

DOE/EIS-0359

**FINAL ENVIRONMENTAL IMPACT
STATEMENT FOR CONSTRUCTION
AND OPERATION OF A DEPLETED URANIUM
HEXAFLUORIDE CONVERSION FACILITY
AT THE PADUCAH, KENTUCKY, SITE**

Volume 2: Comment and Response Document

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U.S. Department of Energy
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COVER SHEET

RESPONSIBLE FEDERAL AGENCY: U.S. Department of Energy (DOE)

TITLE: Final Environmental Impact Statement for Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Paducah, Kentucky, Site (DOE/EIS-0359)

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ABSTRACT: The U.S. Department of Energy (DOE) proposes, via a contract awarded at the direction of Congress (Public Law 107-206), to design, construct, and operate two conversion facilities for converting depleted uranium hexafluoride (commonly referred to as DUF₆): one at Portsmouth, Ohio, and one at Paducah, Kentucky. DOE intends to use the proposed facilities to convert its inventory of DUF₆ to a more stable chemical form suitable for beneficial use or disposal. This site-specific EIS considers the construction, operation, maintenance, and decontamination and decommissioning (D&D) of the proposed DUF₆ conversion facility at three locations within the Paducah site; transportation of depleted uranium conversion products and waste materials to a disposal facility; transportation and sale of the hydrogen fluoride (HF) produced as a conversion co-product; and neutralization of HF to calcium fluoride (CaF₂) and its sale or disposal in the event that the HF product is not sold. This EIS also considers a no action alternative that assumes continued storage of DUF₆ at the Paducah site. A separate EIS has been prepared for the proposed facility at Portsmouth (DOE/EIS-0360). DOE's preferred alternative is to construct and operate the conversion facility at Location A within the Paducah site. DOE plans to decide where to dispose of depleted U₃O₈ conversion product after additional appropriate NEPA review.

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NOTATION

The following is a list of acronyms and abbreviations, chemical names, and units of measure used in this document.

GENERAL ACRONYMS AND ABBREVIATIONS

ACEP	American Centrifuge uranium enrichment plant
ALARA	as low as reasonably achievable
ANL	Argonne National Laboratory
ANP	Advanced Nuclear Power, Inc.
ATSDR	Agency for Toxic Substances and Disease Registry
BAT	best available technologies
CAP	Citizen's Advisory Panel
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
D&D	decontamination and decommissioning
DCG	derived concentration guide
DEIS	Draft Environmental Impact Statement
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ERDA	U.S. Energy Research and Development Administration
ETTP	East Tennessee Technology Park (formerly K-25 site)
FOCI	Foreign Ownership, Control and Influence
FR	<i>Federal Register</i>
GDP	gaseous diffusion plant
HP	health physics
ICRP	International Commission on Radiological Protection
KDWM	Kentucky Division of Waste Management
KPDES	Kentucky Pollutant Discharge Elimination System

LEU	low enriched uranium
LLW	low-level waste
LOC	Local Oversight Committee
MEI	maximally exposed individual
NAAQS	National Ambient Air Quality Standard(s)
NEPA	National Environmental Policy Act
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NIOSH	National Institute of Occupational Safety and Health
NRC	U.S. Nuclear Regulatory Commission
NTS	Nevada Test Site
ODNR	Ohio Department of Natural Resources
ORC	Ohio Revised Code
ORNL	Oak Ridge National Laboratory
ORO	Oak Ridge Operations
ORSSAB	Oak Ridge Site Specific Advisory Board
PACE	Paper, Allied-Industrial, Chemical and Energy International Union
PEIS	Programmatic Environmental Impact Statement
PGDP	Paducah Gaseous Diffusion Plant
P.L.	Public Law
PM ₁₀	particulate matter with a mean aerodynamic diameter of 10 μm or less
PM _{2.5}	particulate matter with a mean aerodynamic diameter of 2.5 μm or less
PORTS	Portsmouth Gaseous Diffusion Plant
PRESS	Portsmouth/Pikeeton Residents for Environmental Safety and Security
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SMR	steam methane reforming
SODI	Southern Ohio Diversification Initiative
TDEC	Tennessee Department of Environment and Conservation
TDS	total dissolved solids
TEPP	Transportation Emergency Preparedness Program
UDS	Uranium Disposition Services, LLC
USEC	United States Enrichment Corporation
WAC	waste acceptance criteria

CHEMICALS

CaF ₂	calcium fluoride
DU	depleted uranium
DUF ₆	depleted uranium hexafluoride
HF	hydrogen fluoride
NH ₃	ammonia
NO _x	nitrogen oxides
Np	neptunium
Pu	plutonium
TCE	trichloroethylene
TRU	transuranic(s)
U ₃ O ₈	triuranium octaoxide
UF ₄	uranium tetrafluoride

UNITS OF MEASURE

°C	degree(s) Celsius	kg	kilogram(s)
Ci	curie(s)	km	kilometer(s)
cm	centimeter(s)	km ²	square kilometer(s)
		kPa	kilopascal(s)
d	day(s)		
dB	decibel(s)	L	liter(s)
dB(A)	A-weighted decibel(s)	lb	pound(s)
°F	degree(s) Fahrenheit	m	meter(s)
ft	foot (feet)	m ²	square meter(s)
ft ²	square foot (feet)	m ³	cubic meter(s)
ft ³	cubic foot (feet)	MeV	million electron volts
		mg	milligram(s)
g	gram(s)	mi	mile(s)
gal	gallon(s)	mi ²	square mile(s)
		min	minute(s)
h	hour(s)	mL	milliliter(s)
ha	hectare(s)	mph	mile(s) per hour
		mR	milliroentgen(s)
in.	inch(es)	mrem	millirem(s)
in. ²	square inch(es)	mSv	millisievert(s)

MVA	megavolt-ampere(s)	rem	roentgen equivalent man
MW	megawatt(s)		
MWh	megawatt-hour(s)	s	second(s)
		Sv	sievert(s)
nCi	nanocurie(s)		
		t	metric ton(s)
oz	ounce(s)	ton(s)	short ton(s)
		wt%	percent by weight
pCi	picocurie(s)	yd ³	cubic yard(s)
ppb	part(s) per billion	yr	year(s)
ppm	part(s) per million		
psia	pound(s) per square inch absolute	μg	microgram(s)
psig	pound(s) per square inch gauge	μm	micrometer(s)

1 PUBLIC REVIEW OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENTS

On November 28, 2003, a Notice of Availability was published by the U.S. Environmental Protection Agency (EPA) in the *Federal Register* (68 FR 66824) for two draft environmental impact statements (EISs) evaluating the construction and operation of depleted uranium hexafluoride (DUF₆) conversion facilities at the Portsmouth, Ohio, site (DOE EIS/0360), and the Paducah, Kentucky, site (DOE/EIS-0359). In accordance with Council on Environmental Quality (CEQ) and U.S. Department of Energy (DOE) National Environmental Policy Act (NEPA) regulations, the two site-specific conversion facility EISs were distributed to interested agencies, organizations, and the general public to allow them to provide oral and written comments.

This volume contains the comments received during the review period and DOE's responses to those comments. Because of the similarities in the proposed actions and the applicability of many of the comments to both sites, all comments received on the Portsmouth and Paducah EISs are included in this volume. Consequently, this comment response volume is the same for both the Paducah and Portsmouth conversion facility EISs. All comments received were considered in the preparation of both final EISs, regardless of whether they were submitted in response to one or both of the conversion facility EISs.

The remainder of this chapter contains an overview of the public review process and summarizes the most common concerns raised by reviewers. Chapter 2 contains an index of the reviewers, as well as copies of the actual letters or other documents containing public comments on the draft EISs that were submitted to DOE (including comments extracted from the transcripts of the public hearings). Chapter 3 contains the DOE responses to each of the comments received.

1.1 OVERVIEW OF THE PUBLIC REVIEW PROCESS

Details concerning the public review process are described in a Communications Plan prepared for each EIS (Avci 2003). The communications plans outline the general approach that was followed, delineate the roles and responsibilities of the organizations involved in the preparation and distribution of the EISs, and include the draft EIS distribution lists for Congressmen, governors, tribal leaders, Federal agencies, environmental groups, and other stakeholders.

The two draft site-specific conversion facility EISs were mailed to stakeholders in late November 2003, with the Notice of Availability published on November 28, 2003. In addition, each EIS was made available in its entirety on the Internet at the same time, and e-mail notification was sent to those on the project Web site mailing list. Stakeholders were encouraged to provide comments on the draft EISs during a 67-day review period, from November 28, 2003, until February 2, 2004.

To facilitate public involvement, there were a variety of ways to submit comments on the draft EISs. Comments could be submitted by calling a toll-free telephone number, by toll-free fax, by letter, by e-mail, or through the project Web site (<http://web.ead.anl.gov/uranium/eis/>).

Three public hearings were also held during the review period. The public hearings were held near Portsmouth, Ohio, on January 7, 2004; Paducah, Kentucky, on January 13, 2004; and Oak Ridge, Tennessee, on January 15, 2004. The public hearings were announced on the project Web site and in local newspapers prior to the meetings. The hearings on the draft EISs were an important component in DOE's continuing efforts to provide the public with opportunities to participate in the decision-making process. An independent facilitator conducted the hearings, which included a presentation by the DOE document manager, a question and answer period, and an oral comment session where reviewers were invited to formally enter their comments into the public record. Transcripts of the public hearing proceedings were recorded by a court reporter and are available on the project Web site (<http://web.ead.anl.gov/uranium/eis/>).

1.2 COMMENTS ON THE DRAFT EIS REPORTS

A total of about 210 comments contained in 34 submissions were received during the comment period (including both EISs). As noted above, because of the similarities in the proposed actions and the applicability of many of the comments to both sites, all comments received on the Portsmouth and Paducah EISs are included in this volume and were considered in the preparation of both final EISs. Comments were received from individuals, Federal and State agencies, local governments, and nongovernmental organizations such as businesses and environmental groups.

Chapter 2 of this volume provides copies of the actual letters or other documents containing public comments on the draft EISs that were submitted to DOE (including comments extracted from the transcripts of the public hearings). Each submission was assigned a document number. For those documents containing comments, each individual comment was delineated and assigned a unique identification number. This ensured that the comment tracking system tracked each comment, not just the document itself. It also provided DOE with greater detail regarding the number of comments submitted and the number of documents received.

Chapter 3 of this volume contains the DOE responses to each of the comments received. Where applicable, the responses identify specific chapters, sections, or appendices in the Final EISs that address the issue(s) raised in the comments. The most common issues raised are summarized in Section 1.3.

1.3 COMMON ISSUES RAISED BY REVIEWERS

Specific responses to each comment received on the draft EISs are presented in Chapter 3 of this volume; a summary of the most common issues raised by the reviewers and the general DOE responses to these issues are listed below:

- *Comments related to the proposed action and preferred alternative.* Numerous reviewers expressed support for the DOE conversion project in general and agreement with the preferred alternatives identified in the draft EISs. Reviewers stressed the importance of meeting the requirements of Public Law (P.L.) 107-206, as well as the consent orders that DOE has signed with each of the affected states.

DOE appreciates support for the conversion project, and is committed to complying with all applicable regulations, agreements, and orders.

- *Comments related to transportation of cylinders.* Several reviewers raised concerns over the safe transportation of cylinders from the East Tennessee Technology Park (ETTP) (formerly K-25) site. Common themes included a preference for the use of overpacks, opposition to transporting noncompliant cylinders “as-is” under a U.S. Department of Transportation (DOT) exemption, a general desire that shipments be made in a manner protective of health and safety, and questions concerning the potential use of barge transportation.

DOE is committed to conducting all transportation activities in a manner protective of human health and safety and in compliance with all applicable regulations. A Transportation Plan will be developed for each shipping program related to the DUF₆ conversion facility project. Each Plan will be developed to address specific issues associated with the commodity being shipped, the origin and destination points, and the concerns of jurisdictions transited by the shipments. In all cases, DOE-sponsored shipments will comply with all applicable State and Federal regulations, and these regulations will be reflected in many of the operational decisions that will be made and presented in the Plan. The transportation regulations are designed to be protective of public health and safety during both accident and routine transportation conditions.

To allow flexibility in planning and future operations, the transportation analysis in each EIS evaluates a range of options for cylinder preparation and transport modes. For example, all three options for shipping noncompliant cylinders, including obtaining a DOT exemption, using overpacks, and transferring the contents from noncompliant to compliant cylinders, are evaluated in the EISs, as are both truck and rail modes. Because barge transport has not been proposed as part of the current conversion facility project and for the reasons discussed in Section 2.3.5 of each EIS, a detailed evaluation has not been included in the Final EISs. If barge transportation was proposed in the future, additional NEPA review would be conducted.

- *Comments related to removal of cylinders from the ETTP site.* Several reviewers stressed the importance of DOE compliance with the 1999 consent order with the Tennessee Department of Environment and Conservation that

requires the removal of the DUF₆ cylinders from the ETTP site or the conversion of the material by December 31, 2009.

DOE is committed to complying with the 1999 consent order. Toward that end, the DOE contract for accelerated cleanup of the ETTP site, including removal of the DUF₆ cylinders, calls for completion of this activity by the end of Fiscal Year (FY) 2008.

- *Comments related to the potential for DOE to receive additional DUF₆ cylinders from other sources.* Several reviewers noted that DOE may receive additional DUF₆ cylinders from other sources, including continued United States Enrichment Corporation (USEC) operations, the proposed American Centrifuge Facility at the Portsmouth site, or a new commercial enrichment facility. Some reviewers requested that DOE design the conversion facilities to accommodate such an increase.

At the present time, there are no plans or proposals for DOE to accept DUF₆ cylinders for conversion beyond the current inventory for which it has responsibility. However, Section 2.2.7 of the Portsmouth EIS and Section 2.2.5 of the Paducah EIS discuss a number of possible future sources of additional DUF₆ that could require conversion. The potential environmental impacts associated with expanding plant operations (either by extending operations or increasing the throughput) to accommodate processing of additional cylinders are discussed in Section 5.2.8 of the Portsmouth EIS and Section 5.2.6 of the Paducah EIS. Because of the uncertainty associated with possible future sources of DUF₆ for which DOE could assume responsibility, there is no current proposal to increase the throughputs of the conversion facilities. As part of the potential impacts associated with expanded plant operations, Section 5.2.8 of the Portsmouth EIS also discusses potential impacts that would be associated with a conversion facility consisting of four process lines rather than three. If a decision is made in the future to increase the number of parallel process lines beyond four at either site, additional NEPA review would be conducted.

- *Comments related to USEC's American Centrifuge Facility.* Several reviewers noted the January 2004 announcement by USEC that the American Centrifuge Facility would be sited at Portsmouth, and stated that the EISs should be revised accordingly, including consideration of the facility under Portsmouth cumulative impacts.

The two site-specific conversion facility EISs have been revised to reflect that USEC announced that Portsmouth has been selected as the site for its American Centrifuge Facility. Although Location B is the likely site for construction of the centrifuge facility, it has been retained in the final Portsmouth conversion EIS as a siting alternative. The cumulative impacts analysis included in both the draft and final Portsmouth conversion facility

EIS assumed that a new USEC centrifuge enrichment facility would be constructed and operated at the Portsmouth site (see Sections S.5.16 and 5.3.2). As stated in Sections S.5.16 and 5.3.2, the analysis assumed that such a plant would be sited at Portsmouth, that the existing DOE gas centrifuge technology would be used, and that the environmental impacts of such a facility would be similar to those outlined in a 1977 EIS for Expansion of the Portsmouth Gaseous Diffusion Plant that considered a similar action that was never completed (Energy Research and Development Administration [ERDA] 1977). It should be noted that the U.S. Nuclear Regulatory Commission licensing activities for the proposed centrifuge enrichment plant will include preparation of an environmental impact statement that must also evaluate cumulative impacts at the Portsmouth site. The centrifuge enrichment facility cumulative impacts analysis will be based on the anticipated USEC enrichment facility design, which does not currently exist, and will benefit from the detailed evaluation of conversion facility impacts presented in this EIS.

- *Comments related to current cylinder management.* Several reviewers raised questions and concerns about the current management of the cylinders at the three DOE storage sites.

In response to these concerns, DOE emphasizes that its current cylinder management program provides for safe storage of the depleted UF₆ cylinders. DOE is committed to the safe storage of the cylinders at each site through the implementation of the decision made in the Record of Decision to be issued following this EIS. DOE has an active cylinder management program designed to ensure the continued safety of cylinders until conversion is accomplished.

- *Comments related to the health and safety of workers and the general public during construction and operation of the conversion facilities.*

The construction and operation of the conversion facilities will be conducted with a commitment to keeping workers, the public, and the environment safe. First, DOE will maintain compliance with all applicable health and safety regulations to keep worker exposures to radiation, chemicals, and physical hazards at low levels. Wherever possible, the conversion process will be automated and enclosed so that no worker exposures occur (this will particularly limit exposures to dusts). Workers who may come in contact with radioactive materials will wear radiation dosimeters so that individual exposures can be monitored and controlled to remain at low, health-protective levels.

The EISs include detailed evaluations of the potential impacts to human health and safety, including impacts to workers directly involved in conversion facility operations, other workers located at the sites, as well as members of

the public living around the sites. The EISs consider exposures to not only depleted uranium compounds but also other chemicals used in the conversion process and by-products of conversion. In the Paducah EIS, potential health and safety impacts during operations are discussed in Sections 5.2.2.1 and 5.2.2.2 for routine conditions and accidents, respectively. In the Portsmouth EIS, potential health and safety impacts during operations are discussed in Sections 5.2.3.1 and 5.2.3.2 for routine conditions and accidents, respectively. The results of the analyses indicate that the risks to human health and safety are expected to be low and well within applicable limits and regulations.

1.4 REVISIONS TO THE DRAFT EIS REPORTS

Several revisions were made to the two site-specific conversion facility draft EISs on the basis of the comments received (changes are indicated by vertical lines in the right margins of the documents). The vast majority of the changes were made to provide clarification and additional detail. The changes made in response to public comments did not affect the assessment scope or type, or the overall significance of the environmental impacts presented in the draft EISs.