



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

September 25, 2015

SECRETARY

COMMISSION VOTING RECORD

DECISION ITEM: SECY-15-0100

TITLE: FINAL REPORT TO CONGRESS ON THE HEALTH, SAFETY, AND ENVIRONMENTAL CONDITIONS AT THE GASEOUS DIFFUSION PLANTS LOCATED NEAR PADUCAH, KENTUCKY, AND PORTSMOUTH, OHIO

The Commission acted on the subject paper as recorded in the Staff Requirements Memorandum (SRM) of September 25, 2015.

This Record contains a summary of voting on this matter together with the individual vote sheets, views and comments of the Commission.

A handwritten signature in black ink that reads "Andrew L. Bates".

Andrew L. Bates  
Acting Secretary of the Commission

Enclosures:

1. Voting Summary
2. Commissioner Vote Sheets

cc: Chairman Burns  
Commissioner Svinicki  
Commissioner Ostendorff  
Commissioner Baran  
OGC  
EDO  
PDR

SECY paper to be released to the public in 5 working days after the letter is sent to Congress.

VOTING SUMMARY - SECY-15-0100

RECORDED VOTES

	APRVD	DISAPRVD	ABSTAIN	NOT PARTICIP	COMMENTS	DATE
CHRM. BURNS	X				X	8/8/15
COMR. SVINICKI	X				X	9/2/15
COMR. OSTENDORFF	X				X	8/26/15
COMR. BARAN	X				X	9/11/15

**NOTATION VOTE**

**RESPONSE SHEET**

TO: Annette Vietti-Cook, Secretary

FROM: Chairman Burns

SUBJECT: SECY-15-0100: FINAL REPORT TO CONGRESS ON  
THE HEALTH, SAFETY, AND ENVIRONMENTAL  
CONDITIONS AT THE GASEOUS DIFFUSION PLANTS  
LOCATED NEAR PADUCAH, KENTUCKY, AND  
PORTSMOUTH, OHIO

Approved XX Disapproved \_\_\_\_\_ Abstain \_\_\_\_\_ Not Participating \_\_\_\_\_

COMMENTS: Below XX Attached XX None \_\_\_\_\_

I approve providing to Congress the "U.S. Nuclear Regulatory Commission Final Report to Congress on the Health, Safety, and Environmental Conditions at the Gaseous Diffusion Plants Located near Paducah, Kentucky, and Portsmouth, Ohio," subject to the attached edits.

**Entered in STARS**

Yes ✓  
No \_\_\_\_\_



\_\_\_\_\_  
Signature

8 September 2015  
\_\_\_\_\_  
Date

SGB edits

The Honorable Shelley Moore Capito  
Chairman, Subcommittee on Clean Air  
and Nuclear Safety  
Committee on Environment  
and Public Works  
United States Senate  
Washington, DC 20510

Dear Madame Chairwoman:

The Atomic Energy Act of 1954 (AEA) requires the U.S. Nuclear Regulatory Commission (NRC) to periodically send reports to Congress discussing the health, safety, and environmental conditions at the gaseous diffusion uranium enrichment plants (GDPs) located near Paducah, Kentucky, and Portsmouth, Ohio. The previous such report (NRC's Agencywide Documents Access and Management System (ADAMS) Accession No. ML13253A179) covered the period from October 1, 2008, to September 30, 2013, and was sent to the congressional oversight committees on January 13, 2014. Enclosed is the most current report covering the period October 1, 2013, to February 2, 2015 (ADAMS Accession No. ML15173A254).

As detailed in the enclosed report, the United States Enrichment Corporation notified the NRC in June 2013 that it was terminating its uranium enrichment activities at the Paducah GDP. The enrichment activities there permanently ceased on July 25, 2013. The NRC terminated the Certificate of Compliance for the Paducah GDP on February 2, 2015. The Certificate of Compliance for Portsmouth's GDP was terminated by the NRC on October 12, 2011. ~~and~~ Federal regulation of activities at the Paducah and Portsmouth sites is now provided by the U.S. Department of Energy (DOE). ~~The Certificate of Compliance for Portsmouth's GDP was terminated by the NRC on October 12, 2011.~~

The enclosed report will be the final NRC report regarding the GDPs. ~~The enclosed report covers the period from October 1, 2013, to February 2, 2015.~~ As required by the AEA, the preparation of this report has been coordinated with the DOE and the U.S. Environmental Protection Agency.

Sincerely,

Stephen G. Burns

Enclosure:  
Report to Congress

The U.S. Nuclear Regulatory Commission (NRC) provides this report to Congress pursuant to Section 1701 of the Atomic Energy Act (AEA) that requires NRC reports on the health, safety, and environmental conditions of the gaseous diffusion uranium enrichment plants (GDPs) located near Paducah, Kentucky, and Portsmouth, Ohio. As of July 2013, uranium enrichment operations using the gaseous diffusion process no longer occur in the United States. The NRC terminated the Certificates of Compliance (CoCs) for the Portsmouth and Paducah GDPs in 2011 and 2015, respectively, and no longer regulates any GDP-related activities. Accordingly, this will be the last NRC report on the GDPs. This report covers the time period from October 1, 2013, to February 2, 2015, when the CoC for the Paducah GDP was terminated. As directed by the AEA, the NRC staff consulted with the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) in preparing this report. The information within this report is current as of February 2, 2015.

The NRC initially issued CoCs to the GDPs in March 1997, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 76, "Certification of Gaseous Diffusion Plants." In October 2011, the NRC terminated the CoC for the Portsmouth GDP. The DOE is fully responsible for the regulatory oversight of the Portsmouth GDP. Following termination of the CoC, the DOE began major decontamination and decommissioning activities in most of the Portsmouth GDP buildings. The GDPs had been operated by the United States Enrichment Corporation (USEC), a subsidiary of USEC Inc., its former parent corporation. Note that following bankruptcy proceedings concluded in 2014, USEC, Inc. now does business as Centrus Energy Corp. (Centrus). ~~The DOE is fully responsible for the regulatory oversight of the Portsmouth GDP. Following termination of the CoC for the Portsmouth GDP in 2011, the DOE began major decontamination and decommissioning activities in most of the Portsmouth GDP buildings.~~

In June 2013, USEC notified the NRC that it was permanently terminating its enrichment activities at the Paducah GDP and began a deactivation process. The Paducah GDP facilities were returned to the DOE on October 21, 2014. The NRC's 10 CFR Part 76 CoC for the Paducah GDP was terminated on February 2, 2015, following NRC's confirmation of USEC's compliance with all applicable NRC requirements, and DOE's confirmation that it accepted the return of the leased facilities in accordance with the July 1, 1993, *Lease Agreement Between the United States Department of Energy and the United States Enrichment Corporation*, and its subsequent revisions. Accordingly, the Paducah GDP is now under the DOE's regulatory oversight in conjunction with the EPA and the Commonwealth of Kentucky, Department for Environmental Protection, which regulate environmental activities at the site.

The NRC conducted the most recent review of USEC's performance at the Paducah GDP covering the period between January 1, 2011, and December 31, 2012. Such performance reviews were performed every 24 months and were in addition to the required GDP inspections. The NRC did not conduct a performance review for the Paducah GDP during the current reporting period because the NRC conducted routine inspections of USEC's operations at the site during this period and found no issues of concern. The NRC confirmed that the Paducah GDP continued to conduct operations safely and securely while protecting public health and the environment. ~~Between October 1, 2013, and February 2, 2015, when the Paducah CoC was terminated, there were no significant events requiring activation of the emergency operations center.~~

In 2004, the DOE and the NRC entered into an MOU pertaining to the USEC Inc.'s Lead Cascade located at the Portsmouth GDP. The purpose of the Lead Cascade is to demonstrate that its centrifuge enrichment technology is suitable for commercial use. The MOU delineated the respective regulatory roles and responsibilities of the DOE and the NRC over the Lead Cascade facility. In 2007, the NRC and the DOE entered into a similar MOU covering the ACP. Under the 2007 MOU, the NRC is responsible for ensuring that any future ACP operations are conducted safely and in compliance with NRC requirements. Further details regarding the Lead Cascade and the ACP are provided in Chapter 8 of this report.

In December 2006, the DOE and USEC established *Supplemental Agreement Number 1 to the lease agreement between the United States Department of Energy and the United States Enrichment Corporation*. This supplemental agreement allowed for the long-term leasing of the gas centrifuge enrichment plant facilities.

After the NRC's termination of USEC's CoC for the Portsmouth GDP on October 12, 2011, all regulation of activities in non-leased areas of this site ~~have~~has been conducted by the DOE. The NRC continues to exercise regulatory authority over the Lead Cascade and the ACP facilities under their respective 10 CFR Part 70 licenses, as described above. After the NRC's termination of USEC's CoC for the Paducah GDP on February 2, 2015, the DOE has exercised regulatory oversight there in conjunction with the EPA and the Commonwealth of Kentucky, Department for Environmental Protection, which regulate environmental activities at the site.

The NRC also evaluated accident analyses and technical safety requirements (TSRs) developed by USEC. The accident analyses described potential credible accidents and the facility response to those accidents to demonstrate that the facility was capable of responding in a fashion that would not jeopardize public health and safety. The TSRs defined the safety envelope and operating parameters within which the GDPs were required to operate.

During the operation of the GDPs, any USEC requests for CoC amendments were only granted after a thorough review of design and operational information, and after specialists from both NRC headquarters and NRC Region II Officethe NRC conducted field inspections by specialists from both NRC headquarters and NRC Region II Office. In October 2012, the NRC reduced annual inspection and oversight hours for the Paducah GDP because the plant had continued to operate safely for over a decade. The NRC's inspection and oversight activities found that during the time it was operated, the Paducah GDP continued to implement an effective nuclear safety program, and that most of the identified issues had been of minor safety significance.

In June 2013, USEC notified the NRC of its decision to permanently cease enrichment activities at the Paducah GDP. The NRC staff performed an evaluation of its inspection program at the site and determined that the current and expected material workload at the Paducah GDP were similar in risk to operations at a uranium conversion facility with additional aspects in the areas of MC&A, security, information security, and criticality safety. As a result of this determination, the NRC staff concluded that an adjustment to the NRC's core inspection program for the site was necessary and subsequently removed the Paducah GDP resident inspector from the site at the end of fiscal year (FY) 2013.

The NRC coordinated with DOE and USEC during the CoC termination process to accomplish a seamless regulatory transition of the Paducah GDP site to DOE, and conducted a detailed review of USEC's request to terminate its 10 CFR Part 76 CoC. Prior to CoC termination, the NRC conducted inspections that addressed information security, MC&A, and appropriate disposition of waste. Deactivation at the Paducah GDP is an ongoing project currently being performed by DOE's contractors.

### **The DOE-USEC Lease Agreement**

The 1993 Lease between DOE and USEC, as supplemented in 2006, covered both the Portsmouth and the Paducah GDPs, as well as the Lead Cascade and the ACP at the Portsmouth site. Although USEC no longer leases the GDPs, the lease for the Lead Cascade and the ACP continues and was last approved for renewal on January 15, 2013. The renewed lease began on June 30, 2014, and runs for a period of 5 years. More information about additional NRC-licensed activities under 10 CFR Part 70 at the Portsmouth site is provided in Chapter 8, "Regulatory Activities," of this report.

### **Activities at the Paducah GDP**

In April 2013, USEC submitted an application to renew its CoC for the Paducah GDP for a 5-year period with an expiration date of December 31, 2018. However, by letter dated June 3, 2013, USEC notified the NRC of its decision to terminate uranium enrichment operations at the Paducah GDP and its intention to return the leased facilities to DOE. Following its notification, USEC started a deactivation process, which concluded with the return of the leased facilities to DOE on October 21, 2014. During this process, the NRC continued its oversight of USEC's

## CHAPTER 4

### HEALTH, SAFETY, AND ENVIRONMENTAL STATUS

Until the NRC terminated the CoC for the Paducah GDP, the NRC had oversight responsibility to ensure that the health and safety of the public and the workers at the GDPs were protected from hazards involving radioactive material and radiation. The 10 CFR Part 76.60, "Regulatory Requirements Which Apply," required USEC to comply with applicable sections of 10 CFR Part 20, "Standards for Protection Against Radiation." Health, safety, and environmental conditions were reflected in radiation doses received by workers and in radioactive effluents. This chapter contains information relating to the health, safety, and environmental conditions for the leased areas of the GDPs under NRC regulatory oversight. The DOE was contacted in the preparation of this report, and the input from DOE is included as Appendix A to this report, "Summary of DOE Activities at the Paducah and Portsmouth Gaseous Diffusion Plants."

DOE and USEC maintained onsite and offsite environmental dosimeters to monitor gamma radiation levels at the Paducah GDP. Table 4-1 provides the maximum offsite individual doses for the Paducah GDP for calendar year (CY) 2013 only for both USEC and DOE operations combined. Data for CYs 2014 and 2015 will not be provided in this report; although the CY 2014 environmental dosimeter data has been collected and analyzed, the modeling to calculate off-site personnel dose will not be available until October 2015 as part of Paducah's Annual Site Environmental Report (ASER) for CY 2014. The CY 2015 data will not be calculated and available until October 2016, when the next Paducah Site ASER is to be released, and will be based on data from DOE only. However, based on the historical data for the site, and given USEC's shutdown of enrichment operations at the site in 2013, the NRC does not expect that these gamma radiation levels will exceed the regulatory limit of 1 millisievert (mSv)/year [(100 millirem (mrem)/year)] for members of the public, as specified in 10 CFR Part 20.

Data from the environmental dosimeters at Paducah show that ambient gamma exposure levels at the site boundaries for CY 2013 are very small and well within the NRC's regulatory limits. Maximum annual doses to the nearest offsite individuals from exposure to radioactive effluents from Paducah operations for CY 2013 were calculated to be  $3.0 \times 10^{-4}$  millisievert (mSv) [(0.03 millirem (mrem))], which is far below the NRC regulatory limit of 1 mSv/year (100 mrem/year) for members of the public, as specified in 10 CFR Part 20.

**Table 4-1**  
Maximum Offsite Individual Dose at the Paducah GDP, 2013–2015

Calendar Year	Paducah Maximum Offsite Dose, mSv/yr (mrem/yr) <sup>a</sup> Airborne Emissions
2013	$3.0 \times 10^{-4}$ (0.03)
2014	Not Available
2015 <sup>b</sup>	Not Available

<sup>a</sup> Sv—Sievert; rem—röntgen equivalent man

<sup>b</sup> Plant not in operations

Radiological exposures to the public at the GDP sites are not limited to those arising from past USEC operations. DOE continues to conduct operations at both Paducah and Portsmouth. Table 4-2 shows the maximum collective doses from all plant effluents (covering both USEC and DOE operations) to the population within an 80-kilometer (km) (50-mile [mi]) radius for the Paducah GDP for CY 2013 only. For the reasons previously stated in this chapter, data for CYs 2014 and 2015 will not be provided in this report. ~~These exposures are also very low.~~

**Table 4-2**  
Collective 80-km (50-mi) Population Doses, at Paducah (2013–2015)

Calendar Year	Collective 80-km (50-mi) Population Dose, person-Sv (person-rem)
2013	$2.0 \times 10^{-3}$ (0.2)
2014	Not Available
2015*	Not Available

\* Plant not in operations

Table 4-3 provides collective occupational and maximum individual occupational radiation dose for USEC employees at the Paducah GDP.

**Table 4-3**  
Collective and Maximum Individual Occupational Dose, at Paducah (2013–2015)

Calendar Year	Paducah	
	Collective Occupational Dose, person-Sv (person-rem)	Maximum Individual Occupational Dose, Sv (rem)
2013	$4.6 \times 10^{-2}$ (4.576)	$1.49 \times 10^{-3}$ (0.149)
2014	$7.6 \times 10^{-3}$ (0.765)	$4.3 \times 10^{-5}$ (0.043)
2015*	N/A	N/A

\* Plant not in operations

The radiation exposures data indicate that for the respective reporting periods, individual worker exposures at the Paducah GDP did not exceed 5 mSv (500 mrem), which was the administrative control level at the Paducah GDP. These values are within the historical ranges for both GDP sites, and well within the NRC regulatory limit of 50 mSv/year (5000 mrem/year) specified in 10 CFR Part 20 for workers. There were no instances where the 10 CFR Part 20

## CHAPTER 5

### CERTIFICATION ACTIVITIES

The requirements in 10 CFR 76.45, "Application for Amendment of Certificate," state the process for amending the CoCs to cover new or modified activities. The NRC may also impose additional requirements by issuing orders and/or adding conditions to the CoC.

#### Amendments to the Paducah GDP Certificate

From October 1, ~~2008~~2013, through February 2, 2015, USEC ~~requested and~~ was granted ~~16~~ three amendments to its Paducah CoC. ~~Most of the requests were administrative in nature, but some amendments were required because USEC sought to modify one or more TSRs. Three amendments were issued between October 1, 2013, and February 2, 2015.~~ These amendments addressed the reduced operations and staffing during the GDP deactivation process, and the last amendment terminated the CoC.

#### Orders Issued to the Paducah GDP During This Reporting Period

No Orders were issued by the NRC to the Paducah GDP between October 1, 2013, and February 2, 2015.

#### 2013 Certificate Renewal Application for the Paducah GDP

On April 2, 2013, in accordance with 10 CFR 76.31, USEC submitted to the NRC its application for renewal of the Paducah GDP CoC that had been issued in 2008. USEC's renewal application relied on existing documentation. USEC did not request any changes to the application in the renewal request. After the NRC staff performed an acceptance review of the renewal application and found it acceptable for docketing, the NRC published a notice in the *Federal Register* on May 24, 2013 (78 FR 30342), acknowledging receipt of the application and providing an opportunity for public comment.

In a letter dated June 3, 2013, in accordance with 10 CFR 76.66(b), USEC notified the NRC of its decision to terminate its uranium enrichment operations at the Paducah GDP. Total shut down of enrichment activities at the plant was completed on July 25, 2013. In its June 3, 2013, letter, USEC stated that it planned to continue managing its inventory of NRC-regulated material and conduct clean-up related activities under its existing certificate before returning the Paducah GDP facilities to DOE. On August 1, 2013, USEC provided the DOE with a 2-year notice of its intent to terminate its lease of the GDP.

Due to USEC's decision to terminate enrichment activities at the Paducah GDP and its intention to return the leased facilities there to DOE, the NRC suspended the review of USEC's CoC renewal application and placed USEC's application on timely renewal status pursuant to 10 CFR 76.55. In accordance with 10 CFR 76.55, if a sufficient application for a CoC is timely filed, the existing CoC does not expire until a final determination on the application is made by the NRC. Therefore, USEC's activities at the Paducah GDP continued to be governed by the 2008 CoC, under which the NRC continued to monitor USEC's security and control of nuclear material, and its decontamination, decommissioning, and waste disposal activities. The NRC's regulatory authority was transferred to the DOE when the CoC was terminated on February 2, 2015.

## CHAPTER 6

### INSPECTIONS

Provisions in Subpart F, "Reports and Inspections" of 10 CFR Part 76, govern the NRC inspections of the GDPs. Based on such inspections, as documented in inspection reports, the NRC has authority to take enforcement action and issue civil penalties for violations of the AEA, NRC regulations, orders, or other applicable requirements. NRC provisions governing such actions are in 10 CFR Part 76, Subpart G, "Enforcement," and in 10 CFR Part 2, "Agency Rules for Practice and Procedure," among others.

Violations are enforcement actions identified during NRC inspections that are classified into one of four severity levels (SLs), with SL I assigned to the most significant violations and SL IV being assigned to the least significant. Additionally, there are violations characterized as "non-cited" violations (NCV) that are identified and promptly corrected by the licensee or CoC holder. NCVs are considered nonrecurring SL IV violations, corrected without NRC involvement and not subject to formal enforcement action. Finally, there are other violations of minor safety or environmental significance that are below SL IV. These violations must meet certain criteria and are generally not documented in NRC inspection reports.

More significant violations, identified as escalated enforcement actions, include: (1) SL I, II, and III notices of violation (NOVs); (2) civil penalties; and (3) orders to modify, suspend, or revoke NRC licenses or the authority to engage in NRC-licensed activities (may be issued for substantial safety concerns). More information about the NRC's enforcement policy is provided on the NRC Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement.html>.

As further detailed in Table 6-1 below, during the October 1, 2013, to February 2, 2015, reporting period, the NRC performed a total of 12 inspections at the Paducah GDP. These inspections were conducted by inspectors from the NRC's Region II and the headquarters' offices. The results of each inspection are documented in NRC inspection reports. Each report describes the completion of multiple inspection procedures of various disciplines by the resident inspectors, regional inspectors, and/or headquarters inspectors.

**Table 6-1**  
Number of Inspections and Inspection Hours Spent at the Paducah GDP

Fiscal Year	Paducah	
	Number of Inspections	Number of Inspection Hours
2014	11	346
2015*	1	39
<b>Total</b>	<b>12</b>	<b>385</b>

\*For the period covering October 1, 2014, until February 2, 2015

## CHAPTER 9

### CONSULTATION WITH DOE AND EPA

The AEA, as amended, requires that the NRC report to Congress, in consultation with the EPA and DOE, on the status of health, safety, and environmental conditions at the GDPs, no later than the date on which a CoC is issued.

#### Consultation with DOE

During this reporting period, the DOE Portsmouth/Paducah Project Office continued to discharge its regulatory and oversight responsibilities at the Paducah and Portsmouth GDP sites. DOE conducted its activities in a manner to enhance and improve health, safety, and environmental conditions and achieve compliance with all applicable Federal and State laws and regulations. In those instances where potential violations of these laws and regulations were identified, actions were taken to notify appropriate authorities, identify the cause, and institute corrective measures.

DOE requires an annual site environmental report from each of the sites operating under its authority that presents the results from the various environmental monitoring programs and activities carried out during the year. These reports are public documents that are distributed to government regulators, businesses, special interest groups, and members of the public. The annual site environmental report for DOE activities at the Portsmouth GDP is located at <http://energy.gov/pppo/downloads/portsmouth-annual-site-environmental-reports>. The annual site environmental report for DOE activities at the Paducah GDP is located at <http://energy.gov/pppo/downloads/paducah-annual-site-environmental-reports>.

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#### Consultation with EPA

##### The Paducah GDP

On April 22, 2015, the EPA informed the NRC that its data for the period beginning October 1, 2013, indicates that the Paducah GDP had a pattern of continued noncompliance under the Clean Water Act (CWA) with one quarter in significant noncompliance (SNC) and a period of noncompliance for the past five quarters. For the period prior to October 1, 2013, EPA data also showed noncompliance including additional periods of SNC. In addition to monitoring self-reporting from Paducah, the Commonwealth of Kentucky has regularly conducted CWA inspections, including an evaluation inspection and a sampling inspection in August 2013 and in August 2014. Furthermore, Kentucky has issued four Notice of Noncompliance letters since December 10, 2013, with the latest issued on February 25, 2015. Based on EPA's current review of its available data, Paducah appears to be having continued CWA compliance challenges.

## CHAPTER 11

### LEAD FEDERAL AGENCY/EMERGENCY COORDINATION

#### GDPs

In the 2001 *Joint Procedure between the U.S. Department of Energy (DOE) and the U.S. Nuclear Regulatory Commission (NRC) on Response to Emergencies in the Leased Areas at the Gaseous Diffusion Plants (GDPs)*, the DOE and the NRC agreed that the NRC was to be the initial lead-LFA for events at the GDPs having actual or potential adverse impacts on safety and/or common defense and security. However, following the return of the leased GDP buildings to DOE, and the termination of the Paducah CoC on February 2, 2015, the NRC no longer regulates activities at the Paducah GDP. Accordingly, ~~the NRC is no longer the LFA for emergencies that may occur at the Paducah GDP facilities. Following the return of the leased facilities to the DOE and the termination of the CoC,~~ DOE is now the LFA for any emergencies at the site.

#### ACP and Lead Cascade

As discussed in Chapter 8, "Regulatory Activities," the Lead Cascade and the ACP are located at the Portsmouth site and both are subject to NRC's regulatory oversight under their 10 CFR Part 70 NRC licenses. Both are also subject to a 2002 lease between DOE and USEC. Similar to the LFA agreement between the NRC and DOE documented in the 2001 joint procedure discussed above, the NRC and DOE signed an MOU in 2004 addressing the Lead Cascade. In 2007, the NRC and DOE signed an MOU addressing the ACP. Both MOUs designate NRC as the LFA for emergencies at the Portsmouth site, if the emergency pertains to either the Lead Cascade or the ACP.

## APPENDIX A

### SUMMARY OF DOE ACTIVITIES AT THE PADUCAH AND PORTSMOUTH GASEOUS DIFFUSION PLANTS

The U.S. Department of Energy (DOE) activities at the Paducah Gaseous Diffusion Plant (GDP) between October 1, 2013, and February 2, 2015, are described below.

#### Inspection and Investigation Activities at Paducah

- Participated in a full participation emergency management exercise at the Paducah GDP. (FY 2013)
- Inspected USEC's activities implemented to meet the Arming and Arrest Authority Security Plan requirements to ensure that the activities are being conducted safely and in accordance with the requirements of the DOE-USEC Regulatory Oversight Agreement, Exhibit D of the Lease Agreement between DOE and USEC, dated July 1, 1993, as amended. One item that was identified to be in non-compliance was a random drug test collection that was performed incorrectly. Normally this item would have been cited as a Notice of Violation ~~(NOV)~~. However, the item was immediately resolved and there was no evidence of any further non-compliance; therefore, it was recorded as a Non-cited Violation ~~(NCV)~~. (FY 2014)
- Inspected USEC's activities implemented to meet the Arming and Arrest Authority Security Plan requirements to ensure that the activities are being conducted safely and in accordance with the requirements of the DOE-USEC Regulatory Oversight Agreement, Exhibit D of the Lease Agreement between DOE and USEC, dated July 1, 1993, as amended. All open issues from previously inspections were satisfactorily closed and no new issues were identified. (FY 2015)

#### Overall Status of the Paducah and Portsmouth GDPs

During this reporting period, the DOE Paducah/Portsmouth Project Office continued to discharge its regulatory and oversight responsibilities at the Paducah and Portsmouth GDPs. DOE conducted its activities in a manner to enhance and improve environmental safety and health conditions and achieve compliance with all applicable Federal and State laws and regulations. In those instances where potential violations of these laws and regulations were identified, actions were taken to notify appropriate authorities, identify the cause, and institute corrective measures.

## APPENDIX B

### SUMMARY OF AGREEMENTS REGARDING THE PADUCAH AND PORTSMOUTH GASEOUS DIFFUSION PLANTS

#### I. Agreements Between the U.S. Department Of Energy (DOE) and the U.S. Nuclear Regulatory Commission (NRC) Describing Interface and Responsibilities at the Paducah and Portsmouth Gaseous Diffusion Plants (GDPs)

- Joint Statement of Understanding Between the Nuclear Regulatory Commission and the Department of Energy on Implementing the Energy Policy Act Provisions on the Regulation of Gaseous Diffusion Uranium Enrichment Plants, dated December 1993.
- Agreement Establishing Guidance for NRC Inspection Activities at the Paducah and Portsmouth Gaseous Diffusion Plants between Department of Energy Regulatory Oversight Manager and Nuclear Regulatory Commission, dated August 1994.
- Agreement for the Conduct of Inspection Activities at the Gaseous Diffusion Plants, dated October 1994.
- Agreement Defining Security Responsibilities at the Paducah and Portsmouth Gaseous Diffusion Plants between the Department of Energy Office of Safeguards and Security and the Nuclear Regulatory Commission's Division of Security, dated March 1995.
- Memorandum of Understanding between the Department of Energy and the Nuclear Regulatory Commission - Cooperation Regarding the Gaseous Diffusion Plants, dated October 1997.
- Joint Procedure Between the U.S. Department of Energy and the U.S. Nuclear Regulatory Commission - Response to Emergencies in the Leased Areas at the Gaseous Diffusion Plants, dated February 2001.
- Memorandum of Understanding Between the Department of Energy and the Nuclear Regulatory Commission on Cooperation Regarding the Gas Centrifuge Lead Cascade Facilities at the Portsmouth Gaseous Diffusion Plant Site, dated March 2004.
- Memorandum of Understanding Between the Department of Energy and the Nuclear Regulatory Commission on Cooperation Regarding the American Centrifuge Plant in Piketon, Ohio, dated April 2007

#### II. Agreements between DOE and USEC for the Paducah and Portsmouth GDPs

- Lease Agreement Between the United States Department of Energy and the United States Enrichment Corporation, dated July 1, 1993.

- Lease Agreement Between the United States Department of Energy and the United States Enrichment Corporation for the Gas Centrifuge Enrichment Plant, dated December 7, 2006.

### III. Agreements between DOE and USEC related to Depleted Uranium Management and Disposition at Paducah and Portsmouth

- The *Memorandum of Agreement Between the United States Department of Energy and the United States Enrichment Corporation Relating to Depleted Uranium*, dated June 30, 1998; the *Agreement Between the U.S. Department of Energy (DOE) and USEC Inc. (USEC)*, dated June 17, 2002; the *Cooperative Agreement Between Department of Energy and USEC Inc. Concerning the American Centrifuge Demonstration Project*, dated March 23, 2010; the contract between DOE and USEC for DOE acquisition of separative work unit (SWU), dated March 13, 2012; and the *Cooperative Agreement Between Department of Energy and USEC, Inc. and American Centrifuge Demonstration, LLC, Concerning the American Centrifuge Cascade Demonstration Test Program*, dated June 12, 2012.
- The *Memorandum of Agreement Between the United States Department of Energy and the United States Enrichment Corporation Relating to Depleted Uranium*, dated June 30, 1998 provided for the transfer to DOE of 2,026 48G cylinders containing approximately 16,674,000 Kg of DU generated by USEC's operations. In accordance with the agreement, USEC made the required full payment of over \$50M to DOE, covering the entire quantity of DU to be transferred. Therefore, the liability to dispose of the full amount of USEC's DU specified in the agreement now rests with DOE, further reducing the quantity of DU to be ultimately disposed of by USEC. Within these major parameters of the agreement, USEC and DOE agreed to implement the actual transfer of the material on a schedule covering the period of FY 1999 through 2004. This agreement is complete and no further action is required.
- The *Agreement Between the U.S. Department of Energy (DOE) and USEC Inc. (USEC)*, dated June 17, 2002, provided, in part, for the DOE taking title to DU from USEC operations during USEC's FYs 2002 and 2003 and one-half the amount of DU generated during USEC's FYs 2004 and 2005. Therefore, as a result of this June 17, 2002, agreement, USEC's liability associated with the disposal of USEC generated DU was reduced by the quantity of DU specified in this June 17, 2002, agreement.
- The *Cooperative Agreement Between Department of Energy and USEC Inc. Concerning the American Centrifuge Demonstration Project*, dated March 23, 2010, transferred title to 13,312,411 kg of DU from USEC to DOE to enable USEC to release encumbered funds to support continued development and demonstration of the American Centrifuge technology. In 2012, DOE and USEC entered into a contract in which DOE acquired SWU in exchange for DOE's accepting title to, and eventual disposal responsibility for 13,073,045 kg of DU.

## APPENDIX C

### ABBREVIATIONS AND ACRONYMS

ACO	American Centrifuge Operating, LLC - Current licensee for the ACP and the Lead Cascade
AEA	Atomic Energy Act
ASER	Annual Site Environmental Report
Centrus	Centrus Energy Corp. (formerly known as USEC Inc.)
CFR	<i>Code of Federal Regulations</i>
CoC	Certificate of Compliance
CWA	Clean Water Act
CY	calendar year
DOE	U.S. Department of Energy
DU	depleted uranium
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 1992
EU	enriched uranium
FY	fiscal year
GDP	gaseous diffusion plant
kg	kilogram
km	kilometer
LEU	low-enriched uranium
LFA	lead Federal agency
LPR	licensee performance review
MC&A	material control and accounting
mi	mile
MOU	memorandum of understanding
mrem	millirem
mSv	millisievert
MT	metric ton
NCS	nuclear criticality safety
NCV	non-cited violation
<del>NOV</del>	<del>notice of violation</del>
NRC	U.S. Nuclear Regulatory Commission
RD&D	Research, Development and Demonstration Project
SL	severity level
SNC	significant noncompliance
TSR	technical safety requirement
<sup>235</sup> U	uranium-235
<sup>238</sup> U	uranium-238
UF <sub>6</sub>	uranium hexafluoride
USEC	United States Enrichment Corporation - Certificate holder for the GDPs
USEC (Inc.)	<del>USEC Inc.</del> - USEC's former Parent Company, and former licensee for the ACP and the Lead Cascade

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: COMMISSIONER SVINICKI

SUBJECT: SECY-15-0100: FINAL REPORT TO CONGRESS ON  
THE HEALTH, SAFETY, AND ENVIRONMENTAL  
CONDITIONS AT THE GASEOUS DIFFUSION PLANTS  
LOCATED NEAR PADUCAH, KENTUCKY, AND  
PORTSMOUTH, OHIO

Approved XX Disapproved \_\_\_\_\_ Abstain \_\_\_\_\_ Not Participating \_\_\_\_\_

COMMENTS: Below XX Attached XX None \_\_\_\_\_

I approve the U.S. Nuclear Regulatory Commission "Report to Congress on the Health, Safety, and Environmental Conditions at the Gaseous Diffusion Plants Located Near Paducah, Kentucky, and Portsmouth, Ohio," as edited in the attached document. I approve the draft letters transmitting the report to Congress as edited in the attached version.



Signature

09/ 2 /15

Date

Entered on "STARS" Yes  No \_\_\_\_\_

**U.S. NUCLEAR REGULATORY COMMISSION  
FINAL REPORT TO CONGRESS  
ON THE HEALTH, SAFETY,  
AND ENVIRONMENTAL CONDITIONS AT THE  
GASEOUS DIFFUSION PLANTS  
LOCATED NEAR  
PADUCAH, KENTUCKY,  
AND PORTSMOUTH, OHIO**

**October 1, 2013, to February 2, 2015**

## EXECUTIVE SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) provides this report to Congress pursuant to Section 1701 of the Atomic Energy Act (AEA) that requires NRC reports on the health, safety, and environmental conditions of the gaseous diffusion uranium enrichment plants (GDPs) located near Paducah, Kentucky, and Portsmouth, Ohio. As of July 2013, uranium enrichment operations using the gaseous diffusion process no longer occur in the United States. The NRC terminated the Certificates of Compliance (CoCs) for the Portsmouth and Paducah GDPs in 2011 and 2015, respectively, and no longer regulates any GDP-related activities. Accordingly, this will be the last NRC report on the GDPs. This report covers the time period from October 1, 2013, to February 2, 2015. As directed by the AEA, the NRC staff consulted with the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) in preparing this report. The information within this report is current as of February 2, 2015, when the last GDP CoC was terminated.

The NRC initially issued CoCs to the GDPs in March 1997, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 76, "Certification of Gaseous Diffusion Plants." ~~In October 2011, the NRC terminated the CoC for the Portsmouth GDP. Following termination of the CoC, the DOE began major decontamination and decommissioning activities in most of the Portsmouth GDP buildings.~~ The GDPs had been operated by the United States Enrichment Corporation (USEC), a subsidiary of USEC Inc., its former parent corporation. ~~Note that~~ Following bankruptcy proceedings concluded in 2014, USEC, Inc. now does business as Centrus Energy Corp. (Centrus). In October 2011, the NRC terminated the CoC for the Portsmouth GDP after USEC returned the Portsmouth GDP facilities to DOE. The DOE is fully responsible for the regulatory oversight of the Portsmouth GDP. Following termination of the CoC for the Portsmouth GDP ~~in 2014~~, the DOE began major decontamination and decommissioning activities in most of the Portsmouth GDP buildings.

In June 2013, USEC notified the NRC that it was permanently terminating its enrichment activities at the Paducah GDP and began a deactivation process. The Paducah GDP facilities were returned to the DOE on October 21, 2014. The NRC's 10 CFR Part 76 CoC for the Paducah GDP was terminated on February 2, 2015, following NRC's confirmation of USEC's compliance with all applicable NRC requirements, and DOE's confirmation that it accepted the return of the leased facilities in accordance with the July 1, 1993, *Lease Agreement Between the United States Department of Energy and the United States Enrichment Corporation*, and its subsequent revisions. Accordingly, the Paducah GDP is now under the DOE's regulatory oversight in conjunction with the EPA and the Commonwealth of Kentucky, Department for Environmental Protection, which regulate environmental activities at the site.

The NRC conducted the most recent review of USEC's performance at the Paducah GDP covering the period between January 1, 2011, and December 31, 2012. Such performance reviews were performed every 24 months and were in addition to the required GDP inspections. The NRC did not conduct a performance review for the Paducah GDP during the current reporting period because the NRC conducted routine inspections of USEC's operations at the site during this period and found no issues of concern. The NRC confirmed that the Paducah GDP continued to conduct operations safely and securely while protecting public health and the environment. Between October 1, 2013, and February 2, 2015, when the Paducah CoC was terminated, there were no significant events requiring activation of the emergency operations center.

## CHAPTER 1

### INTRODUCTION

During the time that operation of the Paducah and Portsmouth gaseous diffusion plants (GDPs<sup>1</sup>) was regulated by the U.S. Nuclear Regulatory Commission (NRC), each GDP was required to obtain a Certificate of Compliance (CoC) from the NRC pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 76, "Certification of Gaseous Diffusion Plants." The United States Enrichment Corporation (USEC) was the CoC holder of each GDP. Note that USEC is a subsidiary of its former parent corporation USEC, Inc., and that following bankruptcy proceedings concluded in 2014, USEC, Inc. now does business as Centrus Energy Corp. (Centrus).

In June 2013, USEC notified the NRC of its decision to permanently cease uranium enrichment activities at the Paducah GDP. Enrichment activities at the site permanently ceased on July 25, 2013, and by letter to the U.S. Department of Energy (DOE) dated August 1, 2013, USEC gave notice of its intent to terminate the lease of the Paducah GDP. In the early 2000s, a similar decision was made to cease uranium enrichment activities at the Portsmouth GDP, and for many years thereafter this GDP was kept in a cold shutdown condition. In October 2011, the NRC terminated the CoC for the Portsmouth GDP. Accordingly, this will be the last NRC report on the GDPs, and it covers the time period from October 1, 2013, through February 2, 2015.

Located on the site of the Portsmouth GDP is the American Centrifuge Lead Cascade Facility (Lead Cascade) that ~~is continues to be~~ regulated under an NRC license pursuant to 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material." NRC License SNM-7003 for the Lead Cascade was issued in 2004, and USEC Inc. began operating the Lead Cascade in August 2006. American Centrifuge Operating, LLC (ACO), a subsidiary of Centrus, now holds the NRC license for the Lead Cascade. ACO continues to develop replacement uranium enrichment technology involving the use of gas centrifuges, with the purpose of demonstrating that the Lead Cascade's centrifuge enrichment technology can later produce enriched uranium (EU) for commercial use.

In early 2014, the DOE instructed UT-Battelle, LLC (UT-Battelle), the management and operating contractor for the Oak Ridge National Laboratory (ORNL), to assist in developing a path forward for achieving a reliable and economic domestic uranium enrichment capability. The DOE's intent is to promote private sector deployment of the Lead Cascade's enrichment technology, while also supporting national security purposes. Pursuant to those instructions, on May 1, 2014, UT-Battelle and ACO signed a firm fixed-price agreement for continued cascade operations, while scaling back certain core research and technology activities at the Lead Cascade. Under this agreement, ACO provides periodic reports to ORNL regarding Lead Cascade operations. Minor amendments to NRC License SNM-7003 were issued in 2014 to reflect the reduced research and technology activities. ACO continues to operate the Lead Cascade and remains the NRC licensee holder.

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<sup>1</sup> A listing of abbreviations and acronyms can be found in Appendix C.

## CHAPTER 4

### HEALTH, SAFETY, AND ENVIRONMENTAL STATUS

Until the NRC terminated the CoC for the Paducah GDP, the NRC had oversight responsibility to ensure that the health and safety of the public and the workers at the GDPs were protected from hazards involving radioactive material and radiation. The 10 CFR 76.60, "Regulatory Requirements Which Apply," required USEC to comply with applicable sections of 10 CFR Part 20, "Standards for Protection Against Radiation." Health, safety, and environmental conditions were reflected in radiation doses received by workers and in radioactive effluents. This chapter contains information relating to the health, safety, and environmental conditions for the leased areas of the GDPs under NRC regulatory oversight. The DOE was contacted in the preparation of this report, and the input from DOE is included as Appendix A to this report, "Summary of DOE Activities at the Paducah Gaseous Diffusion Plant."

DOE and USEC maintained onsite and offsite environmental dosimeters to monitor gamma radiation levels at the Paducah GDP. Table 4-1 provides the maximum offsite individual doses for the Paducah GDP for calendar year (CY) 2013 only for both USEC and DOE operations combined. Data for CYs 2014 and 2015 will could not be provided in this report; although the CY 2014 environmental dosimeter data has been collected and analyzed, the modeling to calculate off-site personnel dose will not be available until October 2015 as part of Paducah's Annual Site Environmental Report (ASER) for CY 2014. The CY 2015 data will not be calculated and available until October 2016, when the next Paducah Site ASER is to be released, and will be based on data from DOE only. However, based on the historical data for the site, and given USEC's shutdown of enrichment operations at the site in 2013, the NRC does not expect that these gamma radiation levels will exceed the regulatory limit of 1 mSv/year (100 mrem/year) for members of the public, as specified in 10 CFR Part 20.

Data from the environmental dosimeters at Paducah show that ambient gamma exposure levels at the site boundaries for CY 2013 were very small and well within the NRC's regulatory limits. Maximum annual doses to the nearest offsite individuals from exposure to radioactive effluents from Paducah operations for CY 2013 were calculated to be  $3.0 \times 10^{-4}$  millisievert (mSv) [(0.03 millirem (mrem))], which is far below the NRC regulatory limit of 1 mSv/year (100 mrem/year) for members of the public, as specified in 10 CFR Part 20.

Table 4-1  
Maximum Offsite Individual Dose at the Paducah GDP, 2013–2015

Calendar Year	Paducah Maximum Offsite Dose, mSv/yr (mrem/yr) <sup>a</sup> Airborne Emissions
2013	$3.0 \times 10^{-4}$ (0.03)
2014	Not Available
2015 <sup>b</sup>	Not Available

<sup>a</sup> Sv—Sievert; rem—röntgen equivalent man

<sup>b</sup> Plant not in operations

Radiological exposures to the public at the GDP sites are not limited to those arising from past USEC operations. DOE continues to conduct operations at both Paducah and Portsmouth. Table 4-2 shows the maximum collective doses from all plant effluents (covering both USEC and DOE operations) to the population within an 80-kilometer (km) (50-mile [mi]) radius for the Paducah GDP for CY 2013 only. For the reasons previously stated in this chapter, data for CYs 2014 and 2015 will/could not be provided in this report. These exposures are also very low.

**Table 4-2**  
Collective 80-km (50-mi) Population Doses, at Paducah (2013–2015)

Calendar Year	Collective 80-km (50-mi) Population Dose, person-Sv (person-rem)
2013	$2.0 \times 10^{-3}$ (0.2)
2014	Not Available
2015*	Not Available

\* Plant not in operations

Table 4-3 provides collective occupational and maximum individual occupational radiation dose for USEC employees at the Paducah GDP.

**Table 4-3**  
Collective and Maximum Individual Occupational Dose, at Paducah (2013–2015)

Calendar Year	Paducah	
	Collective Occupational Dose, person-Sv (person-rem)	Maximum Individual Occupational Dose, Sv (rem)
2013	$4.6 \times 10^{-2}$ (4.576)	$1.49 \times 10^{-3}$ (0.149)
2014	$7.6 \times 10^{-3}$ (0.765)	$4.3 \times 10^{-5}$ (0.043)
2015*	N/A	N/A

\* Plant not in operations

The radiation exposures data indicate that for the respective reporting periods, individual worker exposures at the Paducah GDP did not exceed 5 mSv (500 mrem), which was the administrative control level at the Paducah GDP. These values are within the historical ranges for both GDP sites, and well within the NRC regulatory limit of 50 mSv/year (5000 mrem/year) specified in 10 CFR Part 20 for workers. There were no instances where the 10 CFR Part 20 individual limits for workers, including the 10 milligrams (0.000353 ounce) intake of soluble uranium per week, were exceeded.

## CHAPTER 5

### CERTIFICATION ACTIVITIES

The requirements in 10 CFR 76.45, "Application for Amendment of Certificate," state the process for amending the CoCs to cover new or modified activities. The NRC may also impose additional requirements by issuing orders and/or adding conditions to the CoC.

#### **Amendments to the Paducah GDP Certificate**

~~From October 1, 2008, through February 2, 2015, USEC requested and was granted 16 amendments to its Paducah CoC. Most of the requests were administrative in nature, but some amendments were required because USEC sought to modify one or more TSRs.~~ Three amendments were issued between October 1, 2013, and February 2, 2015. These amendments addressed the reduced operations and staffing during the GDP deactivation process, and the last amendment terminated the CoC.

#### **Orders Issued to the Paducah GDP During This Reporting Period**

No Orders were issued by the NRC to the Paducah GDP between October 1, 2013, and February 2, 2015.

#### **2013 Certificate Renewal Application for the Paducah GDP**

On April 2, 2013, in accordance with 10 CFR 76.31, USEC submitted to the NRC its application for renewal of the Paducah GDP CoC that had been issued in 2008. USEC's renewal application relied on existing documentation. USEC did not request any changes to the application in the renewal request. After the NRC staff performed an acceptance review of the renewal application and found it acceptable for docketing, the NRC published a notice in the *Federal Register* on May 24, 2013 (78 FR 30342), acknowledging receipt of the application and providing an opportunity for public comment.

In a letter dated June 3, 2013, in accordance with 10 CFR 76.66(b), USEC notified the NRC of its decision to terminate its uranium enrichment operations at the Paducah GDP. Total shut down of enrichment activities at the plant was completed on July 25, 2013. In its June 3, 2013, letter, USEC stated that it planned to continue managing its inventory of NRC-regulated material and conduct clean-up related activities under its existing certificate before returning the Paducah GDP facilities to DOE. On August 1, 2013, USEC provided the DOE with a 2-year notice of its intent to terminate its lease of the GDP.

Due to USEC's decision to terminate enrichment activities at the Paducah GDP and its intention to return the leased facilities there to DOE, the NRC suspended the review of USEC's CoC renewal application and placed USEC's application on timely renewal status pursuant to 10 CFR 76.55. In accordance with 10 CFR 76.55, if a sufficient application for a CoC is timely filed, the existing CoC does not expire until a final determination on the application is made by the NRC. Therefore, USEC's activities at the Paducah GDP continued to be governed by the 2008 CoC, under which the NRC continued to monitor USEC's security and control of nuclear material, and its decontamination, decommissioning, and waste disposal activities. The NRC's regulatory authority was transferred to the DOE when the CoC was terminated on February 2, 2015.

## CHAPTER 11

### LEAD FEDERAL AGENCY/EMERGENCY COORDINATION

#### GDPs

In the 2001, *Joint Procedure between the U.S. Department of Energy (DOE) and the U.S. Nuclear Regulatory Commission (NRC) on Response to Emergencies in the Leased Areas at the Gaseous Diffusion Plants (GDPs)*, the DOE and the NRC agreed that the NRC was to be the initial lead LFA for events at the GDPs having actual or potential adverse impacts on safety and/or common defense and security. However, following the return of the leased GDP buildings to DOE, and the termination of the Paducah CoC on February 2, 2015, the NRC no longer regulates activities at the Paducah GDP. Accordingly, ~~the NRC is no longer the LFA for emergencies that may occur at the Paducah GDP facilities. Following the return of the leased facilities to the DOE and the termination of the CoC,~~ DOE is now the LFA for any emergencies at the site.

#### ACP and Lead Cascade

As discussed in Chapter 8, "Regulatory Activities," the Lead Cascade and the ACP are located at the Portsmouth site and both are subject to NRC's regulatory oversight under their 10 CFR Part 70 NRC licenses. Both are also subject to a 2002 lease between DOE and USEC. Similar to the LFA agreement between the NRC and DOE documented in the 2001 joint procedure discussed above, the NRC and DOE signed an MOU in 2004 addressing the Lead Cascade. In 2007, the NRC and DOE signed an MOU addressing the ACP. Both MOUs designate NRC as the LFA for emergencies at the Portsmouth site, if the emergency pertains to either the Lead Cascade or the ACP.

## APPENDIX A

### SUMMARY OF DOE ACTIVITIES AT THE PADUCAH AND PORTSMOUTH GASEOUS DIFFUSION PLANTS

The U.S. Department of Energy (DOE) activities at the Paducah Gaseous Diffusion Plant (GDP) between October 1, 2013, and February 2, 2015, are described below.

#### Inspection and Investigation Activities at Paducah

- Participated in a full participation emergency management exercise at the Paducah GDP. (FY 2013)
- Inspected USEC's activities implemented to meet the Arming and Arrest Authority Security Plan requirements to ensure that the activities are being conducted safely and in accordance with the requirements of the DOE-USEC Regulatory Oversight Agreement, Exhibit D of the Lease Agreement between DOE and USEC, dated July 1, 1993, as amended. One item that was identified to be in non-compliance was a random drug test collection that was performed incorrectly. Normally this item would have been cited as a Notice of Violation (NOV). However, the item was immediately resolved and there was no evidence of any further non-compliance; therefore, it was recorded as a Non-cited Violation (NCV). (FY 2014)
- Inspected USEC's activities implemented to meet the Arming and Arrest Authority Security Plan requirements to ensure that the activities are being conducted safely and in accordance with the requirements of the DOE-USEC Regulatory Oversight Agreement, Exhibit D of the Lease Agreement between DOE and USEC, dated July 1, 1993, as amended. All open issues from previously inspections were satisfactorily closed and no new issues were identified. (FY 2015)

#### Overall Status of the Paducah and Portsmouth GDPs

During this reporting period, the DOE Paducah/Portsmouth Project Office continued to discharge its regulatory and oversight responsibilities at the Paducah and Portsmouth GDPs. DOE conducted its activities in a manner to enhance and improve environmental safety and health conditions and achieve compliance with all applicable Federal and State laws and regulations. In those instances where potential violations of these laws and regulations were identified, actions were taken to notify appropriate authorities, identify the cause, and institute corrective measures.

- Lease Agreement Between the United States Department of Energy and the United States Enrichment Corporation for the Gas Centrifuge Enrichment Plant, dated December 7, 2006.

### III. Agreements between DOE and USEC related to Depleted Uranium Management and Disposition at Paducah and Portsmouth

- The *Memorandum of Agreement Between the United States Department of Energy and the United States Enrichment Corporation Relating to Depleted Uranium*, dated June 30, 1998; the *Agreement Between the U.S. Department of Energy (DOE) and USEC Inc. (USEC)*, dated June 17, 2002; the *Cooperative Agreement Between Department of Energy and USEC Inc. Concerning the American Centrifuge Demonstration Project*, dated March 23, 2010; the contract between DOE and USEC for DOE acquisition of separative work unit (SWU), dated March 13, 2012; and the *Cooperative Agreement Between Department of Energy and USEC, Inc. and American Centrifuge Demonstration, LLC, Concerning the American Centrifuge Cascade Demonstration Test Program*, dated June 12, 2012.
- The *Memorandum of Agreement Between the United States Department of Energy and the United States Enrichment Corporation Relating to Depleted Uranium*, dated June 30, 1998 provided for the transfer to DOE of 2,026 48G cylinders containing approximately 16,674,000 Kg of DU generated by USEC's operations. In accordance with the agreement, USEC made the required full payment of over \$50M to DOE, covering the entire quantity of DU to be transferred. Therefore, the liability to dispose of the full amount of USEC's DU specified in the agreement now rests with DOE, further reducing the quantity of DU to be ultimately disposed of by USEC. Within these major parameters of the agreement, USEC and DOE agreed to implement the actual transfer of the material on a schedule covering the period of FY 1999 through 2004. This agreement is complete and no further action is required.
- The *Agreement Between the U.S. Department of Energy (DOE) and USEC Inc. (USEC)*, dated June 17, 2002, provided, in part, for the DOE taking title to DU from USEC operations during USEC's FYs 2002 and 2003 and one-half the amount of DU generated during USEC's FYs 2004 and 2005. Therefore, as a result of this June 17, 2002, agreement, USEC's liability associated with the disposal of USEC generated DU was reduced by the quantity of DU specified in this June 17, 2002, agreement.
- The *Cooperative Agreement Between Department of Energy and USEC Inc. Concerning the American Centrifuge Demonstration Project*, dated March 23, 2010, transferred title to 13,312,411 kg of DU from USEC to DOE to enable USEC to release encumbered funds to support continued development and demonstration of the American Centrifuge technology. In 2012, DOE and USEC entered into a contract in which DOE acquired SWU in exchange for DOE's accepting title to, and eventual disposal responsibility for 13,073,045 kg of DU.

KLS edits

The Honorable Shelley Moore Capito  
Chairman, Subcommittee on Clean Air  
and Nuclear Safety  
Committee on Environment  
and Public Works  
United States Senate  
Washington, DC 20510

Dear Madame Chairwoman:

The Atomic Energy Act of 1954 (AEA) requires the U.S. Nuclear Regulatory Commission (NRC) to periodically send reports to Congress discussing the health, safety, and environmental conditions at the gaseous diffusion uranium enrichment plants (GDPs) located near Paducah, Kentucky, and Portsmouth, Ohio. The previous such report (NRC's Agencywide Documents Access and Management System (ADAMS) Accession No. ML13253A179) covered the period from October 1, 2008, to September 30, 2013, and was sent to the congressional oversight committees on January 13, 2014. Enclosed is the most current report covering the period October 1, 2013, to February 2, 2015 (ADAMS Accession No. ML15173A254).

As detailed in the enclosed report, the United States Enrichment Corporation notified the NRC in June 2013 that it was terminating its uranium enrichment activities at the Paducah GDP. The enrichment activities there permanently ceased on July 25, 2013. The NRC terminated the Certificate of Compliance for the Paducah GDP on February 2, 2015. The Certificate of Compliance for Portsmouth's GDP was terminated by the NRC on October 12, 2011, and Federal regulation of activities at the Paducah and Portsmouth sites is now provided by the U.S. Department of Energy (DOE). The Certificate of Compliance for Portsmouth's GDP was terminated by the NRC on October 12, 2011.

The enclosed report will be the final NRC report regarding the GDPs. The enclosed report covers the period from October 1, 2013, to February 2, 2015. As required by the AEA, the preparation of this report has been coordinated with the DOE and the U.S. Environmental Protection Agency.

Sincerely,

Stephen G. Burns

Enclosure:  
Report to Congress

**NOTATION VOTE**

**RESPONSE SHEET**

TO: Annette Vietti-Cook, Secretary

FROM: Commissioner Ostendorff

SUBJECT: SECY-15-0100: FINAL REPORT TO CONGRESS ON THE HEALTH, SAFETY, AND ENVIRONMENTAL CONDITIONS AT THE GASEOUS DIFFUSION PLANTS LOCATED NEAR PADUCAH, KENTUCKY, AND PORTSMOUTH, OHIO

Approved  Disapproved  Abstain  Not Participating

COMMENTS: Below  Attached  None

I approve providing to Congress the U.S. Nuclear Regulatory Commission "Report to Congress on the Health, Safety, and Environmental Conditions at the Gaseous Diffusion Plants Located Near Paducah, Kentucky, and Portsmouth, Ohio," as edited in the attached document.

**Entered in STARS**

Yes   
No

  
\_\_\_\_\_  
Signature  
  
\_\_\_\_\_  
Date

## EXECUTIVE SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) provides this report to Congress pursuant to Section 1701 of the Atomic Energy Act (AEA) that requires NRC reports on the health, safety, and environmental conditions of the gaseous diffusion uranium enrichment plants (GDPs) located near Paducah, Kentucky, and Portsmouth, Ohio. As of July 2013, uranium enrichment operations using the gaseous diffusion process no longer occur in the United States. The NRC terminated the Certificates of Compliance (CoCs) for the Portsmouth and Paducah GDPs in 2011 and 2015, respectively, and no longer regulates any GDP-related activities. Accordingly, this will be the last NRC report on the GDPs. This report covers the time period from October 1, 2013, to February 2, 2015. As directed by the AEA, the NRC staff consulted with the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) in preparing this report. The information within this report is current as of February 2, 2015 when the CoC was terminated.

The NRC initially issued CoCs to the GDPs in March 1997, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 76, "Certification of Gaseous Diffusion Plants." In October 2011, the NRC terminated the CoC for the Portsmouth GDP. The DOE is fully responsible for the regulatory oversight of the Portsmouth GDP. Following termination of the CoC, the DOE began major decontamination and decommissioning activities in most of the Portsmouth GDP buildings. The GDPs had been operated by the United States Enrichment Corporation (USEC), a subsidiary of USEC Inc., its former parent corporation. Note that following bankruptcy proceedings concluded in 2014, USEC, Inc. now does business as Centrus Energy Corp. (Centrus). ~~The DOE is fully responsible for the regulatory oversight of the Portsmouth GDP. Following termination of the CoC for the Portsmouth GDP in 2011, the DOE began major decontamination and decommissioning activities in most of the Portsmouth GDP buildings.~~

In June 2013, USEC notified the NRC that it was permanently terminating its enrichment activities at the Paducah GDP and began a deactivation process. The Paducah GDP facilities were returned to the DOE on October 21, 2014. The NRC's 10 CFR Part 76 CoC for the Paducah GDP was terminated on February 2, 2015, following NRC's confirmation of USEC's compliance with all applicable NRC requirements, and DOE's confirmation that it accepted the return of the leased facilities in accordance with the July 1, 1993, *Lease Agreement Between the United States Department of Energy and the United States Enrichment Corporation*, and its subsequent revisions. Accordingly, the Paducah GDP is now under the DOE's regulatory oversight in conjunction with the EPA and the Commonwealth of Kentucky, Department for Environmental Protection, which regulate environmental activities at the site.

The NRC conducted the most recent review of USEC's performance at the Paducah GDP covering the period between January 1, 2011, and December 31, 2012. Such performance reviews were performed every 24 months and were in addition to the required GDP inspections. The NRC did not conduct a performance review for the Paducah GDP during the current reporting period because the NRC conducted routine inspections of USEC's operations at the site during this period and found no issues of concern. The NRC confirmed that the Paducah GDP continued to conduct operations safely and securely while protecting public health and the environment. Between October 1, 2013, and February 2, 2015, when the Paducah CoC was terminated, there were no significant events requiring activation of the emergency operations center.

In 2004, the DOE and the NRC entered into an MOU pertaining to the USEC Inc.'s Lead Cascade located at the Portsmouth GDP. The purpose of the Lead Cascade is to demonstrate that its centrifuge enrichment technology is suitable for commercial use. The MOU delineated the respective regulatory roles and responsibilities of the DOE and the NRC over the Lead Cascade facility. In 2007, the NRC and the DOE entered into a similar MOU covering the ACP. Under the 2007 MOU, the NRC is responsible for ensuring that any future ACP operations are conducted safely and in compliance with NRC requirements. Further details regarding the Lead Cascade and the ACP are provided in Chapter 8 of this report.

In December 2006, the DOE and USEC established *Supplemental Agreement Number 1 to the lease agreement between the United States Department of Energy and the United States Enrichment Corporation*. This supplemental agreement allowed for the long-term leasing of the gas centrifuge enrichment plant facilities.

After the NRC's termination of USEC's CoC for the Portsmouth GDP on October 12, 2011, all regulation of activities in non-leased areas of this site have been conducted by the DOE. The NRC continues to exercise regulatory authority over the Lead Cascade and the ACP facilities under their respective 10 CFR Part 70 licenses, as described above. After the NRC's termination of USEC's CoC for the Paducah GDP on February 2, 2015, the DOE has exercised regulatory oversight there in conjunction with the EPA and the Commonwealth of Kentucky, Department for Environmental Protection, which regulate environmental activities at the site. Section 1701 of the AEA does require Congressional reporting for these activities.

## CHAPTER 4

### HEALTH, SAFETY, AND ENVIRONMENTAL STATUS

Until the NRC terminated the CoC for the Paducah GDP, the NRC had oversight responsibility to ensure that the health and safety of the public and the workers at the GDPs were protected from hazards involving radioactive material and radiation. The 10 CFR 76.60, "Regulatory Requirements Which Apply," required USEC to comply with applicable sections of 10 CFR Part 20, "Standards for Protection Against Radiation." Health, safety, and environmental conditions were reflected in radiation doses received by workers and in radioactive effluents. This chapter contains information relating to the health, safety, and environmental conditions for the leased areas of the GDPs under NRC regulatory oversight. The DOE was contacted in the preparation of this report, and the input from DOE is included as Appendix A to this report, Summary of DOE Activities at the Paducah Gaseous Diffusion Plant.

DOE and USEC maintained onsite and offsite environmental dosimeters to monitor gamma radiation levels at the Paducah GDP. Table 4-1 provides the maximum offsite individual doses for the Paducah GDP for calendar year (CY) 2013 only for both USEC and DOE operations combined. Data for CYs 2014 and 2015 will not be provided in this report; although the CY 2014 environmental dosimeter data has been collected and analyzed, the modeling to calculate off-site personnel dose will not be available until October 2015 as part of Paducah's Annual Site Environmental Report (ASER) for CY 2014. The CY 2015 data will not be calculated and available until October 2016, when the next Paducah Site ASER is to be released, and will be based on data from DOE only. However, based on the historical data for the site, and given USEC's shutdown of enrichment operations at the site in 2013, the NRC does not expect that these gamma radiation levels will exceed the regulatory limit of 1 mSv/year (100 mrem/year) for members of the public, as specified in 10 CFR Part 20.

Data from the environmental dosimeters at Paducah show that ambient gamma exposure levels at the site boundaries for CY 2013 are very small and well within the NRC's regulatory limits. Maximum annual doses to the nearest offsite individuals from exposure to radioactive effluents, from Paducah operations for CY 2013 were calculated to be  $3.0 \times 10^{-4}$  millisievert (mSv) ~~{(0.03 millirem (mrem))}~~, which is far below the NRC regulatory limit of 1 mSv/year (100 mrem/year) for members of the public as specified in 10 CFR Part 20.

**Table 4-1**  
Maximum Offsite Individual Dose at the Paducah GDP, 2013–2015

Calendar Year	Paducah Maximum Offsite Dose, mSv/yr (mrem/yr) <sup>a</sup>
2013	$3.0 \times 10^{-4}$ (0.03)
2014	Not Available
2015 <sup>b</sup>	Not Available

<sup>a</sup> Sv—Sievert; rem—röntgen equivalent man

<sup>b</sup> Plant not in operations

## CHAPTER 5

### CERTIFICATION ACTIVITIES

The requirements in 10 CFR 76.45, "Application for Amendment of Certificate," state the process for amending the CoCs to cover new or modified activities. The NRC may also impose additional requirements by issuing orders and/or adding conditions to the CoC.

#### Amendments to the Paducah GDP Certificate

From October 1, ~~2008~~2013, through February 2, 2015, USEC requested and was granted ~~16~~3 amendments to its Paducah CoC. ~~Most of the requests were administrative in nature, but some amendments were required because USEC sought to modify one or more TSRs. Three amendments were issued between October 1, 2013, and February 2, 2015.~~ These amendments addressed the reduced operations and staffing during the GDP deactivation process, and the last amendment terminated the CoC.

#### Orders Issued to the Paducah GDP During This Reporting Period

No Orders were issued by the NRC to the Paducah GDP between October 1, 2013, and February 2, 2015.

#### 2013 Certificate Renewal Application for the Paducah GDP

On April 2, 2013, in accordance with 10 CFR 76.31, USEC submitted to the NRC its application for renewal of the Paducah GDP CoC that had been issued in 2008. USEC's renewal application relied on existing documentation. USEC did not request any changes to the application in the renewal request. After the NRC staff performed an acceptance review of the renewal application and found it acceptable for docketing, the NRC published a notice in the *Federal Register* on May 24, 2013 (78 FR 30342), acknowledging receipt of the application and providing an opportunity for public comment.

In a letter dated June 3, 2013, in accordance with 10 CFR 76.66(b), USEC notified the NRC of its decision to terminate its uranium enrichment operations at the Paducah GDP. Total shut down of enrichment activities at the plant was completed on July 25, 2013. In its June 3, 2013, letter, USEC stated that it planned to continue managing its inventory of NRC-regulated material and conduct clean-up related activities under its existing certificate before returning the Paducah GDP facilities to DOE. On August 1, 2013, USEC provided the DOE with a 2-year notice of its intent to terminate its lease of the GDP.

Due to USEC's decision to terminate enrichment activities at the Paducah GDP and its intention to return the leased facilities there to DOE, the NRC suspended the review of USEC's CoC renewal application and placed USEC's application on timely renewal status pursuant to 10 CFR 76.55. In accordance with 10 CFR 76.55, if a sufficient application for a CoC is timely filed, the existing CoC does not expire until a final determination on the application is made by the NRC. Therefore, USEC's activities at the Paducah GDP continued to be governed by the 2008 CoC, under which the NRC continued to monitor USEC's security and control of nuclear material, and its decontamination, decommissioning, and waste disposal activities. The NRC's regulatory authority was transferred to the DOE when the CoC was terminated on February 2, 2015.

## CHAPTER 11

### LEAD FEDERAL AGENCY/EMERGENCY COORDINATION

#### GDPs

In the 2001, *Joint Procedure between the U.S. Department of Energy (DOE) and the U.S. Nuclear Regulatory Commission (NRC) on Response to Emergencies in the Leased Areas at the Gaseous Diffusion Plants (GDPs)*, the DOE and the NRC agreed that the NRC was to be the initial lead LFA for events at the GDPs having actual or potential adverse impacts on safety and/or common defense and security. However, following the return of the leased GDP buildings to DOE, and the termination of the Paducah CoC on February 2, 2015, the NRC no longer regulates activities at the Paducah GDP.

Accordingly, the NRC is no longer the LFA for emergencies that may occur at the Paducah GDP facilities. ~~Following the return of the leased facilities to the DOE and the termination of the CoC,~~ DOE is now the LFA for any emergencies at the site.

#### ACP and Lead Cascade

As discussed in Chapter 8, "Regulatory Activities," the Lead Cascade and the ACP are located at the Portsmouth site and both are subject to NRC's regulatory oversight under their 10 CFR Part 70 NRC licenses. Both are also subject to a 2002 lease between DOE and USEC. Similar to the LFA agreement between the NRC and DOE documented in the 2001 joint procedure discussed above, the NRC and DOE signed an MOU in 2004 addressing the Lead Cascade. In 2007, the NRC and DOE signed an MOU addressing the ACP. Both MOUs designate NRC as the LFA for emergencies at the Portsmouth site, if the emergency pertains to either the Lead Cascade or the ACP.

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: Commissioner Baran

SUBJECT: SECY-15-0100: FINAL REPORT TO CONGRESS ON  
THE HEALTH, SAFETY, AND ENVIRONMENTAL  
CONDITIONS AT THE GASEOUS DIFFUSION PLANTS  
LOCATED NEAR PADUCAH, KENTUCKY, AND  
PORTSMOUTH, OHIO

Approved XX Disapproved \_\_\_\_\_ Abstain \_\_\_\_\_ Not Participating \_\_\_\_\_

COMMENTS: Below XX Attached XX None \_\_\_\_\_

I approve providing to Congress the "U.S. Nuclear Regulatory Commission Final Report to Congress on the Health, Safety, and Environmental Conditions at the Gaseous Diffusion Plants Located near Paducah, Kentucky, and Portsmouth, Ohio," subject to the attached edits.

Entered in STARS

Yes XX  
No \_\_\_\_\_

  
\_\_\_\_\_  
Signature  
9/11/15  
\_\_\_\_\_  
Date

The Honorable Shelley Moore Capito  
Chairman, Subcommittee on Clean Air  
and Nuclear Safety  
Committee on Environment  
and Public Works  
United States Senate  
Washington, DC 20510

Dear Madame Chairwoman:

The Atomic Energy Act of 1954 (AEA) requires the U.S. Nuclear Regulatory Commission (NRC) to periodically send reports to Congress discussing the health, safety, and environmental conditions at the gaseous diffusion uranium enrichment plants (GDPs) located near Paducah, Kentucky, and Portsmouth, Ohio. ~~The previous such report (NRC's Agencywide Documents Access and Management System (ADAMS) Accession No. ML13253A179) covered the period from October 1, 2008, to September 30, 2013, and was sent to the congressional oversight committees on January 13, 2014. Enclosed is the most current report covering the period October 1, 2013, to February 2, 2015 (ADAMS Accession No. ML15173A254).~~

As detailed in the enclosed report, the United States Enrichment Corporation notified the NRC in June 2013 that it was terminating its uranium enrichment activities at the Paducah GDP. The enrichment activities there permanently ceased on July 25, 2013. The NRC terminated the Certificate of Compliance for the Paducah GDP on February 2, 2015. The Certificate of Compliance for the Portsmouth GDP was terminated by the NRC on October 12, 2011 and Federal regulation of activities at the Paducah and Portsmouth sites is now provided by the U.S. Department of Energy (DOE). ~~The Certificate of Compliance for Portsmouth's GDP was terminated by the NRC on October 12, 2011.~~

The enclosed report, for the period from October 1, 2013, to February 2, 2015, will be the final NRC report regarding the GDPs. ~~The enclosed report covers the period from October 1, 2013, to February 2, 2015.~~ As required by the AEA, the preparation of this report has been coordinated with the DOE and the U.S. Environmental Protection Agency.

Sincerely,

Stephen G. Burns

Enclosure:  
Report to Congress

## EXECUTIVE SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) provides this report to Congress pursuant to Section 1701 of the Atomic Energy Act (AEA) that requires NRC reports on the health, safety, and environmental conditions of the gaseous diffusion uranium enrichment plants (GDPs) located near Paducah, Kentucky, and Portsmouth, Ohio. As of July 2013, uranium enrichment operations using the gaseous diffusion process no longer occur in the United States. The NRC terminated the Certificates of Compliance (CoCs) for the Portsmouth ~~GDP in October, 2011~~ and ~~the Paducah GDPs in 2011 and on February 2, 2015, respectively, and Following the termination of the Paducah CoC, NRC~~ no longer regulates any GDP-related activities. Accordingly, this will be the last NRC report on the GDPs. This report covers the time period from October 1, 2013, to February 2, 2015. As directed by the AEA, the NRC staff consulted with the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) in preparing this report. ~~The information within this report is current as of February 2, 2015.~~

The NRC initially issued CoCs to the GDPs in March 1997, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 76, "Certification of Gaseous Diffusion Plants." ~~In October 2011, the NRC terminated the CoC for the Portsmouth GDP. Following termination of the CoC, the DOE began major decontamination and decommissioning activities in most of the Portsmouth GDP buildings.~~ The GDPs had been operated by the United States Enrichment Corporation (USEC), a subsidiary of USEC Inc., its former parent corporation. ~~Note that Following bankruptcy proceedings concluded in 2014, USEC, Inc. now does business as Centrus Energy Corp. (Centrus). The DOE is fully responsible for the regulatory oversight of the Portsmouth GDP. Following termination of the CoC for the Portsmouth GDP in 2011, the DOE began major decontamination and decommissioning activities in most of the Portsmouth GDP buildings.~~

In June 2013, USEC notified the NRC that it was permanently terminating its enrichment activities at the Paducah GDP and began a deactivation process. The Paducah GDP facilities were returned to the DOE on October 21, 2014. The NRC's 10 CFR Part 76 CoC for the Paducah GDP was terminated ~~on February 2, 2015~~, following NRC's confirmation of USEC's compliance with all applicable NRC requirements, and DOE's confirmation that it accepted the return of the leased facilities in accordance with the July 1, 1993, *Lease Agreement Between the United States Department of Energy and the United States Enrichment Corporation*, and its subsequent revisions. Accordingly, the Paducah GDP is now under the DOE's regulatory oversight in conjunction with the EPA and the ~~Commonwealth of Kentucky~~, Department for Environmental Protection, which regulate environmental activities at the site.

The NRC conducted the most recent review of USEC's performance at the Paducah GDP covering the period between January 1, 2011, and December 31, 2012. Such performance reviews were performed every 24 months and were in addition to the required GDP inspections. The NRC did not conduct a performance review for the Paducah GDP during the current reporting period because the NRC conducted routine inspections of USEC's operations at the site during this period and found no issues of concern. The NRC confirmed that the Paducah GDP continued to conduct operations safely and securely while protecting public health and the environment. Between October 1, 2013, and February 2, 2015, ~~when the Paducah CoC was terminated~~, there were no significant events requiring activation of the emergency operations center.

## CHAPTER 1

### INTRODUCTION

During the time that operation of the Paducah and Portsmouth gaseous diffusion plants (GDPs<sup>1</sup>) was regulated by the U.S. Nuclear Regulatory Commission (NRC), each GDP was required to obtain a Certificate of Compliance (CoC) from the NRC pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 76, "Certification of Gaseous Diffusion Plants." The United States Enrichment Corporation (USEC) was the CoC holder of each GDP. Note that USEC is a subsidiary of its former parent corporation USEC, Inc., and that following bankruptcy proceedings concluded in 2014, USEC, Inc. now does business as Centrus Energy Corp. (Centrus).

In June 2013, USEC notified the NRC of its decision to permanently cease uranium enrichment activities at the Paducah GDP. Enrichment activities at the site permanently ceased on July 25, 2013, and by letter to the U.S. Department of Energy (DOE) dated August 1, 2013, USEC gave notice of its intent to terminate the lease of the Paducah GDP. In the early 2000s, a similar decision was made to cease uranium enrichment activities at the Portsmouth GDP, and for many years thereafter this GDP was kept in a cold shutdown condition. In October 2011, the NRC terminated the CoC for the Portsmouth GDP. Accordingly, this will be the last NRC report on the GDPs, and it covers the time period from October 1, 2013, through February 2, 2015.

Located on the site of the Portsmouth GDP is the American Centrifuge Lead Cascade Facility (Lead Cascade) that ~~is~~ continues to be regulated under an NRC license pursuant to 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material." NRC License SNM-7003 for the Lead Cascade was issued in 2004, and USEC Inc. began operating the Lead Cascade in August 2006. American Centrifuge Operating, LLC (ACO), a subsidiary of Centrus, now holds the NRC license for the Lead Cascade. ACO continues to develop replacement uranium enrichment technology involving the use of gas centrifuges, with the purpose of demonstrating that the Lead Cascade's centrifuge enrichment technology can later produce enriched uranium (EU) for commercial use.

In early 2014, the DOE instructed UT-Battelle, LLC (UT-Battelle), the management and operating contractor for the Oak Ridge National Laboratory (ORNL), to assist in developing a path forward for achieving a reliable and economic domestic uranium enrichment capability. The DOE's intent is to promote private sector deployment of the Lead Cascade's enrichment technology, while also supporting national security purposes. Pursuant to those instructions, on May 1, 2014, UT-Battelle and ACO signed an ~~firm fixed-price~~ agreement for continued cascade operations, while scaling back certain core research and technology activities at the Lead Cascade. Under this agreement, ACO provides periodic reports to ORNL regarding Lead Cascade operations. Minor amendments to NRC License SNM-7003 were issued in 2014 to reflect the reduced research and technology activities. ACO continues to operate the Lead Cascade and remains the NRC licensee holder.

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<sup>1</sup> A listing of abbreviations and acronyms can be found in Appendix C.

In 2004, the DOE and the NRC entered into an MOU pertaining to the USEC Inc.'s Lead Cascade located at the Portsmouth GDP. The purpose of the Lead Cascade is to demonstrate that its centrifuge enrichment technology is suitable for commercial use. The MOU delineated the respective regulatory roles and responsibilities of the DOE and the NRC over the Lead Cascade facility. In 2007, the NRC and the DOE entered into a similar MOU covering the ACP. Under the 2007 MOU, the NRC is responsible for ensuring that any future ACP operations are conducted safely and in compliance with NRC requirements. Further details regarding the Lead Cascade and the ACP are provided in Chapter 8 of this report.

In December 2006, the DOE and USEC established *Supplemental Agreement Number 1 to the lease agreement between the United States Department of Energy and the United States Enrichment Corporation*. This supplemental agreement allowed for the long-term leasing of the gas centrifuge enrichment plant facilities.

~~After~~ Since the NRC's termination of USEC's CoC for the Portsmouth GDP on October 12, 2011, all regulation of activities in non-leased areas of this site have been conducted by the DOE. The NRC continues to exercise regulatory authority over the Lead Cascade and the ACP facilities under their respective 10 CFR Part 70 licenses, as described above. ~~After~~ Following the NRC's termination of USEC's CoC for the Paducah GDP on February 2, 2015, the DOE has exercised regulatory oversight ~~there~~ in conjunction with the EPA and the Commonwealth of Kentucky, Department for Environmental Protection, ~~which regulate environmental activities at the site.~~

The NRC terminated the CoC for the Paducah GDP on February 2, 2015, following confirmation of USEC's compliance with all applicable NRC requirements, and DOE's confirmation of its acceptance of the return of the leased facilities in accordance with the 1993 Lease and its subsequent revisions. After USEC's return of the Paducah GDP facilities to DOE and the NRC's termination of the CoC, DOE became the Federal regulator of activities there in conjunction with the EPA and the Commonwealth of Kentucky, Department for Environmental Protection, which regulate environmental activities at the site.

Until December 2013, USEC continued to participate in the commercially financed Government-industry partnership, Megatons to Megawatts Program, in which highly enriched uranium from dismantled Russian nuclear warheads was being processed into low-enriched uranium (LEU) to produce fuel for nuclear power plants in the United States. This program supplied the reactor fuel used to generate nearly 10 percent of U.S. electricity since 1995. The last LEU delivery to the United States from Russia under this partnership arrived in the Port of Baltimore on December 11, 2013.

## CHAPTER 4

### HEALTH, SAFETY, AND ENVIRONMENTAL STATUS

Until the NRC terminated the CoC for the Paducah GDP, the NRC had oversight responsibility to ensure that the health and safety of the public and the workers at the GDPs were protected from hazards involving radioactive material and radiation. The 10 CFR 76.60, "Regulatory Requirements Which Apply," required USEC to comply with applicable sections of 10 CFR Part 20, "Standards for Protection Against Radiation." Health, safety, and environmental conditions were reflected in radiation doses received by workers and in radioactive effluents. This chapter contains information relating to the health, safety, and environmental conditions for the leased areas of the GDPs under NRC regulatory oversight. The DOE was contacted in the preparation of this report, and the input from DOE is included as Appendix A to this report, "Summary of DOE Activities at the Paducah and Portsmouth Gaseous Diffusion Plant."

DOE and USEC maintained onsite and offsite environmental dosimeters to monitor gamma radiation levels at the Paducah GDP. Table 4-1 provides the maximum offsite individual doses for the Paducah GDP for calendar year (CY) 2013 only for both USEC and DOE operations combined. Data for CYs 2014 and 2015 will could not be provided in this report; although the CY 2014 environmental dosimeter data has been collected and analyzed, the modeling to calculate off-site personnel dose will not be available until October 2015 as part of Paducah's Annual Site Environmental Report (ASER) for CY 2014. The CY 2015 data will not be calculated and available until October 2016, when the next Paducah Site ASER is to be released, and will be based on data from DOE only. However, based on the historical data for the site, and given USEC's shutdown of enrichment operations at the site in 2013, the NRC does not expect that these gamma radiation levels will exceed the regulatory limit of 1 millisievert (mSv)/year (100 millirem (mrem)/year) for members of the public, as specified in 10 CFR Part 20.

Data from the environmental dosimeters at Paducah show that ambient gamma exposure levels at the site boundaries for CY 2013 were very small and well within the NRC's regulatory limits. Maximum annual doses to the nearest offsite individuals from exposure to radioactive effluents from Paducah operations for CY 2013 were calculated to be  $3.0 \times 10^{-4}$  millisievert (mSv) (0.03 millirem (mrem)), which is far below the NRC regulatory limit of 1 mSv/year (100 mrem/year) for members of the public, as specified in 10 CFR Part 20.

Table 4-1  
Maximum Offsite Individual Dose at the Paducah GDP, 2013–2015

Calendar Year	Paducah Maximum Offsite Dose, mSv/yr (mrem/yr) <sup>a</sup> Airborne Emissions
2013	$3.0 \times 10^{-4}$ (0.03)
2014	Not Available
2015 <sup>b</sup>	Not Available

<sup>a</sup> Sv—Sievert; rem—röntgen equivalent man

<sup>b</sup> Plant not in operations

Radiological exposures to the public at the GDP sites are not limited to those arising from past USEC operations. DOE continues to conduct operations at both Paducah and Portsmouth. Table 4-2 shows the maximum collective doses from all plant effluents (covering both USEC and DOE operations) to the population within an 80-kilometer (km) (50-mile [mi]) radius for the Paducah GDP for CY 2013 only. For the reasons previously stated in this chapter, data for CYs 2014 and 2015 will could not be provided in this report. ~~These exposures are also very low.~~

**Table 4-2**  
Collective 80-km (50-mi) Population Doses, at Paducah (2013–2015)

Calendar Year	Collective 80-km (50-mi) Population Dose, person-Sv (person-rem)
2013	$2.0 \times 10^{-3}$ (0.2)
2014	Not Available
2015*	Not Available

\* Plant not in operations

Table 4-3 provides collective occupational and maximum individual occupational radiation dose for USEC employees at the Paducah GDP.

**Table 4-3**  
Collective and Maximum Individual Occupational Dose, at Paducah (2013–2015)

Calendar Year	Paducah	
	Collective Occupational Dose, person-Sv (person-rem)	Maximum Individual Occupational Dose, Sv (rem)
2013	$4.6 \times 10^{-2}$ (4.576)	$1.49 \times 10^{-3}$ (0.149)
2014	$7.6 \times 10^{-3}$ (0.765)	$4.3 \times 10^{-5}$ (0.043)
2015*	N/A	N/A

\* Plant not in operations

The radiation exposures data indicate that for the respective reporting periods, individual worker exposures at the Paducah GDP did not exceed 5 mSv (500 mrem), which was the administrative control level at the Paducah GDP. These values are within the historical ranges for both GDP sites, and well within the NRC regulatory limit of 50 mSv/year (5000 mrem/year) specified in 10 CFR Part 20 for workers. There were no instances where the 10 CFR Part 20 individual limits for workers, including the 10 milligrams (0.000353 ounce) intake of soluble uranium per week, were exceeded.

## CHAPTER 5

### CERTIFICATION ACTIVITIES

The requirements in 10 CFR 76.45, "Application for Amendment of Certificate," state the process for amending the CoCs to cover new or modified activities. The NRC may also impose additional requirements by issuing orders and/or adding conditions to the CoC.

#### Amendments to the Paducah GDP Certificate

From October 1, ~~2013~~, through February 2, 2015, USEC requested and was granted ~~16~~ three amendments to its Paducah CoC. ~~Most of the requests were administrative in nature, but some amendments were required because USEC sought to modify one or more TSRs. Three amendments were issued between October 1, 2013, and February 2, 2015.~~ These amendments addressed the reduced operations and staffing during the GDP deactivation process, and the last amendment terminated the CoC.

#### Orders Issued to the Paducah GDP During This Reporting Period

No Orders were issued by the NRC to the Paducah GDP between October 1, 2013, and February 2, 2015.

#### 2013 Certificate Renewal Application for the Paducah GDP

On April 2, 2013, in accordance with 10 CFR 76.31, USEC submitted to the NRC its application for renewal of the Paducah GDP CoC that had been issued in 2008. USEC's renewal application relied on existing documentation. USEC did not request any changes to the application in the renewal request. After the NRC staff performed an acceptance review of the renewal application and found it acceptable for docketing, the NRC published a notice in the *Federal Register* on May 24, 2013 (78 FR 30342), acknowledging receipt of the application and providing an opportunity for public comment.

In a letter dated June 3, 2013, in accordance with 10 CFR 76.66(b), USEC notified the NRC of its decision to terminate its uranium enrichment operations at the Paducah GDP. Total shut down of enrichment activities at the plant was completed on July 25, 2013. In its June 3, 2013, letter, USEC stated that it planned to continue managing its inventory of NRC-regulated material and conduct clean-up related activities under its existing certificate before returning the Paducah GDP facilities to DOE. On August 1, 2013, USEC provided the DOE with a 2-year notice of its intent to terminate its lease of the GDP.

Due to USEC's decision to terminate enrichment activities at the Paducah GDP and its intention to return the leased facilities there to DOE, the NRC suspended the review of USEC's CoC renewal application and placed USEC's application on timely renewal status pursuant to 10 CFR 76.55. In accordance with 10 CFR 76.55, if a sufficient application for a CoC is timely filed, the existing CoC does not expire until a final determination on the application is made by the NRC. Therefore, USEC's activities at the Paducah GDP continued to be governed by the 2008 CoC, under which the NRC continued to monitor USEC's security and control of nuclear material, and its decontamination, decommissioning, and waste disposal activities. The NRC's regulatory authority was transferred to the DOE when the CoC was terminated on February 2, 2015.

## CHAPTER 6

### INSPECTIONS

Provisions in Subpart F, "Reports and Inspections" of 10 CFR Part 76, govern the NRC inspections of the GDPs. Based on such inspections, as documented in inspection reports, the NRC has authority to take enforcement action and issue civil penalties for violations of the AEA, NRC regulations, orders, or other applicable requirements. NRC provisions governing such actions are in 10 CFR Part 76, Subpart G, "Enforcement," and in 10 CFR Part 2, "Agency Rules for Practice and Procedure," among others.

Violations are enforcement actions identified during NRC inspections that are classified into one of four severity levels (SLs), with SL I assigned to the most significant violations and SL IV being assigned to the least significant. Additionally, there are violations characterized as "non-cited" violations (NCV) that are identified and promptly corrected by the licensee or CoC holder. NCVs are considered nonrecurring SL IV violations, corrected without NRC involvement and not subject to formal enforcement action. Finally, there are other violations of minor safety or environmental significance that are below SL IV. These violations must meet certain criteria and are generally not documented in NRC inspection reports.

More significant violations, identified as escalated enforcement actions, include: (1) SL I, II, and III notices of violation (NOVs); (2) civil penalties; and (3) orders to modify, suspend, or revoke NRC licenses or the authority to engage in NRC-licensed activities (may be issued for substantial safety concerns). More information about the NRC's enforcement policy is provided on the NRC Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement.html>.

As further detailed in Table 6-1 below, during the October 1, 2013, to February 2, 2015, reporting period, the NRC performed a total of 12 inspections at the Paducah GDP. These inspections were conducted by inspectors from the NRC's Region II and the headquarters' offices. The results of each inspection are documented in NRC inspection reports. Each report describes the completion of multiple inspection procedures of various disciplines by the resident inspectors, regional inspectors, and/or headquarters inspectors.

**Table 6-1**  
Number of Inspections and Inspection Hours Spent at the Paducah GDP

Fiscal Year	Paducah	
	Number of Inspections	Number of Inspection Hours
2014	11	346
2015*	1	39
<b>Total</b>	<b>12</b>	<b>385</b>

\*For the period covering October 1, 2014, until February 2, 2015

The weather and ambient condition event involved the declaration of an alert due to an EF-2 level tornado that passed within the controlled access area. The tornado caused flying debris, damage to plant buildings and structures, and damage in the switchyards that resulted in a loss of power throughout sections of the site. The high pressure fire water system experienced a breach, which caused the storage tank water level to drop. The breach was isolated and the tank water level was restored. A section of perimeter fencing and lighting was damaged, resulting in security contingency measures being put in place until repairs were made. There were no injuries and no hazardous or radiological material released. Security of the site and sensitive areas was maintained throughout the event. The alert was terminated after completion of a security check of the site perimeter and a compilation of the damages sustained by the site.

## CHAPTER 9

### CONSULTATION WITH DOE AND EPA

The AEA, as amended, requires that the NRC report to Congress, in consultation with the EPA and DOE, on the status of health, safety, and environmental conditions at the GDPs, no later than the date on which a CoC is issued.

#### Consultation with DOE

During this reporting period, the DOE Portsmouth/Paducah Project Office informed the NRC that it continued to discharge its regulatory and oversight responsibilities at the Paducah and Portsmouth GDP sites. ~~DOE conducted its activities in a manner to enhance and improve health, safety, and environmental conditions and achieve compliance with all applicable Federal and State laws and regulations.~~ In those instances where potential violations of these laws and regulations were identified, actions were taken to notify appropriate authorities, identify the cause, and institute corrective measures.

DOE requires an annual site environmental report from each of the sites operating under its authority that presents the results from the various environmental monitoring programs and activities carried out during the year. These reports are public documents that are distributed to government regulators, businesses, ~~special interest groups,~~ and members of the public. The annual site environmental report for DOE activities at the Portsmouth GDP is located at <http://energy.gov/pppo/downloads/portsmouth-annual-site-environmental-reports>. The annual site environmental report for DOE activities at the Paducah GDP is located at <http://energy.gov/pppo/downloads/paducah-annual-site-environmental-reports>.

#### Consultation with EPA

##### The Paducah GDP

On April 22, 2015, the EPA informed the NRC that its data for the period beginning October 1, 2013, indicates that the Paducah GDP had a pattern of continued noncompliance under the Clean Water Act (CWA) with one quarter in significant noncompliance (SNC) and a period of noncompliance for the past five quarters. For the period prior to October 1, 2013, EPA data also showed noncompliance including additional periods of SNC. In addition to monitoring self-reporting from Paducah, the Commonwealth of Kentucky has regularly conducted CWA inspections, including an evaluation inspection and a sampling inspection in August 2013 and in August 2014. Furthermore, Kentucky has issued four Notice of Noncompliance letters since December 10, 2013, with the latest issued on February 25, 2015. Based on EPA's current review of its available data, Paducah appears to be having continued CWA compliance challenges.

## CHAPTER 11

### LEAD FEDERAL AGENCY/EMERGENCY COORDINATION

#### GDPs

In the 2001, *Joint Procedure between the U.S. Department of Energy (DOE) and the U.S. Nuclear Regulatory Commission (NRC) on Response to Emergencies in the Leased Areas at the Gaseous Diffusion Plants (GDPs)*, the DOE and the NRC agreed that the NRC was to be the initial ~~lead~~-LFA for events at the GDPs having actual or potential adverse impacts on safety and/or common defense and security. However, following the return of the leased GDP buildings to DOE, and the termination of the Paducah CoC on February 2, 2015, the NRC no longer regulates activities at the Paducah GDP.

Accordingly, ~~the NRC is no longer the LFA for emergencies that may occur at the Paducah GDP facilities. Following the return of the leased facilities to the DOE and the termination of the CoC,~~ DOE is now the LFA for any emergencies at the site.

#### ACP and Lead Cascade

As discussed in Chapter 8, "Regulatory Activities," the Lead Cascade and the ACP are located at the Portsmouth site and both are subject to NRC's regulatory oversight under their 10 CFR Part 70 NRC licenses. Both are also subject to a 2002 lease between DOE and USEC. Similar to the LFA agreement between the NRC and DOE documented in the 2001 joint procedure discussed above, the NRC and DOE signed an MOU in 2004 addressing the Lead Cascade. In 2007, the NRC and DOE signed an MOU addressing the ACP. Both MOUs designate NRC as the LFA for emergencies at the Portsmouth site, if the emergency pertains to either the Lead Cascade or the ACP.

## APPENDIX A

### SUMMARY OF DOE ACTIVITIES AT THE PADUCAH AND PORTSMOUTH GASEOUS DIFFUSION PLANTS

The U.S. Department of Energy (DOE) activities at the Paducah Gaseous Diffusion Plant (GDP) between October 1, 2013, and February 2, 2015, are described below.

#### Inspection and Investigation Activities at Paducah

- Participated in a full participation emergency management exercise at the Paducah GDP. (FY 2013)
- Inspected USEC's activities implemented to meet the Arming and Arrest Authority Security Plan requirements to ensure that the activities are being conducted safely and in accordance with the requirements of the DOE-USEC Regulatory Oversight Agreement, Exhibit D of the Lease Agreement between DOE and USEC, dated July 1, 1993, as amended. One item that was identified to be in non-compliance was a random drug test collection that was performed incorrectly. Normally this item would have been cited as a Notice of Violation ~~(NOV)~~. However, the item was immediately resolved and there was no evidence of any further non-compliance; therefore, it was recorded as a Non-cited Violation ~~(NGV)~~. (FY 2014)
- Inspected USEC's activities implemented to meet the Arming and Arrest Authority Security Plan requirements to ensure that the activities are being conducted safely and in accordance with the requirements of the DOE-USEC Regulatory Oversight Agreement, Exhibit D of the Lease Agreement between DOE and USEC, dated July 1, 1993, as amended. All open issues from previously inspections were satisfactorily closed and no new issues were identified. (FY 2015)

#### ~~Overall Status of the Paducah and Portsmouth GDPs~~

~~During this reporting period, the DOE Paducah/Portsmouth Project Office continued to discharge its regulatory and oversight responsibilities at the Paducah and Portsmouth GDPs. DOE conducted its activities in a manner to enhance and improve environmental safety and health conditions and achieve compliance with all applicable Federal and State laws and regulations. In those instances where potential violations of these laws and regulations were identified, actions were taken to notify appropriate authorities, identify the cause, and institute corrective measures.~~

## APPENDIX B

### SUMMARY OF AGREEMENTS REGARDING THE PADUCAH AND PORTSMOUTH GASEOUS DIFFUSION PLANTS

#### I. Agreements Between the U.S. Department Of Energy (DOE) and the U.S. Nuclear Regulatory Commission (NRC) Describing Interface and Responsibilities at the Paducah and Portsmouth Gaseous Diffusion Plants (GDPs)

- Joint Statement of Understanding Between the Nuclear Regulatory Commission and the Department of Energy on Implementing the Energy Policy Act Provisions on the Regulation of Gaseous Diffusion Uranium Enrichment Plants, dated December 1993.
- Agreement Establishing Guidance for NRC Inspection Activities at the Paducah and Portsmouth Gaseous Diffusion Plants between Department of Energy Regulatory Oversight Manager and Nuclear Regulatory Commission, dated August 1994.
- Agreement for the Conduct of Inspection Activities at the Gaseous Diffusion Plants, dated October 1994.
- Agreement Defining Security Responsibilities at the Paducah and Portsmouth Gaseous Diffusion Plants between the Department of Energy Office of Safeguards and Security and the Nuclear Regulatory Commission's Division of Security, dated March 1995.
- Memorandum of Understanding between the Department of Energy and the Nuclear Regulatory Commission - Cooperation Regarding the Gaseous Diffusion Plants, dated October 1997.
- Joint Procedure Between the U.S. Department of Energy and the U.S. Nuclear Regulatory Commission- Response to Emergencies in the Leased Areas at the Gaseous Diffusion Plants, dated February 2001.
- Memorandum of Understanding Between the Department of Energy and the Nuclear Regulatory Commission on Cooperation Regarding the Gas Centrifuge Lead Cascade Facilities at the Portsmouth Gaseous Diffusion Plant Site, dated March 2004.
- Memorandum of Understanding Between the Department of Energy and the Nuclear Regulatory Commission on Cooperation Regarding the American Centrifuge Plant in Piketon, Ohio, dated April 2007

#### II. Agreements between DOE and USEC for the Paducah and Portsmouth GDPs

- Lease Agreement Between the United States Department of Energy and the United States Enrichment Corporation, dated July 1, 1993.

- Lease Agreement Between the United States Department of Energy and the United States Enrichment Corporation for the Gas Centrifuge Enrichment Plant, dated December 7, 2006.

### III. Agreements between DOE and USEC related to Depleted Uranium Management and Disposition at Paducah and Portsmouth

- The *Memorandum of Agreement Between the United States Department of Energy and the United States Enrichment Corporation Relating to Depleted Uranium*, dated June 30, 1998; the *Agreement Between the U.S. Department of Energy (DOE) and USEC Inc. (USEC)*, dated June 17, 2002; the *Cooperative Agreement Between Department of Energy and USEC Inc. Concerning the American Centrifuge Demonstration Project*, dated March 23, 2010; the contract between DOE and USEC for DOE acquisition of separative work unit (SWU), dated March 13, 2012; and the *Cooperative Agreement Between Department of Energy and USEC, Inc. and American Centrifuge Demonstration, LLC, Concerning the American Centrifuge Cascade Demonstration Test Program*, dated June 12, 2012.
- The *Memorandum of Agreement Between the United States Department of Energy and the United States Enrichment Corporation Relating to Depleted Uranium*, dated June 30, 1998 provided for the transfer to DOE of 2,026 48G cylinders containing approximately 16,674,000 Kg of DU generated by USEC's operations. In accordance with the agreement, USEC made the required full payment of over \$50M to DOE, covering the entire quantity of DU to be transferred. Therefore, the liability to dispose of the full amount of USEC's DU specified in the agreement now rests with DOE, further reducing the quantity of DU to be ultimately disposed of by USEC. Within these major parameters of the agreement, USEC and DOE agreed to implement the actual transfer of the material on a schedule covering the period of FY 1999 through 2004. This agreement is complete and no further action is required.
- The *Agreement Between the U.S. Department of Energy (DOE) and USEC Inc. (USEC)*, dated June 17, 2002, provided, in part, for the DOE taking title to DU from USEC operations during USEC's FYs 2002 and 2003 and one-half the amount of DU generated during USEC's FYs 2004 and 2005. Therefore, as a result of this June 17, 2002, agreement, USEC's liability associated with the disposal of USEC generated DU was reduced by the quantity of DU specified in this June 17, 2002, agreement.
- The *Cooperative Agreement Between Department of Energy and USEC Inc. Concerning the American Centrifuge Demonstration Project*, dated March 23, 2010, transferred title to 13,312,411 kg of DU from USEC to DOE to enable USEC to release encumbered funds to support continued development and demonstration of the American Centrifuge technology. In 2012, DOE and USEC entered into a contract in which DOE acquired SWU in exchange for DOE's accepting title to, and eventual disposal responsibility for 13,073,045 kg of DU.