



## Department of Energy

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**OCT 05 2018**

Mr. Norm Sandlin, Prime Contract Manager  
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PPPO-02-5104189-19

Dear Mr. Sandlin:

**CONTRACT NO. DE-EM0004895: APPROVAL OF DELIVERABLE NO. 94, SITE SUSTAINABILITY PLAN, CP2-ES-0100/FR0**

Reference: Letter from J. Bradford to M. Fultz, "Four Rivers Nuclear Partnership, LLC, Deliverable No. 94—DRAFT *Four Rivers Nuclear Partnership, LLC, Sustainability Plan at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, CP2-ES-0100/FR0*," (FRNP-18-1308), dated August 30, 2018

The U.S. Department of Energy approves Deliverable No. 94, Site Sustainability Plan, CP2-ES-0100/FR0, as submitted.

If you have any questions or require additional information, please contact Cynthia Zvonar at (859) 219-4066.

Sincerely,

Marcia D. Fultz  
Contracting Officer  
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**CP2-ES-0100/FR0**

**Four Rivers Nuclear Partnership, LLC,  
Sustainability Plan  
at the Paducah Gaseous Diffusion Plant,  
Paducah, Kentucky**

This document is approved for public release per review by:

  
FRNP Classification Support

8-29-18  
Date

**Four Rivers Nuclear Partnership, LLC,  
Sustainability Plan  
at the Paducah Gaseous Diffusion Plant,  
Paducah, Kentucky**

Date Issued—August 2018

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**

**Four Rivers Nuclear Partnership, LLC,  
Sustainability Plan  
at the Paducah Gaseous Diffusion Plant,  
Paducah, Kentucky**

**CP2-EC-0001/FR0**

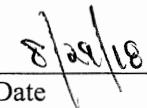
August 2018

This Sustainability Plan implements the requirements of U.S. Department of Energy (DOE) Order 436.1, *Departmental Sustainability*, for Four Rivers Nuclear Partnership, LLC, at the Paducah Gaseous Diffusion Plant. This plan identifies the Deactivation and Remediation Project's plan for meeting DOE sustainability goals.

FRNP management is committed fully to the proper implementation of this Plan.

Approved by:

  
\_\_\_\_\_  
Jeff Bradford  
Program Manager

  
\_\_\_\_\_  
Date

Effective Date: <u>10/05/2018</u>
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## ACRONYMS

CY	calendar year
DOE	U.S. Department of Energy
EISA	Energy Independence and Security Act
EMS	Emergency Management System
FRNP	Four Rivers Nuclear Partnership, LLC
FY	fiscal year
GHG	greenhouse gas
GSA	General Services Administration
PGDP	Paducah Gaseous Diffusion Plant
R-114	1,2-Dichlorotetrafluoroethane
REC	renewable energy certificate
SPO	Sustainability Performance Office
SSP	Site Sustainability Plan
SST	Swift & Staley Team
TVA	Tennessee Valley Authority

## 1. INTRODUCTION

The purpose of this Four Rivers Nuclear Partnership, LLC, (FRNP) Sustainability Plan is to identify FRNP's plan to meet U.S. Department of Energy (DOE) site sustainability goals for the Paducah Gaseous Diffusion Plant (PGDP). This FRNP Sustainability Plan implements the requirements of DOE Order 436.1, *Department Sustainability*. FRNP uses the FRNP Environmental Management System (EMS), CP2-ES-0101, as a platform for Sustainability Plan implementation. EMS objectives and targets, including those related to sustainability, are addressed in the EMS. Specific EMS objectives and targets are published on an annual basis, such as the objectives and targets for calendar year (CY) 2018 (ESHQ-18-005) and include specific project goals pertaining to recycle, reduction, reuse of materials, and energy efficiency, among others.

Since 2011, DOE's Sustainability Performance Office (SPO) has issued guidance documents for completing sustainability reporting requirements. The *Sustainability Dashboard User Guide* and *Site Sustainability Plan Guidance* serve as resources for data reporting and developing narrative plans. As part of site sustainability reporting, the SPO launched the Sustainability Dashboard (Dashboard) in the fall of 2016. The purpose of the Dashboard is to maintain historical data sets for each DOE site and national laboratory; to collect current year data, consistent with processes established in the previous fiscal year (FY) reporting cycles; and to provide DOE sustainability personnel with analytical tools for managing sustainability at each site or within each program.

PGDP was built in the early 1950s and has served the nation in producing enriched uranium, initially for the nuclear weapons program and later for nuclear fuel production. In 2013, production came to a close, and PGDP leased facilities were returned to DOE in October 2014. The task of meeting sustainability goals is a challenge due to the dramatic increase in PGDP square footage managed by the DOE since the baseline years for the individual sustainability goals. Consideration in meeting sustainability goals must be balanced against the dramatic increase in PGDP square footage, aging facilities, and eventual demolition.

FRNP is one of three DOE prime contractors at the PGDP. FRNP is responsible for ongoing deactivation, surveillance, maintenance, environmental remediation activities, and sitewide utilities at PGDP. FRNP is using a multifaceted approach to implement sustainable practices and projects and increase awareness of sustainability opportunities in the workplace.

The Infrastructure Contractor, Swift & Staley Inc. (SST), is responsible for managing the PGDP Site Sustainability Program and for preparing the annual sitewide PGDP Site Sustainability Plan (SSP), which includes an annual progress update on meeting DOE's sustainability goals for the PGDP. SST's responsibilities include compiling and reporting the PGDP Site Sustainability Plan narrative and data into the DOE Sustainability Dashboard, with assistance from FRNP and the Depleted Uranium Hexafluoride Conversion Facility Contractor. FRNP provides sustainability narratives and data annually (early in each FY) to the Infrastructure Contractor for Dashboard reporting in accordance with the annual schedule published by DOE's SPO. The sustainability narrative and data (e.g., annual updates), provided by FRNP to the Infrastructure Contractor, are and will continue to be reviewed and approved by DOE on an annual basis. FRNP will continue to share the SSP information, data, contractor experiences, and future successes internally and externally (e.g., with other DOE PGDP contractors) as part of the PGDP Site Sustainability Program.



## 2. SUSTAINABILITY CATEGORIES

The most recent SPO guidance, *FY 2018 DOE Site Sustainability Plan Guidance Document*, dated September 8, 2017, organized SSPs by overarching categories (rather than goals) to reduce redundancies and streamline reporting. This FRNP Sustainability Plan aligns with the FY 2018 guidance document and is consistent with the PGDP narrative reported in the Dashboard.

FRNP FY narrative and data contributions provided to SST are discussed in the proceeding sections and correspond to the Dashboard's overarching categories. The following are the sustainability categories discussed in the following sections.

- Energy Management
- Water Management
- Waste Management
- Fleet Management
- Clean and Renewable Energy
- Green Buildings
- Acquisition and Procurement
- Measures, Funding, and Training
- Travel and Commute
- Fugitives and Refrigerants
- Electronic Stewardship
- Organization Resilience

## 3. ENERGY MANAGEMENT

The Energy Management category focuses on all energy-related topics such as greenhouse gas (GHG) emissions, energy intensity, metering, and non-fleet fuel use. The Dashboard narrative and data entry categories for this category include energy, facility metering status, Energy Independence and Security Act (EISA) Section 432 benchmarking and evaluations, non-fleet vehicles and equipment fuel, and efficiency and conservation measures. The Energy Management Category continues to be a challenge for PGDP with the October 2014 return of the facilities leased to United States Enrichment Corporation.

With the return of the previously leased facilities, the number of DOE managed facilities increased dramatically. These facilities were not part of the original FY 2008 baseline, but are now part of the DOE mission at PGDP. The addition of these facilities skews sustainability data. FRNP currently manages approximately 155 buildings, 98 trailers, and 294 other structured facilities, which include areas such as pads and yards. FRNP buildings and trailers cover almost 8 million ft<sup>2</sup>. The majority of the FRNP gross square footage is attributable to the process buildings.

The Contract requires that FRNP "...increase energy efficiency by adding meters to buildings that meet the Department's cost-benefit analysis guidelines." Tracking and metering of utilities in federal buildings is maintained by Section 103 of the Energy Policy Act of 2005. Most of the PGDP facilities were built in the early 1950s and are not individually metered for any utilities. In accordance with the Contract, FRNP will install and track meters for use of power, natural gas, water, and other fuels when modifications are made to the utility service for a building/group of buildings such that installation of the meters is practicable to DOE. This does not apply to facilities that are actively undergoing or have completed

deactivation. Contract Deliverable No. 151 requires that FRNP provide a list annually of facility meters to be added or deleted.

An energy efficiency plan has been developed that outlines how FRNP plans to meet the DOE energy efficiency goals and objectives contained in Executive Order 13693, *Planning for Federal Sustainability in the Next Decade*. CP2-ES-0104, *Energy Efficiency Plan for the Deactivation and Remediation Project, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, was approved by DOE on February 9, 2018. FRNP activities and projects that have or will reduce energy usage are described in the plan.

Specific FRNP sustainable activities that have or will reduce GHG emissions include the following:

- Consolidating personnel work areas;
- Using a 4-10 workforce schedule, which reduces weekly commuter mileage by approximately 20%;
- Switching off lights in administrative and break areas when not in use;
- Demolishing structures and trailers per contractual requirements; and
- Deactivating facilities.

Specific FRNP sustainable projects that have or will reduce GHG emissions include the following:

- Development of heating/cooling service replacement plans and schedules (Deliverable No. 153);
- Installation of replacement heating/cooling service for the chiller and recirculating heat system with shutdown of current chiller and recirculating heat system (due April 2020);
- Installation of replacement heat service for steam (due May 2021);
- Complete shutdown, isolation, de-energization, and draining of oil from equipment in the C-533, C-537, and C-535 Switchyards and associated ancillary/support facilities [due six months after Electric Energy, Inc., and Tennessee Valley Authority (TVA) complete reconfiguration of the 161 kV lines to migrate them away from C-533, C-537, and C-535];
- Complete shutdown, isolation, de-energization, and draining of oil from equipment in the C-531 Switchyard and associated ancillary/support facilities (due six months after completion of the tie-ins of the new 14kV cables to the existing 14kV distribution system and to new switchyard equipment); and
- Achievement of net-zero buildings through air-gapping of utilities with subsequent deactivation and future demolition per contractual requirements.

## **4. WATER MANAGEMENT**

The Water Management category focuses on all water-related topics such as potable and industrial water intensity, landscaping, and agricultural water consumption. The Dashboard narrative and data entry categories for this category include potable water, industrial water, EISA S432 Evaluations, and efficiency and conservation measures.

PGDP facilities are not individually metered for water usage. FRNP operates the C-611 Water Treatment Facility. FRNP is required to reduce "...water consumption where practical, in all applicable buildings, trailer, and other structures and facilities." The sustainability goal requires a 36% potable water intensity reduction by 2025 from a FY 2007 baseline. Overall potable water number metrics are significantly higher than the FY 2007 baseline due to the return of the previously leased facilities, which were not included as part of the PGDP site sustainability baseline metrics.

Potable water is required for the operation of plant equipment and systems, such as the plant air system. Potable water reductions are realized as leaks to the system are identified and repaired. FRNP has been tasked to prepare a plan for optimization of the on-site Sanitary Water distribution system (Deliverable No. 155) as well as a water facility shutdown plan (Deliverable No. 154). Opportunities for continued optimization of the plant water system, as well as eventual transition to a local water district, will continue to be evaluated, thereby resulting in continued reductions in potable water usage. As equipment and systems cease to operate at the Paducah site, potable water reductions will continue.

## **5. WASTE MANAGEMENT**

The Waste Management category focuses on all waste related topics such as municipal solid waste, waste diversion, wastewater treatment, and associated GHG emissions. Dashboard data entry categories include municipal solid waste, waste diversion, and wastewater treatment.

FRNP is committed to the practice of sustainable performance, preventing pollution, and minimizing waste generation during all phases of operation. Demolition projects at the PGDP are often projects involving facilities that have radiological contamination, asbestos, or hazardous chemicals present. This can make diversion or recycling debris difficult to achieve, often resulting in disposal in regulated landfills. The waste from such demolitions is either shipped off-site for disposal or placed in the C-746-U Landfill, depending upon the level and type of contaminants. Historically, when the Site has demolished a clean facility, recycling of the waste takes precedence; this is also the goal going forward. Diversion of construction and demolition debris is factored into the planning phase of projects and performed whenever possible.

Waste streams such as paper, aluminum, activated carbon, scrap metal, and cardboard are recycled. Universal waste eligible for recycling includes batteries and bulbs. FRNP opportunities for reuse include office furniture and wooden pallets; furniture and wooden pallets have and will continue to be provided to other PGDP contractors and the Paducah Area Community Reuse Organization for reuse. Examples of items transferred to SST for final disposal include cafeteria equipment, electronics, radiation detection instruments, various analytical unused glassware and supplies, and office furniture.

Projects target recycling opportunities such as recycling mineral oil from the switchyards. During CY 2018, FRNP anticipates recycling targets of 150,000 gal of mineral oil from the C-535 Switchyard and 350,000 gal from the C-537 Switchyard. Additional information regarding recycling efforts is addressed in CP2-WM-0002, *Four Rivers Nuclear Partnership, LLC, Paducah Deactivation and Remediation Project Asset Recovery and Recycling Plan*.

## **6. FLEET MANAGEMENT**

The Fleet Management category focuses on all fleet related topics such as GHG emission and fleet inventory, mileage, and fuels, including petroleum reduction and alternative fuel use. Dashboard data entry categories for Fleet Management include fleet vehicle fuel, inventory, and mileage.

Each of the PGDP contractors has its own respective Fleet Management Program; all are responsible for requisitioning, managing, maintaining, and dispositioning DOE owned and leased vehicles, which includes all preventive maintenance aspects of the Site fleet. The majority of the Site fleet is made up of General Services Administration (GSA) vehicles from the regional office. While preventive maintenance is administered for all fleet vehicles, the GSA vehicles are managed through vetted GSA approved vendors.

Vehicles are replaced based on criteria that include age and/or the mileage standards that GSA has established. The Contract requires that the Deactivation and Remediation Contractor "...transition all fleet vehicles to alternative fuel as vehicles are replaced." The pursuit of plug-in hybrid vehicles is required "where economically and operationally practical." The PGDP currently does not have the infrastructure to support plug-in hybrid vehicles. FRNP fleet vehicles are considered for replacement with alternative fuel vehicles, taking into consideration availability and their required end-use or purpose.

## **7. CLEAN AND RENEWABLE ENERGY**

The Clean and Renewable Energy category focuses on clean and renewable energy use as a percentage of overall energy use. Dashboard data entry categories for Clean and Renewable Energy include clean and renewable energy and efficiency and conservation measures. The clean energy target in EO 13693 is an electric and thermal energy target directing agencies to obtain no less than 25% of their total facility energy from clean energy sources by 2025.

PGDP has had limited success in meeting clean energy targets. Power supply is readily available from TVA and has come at a low cost compared to the high cost of clean energy alternatives. FRNP is not responsible for purchasing power; DOE negotiates the TVA power contract and purchases power. In the past, DOE Portsmouth/Paducah Project Office (PPPO) has purchased Renewable Energy Certificates (RECs) for PGDP and may choose to purchase RECs in the future. Due to the nature and scope of FRNP activities, clean energy opportunities are limited. Although minor in scope, FRNP is responsible for nine air monitoring stations powered by solar panels, which saves over 2,800 kWh per year. FRNP will consider the use of clean energy technology during work planning activities, as appropriate. Given the age and complexity of PGDP, FRNP will place priority on reducing energy use and cost while exploring renewable or alternative energy solutions where life-cycle and cost-effective.

## **8. GREEN BUILDINGS**

The Green Buildings category focuses on green building related topics such as High Performance Sustainable Buildings, Net-Zero, and building inventory changes and design. The Dashboard data entry categories for green buildings consist of green buildings, facility goal category, and building inventory change and design. Beginning in FY 2025, DOE requires that 1% of its existing buildings above 5,000 gross square ft are energy, waste, or water net zero buildings. Beginning in FY 2020 and thereafter, all

new construction of buildings greater than 5,000 gross square ft that enter the planning process shall be designed to achieve energy net-zero and, where feasible, water or waste net-zero by FY 2030.

PGDP currently is undergoing deactivation, demolition, and remediation. Due to the life-cycle of existing FRNP facilities along with the cost to make existing facilities net-zero buildings, Deactivation and Remediation Contractor facilities will become net-zero buildings through air-gapping of utilities with subsequent deactivation and demolition. There are currently no plans for any new FRNP buildings and no plans to acquire new rental agreements for buildings/office space.

FRNP is relocating and consolidating employee office areas as addressed in the “Annual Site Facility Occupation Status Report” (Contract Deliverable No. 146).

## **9. ACQUISITIONS AND PROCUREMENT**

The Acquisitions and Procurement category focuses on non-electronic acquisitions, procurement, and GHG supply chain topics. The Dashboard data entry category for acquisitions and procurement consists of sustainable contract review. The corresponding sustainability goal promotes sustainable acquisition and procurement to the maximum extent practicable, ensuring BioPreferred and biobased provisions and clauses are included in 95% of applicable contracts.

Executive Order 13693, Section 3(i)(B) requires that sites promote sustainable acquisition and procurement by ensuring that environmental performance and sustainability factors are included to the maximum extent practicable for all applicable procurements in the planning, award, and execution phases of an acquisition by meeting statutory mandates that require purchase preference for “energy and water efficient products and services, such as ENERGY STAR qualified and Federal Energy Management Program-designated products, identified by the U.S. Environmental Protection Agency and the Department of Energy.”

FRNP will use the procurement process and procedures to assess subcontract actions to maximize the supply or use of products and services that are energy efficient (ENERGY STAR or Federal Energy Management Program-registered products); water efficient; bio-based; environmentally preferable (including Electronic Product Environmental Assessment Tool-registered products); non-ozone depleting; and contain recycled content, non-toxic, or less toxic alternatives, as appropriate.

## **10. MEASURES, FUNDING, AND TRAINING**

The Measures, Funding, and Training category focuses on topics relating to efficiency and conservation measure, performance contracts, other funding mechanisms, and training and education. The Dashboard narrative and data entry categories include efficiency and conservation measures, appropriations/direct obligations, and training and education. CP2-ES-0104, *FRNP Energy Efficiency Plan*, discusses the opportunities for energy savings. The Annual Site Facility Occupation Status Report (Contract Deliverable No. 146) has identified the goal to reduce the number of occupied facilities by 20% over the Contract baseline period of performance. Through facility deactivation and utility optimization efforts, including reduction in site footprint through the removal of small structures and trailers, utility usage reductions will continue.

## **11. TRAVEL AND COMMUTE**

The Travel and Commute category focuses on all travel related topics such as Scope 3 GHG emissions, air travel, ground travel, and commuting. The Dashboard narrative and data entry categories include air travel, ground travel, and commute. The Sustainability Goal for this category is a 25% Scope 3 GHG reduction by FY 2025 from a FY 2008 baseline.

Travel and commuting sustainability goals are a challenge for PGDP due to the return of leased facilities in October 2014. When the leased facilities were returned to DOE in October 2014, the facilities and their associated workforce increased dramatically. The PGDP 25% Scope 3 GHG reduction by FY 2025 from a FY 2008 baseline will be challenging, if not impossible, to attain. Consideration in meeting this goal must be balanced against the dramatic increase in the PGDP workforce, which is managed as part of DOE Sustainability efforts. The FRNP workforce uses a 4-10 work schedule, which reduces commuter mileage by approximately 20%.

## **12. FUGITIVES AND REFRIGERANTS**

The Fugitives and Refrigerants category focuses on the emissions of fugitive gases and refrigerants. The Dashboard narrative and data entry category is fugitives and refrigerants.

PGDP 1,2-Dichlorotetrafluoroethane (R-114) process inventories originally were estimated to be 8.5 million lb. After the C-337 Building R-114 systems were drained to tank cars, the resulting tank car inventory proved to be greater than the original inventory calculation for the process systems. This amount increased during FY 2017, with the addition of some of the Portsmouth Gaseous Diffusion Plant R-114 inventory. No contract award has been provided for disposition of the R-114 to date. FRNP is tasked with ensuring all of the R-114 Freon at PGDP is drained and completely dispositioned within the contract period of performance (due no later than June 2027). Other fugitives and refrigerants are reported as part of general maintenance actions.

## **13. ELECTRONICS STEWARDSHIP**

The Electronics Stewardship category focuses on all electronics-related topics such as acquisitions, operations, end-of-life disposal strategies, and data centers. The Dashboard narrative and data entry categories include electronics acquisition, electronics operations, electronics end-of-life, and data centers.

The Infrastructure Contract is responsible for providing, maintaining, and operating the Local Area Networks and Wireless Local Area Networks. Services include maintenance and repair of the PGDP IT infrastructure. FRNP does not operate any data centers.

FRNP's electronics stewardship goals are to help reduce electrical consumption and increase reuse and recycling of obsolete machines and equipment. Specific FRNP actions to help meet the goals for electronics stewardship include the following:

- Monitors and computers, after a set time, drop into a hibernate state;

- Used electronics are reused or recycled using environmentally sound disposition options;
- Eligible printers are set to default to duplex printing capabilities;
- Electronics-related assets will be acquired following Electronic Product Environmental Assessment Tool guidelines when available;
- Environmentally approved vendors will be used for electronics recycling as the need arises; and
- Electronics deemed appropriate for reuse will be placed on the GSA website, or other pre-approved avenues.

## 14. ORGANIZATIONAL RESILIENCE

The Organizational Resilience Category focuses on resilience strategies and procedures that identify and respond to events with the potential to disrupt, strain, compromise, or eliminate DOE activities or facilities. The Dashboard narrative and data entry categories for this include the climate resilience status questionnaire.

The implementation of Continuity Programs, per DOE Order 150.1A, *Continuity Programs*, provides a site-specific approach to responding to climatic emergency events. PGDP has no unique way of anticipating climate change directly. CP2-EP-4000, *Continuity of Operations Plan, U.S. Department of Energy Paducah Site, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, describes how PGDP mission essential functions can be performed during a continuity event, such as an earthquake.

FRNP is responsible for the overall Emergency Management and Fire Services direction and control at PGDP. The FRNP Emergency Management Program is designed to comply with federal, state, and local regulations, which include maintaining Letters or Memoranda of Agreement and relationships with off-site agencies and service providers for responding to emergencies at PGDP. The FRNP Paducah Site Emergency Management Program addresses extreme and changing weather conditions and events through procedures and Emergency Actions Plans.

## 15. REFERENCES

DOE (U.S. Department of Energy) 2017. *Paducah Gaseous Diffusion Plant FY 2018 Site Sustainability Plan*, DOE Sustainability Dashboard narrative.

FRNP (Four Rivers Nuclear Partnership, LLC) 2018. *Continuity of Operations Plan, U.S. Department of Energy Paducah Site, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, CP2-EP-4000/FR0, January.

FRNP 2018. *Environmental Management System for the Deactivation and Remediation Project*, CP2-ES-0101/FR2A, May.

FRNP 2018. *Energy Efficiency Plan for the Deactivation and Remediation Project, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, CP2-ES-0104/FR1, January.

FRNP 2018. *Four Rivers Nuclear Partnership, LLC, Paducah Deactivation and Remediation Project Asset Recovery and Recycling Plan*, CP2-WM-0002/FR2, August.