



# **Independent Assessment of Work Planning and Control at the Paducah Gaseous Diffusion Plant**

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## Acronyms

ALWCD	Activity-Level Work Control Document
CAS	Contractor Assurance System
CFR	Code of Federal Regulations
CRAD	Criteria and Review Approach Document
DOE	U.S. Department of Energy
EA	Office of Enterprise Assessments
FRNP	Four Rivers Nuclear Partnership, LLC
IHWP	Industrial Hygiene Work Permit
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
JHA	Job Hazard Analysis
LOTO	Lockout/Tagout
NFPA	National Fire Protection Association
OFI	Opportunity for Improvement
ORPS	Occurrence Reporting and Processing System
PGDP	Paducah Gaseous Diffusion Plant
PPE	Personal Protective Equipment
PPPO	Portsmouth/Paducah Project Office
QA	Quality Assurance
RWP	Radiological Work Permit
SME	Subject Matter Expert
SOTW	Skill of the Worker
TI	Task Instruction
WO	Work Order
WP&C	Work Planning and Control

# Independent Assessment of Work Planning and Control at the Paducah Gaseous Diffusion Plant

## Executive Summary

The U.S. Department of Energy Office of Enterprise Assessments (EA) conducted an independent assessment of work planning and control (WP&C) at the Paducah Gaseous Diffusion Plant onsite in March 2020 and, due to the Coronavirus Disease 2019 pandemic, remotely in May 2021. Specifically, this assessment evaluated the Four Rivers Nuclear Partnership, LLC (FRNP) WP&C processes for deactivation work, elements of the FRNP electrical safety program and contractor assurance system, and the Portsmouth/Paducah Project Office (PPPO) oversight processes of WP&C.

EA identified the following strengths and one best practice:

- The FRNP industrial hygiene work permit process provides a practical and useful mechanism for identifying, analyzing, and documenting industrial hygiene hazards and controls. (Best Practice)
- FRNP is staffed with well-qualified industrial hygiene, radiological control, and electrical safety subject matter experts.
- The FRNP WP&C program is a useful framework for implementing the core functions of integrated safety management.
- PPPO has a comprehensive and integrated process for Federal line oversight for WP&C and has implemented effective assessment planning and performance, operational awareness activities, and performance assurance analysis.

EA also identified several weaknesses and two findings summarized below:

- The FRNP WP&C program does not include sufficient requirements or instructions to ensure adequate implementation of all integrated safety management core functions for low-hazard and low-complexity work to be performed as skill of the worker (SOTW). (Finding)
- FRNP has not implemented the job hazard analysis (JHA) process in accordance with established FRNP procedures. Specifically, FRNP is not tailoring hazards and controls to specific work activities, over-relies on general JHAs that do not cover all identified hazards, and inappropriately relies on safety permits to identify hazards not addressed in JHAs. (Finding)
- EA observed examples of workers not following FRNP WP&C requirements for proper preparation of work instructions and JHAs, not taking appropriate actions in response to inappropriate or poorly written work instructions, and not implementing some required controls.
- PPPO has not effectively tracked or monitored the Facility Representative qualification program to ensure that Facility Representatives complete qualifications.

In summary, FRNP has a WP&C framework that is well-documented with program plans and detailed implementing procedures as required by 10 CFR 851, *Worker Safety and Health Program*, and 48 CFR § 970.5223-1, *Integration of environment, safety, and health into work planning and execution*. However, EA observed examples of inadequate implementation of the FRNP JHA process that presents significant vulnerabilities to worker safety, and FRNP does not have a well-defined SOTW program. Until FRNP addresses the concerns in this report, there is no assurance that the site has identified the required hazards and established controls to sufficiently protect workers' safety and health at the Paducah Gaseous Diffusion Plant. As a follow-up to this assessment, EA plans to reassess the WP&C programs and implementation regarding the findings identified in this report before fiscal year 2025.

# **Independent Assessment of Work Planning and Control at the Paducah Gaseous Diffusion Plant**

## **1.0 INTRODUCTION**

The U.S. Department of Energy (DOE) Office of Worker Safety and Health Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of work planning and control (WP&C) for deactivation work in process buildings at the Paducah Gaseous Diffusion Plant (PGDP), which is managed by Four Rivers Nuclear Partnership, LLC (FRNP). This assessment was conducted on site from March 9 to 12, 2020, and remotely from May 3 to 13, 2021, due to the Coronavirus Disease 2019 pandemic.

Consistent with the *Plan for the Work Planning and Control Assessment at the Paducah Gaseous Diffusion Plant, March 2020*, this assessment evaluated the effectiveness of the implementation of the integrated safety management (ISM) core functions (define the scope of work, identify and analyze hazards, identify and implement controls, perform work safely within controls, and provide feedback and make improvements) for activity-level work involving process building deactivation efforts. This assessment also evaluated elements of the electrical safety program, the contractor assurance system (CAS), and the oversight of WP&C provided by the Portsmouth/Paducah Project Office (PPPO).

## **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, deficiencies, findings, and opportunities for improvement (OFIs)” as defined in DOE Order 227.1A.

As identified in the assessment plan, this assessment considered objectives and criteria from DOE Guide 226.1-2A, *Federal Line Management Oversight of Department of Energy Nuclear Facilities*, Appendix D: *Activity Level Work Planning and Control Criterion Review and Approach Documents with Lines of Inquiry*. EA used elements of Criteria and Review Approach Document (CRAD) EA-30-07, Rev. 0, *Federal Line Management Oversight Processes*, to collect and analyze data on PPPO oversight activities related to WP&C. The EA team also used objectives and criteria from EA CRAD 32-03, Rev. 1, *Industrial Hygiene Program*, and CRAD 45-35, Rev. 1, *Occupational Radiation Protection Program*.

EA observed the planning and implementation of work activities in two primary areas: (1) deactivation of gaseous diffusion plant process buildings and (2) maintenance work, including a detailed assessment of the electrical safety program. EA examined key activity-level work control documents (ALWCDs), such as WP&C plans and procedures, job hazard analyses (JHAs), work orders (WOs), manuals, analyses, and policies. EA also interviewed key personnel responsible for developing and executing the associated programs, observed 12 onsite work activities, and walked down relevant portions of specific facilities. The observed onsite work activities consisted of five broad scope deactivation work activities performed within radiologically controlled areas and seven electrical maintenance activities during the Team’s initial March 2020 site visit. The remote portion of the assessment in May 2021 consisted of follow up interviews and document reviews, along with a review of documentation associated with two additional onsite work activities.

Appendix A lists the assessment team members, the Quality Review Board, and management responsible for this assessment.

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

### 3.0 RESULTS

The objective of this assessment was to verify that FRNP manages and performs work in accordance with a documented Safety Management System that (1) defines the scope of work; (2) identifies and analyzes hazards associated with the work; (3) develops and implements hazard controls; (4) performs work within controls; and (5) provides feedback on the adequacy of controls and continues to improve safety management, all in accordance with the DOE requirements for an Integrated Safety Management System (ISMS) as defined in DOE Policy 450.4A, *Integrated Safety Management Policy*, and 48 CFR 970.5223-1(c), *Integration of Environment, Safety, and Health into Work Planning and Execution*.

#### 3.1 Work Planning and Control Institutional Programs

The objective of this portion of the assessment was to verify that FRNP has established a WP&C process to enable the implementation of ISMS and the safe performance of work.

Overall, FRNP's WP&C program is well-designed, with one exception addressed below. FRNP has developed and implemented a single work control process for the various types of work activities at PGDP (e.g., construction, deactivation, maintenance). FRNP procedures for work package development are extensive, are maintained current, and provide an adequate structure for work planning, development of ALWCDs, and the authorization and execution of work activities. Examples include procedures CP3-SM-1101, *Work Package Development*; CP3-SM-1102, *Activity Level Work Execution and Closeout*; CP3-HS-2004, *Job Hazard Analyses*; and CP3-OP-0316, *Pre and Post Job Briefings*. FRNP has also developed a series of "writer's guides" for preparing WP&C work documents (e.g., CP5-SM-1006, *Activity Level Work Control Document Writer's Guide*, CP5-SM-1008, *Hazard/Control Integration Guide*).

Between March 2020 and March 2021, FRNP proactively implemented several work control process changes to address weaknesses identified by EA during the March 2020 site visit. For example, FRNP revised its work control program and procedures for better alignment with DOE-HDBK-1211-2014, *DOE Handbook on Activity-Level Work Planning and Control Implementation*, and the Energy Facility Contractors Group WP&C program. These changes included technical and administrative revisions to several work control implementing procedures and training modules. Further, in response to EA comments regarding radiological observations, FRNP revised the existing As Low As Reasonably Achievable review procedure. FRNP also created a new procedure for developing radiological work permits (RWPs) to better align with CP2-RP-0002-FR3, *FRNP Radiological Control Manual*. However, these changes did not resolve all of EA's RWP concerns, as discussed in Section 3.2 of this report.

In addition, FRNP industrial hygiene staff proactively followed up on concerns identified by EA in March 2020. FRNP now provides industrial hygiene technicians with additional confined space training to clarify the confusion that EA had observed in the field regarding requirements for permitted and non-permitted confined spaces. Also, FRNP developed and implemented an Industrial Hygiene Work Permit (IHWP) Request Form for documenting IH decisions regarding the need to create an IHWP and perform industrial hygiene sampling. With these changes to the IHWP process and the positive field observations in March 2020, the FRNP IHWP process, which is defined in Appendix C of procedure CP3-HS-2004, is cited as a **Best Practice** for the effective identification, analysis, and documentation of industrial hygiene hazards and controls.

However, the WP&C program does not provide requirements and instructions to identify work scope boundaries, hazards, and hazard controls (core functions of ISM) for low-hazard and low-complexity work performed as skill of the worker (SOTW) as required by 48 CFR § 970.5223-1 - *Integration of Environment, Safety, and Health into Work Planning and Execution*, section (c). While the recently revised CP2-SM-1000, *Activity Level Work Planning and Control Program*, provides a new definition of SOTW, no FRNP documents provide direction to ensure that the core functions of ISM are met for SOTW-type work. For example, while observing an instrument maintenance activity, EA noted that work instruction SI-SM-0034, *Minor Instrument Maintenance Activities*, states that “work performed is skill of craft work and will be performed per Instruction/Vendor manuals and/or guidance from Engineering.” Because FRNP does not have a defined SOTW program, this instruction has no methodology for implementation. Furthermore, there are no WP&C requirements for the use of pre- and post-job briefs in low-hazard work because CP5-1001 states that “some activities graded as low complexity and low hazard are ‘excluded’ from the WP&C work package planning process.” These excluded work activities identified in CP5-SM-1001 may involve potential hazards and require hazard controls to mitigate the risk of injury or illness to workers. Examples include warehouse operations, resetting electrical breakers per CP3-SM-0019, *Electrical Safety Guidelines*, removing or disassembling Resource Conservation and Recovery Act waste for disposal, and animal/insect control. (See **Finding F-FRNP-1** and **OFI-FRNP-1**.)

### **Work Planning and Control Institutional Programs Conclusions**

Since the initial March 2020 assessment visit, FRNP has made substantial revisions to its WP&C procedures and addressed several weaknesses identified by EA. Overall, the FRNP WP&C process and procedures for planning and performing work provide a useful framework for implementing the core functions of ISM, except for some work deemed to be “low complexity” and “low risk.” Further, the FRNP SOTW program does not define what is meant by “performing work as Skill-of-the Worker” or ensure that the core functions of ISM will be implemented.

### **3.2 Work Planning and Control Implementation**

This section discusses the assessment of FRNP’s implementation of its institutional WP&C program for the deactivation of PGDP process buildings, including implementation of its institutional WP&C program for deactivation work activities.

#### **Defining the Scope of Work**

Procedure CP3-SM-1101 provides adequate instruction for preparing and screening work scopes. EA reviewed 16 ALWCDs and found that 12 were consistent with CP3-SM-1101 requirements. However, the work scopes of the remaining four ALWCDs were overly broad, covering multiple work activities. In one example observed during the removal of the two stacks from the exterior of Building C-400, Task Instruction (TI)-19100173 instructs the workforce to “lower sections (of the stack) to ground.” However, it does not describe the mechanisms to complete this task (e.g., using a crane, block and tackle, or simply dropping the structure). These four examples did not sufficiently describe the “mechanisms and/or approaches for completing the assigned work scope (for example, how to do it)” as required by CP3-SM-1101, Section 6.2.2. Additionally, three of seven electrical WOs and work instructions reviewed were generic and did not address the specific work activities to be performed. (See **Deficiency D-FRNP-1**.)

#### **Identifying and Analyzing Hazards Associated with the Work**

The primary mechanism for identifying and analyzing hazards for activity-level work, not identified as SOTW, is the JHA, which is described in procedure CP3-HS-2004. The two types of JHAs are general JHAs and job-specific JHAs. Overall, these procedures provide an adequate mechanism for defining the

job hazard identification and analysis requirements. However, EA identified the following weaknesses with respect to the implementation of the JHA process that are contrary to the requirements of 48 CFR § 970.5223-1 - *Integration of Environment, Safety, and Health into Work Planning and Execution*, section (h): (See **Finding F-FRNP-2** and **OFI-FRNP-1**.)

- Five deactivation WOs for observed work at Buildings C-333 and C-400 either did not incorporate the hazards and controls listed in the referenced JHAs into the work instruction or work steps as required by CP3-SM-1101 (e.g., WO19100173), or the associated JHA did not tailor the hazards and controls to the work scope (e.g., WO19100120, WO9100121, WO19100122, WO19070020).
- WO19100121 includes the job-specific JHA 9583, *Asbestos Glove Bagging (Maintenance Activities)*, for the removal of asbestos transite (products made of cement mixed with asbestos) cell housings in Building C-333. However, the observed activity did not involve a “maintenance activity” or the use of “asbestos glove bags,” which was the focus of the JHA. The JHA also included several hazard controls (e.g., standard poly glove bags) that may have been applicable to asbestos glove bagging work performed by maintenance personnel but were not applicable to the observed work.
- The job-specific JHA 19032, *Deactivation of C-333*, inappropriately refers workers to the general JHA-9698, *JHA Site Orientation-000*, for hazards and controls associated with radiological and nuclear criticality concerns, potential exposure to electrical arc flash, and exposure to potential release of hazardous energy. JHA-19032 serves as a primary hazard analysis resource for most of the high-risk and high-complexity work activities observed by EA (e.g., building demolition, removal of asbestos transite, and removal of instrument lines). However, JHA-9698, is a general JHA used for “the [Deactivation and Remediation] Contractor’s Site Safety Orientation, General Employee Training, for office/administrative personnel, and for general tours and inspection” and does not sufficiently identify hazards or controls specific to the high-risk and high-complexity work activities of JHA-19032. Additional examples of an overreliance on the general site JHA-9698 to specify activity-level hazards include electrical JHAs 8348, 10132, and 12523.
- Two of five reviewed job-specific JHAs defer the identification of hazards and controls to safety permits provided in the ALWCD, which do not address either the hazards or controls presumed by the JHA. For example, JHA-10508 describes a potential “arsenic exposure hazard from heavy machinery shearing activities.” The control specified in the JHA is “Follow the requirements of the job specific IHWP.” However, the IHWP for this activity does not address the heavy machinery shearing activity or potential arsenic exposure.

### **Developing and Implementing Hazard Controls**

CP5-SM-1008 provides the primary guidance for integrating hazards and controls from a JHA to Type 1 TIs and technical procedures and provides guidance for integrating hazards and controls from IHWPs to Type 1 TIs. Overall, the combination of procedure CP3-HS-2004 and CP5-SM-1008 guidance is instructional and appropriate for the work observed by EA. Industrial hygiene and radiological control subject matter experts (SMEs) and technicians were effectively engaged in the work planning and execution process. Industrial hygiene and radiological control SMEs were appropriately involved in reviewing and approving hazard analyses and technical work documents governing work observed in March 2020.

However, implementation did not meet the requirements of FRNP procedure CP3-HS-2004, Section 4.3. For example, during the removal of the two stacks from the exterior of Building C-400, as described in Section 7.5 of TI-19100173, EA identified several potential significant hazards (e.g., materials falling



from elevated heights, working at elevated heights, hazards to personnel associated with crane and hoisting operations, aerial lifts, excessive noise, rigging of components). Moreover, these hazards and the controls to mitigate them were not addressed in the ALWCD (JHA-10508) associated with this activity. (See **Deficiency D-FRNP-2.**)

While generally adequate, RWPs for observed work did not meet CP2-RP-0002-FR3 content expectations for including work area radiological conditions within RWPs and direct linkage of RWPs with the specific technical work documents they are intended to control. As discussed in Section 3.1 of this report, FRNP developed a new procedure, CP-3-RP-1119, *Radiological Work Permit Development*, based on an FRNP-generated corrective action (CA-002537) to include a methodology to link WOs to RWPs. However, this procedure does not provide any formal mechanism to ensure RWP and WO linkage such that workers would be able to determine the correct RWP(s) from the WO. The new procedure also does not include anticipated work area radiological conditions based on survey data within the RWP. (See **OFI-FRNP-2** and **OFI-FRNP-3.**)

### **Performing Work Within Controls**

Procedure CP3-SM-1102 provides a well-defined process for the execution and timely closeout of activity-level work. Most observed pre-job briefings were comprehensive and addressed the work scope, tasks, and hazard controls that in some cases were not explicitly defined in the WCDs, as discussed previously. Pre-job briefings were interactive, inclusive, and employed effective “what if” analysis techniques to ensure that potential hazards were identified and addressed. For briefings observed in support of surveillance and maintenance work, supervisors directed and discussed work scope and included discussion of potential hazards and requisite controls. Industrial hygiene and radiological control technicians were observed at both the pre-job briefings and in the field supporting survey and sampling efforts during work observed in March 2020.

Work observations demonstrated the use of appropriate administrative controls and personal protective equipment (PPE). For example, field work observations identified appropriate work area postings, erected barriers as required, and PPE consistent with work package requirements. However, EA observed the following two examples of workers not taking appropriate actions in response to inappropriate or poorly written work instruction, as required by Section 1 of procedure CP2-SM-1000. (See **Deficiency D-FRNP-3.**)

- Workers did not stop and seek a WO revision when they discovered a deficiency in work steps as required by Section 1 of CP2-SM-1000. Specifically, during the removal of the stacks at Building C-400, two steps in this Type 1 work package were performed out of sequence to avoid a hazardous work condition that could have occurred by following the sequence of written work instructions (i.e., attaching the rigging after the heavy stack components were partially disconnected, which could have resulted in a dropped load).
- SOTW workers did not notice or adhere to written vendor manual electrocution hazard warnings and instructions to remove power from the instrument before doing maintenance or service activities specified in SI-SM-0034. Furthermore, the pre-job briefing and engineering guidance covered the technical aspects of testing and calibration of the controller but did not include vendor hazard warnings or controls. After EA provided comments in March 2020 on this observation, FRNP revised CP5-SM-1006 to address the use of vendor instructions with ALWCDs (through branch referencing). However, the revision does not stipulate the actions to be taken to implement hazards and controls or the precautions and limitations that are specified in the vendor instructions.

## Work Planning and Control Implementation Conclusions

Work scopes for 12 of 16 reviewed ALWCDs were screened and prepared consistent with institutional requirements and guidance, but the remaining four ALWCDs were too broad to provide sufficient detailed instruction. Work observations in March 2020 associated with these ALWCDs identified examples where JHA process requirements were ineffectively implemented, including hazards and controls in applicable JHAs not being tailored to the work being performed, and hazards and controls from the JHAs not being included in the work instructions as required. The lack of a formally established and implemented SOTW program contributed to these weaknesses. EA also observed examples of workers not following FRNP WP&C requirements for preparing work instructions and JHAs, not taking appropriate actions in response to inappropriate or poorly written work instructions, and not implementing required controls.

### 3.3 Electrical Safety

The objective of this portion of the assessment was to assess the FRNP electrical safety program and its implementation, including the installation of arc flash warning labels on certain electrical equipment and electrical lockout/tagout (LOTO).

The FRNP electrical safety program (CP3-SM-0019) effectively integrates the requirements of 10 CFR 851 and National Fire Protection Association (NFPA) 70E-2015, *Standard for Electrical Safety in the Workplace*, Section 110.1, *Electrical Safety Program*. Additionally, CP3-HS-2010-FR4, *Instructions for Lockout/Tagout*, and CP4-SM-0010-FR2, *Verifying De-Energized Electrical Equipment*, address the requirements for establishing the electrically safe work condition requirements of NFPA 70E-2015, Article 120. The electrical safety program is well-staffed with SMEs and authorities having jurisdiction who are qualified in all aspects of electrical safety.

All observed 208-volt and greater, three-phase electrical panels, disconnect switches, motor control centers, and switchgear have a current arc flash warning label installed as required by NFPA 70E-2015, Section 130.5(D). These labels provide warnings and guidance for maintenance and operations personnel of the potential arc flash hazard, arc flash boundary, and required PPE for anyone working on or operating equipment within the arc flash boundary.

EA observed that the FRNP electrical safety program is effectively implemented for electrical maintenance work activities performed on de-energized electrical equipment. For seven observed electrical work activities, qualified first-class electrical mechanics performed the work safely, appropriate to the risk associated with electrical hazards, and in accordance with the requirements of the electrical safety program. This work included verifying that previously applied energy control LOTO was properly installed and provided the required protection, compliance with LOTO requirements, appropriate PPE for shock and arc flash hazards, and safe work practices, including redundant zero energy checks that a second qualified worker verified.

EA also performed two remote assessments of electrical work performed by qualified first-class electrical mechanics. EA participated in the pre-job briefing for work to replace a street lighting transformer. The associated WO contained a detailed step-by-step procedure, including LOTO requirements and provisions for checking off required steps as they were completed. The hazards analysis was thorough and addressed all appropriate controls, including the required PPE. However, in one recent event, FRNP's adherence to implementing procedures was less than adequate. Occurrence Reporting and Processing System (ORPS) Report EM-PPPO-FRNP-PGDPDAR-2021-0003, *Fire at the C-532 Facility*, identified an incident where an electrician inadvertently missed a step in a work instruction package that resulted in arcing cables that created smoke, but no fire or personal injury.

## Electrical Safety Conclusions

The FRNP electrical safety program effectively integrates the requirements of 10 CFR 851 and NFPA 70E-2015. All observed electrical equipment have a current arc flash warning label installed as required by NFPA 70E-2015. The FRNP electrical safety program is effectively implemented for electrical maintenance work activities performed on de-energized electrical equipment. However, in one recent ORPS-reported incident, an electrician inadvertently missed a step in a work instruction package that resulted in arcing cables.

### 3.4 Contractor Assurance System

The objective of this portion of the assessment was to ensure that FRNP has established a CAS to identify and manage WP&C issues and associated corrective actions, plan and conduct assessments, and analyze CAS results to provide feedback on the adequacy of work controls to enable continued improvement of safety management.

FRNP has developed and implemented CP2-QA-3000-FR2, *Contractor Performance Assurance Program Description at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, reviewed and approved by PPPO. CP2-QA-3000-FR2 provides a comprehensive performance assurance system that includes effective issues management, assessment planning, data trending, contractor parent company involvement, and use of lessons learned.

FRNP procedure CP3-QA-3001, *Issues Management*, provides a comprehensive system for identifying issues, analyzing issue causes using a graded approach, developing corrective actions, monitoring completion activities, and conducting appropriate effectiveness reviews. Corrective action development and management is systematic and effective, as demonstrated by three ORPS reports, three investigations and associated causal analyses, four records of Executive Review Board meeting minutes, 20 corrective actions/preventive actions, and three effectiveness reviews. Moreover, the observed process of conducting daily FRNP Screening Committee Meetings, which included United Steel Workers safety representatives, to review issues and monitor corrective actions/preventive actions, is useful for real-time tracking of corrective actions.

FRNP assessment planning is systematic and comprehensive in covering identified actions, overdue actions, and overdue assessments, which the Executive Review Board reviews weekly. EA reviewed one annual self-assessment of the contractor's performance; five management assessments; three self-assessments covering aspects of work planning, performance, and controls; and 20 performance observations and identified that they were sufficiently self-critical and effective in identifying areas for improvement. In addition, one parent company independent assessment of the CAS was particularly well-documented and thorough and identified weaknesses worthy of management attention to enhance contractor performance.

FRNP has effective processes for collecting, analyzing, and presenting performance data for review by management. Each identified issue is reviewed by the daily FRNP Screening Committee and assigned an associated ISMS core function and guiding principle; the issues are tracked, trended, and reported as part of the contractor performance assurance program quarterly trending reports. This information provides management with an effective way of monitoring the WP&C process for needed improvement.

Although FRNP tracks and trends metrics related to injuries, illnesses, incidents, and issues, it has not identified a specific set of metrics for monitoring WP&C performance. However, FRNP is working with

an experienced “reach back” consultant to its parent company to help identify appropriate sitewide metrics. (See **OFI-FRNP-4**.)

FRNP maintains an effective lessons learned program that gathers information from multiple sources, including the DOE Lessons Learned and OPEX Share websites, and shares lessons learned with appropriate FRNP organizational elements. The FRNP Lessons Learned Coordinator conducts assessments to ensure that lessons learned resulting from worker feedback are appropriately used in subsequent work planning and work procedure development, as demonstrated by a 2018 self-assessment. Although worker WP&C-related feedback is collected (e.g., CP3-QA-3011-F01, *Employee Feedback for Continuous Improvement*), workers initiating feedback do not have an easy way to access information regarding the review status and final disposition of their feedback. (See **OFI-FRNP-5**.)

### **Contractor Assurance System Conclusions**

FRNP has effectively developed and implemented a DOE-approved CAS that provides a comprehensive system for identifying issues, analyzing issue causes using a graded approach, developing corrective actions, monitoring completion activities, and conducting appropriate effectiveness reviews. Assessments conducted by FRNP provide useful information to enhance contract performance. FRNP’s collection, monitoring, and analysis of performance information helps management focus on needed improvements. Lessons learned are distributed and used to improve work procedures. This performance demonstrates the qualities of a learning organization in monitoring and improving WP&C. However, FRNP has not identified a specific set of metrics for use in monitoring WP&C performance but is working with its parent company to enhance this capability. Also, worker feedback is collected and used, but workers lack a reliable process to access information regarding the status and disposition of their feedback.

### **3.5 PPPO Field Office Oversight**

The objective of this portion of the assessment was to assess the PPPO WP&C oversight process for overseeing and evaluating PGDP operations managed by FRNP and the implementation of specific PPPO programs, including assessments and operational awareness activities; issues management; and performance assurance analysis.

PPPO oversees operations in Paducah and Portsmouth and has established oversight programs and procedures common to its operations oversight groups. PPPO-M-226.1-2, *Oversight Program Plans*, adequately describes the roles and responsibilities of oversight personnel, oversight methods, and annual assessment schedules. Moreover, PPO-M-226.1-2 identifies the program areas to be reviewed, the periodicity of reviews, the reviews necessary to maintain the baseline oversight program, the qualifications of review personnel, and review criteria. PPPO has documented oversight programs, instructions, and processes, including assessment plans and schedules that demonstrate how oversight is integrated across the quality assurance (QA) program, the system safety oversight program, and the Facility Representative program. All PPPO personnel leading oversight activities at PGDP are certified NQA-1 lead auditors.

The Integrated Assessment and Surveillance Schedule for FRNP, developed by QA personnel with input from Facility Representatives and system safety oversight engineers, ensures that ISM focus areas are assessed to ensure that work is performed safely. PPPO’s ISMS program description is incorporated within the PPPO-M-413.1-1, *Management Plan*, and effectively contains the safety and health requirements necessary for achieving integrated safety management. PPPO-M-413.1-1 also contains the PPPO functions, responsibilities, and authorities, which describe the essential safety management functions, and clearly establishes PPPO lead roles, responsibilities, and authorities for the execution of authorized work.

PPPO performs biannual ISMS effectiveness reviews and uses the results of reviews to create a biannual written declaration of the status and effectiveness of ISM implementation within the field office and the contractor's organization and submits this declaration to the EM Program Office. The Fiscal Year 2020 ISMS Effectiveness Review Declaration provided a concise summary of performance-based insights from established, ongoing Field Element oversight processes and the QA program.

From December 2017 through September 2020, PGDP conducted 13 scheduled assessments and surveillances of ISMS focus areas. The assessment reports were detailed and adequately documented concerns and issues. Additionally, EA reviewed 11 weekly oversight reports and 13 monthly safety summary reports, which included review of ORPS, Computerized Accident/Injury Reporting System, and Management Tracking System reporting and trending for FRNP, and determined that they were detailed and adequately characterized performance.

Although the Coronavirus Disease 2019 pandemic impacted assessment schedules and some assessments were postponed, PPPO maintained oversight during the pandemic by having one Facility Representative and two support staff on site daily at PGDP. The issues observed from oversight activities were entered into the PPPO Management Tracking System and were effectively communicated to PPPO management and FRNP.

The PPPO management assessment of PPPO programs and processes (PPPO-19-MA-101552, *Final Report for the Management Assessment of Issues Impacting Safe Operations at the Portsmouth/Paducah Project Office*) was conducted in September 2019 identified that all Facility Representatives assigned to PGDP were not fully-qualified but on track to complete their qualification. During interviews, one Facility Representative mentioned that he is a fully-qualified Facility Representative. However, a review of the Facility Representative training tracking record showed that the records were not maintained. Additionally, the Facility Representatives did not complete their qualifications required by PPPO-M-426.1-0, *Technical Qualification Program Plan*, Sections 6.9.5, 6.9.3, and 6.9.6, although all five Facility Representatives were in the process of completing their qualifications. Out of the five Facility Representatives, two were enrolled in the technical qualification program for over three years. PPPO-M-426.1-0 requires that the Facility Representatives complete their qualifications in 18 months. (See **Deficiency D-PPPO-1.**)

#### **PPPO Field Office Oversight Conclusions**

Overall, PPPO has a comprehensive and integrated process for Federal line oversight of WP&C. Moreover, PPPO implements effective assessment planning and performance, operational awareness activities, and performance assurance analysis and effectively communicates issues from oversight activities to FRNP. However, PPPO is not maintaining the Facility Representative training tracking records or ensuring that all Facility Representatives complete qualifications in a timely manner.

#### **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:

- The FRNP IHWP process, which is defined in Appendix C of procedure CP3-HS-2004, is a practical and useful mechanism for identifying, analyzing, and documenting industrial hygiene hazards and controls in ALWCDs.

## 5.0 FINDINGS

Findings are deficiencies that warrant a high level of attention from management. If left uncorrected, findings could adversely affect the DOE mission, the environment, the safety or health of workers and the public, or national security. DOE line management and/or contractor organizations must develop and implement corrective action plans for findings. Cognizant DOE managers must use site- and program-specific issues management processes and systems developed in accordance with DOE Order 226.1, *Implementation of Department of Energy Oversight Policy*, to manage the corrective actions and track them to completion.

### Four Rivers Nuclear Partnership, LLC

**Finding F-FRNP-1:** The FRNP WP&C program does not include sufficient requirements or instructions to ensure adequate implementation of the ISM core functions, including work scope boundaries, hazards, and hazard controls, for low-hazard and low-complexity work to be performed as SOTW. (48 CFR § 970.5223-1 - *Integration of environment, safety, and health into work planning and execution*, section (c))

**Finding F-FRNP-2:** FRNP has not implemented the JHA process in accordance with established FRNP procedures. Specifically, FRNP does not: (1) adequately tailor hazards or controls to specific work activities, (2) places an over-reliance on general JHAs that do not cover all identified hazards, and (3) in some cases inappropriately relies on safety permits to identify hazards not addressed in JHAs. (48 CFR § 970.5223-1 - *Integration of environment, safety, and health into work planning and execution*, section (h))

## 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.

### Four Rivers Nuclear Partnership, LLC

**Deficiency D-FRNP-1:** FRNP did not provide sufficient detail in the work scopes of some observed ALWCDs to permit the identification of hazards and controls for individual work steps, including the “mechanisms and/or approaches for completing the assigned work (for example, how to do it).” (FRNP procedure CP3-SM-1101, Section 6.2.2)

**Deficiency D-FRNP-2:** FRNP does not ensure that hazard controls are sufficiently identified and integrated into all ALWCDs. (FRNP procedure CP3-HS-2004, Section 4.3)

**Deficiency D-FRNP-3:** FRNP workers did not take appropriate actions in response to inappropriate or poorly written work instructions. (FRNP procedure CP2-SM-1000, Section 1)

### Portsmouth/Paducah Project Office

**Deficiency D-PPPO-1:** PPPO does not effectively track or monitor the Facility Representative qualification program to ensure that Facility Representatives complete qualifications. (PPPO-M-426.1-0, *Technical Qualification Program Plan*, Sections 6.9.5, 6.9.3, and 6.9.6)

## **7.0 OPPORTUNITIES FOR IMPROVEMENT**

EA identified five OFIs for FRNP 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.

### **Four Rivers Nuclear Partnership, LLC**

**OFI-FRNP-1:** Consider incorporating elements of the SOTW and JHA programs, (e.g., hazards and controls, boundary conditions, prerequisites, action statements, pre-job talking points, and task notes) being implemented at the Lawrence Livermore National Laboratory (LLNL).

**OFI-FRNP-2:** Consider establishing a physical RWP file that workers can access containing all specific WOs/work instructions and the associated RWP, allowing workers to determine and verify the proper RWP for their assigned work.

**OFI-FRNP-3:** Consider additional revisions to CP-3-RP-1119 to better address (1) the intended linkage between RWPs and WOs/work instructions, and (2) expectations for inclusion of anticipated work area radiological conditions based on actual survey data.

**OFI-FRNP-4:** Consider identifying a specific set of metrics to be used for monitoring WP&C performance. Candidates for such metrics include FRNP trending of issues that have been assigned an associated ISMS core function and guiding principle. In addition, a review of WP&C-related metrics developed by the LLNL WP&C program management may be useful.

**OFI-FRNP-5:** Consider developing an easy way for workers initiating feedback to access information regarding the review status and final disposition of their feedback. LLNL has developed an easy way for workers to access such information in its WP&C database.

## **Appendix A Supplemental Information**

### **Dates of Assessment**

Onsite Assessment: March 9-12, 2020

Remote Assessment: May 3-13, 2021

### **Office of Enterprise Assessments 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

Kevin M. Witt, Director, Office of Nuclear Safety and Environmental Assessments

Charles C. Kreager, Director, Office of Worker Safety and Health Assessments

Jack E. Winston, Director, Office of Emergency Management Assessments

Joseph J. Waring, Director, Office of Nuclear Engineering and Safety Basis Assessments

### **Quality Review Board**

William F. West

Thomas C. Messer

Jacob M. Miller

Michael A. Kilpatrick – Advisor to the Quality Review Board

### **Office of Enterprise Assessments Assessors**

Charles C. Kreager – Lead

Nimalan Mahimaidoss

Roby D. Enge

Joseph Lischinsky

James R. Lockridge

Dennis K. Neitzel

Mario A. Vigliani