February 24, 2005

Dr. Jeffrey Wadsworth, Director
Oak Ridge National Laboratory
UT-Battelle, LLC
Post Office Box 2008
Oak Ridge, Tennessee 37831-6255

Dear Mr. Wadsworth:

DEPARTMENT OF ENERGY (DOE), OAK RIDGE OPERATIONS (ORO), ASSISTANT MANAGER FOR LABORATORIES INTEGRATED ASSESSMENT PROGRAM – ASSESSMENT OF IMPLEMENTATION OF 10 CFR 830 REQUIREMENTS FOR OAK RIDGE NATIONAL LABORATORY (ORNL) NON-REACTOR NUCLEAR FACILITIES

As part of the DOE ORO Assistant Manager for Laboratories (AML) Integrated Assessment Program, a technical assessment was conducted of the ORNL implementation of 10 CFR 830 requirements at non-reactor nuclear facilities. The assessment was conducted during January 10-21, 2005. The final report from this assessment is enclosed. The results of the assessment were provided to your staff during the assessment closeout meeting on January 21, 2005, and a draft report was provided on January 28, 2005. Your staff submitted factual accuracy comments on this draft report to us on February 4, 2005. These comments were resolved in preparation of the final report.

Please prepare and submit to me a corrective action plan (CAP) that addresses each finding and observation listed in Appendix III of the report. The corrective action plan for findings should be in the following format:

1. Finding: Restate the finding and its associated number. It is not necessary to repeat the discussion portion of the finding.

2. Response: Provide a summary response to the finding that states the cause of the finding and what will be done to correct the finding and prevent recurrence.

3. Itemized Corrective Actions: Present a tabular listing of the individual corrective actions that will be performed to address the finding and the estimated completion date for each corrective action.

We will be formally tracking the status of findings until closure.

Dr. Jeffrey Wadsworth -2- February 24, 2005

The CAP for observations is not required to be in the above format and can include brief statements that specify how UT-Battelle plans to disposition the noted observation. Observations will not be formally tracked, but we may follow up on them during our routine site oversight activities.

The CAP should be submitted to me within 30 calendar days of receipt of this letter. Simultaneously, an electronic copy of the CAP should also be sent by email to cardendm@ornl.gov.

If there are any questions on this report or on the required format for corrective action response, please contact David Carden at 576-9262.

Sincerely,

George J. Malosh
Assistant Manager for Laboratories

Enclosure

cc w/enclosure:
R. E. Daniels, LM-10.1, ORO
B. J. Davis, SE-31, ORO
H. R. Fair, LM-121, ORO
J. A. Ferrer, SE-33, ORO
R. W. Martin, SE-30-1, ORO
J. D. Pearson, SE-31, ORO
H. R. Persinger, LM-112, ORO
R. C. Smyth, LM-11, ORO
M. R. Woods, LM-10.1, ORO
J. G. Ezold, ORNL
D. G. Renfro, ORNL
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D. Carden:6-9262:PH:4-6363:2/10/05:8952.ph

Concurrence
Rtg-Symbol
LM-11
Initials/Sig.
DMC
Date: 2/14/05
Rtg. Symbol
LM-11
Initials/Sig.
RCS
Date: 2/17/05
Rtg. Symbol
LM-10
Initials/Sig.
JJK
Date: 2/18/05
Rtg. Symbol
LM-10
Initials/Sig.
JOM
Date: 2/23/05
Rtg. Symbol
LM-10
Initials/Sig.
GJM
Date: 2/24/05
Rtg. Symbol
Initials/Sig.
Date:
Rtg. Symbol
Initials/Sig.
Date:
Rtg. Symbol

Department of Energy

Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831—

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C. H. Scott, ORNL

Implementation of 10 CFR 830 Requirements for Oak Ridge National Laboratory Nonreactor Nuclear Facilities

Assessment Report

Oak Ridge Operations Office
Office of Science
Integrated Assessment Program

January 2005

DOE Oak Ridge Operations
Assistant Manager for Science
Integrated Assessment Program

Implementation of 10 CFR 830 Requirements for Oak Ridge National Laboratory Nonreactor Nuclear Facilities

The assessment team has reviewed the subject assessment report and concurs with its contents and results:

Rick E. Daniels — Date: 2/14/05

Richard W. Martin — Date: 2/14/05

John D. Pearson — Date: 2/15/05

Kirk R. Russell — Date: 2/15/05

Mike R. Woods — Date: 2/17/05

Approved:

David M. Carden, Assessment Team Lead — Date: 2/14/05

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Executive Summary

An assessment was performed during January 10-21, 2005 of the operations and management system implementation at selected Oak Ridge National Laboratory (ORNL) nonreactor nuclear facilities. The primary objective of the assessment was to verify the adequacy of implementation of the specific technical safety requirements and credited safety management program contained in the approved safety basis and authorization agreement (as applicable) documents.

The assessment was led by the DOE Oak Ridge Operations, Assistant Manager for Science (AMS), Technical Support and Assessment Team. The assessment team included participation from AMS Facility Representatives and subject matter experts from the Assistant Manager for Environment, Safety, and Health. The assessment focused on three representative nonreactor nuclear facilities operated by the University of Tennessee-Battelle (UT-B) Nonreactor Nuclear Facilities Division (NNFD). These facilities included:

Building 2026 – Radioactive Materials Laboratory
Building 3525 – Irradiated Fuels Examination Laboratory
Building 7920 – Radiochemical Engineering Development Center

For each of these facilities, the following specific functional areas were assessed: industrial safety (hoisting and rigging), emergency management, system engineering, conduct of operations, quality assurance, maintenance/inspection/calibration, configuration management, fire protection, waste management and environmental compliance, and nuclear material inventory control.

The assessment indicated a total of 18 findings, 21 observations, and 10 proficiencies. Key findings were noted in the following areas:

- System Engineering – Lack of overall program maturity, need for improved involvement of System Engineers in day-to-day activities.
- Conduct of Operations – Work not being conducted with necessary formality, e.g. inadequate systems labeling, need for procedure revisions, lack of clarity in some roles and responsibilities, incomplete implementation of procedures.
- Corrective Action Management – Lack of attention to fixing numerous issues identified during UT-B operational awareness program assessments. Lack of systems to prioritize issues for corrective action and to ensure follow up.
- Software Quality Assurance – Lack of adequate software quality assurance for nuclear materials inventory tracking systems.

Overall, the results contained in this report indicate that, within the scope of this assessment, UT-B NNFD has implemented the safety management programs and technical safety requirements required by the safety basis documents. However, numerous issues were identified that relate to weaknesses in the implementation of these documents and associated UT-B/NNFD procedures.

List of Acronyms

AMS	DOE Oak Ridge Operations, Assistant Manager for Science
ORNL	Oak Ridge National Laboratory
LCO	Limiting Condition of Operation
SSCs	Systems, Structures, and Components
SE	System Engineer
UT-B	University of Tennessee-Battelle
DSA	Documented Safety Analysis
SB	Safety Basis
TSR	Technical Safety Requirements
NNFD	UT-B Nonreactor Nuclear Facilities Division
C&IS	UT-B Calibration and Instrumentation Services Core Team
NSTD	Nuclear Science and Technology Division
MC	UT-B Metals and Ceramics Division
CSD	UT-B Chemical Sciences Division
FAMMIS	Facility and Maintenance Management Information System
F&O	UT-B Facilities and Operations Directorate
LPD	Laboratory Protection Division
NFSS	Nuclear and Facility Safety Services
MIDAS	Maintenance Information and Data Acquisition System
OSSD	UT-B Operational Safety Services Division
RMS	UT-B Records Management Services
TRS	UT-B Training Resource Services
EP&WSD	UT-B Environmental Protection & Waste Services Division

Implementation of 10 CFR 830 Requirements for Oak Ridge National Laboratory Nonreactor Nuclear Facilities Final Report

1.0 OBJECTIVE

An assessment was performed of the operations and management system implementation at selected Oak Ridge National Laboratory (ORNL) nonreactor nuclear facilities. The objectives of this assessment are:

(1) To verify the adequacy of implementation of the specific technical safety requirements and credited safety management programs contained in the approved safety basis and authorization agreement (as applicable) documents.
(2) To verify the adequacy of the operational controls and management systems for active safety systems and passive design features.

2.0 SCOPE

The assessment included a performance based evaluation of the implementation of physical and administrative controls and management system elements credited in the safety basis documents (and in authorization agreements, as applicable) for ensuring that the significant consequences to workers, the public, and the environmental are prevented during the various credible accident scenarios. In addition, the review verified that DOE expectations are being met for ensuring sustained and reliable operability and integrity of active safety systems.

Specific scope elements included:

(1) Verifying that the surveillance and monitoring requirements contained in the TSR and authorization agreement documents are being met,
(2) Verifying that administrative controls and credited safety management programelements contained in the safety basis documents are being implemented,
(3) Verifying that limiting conditions of operation (LCOs) are being met when in operation and that facility procedures and training address what to do in the event that the LCO is not met,
(4) Verifying that any active safety systems are maintained in an operable condition using management systems and controls which ensure that operability is sustained and reliable, and
(5) Verifying that passive design features listed as safety class and safety significant systems, structures and components (SSCs) are under an adequate surveillance and maintenance program and are under configuration control to prevent unauthorized changes.

The above scope was reviewed for the following nuclear facilities:

- Building 7920,
- Building 3525, and

- Building 2026.

Specific safety management programs included with respect to scope element (2) include:

- quality assurance (organization, administrative controls);
- fire protection;
- maintenance, inspection, and calibration programs;
- Conduct of Operations;
- Waste management/environmental protection;
- Industrial safety (hoisting and rigging);
- emergency management;
- System Engineering;
- Configuration Management

3.0 PERFORMANCE CRITERIA

Performance criteria are defined as the requirements documents and standards that are applicable to the activity and scope being assessed: For the objectives and scope of the current assessment, these performance criteria include:

(1) Documented Safety Analysis/Safety Analysis Reports (2026, 3525, and 7920)
(2) Technical Safety Requirements (2026, 3525, and 7920)
(3) Safety Evaluation Reports (2026, 3525, and 7920)
(4) 10 CFR 830, *Nuclear Safety Management*
(5) UT-B Standards Based Management System requirements
(6) WSS as contained in UT-B contract

4.0 ASSESSMENT METHODS

The assessment was conducted in accordance with the AMS Integrated Assessment Program procedure during January 10-21, 2005. The following sections contain specific details on the schedule and logistics, lines of inquiry, assessment conduct, and assessment results reporting.

Name	Organization	Review Function
David Carden	DOE AMS	Team Leader, Quality Assurance, Facility Maintenance/Calibration, Testing; Facility Management
John Pearson	DOE ES&H	Industrial Safety (hoisting and rigging), emergency management
Rick Daniels	DOE AMS	System Engineering, Conduct of Operations, Configuration Management

Name	Organization	Review Function
Kirk Russell	Parallax	Fire Protection
Richard Martin	DOE ES&H	Waste management,
Mike Woods	DOE AMS	System Engineering, Configuration Management, Conduct of Operations

The specific Lines of Inquiry (LOI) used during the assessment were listed in the Assessment Plan and are included in this report at Appendix I.

The review was conducted by performing facility walkthroughs; conducting facility management and operations staff interviews; and reviewing procedures, documents, and records. A listing of key documents reviewed and staff interviewed are included in Appendix II.

5.0 RESULTS

The assessment indicated a total of ten proficiencies, eighteen findings and twenty-one observations. These are included in Appendix III. There were no Priority I findings that indicate issues related to imminent threat to workers, public, or the environment or substantial breakdowns in the implementation of safety management systems. All findings were at the Priority II level indicating that some requirements are not being adequately met. Observations represent areas where improvements could be made to ensure more effective implementation.

The following sections summarize the results of each functional area of the assessment with respect to overall adequacy and identified weaknesses.

5.1 System Engineering

UT-B has flowed down the System Engineering requirements of DOE O 420.1A, section 4.5.1.3 through the SBMS Subject Area, *System Engineering* located within the Nuclear and Facility Safety Management System. In accordance with this SBMS, NNFD has assigned System Engineers (SEs) to the following types of systems:

- Safety-class systems, structures and components (SSCs)
- Safety-significant SSCs
- Important defense in depth systems necessary for safe operation of ORNL facilities that perform an active function within the context of the Safety Basis

The specific duties and responsibilities for System Engineers (SEs) are defined in the SBMS and include:

- Configuration Management
- Assessment of System Status and Performance
- Technical Support for Operations and Maintenance Activity

Specifically, the SE is required to be the lead for the configuration management of their assigned systems, to conduct routine in-service inspections (passive systems) and assessments (active systems) for their assigned systems, to be involved in the day-to-day operations and maintenance, and to remain cognizant of all activities affecting their assigned systems. NNFD applies the SE program to both active and passive safety SSCs, whereas the DOE Order 420.1A requires SEs for only active systems.

Currently, NNFD has seven qualified SEs. These SEs are grouped into five subject matter expert (SME) areas:

- HVAC (2 SEs)
- Mechanical (1 SE)
- Instrumentation (1 SE)
- Electrical Systems (1 SE)
- Fire Protection (2 SEs)

NNFD has established a "qualification card" program for SEs and each of the seven NNFD SEs has completed this qualification program. The NNFD Training Manager maintains copies of the qualification records for each SE. During the assessment, qualification records were reviewed for three of NNFD SEs. The records indicated that the qualification program was detailed and rigorous with elements of required reading, baseline training, SE specific classroom training, and monitored on-the-job evaluation of site specific performance. The qualification cards were approved by NNFD management. An observation was issued which noted that the NNFD SE qualification program has not established requirements for continuing training and/or periodic re-qualification.

Interviews were conducted with NNFD SEs in the HVAC, instrumentation, mechanical, and fire protection areas. Some of these SEs were also asked to participate in site walkthroughs with the assessment team. It was obvious from these interactions that the SEs are fully knowledgable of their assigned systems and have substantial background and expertise as SMEs. This fact was noted as a proficiency.

UT-B and NNFD procedures detailing job performance requirements and records of SE involvement in day-to-day operations were reviewed. This review of SE performance requirements indicated that the expectations for involvement in maintenance activities were not consistent with the DOE Order 420.A requirements. Specifically, the SBMS for Work Control requires SE review of maintenance work packages only for corrective, non-routine maintenance, and trouble shooting and does not require their involvement in "Safety Related or Safety Significant Calibrations, or Routine Operations". This is not consistent with the DOE Order 420.1A requirement that the SE "remain appraised of operational status....assist operations to review key system parameters and ...remain cognizant of system-specific maintenance/operations ....". It was also noted that once the maintenance job requests (MJRs) are written, the System Engineers are not adequately involved or asked to evaluate priority on documented deficiencies and are not required to provide engineering judgment on the effect these deficiencies have on operability of the system. A finding was noted to address these issues.

One of the responsibilities of the SE is to conduct annual in-service assessments for active safety systems and annual in-service inspections for passive safety systems. NNFD procedure NNFD-008, *In-service Inspection and Safety System Assessment Program* defines how these inspections/assessments are to be conducted. NNFD-008 also states that deficiencies identified during inspections/assessments are to be either converted into MJRs or are to be entered into the ACTS tracking system. However, in practice, these deficiencies are not being consistently dispositioned as identified in the procedure. Numerous items identified have not yet been converted into ACTS items or MJRs for resolution and prioritization. The NNFD procedures does not specify how discrepant conditions are assigned priority for correction and how tracking and followup is performed to ensure that needed corrective actions take place. A finding was noted to address this issue.

5.2 Emergency Management

The Emergency Management Program (EM) was reviewed for Buildings 2026, 3525, and 7920 to assure the completion and currency of relevant EM documents, including the EM Hazards Assessments, Emergency Action Levels, local emergency response procedures, and Local Emergency Manuals. Also reviewed were requirements for emergency reporting by employees, warning and communications systems for employee evacuation and accountability, employee emergency action training, emergency drills, documentation of findings, and the availability of trained emergency wardens.

ORNL lab-wide requirements for EM are defined in the SBMS document "Emergency Preparedness and Response," which covers such areas as drills, emergency numbers and locations, personnel accountability, emergency squads, emergency training, alarm activation, evacuation and shelter-in-place requirements, and emergency preparedness documentation.

Most of the emergency management documentation reviewed, such as Local Emergency Manuals and Emergency Preparedness Hazard Assessments, were up to date and contained the array of subjects that should be covered. However, the Building 7920 Local Emergency Manual has not been adequately updated. The Building 7920 Local Emergency Manual (LEM) has a list of emergency contacts that has been updated in the past quarter, but the page is still dated Feb. 2004. The LEM also contains records of a 2003 drill, but does not show the Oct. 2004 Evacuation drill. Records of required annual emergency training are also not included in the LEM.

Facility supervisors and managers were interviewed and found knowledgeable regarding their responsibilities for emergency response, training, maintaining emergency documents, etc. Also interviewed were members of the ORNL Emergency Preparedness Department, who provided a lab-wide overview of emergency preparedness and response, as well as comments on facility-specific issues. They were also quite knowledgeable of their roles and responsibilities and emergency management requirements.

Records for emergency training in the local buildings reviewed showed that training was current for employees and emergency squad members.

Emergency equipment observed during reviews at the local buildings included the public address system, fire alarms, fire extinguishers, "scram" low ventilation alarms, and emergency lighting. No significant problems were noted.

Quarterly assessments by NNFD include reviews of Local Emergency Manuals and Emergency Planning Hazards Assessments. These are planned reviews that are scheduled on the annual Assessment Plan.

Evaluation of the condition of aspects of emergency response is occasioned following evacuations during drills or actual emergencies. Accountability of personnel in all buildings reviewed, in the event of evacuation, is achieved by use of the daily visitor sign-in logs, and the supervisor's knowledge of personnel present at the Plan of Day meeting each morning. If needed to determine accountability, the LSS printouts of people who have badged into the building are available for review.

For all buildings, searchers (Emergency Wardens) provide building searches for all building evacuations, except radiation and fire alarms that are actual emergencies. For those cases, accountability is determined at the assembly point outside the building by the Local Emergency Supervisor, as described above.

5.3 Fire Protection

NNFD Fire Protection procedures relative to operations in Buildings 2026, 3525, and 7920 were reviewed. A walkdown of each building was conducted with Operations personnel and the respective cognizant Fire Protection System Engineer. Each building has a specific procedure for a combustible control program that requires a monthly documented inspection. Building 3525 was not conducting these required monthly inspections. The SAR takes credit for minimization of flammable and combustible material and the combustible control program for Building 3525. NNFD-3525-AP-001, "Building 3525 Combustible Control Procedure" was presented as objective evidence for implementation of the safety basis. A finding for failure to conduct these monthly inspections is issued to address the importance of compliance to the procedure and safety basis documentation requirements.

Inspection, testing, and maintenance (IT&M) of fire protection systems is being conducted by the ORNL Fire Department. Generally, IT&M is adequately conducted in accordance with NFPA requirements and as modified by approved equivalencies. However, backflow preventers in fire protection systems are not being tested to the requirements of NFPA.

The Fire Hazards Analysis (FHA) for each of the buildings was reviewed during the course of the assessment. SBMS: Fire Protection Program Description requires annual updates of the FHAs for Category 1, 2, or 3 nuclear facilities. The FHAs for Buildings 2026 and 7920 have not been updated since August 2004 and May 2002, respectfully. The required updates have been self identified and entered into ACTS for completion during the second quarter of the fiscal year. Since the FHAs are major support documentation for the SAR and prior commitments have been submitted as objective evidence of implementation of the safety basis, a finding has been issued for corrective action.

The fire protection personnel were noted to be professional, knowledgeable, and well trained for their responsibility within the Fire Protection Program. This included the NNFD Fire Protection System Engineers and the ORNL Fire Department.

The ORNL Fire Department develops and maintains the Pre-Fire Plans for these facilities. All three Pre-Fire Plans were reviewed and found to adequately address the necessary hazards that may be encountered by emergency responders. The plans also provided comprehensive information for tactical consideration in a fire emergency.

To maintain sufficient resources to perform fire fighting effort, the ORNL Fire Department has received additional funding to replace an old pumper truck. The new crew cab truck is a 1500-gpm pumper, with a 750 gallon tank, and has a Class A rating. The replacement of this equipment is in line with the recommendations outlined in the 2003 Baseline Needs Assessment of the ORNL Fire Department.

The ORNL Fire Department conducts monthly fire extinguisher inspections. The inspection schedule requires each shift to rotate to a different quadrant of the ORNL. This process provides each firefighter the opportunity to walkdown and familiarize themselves with each building at least annually.

5.4 Industrial Safety – Hoisting and Rigging Program

The Hoisting and Rigging Program (H&R) was reviewed for Buildings 2026, 3525, and 7920 to assure that lifts are formally planned and approved, that qualified staff are used to administer H&R activities, that equipment is inspected and maintained, and that lifting accessory equipment is acceptably stored.

ORNL site-wide requirements for H&R are defined in the SBMS document "Hoisting and Rigging" and covers preparation steps, lift performance steps, operator qualifications, and inspection and maintenance. This procedure requires all lifts at ORNL to have an approved lift plan. It classifies lifts as Ordinary, Critical, or Pre-Engineered.

Each lift by a hoist or crane is required to be pre-approved in a lift plan by ORNL H&R subject matter experts. Work plans also document completion of requirements for preparing for and conducting lifts. Several work plans were reviewed during the conduct of this review. All work plans and lift plans reviewed showed evidence that this review and approval had occurred. For example, two work plans from 7920 for 2004 that involved H&R were reviewed. Copies of all required approvals, including Ordinary Production Lift Plans, were included in the packages.

Procedure NNFD-3525-OP-101 describes requirements for moving materials into and out of Building 3525 using the overhead crane. This procedure was signed and approved by the ORNL Hoisting and Rigging Manager, and serves the function of a Pre-engineered Lift Plan. However, the procedure does not incorporate requirements for monthly inspections or inspection records by local operators, as required by ORNL SBMS procedure "Inspection and Maintenance of Hoisting and Rigging Equipment." A separate file of monthly inspection records is maintained by 3525

management. Addition of the monthly operator's inspection requirement to the NNFD procedure would add to its completeness.

Facility supervisors and managers were interviewed and found knowledgeable regarding operating methods, inspection requirements, and approvals required for operating hoists and cranes in the 3 buildings under review. Also interviewed were the ORNL H&R Program Manager, who approved all Lift Plans, and the Fabrication Division Director who manages the annual inspection program for all ORNL hoists and cranes, and who also approves all lift plans.

An active crane operators training program is taught onsite by ORNL, using the actual cranes that the employees use on their jobs. Retraining is required every 3 years. Training for professional ORNL crane and hoist inspectors is provided by the Crane Institute of America.

Visual observations were made of cranes, hoists, and rigging equipment in Buildings 2026, 3525, and 7920. No ORNL crane operations or inspections were ongoing at the time of this review. The observations therefore did not include disassembly of the equipment or any actual testing. The following pieces of equipment were observed:

- Building 2026: Overhead Hoist IE 11012; 2nd floor dock 2-ton hoist IE 11017
- Building 3525: New Chester Crane for lid handling (currently being installed, adjacent to the High Bay area); 3-ton cranes in 3 of the hot cells; 750 pound General Mills manipulators; 10-ton crane; and chains, hooks, & nylon slings in the High Bay area.
- Building 7920:. 50 ton crane; 2-ton Yale Hoist IE 11445; small 3100 pound hoist in Transfer Cases; Hoists in Cubicles 1, 2, & 3; red-tagged hoist in Makeup area IE 12503 (has not been used for several years); JLG Scissor Lift in Room 201-B IE 12354; outdoors 50-ton crane; storage cabinet for nylon slings.

All cranes and hoists observed in the 3 buildings (except for the one that was red-tagged in 7920) under review were found to have current annual inspection and maintenance tags.

An independent review of ORNL's H&R Program was performed following a dropped hoist accident in Building 7930 on June 4, 2004. Several program areas needing improvement were identified. This resulted in corrective actions taken that addressed H&R throughout ORNL. The DOE Site Office also identified several areas for needed improvement including incorporation of the DOE H&R Standard into ORNL's work smart standards and SBMS. An implementation plan to address this DOE standard was issued by ORNL on December 8, 2004.

5.5 Conduct of Operations

The conduct of operations section of the review focused primarily on the procedural and guidance aspects of the order (Training Implementation Matrix) and how the NNFD organization has implemented the necessary aspects of the conduct of operations order.

The Standards Based Management System (SBMS) is the system by which ORNL implements requirements. SBMS is the platform upon which all functions of the Laboratory are defined and

integrated. The functions or processes are defined within a finite set of Management Systems. As outlined in the SBMS program descriptions for Conduct of Operations, the Conduct of Operations (COO) Program Description supports ORNLs' agenda for scientific and operational excellence within nuclear facilities. The program is specifically designed to meet the requirements of DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*, which is applicable to all category 1, 2 and 3 nuclear facilities at ORNL.

DOE Order 5480.19 requires that contractors use the Order in developing and reviewing directives, plans, or procedures relating to conduct of operation and use a graded approach during implementation. The UT-B Quality Assurance Program Description (QAPD) defines the concept of a graded approach which is used for many ES&H and quality related activities at ORNL. The graded approach discussed in the QAPD is also applicable to Conduct of Operations.

The NNFD procedure for implementation of Conduct of Operations, NNFD-011-R0-CN-3, *Conduct of Operations*, was reviewed by the assessment team and found to be clearly written and in conformance with the general tenets of the DOE Order 5480.19. The procedure was issued in late November and has had recent revisions to provide clarity and further definition of expectations for the various NNFD facilities.

Specific review emphasis was placed on evaluating the implementation aspects of the matrix contained in NNFD-011. Various facility specific documents were reviewed and interviews with operations personnel and System Engineers were conducted. Reviews of facility specific log sheets, operator round sheets, and various work control documents were reviewed for implementation with respect to the order. Since the procedure (NNFD-011) has recently been issued, the implementation status for each facility is somewhat varied and in many cases inconsistent with other NNFD facilities. The basics outlined in the procedure are generally addressed by each facility. However, no NNFD specific expectation or guidance outlining standard performance expectations has been identified. NNFD should evaluate each facility's manner of implementation and strive for consistency and cohesion (within NNFD) in performing the various operational activities that the Order outlines. Further review for implementation and standardization for NNFD facilities with the NNFD -011 should be undertaken by NNFD management to ensure that each facility in NNFD meets the expectations outlined in the implementation matrix.

Three issues were noted with respect to implementation aspects of COO. These included:

- NNFD is not conducting reviews of Standing Orders as required by NNFD-011.
- Safety related equipment and components are not adequately labeled at some NNFD facilities.
- Facility Manager logbook entries at Building 2026 lack adequate detail to describe the events that transpired during the operating shift.

These issues were noted as findings.

5.6 Quality Assurance

The quality assurance section of the review focused primarily on definition and staffing of the quality program, training, adequacy of procedures, software quality assurance, quality improvement (including assurance of corrective actions), and management and independent assessments. Calibration and testing and design control, although elements of quality assurance, are covered in other sections of this assessment report.

The upper tiered UT-B requirements for quality assurance are established in SBMS in the quality management system. Specifically, the Quality Assurance Program Description in this SBMS area is stated to be "specifically designed to meet the requirements of 10 CFR 830 Subpart A". The SBMS indicates that the QA Program Description (QAPD) is mandatory for nuclear facilities and non-mandatory for all other UT-B work programs. Review of the QA Program Description indicates that it provides a general and non-prescriptive description of how 10 CFR 830.122 is to be implemented at ORNL. The QAPD refers the reader to other SBMS sections for specific requirements on how the quality criteria are to be implemented. However, some areas of SBMS do not offer much more in the level of prescriptiveness than that provided in the QAPD. For example, 10 CFR 830.122 states "Specify, prepare, review, approve, and maintain records. (10 CFR.830.122 (d)(2))". However, the referenced SBMS area does not define specific requirements on how this is done at UT-B.

UT-B Quality Services has matrixed two Quality Assurance Specialists to provide technical support directly to NNFD. These QASs are primarily involved in the following activities:

- Technical support of the work control process including review of work packages to ensure that quality management requirements are being met.
- Data entry, tracking, and status reporting for actions and commitments contained in the UT-B Assessment and Commitment Tracking System (ACTS).
- Review of new issues for PAAA significance.

There are also other QASs that support the NNFD customer organizations, e.g. Chemical Sciences Division and Nuclear Science and Technology Division. These QASs support the NNFD QAS in the implementation of the quality program responsibilities for NNFD facilities.

Review of available procedures for NNFD indicated that twelve division level NNFD procedures have been prepared as well as numerous NNFD division level plans. At the 2026, 3525, and 7920 facility specific level, it was noted that a substantial number of procedures had been "blue sheeted" from the NNFD predecessor organizations including Metals and Ceramics, Chemical Technology Division, Nuclear Science and Technology Division, and Chemical and Analytical Sciences Division. "Blue Sheeting" is a term that indicates that the former procedure was adopted "as is" from the predecessor organization with a limited number of modifications denoted on a cover sheet. This "blue sheeting" was done for expediency so that the new NNFD organization could assume operations without having to stop and wait for procedural rewrites. A NNFD plan was prepared to control the procedural upgrade process entitled, NNFD-PLAN-012, *Project Plan for Procedure Improvement for Oak Ridge National Laboratory's (ORNL) Nonreactor Nuclear Facilities Division (NNFD)*. This plan identifies a schedule for the

evaluation of the "blue sheeted" procedures for adequacy followed by needed revisions and assignment of NNFD procedure numbers. The schedule indicates a lengthy review and revision period that extends into FY 2007. The largest number of these "blue sheeted" procedures were noted at 7920 where over 130 blue sheeted procedures exist. Although, this large number of 7920 procedures must be evaluated and revised (if needed), it was noted that the procedural management staff at 7920 had been terminated due to budget constraints. An observation was noted relating to this issue.

Qualification and training requirements and roles and responsibilities definitions were reviewed for System Engineers, Facility Managers, and TSR required minimum staff. Interviews with System Engineers and Facility Managers indicated that they were fully knowledgeable of their assigned systems. Review of training records for NNFD System Engineers and Facility Managers (3525, 2026, and 7920) indicated each had completed their required qualifications. Roles and responsibilities for these positions are also adequately described in NNFD documentation, e.g. R2A2s. At 2026 and 3525, however, it was noted that there is lack of clarity in the organizational assignments and duties for facility manager, facility supervisor, operations supervisor, and the research side managers. An observation was noted with respect to this issue.

At facilities 2026 and 3525, there are no minimum staffing requirements. At 7920, minimum staffing requirements are established which specify that during Operations and Limited Operations Modes there must be at least one technical staff member or qualified process technician/supervisor in the control room or within the REDC area and reachable by another person who is in the control room. During the assessment of 7920, the assessment team verified that these conditions were met (there were many qualified staff reachable and two or more staff within the control room).

The requirements for software quality assurance are established in the Software Quality Assurance SBMS subject area. These requirements specify that software must be graded in accordance with its importance and error consequences. Depending on the applicable grading, the software may require validation and formal configuration control. NNFD procedures for 3525 and 2026 establish additional software quality assurance requirements for nuclear material inventory tracking software (spreadsheets). For the facilities reviewed during this assessment, it was noted that the SBMS and NNFD requirements for software quality assurance had not been followed for the inventory tracking software, e.g. spreadsheets were not under configuration control and validation documentation was not present. A finding was noted to address this issue.

The assessment evaluated the NNFD practices for identifying and correcting problems and issues. Various assessment programs are implemented by NNFD or by external UT-B organizations:

- Maintenance and Operations Assessment – performance weekly by line management staff
- ES&H Routine Assessments – Managed by the NNFD ES&H Lead. Includes quarterly ES&H assessments of facilities as well as other ES&H functional assessments (e.g. NMC&A reviews, emergency management reviews).
- Operational Awareness Program (OAP) – independent walkthroughs managed by Quality Services (Spring 2004 was last OAP assessment of NNFD)

- Independent Oversight (IO) Assessment (August 3, 2003 was last complete assessment of NNFD)

Review of these assessment reports indicated that they were thorough and rigorous in evaluation of facilities, work processes, and management systems. In particular, the IO and OAP were good examples of the proper conduct of independent assessment programs. A proficiency was noted in this area. However, once an assessment has been completed and specific issues are noted for corrective action, a substantial program weakness exists in the follow-up and resolution of any noted problems. Specifically:

- There is no formal process whereby NNFD reviews and evaluates all issues identified during the various assessments to prioritize them for corrective action or to ensure management involvement in placing emphasis on timely correction.
- ACTS is not being adequately used for tracking of discrepant conditions noted during the various ES&H walkthroughs that are conducted.
- NNFD has not given attention to timely correction of numerous ES&H discrepancies noted during OAP assessments.

A finding was noted with respect to the above issue.

5.7 Maintenance, Testing, and Calibration

The maintenance, testing, and calibration section of the assessment focused primarily on the NNFD activities associated with ensuring reliability of safety class, safety significant, and defense-in-depth active and passive systems, structures, and components (SSCs).

For NNFD facilities, corrective and preventative maintenance is performed by NNFD Craft Services. Testing and calibration of gages, pressure switches, level switches, annunciators, alarms and other mechanical and electrical indicators associated with facilities SSCs is performed by the UT-B Facilities Management, Controls and Instrument Services (C&IS) Core Team. Calibration of radiological control instrumentation is performed by the UT-B Radiological Instrument Calibration staff. For non-radiological testing and calibrations, C&IS utilizes the ORNL Metrology Laboratory for primary calibration of their calibrators and instruments used for calibration (e.g. DVMs, bourdon pressure calibrators). Equipment and sources used for radiological instrument calibration is managed by the Radiological Protection program staff.

NNFD utilizes two primary interface systems for tracking and scheduling of maintenance, testing, and calibration activities:

- Facility and Maintenance Management Information System (FAMMIS) – used for corrective and preventative maintenance and routine non-instrument related system test (e.g. crane load tests, HEPA efficiency tests) tracking

- Maintenance Information and Data Acquisition System (MIDAS) – used for instrument calibration and testing services tracking.

To plan and implement corrective and preventative maintenance, FAMMIS interfaces with the Work Plan System (WPS) database and with a Craft Scheduling System. Though these interfaces, maintenance work plans can be automatically prepared, reviewed by appropriate staff, and approved. The electronic system will also allow scheduling of craft resources on a daily basis through a documented Plan of the Day interface. While, the automation of this process appears commendable on first view, those who utilize this process daily indicate that it is often cumbersome and difficult to use.

The UT-B Work/Project Planning & Control (WPPC) Management System contains the lab wide requirements for maintenance. Within this SBMS management system, the Work Control Subject Area contains the specific requirements applicable to nuclear facilities. Review of this Work Control area indicates that work within nuclear facilities must be assigned to one of four work categories:

- Grade 1: Nuclear Safety Equipment/Systems: Work that could affect the operation of a CAT 1, 2, or 3 Nuclear Facility. Grade 1 tasks are subdivided into 8 types (A-H) based on the definitions in the table below. These types are driven by the documentation and review requirements for work being performed.
- Grade 2: Life Safety, High Rigor Equipment, Facility Modifications
- Grade 3: Work activities not classified as Grade 1 or 2 that require job specific permitting for personnel safety, or a high level of coordination due to the fact that the work might have a significant impact on laboratory operations.
- Grade 4: Tasks that can be planned and safely performed by empowering workers to utilize their skill level and technical capabilities without direct field supervision.

A review of FAMMIS data, as well as several work package records, indicated that UT-B does not consistently utilize Grade 1 for work that could affect the operation of a CAT 1, 2, or 3 Nuclear Facility. The use of lower priority/risk grading levels for work on safety related structures, systems, and components may result in the lack of needed reviews and work controls with an associated reduction in the margin of safety. A finding was noted with respect to this issue.

For each of the three buildings assessed, records were reviewed to ensure that required calibrations and preventative maintenance were being scheduled and completed. This was done through review of round sheets, inspection of calibration and testing stickers, and reviews of calibration/testing data. In general, all inspected equipment, gages, and instruments had current calibrations and tests. One finding was noted relating to the need to complete a required annual test of the Building 3525 transfer switch.

The assessment team visited the UT-B Calibration and Instrumentation Services (C&IS) Core Team and conducted a review of their records supporting the testing of building 2026 cell differential pressure alarms. The records were well organized and all tests were performed using calibrated instruments that were traceable to primary standards maintained by the UT-B Metrology Laboratory. However, the records indicated that the alarm set points that were being used were not in accordance with the building 2026 operating procedure and system drawing. Specifically, the alarm was being set at -0.75 inches water gage pressure while the procedure

indicated that the set point was -0.5 inches of water gage pressure. While the error was in the conservative direction, it indicates that there is a need to reconcile actual testing and calibration practices against the approved version of operating procedures.

At present NNFD has developed aging equipment lists of safety related SSCs. However, they have not fully implemented plans to ensure that needed attention is applied so that potential failures are predicted and needed repairs/maintenance is scheduled to prevent these failures. A predictive maintenance plan for NNFD is scheduled to be completed by April 1, 2005. Aging equipment plans must also be completed and approved.

In the event of unexpected equipment failures for safety related SSCs, there is a potential that operational restart could be adversely affected as there are presently no spare parts programs for this equipment. Also the System Engineers have not developed critical spare parts lists as required by the System Engineering SBMS subject area procedure: *Providing Technical Support for Operations and Maintenance Activities.* A finding was noted with respect to this issue.

5.8 Configuration Management and Unreviewed Safety Question Determination Process

The assessment reviewed the management systems and controls for configuration management of changes to procedures, work processes, and nuclear facility SSCs. Specifically, the following administrative control processes were reviewed:

- Document Control
- Engineering Configuration control, and
- Unreviewed Safety Question Process for Nuclear Facilities

Document control is implemented for NNFD procedures to ensure that procedures issued reflect the work practices that are intended to be implemented and to ensure that those using a given procedure have the most recent version. The NNFD requirements for document control are contained in the SBMS Subject Area: *Document Control.* Procedure history files are maintained in the Laboratory Records area for NNFD procedures. History files were reviewed for randomly selected facility procedures from 2026, 3525, and 7920. The files were well maintained and contained adequate evidence that the procedures were validated by facility staff and revised as needed. Given that the most current versions of NNFD Division Level and facility level procedures are located on the ORNL internal web, there should be no issues with document control.

Engineering configuration control for SSC configuration items is controlled at the lab-wide level by the SBMS Subject Area, *Configuration Management* and for nuclear facility safety related SSCs through the SBMS Subject Area: *System Engineering.* NNFD has also established a Division Level procedure for configuration management: NNFD-002, *Change Control of Safety Structures, Systems, or Components.* This procedure requires the development and maintenance of a Configuration Item (CI) list for each safety related system (safety significant, safety class, and defense-in-depth). These lists were reviewed for 3525, 2026, and 7920 and found to be consistent with the systems identified as safety related in the TSRs and SARs. The CI Lists specified the systems that are under configuration management and the associated drawings. It

was noted that the CI List for 7920 was much more descriptive in detail than the CI lists at 2026 and 3525.

Interviews with System Engineers indicate that they are involved when changes are proposed for CIs on the systems that are responsible for. Work packages for recent configuration changes were reviewed. These packages indicated that NNFD-002 was being implemented. It was noted, however, that there have been no recent changes where Change Control Boards were established and utilized. Typically configuration reviews occur through an additional form added to the work package review and approval process.

The Unreviewed Safety Question process is controlled at the lab-wide level through the SBMS Subject Area, *Unreviewed Safety Question (USQ) Process for Nuclear and Facility Safety*. Review of the Unreviewed Safety Question process implementation for NNFD was limited to ensuring that a USQ Screen or USQ Determination (USQD) was completed when changes were made to nuclear facility work processes, facilities, procedures, etc. The technical adequacy of the specific USQ Screen or USQD was not evaluated in-depth during this review. For any work package reviewed that involved a modification and for all procedures developed and revised, a completed and approved USQ Screen or USQD was also present in the documentation. Typically these documents were prepared by one of the NNFD Safety Basis Engineers assigned as technical support to NNFD from UT-B Nuclear and Facility Safety Services. No issues were noted with the USQ process implementation.

5.9 Radioactive and Hazardous Waste Management

NNFD activities in buildings 2026, 3525, and 7920 were reviewed to determine whether solid and liquid wastes generated were being managed in compliance with applicable procedures and requirements. Walkthroughs of the facilities were conducted, key waste management personnel were interviewed, and procedures and required documentation were reviewed. The facilities generate a variety of solid and liquid waste types, including low level, RH- and CH-TRU, hazardous, and mixed.

Requirements for radioactive wastes originate with DOE Order 435.1 and flow through DOE Manual 435.1-1, the approved 435.1 Implementation Plan, the UT-B Radioactive Waste Management Basis, and facility procedures.

Solid wastes are typically prepared and documented for transfer to Bechtel Jacobs (BJC) or their subcontractors for storage, treatment, and disposal. The Implementation Plan approved in accordance with DOE Order 435.1 allows wastes to be staged for up to 120 days to allow for necessary characterization and reviews. NNFD has not promulgated requirements for inspections of containers, as a best management practice, while staged. Prior to staging, some non-hazardous SLLW wastes are collected in bags and moved to central locations within the facilities. NNFD has not promulgated requirements for documenting the types or origins of wastes collected in this manner, or the dates they were generated. This lack of documentation is inconsistent with the requirement of the Radioactive Waste Management Basis to maintain cognizance of the waste characteristics. In addition, NNFD procedures state that the LLW staging requirement do not start until the wastes have been certified. This is inconsistent with the intent of DOE O 435.1 in

that it allows LLW to be stored in unlimited quantities for an unlimited time with no management standards. It was noted that one facility maintains an informal log of some of the bags being collected to facilitate completion of the characterization forms, but generation dates are not recorded.

Hazardous wastes are collected in satellite accumulation areas subject to ORNL-level requirements. These wastes are typically transferred to 90-day accumulation areas managed by the Laboratory Waste Services organization. One instance of an improperly closed container was noted in an SAA; an observation was noted.

Liquid wastes and process wastewaters are collected in tanks or containers for treatment and disposal by BJC. Some recordkeeping requirements for liquid wastes were not being met resulting in one finding being issued. Some building drains are connected to the storm drain system and are therefore subject to site Stormwater Pollution Prevention requirements. An open bucket of oil was noted to be present on the floor in the 7920 mechanical room; this could potentially spill into a floor drain. An observation was noted for this issue.

All wastes are documented to ensure that the waste acceptance criteria of the receiving facility are met. Representatives from the receiving facility must review and approve each waste accepted. The generator is not required to maintain copies of the documentation.

Overall, NNFD solid and liquid wastes are well managed. Personnel interviewed were well aware of and generally met the compliance and documentation requirements. Some gaps were identified, and some of those were mitigated by specific circumstances described within the findings.

5.10 Radiological Materials Inventory Control

This section of the assessment primarily focused on the work processes utilized by NNFD for the control of facility radiological inventory to ensure that the authorized limits contained in the Safety Basis Documents are not exceeded:

- 2026 – The sum of fractions of the in-house inventory and the category 2 values from DOE-STD-1027 cannot exceed 1. Fissile material inventory cannot exceed the Significant Amount of Fissionable Material (SAFM) which is equal to the fissile threshold of DOE-STD-1027 for a category 2 facility (90% of the critical mass).
- 3525 --The total inventory of radioactive materials within Building 3525 is maintained below the source term limits assumed in Chapter 3 of the Building 3525 Safety Analysis Report Table 3-8. The inventory of fissionable isotopes permitted in the IFEL will not exceed the amounts authorized in the Nuclear Criticality Safety Approvals (NCSAs) conditions of approval. For the hot cells, charging area, and 2nd floor shielding area, the allowable inventory is the equivalent of a HFIR core.

- 7920 – The total inventory cannot exceed the limits specified in the Safety Analysis Report including 140,000 Ci of Actinides (Np, Pu, Am, Cm, Bk, Cf, Es, Fm) and 340,000 Ci of activation Products. The fissile mass limit is approximately 43% of the SAFM.

Each facility has unique and separate tracking system software (Excel spreadsheets) as an administrative tool to ensure that the inventory limits are not exceeded. Typically, the software contains internal limits to prevent inadvertent exceedence of the SAR specified limits (e.g. do not exceed 80% of the SAR limits). As noted in the Quality Assurance section of this report, the software quality assurance program for these tracking programs was not fully adequate resulting in issuance of a finding.

Facility staff responsible for tracking the inventories were interviewed and found to be knowledgeable of the use of the tracking systems. All indicated that the inventories were being maintained up-to-date. Comparison of the inventory tracking procedures for 3525 and 2026 with actual work practices indicated some discrepancies, e.g. decay corrections for the 3525 inventory have not been conducted as specified in the procedure. An observation was issued to address these discrepancies. It was also noted that there is no written operating procedure or program document for the Building 7920 tracking system. The 7920 TSR specifically requires that a program and/or procedures exist for controlling inventory. A finding was issued with respect to this issue.

6.0 CONCLUSION

The results contained in this report indicate that, within the scope of this assessment, UT-B NNFD has implemented the safety management programs and technical safety requirements required by the safety basis documents. However, numerous issues were identified that relate to weaknesses in the implementation of these documents and associated UT-B/NNFD procedures. Key areas of weakness include system engineering, conduct of operations, corrective action management, and software quality assurance.

APPENDIX I

ASSESSMENT LINES OF INQUIRY

APPENDIX I
LINES OF INQUIRY

QUALITY ASSURANCE (ORGANIZATION):

(1) A qualified Facility Manager (FM) and backup FM have been assigned.
(2) Training records indicate that the current FM and backup have completed their training requirements.
(3) SOPs or other controlled documents have been prepared that define Facility Manager roles and responsibilities and provide standard processes for conducting Facility Manager duties.
(4) Facility Management SOPs contain verbage that implements the responsibilities defined in the TSR.
(5) The Facility Manager is in the review and approval loop for all configuration changes.
(6) Interviews with the FM and backup FM indicate that both are fully aware of the details of the TSR, DSA, and SER.
(7) Review of records and observations of work indicate the Facility Manager is available during operations.
(8) The project has adequately defined what it means to be "AVAILABLE".
(9) The Facility Manager is available by telephone during periods of non-operation.
(10) The transfer of responsibility from the primary to the backup is done in a formal and documented manner with signature acknowledgement of both parties.

QUALITY ASSURANCE (TRAINING AND PROCEDURES):

(1) A FM training program is in place. The FM and backup have a formal qualification program and have both completed this qualification program. Retraining is provided at a defined frequency.
(2) A process is in place which ensures that Facility Manager consistently and routinely reviews the training adequacy of the Operations Supervisor and staff that conduct facility activities.
(3) Job task analysis has been performed to define the types of workers involved in operations and operation s support.
(4) Training needs assessments have been conducted for each worker category defined.
(5) Training requirements have been translated into job specific training requirements e.g. qualification standards, training requirements matrices, etc.
(6) Training/qualification procedures or plans are in place that defines the training program.
(7) Training requirements are tracked to ensure that all required staff is current with respect to their training needs.
(8) Training records are maintained in a retrievable and complete manner.
(9) Training covers the required elements of the TSR:
Facility workers shall be trained to evacuate in case of an emergency.
Facility workers shall be trained to notify the LSS in case of an emergency.
(10) A procedure is in place that controls how procedures are prepared and issued.
(11) Procedures define the specific conditions that define normal, abnormal, and emergency operations.
(12) Evidence exists that proves that procedures have been verified for accuracy and completeness by staff knowledgeable of the operations and by workers involved in the operations.
(13) Procedure walk downs have been done to ensure that procedures can be implemented as written.
(14) Records of procedure reviews are maintained in a retrievable manner.
(15) USQD screens are performed for all procedure modifications.
(16) A document control system is in place which ensures that the user has only the correct version of the procedure.
(17) Inspection of various procedures that are in use indicates that the document control system is working.
(18) The conditions for abnormal operations include all reasonably potential abnormal conditions.

QUALITY ASSURANCE (ASSESSMENTS):

(1) An assessment schedule exists that shows that management and independent assessments are being planned and conducted.
(2) Assessment plan indicates that the required independent assessment elements contained in the TSR are being covered at a defined frequency.
(3) Assessment reports indicate that assessments are being conducted as planned.
(4) Standard operating procedures are in place for the types of assessments being conducted.

(5) Periodic management self-assessments are performed in accordance with the Quality Assurance Program to verify effective implementation.
(6) Assessment issues are entered into ATS and tracked until completion.

SYSTEM ENGINEERING (Active Safety Systems and Passive Design Features) :
(1) A System Engineer is designated for each active safety system.
(2) Review of records and interviews with the System Engineers indicate that they are trained and qualified and are adequately knowledable of the assigned system.
(3) A System Engineering procedure is in place that defines duties of System Engineer and provides standardized processes for implementation of these duties.
(4) Active safety systems and Design features are under formal configuration control to prevent changes from being made that could change their safety features.
(5) Active safety systems and design features are under a routine surveillance and maintenance program that ensures integrity for the Credited features.
(6) Procedures and/or plans are written that institutionalize the surveillance/maintenance (S&M) of these systems and design features.
(7) Records indicate that S&M is occurring as required.
(8) Safety basis-related technical, functional, and performance requirements for the system are identified/defined in appropriate safety Documents.
(9) Safety/Authorization Basis documents identify and describe:
- the system safety functions and the safety functions of any essential supporting systems, and
- the system requirements and performance criteria that the system must meet to accomplish its safety functions.

(10) Changes to safety basis-related requirements, documents, and installed components are controlled:
- Changes to system safety basis requirements, documents, and installed components are designed, reviewed, approved, implemented, tested, and documented in accordance with controlled procedures.
- Consistency is maintained among system requirements and performance criteria, installed system equipment and components, and associated documents as changes are made.
- Limited technical walkdown of selected system components verifies that the actual physical configuration of these components conforms to documented design and safety basis documents for the system.
- Changes to system safety basis requirements, documents, and installed components conform to the approved safety authorization basis (safety envelope) for the facility, and the appropriate change approval authority is determined using the Unreviewed Safety Question (USQ) process.
- Facility procedures ensure that changes to the system safety basis requirements, documents, and installed components are adequately integrated and coordinated with those organizations affected by the change.
- Software used in system instrumentation and control (I&C) components that perform functions important to safety is subject to a software quality process consistent with 10 CFR 830.120.

(8) The system is maintained in a condition that ensures its integrity, operability and reliability.
- Maintenance processes consistent with the system safety classification are in place for prescribed corrective, preventive, and predictive maintenance, and to manage the maintenance backlog.
- The system is periodically walked down in accordance with maintenance requirements to assess its material condition.
- For applicable cylinders, a method for preventing water in-leakage has been implemented.

(10) Surveillance and testing of the safety system demonstrates that it is capable of accomplishing its safety functions and continues to meet applicable system requirements and performance criteria
- Requirements for surveillance and testing are adequate for demonstrating overall system reliability and operability, and are linked to the technical safety basis.
- Surveillance and test procedures confirm that key operating parameters for the overall system and its major components are maintained within operating limits.
- Instrumentation and measurement and test equipment for the system are calibrated and maintained.

CONFIGURATION MANAGEMENT:

(1) Any changes to the safety-significant SSCs (active safety systems and design features) are implemented through the configuration control process.
(2) A formal and documented Configuration Management Plan exists and is being implemented.
(3) The Facility Manager is integrally involved in the approval of Configuration changes.
(2) A configured items list is in place so that all clearly know what is under strict configuration control and what is not.
(3) Changes to all facility features are implemented through a DOE-approved Unreviewed Safety Question Determination (USQD) process.
(4) Spare parts inventories are identified, documented, and maintained controlled.
(5) Replacements and repairs are under formal configuration control.
(6) A list of configuration control items is in place and is approved.
(7) Engineering data sheets are available for Configuration Control Items.
(8) Inspection are conducted to provide information as to whether design features are providing their credited function.
(9) The frequency of inspections and surveillances is adequate.
(10) Acceptance criteria are defined for inspections which provide a basis for determination as to whether a repair is needed.

EMERGENCY MANAGEMENT:

(1) Has the Hazard Survey been completed.
(2) Has the Hazard Analysis been completed.
(3) Has the Emergency Action Level (EAL) been completed.
(4) Has the Facility Emergency Plan been completed.
(5) Are the Hazard Survey, Hazard Assessment, and the Emergency Action Level developed in accordance with DOE and ORO requirements.
(6) Are the consequence assessment portions of the Hazard Assessments properly translated into the EALs.
(7) Are the Hazard Survey, Hazard Assessment, and EAL provided to the site lead contractor.
(8) Are the hazards and inventory of material used in Hazard Assessment consistent with those used for the safety basis documentation. If not, are the differences well understood.
(9) Are requirements in place for facility employees to report abnormal or emergency conditions at the facility and do they specify to whom these reports are to be made.
(10) Are the required notifications for an emergency contained in a checklist/procedure.
(11) Does the notification checklist/procedure contain all necessary contact numbers and means.
(12) Are warning and communications systems effective for timely warning of and communication about an emergency to all onsite personnel.
(13) Are provisions in place to account for all facility personnel within a reasonable time of emergency evacuation.
(14) Are provisions in place for timely evacuation of personnel, if necessary, including evacuation criteria, procedures, transportation, and routes.
(15) Are evacuation routes and assembly areas clearly marked. Are they consistent with site and facility documentation.
(16) Are provisions established and maintained for training onsite personnel on their actions in the event of an emergency.
(17) Does training include personnel onsite who may have to take protective actions in the event of an emergency. Is the training required every 2 years, at a minimum. Is it adequate.
(18) Does a formal training program provide initial and annual training for the facility emergency personnel.
(19) Are emergency exercises conducted annually.
(20) Is there a system for documenting findings and lessons learned, assigning responsibility, and tracking issue resolution.
(21) Have personnel been drilled on the emergency procedures.
(22) Have Emergency Wardens been assigned and have they received the site-specific training required for assignment as an Emergency Warden

HOISTING AND RIGGING:

(1) Lifts involving radiological/hazardous materials or which may affect safe facility operations are formally planned and approved before they are permitted.
(2) Critical lift plans are prepared when needed
(3) Preengineered lift plans are not utilized for nonroutine lifts or specialized lifts
(4) Qualified staff are available to serve as Person In Charge or Designated Leader for lifts.
(5) The following equipment are inspected and maintained at prescribed intervals:
- Overhead and Gantry Cranes
- Hoists
- Mobile Cranes
- Forklifts
- Slings
- Below-the-Hook Lifting Devices
- Rope

(6) An inspection of lifting equipment indicates that it is kept in a acceptable storage area and is in good condition.
(7) A review of selected lift plans indicate that they adequate define the conditions of the lift and have adequate controls in place for the lifts.

USQD PROCESS:

(1) The project is adhering to the DOE approved USQD procedure for screens and USQDs
(2) USQD reviewers and preparers meet specified training requirements.
(3) Project specific USQD records are well maintained

FIRE PROTECTION PROGRAM:

(1) The Fire Protection Program develops and maintains effective fire protection and suppression measures for the protection of personnel and facilities in accordance with the UT-B and applicable DOE requirements.
(2) UT-B Fire Department Operations are responsible for inspection, testing, and supervision of fixed fire protection systems, building inspections for fire safety, fire-fighting, and fire-fighting training.
(3) The UT-B Fire Protection Program features for the facility shall be characterized by fire prevention and fire control as outlined below:
- Fire Prevention
- control of combustible loading, hot work, and combustible/flammable liquids;
- facility inspections and finding resolution; and
- over sight of hot work activities.
- Fire Control
- fire protection systems;
- testing of fire protection systems;
- Fire Department response;
- prefire plans including fire-fighting techniques compatible with operational activities;
- fire watches (as necessary);
- fire barriers; and compensatory measures for Fire Protection Program elements as determined by the Fire Protection Engineering

(4) The UT-B Fire Department executes the following responsibilities by maintaining sufficient resources to perform:
- fire ground management,
- emergency rescue,
- emergency medical services,
- interior structural fire fighting,
- inspection, testing, and
- maintenance of fixed fire protection systems, portable fire extinguisher inspection, testing, and servicing, and training activities for UT-B fire department personnel.

(5) Combustibles control program is written and in implemented in complete conformance to TSR.
(6) Procedures and training are in place to implement fire protection program.

(7) Facility sprinkler system is maintained in accordance with standards and requirements and maintenance is scheduled and documented.
(8) Facility inspection indicates that combustible control program is being met and that fire protection equipment is maintained in good condition.
(9) Records of combustible control program implementation are complete and adequate for all periods of operations.

CONDUCT OF OPERATIONS:
(1) Approved Conduct of Operations matrix is in place.
(2) Elements of approved Con Ops matrix are addressed in project procedures.
(3) Facility shift logs are detailed, up to date, and legible. Logs demonstrate that the activities that occurred are fully described. Logbooks are signed and periodically reviewed.
(4) Control room operations are in conformance to DOE Order 5480.19.
(5) Facility labeling and postings are in conformance to DOE Order 5480.19
(6) A controlled system of Operator Aids is established.
(7) A controlled system of Timely Orders is in place
(8) A controlled system of Required Readiing is in place
(9) Emergency communication systems are effectively and properly used.
(10) Procedures and training address what to do with respect to emergency actions that depart from an approved TSR. Such actions may be taken when no actions consistent with the TSR are immediately apparent, and when these actions are needed to protect workers, the public, or the environment from imminent and significant harm. The approval authority for such actions is defined (e.g. Facility manager or designee).
(11) If emergency action is taken, procedures requires that a verbal notification be made to DOE Oak Ridge and a written report shall be made to DOE Oak Ridge as soon as practical.
(12) Project procedures address occurrence reporting requirements that are in compliance with contract and DOE requirements.
(13) Project personnel understand reporting requirements.
(14) Occurrences are reported and tracked until closure in accordance with UT-B procedures and contract requirements.
(15) Review of recent occurrence reports indicate compliance with requirements.
(16) Project procedures address required response to AC violations. Documented AC Violations are in compliance with the TSR requirements.

APPENDIX II

DOCUMENTS REVIEWED, STAFF INTERVIEWED, FACILITY WALKTHROUGHS CONDUCTED, AND WORK OBSERVED

1.0 STAFF INTERVIEWED

Name	Function	Facility	Organization
Mike Pierce	Facility Manager	2026	NNFD
Ed Benson	Operations Supervisor	2026	NNFD
Terry Collins	HVAC SE	4500-N	NNFD
Phil Watts	Mechanical SE	4500-N	NNFD
John Keller	Operations Manager	2026	CSD
Elvira Hodges	ESH&Q Lead	3047I	NNFD
Ron Keith	Procedures Manager	3047	NNFD
David Renfro	Nuclear Facility Safety Services	4500-S	OSSD
Dale Caquelin	Facility Manager	3525	NNFD
Tom Kenney	Operations Supervisor	3525	NNFD
Craig Green	Maintenance Manager	3104	NNFD
Steve Layendecker	Work Control Lead	3104	NNFD
Mike Ritchie	Operations Manager	7920	NNFD
Rod Brewer	Operations Supervisor	7920	NNFD
Roger Weaver	Shift Supervisor	7920	NNFD
Porter Bailey	Operations Supervisor	7920	NNFD
Marvin Lowery	HVAC SE	4500-N	NNFD
Gerald Sullivan	Instrumentation SE	7920	NNFD
Tom McConnell	Facility Supervisor	7920	NNFD
Kevin Felker	Facility Engineer	7920	NSTD
Dean Campbell	Safety and Health	3047A	NNFD
Wayne Evans	Environmental Compliance	7920	NNFD
Robin Taylor	Environmental Compliance	7920	NSTD
Ken Wilson	Facility Manager	7920	NNFD
Greg Chitwood	Quality Services	3047	QSD
Bob Lively	Maintenance Manager	2033	C&IS
Linda Crews	Records Management Systems	4500-N	RMS
Ed Rosenbaum	Training Manager	3047	NNFD
Don Coffey	Waste Services	2518	EP&WS
Rachel Murphy	Waste Services	2518	EP&WS
Darrell Daugherty	Waste Services	2518	EP&WS
Don Shupe	Hoisting/Rigging Program	7077A	OSSD
David Milan	Emergency Preparedness Mgr.	1503	LPD
Jeff Long	Emergency Preparedness	1503	LPD
Rick Rodriguez	Emergency Preparedness	1503	LPD
Claude Robison	Fabrication Division Director	7012	F&O
Art Osborne	Hoisting & Rigging Trainer	2661	TRS
Jeff Sipes	Fire Protection SE (7920)	1000	NFSS
Brent Albertsen	Fire Protection SE (2026 and 3525)	1000	NFSS

David Baity	ORNL Fire Department Manager	2500	LPD
Michael Masters	Fire Protection Engineer	2500	LPD
Keith Yahr	Fire Department, Shift Commander	2500	LPD
Howard Freeman	Inspection Technologist	5500	F&O

2.0 DOCUMENTS REVIEWED

Safety Basis Documents:

- *Technical Safety Requirements, Irradiated Fuels Examination Laboratory*, ORNL/3525/TSR Revision 1
- *Safety Analysis Report, Irradiated Fuels Examination Laboratory*, ORNL/3525/SAR Revision 0
- *Safety Analysis Report, Radioactive Materials Analysis Laboratory*, ORNL/2026/SAR, Revision 4
- *Technical Safety Requirements, Radioactive Materials Analysis Laboratory*, ORNL/2026/TSR, Revision 4
- *Safety Analysis Report, Radiochemical Engineering Development Center Building 7920*, SAR/7920-CTD/01 R1
- *Technical Safety Requirements , Radiochemical Engineering Development Center Building 7920*, TSR/7920-CTD/01 R1

Standards Based Management Subject Areas and Associated Procedures:

- *System Engineering*
- *Work Control*
- *Fire Protection, Prevention & Control*
- *Hazardous and Mixed Waste Management*
- *Hoisting and Rigging*, 12/17/2004
- *Nuclear Materials Control and Accountability*
- *Radioactive Waste (Nonwastewaters) Management*
- *Software Quality Assurance*
- *Wastewater, Managing*
- *Fire Protection Program Description*
- *Used Oil Management*
- *Compressed Gas Cylinders and Related Systems*
- *Chemical Safety*
- *Welding, Burning, and Hot Work*
- *Program Description: Quality Assurance Program*
- *Document Control*

ORNL Site Wide Documents:

- Radioactive Waste Management Basis
- Procedure: *Planning Solid Radioactive Waste Generation and Setting Up New Radioactive Waste Staging Areas*

- Procedure: *Managing and Packaging Radioactive Waste*
- Exhibit: *Posting, Labeling, and Control of Radioactive Materials*
- Procedure: *Hazardous and Mixed Waste Management*

NNFD Plans:

- NNFD-PLAN-014, *FY05 NNFD Maintenance and Operations Assessment Plan*
- NNFD-PLAN-003, *FY04 Performance Assessment Plan for the Nonreactor Nuclear Facilities Division*
- NNFD-PLAN-004, *FY04 Environmental, Safety, and Health (ES&H) Assessment Plan for Nonreactor Nuclear Facilities Division (NNFD)*
- NNFD-PLAN-007, *Training Implementation Project Plan for ORNL Nonreactor Nuclear Facilities Division (NNFD)*
- NNFD-PLAN-010, *Nonreactor Nuclear Facilities Division (NNFD) System Engineering Project Plan*
- NNFD-PLAN-014, *FY05 NNFD Maintenance and Operations Assessment Plan*
- NNFD-PLAN-015, *Fiscal Year 2005 (FY05) Environmental, Safety, and Health (ES&H) Assessment Plan for Nonreactor Nuclear Facilities Division (NNFD)*
- NNFD-PLAN-012, *Project Plan for Procedure Improvement for Oak Ridge National Laboratory's (ORNL) Nonreactor Nuclear Facilities Division (NNFD)*

NNFD Division Wide Procedures:

- NNFD-011-R0-CN-3, *Conduct of Operations*
- NNFD-003, *Document Control*
- NNFD-009, *Training Qualification Program Plan*
- NNFD-007 2 NNFD, *Roles, Responsibilities, Accountability, and Authorities (R2A2s)*
- NNFD-004, *Work Control*
- NNFD-2, *Change Control of Safety Structures, Systems, or Components*

Building 2026 Facility Specific Standard Operating Procedure:

- NNFD-2026-OP-100-R1-CN-1, *Building 2026 Nuclear Material Inventory Control*
- NNFD-2026-OP-101, *Facility Round Sheets*
- NNFD-2026-OP-103, *LLLW Round Sheets*
- CASD-OP-RML-FM02, *Heating and Ventilation System Operating Procedure for the Radioactive Materials Analytical Laboratory (RMAL), Building 2026*
- NNFD-2026-OP-102 *Discharging Liquids to LLLW Drains*
- NNFD-2026-AP-001, *Building 2026 Combustible Control Procedure*
- CASD-OP-RML-FM03, *Emergency Operating Procedure for the Radioactive Materials Analytical Laboratory (RMAL) Building 2026*, 4/16/2003

Building 3525 Facility Specific Standard Operating Procedures:

- NNFD-3525-AP-001, *Building 3525 Combustible Control Program*
- NNFD-3525-OP-100, *Building 3525 Radioactive Material Inventory Control Program*
- NNFD-3525-OP-101, *Moving Shielded Carriers, Casks, and Shipping Drums Using the Overhead Crane*
- NNFD-3525-OP-102-R1-CN-1, *Routine Checks of Facility Systems*
- NNFD-3525-OP-103, *Operation and Testing of the Building 3525 Ventilation System*

Building 7920 Facility Specific Standard Operating Procedures:

- REDC FO/WH 4010 *REDC Radioactive Solid Low Level Waste Certification Procedure*
- REDC FO/WH 5100 *Certification, Packaging, and Disposition of CH-TRU Waste at REDC*
- HCOP 1100 *Disposal of F-126 Contents to Melton Valley MCS Waste Tank F-1800*
- REDC FO/WH 5200 *Certification, Packaging and Disposition of newly-Generated, RH- TRU Solid Waste at Building 7020 of the REDC*
- REDC FEG 020 *RH Waste Removal from the REDC Cell Bank to a Waste Cask*
- HCOP 0206 *Scrubbing of the Organic Extractant in T-40*
- Form ORNL-RWC, Rev. 1, 12/27/04 *ORNL Radioactive Waste Container Log Sheet*
- NNFD-7920-AP-002, *Combustible Control Procedure*
- REDC-FD-001 Facility Drills, Rev. 0, 7/18/2003

Configured Items Lists:

- NNFD-CI-3525, *Non-Reactor Nuclear Facilities Division Building 3525 Configuration Items List*
- NNFD-CI-2026, *Non-Reactor Nuclear Facilities Division Building 2026 Configuration Items List*
- NNFD-CI-7920, *Non-Reactor Nuclear Facilities Division Building 7920 Configuration Items List*

System Engineer Assessments: In-Service Inspections and Assessments:

- Building 2026, 3525, and 7920 Ventilation Systems
- Building 2026 and 3525 Hot Cell and Glovebox Systems
- Building 2026 Radiation Monitoring Systems

Work Packages and Maintenance Job Requests:

- Hoisting and Rigging Related Work Packages

  - ORNL Work Plan Manipulator (MSM) Removal and Installation, Building 2026, Room 108, and Operational Areas and Other MSM Locations. -This Work Plan included a Pre-Engineered Production Lift plan, approved by ORNL management and the Hoisting & Rigging Program Manager.
  - ORNL Building 7920 Work Plan MP 276863 Rev. 0, Install Conduit Mast, 8/23/2004, including Ordinary Production Lift Plan, and Job Hazard Evaluation.
  - ORNL Work Plan MP 261051 Refurbish 7920 Decontamination Facility Glovebox, 9-15-2004, including Ordinary Production Lift Plan, and Job Hazard Evaluation.
  - Building 3525 Work Plan IFEL-WP-2004-25, Rev. 2, Top Loading Casks. This plan required use of the Pre-Engineered Lift Plan NNFD-3525-OP-101.
  - Building 3525 Work Plan IFEL-WP-2004-28, Horizontal Cask, 12/10/2004. This plan required the use of the Pre-Engineered Lift Plan NNFD-3525-OP-101.
- 2026 Work Packages:
  - Installation of fitting in hot cell 6
- 3525 Work Packages
  - MW PMS G2/2, K-8 Maintenance (10/18/04)
  - IFEL-WP-2004-4, HEPA Filter Inspection and Testing (9/30/04)
  - HRLEL Autohandler Maintenance (8/23/04)
- 7920 Work Packages:
  - MJR MP284454
  - MJR MP284456
  - MJR MP283422

Other Records:

- Implementation Plan for DOE Order 435.1
- IO-2003-10: Evaluation of Nuclear and Operations Safety Systems and Performance Assessment in the Non-Reactor Nuclear Facilities Division, August 1, 2003
- Form ORNL-RWC, Rev. 1, 12/27/04 *ORNL Radioactive Waste Container Log Sheet*
- C&IS Differential Pressure Gage Calibration Files for Measurement of DP between 2026 Cell 6 and Room 108:
  - Pressure switch check (PE-10)
  - Gage calibration
  - Strip chart Recorder check
- Numerous USQD Records for procedures changes and system modifications
- Numerous Maintenance Job Requests as found on FAMMIS
- MIDAS Instrument Calibration Recall listing for Building 7920
- Configuration control package for CCM No. 3019-01-23
- Facility Manager Logbooks for 7920, 3525, and 2026

- Operational Round Sheets for Building 2026, 7920, and 3525
- 2026 Weekly Annual Pressure Check Sheets
- Operational Awareness Program (OAP) Assessment Reports for 3525, 2026, and 7920
- Procedure History Files for Building 2026, 3525, and 7920 Procedures
- Training/Qualification Records for Seven System Engineers
- Objective Evidence of Implementation of the Revised Building 2026 Safety Basis
- Objective Evidence of Implementation of the Revised Building 3525 Safety Basis
- Nuclear material inventory reports at 2026, 3525, and 7920
- Engineering drawings for ventilation systems at 3525 and 7920
- LLLW Discharge Logbook for 2026
- Quarterly Hot Cell Drain Tests for 2026
- Weekly Drain Lines Tests for 2026
- Weekly Annulus Pressurization Gauges Checks for 2026
- Radioactive Waste Management Basis Documents
- Implementation Plan for DOE Order 435.1
- ORNL/2026/EMHA, *Emergency Management Hazard Assessment for the Radioactive Materials Analytical Laboratory Building 2026*, 3/12/2004
- ORNL/3525/EPHA, *Emergency Planning Hazards Assessment for the Irradiated Fuels Examination Laboratory Building 3525*, 9/1/2004
- ORNL/OLP-EP/HA-3525, *Oak Ridge National Laboratory Emergency Management Hazards Assessment for the M&O Contractor Nuclear Facility 3525*, 12/5/2002
- ORNL-X-GP-25, Local Emergency Squads at ORNL, 12/18/2000
- Emergency Planning Hazard Assessment for the Radiochemical Engineering Development Complex, Bldg. 7920, 10-1-2004
- ORNL-X-GP-26, Rev. 0, ORNL Operational Emergency Accountability for Personnel, 9/3/1996
- Monthly Hoisting Equipment Certification Record for Cranes in 3525, 8/19/2004.
- ORNL Implementation Plan for DOE-STD-1090-2004, Dec. 8, 2004. This covers implementation of the DOE Hoisting & Rigging Standard into ORNL SBMS.
- ORNL Bldg. 7920 Hoisting & Rigging Program Pre-Engineered Production Lift Plan, for transferring Mark 42 segments from Mark 42 storage facility to Cubicle 7, 9/24/2004.
- ORNL Bldg. 3525 Hoisting & Rigging Program Ordinary Production Lift Plan, for moving a lifting fixture from the Truck Bay to the Glove Maintenance Room airlock, 10/12/2004.
- ORNL Bldg. 3525 Hoisting and Rigging Program Ordinary Production Lift Plan, move 15,000 pound load loop cask using overhead crane, 12/2/2004.
- Building 7920 Hostile Environment Plan, overhead crane used in 3rd floor cell G Glovebox, 5/26/2004.
- Building 7920 Hostile Environment Plan, overhead bridge crane and hoist used in Cubicle 1, 5/24/2004.
- ORNL SSI 220, Inspection of Overhead and Gantry Cranes, Rev. 4, 9/22/2003.
- Oak Ridge National Laboratory, Fire Department Baseline Needs Validation, dated May 2003.

- Fire Hazards Analysis, Revision 1, for the Radioactive Materials Analytical Laboratory, Building 2026, dated 8/13/03.
- Fire Hazards Analysis, Revision 1, for the Irradiated Fuels Examination Laboratory, Building 3525, dated 11/5/04.
- Fire Hazards Analysis, Revision 0, for Radiochemical Engineering Development Center, Building 7920, dated 5/10/02.
- ORNL Fire Department Pre-Fire Plan for Building 2026, dated 11/28/03.
- ORNL Fire Department Pre-Fire Plan for Building 3525, dated 12/21/04.
- ORNL Fire Department Pre-Fire Plan for Building 7920, dated 4/15/04.
- SSI 2001, Rev. 1 Lockheed Martin Energy Research Corporation Quality Engineering and Inspection, "Inspection and Test of Reduced-Pressure Backflow Preventers

3.0 WORK OBSERVED/WALKTHROUGHS PERFORMED

- Plan of Day meetings at 3525 and 2026
- General facility tours: 2026 (January 10), 3525 (January 12), 7920 (January 18)
- Inspection of TSR required safety systems and defense in depth systems at 3525, 2026, and 7920 (e.g. Inspection of COG, VOG, HCSA , and LA exhaust systems on 1/21/05)
- Walkthroughs at 3525 and 7920 to determine OAP corrective action effectiveness
- Inspection of nuclear material inventory tracking systems at 2026 (John Keller), 3535 (Dale Caquelin), and 7920 (Kevin Felker)
- Inspections of FAMMIS and WPS data systems
- Fire Protection System walkthroughs – 2026, 3525, 7920
- Waste management and environmental compliance walkthroughs - 2026, 3525, 7920
- General safety and health walkthroughs - 2026, 3525, 7920 (various times)

APPENDIX III

FINDINGS and OBSERVATIONS

1.0 Proficiencies:

(1) The automation of the procedures system and the work control system is a commendable effort for UT-B. Determining the applicable requirements for a task is made easy by direct and user friendly access to SBMS and facility specific procedures. The use of FAMMIS to define and control maintenance and the development of Work Packages through Work Plan System (WPS) allows improves the efficiency of the maintenance planning and implementation process.

(2) The assigned NNFD System Engineers were thoroughly familiar with the requirements and configurations of their assigned systems. It was evident that each SE interviewed was well qualified to perform their assigned area of responsibility.

(3) The ventilation system at 7920 was well labeled with clear identification of components and configuration control status.

(4) The initial qualification process for System Engineers is rigorous and well documented. Records were detailed, complete, and in good order.

(5) The ES&H quarterly assessments are rigorous in the evaluation of facility ES&H program implementation status.

(6) Quarterly assessments by NNFD cover reviews of all Local Emergency Manuals and Emergency Planning Hazards Assessments.

(7) All cranes and hoists observed from the 3 buildings under review were found to be currently within annual inspection and maintenance certification.

(8) An active crane operators training program is taught onsite by ORNL. Retraining is required every 3 years. Training for professional ORNL crane and hoist inspectors is provided by the Crane Institute of America.

(9) ORNL requires all lifts to be approved either as Ordinary Lifts, Pre-Engineered Lifts, or Critical Lifts. All work plans and lift plans reviewed showed evidence that this review and approval had occurred. For example, two work plans from 7920 for 2004 that involved hoisting and rigging were reviewed. Copies of all required approvals, including Ordinary Production Lift Plans, were included in the packages.

(10) Review of available NNFD assessment reports indicated that they were thorough and rigorous in evaluation of facilities, work processes, and management systems. In particular, the IO and OAP were good examples of proper conduct of an independent assessment programs.

2.0 Findings:

Findings are issues that represent nonconformances with established procedures, policies, and requirements. The priority of the finding represents it significance from a risk perspective. Priority I findings are the most serious with respect to risk and could represent conditions of imminent danger to worker, public, or environment or substantial breakdown in the implementation of a management system. There were no Priority I findings noted during this assessment. Priority II findings represent issues where one or more requirements are not being met but substantial adverse risks are not present and there are no systematic breakdowns in management systems.

System Engineering

SE-050121-A: The involvement of System Engineers in preventative and corrective maintenance of active safety systems is not assured. (Priority II)(NNFD-007, *R2A2s*; SBMS – *System Engineering*, DOE O 420.1A, section 4.5.1.3)

Discussion:

DOE Order 420.1A, section 4.5.1.3 requires: "*The CSE shall remain appraised of operational status and ongoing modification activities, assist operations to review key system parameters and evaluate system performance; initiate actions to correct problems, remain cognizant of system-specific maintenance/operations .....*"

The Order also states that the system engineering program requirements apply to " *active safety class and safety significant structures, systems and components (SSCs), as defined in the nuclear facility's DOE-approved safety basis and other active systems that perform an important defense-in-depth function for the protection of the public, workers, or the environment within the context of the safety basis, as designated by the facility line management (hereafter collectively referred to as systems).*"

A review of the NNFD R2A2s indicates that the System Engineer is to function as the Task Leader, as assigned. Per the NNFD *Work Control* procedure (NNFD-004), the Task Leader is integrally involved in the review and statusing of maintenance job requests.

Review of the UT-B SBMS indicates that System Engineers are to

- Provide support to ensure work control and change control processes are followed for assigned systems,
- Function as cognizant individual of system specific maintenance/operations history, system configuration, as well as industry operating experience, and
- Provide technical support to ensure system operability is maintained.

However, further review of the SBMS Work Control subject area indicates that it limits the involvement of System Engineers in a manner that is inconsistent with DOE Order 420.1A, with NNFD R2A2s, and with the initial section of the SBMS. Specifically, the SBMS Work Control subject area indicates the following requirements for System

Engineer involvement in work control of maintenance and operations work package planning and review:

Work Package Reviewers Table for Grade 1 Work								
Work Type	**Description**	*IS/IH*	*Line or Facility Mgmt*	*Radiation Protection*	*System Eng.*	*QA*	*Nuclear or Facility Safety*	*Task Leader*
A	Requires Facility Manager Attention							X
B	Experiment Systems Maintenance		X					X
C	Non-Safety Related or Defense in Depth PM, Calibrations, or Routine Operations		X					X
D	Non-Safety Related or Defense in Depth Corrective Maintenance, Trouble Shoot/Testing, or Operations		X					X
E	Safety Related or Safety Significant Calibrations, or Routine Operations		X					X
F	Safety Related or Safety Significant Corrective Maintenance, Trouble Shoot/Testing or Operations		X		X	X	X	X
G	Non-Safety Related Facility Modification		X		X			X
H	Safety Related or TSR Related Facility Modification		X		X	X	X	X

X - Indicates a required review for the grade type
A blank indicates other potential reviews based on the Work Author's discretion

The work control system will automatically include the System Engineer on the review/approval page of the work package ***IF*** the work is graded as I-F and H involving corrective maintenance and modifications of safety related systems. For other Grade 1 work types, e.g. routine preventative maintenance on a safety related SSCs, the System Engineer is not required to be involved or notified of the work planned and is added only at the discretion of the person initiating the work package. Such lack of involvement is inconsistent with DOE Order 420.1A, UT-B R2A2s, and other sections of the System Engineering SBMS. Specific weaknesses with this process include:

(1) System Engineers are not included in the Work Planning Process for preventative maintenance of their system.
(2) System Engineers are not included in the work planning process for any type of maintenance on systems listed as defense in depth in the safety analysis report, although these systems are assigned to them for their cognizance.

Also, once system deficiencies are noted and corrective maintenance is requested, the System Engineers are not adequately involved in defining priority of the needed maintenance or in providing engineering judgment on the effect that deficiencies have on operability of the system. Examples of this issue include:

(1) The VOG system at REDC has had a moisture problem that requires the Iodine retention system heaters to run continuously to maintain moisture at acceptable levels so as not to wet the HEPA filters, which requires changing the filters. Operation of the IRS heaters continuously greatly shortens the life of the charcoal filters, which were designed for limited use during target rod dissolution. An increase in the differential pressure of the charcoal filter was noted as a potential impact to the VOG. The installation of a demister in the system as an interim fix was proposed via a series of meetings involving the facility engineers, System Engineers, facility management, operations management, research and development management, operations supervision, and other facility personnel. However the scope has now been modified to improve the IRS so that the IRS heaters can be used as an interim fix without shortening the life of the charcoal filters. Replacement of the VOG Scrubber is the long term fix, but no schedule for its replacement is available. Evaluation of this situation should be made along with a plan for future replacement of the scrubber. The 7920 VOG HEPA Filter Wetting Interim Repair is funded for FY05 and provides for operation related to preventing filter wetting until the replacement is complete.

(2) At 3525, the Cell Window Nitrogen Purge System that has been out of service for several weeks. An MJR was written several weeks ago, but no priority has been given to this repair.

(3) At building 2026, Page 2 of Appendix A round sheet has had out of specification readings noted on room 139 differential pressure for several weeks without any action being taken to resolve the problem. Although the System Engineer had been involved in an initial solution to this problem, he had not been alerted that the problem was recurring.

Without formal requirements for more integral involvement of the System Engineers in the planning and implementation of all important maintenance activities, the System Engineers are not meeting the DOE Order requirement to "*remain cognizant of system-specific maintenance/operations*".

Emergency Management

EM-050121-A: The Building 7920 Local Emergency Manual has not been adequately updated. (Priority II)(SBMS - ORNL Emergency Preparedness requirements)

Discussion:

The Building 7920 Local Emergency Manual (LEM) has a list of emergency contacts that has been updated in the past quarter, but the page is still dated Feb. 2004. The LEM also contains records of a 2003 drill, but does not show the Oct. 2004 Evacuation drill. Records of required annual emergency training are also not included in the LEM.

Fire Protection

FP-050121-A:The Fire Protection Combustible Control Procedure is not implemented and inspections are not being conducted for Building 3525. (Priority II)(DOE O 420.1A; NNFD-3525-AP-001, *Building 3525 Combustible Control Procedure*)

Discussion:

DOE Order 420.1A, "Facility Safety" requires written fire protection procedures governing the use and storage of combustible, flammable, radioactive, and hazardous materials so as to minimize the risk from fire. NNFD-3525-AP-001, *Building 3525 Combustible Control Procedure*, is the building specific procedure implementing this fire protection requirement for this nuclear facility. The procedure requires documented monthly inspections of the facility with specific guidance on corrective action requirements.

A baseline inspection implementing this procedure was conducted in June 2004 with the facility fire protection engineer as required. No additional monthly inspections were conducted since the initial baseline inspection. The SAR takes credit for the overall fire protection program and specifically cites compliance with NNFD-3525-AP-001, *Building 3525 Combustible Control Procedure,* in several citations. Implementation of this procedure/program is necessary to detect the introduction and management of materials capable of exposing the facility to significant or catastrophic losses. Once this deficiency was identified, UT-Battelle promptly investigated and determined that no TSR violation had occurred.

FP-050121-B: The Fire Hazards Analysis for Buildings 2026 and 7920 have not been updated. (Priority II)(SBMS – Fire Protection Program Description)

Discussion:

The Fire Hazards Analysis (FHA) for Building 2026 was last issued on August 13, 2003. The SAR/TSR Implementation Commitments issued in August 2004 identified the need to update the FHA to be consistent with the SAR. ACTS 6235.1.11 identifies the due date for this requirement as 3/31/05.

The Fire Hazards Analysis (FHA) for Building 7920 was last issued on May 23, 2002. ACTS 6759.1.2 identifies the due date for this FHA as 2/28/05.

DOE Order 420.1A, "Facility Safety" identifies the requirement for FHAs but does not identify frequency requirements. SBMS: Fire Protection Program Description, Section 5.5.1 requires annual updates of the Fire Hazards Analysis for Category 1, 2, or 3 nuclear facilities.

FP-050121-C: Backflow preventers in the sprinkler system supply lines are not being tested in accordance with fire protection requirements. (Priority II)(NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*)

Discussion:

The backflow preventers are being inspected and tested by the QA organization in accordance with the Tennessee Department of Public Health requirements. These tests ensure that water from the downstream side does not contaminate the upstream potable water supply. In accordance with NFPA 25 "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," a forward flow test must also be conducted at the systems' water demand requirements. The Fire Department organization responsible for inspection, testing, and maintenance of fire protection systems has no responsibility, input or oversight of the testing currently being conducted on the backflow preventers.

Industrial Safety

No findings were noted in this functional area.

Conduct of Operations

CO-050124-A: NNFD cannot demonstrate that Standing Orders are being reviewed at the required frequencies. (Priority II)(NNFD-011, *Conduct of Operations* (Rev. 0, CN-3))

Discussion:

As required by NNFD-011, "The Facility Manager shall review facility-specific timely orders monthly to ensure the timely orders are still applicable. The NNFD Director shall review NNFD division-level timely orders semi-annually to ensure the timely orders are still applicable."

Standing orders listed on the NNFD Integrated Document Management System webpage were reviewed. The following NNFD division standing orders should have received at least one semi-annual review:

NNFD-2003-11 0 Disposal of Inlet Air Filters 10/06/2003
NNFD-2003-12 0 Radiological Work - Independent Review 11/21/2003
NNFD-2004-001 0 USQ Screeners, Preparers, Reviewers, and Approvers 02/12/2004
NNFD-2004-002 0 Procurement and Receipt Inspection Planning for NNFD Supplies 03/01/2004

However, there is no evidence that these timely orders have been reviewed for applicability. Also, there is no evidence that the facility specific standing orders are being reviewed monthly as required.

CO-050124-B: Safety related equipment and components are not adequately labeled at some NNFD facilities. (Priority II)(SMBS for System Engineering: *Exhibit: Labeling Systems and Components*)

Discussion:

The UT-B System Engineering SBMS contains specific labeling requirements that pertain to "all Safety Class and Significant active components. Defense-in-Depth components that have a related preventive maintenance activity associated with it are also labeled (e.g., if a defense-in-depth magnehelic has a "M" number assigned for period calibration or an exhaust fan has a FAMMIS number assigned, etc)."

Inspection of defense-in-depth ventilation system components and pressure gage instrumentation at 2026 and 3525 indicated that they were not labeled according to the SBMS exhibit. Inspection at 7920, however, indicated that the labeling requirements were being met for the same type of equipment.

CO-050121-C: Facility Manager logbook entries at Building 2026 lack adequate detail to describe the events that transpired during the operating shift. (Priority II)(Standing Order NNFD-2026-2004-05)

Discussion:

Logbook entries for the 2026 Facility Manager narrative log are not in accordance with the Standing Order NNFD-2026-2004-05. On several days, the only entries included: Assumed shift, attended POD, ended shift. More descriptiveness as to events that occurred on-shift is needed.

Quality Assurance

QA-050124-A: Software quality assurance is not adequately implemented for spreadsheet data processing tools used for nuclear inventory management. (Priority II)(SBMS for Software Quality Assurance Subject Area; NNFD-2026-OP-100-R1-CN-1, Building 2026 Nuclear Material Inventory Control)

Discussion:

The UT-B SBMS for Software Quality Assurance states "Any ORNL staff who are responsible for the use, procurement, development, adaptation, or maintenance of software must exercise a degree of formal quality assurance that is commensurate with the potential impact of the software on the environment, safety, health, security, legal requirements, costs or mission of the laboratory." The SBMS further requires that users of software register their software with UT-B and perform a risk categorization of the software based on failure consequence. Based on the risk category, the required software QA elements are specified.

Based on the UT-B SBMS, the following issues were noted:

(1) The radiological inventory tracking spreadsheets used at 2026, 3535, and 7920 are not registered as required by SBMS.
(2) There is no documented risk categorization for the software in (1). NNFD staff have stated that it is category 0 which requires no SQA. Inspection of the grading categories indicate that Category 0 is software that has MINOR impact if it fails, e.g. personal inconvenience, minor financial or business impact, minor disruption of work. It is clear to the assessment team that a failure or mistake in inventory tracking is **NOT** minor and could result in exceedance of SAR limits, fissile limits, and inadvertent facility category changes. The software likely meets the category 2 risk which indicates a *significant impact* as a consequence of failure.
(3) There is limited to no documentation of spreadsheet verification/validation at 2026, 3525, and 7920. 2026 has a partial validation of the spreadsheet but full validation records were not located (NOTE: the UT-B internal procedure, NNFD-2026-OP-100-R1-CN-1, *Building 2026 Nuclear Material Inventory Control*, requires that validation be done and records kept).
(4) There is no Software QA Plan for the three inventory tracking programs reviewed.
(5) The three tracking programs reviewed were not being maintained under formal configuration control.

QA-050121-B: NNFD is not assuring that corrective actions are implemented for identified ES&H problems. (Priority II)(10 CFR 830.122, Criterion 3)

Discussion:

10 CFR 830.122, Criterion 3 states that nuclear facilities must "(1) Establish and implement processes to detect and prevent quality problems, and (2) Identify, control, and correct items, services, and processes that do not meet established requirements."

Review of the NNFD process for problem identification and corrective action indicated the following issues:

- There are numerous types of internal NNFD assessment activities for NNFD facilities and operations including M&O assessments, ES&H assessments, In-Service Inspections, and In-Service Assessments. There are also independent assessments conducted by the UT-B Operational Awareness Program (OAP) and the Independent Oversight (IO) Program. While it is obvious that NNFD is meeting its 10 CFR 830 commitments for assessments, there is no formal process whereby NNFD reviews and evaluates all issues identified during the various assessments to prioritize them for corrective action or to ensure management involvement in placing emphasis on timely correction.
- A review of entries in the Assessment and Commitments Tracking System indicates that there are about 60 assessments listed for NNFD since the year 2000. Entries for quarterly ES&H assessments, OAPs, ISAs, and ISIs are very few. Most entries are related to external assessments (e.g. Fac Rep assessments), occurrences, and high profile internal reviews. It is obvious that ACTS is not being used for tracking of discrepant conditions noted during the various ES&H walkthroughs that are conducted.
- The NNFD *In-service Inspection and Safety System Assessment Program* procedure (NNFD-008) indicates that deficiencies identified during inspections/assessments are to be either converted into MJRs or are to be entered into the ACTS tracking system. However, in practice, these conditions are not being consistently carried out as identified in the procedure. Numerous items identified have not yet been converted into ACTS items or MJRs for resolution and prioritization. The NNFD procedure does not specify how discrepant conditions are assigned priority for correction and how tracking and follow up is performed to ensure that needed corrective actions take place.
- As a result of (1) and (2), NNFD has not given attention to timely correction of numerous ES&H discrepancies noted during OAP assessments. During the current assessment, the OAP reports for 3525 (April 2004) and 7920 (May 2004) were walked down to determine corrective action effectiveness. A large percentage (e.g. 50% at 3525) of the OAP-noted issues at both buildings had not been corrected even though some actions were simple quick fixes. While some corrective actions were completed, the overall corrective action status was unacceptable for this UT-B/DOE ORO assessment teaming effort. Also, there was no documented rationale for the non-completion of these items and there was no schedule for completion.

- NNFD is not formally trending the results of assessments to detect and correct adverse performance trends that require corrective action.

The NNFD ES&H Program Manager has realized that the facilities are not providing adequate corrective attention to ES&H inspection issues as noted above. The corrective action status of OAP issues are now being assessed during quarterly ES&H assessments (this started during 4th quarter 2004). The ES&H Program Manager stated that incomplete OAP actions will be entered into ACTS. However, NNFD is encouraged to determine why the facilities are ignoring these inspection results and ensure that a fix is implemented.

Maintenance, Calibration, and Testing

MC-050124-A: Maintenance conducted at NNFD facilities, which could affect safety system operation, is not consistently graded in a correct manner. (Priority II)(NNFD-004, *Work Control*)

Discussion:

A review of completed and planned Maintenance Job Requests (MJRs) for recent maintenance of nuclear facility safety systems indicated that some were improperly graded. Examples include:

The following MJRs related to category 2 or 3 safety systems were reviewed and found to be graded incorrectly:

- MP272127 – K-8 Exhaust Fan PM - (Listed as Grade 2)
- MP293341 – K-8 Exhaust Fan - (Listed as Grade 2)
- MP276353 – 3525 HEPA Filter Safety Inspection - (Listed as Grade 4)
- MP279086 – Maintenance on HRLEL Cask - (Listed as Grade 4)
- MP267252 – K-2 Exhaust Maintenance at 2026 (Listed as Grade 3)
- MP272128 – Maintenance on K-18 Exhaust at 3525 (Listed as Grade 2)
- MP262559 – HEPA Filter Safety Inspection at 7920 (Listed as Grade 4)

Inspection of a FAMMIS listing of all closed MJRs in FAMMIS from 1/1/2004 to 12/31/2004 indicates the following results:

- Building 2026: There were approximately 384 completed MJRs; of these only 1 was graded as Grade 1
- Building 3525: There were approximately 320 completed MJRs; of these 8 were graded as Grade 1
- Building 7920: There were approximately 608 completed MJRs; of these 160 were graded as Grade 1

The above indicates an inconsistency in the grading process between 2026/3535 and 7920. It also supports the likelihood that a substantial percentage of maintenance work relating to safety SSC, particularly at 3525 and 2026, is not correctly graded.

It is essential the grading process be properly conducted upfront or there is a potential that needed reviews and work controls will not be implemented, resulted in reduction in the margin of safety.

MC-050121-B: Alarm set points for cell to operating area differential pressure alarms are not in accordance with facility operating procedures. (Priority II)(10 CFR 830.120, Criterion 5)

Discussion:

10 CFR 830.122, criterion 5 states, *" Perform work consistent with technical standards, administrative controls, and other hazard controls adopted to meet regulatory or contract requirements, using approved instructions, procedures, or other appropriate means."*

UT-B Controls and Instrument Services (C&IS) calibration and testing records for the Building 2026 cell differential pressure gages were reviewed (pressure differential between cells and operating area, Room 108). These records indicate that the differential pressure gage alarm set points are tested and set at 0.75 inches of water (gage pressure). However, the 2026 operating procedure (CASD-OPM-RML-FM02) indicates that the set points are 0.5 inches water gage pressure. While use of 0.75 inches set point increases the margin of safety, it is inconsistent with the procedure.

Building 2026 should review all set points and calibration requirements for their defense in depth systems and determine if procedural corrections are needed.

MC-050121-C: Critical spare parts lists are not being maintained by the System Engineers. (Priority II)(SBMS for System Engineering: *Procedure -- Providing Technical Support for Operations and Maintenance Activities*)

Discussion:

The UT-B System Engineering subject area SBMS procedure entitled "*Providing Technical Support for Operations and Maintenance Activities*" specifies that "The System Engineer provides technical support to ensure system operability is maintained by: .... Identifying critical spare parts required to maintain operability of assigned system(s)."

Interviews with NNFD System Engineers indicate that they do not have lists of critical spare parts. In fact, for some facilities, e.g. 2026 ventilation system, there are no spare parts inventories. In times when budget constraints prevent comprehensive inventories of spare parts, the prioritization of which spare parts are most essential, i.e. critical spare parts, is important to establish.

MC-050121-D: The annual transfer switch test for Building 3525 has not been completed on schedule. (Priority II)(NNFD-3525-OP-102)

Discussion:

NNFD-3525-OP-102, Appendix B, Daily Check Sheet, page 4 of 4, for the week beginning 1/3/05, comment #1, states that the annual transfer switch test due 9/9/04 has not yet been completed.

Configuration Management/Unreviewed Safety Question Determination Process

No findings were noted in this functional area.

Waste Management and Environmental Compliance

EC-050121-A: NNFD has not established management standards for generated wastes prior to staging or storage. (Priority II) (Radioactive Waste Management Basis; Implementation Plan for DOE Order 435.1)

Discussion:

A key assumption of the RWMB states "All activities conducted in the management of radioactive wastes and radioactive mixed wastes will be done in a manner that maintains cognizance of the chemical characteristics of the waste as well as the radiological characteristics and maintains chemical exposure ALARA." Significant quantities of solid low-level wastes are accumulated in bags in buildings 2026 and 3525. Filled, closed bags were found on the floor of the filter pit shed and in fire-retardant bins in 2026, and in a second floor room in 3525. NNFD has not established requirements to document the origin or type of wastes in the bags or the date the waste was generated. Thus, cognizance of the chemical and radiological characteristics of the wastes is not being maintained. The IP allows staging of low-level wastes for 120 days. NNFD personnel stated that staging begins when the waste is certified, and that DOE had agreed. However, allowing wastes to be accumulated in unlimited quantities for an unlimited time with no management standards appears inconsistent with the intent of DOE O 435.1. It was noted that bags placed in the fire-retardant bins in 2026 were recorded onto a log utilized by building staff to facilitate future completion of characterization forms. However, generation dates were not recorded.

EC-050121-B: Required weekly annulus pressurization gauges checks in 2026 were not being performed each week. (Priority II) (NNFD-2026-OP-103)

Discussion:

NNFD procedure requires the gauges on panel K-261 in room 120 of building 2026 to be checked weekly. Facility staff indicated that the checks are more appropriately performed prior to discharging liquids and plan to revise the procedure accordingly. However, the actual practice at the time of this review was not compliant with the procedure in place.

EC-050121-C: Operators failed to follow the appropriate steps regarding test suspension during a quarterly hot cell drains test in Building 2026. (Priority II) (NNFD-2026-OP-103)

Discussion:

Supervisor approval to continue is required when volume recovery in the drains lines is more or less than 5 gallons. The NNFD procedure requires a minimum of 10 gallons of process water to flush the drain, with a maximum of 30 gallons added without verification of effective recovery. In practice, the drains are flushed in batches of 10-20 gallons. The procedure does not address this practice, and does not specify whether recovery verification is based on batched or on the total volume for the test. Review of the logbook revealed that the proper suspension and supervisor notification was not done when one batch was not properly recovered and when the total quantity was not properly recovered.

Radiological Materials Inventory Control

NS-050121-A: A written procedure has not been completed to describe and consistently implement the inventory control program at Building 7920. (Priority II)(10 CFR 830.120, criterion 5; Technical Safety Requirements , Radiochemical Engineering Development Center Building 7920, TSR/7920-CTD/01 R1)

Discussion:

10 CFR 830.122, criterion 5 states, " *Perform work consistent with technical standards, administrative controls, and other hazard controls adopted to meet regulatory or contract requirements, using approved instructions, procedures, or other appropriate means.*" The TSR for 7920 requires *"A program and/or procedures shall be established, implemented, and maintained to ensure that the total inventory of radioactive materials within Building 7920 and the amounts of radioactive materials in process in the hot cells, shielded caves, and alpha laboratory glove boxes are within the bounds established in the Building 7920 Safety Analysis Report."*

Interviews with inventory tracking staff at 7920 and review of the current approved 7920 procedure list indicates that there is not a procedure that describes how inventory tracking is implemented.

3.0 Observations:

Observations are issues relating to the need to implement Best Management Practices. Observations may also represent minor and/or isolated deviations from requirements.

(1) During facility walkthroughs, several instances were noted where more attention is needed to safety:

- In 2026, room 108, the cabinet used to store analytical process resins (e.g. Eichrom resins) was not labeled.

- In 2026, the hoist in the HEPA Filter Sump Building was connected to line power using an extension cord.
- In 2026, the sign denoting egress requirements at the exit door to the outside in the counting room indicates that exit surveys must be done after crossing the yellow line. The sign should be changed to indicate that surveys are to done BEFORE one crosses the yellow line.
- In Building 2026, in a first floor lab, an overhead emergency light was tested and did not work.
- Two 5-gallon cans labeled "Flammable Liquids" were found next to the sprinkler riser of Building 2026. The source of the cans could not be identified and the cans were immediately relocated outside of the building.
- There were no lighted exit signs in the 7920 Mechanical Room. UT-B Fire Protection should evaluate this condition from a Life Safety Code perspective.
- An open and unlabelled pail containing oil was noted in the 7920 Mechanical Room.
- Propane and acetylene cylinders were not adequately secured on the docks of Building 7920.
- Numerous small bottles of various chemicals were located throughout Building 7920 that are not provided with proper labeling.
- In Building 7920, several flammable liquid cabinets were found to be overfilled with small containers that were stacked on top of each other.
- In the Building 7920 Limited Access Area, second floor, adjacent to Hoist IE11445, a "Fire Extinguisher" sign was on the wall, but the fire extinguisher was missing.
- Numerous OAP related deficiencies have not been fixed in 2026, 3525, and 7920.

(2) Periodicity requirements for continuing training and qualification of System Engineers have not been specified. NNFD-009 requires a biennial requalification for facility operations staff but does not indicate frequency of requalification, if any, for system engineers.

(3) At 2026 and 3525, the radiological inventory is stored on the hard drive of the inventory manager PC and is not backed up to the network (or another independent directory/disk) at any routine/defined frequency. This can result in disaster recovery problems in the event of hard drive failures.

(4) Required maintenance and testing for the HREL and Loop Casks is not defined in facility procedures.

(5) Many blue sheeted procedures are not scheduled to be updated until FY 06 and 07. A more expedited schedule is appropriate for nuclear operations. It was also noted that the completion of needed procedural revisions for 7920 has been substantially slowed even further due to loss of procedure revision staff resulting from budget constraints. UT-B facility management indicated

that the documented schedule will be difficult to meet without staff to perform the needed revisions.

(6) A review of the 7920 operator aide logbook indicated that operator aids and revisions were being performed using REDC-AP-002, Administration of Operator Aids. However, the current NNFD procedure for operator aids is NNFD-011, Conduct of Operations.

(7) The following procedures were reviewed and compared to actual implementation practices:
- NNFD-2026-OP-100-R1-CN-1, Building 2026 Nuclear Material Inventory Control
- NNFD-3525-OP-100, Building 3525 Radioactive Material Inventory *Control Program*

At 2026 and 3525, the procedure requires an *annual* verification of inventory by the Facility Manager or designee. To date, this has not been done. Likewise, the 3525 procedure requires decay correction of the inventory at least annually; to date this has not been done.

Also, at 3525, the procedure requires that the Facility Supervisor update inventory with a check by the Facility Manager. In practice, the Facility Manager does the entire effort for inventory management and there are not routine second person checks.

(8) NNFD has not established or implemented requirements to inspect containers of low-level wastes while staged. While the general performance standards and time limits of DOE M 435.1-1 have been incorporated into site procedures for managing and packaging radioactive wastes, including waste and container compatibilities, security, and free liquids management, inspections are not required to ensure the standards and time limits are met.

(9) Potential abnormal and unusual conditions and emergency response for building 2026 are described in CASD-OP-RML-FM03 and in the 2026 Local Emergency Manual. The CASD procedure describes all the various alarms that could go off inside the building, but does not describe which of these alarms automatically signal to the Lab Shift Superintendent Office and which do not, and does not describe the need for communications from the building supervisor to the LSS to describe the emergency or operational upset, and whether help is needed or not.

(10) The Emergency Action Level Matrix in the 3525 Local Emergency Manual is dated August 2002, but the latest approved EAL is dated November 2004.

(11) The Emergency Action Level Matrix in the 2026 Local Emergency Manual is dated August 2002, which is nearly 2 years out of date from the current version.

(12) In the Building 2026 Local Emergency Manual, the Emergency Squad List, dated 1/14/2004, is in need of updating with current personnel.

(13) In Building 2026 Room 208, the emergency contact list on the door lists personnel who are no longer in the indicated positions in the facility.

(14) In Building 7920, second floor Makeup Area, 10 foot high open storage shelves were present containing glassware, constituting unsafe storage and the possibility of materials falling on employees below.

(15) Procedure NNFD-3525-OP-101 describes requirements for moving materials into and out of Building 3525 using the overhead crane. This procedure was signed and approved by the ORNL Hoisting and Rigging Manager, and serves the function of a Pre-engineered Lift Plan. However, the procedure does not incorporate requirements for monthly inspections or inspection records by local operators, as required by ORNL SBMS procedure "Inspection and Maintenance of Hoisting and Rigging Equipment." A separate file of monthly inspection records is maintained by 3525 management. Addition of the citation to the NNFD procedure would add to its completeness.

(16) In Building 2026, the designated exit from corridor 110 to the loading dock is not provided with a barrier to prevent personnel from falling off the loading dock.

(17) Building 3525 is provided with an emergency generator for Life Safety Code requirements. The generator is not being adequately tested in accordance with NFPA 110. This was first identified in 2002 and is tracked in the ACTS. The completion date is currently overdue.

(18) There is lack of clarity in the assignment of NNFD and Research management staff at Buildings 2026 and 3525. Specific issues include:

- NNFD Organization charts for 2026 and 3525 should show a dotted line to research side managers similar to the chart for REDC for those managers that have an active role in the operations of the facility. For instance, Chris Parks is the Operations Manager for 2026, but is not shown on the organization chart.
- NNFD Organization charts for 2026 and 3525 show employees assuming dual roles as Facility Supervisor and Operations Supervisor. However, it is not clear what the distinction is between the two and whether the responsibilities for these two positions were intended to be assumed by the same employee.
- At 2026, it was also noted that details of which Facility Manager is on duty on any given day are not documented. Transfer of FM duty responsibilities are not recorded in the FM logbook.

(19) Section 2.7 of the SAR for Building 2026 states, "The RMAL facility employs a standard compliment of protective features including a wet standpipe sprinkler system…" This is confusing terminology as either there could be a wet standpipe, a wet sprinkler system, or both if a comma is missing. The facility actually has both; however, the standpipe has recently been removed from service, as the Fire Department would not use the standpipe. In addition, maintenance is not being continued on the standpipe system. The fourth paragraph of this section also identifies fire suppression system as being defense in depth systems. At the next revision to the SAR, clarification should be provided.

(20) NNFD has not established or implemented requirements to inspect containers of low-level wastes while staged. While the general performance standards and time limits of DOE M 435.1-1 have been incorporated into site procedures for managing and packaging radioactive wastes, including waste and container compatibilities, security, and free liquids management, inspections are not required to ensure the standards and time limits are met.

(21) One satellite accumulation area was not being managed in compliance with regulations and site procedures (i.e. TN Rule 1200-1-11-.03(4)(e)5; Procedure: Operating a Satellite Accumulation Area). To be exempt from RCRA permitting requirements, hazardous wastes in a satellite accumulation area must be in closed containers except when adding or emptying waste. The lid on a 5-gallon bucket SAA in the make-up area in building 7920 was not fastened or aligned with the container. Wastes extended above the container opening, thus precluding proper placement of the lid.