



# **Independent Assessment of the Fire Protection Program at the Y-12 National Security Complex**

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## Acronyms

|        |   |
|--------|---|
| AGS    | American Glovebox Society   |
| BNA    | Baseline Needs Assessment   |
| CAHJ   | Contractor Authority Having Jurisdiction                                |
| CFR    | Code of Federal Regulations   |
| CNS    | Consolidated Nuclear Security, LLC                                      |
| ConOps | Conduct of Operations   |
| CRAD   | Criteria and Review Approach Document                                   |
| CSE    | Cognizant System Engineer   |
| DOE    | U.S. Department of Energy   |
| DSA    | Documented Safety Analysis  |
| EA     | Office of Enterprise Assessments  |
| ENS    | Emergency Notification System   |
| FD     | Y-12 Fire Department  |
| FHA    | Fire Hazards Analysis   |
| FPE    | Fire Protection Engineer  |
| FPEA   | Fire Protection Engineering Assessment                                  |
| FPI    | Fire Protection Inspector   |
| FPP    | Fire Protection Program   |
| FR     | Facility Representative   |
| FY     | Fiscal Year   |
| ITM    | Inspection, Testing, and Maintenance                                    |
| NFPA   | National Fire Protection Association                                    |
| NNSA   | National Nuclear Security Administration                                |
| NPO    | NNSA Production Office  |
| OFI    | Opportunity for Improvement   |
| ORR    | Oak Ridge Reservation   |
| PAS    | Public Address System   |
| PC     | Performance Category  |
| PFP    | Pre-fire Plan   |
| PPWS   | Plant Potable Water System  |
| ROD    | Record of Decision  |
| SAR    | Safety Analysis Report  |
| SDD    | System Design Description   |
| SME    | Subject Matter Expert   |
| SS     | Safety Significant  |
| SSCs   | Structures, Systems, and Components                                     |
| TOPIC  | Tools for Opportunities – Performance Improvement through Communication |
| TSR    | Technical Safety Requirement  |
| Y-12   | Y-12 National Security Complex  |

# INDEPENDENT ASSESSMENT OF THE FIRE PROTECTION PROGRAM AT THE Y-12 NATIONAL SECURITY COMPLEX

## Executive Summary

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) conducted an independent assessment of the fire protection program (FPP) at the Y-12 National Security Complex (Y-12) on May 1-5, 2023. Consolidated Nuclear Security, LLC (CNS) is the primary contractor for Y-12 operations, with the National Nuclear Security Administration Production Office (NPO) having overall Federal oversight responsibilities. The primary objective of this assessment was to evaluate the effectiveness of CNS's implementation of the FPP for buildings 9204-2E and 9215 and management of open issues related to fire protection safety systems. Additionally, the assessment evaluated the effectiveness of NPO oversight related to CNS's fire protection activities.

EA identified the following strengths, including one best practice:

- CNS effectively performs quarterly self-assessments and evaluations of open fire protection impairments that formally verify the status of corrective actions, monitor the sustained implementation of assigned compensatory actions, and reinforce the priority of completing corrective actions. (Best Practice)
- CNS has established a comprehensive sitewide FPP and policy to ensure effective implementation of Y-12 fire protection requirements.
- The CNS Y-12 Fire Department (FD) training program effectively prepares FD personnel to perform technical safety requirement (TSR) surveillances and inspection, testing, and maintenance (ITM) in accordance with site FPP requirements.
- The CNS FD has developed and implemented a thorough pre-incident planning program that enhances the effectiveness and safety of emergency response activities.
- NPO has performed effective oversight of CNS's response to recent high priority NPO-identified fire protection issues and routinely engages with CNS to monitor FPP trends.

EA also identified the weaknesses summarized below:

- CNS has not fully integrated glovebox fire hazard evaluation information for building 9204-2E into the facility's fire hazards analysis (FHA).
- The CNS system design description (SDD) for building 9204-2E wet pipe sprinkler system 4 has not been updated and is inconsistent with the facility's safety analysis report.
- CNS has not specified an acceptance criterion of 60 seconds maximum for the water delivery time to the inspector's test connection for a dry-pipe valve full flow trip test.

In summary, CNS has effectively established and implemented a FPP, controls, and operating practices for buildings 9204-2E and 9215. CNS performs quarterly self-assessments of open fire protection impairments that formally verify corrective action status, monitor implementation of compensatory actions, and reinforce the priority of correction action completion. The FD has established a training program that effectively prepares FD personnel to perform TSR surveillance and ITM activities. NPO has also performed effective Federal oversight of CNS fire protection activities. However, EA identified gaps associated with integration of glovebox fire hazard evaluation information into the building 9204-2E FHA, inconsistencies between a wet pipe sprinkler SDD and safety basis documentation, and current acceptance criteria for a dry-pipe full flow trip test. Resolution of the weaknesses identified in this report will serve to enhance the management and overall effectiveness of the CNS FPP, controls, and operating practices.

# INDEPENDENT ASSESSMENT OF THE FIRE PROTECTION PROGRAM AT THE Y-12 NATIONAL SECURITY COMPLEX

## 1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Office of Nuclear Safety and Environmental Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of the effectiveness of Consolidated Nuclear Security, LLC (CNS) fire protection program (FPP) implementation for buildings 9204-2E and 9215 activities at the Y-12 National Security Complex (Y-12). CNS is the primary contractor for Y-12 operations, with the National Nuclear Security Administration (NNSA) Production Office (NPO) having overall Federal oversight responsibilities. Remote assessment planning, document collection, and interviews began in April 2023, and onsite assessment activities were conducted on May 1-5, 2023.

In accordance with the *Plan for the Independent Assessment of the Fire Protection Program at the Y-12 National Security Complex, March 2023*, this assessment evaluated the effectiveness of CNS activities to manage and maintain an appropriate FPP, controls, and operating practices for buildings 9204-2E and 9215. Additionally, this assessment evaluated the effectiveness of CNS's management of open issues related to credited fire protection safety systems and of the associated recommendation identified in EA report, *Independent Assessment of the Consolidated Nuclear Security, LLC Management of Safety Issues at the Y-12 National Security Complex – December 2022*. This assessment also reviewed NPO's oversight of CNS's fire protection activities. This assessment was performed at the request of NPO.

Y-12 serves DOE's nuclear security enterprise by maintaining the safety, security, and effectiveness of the U.S. nuclear weapons stockpile, reducing the global threat posed by nuclear proliferation and terrorism, and providing feedstock to fuel the U.S. Nuclear Navy. Building 9204-2E is a hazard category (HC) 2 facility supporting disassembly and assembly of nuclear stockpile components, dismantling of components no longer needed, and stockpile quality evaluations and maintenance. Building 9215 is an HC 2 facility providing uranium machining and finishing capabilities for production activities. While the Uranium Processing Facility (UPF) presently under construction will replace most of Y-12's aging production facilities and operations, buildings 9204-2E and 9215 have been designated as enduring mission facilities and are expected to continue their current functions for several decades following the startup of UPF.

## 2.0 METHODOLOGY

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*, which EA implements through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. This report uses the terms "best practices, deficiencies, findings, and opportunities for improvement (OFIs)" as defined in the order.

As identified in the assessment plan, the criteria used to guide this assessment were based on objectives FP.1, FP.2, FP.3, FP.4, FP.5, and FP.6 of EA CRAD 31-12, Revision 2, *Fire Protection Program*. In addition, elements of EA CRAD EA-30-07, Revision 0, *Federal Line Management Oversight Processes*, were used to collect and analyze data on NPO oversight activities. To gather relevant assessment data, EA reviewed CNS and NPO policies, processes, procedures, calculations, and records supporting key elements of the Y-12 FPP; fire hazards analyses (FHAs) and associated controls; inspection, testing, and maintenance (ITM) of fire protection systems; program self-assessments; and management of FPP issues. EA walked down buildings 9204-2E and 9215 fire protection structures, systems, and components

(SSCs), witnessed the performance of relevant ITM activities, and observed work planning meetings. EA also interviewed key contractor and Federal personnel responsible for developing, implementing, maintaining, and overseeing the Y-12 FPP. The members of the assessment team, the Quality Review Board, and the management responsible for this assessment are listed in appendix A.

While there were no previous findings for follow-up addressed during this assessment, the assessment evaluated initial actions to address a recommendation previously issued in EA report *Independent Assessment of the Consolidated Nuclear Security, LLC Management of Safety Issues at the Y-12 National Security Complex – December 2022* that CNS, in coordination with NPO, evaluate the adequacy of existing conditions and develop a resource-loaded plan to resolve longstanding fire protection issues that could impact safety or present significant risk to high-value, mission-essential assets.

### **3.0 RESULTS**

#### **3.1 Fire Protection Program**

This portion of the assessment evaluated the effectiveness of CNS's FPP policy and procedures implementation, equivalencies and exemptions, FHA program, building fire protection assessment program, baseline needs assessment (BNA), pre-incident plans, and wildland fire management program.

##### **Fire Protection Program Policy and Procedures Implementation**

CNS has established a comprehensive sitewide FPP and policy to ensure the effective implementation of Y-12 fire protection requirements. E-SD-2004, *Fire Protection Program*, E-POL-0048, *Fire Protection Policy*, and Y79-001, *Y-12 Fire Protection Program Manual*, effectively establish CNS's FPP, policy, and procedures in accordance with DOE Order 420.1C, *Facility Safety*, attachment 2, chapter II. E-SD-2004 received appropriate NPO approval per DOE Order 420.1C, section 5.d.(5), and identifies applicable codes and standards, including DOE technical standards, building code, National Fire Protection Association (NFPA) codes and standards, and other industry codes and standards. Further, E-SD-2004 and Y79-001 adequately define FPP staffing, resources, roles and responsibilities, and training requirements.

CNS implements the Y-12 FPP through a collection of site-level procedures that appropriately address design and configuration management; use and storage of combustible and flammable liquids, compressed gases, and hazardous, pyrophoric, and other materials; hot work; and ITM of fire protection systems and features based on DOE-STD-1066-2016, *Fire Protection*, NFPA codes and standards, and other applicable standards. CNS has appropriately delegated fire protection contractor authority having jurisdiction (CAHJ) responsibilities, in coordination with NPO, to two qualified CNS individuals in accordance with E-PROC-3175, *Fire Protection Contractor Authority Having Jurisdiction Activities*.

CNS has adequately developed and implemented facility-level fire protection safety management programs (SMPs) for buildings 9204-2E and 9215 as required by facility documented safety analyses (DSAs), technical safety requirements (TSRs), DOE-STD-1066-2016, NFPA 801, *Standard for Fire Protection for Facilities Handling Radioactive Materials*, and Y-12 sitewide FPP requirements. Important elements of the facility fire protection SMPs include quarterly fire safety/prevention inspections that incorporate combustible material controls verifications. Six reviewed quarterly fire safety inspections for building 9204-2E and two for building 9215 were adequately documented. During walkdowns, idle wood pallets, wood-crated equipment, and portable equipment (e.g., portable generator) were aggregated within the fenced alley way between buildings 9204-2E and 9215. Also, combustible materials awaiting screening and release were accumulated within building 9215. The assigned fire

protection engineer (FPE), in close coordination with operations management, proactively addressed combustible loading concerns observed during the building 9204-2E walkdown.

The Y-12 Fire Department (FD) training program effectively prepares FD personnel to perform TSR surveillances and ITM in accordance with site FPP requirements. The training program contains appropriate content to provide FD fire protection inspectors (FPIs) the required knowledge and skills to implement conduct of operations (ConOps) protocols and specific training on procedure compliance. Thirteen interviewed FD personnel, who directly conduct or supervise the conduct of TSR surveillances and ITM, expressed a positive view of the FD leadership's recent attention to training improvements, stated that they are receiving appropriate training for the ITM tasks they perform, and demonstrated an understanding of the expectations associated with ConOps and procedural compliance. Six reviewed FPI qualification records documented additional ITM training and external certification programs recently offered to FPIs to enhance their knowledge and skills. However, minor FD training program weaknesses were identified related to the implementation of DOE Order 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*. Specifically, training improvements involving obtaining industry certifications are optional and not formally included in the training program. Some objectives in the lesson plans for "Conduct of Operations" and "Procedure Compliance" do not state the knowledge, skill, or ability to be gained from the training. On-the-job-training requirements for FPI qualification lack detailed guidance on tasks to be successfully demonstrated prior to qualification. FD training program self-assessments are also not formally documented. (See **OFI-CNS-1**.)

### **Equivalencies and Exemptions**

CNS has established and implemented an adequate, mature process for developing, submitting, and maintaining FPP-related equivalencies and exemptions. This process is documented in E-SD-2004 and E-PROC-0011, *Prime Contract Management*, which is appropriately based on DOE Order 420.1C. Two reviewed equivalency packages (EQ032 and EQ049) adequately documented commitments, compensatory measures, and Federal conditions of approval. The equivalencies are appropriately assessed during FHA updates and/or annual building fire protection assessments for buildings 9204-2E and 9215. Six approved equivalencies associated with fire protection SSC and equipment ITM are further evaluated in section 3.4 of this report. No exemptions have been approved for buildings 9204-2E or 9215.

The CNS process for performing and documenting delegated CAHJ determinations is adequately described in E-PROC-3175. The FPP compliance approaches for buildings 9204-2E and 9215 rely extensively on multiple individual CAHJ determinations (approximately 24 each for buildings 9204-2E and 9215). FHA FH-FPD-92042E-A001, *Fire Hazards Analysis of Building 9204-2E*, section 1.3, states that NPO concurrence on CAHJ determinations completed prior to December 18, 2014, "cannot be inferred." CNS explained that legacy CAHJ determinations not associated with DSA-credited SSCs generally remained approved, but those that address DSA-credited SSCs were to be withdrawn, recategorized, and subject to further disposition. However, one legacy CAHJ determination (AHJ22) that applies to the building 9215 safety significant (SS) sprinkler system DPS-006 has not been withdrawn or subject to further disposition. (See **OFI-CNS-2**.)

### **Fire Hazards Analysis Program**

CNS has developed and implemented a generally adequate FHA program that applies to Y-12 nuclear facilities and other facilities that represent unique fire safety risks. E-SD-2004, section 4.6; E-PROC-3173, *Facility Fire Protection Evaluation*, section 6.1; and Y17-008, *Fire Hazards Analyses*, establish an FHA program that is appropriately based on a graded approach. FHAs for buildings 9204-2E and 9215

are current (three years or less) and appropriately analyze facility fire hazards consistent with the expectations of DOE-STD-1066-2016 and NFPA 801. The FHAs for buildings 9204-2E and 9215 adequately define the design bases for fire protection SSCs (e.g., automatic sprinklers, fire detection and alarm, fire barriers, fire extinguishers) and life safety SSCs (e.g., means of egress, occupant notification, emergency lighting and exit signage), and ensure the adequacy of protection based on the hazards protected. Existing open and new issues, deficiencies, and recommendations resulting from the most recent buildings 9204-2E and 9215 FHAs have been appropriately entered into the CNS issues management system, Tools for Opportunities - Performance Improvement through Communication (TOPIC). FHAs for buildings 9204-2E and 9215 appropriately included lists of FPE records of decision (RODs), CAHJ determinations, FHA-derived restrictions, and approved equivalencies, including the bases, approval status, and validation of approval conditions on an individual basis for each facility.

FHA restrictions for building 9204-2E were appropriately implemented under PLN 920402E-F-058, *Implementation Plan for Restrictions in Fire Hazards Analysis of Building 9204-2E*, and subject to reaffirmation during the annual building fire protection assessment and each FHA revision. Similarly, FHA restrictions for building 9215 were adequately implemented under PLN 9215-F-0033, *Implementation Plan for Restrictions in Fire Hazards Analysis for Building 9215*, and subject to reaffirmation during the annual building fire protection assessment and each FHA revision. However, Y17-008 does not reference or include all the review criteria for gloveboxes and similar enclosures included within American Glovebox Society (AGS)-G010, *Standard of Practice for Glovebox Fire Protection*. (See **OFI-CNS-3**.) CNS has also not yet obtained NPO approval for the long-standing Y-12 occupant emergency notification strategy for buildings 9204-2E and 9215 identified in FHA FH-FPD-92042E-A001, section 5.4.2, which combines the Y-12 emergency notification system (ENS) with the public address system (PAS). (See **OFI-CNS-4**.)

### **Building Fire Protection Assessments Program**

CNS has developed and implemented an adequate building fire protection assessment program that periodically evaluates the status of FPP implementation within Y-12 facilities. E-SD-2004, section 4.4.1.8, and E-PROC-3173, section 7, implement the building fire protection assessment program and are appropriately based on DOE Order 420.1C and DOE-STD-1066-2016, section 7.2. Building fire protection assessments, known at Y-12 as fire protection engineering assessments (FPEAs), are adequately completed on frequencies consistent with DOE Order 420.1C for buildings 9204-2E and 9215, and are performed by and under the supervision of a qualified FPE. Existing open and new issues, deficiencies, and recommendations resulting from the most recent buildings 9204-2E and 9215 FPEAs have been appropriately entered into TOPIC for management to track to closure.

The annual FPEAs for buildings 9204-2E and 9215 are current and generally address the applicable elements identified in DOE-STD-1066-2016. These FPEAs adequately evaluate the performance of the ITM program for fire protection and life safety SSCs and the maturity of facility FPP implementation. The FPEAs included lists of FPE RODs, CAHJ determinations, FHA-derived restrictions, administrative controls, and approved equivalencies, including the bases, approval status, and validation of approval conditions on an individual basis, associated with each facility. However, the FPEAs for buildings 9204-2E and 9215 do not include comprehensive lists of all applicable RODs, CAHJ determinations, equivalencies, or administrative controls. (See **OFI-CNS-5**.) Specific FPEA inconsistencies were shared directly with the CNS FPE Manager for consideration.

### **Baseline Needs Assessment**

CNS has performed and maintains a comprehensive BNA of the fire protection and emergency response organizations. ASM IA-02-084, *Baseline Needs Assessment Y-12 Fire Department*, is appropriately



based on DOE Order 420.1C, DOE-STD-1066-2016, and the applicable NFPA codes and standards. ASM IA-02-084 has been appropriately reviewed and updated within the last three years and approved by NPO. The BNA adequately defines and documents roles and responsibilities, command and control, communications protocols, available apparatus and equipment, emergency medical response procedures, and training for the FD and site emergency services. The BNA also specifies minimum FD and emergency response staffing, apparatus and equipment requirements, tactics, and procedures appropriately based on bounding fire emergencies. The BNA clearly defines and affirms emergency response mutual aid agreements in support of the CNS emergency management program, FD, and the Oak Ridge Reservation (ORR). The BNA is appropriately referenced by the buildings 9204-2E and 9215 FHAs, with the closest Y-12 fire station (Fire Station 1) currently located within a four-minute response time to these facilities. Observed apparatus and staffing levels at Fire Station 1 were consistent with the BNA. CNS actively manages and tracks improvement actions and recommendations identified within the BNA.

### **Pre-Incident Plans**

The CNS FD has developed and implemented a thorough pre-incident planning program that enhances the effectiveness and safety of emergency response activities. Y79-54-FPO-001, *Y-12 Fire Department Standard Operating Guidelines*, implements the pre-incident planning program and is appropriately based on DOE-STD-1066-2016, section 6.3, and NFPA 1620, *Standard for Pre-Incident Planning*. FD pre-incident planning documents, known at Y-12 as pre-fire plans (PFPs), are appropriately subject to input and review by FPEs, facility subject matter experts (SMEs), emergency responders, and, where appropriate, criticality safety staff. The PFPs for buildings 9204-2E and 9215 are comprehensive, adequately establish appropriate strategies for effective emergency response to the facility, and have been appropriately reviewed by CNS criticality safety staff. During facility walkdowns, observed physical access, apparatus, and equipment for manual firefighting were consistent with those described in the buildings 9204-2E and 9215 PFPs.

ASM SUR-ME-FPE-FY21-001, *Organizational Surveillance Results, Y-12 Fire Department Pre-Fire Plans*, documents an adequate 2021 comprehensive self-assessment of the FD PFP program. The 11 findings and 4 weaknesses identified by the PFP self-assessment were appropriately entered into TOPIC. As of May 1, 2023, five issues remain in open status with corrective actions in-process.

### **Wildland Fire Management Program**

The Federal Manager for the Office of Science Oak Ridge National Laboratory Site Office (DOE-OSO) and NPO have developed and approved an adequate wildland fire management plan for the ORR, which includes Y-12. The *Oak Ridge Reservation Wildland Fire Management Plan* and companion *Oak Ridge Reservation Wildland Fire Implementation Plan*, updated and approved by DOE-OSO and NPO in April 2021, are appropriately based on the *Federal Wildland Fire Management Policy* as delineated in DOE-STD-1066-2016, section 8.0, and implemented in accordance with the applicable portions of NFPA 1143, *Standard for Wildland Fire Management*. FD wildland fire response responsibilities are appropriately described in the *Oak Ridge Reservation Wildland Fire Management Plan*. The wildland fire exposure risks to buildings 9204-2E and 9215 have been adequately evaluated within the facility FHAs with mitigating actions (e.g., defensible space and vegetation control) identified. Walkdowns confirmed appropriate implementation of the identified wildland fire mitigating actions for these facilities.

### **Fire Protection Program Conclusions**

CNS has established and implemented a comprehensive FPP and policy approved by NPO, assigned appropriate personnel as the CAHJ, and implemented adequate sitewide and facility-specific FPP

procedures and training. CNS has developed and implemented appropriate FPP-related equivalencies and other compliance documents, established generally adequate FHA and building fire protection assessment programs, maintains a comprehensive BNA, and implements an effective pre-incident planning program. DOE has also developed and implemented an adequate integrated wildland fire management plan for the ORR. However, EA identified weaknesses associated with elements of the FD training program, a legacy CAHJ determination for a building 9215 SS sprinkler system, review criteria for gloveboxes and similar enclosures, the Y-12 occupant emergency notification strategy, and FHA/FPEA compliance document inconsistencies.

### **3.2 Fire Hazards Analysis and Documented Safety Analysis Integration**

This portion of the assessment evaluated the effectiveness of CNS's integration of the buildings 9204-2E and 9215 FHAs into associated safety design basis documentation and fire protection controls described in the facility safety bases.

CNS has appropriately integrated the *Fire Hazards Analysis for Building 9204-2E* and *Fire Hazards Analysis for Building 9215* into the respective facility DSAs, known at Y-12 as safety analysis reports (SARs), to ensure that analyzed fire hazards are sufficiently mitigated through controls for normal, abnormal, and accident conditions. The FHAs and SARs for both facilities appropriately evaluate credited fire sprinkler systems and potential fire scenarios. The evaluated fire scenarios and supporting conclusions in the FHAs are included in the SAR hazard evaluations and accident analyses sections in accordance with Y74-802, *Safety Basis Documents for Nuclear PSM/RMP Facilities*.

The credited fire sprinkler systems and hazard material inventory controls are adequately based on fire hazard identification and supporting accident analyses to ensure the protection of workers, the public, and the environment in accordance with DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*, and 10 CFR 830, *Nuclear Safety Management*. However, contrary to NFPA 801 and AGS-G010, glovebox fire hazard evaluation information for building 9204-2E has not been fully integrated into the facility's FHA. (See **Deficiency D-CNS-1**.) Glovebox operations represent significant operational risks due to the pyrophoric materials being handled and other complex and high-risk activities, including potential energetic events. Incomplete integration of glovebox fire hazard evaluations into the FHA could result in the omission of key fire protection safety controls.

### **Fire Hazards Analysis and Documented Safety Analysis Integration Conclusions**

CNS has appropriately integrated the buildings 9204-2E and 9215 FHAs into their respective SARs. Building fire scenarios are appropriately described, and hazard controls are adequately identified to mitigate the risk due to fire. However, glovebox fire hazard evaluation information for building 9204-2E has not been fully integrated into the facility's FHA.

### **3.3 Fire Protection Structures, Systems, and Components Design**

This portion of the assessment evaluated the effectiveness of design requirements, engineering, and design verification for fire protection SSCs.

#### **Design Requirements**

CNS has established and implemented generally adequate fire protection SSC design requirements. Reviewed procedures used to operate, test, and inspect the fire protection SSCs appropriately contained

design requirements that were aligned with corresponding calculations, including *Pipe Schedule Calculation for 9215 and 9204-2E Sprinkler Systems*. CNS FPEs and cognizant system engineers (CSEs) demonstrated during interviews that they are familiar with the design requirements in these procedures. However, contrary to DOE Order 420.1C, attachment 2, chapter V, and E-PROC-34048, *System Design Descriptions [SDDs], Equivalent System Design Description for 9204-2E Wet Pipe Sprinkler System 4* has not been updated and is inconsistent with Y/SAR-003, *Safety Analysis Report for the 9204-2E Facility*. (See **Deficiency D-CNS-2**.) The SDD states, “Wet pipe sprinkler system 4 is credited in the 9204-2E facility safety basis ...during an evaluation basis earthquake through continued pressure boundary integrity and position retention” which conflicts with Y/SAR-003. The wet pipe sprinkler system was upgraded and credited for seismic events to support a prior project; however, the design feature is no longer currently required per the facility’s SAR. SDDs not being maintained current with associated safety basis documentation can result in inaccurate design information affecting the functional and safety requirements of credited SSCs.

## **Engineering**

The CNS design change process described in Y15-187, *Integrated Safety and Change Control Process*, establishes an appropriate conduct of engineering program framework that integrates design changes for fire protection SSCs. Three reviewed design change packages (i.e., building 9215 multi-water system-002 replacement, WPS-002 sprinkler riser replacement, and DPS-007 sprinkler riser replacement) appropriately included unreviewed safety question determinations, identification of affected documents, engineering instructions detailing the scopes of work, SSC grade levels, materials for installation, and design requirements with NFPA code references.

Vital safety systems (VSSs) are appropriately identified and CSEs perform VSS walkdowns as directed in procedure Y17-019, *Walkdowns to Assess Configuration Management, Material Condition, and Aging Issues Associated with Vital Safety Systems*. Interviewed CSEs for buildings 9204-2E and 9215 SS sprinkler systems were qualified and knowledgeable of their systems, including status of current maintenance activities, procurement of replacement parts, and ongoing challenges to system operability and reliability. CNS procedure RP 000Y12-F-0021-000 02, *Engineering Training and Qualification Program Description for Y-12 Fire Protection Personnel*, establishes appropriate training and qualification requirements for CSEs in accordance with DOE Order 420.1C and DOE Order 426.2. CSEs provide detailed monitoring of the condition and performance of fire system SSCs. Reviewed system health reports for building 9215 credited sprinkler systems appropriately include detailed status, metrics for system reliability, trending of key parameters, summaries of preventive and corrective maintenance, tracking of corrective action commitments, and identification of ongoing performance issues.

## **Design Verification**

CNS adequately verified the fire protection design of the three reviewed design change packages (i.e., building 9215 multi-water system-002 replacement, WPS-002 sprinkler riser replacement, and DPS-007 sprinkler riser replacement). The design change packages include replacement of degraded sprinkler piping and valves in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*. In accordance with Y15-187, the design change packages documented that the adequacy of the fire protection design was verified by individuals and groups other than those who performed the work.

## **Fire Protection Structures, Systems, and Components Design Conclusions**

CNS has established a generally adequate process for developing design requirements, producing engineering products, and performing design verification. CSEs for buildings 9204-2E and 9215 are qualified and appropriately assigned to effectively monitor their assigned systems, ensure that

configuration management is implemented, and support operations and maintenance personnel. However, the SDD for building 9204-2E wet pipe sprinkler system 4 has not been updated and is inconsistent with the facility's SAR.

### **3.4 TSR Surveillances and Inspection, Testing, and Maintenance**

This portion of the assessment evaluated the effectiveness of CNS's fire protection and life safety SSCs TSR surveillance testing, ITM program and performance, and impairment controls.

#### **TSR Surveillance Testing**

CNS adequately completes TSR surveillances to demonstrate that credited fire sprinkler systems in buildings 9204-2E and 9215 provide appropriate fire protection for other SS SSCs, critical process equipment, and high value property and can prevent a major fire from impacting the remainder of the facility. The ITM procedures for the fire sprinkler systems contain detailed steps for performing and documenting TSR surveillance requirements to verify system operability. Reviewed ITM procedures and interviews confirmed that ITM is performed by trained FD personnel and supported by qualified CSEs to satisfy NFPA requirements. Acceptance criteria are well-defined and serve as baseline requirements.

FD personnel properly simulated a TSR surveillance for a building 9215 fire sprinkler system, demonstrating that the personnel performing testing and inspections have adequate knowledge of system operability limits, equipment control settings, and requirements for the annual main drain test. Reviewed ITM records and surveillances for the credited fire sprinkler systems for building 9215 performed over the past three years confirmed that the systems have met their respective TSR acceptance criteria as currently defined. These reviewed ITM records were also representative of the building 9204-2E credited fire sprinkler systems because the surveillance requirements are the same for both facilities' respective systems.

During the simulated building 9215 TSR surveillance, FD personnel used the procedures properly, including strict compliance and place keeping; appropriate communication techniques, including the use of phonetic alphabet and repeat backs; and effective adherence to equipment configuration control, appropriately returning systems to normal status after completion of test activities. The personnel also demonstrated knowledge of appropriate actions to take if called to respond to an emergency while conducting a TSR surveillance (i.e., placing the system in a safe condition and reevaluating system status prior to resuming the surveillance). Additionally, buildings 9204-2E and 9215 facility management and Facility Representatives (FRs) shared their observations that FD personnel routinely perform TSR surveillances and ITM activities in accordance with proper ConOps protocols.

#### **Inspection, Testing, and Maintenance Program and Performance**

CNS performs generally adequate ITM on fire protection and life safety SSCs and equipment. Y/FPET-096, *Test, Maintenance, and Inspection of Fire Protection Systems*, and Y79-53-ESSO-001, *Emergency Services System Operations Work Execution Manual*, appropriately document the fire protection and life safety SSC ITM program requirements and are based on DOE Order 420.1C, DOE-STD-1066-2016, applicable NFPA codes and standards, and approved equivalencies. However, Y/FPET-096 does not provide ITM requirements for underground distribution piping and valves (as modified by CAHJ Determination 15-011, R.1, *Tamper Resistant Seals and Other Determinations for Underground Roadway Box Valves*), fire barriers (ceilings, floors, walls, fireproof coatings, and through-penetration firestop systems), and lightning protection systems. (See **OFI-CNS-6**.)

The sitewide and buildings 9204-2E and 9215 fire protection and life safety ITM programs have appropriately incorporated the six DOE/NNSA-approved equivalency requests for emergency and exit lighting (EQ002), portable fire extinguishers and other manual fire extinguishing agents (EQ021 and EQ045), lightning protection systems (EQ028), fire alarm and detection systems (EQ040), and water-based fire suppression systems (EQ042). CNS annual trending reports for 2020 – 2022 associated with EQ040 and EQ042 have not been accepted by NPO. In August 2022, ASM Y/FPEA-001, *Fire Protection Engineering Assessment Y/AREA Fire Protection*, identified the lack of approved trending reports for 2020 and 2021 as a finding. CNS stated that they are still coordinating with NPO on resolution of the expected content, trending analyses, and appropriate criteria for acceptable failure rates for the annual report.

Reviewed ITM procedures for fire protection and life safety SSCs appropriately defined acceptance criteria and actions to take should the acceptance criteria not be met. ITM records and results for the fire protection and life safety SSCs within buildings 9204-2E and 9215 are adequately documented, reviewed by qualified individuals (i.e., FPE, FD first line supervisors, facility operations), and periodically evaluated for performance and trending within the facility FPEA to identify adverse conditions and trends. Sitewide fire protection infrastructure is also adequately reviewed and periodically evaluated for performance and trending in accordance with the Y/AREA FPEA, *Y/AREA Fire Protection (AS-6007)*.

CNS appropriately self-identified ITM deficiencies for the plant potable water system (PPWS), which consists of two elevated water storage tanks, underground distribution piping, and fire hydrants that supply fire protection water to the SS fire sprinkler systems for buildings 9204-2E and 9215. TOPIC contains open self-identified issues for the lack of conformity to NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*; required ITM of the two water storage tanks (TOPIC issue FPEA-001-FP-K7-22-02); and observed domestic water usage (flow rates) lower than stated in EQ024, which justifies the omission of tank heating and temperature monitoring for freeze protection (TOPIC issue FPEA-001-FP-K13-21-08). TOPIC also contains an open self-identified issue for the incomplete annual inspection and operation of all operationally required PPWS control valves (TOPIC issue FPEA-001-FP-K7-22-03).

PPWS control valves associated with buildings 9204-2E and 9215 fire sprinkler systems and fire hydrants around the perimeter of these buildings are subject to appropriate ITM. RP 1418-PPW-0002, *Annual Water Report 2020 Potable Water Report*, documents that limiting conditions for operation and balance of plant control valves associated with buildings 9204-2E and 9215 fire sprinkler systems were satisfactorily identified, inspected, and operated in 2020. PPWS fire hydrants are subject to appropriate routine ITM as required by NFPA 25 according to Y/FPET-096, and the buildings 9204-2E and 9215 FPEAs contain current flow test information affirming that an adequate fire protection water supply is being provided to these buildings. The PPWS includes 70-year-old unlined cast iron lines in the Y-12 grid with no plans for replacement. Per RP 1418-PPW-0002, the PPWS experienced two water line breaks in 2020 and seven in the previous year. RP 900009-0072, *Replacing the Remaining Cast Iron Piping in the Y-12 Potable Water Grid*, established a preliminary scope and cost estimate for replacing the most vulnerable cast iron segments in the PPWS. The latter report evaluated 104 building interface laterals and identified 27 as high risk. While CNS has initiated appropriate efforts to begin replacement of the 27 high risk laterals, risk of future inadvertent breaks remains for the rest of the aged PPWS grid, and the current leakage rate has not been evaluated. (See **OFI-CNS-7**.)

CNS performs generally adequate ITM on fire suppression systems. FD personnel properly performed a semiannual wet-pipe fire sprinkler system ITM evolution within a balance of plant facility. During the evolution, personnel adhered to appropriate ConOps protocols. Further, reviewed ITM records for building 9215 fire sprinkler systems demonstrated appropriate routine (monthly, quarterly, semiannual, annual, three-year, and five-year) ITM performance, consistent with NFPA 25 requirements as modified

by EQ042. However, contrary to Y/FPET-096, section 2 and NFPA 13 design requirements, which specify a performance criterion of 60 seconds (maximum) for water delivery to the system inspector's test connection during a dry-pipe valve full flow trip test, Y52-54-FDO-700, *9215 Complex Fire Protection Inspection, Testing, and Maintenance Manual, Chapter 7: 9215 System 6 and 9998 System 14 Dry Pipe System Annual Surveillance*, section 5.4, specifies up to 180 seconds for test acceptance and before notification is made to the FPE of adverse test results. (See **Deficiency D-CNS-3.**) A dry-pipe fire sprinkler system that takes a longer time to deliver water may prevent the expected control of a fire by the activated system during the early stages of fire development.

CNS performs adequate ITM on fire detection and alarm systems. Reviewed building 9204-2E ITM records demonstrated appropriate routine fire detection and alarm system ITM performance consistent with NFPA 72, *National Fire Alarm and Signaling Code*, requirements as modified by EQ040. For example, reviewed records for the manual pull station (annual), 18 duct smoke detectors (five-year), a linear heat detection subsystem (annual), and the alarm transponder (semi-annual and annual) within building 9204-2E demonstrated satisfactory inspection and testing results. Records reviewed for the building 9204-2E ENS and associated equipment also demonstrated satisfactory annual ITM.

The portable fire extinguishers and other manual fire extinguishing agents in buildings 9204-2E and 9215 are subject to adequate ITM consistent with NFPA 10, *Standard for Portable Fire Extinguishers*, requirements as modified by EQ021. Four individual inspection records each comprising the last quarter of 2022 and the latest annual FD inspection records for buildings 9204-2E and 9215 demonstrated adequate inspection completion.

FHA/FPEA-designated fire barriers and associated opening protectives (e.g., fire doors, fire dampers, and through-penetration firestop systems) within buildings 9204-2E and 9215 are appropriately subject to routine ITM consistent with applicable NFPA requirements. The last annual record of ITM for the 25 building 9204-2E fire doors demonstrated adequate inspection and testing in accordance with NFPA 80, *Standard for Fire Doors and Other Opening Protectives*, requirements with appropriate notification of the facility FPE for unsatisfactory results. Eleven individual records comprising the last four-year (July 2020) ITM of the FHA/FPEA-designated required fire dampers in building 9215 demonstrated adequate inspection and test completion per NFPA 80. However, UCN-21473, *9215 Complex Annual Fire Barrier Inspection Sheet*, provides no criteria for declaring the overall fire barrier inspection as unsatisfactory for building 9215. (See **OFI-CNS-8.**) The last three annual fire barrier inspection records each documented approximately 12 individual unsatisfactory entries (many repeating) for the 217 inspection items, with the overall inspections declared satisfactory. CNS did not identify compensatory measures or follow-up actions for the unsatisfactory items in building 9215.

The buildings 9204-2E and 9215 emergency and exit lighting units are subject to adequate routine inspection and testing consistent with NFPA 101, *Life Safety Code*, as modified by EQ002 requirements. Six and eight individual records comprising the last two quarters of ITM for buildings 9204-2E and 9215, respectively, demonstrated adequate inspection and test completion for emergency and exit lighting fixtures. However, 10 fixtures are documented as repeat test failures. Because EQ002 allows testing on a quarterly frequency in lieu of monthly per NFPA 101, these repeating test failures may allow for deficient emergency lighting coverage for extended durations without compensatory measures. (See **OFI-CNS-9.**)

### **Fire Protection Impairment Controls**

CNS has established and implemented adequate impairment controls for fire protection and life safety SSCs. Y79-001, chapter 10, and Y79-53-ESSO-001, chapter 1, adequately document the Y-12 fire protection impairment control process that is appropriately based on DOE Order 420.1C, DOE-STD-1066-2016, and applicable NFPA codes and standards. The impairment control process is appropriately

applied to active fire alarm and suppression SSCs, fire doors, fire dampers, emergency lighting, and means of egress availability. The process adequately describes coordination, communication, and approval requirements for planned and emergency outages and impairments, including the determination of appropriate compensatory actions by the facility FPE. Fire protection impairments, including compensatory actions, are appropriately tracked until SSCs are returned to service in accordance with Y79-53-ESSO-001.

CNS effectively completes quarterly topical area self-assessments of the impairment control process to evaluate the ongoing effectiveness of impairment monitoring, corrective actions, and implementation of compensatory actions. Within the latest quarterly assessment ENG-FPE-23-001, *Quick Card – First Quarter Compensatory Measure Report for 2023*, the assigned FPE appropriately reviewed the four (two each) active impairments within buildings 9204-2E and 9215 for the status of corrective actions and the sustained implementation of assigned compensatory actions. Documented quarterly self-assessments and evaluations of open fire protection impairments that formally verify the status of corrective actions, the sustained implementation of assigned compensatory actions, and reinforce the priority of completing corrective actions is considered a **Best Practice**. Findings associated with these topical area self-assessments were appropriately entered into TOPIC.

### **TSR Surveillances and Inspection, Testing, and Maintenance Conclusions**

CNS is performing adequate TSR surveillances for credited fire sprinkler systems in buildings 9204-2E and 9215. CNS has also established and implemented a generally comprehensive fire protection and life safety SSC ITM program that appropriately incorporates approved ITM related equivalencies, an adequate impairment control process, and is performing generally adequate ITM within buildings 9204-2E and 9215. Formal quarterly self-assessment of open impairments and implementation of compensatory actions is considered a best practice. However, weaknesses were identified with lack of ITM criteria for water distribution controls valves, fire barriers, and lightning protection systems; life cycle planning for and evaluation of a leakage rate for the PPWS; fire sprinkler system ITM requirements; acceptance criteria for building 9215 fire barrier inspections; and repeated building 9215 emergency lighting test failures.

### **3.5 Fire Protection Program Self-Assessment**

This portion of the assessment evaluated the effectiveness of CNS self-assessments to continuously strengthen FPP implementation.

CNS has performed an adequate and comprehensive FPP self-assessment within the last three years as required by DOE Order 420.1C, chapter II, section 3.b.(3), in accordance with E-POL-0048, section 4.2.2, and E-PROC-3185, *CNS Fire Protection Program Self-Assessment*. AS-1186, *Management Assessment of the Fire Protection Program (January 2022)*, appropriately consists of the roll-up of three functional area assessments (fire protection operations, FPP implementation, and facility engineering) and other input, and is considered the baseline CNS FPP self-assessment described in E-PROC-3185. Review of the three functional area assessments demonstrated an in-depth critical review of sitewide FPP elements and implementation maturity. AS-1186 was appropriately performed and compiled by and under the supervision of an FPE. Issues (25 findings, 18 OFIs/weaknesses) and one previous open observation resulting from AS-1186 have been adequately entered into TOPIC for tracking to closure. As of May 1, 2023, 13 findings and 10 weaknesses remain open with corrective/improvement actions appropriately identified and assigned.

## **Fire Protection Program Self-Assessment Conclusions**

CNS has performed an adequate and comprehensive FPP self-assessment within the last three years and appropriately entered resulting issues into TOPIC for resolution.

### **3.6 Issues Management**

This portion of the assessment evaluated the effectiveness of CNS's actions in response to the recommendation from EA assessment report *Independent Assessment of the Consolidated Nuclear Security, LLC Management of Safety Issues at the Y-12 National Security Complex – December 2022*, associated with the aging fire protection issues, adequacy of compensatory actions for fire protection system deficiencies, and aggregate effects of issues on a single facility.

CNS FPP leadership has appropriately established a set of metrics to effectively prioritize and monitor fire protection issues and has made progress in addressing aging issues. As of May 1, 2023, there were 214 open Y-12 fire protection issues in TOPIC. Issues older than 7 years have effectively been reduced from 30 in September 2022 to 16 as of May 1, 2023, while issues older than 3 years have been reduced from 82 in September 2022 to 59 as of May 1, 2023. However, 30% of the open issues contained minimal justification in TOPIC for not implementing compensatory actions for deficient fire sprinklers, fire dampers, fire barriers, and rusted piping. For example, TOPIC justifications included statements such as "rusted piping was acceptable since it wasn't leaking," "breached fire barriers were acceptable since openings were small and fire suppression was present," and "painted or corroded sprinklers were acceptable since other sprinklers were present in the area." In each of these cases, further details addressing design features or engineering assessment of the deficiency were not included in TOPIC. Additionally, CNS has not assessed the aggregate risk posed by 35 (16%) of the open TOPIC issues that involved testing deficiencies, including tests not conducted, incomplete, or missing requirements. The significance determination for most of these issues stated that the deficiencies were "not indicative of a programmatic or systematic problem" without further substantiation. CNS FPP leadership acknowledged these weaknesses and stated they are being evaluated as part of CNS's formal corrective action plan currently under development in response to the recommendation from EA assessment report *Independent Assessment of the Consolidated Nuclear Security, LLC Management of Safety Issues at the Y-12 National Security Complex – December 2022*.

### **Issues Management Conclusions**

Overall, CNS has made improvements in addressing aging fire protection issues in TOPIC. However, challenges with documenting the adequacy of compensatory measures and assessing the aggregate impact of issues in facilities remain.

### **3.7 Federal Oversight**

This portion of the assessment evaluated the effectiveness of NPO's oversight of CNS's FPP activities and management of NPO-identified issues.

### **Oversight and Assessments**

The NPO FPP SME and FRs for buildings 9204-2E and 9215 closely coordinate and perform effective oversight of the Y-12 FPP through recurring operational awareness activities, routine engagement with CNS, and formal assessments. During interviews, the FPP SME and FRs demonstrated comprehensive knowledge of fire protection SSCs, associated ITM activities, and ongoing FPP issues at buildings 9204-2E and 9215. The reviewed monthly FR and FPP SME operational awareness reports from February



2022 to March 2023 documented a strong field presence (i.e., multiple walkdowns per week), detailed the status of relevant facility FPP activities and issues, and provided updates on interactions with CNS counterparts during evaluations of FPP corrective actions. The FPP SME is appropriately qualified as a FPE and safety system oversight (SSO) engineer in accordance with the DOE Order 426.1B, *Department of Energy Federal Technical Capabilities*, requirements and has multiple years of experience conducting Federal oversight of the Y-12 FPP.

NPO-3.4.1.1, *NPO Oversight Planning and Implementation Process*, provides NPO personnel adequate guidance to plan and conduct FPP oversight activities meeting the requirements of DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*. The Y-12 FPP oversight activities included in the FY 2023 NPO site integrated assessment plan were appropriately identified using the risk-based, graded approach defined in NPO-3.4.1.1. NPO conducts a full assessment of the Y-12 FPP on an approximately triennial basis and facility-level fire protection functional area reviews on a rotating basis as part of annual integrated SSO assessments. NPO's most recent full assessment of the Y-12 FPP, *NNSA Triennial Contractor Fire Protection Program Assessment- July 2020*, and integrated SSO assessment, *Fiscal Year 2022 Integrated Safety System Oversight Y-12 Building 9212 Assessment Report – September 2022*, were conducted by knowledgeable FPP SMEs, appropriately incorporated DOE Order 420.1C, attachment 2, chapter II, requirements into review criteria, included relevant interviews and document reviews, and clearly listed assessment results. The FP SME stated that NPO is actively planning the scope and timing for the next full Y-12 FPP assessment based on recent external FPP assessment activities.

### **Federal Issues Management**

NPO has performed effective oversight of CNS responses to recent high priority NPO-identified fire protection issues and routinely engages with CNS to monitor FPP trends. In fiscal year (FY) 2022, NPO issued a management concern (MC) to CNS regarding increasing Pantex and Y-12 FPP corrective maintenance backlog. The MC was appropriately tracked via TOPIC and NPO's Triennial Issues Management Meeting (TIMM). TIMM minutes from FY 2022 and FY 2023 documented strong FPP SME involvement in NPO's review of associated corrective actions and closure of the MC's Y-12 portion. NPO has also established strategic performance metrics to monitor the effectiveness of key Y-12 FPP areas (e.g., system availability, FD response times, corrective maintenance backlog). The FPP SME meets bi-weekly with CNS fire protection, FD, emergency services, and maintenance management to review metric performance data and discuss emerging FPP issues. Reviewed meeting notes from February 2022 to March 2023 appropriately documented status updates on key FPP trends and issues. During the observed May 3, 2023, bi-weekly meeting, the FPP SME presented current metrics and thoroughly engaged with their CNS counterparts to evaluate progress on recent issues.

### **Federal Oversight Conclusions**

Overall, NPO has effectively performed Federal oversight of CNS's FPP activities in accordance with DOE Order 226.1B. NPO has appropriately communicated its fire protection oversight findings and monitored associated corrective action development, execution, and closure through close coordination with CNS.

## **4.0 BEST PRACTICES**

Best practices are safety-related practices, techniques, processes, or program attributes observed during an assessment that may merit consideration by other DOE and contractor organizations for implementation.

The following best practice was identified as part of this assessment:

- CNS effectively performs quarterly self-assessments and evaluations of open fire protection impairments that formally verify the status of corrective actions, monitor the sustained implementation of assigned compensatory actions, and reinforce the priority of completing corrective actions.

## 5.0 FINDINGS

No findings were identified during this assessment.

## 6.0 DEFICIENCIES

Deficiencies are inadequacies in the implementation of an applicable requirement or standard. Deficiencies that did not meet the criteria for findings are listed below, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

### Consolidated Nuclear Security, LLC

**Deficiency D-CNS-1:** Glovebox fire hazard evaluation information for building 9204-2E has not been fully integrated into the facility's FHA. (NFPA 801, and AGS-G010)

**Deficiency D-CNS-2:** The SDD for building 9204-2E wet pipe sprinkler system 4 has not been updated and is inconsistent with the facility's SAR. (DOE Order 420.1C, att. 2, chap. V, and E-PROC-34048)

**Deficiency D-CNS-3:** CNS has not specified an acceptance criterion of 60 seconds maximum for the water delivery time to the inspector's test connection in Y52-54-FDO-700 for the dry-pipe valve full flow trip test. (Y/FPET-096, sec. 2, and NFPA 13)

## 7.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified the OFIs shown below to assist cognizant managers in improving programs and operations. While OFIs may identify potential solutions to findings and deficiencies identified in assessment reports, they may also address other conditions observed during the assessment process. These OFIs are offered only as recommendations for line management consideration; they do not require formal resolution by management through a corrective action process and are not intended to be prescriptive or mandatory. Rather, they are suggestions that may assist site management in implementing best practices or provide potential solutions to issues identified during the assessment.

### Consolidated Nuclear Security, LLC

**OFI-CNS-1:** Consider aligning the elements of the FD training program with the requirements of DOE Order 426.2 and integrating the FD training program with the overall Y-12 training program.

**OFI-CNS-2:** Consider evaluating whether legacy CAHJ determination AHJ22 remains applicable to the building 9215 SS sprinkler system DPS-006 or whether further disposition is required.

**OFI-CNS-3:** Consider incorporating the review criteria of AGS-G010 for gloveboxes within Y17-008 or creating a separate procedure for the development and maintenance of glovebox fire hazard evaluations in accordance with DOE-STD-1066-2016, section 4.4.2.3.

**OFI-CNS-4:** Consider addressing the continued use of Y-12 ENS, PAS, and fire detection system coverage as providing acceptable occupant emergency notifications in buildings 9204-2E and 9215 per DOE-STD-1066-2016, section 4.2.8.2.3, through an equivalency or CAHJ determination.

**OFI-CNS-5:** Consider creating a consolidated, comprehensive listing of applicable FPP compliance-related documents (e.g., authority having jurisdiction determinations, RODs, equivalencies, and administrative controls) within the FHA or FPEA for buildings 9204-2E and 9215 to provide a single location for this information.

**OFI-CNS-6:** Consider incorporating ITM requirements for fire protection underground distribution piping and valves (as modified by CAHJ Determination 15-011, R.1), fire barriers, and lightning protection systems (as modified by EQ028) into Y/FPET-096.

**OFI-CNS-7:** Consider documenting a program for evaluating and upgrading the PPWS to monitor and continue the replacement of aged underground water piping vulnerable to inadvertent breaks consistent with American Water Works Association Standard G200-09, *Distribution Systems Operation and Management*, including developing a leakage rate for the PPWS to determine the maximum usage demand for the system to ensure that the existing dedicated volume for fire protection supply is consistent with the standard.

**OFI-CNS-8:** Consider incorporating criteria into the building 9215 fire barrier inspection checklist for determining when the aggregation of individual unsatisfactory inspection items results in an overall unsatisfactory inspection requiring prompt initiation of corrective maintenance.

**OFI-CNS-9:** Consider, as part of the post-job review, assigning a priority for initiating corrective maintenance of repeating quarterly emergency and exit lighting unit test failures to promptly verify and restore operability of these required life safety SSCs.

## **Appendix A Supplemental Information**

### **Dates of Assessment**

Onsite Assessment: May 1-5, 2023

### **Office of Enterprise Assessments (EA) Management**

John E. Dupuy, Director, Office of Enterprise Assessments  
William F. West, Deputy Director, Office of Enterprise Assessments  
Kevin G. Kilp, Director, Office of Environment, Safety and Health Assessments  
David A. Young, Deputy Director, Office of Environment, Safety and Health Assessments  
Vacant, Director, Office of Nuclear Safety and Environmental Assessments  
Kimberly G. Nelson, Director, Office of Worker Safety and Health Assessments  
Jack E. Winston, Director, Office of Emergency Management Assessments  
Brent L. Jones, Director, Office of Nuclear Engineering and Safety Basis Assessments

### **Quality Review Board**

William F. West, Advisor  
Kevin G. Kilp, Chair  
Thomas C. Messer  
Timothy B. Schwab  
Michael A. Kilpatrick

### **EA Site Lead for the Y-12 National Security Complex**

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