/20/2017
- (Laboratory-Wide) Manual 12, Training and Qualification, Rev. 172, 07/26/2017
- LST-893, TREAT Operations Document System Identifier Table, Rev. 1, 8/18/2015
- LST-900, TREAT Systems and Document Numbering Information, Rev. 9, 6/1/2017
- LWP-9101, INL Procedure Usage, Rev. 0, 03/16/2010
- LWP-9600, Conduct of Operations for the Idaho National Laboratory, Rev. 0, 10/17/2012
- LWP-10500, Managing the Configuration of Structures, Systems, and Components, Rev. 8, 2/13/2017
- LWP-10501, Engineering Change Control, Rev. 5, 5/18/2017
- LWP-13840, Issues Management, Rev. 8, 9/30/2015

- LWP-1201, Document Management, Rev. 11
- LWP-21220, Work Management, Rev. 13, 03/16/2016
- MCP-3955, Conduct of Operations for the Transient Reactor Test (TREAT) Facility, Rev. 3, 7/19/2017
- MCP-9676, TREAT Procedure Usage, Rev. 1, 07/13/2017
- MCP-9902, Verification of Readiness to Start Up or Restart Nuclear Facilities, Rev. 3, 9/23/2015
- Memorandum from Peter B. Lyons, Assistant Secretary for Nuclear Energy to Richard B. Provencher, Manager of Idaho Operations Office (DOE-ID), Delegation of Safety Authorities, 1/14/2013
- Memorandum from Richard B. Provencher, Manager of Idaho Operations Office to Robert D. Boston, Deputy Manager Operations Support, Delegation of Safety Authorities, 1/17/2013
- NE-ID-BEA-2016-012, Line Management Assessment for the Restart of Transient Testing Activity at the Transient Reactor Test (TREAT) Facility, Rev. 0, 7/25/2017
- PLN-5146, Contractor Readiness Assessment Plan of Action for the TREAT Restart of Transient Testing Activity, Rev. 0, 9/26/2016
- PLN-4797, TREAT Configuration Management Program Implementation Plan, Rev. 1, 10/11/2016
- PLN-5223, TREAT Restart Plan, Rev. 3, 7/24/2017
- PDD-171, Contractor Assurance System, Rev. 2, 8/21/2014
- PDD-218, TREAT Nuclear Facility Training Program, Rev. 1, 10/06/2016
- PDD-10502, INL Configuration Management Program, Rev. 4, 6/12/2017
- PEMP Status Reports by Objective, 1st Quarter 2017
- QNTFPRRO, Provisional Reactor Operator
- Request for Approval of the Department of Energy, Idaho Operations Office (DOE-ID) Readiness Assessment (RA) Plan of Action (POA) for the Transient Reactor Test Facility Restart of Transient Testing Activity, 2/22/2017
- SAR-420, Transient Reactor Test (TREAT) Facility FSAR, Rev. 1, 03/01/17
- SCMP-174, Control Rod System Configuration Management Program, Rev. 1, 6/12/2017
- SD-49.2.1, Roles and Responsibilities for TREAT Program Oversight and Assurance and TREAT Training, Rev. 5, 4/11/17
- SP-50.0.2, TREAT Document Management Supplement to LWP-1201 and LWP-21220, Rev. 6, 04/13/2017
- SP-50.1.2, Functionality Testing of TREAT Systems and Components, Rev. 2, 4/7/2017
- SP-50.1.6, TREAT System Readiness Process, Rev. 3, 4/7/2017
- SP-50.3.1.0, TREAT Temporary Facility Modification Control, Rev. 0, 8/25/2016
- TEV-2097, Classification of TREAT Systems, Structures, and Components, Rev. 3, 10/11/2016
- TFTR0053, Training Request: TREAT Self Study Guide TFSSG006, TREAT Plant Air System
- TGTF0054, Tailgate Training on Modifications, July 2017
- TREAT Operational Staffing Plan, Rev. 3, 05/22/2017
- TREAT Operations Organizational Chart, 07/19/2017
- TREAT Assessment & Audit Index (provided in table of contents for evidence binder)
- TREAT Management Review Meeting (MRM) and Key Performance Indicator (KPI) Report, Second Quarter FY 2017, May 2017
- TREAT 2018 Assessment/Audit Schedule, as of 08/01/2017
- TREAT-EAR-005, TREAT Alarm Response, Rev. 1, 4/12/2017
- TREAT-OI-0400, Minimum Radiological Monitoring at TREAT, Rev. 3, 3/30/17
- TREAT-OI-0507, Transient Operations, Rev. 4, 07/12/2017
- TREAT-OI-0509, Dedicated Microprocessor Tester Operations, Rev. 3, 7/12/2017
- TREAT-OI-0513, Trip Calculations, Rev. 3, 7/19/2017

- TREAT-OI-0708, Loop-Handling-Cask and Storage-Hole Operations, Rev. 5, 07/20/2017
- TREAT-OI-0705, TREAT Air Systems, Rev. 7, 07/12/2017
- TREAT-OI-0703, Filtration/Cooling System, Rev. 4, 07/12/2017
- TREAT-OI-0702, TREAT Hydraulic Systems, Rev. 7, 07/31/2017
- TREAT-OTP-17-001, TREAT Restart, Rev. 1, 4/13/2017
- TREAT Work Order 229928-01, 1Y TREAT-720-RTS Transient Input Trip Logic Calibrations (TS), Rev. 1, 11/12/2015
- TS-420, Technical Specifications for the TREAT Facility, Rev. 1, 03/01/2017

Interviews (Observed)

- TREAT Plant Manager
- TREAT Chief Operations Officer
- TREAT Oversight and Assurance Division Director
- TREAT Experiment Safety Engineering Manager
- TREAT Maintenance Manager and Engineering Manager
- TREAT Maintenance Implementation Manager
- TREAT Operations Manager
- TREAT Deputy Operations Manager
- TREAT Quality Assurance Manager
- TREAT Cognizant System Engineer
- TREAT System Engineer
- TREAT Reactor Engineer
- TREAT Quality Engineer
- TREAT Reactor Operators (multiple)
- TREAT Senior Reactor Operator
- TREAT Shift Supervisors (2)
- TREAT Training Manager
- TREAT Training Instructors (2)
- TREAT Training Coordinator
- TREAT Transient Control Technicians (2)
- TREAT Maintenance Mechanic

Interviews (Conducted)

- DOE-ID MFC Supervisor
- DOE-ID TREAT Federal Project Deputy Director
- DOE RA Team Leader
- DOE RA Team Senior Advisor
- DOE RA Team Members (8)

Observations - Facility Evolutions, Operational Demonstrations and Tabletops

- DOE RA Inbrief Meeting
 - Safety Briefing
 - Facility Introductions
 - Overview of RA Process
 - TREAT/Activity Overview and Evidence Materials
- Tour of TREAT Facility and Walkdown of Reactor
- Pre-job Briefing for Dedicated Microprocessor Testing Surveillance

- Maintenance Evolution: Dedicated Microprocessor Testing Surveillance
- Systems Lineup – Hydraulics, Air/Cooling, and Electrical
- Pre-job Briefing for Reactor Startup and Transient Event
- Operational Evolution: Reactor Startup and Transient Event (Demonstration)
- Post-job Briefing for Reactor Startup and Transient Event
- Pre-job Briefing for Loop Handling Cask
- Operational Evolution: Loop Handling Cask (Demonstration)
- Post-job Briefing for Loop Handling Cask
- Pre-job Briefing for TS Surveillance Requirement, Reactor Trip System (RTS) Transient Input Trip Logic Calibration
- Maintenance Evolution: TS Surveillance Requirement, RTS Transient Input Trip Logic Calibration
- Post-job Briefing for TS Surveillance Requirement, RTS Transient Input Trip Logic Calibration
- Pre-job Briefing for Monthly TREAT Diesel Generator Preventive Maintenance (PM)
- Maintenance Evolution: Monthly TREAT 130KW Diesel Generator PM (WO 250172)
- Maintenance Evolution: Monthly TREAT 30KW Diesel Generator PM (WO 250170)
- Weekly Operator Rounds
- Post-job Briefing for Weekly Operator Rounds
- TREAT Weekly Issues Management Meeting
- DOE RA Team Meetings (5)