Independent Assessment of Construction Quality at the Y-12 National Security Complex Uranium Processing Facility

August 2022

Office of Enterprise Assessments
U.S. Department of Energy

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Acronyms

APMO	Y-12 Acquisition and Project Management Office
Apollo	Apollo Mechanical Contractors
ASME	American Society of Mechanical Engineers
BNI	Bechtel National, Inc.
CFR	Code of Federal Regulations
COE	Conduct of Engineering
CNS	Consolidated Nuclear Security, LLC
CR	Condition Report
CRAD	Criteria and Review Approach Document
CWP	Construction Work Package
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
ECP	Engineering Change Proposal
EA	Office of Enterprise Assessments
HVAC	Heating, Ventilation, and Air Conditioning
MPB	Main Processing Building
MWP	Master Work Package
NQA	Nuclear Quality Assurance
OFI	Opportunity for Improvement
Q	Quality
QA	Quality Assurance
QAP	Quality Assurance Program
QAPD	Quality Assurance Program Description
QC	Quality Control
RS	Risk Significant
SAB	Salvage and Accountability Building
SS	Safety Significant
SSCs	Structures, Systems, and Components
STR	Subcontractor Technical Representative
UPF	Uranium Processing Facility
V&ID	Ventilation and Instrumentation Drawing
Y-12	Y-12 National Security Complex

INDEPENDENT ASSESSMENT OF CONSTRUCTION QUALITY AT THE Y-12 NATIONAL SECURITY COMPLEX URANIUM PROCESSING FACILITY

Executive Summary

The U.S. Department of Energy Office of Enterprise Assessments (EA) conducted an independent assessment of construction quality at the Y-12 National Security Complex (Y-12) Uranium Processing Facility (UPF) from May 23-27, 2022. Consolidated Nuclear Security, LLC (CNS) serves as the primary contractor for the UPF project and has subcontracted Bechtel National, Inc. (BNI) to manage and subcontract UPF design and construction activities. The National Nuclear Security Administration Y-12 Acquisition and Project Management Office (APMO) has overall Federal UPF project oversight responsibilities. The primary objective of the assessment was to evaluate the effectiveness of CNS, BNI, and subcontractor Apollo Mechanical Contractors (Apollo) quality assurance (QA) processes for the design, procurement, installation, and inspection of certain UPF heating, ventilation, and air conditioning (HVAC) structures, systems, and components (SSCs) related to nuclear safety. Additionally, the assessment evaluated the effectiveness of APMO oversight of CNS, BNI, and Apollo HVAC construction quality activities.

EA identified the following strengths:

- Engineering design products reviewed by EA for UPF HVAC SSCs related to nuclear safety appropriately incorporate requirements from consensus standards and the facility documented safety analysis (DSA).
- Work scopes, technical specifications, and quality requirements are well defined, properly flowed down, and effectively implemented into CNS, BNI, and Apollo UPF HVAC construction activities.
- BNI has implemented a robust subcontractor technical representative program for effective oversight of Apollo HVAC field activities and efficient resolution of identified issues.
- APMO has performed effective Federal oversight of UPF HVAC construction quality activities, communicated observations and findings, and monitored associated corrective action development, execution, and closure.

EA also identified the following weaknesses:

- Several of the reviewed UPF HVAC technical baseline documents (i.e., system design descriptions and ventilation and instrumentation drawings) are not maintained as current.
- The APMO issues management system Federal Project Directors Project Management Tool currently has limited search options and lacks built-in trending capabilities.

In summary, CNS, BNI, and Apollo have closely coordinated to effectively establish and implement QA programs and processes for the construction of UPF HVAC SSCs related to nuclear safety. APMO has also performed effective Federal oversight of UPF HVAC construction quality activities. The HVAC engineering design products and associated QA requirements that were reviewed by EA are consistent with the current UPF DSA and incorporate appropriate consensus standards. The HVAC work scope, technical specifications, and quality requirements are well defined, properly reviewed and approved, and effectively flowed down, and they were appropriately implemented during the observed construction work planning and execution activities. The identified weaknesses are currently being addressed by CNS and APMO and do not substantially detract from the overall effectiveness of the QA processes that are in place for the design, procurement, installation, and inspection of the reviewed UPF HVAC SSCs.

INDEPENDENT ASSESSMENT OF CONSTRUCTION QUALITY AT THE Y-12 NATIONAL SECURITY COMPLEX URANIUM PROCESSING FACILITY

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 primary Uranium Processing Facility (UPF) project contractor Consolidated Nuclear Security, LLC (CNS), UPF design and construction subcontractor Bechtel National, Inc. (BNI), UPF heating, ventilation, and air conditioning (HVAC) subcontractor Apollo Mechanical Contractors (Apollo), and the National Nuclear Security Administration Y-12 National Security Complex (Y-12) Acquisition and Project Management Office (APMO). EA assessed the implementation of quality assurance (QA) specifications and requirements for the ongoing construction of HVAC structures, systems, and components (SSCs) related to nuclear safety at the Y-12 UPF in Oak Ridge, Tennessee. Remote assessment planning and document collection activities began in April 2022, with onsite assessment activities conducted from May 23-27, 2022. This assessment was performed at the request of APMO.

Upon its completion, UPF will offer modernized infrastructure to replace several aging Y-12 production facilities currently in use. The UPF design segregates processes into separate buildings based on nuclear safety and security risks. The Main Processing Building (MPB) will contain the most hazardous processes, and the Salvage and Accountability Building (SAB) will house medium-risk processes. The current UPF construction activities are focused on the installation of key facility SSCs at MPB and SAB, including ductwork and HVAC systems with functional and performance requirements derived from the UPF nuclear safety basis. BNI is responsible for all Quality (Q) quality level UPF HVAC construction activities and has subcontracted Apollo to complete some of the Risk Significant (RS) quality level UPF HVAC work. The Q quality level designation is assigned to UPF safety significant (SS) SSC construction activities that are subject to the UPF project's highest level of quality processes and controls. The RS quality designation is assigned to UPF SSC construction activities requiring a high level of quality controls, though not as high as the level required of Q designated SS SSCs.

In accordance with the *Plan for the Independent Assessment of Construction Quality at the Y-12 National Security Complex Uranium Processing Facility, May 2022*, the assessment evaluated the effectiveness of CNS, BNI, and Apollo's implementation of the UPF quality assurance programs (QAPs) and requirements for the engineering design, receipt, fabrication, storage, installation, and inspection of HVAC SSCs related to nuclear safety at UPF. The primary focus of this assessment was the ongoing construction of HVAC SSCs related to nuclear safety at the MPB and SAB because both buildings will present the highest radiological risk and rely on HVAC systems to mitigate hazards as established in facility safety bases. This assessment also included a review of DOE oversight conducted by APMO of UPF HVAC construction quality activities.

2.0 METHODOLOGY

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*, which is implemented through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. This report uses the terms "best practices, findings, deficiencies, 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 SS.1 and SS.2 of EA Criteria and Review Approach Document (CRAD) 31-15, Rev. 1, *Safety Systems Management Review*. In addition, elements of EA CRAD 30-07, Rev. 0, *Federal Line Management Oversight Processes*, were used to collect and analyze data on APMO oversight activities. To gather relevant assessment data, EA reviewed CNS, BNI, Apollo, and APMO policies, processes, procedures, and records supporting UPF QAPs, HVAC system engineering design, work planning and execution, QA personnel training and qualification, and issues management. EA observed relevant UPF construction activities and work planning meetings. EA also interviewed key contractor, subcontractor, and Federal personnel responsible for UPF QAP implementation. The members of the assessment team, the Quality Review Board, and management responsible for this assessment are listed in appendix A.

There were no previous findings for follow-up addressed during this assessment.

3.0 RESULTS

3.1 Engineering Design

This portion of the assessment evaluated whether engineering design documents and analyses were technically adequate, developed using sound engineering principles incorporating applicable requirements, and appropriately verified and documented.

Design Engineering

CNS has established and BNI has implemented adequate conduct of engineering (COE) processes and procedures for developing and controlling relevant HVAC SSC design criteria, calculations and associated analyses, drawings, and specifications. CNS COE procedures provide an appropriate process to ensure that BNI designs HVAC SSCs using sound engineering principles and translates the design bases and assumptions in the documented safety analysis (DSA) into criteria for design outputs (e.g., calculations, drawings, and specifications). The reviewed UPF design criteria and calculations adequately demonstrated that defense-in-depth HVAC SSCs and associated support system designs can provide their documented safety function in normal, abnormal, and accident conditions (e.g., fire and natural phenomenon hazards). For example, calculations DAC-EF-801786-A090, *UPF HEPA Filter Exposure*, and DAC-EZ-801768-A101, *UPF HEPA Filter Soot Loading*, evaluated HEPA filter response to a design basis fire and demonstrated that the filtration will continue to perform its defense-in-depth function. In UPF-3DP-G04B-00049, *UPF Engineering Specifications*, the specification requirements for commodities, equipment procurement, and construction are adequately defined and implemented, ensuring that the reviewed HVAC SSCs were fabricated with materials qualified for expected environments. Acceptance criteria identified for tested parameters (e.g., air flows and differential pressure) were also adequately supported by calculations and other engineering documents to meet design bases assumptions.

UPF-3DP-G04B-00901, *UPF Technical Change Control*, includes an effective change control process for ensuring proper engineering review and approval of proposed HVAC design changes (including field changes) and the identification of all affected documents. The change control process adequately addresses the unreviewed safety question process as required by 10 CFR 830, subpart B, *Safety Basis Requirements*, until UPF is approved for operations. UPF-3DP-G04B-00901, section 4.4, requires that relevant organizations and disciplines participate in design change reviews to drive communication among contributors. The approach uses an effective collaborative process for the review and approval of changes to the technical design documents using safety-in-design integration teams and technical change control boards, which consist of multi-discipline and multi-contractor (i.e., CNS and BNI) members. For

example, engineering change proposal (ECP)-EG-801768-D296, *Align HVAC Datasheets with 3D Model*, appropriately documented team/board involvement in the review and approval of the proposed UPF HVAC design changes.

Design Requirements

The reviewed UPF HVAC engineering designs appropriately incorporate applicable requirements from consensus standards and the DSA into design work and design changes. PL-RM-801768-A001, *UPF Design Code of Record*, adequately establishes applicable regulations, DOE directives, and industry codes and standards pertinent to HVAC design, including American Society of Mechanical Engineers (ASME) AG-1, *Code on Nuclear Air and Gas Treatment*, the American Conference of Government Industrial Hygienists Industrial Ventilation Manual, and DOE HDBK-1169-2003, *Nuclear Air Cleaning Handbook*. The reviewed HVAC design documents adequately identified SSC functional and performance requirements derived from the current UPF safety basis and defined appropriate design criteria.

Design Verification

CNS and BNI have established effective design verification processes requiring that independent reviewers verify HVAC design work before approval and during implementation. UPF-3DP-G04B-00092, *UPF System Verification*, provides an appropriate verification process using individuals who have relevant subject matter expertise to ensure that engineering products are technically accurate and completed according to ASME Nuclear Quality Assurance (NQA)-1-2008/2009a, req. 3, sec. 500, *Design Verification*. Four reviewed design calculations were appropriately checked by independent engineers before the designs were implemented. During interviews, the engineers who checked the design products demonstrated thorough knowledge of relevant HVAC engineering disciplines.

Design Documentation

The reviewed HVAC technical baseline documents (i.e., design criteria, drawings, analyses, calculations, specifications, and performance characteristics) generally support adequate facility safety basis development and implementation. PL-PJ-801768-A017, *Systems Engineering Management Plan for the Uranium Processing Facility*, section 3.1, provides an effective process, as implemented by PL-PJ-801768-A025, *Technical Requirements Management Plan for the Uranium Processing Facility Project*, for ensuring identification, development, and maintenance of the technical baseline documents in accordance with DOE Order 420.1C, *Facility Safety*, att. 2, ch. 5, par. 3.c.2.

The reviewed HVAC system design descriptions (SDDs) - SDD-EH-922600-HVMAA-A020, *System Design Description of the HVAC Materials Access Area (HVMAA) System, PCS, and SCS for the MPB Casting Process Area*, and SDD-EH-922600-HVMAA-A037, *System Design Description of the HVAC Materials Access Area (HVMAA) System, PCS, and SCS for the SAB NDA, WP, DEC and CTMN* - conform to the requirements of DOE Standard 3024, *Content of System Design Descriptions,* and DOE Order 420.1C. The reviewed HVAC technical baseline documents were also generally maintained as current in accordance with UPF-3DP-G04B-00901. However, the reviewed SDDs, which reflect the 30% design, have not been updated per the UPF Design Guide DG-EG-801768-A003, *UPF System Facility Design Description Guide*, although the current design is nearly completed. Delays in updating these SDDs may result in the most current information regarding technical design bases not being properly incorporated into associated planned UPF HVAC system design and construction activities. Similarly, reviewed technical baseline document H2D922600D244, Rev. 6, *MPB Casting VAC Anneal Exhaust V&ID* [Ventilation and Instrumentation Drawing], has not been updated to reflect the Q quality level boundary, contrary to the appropriately developed ECP-EG-801768-D023, *HVAC Q Duct Minimum Volume for Relief Vent Path*, approved in October 2021. Delays in updating the V&ID to reflect the

boundary requirements in the approved ECP may increase the potential for associated planned UPF HVAC construction activities being performed under an inappropriate quality level. (See **OFI-CNS-1**.)

Engineering Design Conclusions

Overall, the reviewed UPF HVAC design documents and analyses are technically adequate and demonstrate adherence to the CNS COE processes and procedures, which are based on sound engineering principles. The reviewed engineering design products appropriately incorporate applicable requirements from consensus standards and the current UPF DSA and were properly independently verified. The reviewed technical baseline documents conform to applicable standards for supporting facility safety basis development and implementation. However, several technical baseline documents were not maintained as current.

3.2 Quality Assurance

This portion of the assessment evaluated whether BNI implements an effective quality assurance program for the procurement, shop fabrication, and field installation of UPF HVAC SSCs related to nuclear safety and provides adequate oversight of Apollo HVAC construction activities.

Quality Assurance Programs

The CNS UPF quality assurance program description (QAPD) Y60-95-102PD, *UPF Quality Assurance Program Description*, appropriately establishes the QA requirements for UPF engineering, procurement, construction, startup, and commissioning in accordance with 10 CFR 830*,* subpart A, and DOE Order 414.1D, *Quality Assurance*. The CNS UPF QAPD also appropriately incorporates consensus standards from ASME NQA-1 2008 Edition, part I, including the NQA-1a-2009 addendum, *Quality Assurance Requirements for Nuclear Facility Applications*, and requirements from DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*. Additionally, the CNS UPF QAPD addresses the applicable NQA-1, part II, QA requirements for certain work activities. The CNS UPF QAPD is reviewed annually, and a summary of the review is appropriately submitted to APMO for approval. CNS subcontract 4300092953, *Uranium Processing Facility Project Management*, requires BNI to perform its UPF construction project management and execution activities in accordance with PL-QA-801768-A001, *Bechtel National Incorporated Uranium Processing Facility Project Quality Assurance Plan*, which has been reviewed and approved by CNS. The BNI QAP effectively flows down the applicable requirements established in the CNS UPF QAPD and, where appropriate, NQA-1 for the BNI scope of work. The CNS UPF QAPD and BNI QAP also define the special controls, processes, test equipment, tools, and skills for properly verifying the required quality of activities and items.

Procurement

The BNI QAP incorporates by reference CNS UPF QAPD section 5.4, *Procurement Document*. Section 5.4 establishes adequate processes to ensure that the program in control of purchased material, equipment, and services in support of the UPF project meets the requirements of 10 CFR 830.122, criterion 7, *Performance/Procurement*. Section 5.4 also appropriately requires that applicable procurement QA requirements flow down to all levels of subcontractor procurement documents. The reviewed BNI procurement documents in support of the Apollo UPF HVAC system fabrication, installation, and construction activities categorized as RS quality level appropriately included the scope of work, right of access to facilities, design specifications, testing and inspection activities, special process requirements, and quality requirements. These procurement documents appropriately required that items and services supplied by Apollo in support of the construction of HVAC SSCs be consistent with the approved QAPs and QA procedures.

The BNI QAP also incorporates by reference CNS UPF QAPD section 5.7, *Control of Purchased Items and Services*. Section 5.7 establishes processes to ensure that approved suppliers provide items and services in support of the UPF project that meet the requirements of 10 CFR 830.122, criterion 7. Section 5.7.2, *Supplier Evaluation, Selection, and Monitoring*, further requires BNI to ensure that approved suppliers continue to meet the specified technical and applicable quality requirements through periodic reevaluations, surveillances, inspections, tests, audits, and other monitoring activities. Three reviewed audit/surveillance reports completed between 2019 and 2021 were appropriately performed at the required frequency, were based on approved procedures, and demonstrated that Apollo complied with the applicable technical and quality requirements. The scope of these oversight activities focused on the adequacy and effectiveness of Apollo's implementation of quality programs. The reviewed audit/surveillance reports adequately demonstrated that Apollo has effectively implemented its quality program in accordance with BNI QA requirements.

Shop Fabrication Quality Control

The Apollo shop (located off site in Oak Ridge, TN) has established an adequate QA/quality control (QC) program, which BNI approved on December 1, 2018. During the assessment, EA observed implementation of relevant QC activities at the offsite Apollo shop, which fabricates RS ductwork sections and duct supports for the UPF project. The shop appropriately implements a welding program consisting of qualified welders; certified weld inspectors, including a Level III weld inspector; and a weld filler rod control room that is controlled by the shop fabrication manager and monitored by QC personnel. Apollo adequately prepares repetitive work packages that include master work packages (MWPs) for the fabrication of individual RS ductwork sections and duct support structures. Four reviewed MWPs demonstrated appropriate verification of fabricated ductwork sections and duct supports. The MWPs also appropriately included weld maps and QC weld inspection reports, listed hold points for inspections during fabrication activities, documented QC inspection completion, and identified required measuring and test equipment with acceptable calibration.

The observed fabricated duct sections and supports were adequately labeled and stored in accordance with Sheet Metal and Air Conditioning Contractors' National Association, Inc., and project specification requirements. During the observations of the fabrication shop work performed by Apollo, the Apollo quality assurance manager, Apollo QC inspector, and two BNI subcontractor technical representatives (STRs) demonstrated adequate knowledge of MWP fabrication and critical attribute inspection requirements. The Apollo fabrication shop effectively retains all MWPs for issuance to workers as needed, ensuring proper control of work records. MWPs are properly stored in fire-safe cabinets at the end of each work shift and can only be accessed by document control personnel. Updated MWPs demonstrated appropriate document and drawing revisions ready for reissue. However, prior to the onsite portion of the assessment, CNS identified two Q SS ductwork V&IDs that BNI assigned to Apollo, which is authorized to perform only RS HVAC construction activities. The ductwork is for a small alternate vent path system identified as SS in the UPF DSA. In response, CNS initiated condition report (CR)-03797 to address this discrepancy, which was assigned to BNI Engineering for disposition. The CR appropriately required an extent of condition review to check for other similar issues associated with the confinement ventilation system.

Field Installation Quality Control

BNI has adequately prepared construction work packages (CWPs) for field installation of the reviewed RS and Q ventilation equipment, including air filter housings and air handling units. BNI maintains an effective QC group consisting of a QC manager and QC inspectors who appropriately verified that technical attributes from relevant technical evaluation critical attributes mitigation (TECAM) documents

were met in the reviewed BNI and Apollo CWPs. During the observations of equipment installations performed by BNI in the MPB and SAB areas, the interviewed BNI QC manager and two QC inspectors demonstrated thorough knowledge of CWPs and TECAM requirements. Six reviewed CWPs appropriately listed hold points for inspections during installation activities, documented completed work and required quality inspections (which included TECAM requirements and other critical attributes), and verified that physical and functional aspects of items, services, and processes met applicable acceptance requirements.

Apollo has also implemented an adequate QC program for the reviewed field installation activities. Apollo onsite staff adequately prepared repetitive work packages that include CWPs for installing individual ductwork sections and duct supports. During the observations of Apollo's installation of ductwork sections and duct supports in the MPB and SAB areas, the interviewed Apollo QC manager, QC inspector, and BNI STRs demonstrated thorough knowledge of work package and critical attribute inspection requirements. The Apollo field installation document control system mirrors the shop fabrication system and provides equally effective document control. Six reviewed Apollo CWPs demonstrated appropriate verification of installed ductwork sections and duct supports. All six appropriately included hold points for inspections during installation activities and documented verifications that physical and functional aspects of items, services, and processes met acceptance requirements.

Control of Nonconformances

BNI has implemented an adequate process to disposition reviewed nonconformances. Y17-95-64-804, *UPF Construction Nonconformance Reporting, and Control*, appropriately incorporates instructions for dispositioning nonconformances in accordance with ASME NQA-1, 2008/2009a, requirement 15, *Control of Nonconforming Items*. Three reviewed nonconformance reports (NCRs) included appropriate steps for identifying, segregating, and dispositioning items in accordance with Y17-95-64-804. These NCRs were appropriately prepared by BNI STRs; reviewed/approved by the BNI design authority, responsible engineer, and QC manager; forwarded to Apollo for final disposition; and documented in the NCR database by BNI STRs in accordance with Y17-95-64-804.

Oversight and Surveillance Assessment of Construction Quality Performance

BNI provides effective oversight of Apollo performance and construction quality using a robust STR program described in UPF procedures Y17-95-64-876, *UPF Subcontract Management*, and UPF-PROCUREMENT-PROC-7.54, *Subcontract Coordinator/Subcontract Technical Representative Program*. The STR program provides thorough oversight using four BNI STRs specifically assigned to the Apollo subcontract who cover all UPF HVAC-related project areas: MPB East, MPB West, SAB, and the Apollo laydown area and fabrication shop. These STRs routinely interface directly with Apollo QA/QC and field engineers to address HVAC construction and fabrication issues. During the observed shop and field work performed by Apollo in the MPB and SAB areas, the interviewed area STR and lead STR demonstrated thorough knowledge of the project and the safety aspects of the work. Ten reviewed CWPs demonstrated that the STRs actively reviewed and concurred on the work package contents and job hazard analyses. STRs also properly initiated two field change notices and one field change request from subcontractors per Y17-95-64-802*, UPF Construction Field Change Documents*. BNI QA/QC managers, responsible engineers, and STRs and Apollo QA/QC managers and field engineers also attend weekly progress and engineering meetings to resolve engineering design and other field issues. The reviewed engineering meeting minutes demonstrated that the STRs were actively involved.

BNI has appropriately performed a QA surveillance assessment to ensure that the work associated with HVAC equipment and installation meets quality requirements. The surveillance assessment took place

over a period of two weeks at Apollo's shop in Oak Ridge and at the UPF construction site. The reviewed QA surveillance assessment demonstrated appropriate oversight of engineering product development and change control and HVAC SSC fabrication and installation work control.

Quality Assurance Conclusions

The CNS UPF QAPD adequately establishes UPF quality requirements based on applicable codes and standards. The BNI QAP effectively incorporates, flows down, and implements CNS UPF QAPD requirements into the reviewed BNI and Apollo HVAC construction activities. BNI procurement documents appropriately identify QA/QC requirements for items and services provided by Apollo. Apollo and BNI demonstrated adequate offsite shop fabrication and onsite installation of their assigned UPF HVAC RS and Q equipment. BNI also has an adequate process to identify and disposition nonconformances. The BNI STR program provides for effective oversight of Apollo HVAC field activities and efficient resolution of identified issues.

3.3 Federal Oversight

This portion of the assessment evaluated the effectiveness of APMO oversight planning and performance for CNS, BNI, and Apollo HVAC construction quality activities and APMO management of identified issues.

Oversight Planning and Performance

APMO processes and procedures for planning and performing Federal UPF construction quality oversight activities appropriately incorporate the requirements of DOE Order 226.1B. APMO procedure Y12-APMO-PR-A003, *APMO Oversight Planning Process*, provides a systematic, risk-based approach for prioritizing and ranking annual oversight activities based on potential impact to project quality, safety and security, success, cost, and schedule/critical path. Oversight planning roles and responsibilities are clearly defined for each level of the organization. Interviews with APMO project leadership, functional area management, and relevant APMO staff showed consistent understanding of the oversight planning process and individual roles in the process. The APMO Fiscal Year 2022 annual assessment plan Y-12APMO-PL-95-A005, *Acquisition and Project Management Office Oversight Plan*, demonstrated an adequate combination of system walkdowns, operational awareness activities, and shadow and formal APMO-led assessments for monitoring contractor and subcontractor quality program performance. EA reviewed reports and documentation from formal APMO assessments of UPF HVAC design and HVAC subcontract statement of work development, shadow assessments of BNI oversight of Apollo HVAC construction quality programs, and APMO operational awareness activities related to Apollo HVAC work planning and control and duct installation. Each reviewed oversight activity was performed by APMO staff members who were appropriately qualified in relevant technical areas (e.g., NQA-1 and HVAC engineering), and each activity was executed in accordance with Y12-APMO-PR-A004, *Y-12 APMO Oversight Execution/Reporting Process*.

Issues Management

APMO has effectively communicated and documented its observations and findings from oversight activities to contractor/subcontractor management through formal correspondence. The formal memoranda reviewed by EA clearly articulated APMO-identified issues to contractor management, set expectations for associated contractor responses, and were appropriately documented in the APMO issues management system Federal Project Directors Project Management Tool (FPD Tool). APMO also appropriately monitors contractor/subcontractor corrective action development, execution, and closure through participation in routine coordination meetings and the use of the FPD Tool. Interviews with

functional area management and review of meeting minutes from May 2022 demonstrated that APMO functional area management or their designees routinely attended and engaged in weekly contractor-led Condition Report Review Committee (CRRC) meetings and biweekly Management Review Board meetings. During each meeting, APMO attendees had opportunities to comment on contractor/subcontractor ranking of issues and development, execution, and closure of associated corrective actions. During the CRRC meeting observed by EA on May 23, 2022, APMO and contractor attendees provided feedback on action rankings and assignments for multiple recent issues, including CR-03797, which is related to the Q UPF HVAC work scope being incorrectly assigned to Apollo. The feedback was constructive and ultimately incorporated into associated corrective actions.

The FPD Tool provides a generally adequate platform for electronically documenting APMO assessment and oversight activities, monitoring Federal and contractor UPF issues identified by APMO, and tracking the status of corrective actions associated with APMO findings. Interviewed APMO FPD Tool users characterized the system as relatively new (i.e., implemented in December 2021 in place of the former ePegasus system), with increased functionality for categorizing APMO assessment data; uploading formal APMO and contractor correspondence on corrective action planning, execution, and closure; and exporting key assessment data for further trending and analysis. Observed use of the FPD Tool by relevant APMO subject matter experts (SMEs) demonstrated their ability to readily find and extract reports, issues, and actions related to APMO oversight of UPF HVAC and Apollo activities. APMO also appropriately used the FPD Tool to monitor and document closure of contractor actions in response to APMO-identified HVAC issues. However, interviewed APMO SMEs acknowledged that the FPD Tool currently has limited search options (e.g., responsible organization, closure status, and general keyword search) and no built-in functional area trending capabilities. (See **OFI-APMO-1**.) The SMEs stated that the platform is versatile and can be updated to include additional search criteria.

Federal Oversight Conclusions

Overall, APMO has effectively planned and performed Federal oversight of UPF HVAC construction quality activities in accordance with DOE Order 226.B. APMO has appropriately communicated oversight findings and monitored associated corrective action development, execution, and closure through close coordination with the contractor/subcontractor and use of the FPD Tool. However, the FPD Tool currently has limited search options and no built-in functional area trending capabilities.

4.0 BEST PRACTICES

No best practices were identified during this assessment.

5.0 FINDINGS

No findings were identified during this assessment.

6.0 DEFICIENCIES

No deficiencies were identified during this assessment.

7.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified two OFIs 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 a recommendation 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 updating the engineering design process to ensure design documentation is maintained current. Timely updating key design documentation ensures technical baseline information is efficiently and effectively incorporated into design and construction activities, providing for a more optimal design process.

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OFI-APMO-1: Consider expanding the FPD Tool search criteria to include additional functional areas and incorporating built-in issues trending capabilities. APMO functional area managers and personnel currently manually categorize and trend issues based on exported FPD Tool data. Expanding search criteria and incorporating trending capabilities directly into the FPD Tool may optimize the process and reduce the potential for human error.

Appendix A
Supplemental Information

Dates of Assessment

Onsite Assessment: May 23-27, 2022

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