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**CP2-SM-1000/FR3**

# Activity Level Work Planning and Control Program for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

FOUR RIVERS NUCLEAR PARTNERSHIP, LLC

**CP2-SM-1000/FR3**

# Activity Level Work Planning and Control Program for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

Date Issued—July 2019

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

Prepared by
FOUR RIVERS NUCLEAR PARTNERSHIP, LLC,
managing the
Deactivation and Remediation Project at the
Paducah Gaseous Diffusion Plant
under Contract DE-EM0004895

# APPROVALS

**Activity Level Work Planning and Control Program**
**Paducah Gaseous Diffusion Plant**
**Deactivation and Remediation Project**

**CP2-SM-1000/FR3**

July 2019

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# ACRONYMS

| | |
|---|---|
| ALW | activity level work |
| ALWCD | activity level work control document |
| *CFR* | *Code of Federal Regulations* |
| CM | corrective maintenance |
| D&R | deactivation and remediation |
| DOE | U.S. Department of Energy |
| EMS | Environmental Management System |
| FLM | front line manager |
| FM | facility manager |
| HHRB | high hazard review board |
| ISMS | Integrated Safety Management System |
| MOD | modification |
| NFM | nuclear facility manager |
| O | DOE Order |
| PdM | predictive maintenance |
| PGDP | Paducah Gaseous Diffusion Plant |
| PM | preventive maintenance |
| PPPO | Portsmouth/Paducah Project Office |
| QA | quality assurance |
| RM | responsible manager |
| SME | subject matter expert |
| SOW | scope of work |
| SUP | support services |
| WO | work order |
| WPC | work planning and control |

# 1. INTRODUCTION

The Activity Level Work Planning and Control (WPC) Program defines requirements for Paducah Gaseous Diffusion Plant (PGDP) Deactivation and Remediation (D&R) contractor activity level work (ALW) performed under Contract DE-EM0004895 at the U.S. Department of Energy (DOE) Paducah Site. The ALW planning and control requirements are derived from DOE Order (O) 433.1B, Admin Chg 1, *Maintenance Management Program for DOE Nuclear Facilities*; DOE O 430.1C, *Real Property Asset Management*; DOE O 420.1C, Chg 1, *Facility Safety*; and DOE O 414.1D, Admin Chg 1, *Quality Assurance*. The requirements maintain compliance with 10 *CFR* Part 835, *Occupational Radiation Protection,* and 10 *CFR* Part 851, *Worker Safety and Health Program.* In developing WPC requirements for the PGDP D&R project, the guidance of DOE-HDBK-1211-2014, *Activity Level Work Planning and Control Implementation,* was considered and implemented, as appropriate, based on the PGDP D&R contractor work scope.

The WPC Program incorporates Integrated Safety Management System (ISMS) guiding principles and core functions identified in DOE O 450.2, Chg 1, *Integrated Safety Management*, and Environmental Management System (EMS) objectives and strategies identified in DOE O 436.1, *Departmental Sustainability*. Additional regulations, orders, and consensus standards applicable to PGDP D&R contractor work processes are defined in the contract and subsequent modifications (MODs). These standards and regulations are defined in Section J, Attachment J-4, of contract DE-EM0004895.

Oversight of the Work Control Program is provided per CP2-QA-3000, *Contractor Performance Assurance Program Description*, in accordance with DOE O 226.1B, *Implementation of Department of Energy Oversight Policy*, and CP3-OP-0500, *Performance Observation Program*.

Work scopes defined in the contract are performed and supported by multiple project organizations on a project site that include multiple DOE support contractors. The site interface process is used to communicate information regarding ALW that, based on work location or potential impacts, require coordination with other site contractors. The goal is safe, environmentally protective, efficient, and reliable conduct of all contract work scopes in support of the Portsmouth/Paducah Project Office (PPPO) in addressing the DOE mission. If work cannot be performed as written, work is paused/stopped until the issue is resolved.

This program description applies to all workers (for example, employees, subcontractors, teaming partners, and other assigned personnel) with responsibility for conducting and supporting construction, stabilization and deactivation, maintenance, environmental monitoring, or operations under PGDP D&R contractor management. The responsibilities section includes roles, responsibilities, authorities and accountability conditions as directed by CP2-TS-1000, *Roles, Responsibilities, Authorities and Accountability*.

All activity level work control documents (ALWCDs) approved prior to the effective date of this document are grandfathered until the next revision or required review date of that document.

# 2. PROGRAM OVERVIEW

The WPC Program is established to incorporate the ISMS core functions and guiding principles, EMS, worker safety, applicable quality assurance (QA) criteria, and the commitment to address necessary WPC requirements for all authorized work. The WPC procedures are developed to implement the program

requirements to integrate ISMS, EMS, applicable QA criteria, worker safety, and PPPO expectations into WPC at the activity level.

The WPC process supports the full spectrum of PGDP D&R contractor work and identifies requirements by which any work activity can be planned, managed, and executed. The WPC is structured on a graded approach in order to foster a program to ensure the appropriate rigor is applied to an activity. A simple process is understood/retained better, resulting in improved safety and compliance achieved during work execution. A critical element to the WPC Program will be the utilization of a responsible manager (RM) concept. The RM role is responsible for control of fieldwork; however, all workers must be able to identify unsafe and changing conditions and are empowered to pause or stop work when an unsafe condition or a condition outside the scope of the ALWCD is identified.

Human error prevention tools are used to help workers maintain positive control of assigned work situations and to do the job right the first time in order to identify error-likely situations and promote error-free performance. Before taking any action, workers are expected to understand the significance of their action and its intended result. The implementation of human error prevention tools ultimately help avoid delays caused by events. Workers who cannot perform the work as stated in the ALWCD must pause work and assist in the resolution of any issues.

## 2.1 CATEGORIES OF WORK

Work performed under the contract includes four specific categories of work, each with specific WPC considerations and requirements. Work categories are not limited to a particular functional area. These categories of work are Operations, Project, Maintenance, and Emergency Response.

Operations work includes activities performed in accordance with approved performance documents to operate systems and equipment (including routine laboratory, quality control, pump-and-treat, and waste operations activities). Operations work consists of performance of programmatic safety; industrial hygiene; environmental monitoring and sampling; and radiological monitoring and sampling, including associated instrument calibration checks. Operations work includes also routine activities performed to prepare, relocate, or otherwise set up facilities or equipment to perform maintenance or testing.

Project work includes work defined as a project work scope in the contract work breakdown structure, but specifically does not include tasks that are part of the operations and maintenance work scope. All project work has a specifically defined duration and scope and a predefined end-state. It may be necessary to perform other categories of work in support of project work completion, such as maintenance or operations.

Maintenance work includes work identified and performed to maintain facilities and equipment in a predefined operational condition. Maintenance work includes preventive maintenance (PM), corrective maintenance (CM), MOD activities, and maintenance shop activities.

Emergency Response Actions include actions performed as immediate response, supplemental response to an emergency condition, including actions identified in emergency action or response plans, or other approved contingency plans.

### 2.2 TYPES OF MAINTENANCE

Types of maintenance (WO type in SOMAX) are used to schedule and manage maintenance activities effectively at PGDP. In addition to the following types of maintenance, SOMAX includes also other WO types for the purposes on identifying and tracking nonmaintenance activities.

CM is performed in response to failed or malfunctioning equipment, systems, or facilities in order to restore their intended function and design capabilities.

PM consists of all those systematically planned and scheduled actions performed to prevent equipment failure. Most PM work orders (WOs) are system generated, but some are initiated through the work request process.

Predictive Maintenance (PdM) consists of measurements or tests performed to detect equipment or system conditions. These activities should be less invasive, time consuming, and costly than preventive or CM. PdM is a subgroup of PM, and is used very little at PGDP.

Surveillance is a subgroup of PM, and consists of those activities that are required by nuclear facility technical safety requirements.

Support Services (SUP) is not always related to a maintenance activity, but can be. Where a CM WO exists (tracking the deficiency) and support is required from another group, a SUP WO may be generated to support the CM activity or other types of activities.

MOD is a maintenance activity that changes a system or component. Configured systems will require engineering documentation. Nonconfigured systems require engineering review to determine if engineering documentation is required.

## 3. RESPONSIBILITIES

WPC Program ownership and authority are the responsibility of the operational programs manager. Several key positions are assigned to address and control the WPC process. These positions are discussed below. The following titles apply to the PGDP D&R contractor. Subcontractors may utilize different titles to satisfy these responsibilities.

### 3.1 PROGRAM MANAGER AND/OR DIRECTORS

- Assigns RMs based on experience and standards commensurate with their assigned responsibilities.
- Maintains a list of approved RMs.

### 3.2 OPERATIONAL PROGRAMS MANAGER

- The subject matter expert (SME) for WPC Program who assigns alternate SMEs, as deemed appropriate.

- Develops and maintains the WPC Program that is consistent with DOE requirements and guidance.

- Develops and maintains WPC Program, implementing procedures and standards.

- Performs and/or oversees regular observations and assessments to ensure program, procedures and standards are properly implemented in the field and effectively support ISMS goals.

- Defines WPC training requirements for personnel who participate in work planning and execution activities. Mentors personnel (including RMs) on execution of WPC program, procedures, and guides.

### 3.3 DESIGNATED SME

- Reviews changes to WPC Program.
- Develops and maintains WPC Program implementing guides.

### 3.4 PLANNING MANAGER

- Staffs and organizes the WPC organization consistent with authorized staffing levels.

- Provides assignments and oversight of planning resources to assist in meeting objectives and field schedules.

- Performs and supports regular observations to ensure program, procedures, and standards are implemented properly in the field and support the ISMS goals effectively.

### 3.5 RESPONSIBLE MANAGERS

- Responsible for the planning process by ensuring the availability of planning team resources for walkdowns, job hazard analysis, ALWCD development, and providing approval of ALWCDs and/or work packages.

- Ensures work scopes are identified properly and developed so that work is executed in a safe, cost-effective, and compliant manner, while meeting project performance objectives and goals.

- Manages schedules to ensure work packages are prepared and approved prior to the scheduled execution week.

- Manages execution of field activities, ensuring readiness and compliance with work execution requirements.

### 3.6 WORK PLANNER

- Screens WOs and determines appropriate ALWCD for the task based on performance risk.

- Ensures the scope of each ALWCD is sufficient for the work being performed.

- Assumes authority of work planning processes and acts as leader of teams assigned for planning, including final authority over meeting locations and schedules, attendance requirements, and assignment of responsibilities for planning.

# 4. WORK AUTHORIZATION

PGDP D&R contractor work authorization and work control processes provide a multitiered approach to establish that performance of a work scope or activity is approved and released for performance prior to initiation. These work authorization processes provide necessary definition to bound contract work scopes and help ensure the appropriate control and accountability for work execution at work locations within PGDP D&R contractor facilities.

At the point of execution, the work is authorized by the facility manager (FM) or nuclear facility manager (NFM), as applicable, utilizing a start-work process. Work then is released for execution by the work crews responsible for performance of that work. For high risk work scopes, the work package also is reviewed and approved by a High Hazard Review Board (HHRB) prior to being authorized by the FM/NFM. All work packages are reviewed by an RM prior to execution approval.

Because of the urgency of emergency response actions, work authorization authority is given to the NFM and may be delegated to plant emergency response officials, as established by PGDP emergency response plans. This authority includes ALW required to implement immediate and supplemental actions in response to an emergency situation. This authority does not, however, extend to work authorization of recovery actions following an emergency.

# 5. WORK PLANNING

Work planning includes development of necessary work control documents for execution of ALW. Planning requirements are determined using a graded approach based on risk and complexity.

## 5.1 GRADED APPROACH TO PLANNING

The WPC Program incorporates a graded approach to identify the appropriate level of rigor for work planning and the appropriate level of discipline required in work execution. This approach includes a screening process that is used to evaluate the scope of the work against risk and complexity. Risk and complexity then can be used to determine the appropriate planning level. Table 1, Work Planning Rigor, is designed for self-performed work using PGDP D&R contractor resources. Table 2, Subcontract Work Planning Rigor, is designed for subcontracted work using subcontractor resources.

**Table 1. Work Planning Rigor**

| WORK PACKAGE TYPE DETERMINATION | | | | |
|---|---|---|---|---|
| RISK | High | Type 1: Task Instruction | Type 1: Task Instruction | Type 1: Task Instruction |
| | Moderate | Type 3: SOW Instruction | Type 2: Standard Instruction | Type 1: Task Instruction |
| | Low | Type 3: SOW Instruction | Type 2: Standard Instruction | Type 2: Standard Instruction |
| | | Low | Moderate | High |
| | | | COMPLEXITY | |

**Table 2. Subcontractor Work Planning Rigor**

| WORK PACKAGE TYPE DETERMINATION | | | |
|---|---|---|---|
| RISK LEVEL | 1 | Detailed Work Package | Detailed Work Package |
| | 2 | Craft Work Package | Detailed Work Package |
| | 3 | Craft Work Package | Detailed Work Package |
| | | 2 | 1 |
| | | COMPLEXITY LEVEL | |

### 5.1.1 Type 4: Use of Approved Procedures

Type 4: For operation-type work activities and other moderate risk work activities, the preferred method of work control is standardized performance documents. These documents include procedures or other approved performance documents intended to provide readily available, off-the-shelf work control that can be implemented easily for each performance of the work processes defined within the documents. Only technical procedures may be used as an ALWCD.

### 5.1.2 Type 3: Scope of Work Instructions

Type 3: Scope of Work (SOW) instructions are routine work tasks that are recognized to be limited in complexity and risk from hazards when performed in a stable work environment (where location-specific hazards are expected to remain unchanged during work performance) by skilled craft workers. Type 3: SOW Instructions are intended to be a single use document (daily or until the completion of the work package) and may be executed either with or without a work package. The RM is the final approval authority for all Type 3: SOW Instructions. Type 3: SOW Instruction criteria are defined in CP3-SM-1101, *Activity Level Work Request, Planning, Scheduling and Release.*

### 5.1.3 Type 2: Standard Instruction

Type 2: Standard Instructions are planned using a task-centered approach by dividing the work scope into tasks and planning the performance of each individual task. Completed Type 2: Standard Instructions are incorporated into a Type 2: work package for implementation. Reviewers are determined based on the work scope per the reviewer determination matrix in CP3-SM-1101. The RM is the final approval authority for all Type 2: Standard Instructions.

### 5.1.4 Type 1: Task Instructions

Type 1: Task Instructions are intended to be for high levels of risk of complexity, and contain defined instructions. Reviewers are determined based on the work scope per the reviewer determination matrix in CP3-SM-1101. Planning teams include also representative membership from the workforce expected to supervise and perform the work. Type 1 work packages require review and approval from the HHRB prior to beginning work. The RM is the final approval authority for all Type 1: Task Instruction Work Packages.

### 5.1.5 Craft Work Package

Craft work packages are routine work tasks recognized to be limited in risk and complexity from hazards when performed in a stable work environment (where location-specific hazards are expected to remain unchanged during work performance) by skilled craft workers. Reviewers are determined based on the work scope per the reviewer determination matrix in CP3-SP-0019, *Subcontractor Work Planning and Execution*. The contract technical representative is the final approval authority for all craft work packages. Craft work package criteria are defined in CP3-SP-0019.

### 5.1.6 Detailed Work Package

Detailed work packages are nonroutine work tasks that require more detailed instructions than a craft work package to ensure objectives are met and hazards are mitigated properly. Detailed work packages require review and approval by the HHRB prior to beginning work. Reviewers are determined based on the work scope per the reviewer determination matrix in CP3-SP-0019, *Subcontractor Work Planning and Execution*. The contract technical representative is the final approval authority for all detailed work packages. Detailed work package criteria are defined in CP3-SP-0019.

## 5.2 WORK PLANNING EXCLUSIONS

Upon application of the graded approach described in the previous section, some activities graded as low complexity and low hazard are excluded from WPC processes. These exclusions are low-risk activities involving minimal potential for exposure to hazardous contaminants and health and safety hazards. Activities excluded from the WPC process are defined in CP3-SM-1101 and CP3-SP-0019.

## 5.3 EMERGENCY RESPONSE ACTIONS

Emergency response actions are performed as immediate or supplemental responses to an emergency condition, including actions identified in emergency action or response plans or other approved contingency plans. An emergency condition is any condition that requires immediate action to prevent personnel injury, environmental harm, security breaches, or property loss, as determined by senior management, by pre-determined action levels, or incident commander.

For emergencies, activities are performed at the direction of a trained and knowledgeable incident commander, crisis manager, or plant shift superintendent.

### 5.4 WORK PLANNING PARTICIPATION AND FEEDBACK

Workers participate in work planning and work execution for all activities. Worker involvement brings direct operational knowledge and experience to the planning process. This arrangement helps ensure that work process operability, practicality, and safety are improved by incorporating operational experience into ALWCD. Worker involvement also includes the responsibility and ability to stop work if conditions are deemed unsafe, noncompliant, introduce environmental risk, or if there is doubt about how to proceed safely. In addition to worker involvement, appropriate SMEs, front line managers (FLMs), and support personnel involvement plays a vital role in ensuring that ALWCDs are adequate for the work. This includes involvement in ALWCD development by performing reviews, walkdowns, and approvals. Participation of PPPO Site Office personnel in work planning and execution is welcomed. PPPO technical and oversight staff provide oversight of work control processes, which fosters understanding and communication between the PGDP D&R contractor and PPPO. The open communication allows PGDP to incorporate PPPO experience and expectations into work activities and processes. Execution of an ALWCD is not limited to the personnel who initially reviewed/approved ALWCD. The planning manager approves the minimal required planning team members. The RM is responsible for ensuring appropriate planning team personnel are available to participate in the planning process.

### 5.5 OPERATING EXPERIENCE/LESSONS LEARNED

PGDP D&R contractor personnel will collect, share, and evaluate operating experiences and lessons learned during the planning process from external and internal sources. These operating experiences and lessons learned will be integrated into daily work performance and work planning activities.

FLMs oversee work and perform pre-job briefings and post-job reviews to obtain process feedback from workers for continuous improvement. This information is documented using CP3-SM-1101-F04, *Pre-Job Brief/Status Log,* and CP3-SM-1101-F13, *Work Control Status Log Continuation Sheet* (or equivalent), for management review and to support improvement of work control processes.

### 5.6 EPISODE WORK PACKAGES

For tasks that may be performed repetitively, ALWCDs routinely required for work activities may be incorporated into an episode work package. These work packages are developed by the work planner, may be assembled using any type of instruction, and are used to eliminate the need for redundant planning of repetitive tasks or work scopes. A form is utilized to document work start authorization and close out for each specific episode performed under the episode work package. Episode work packages are closed out at least each calendar year.

## 6. WORK EXECUTION

Work execution includes the performance of ALW including establishment of pre-start conditions and ensuring workers are prepared to perform the ALW activities described in ALWCD. FLMs are accountable to RMs who have final responsibility to ensure work is properly executed and appropriate

controls are in place. FLMs and workers are accountable to management for performance of work activities. Direct and routine monitoring of work activities is vital to work execution. This monitoring, either by formal assessments, informal feedback from execution team members during performance of the work, or by routine observation by the RM ensures timely identification of issues. Coordination of SUP and other associated or nearby activities that may be impacted by work must be performed by the supervisor.

Work packages are readily available to FLMs and workers at all times during work performance. Requirements are communicated clearly and routinely to workers in a manner that ensures their understanding of responsibilities for the safe, compliant, and efficient performance of the defined work scope.

Supervisors enforce ALWCD compliance requirements in a manner that prevents errors in interpretation, supports safety requirements, and is consistent with the performance risk associated with the task being performed. ALWCDs may include hold points, critical steps, and safety-significant steps that require inspections, briefings, surveys, or data collection activities to be documented prior to proceeding or upon completion and prior to proceeding to a successive step.

Workers must understand the need to perform work activities in a deliberate manner with forethought and good judgment. Workers should always question and seek interpretation of requirements in any situation that, in their judgment, are ambiguous or seem inappropriate. Workers, FLMs, and managers work together, as required, to respond to inquiries and concerns promptly and suspend work activities as necessary whenever concerns cannot be immediately and adequately addressed.

FLMs are notified immediately when instructions, whether written or verbal, cannot be followed or when unexpected results occur. In these instances, work is not continued until a correct method of performance is established and, if appropriate, documented in a revision to the ALWCDs, or unexpected results are adequately explained. Work and locations are placed in a safe condition prior to stopping the activity.

## 6.1 READINESS AND PRE-START REQUIREMENTS

It is necessary to evaluate readiness and ensure that all planning and logistic activities have been completed prior to starting work. These readiness evaluations are used to validate that work may be safely and compliantly initiated, along with ensuring that all necessary resources, including materials, supplies, equipment, and personnel are in place and ready for work to begin. Readiness processes for routine activities are generally informal and performed as part of daily practice by FLMs. The RM will conduct periodic spot reviews with the supervisor to confirm work is ready to begin. The reviews are to include ALWCDs (including hazards/controls), materials, and personnel. For new projects or work that is high risk, additional formal processes are needed. Generally, preventive and CM do not require readiness reviews.

## 6.2 PRE-JOB BRIEFINGS

Pre-job briefings are conducted at least daily. Additional briefings may be performed based on changes or additions to the work scope. Pre-job briefings are documented using the pre-job briefing form. Workers should be challenged at all briefings, and whenever work tasks are completed to provide any recommendations to improve work processes. Tasks should also be reviewed at least daily for changed conditions, requirements, or important lessons learned while the work task is in progress.

### 6.3 WORK CLOSEOUT, REVIEW, AND RECORDS MANAGEMENT

The work closeout process is a multistep process that depends, to a large extent, on the work package type. The closeout process does not apply to operations type work activities that are performed on an ongoing basis to stand-alone performance documents. Key components of work closeout for project type and maintenance type work are verifying that the work scope has been completed; documenting the completion of work; documenting tools, demobilization activities, materials and equipment used; and verifying all regulatory, quality, and other stated requirements have been met. For maintenance type work, it is also important that the ALWCD include sufficient information and documentation to maintain an accurate maintenance history and documents any PM performance. Worker feedback and operating experience are also captured as part of the closeout process.

## 7. TRAINING

Implementation of the PGDP D&R contractor WPC program requires that personnel be provided sufficient training to provide awareness of the program and to support performance of their functional responsibilities within the program. PGDP D&R contractor personnel are trained based on their roles and responsibilities.

Work control training is implemented using the PGDP D&R contractor training program. Appropriate training materials, including lesson plans and modules, are developed by the training department with input provided by the appropriate operational programs manager.

## 8. SOURCE REFERENCES

10 *CFR* Part 830, *Nuclear Safety Management*

10 *CFR* Part 835, *Occupational Radiation Protection, Amended*

10 *CFR* Part 851, *Worker Safety and Health Program*

29 *CFR* Part 1910.120, *Hazardous Waste Operations and Emergency Response*

CP2-QA-3000, *Contractor Performance Assurance Program Description*

DOE EM-QA-001, *Environmental Management Quality Assurance Program (QAP)*

DOE G 424.1-IB, *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements*

DOE Handbook, DOE-HDBK-1211-2014, *Activity Level Work Planning and Control Implementation*

DOE O 226.1B, *Implementation of Department of Energy Oversight Policy*

DOE O 414.1D, Admin. Chg 1, *Quality Assurance*

DOE O 420.1C, Chg 1, *Facility Safety*

DOE O 422.1, Chg 2, *Conduct of Operations*

DOE O 425.1D, Admin. Chg 1, *Verification of Readiness to Start Up or Restart Nuclear Facilities*

DOE O 430.1C, *Real Property Asset Management*

DOE O 433.1B, Admin Chg 1, *Maintenance Management Program for DOE Nuclear Facilities*

DOE O 436.1, *Departmental Sustainability*

DOE O 450.2, Chg 1 (MinChg), *Integrated Safety Management*

National Fire Protection Association Standard 70E, *Electrical Safety in the Workplace*