1. INTRODUCTION

1.1 Background

The U.S. Nuclear Regulatory Commission (NRC) prepared this Environmental Impact Statement (EIS) in response to an application submitted by USEC Inc. (USEC) for a license that would allow the construction, operation, and decommissioning of a gas centrifuge uranium enrichment facility in Piketon, Ohio (Figure 1-1). The proposed facility is called the American Centrifuge Plant (ACP).

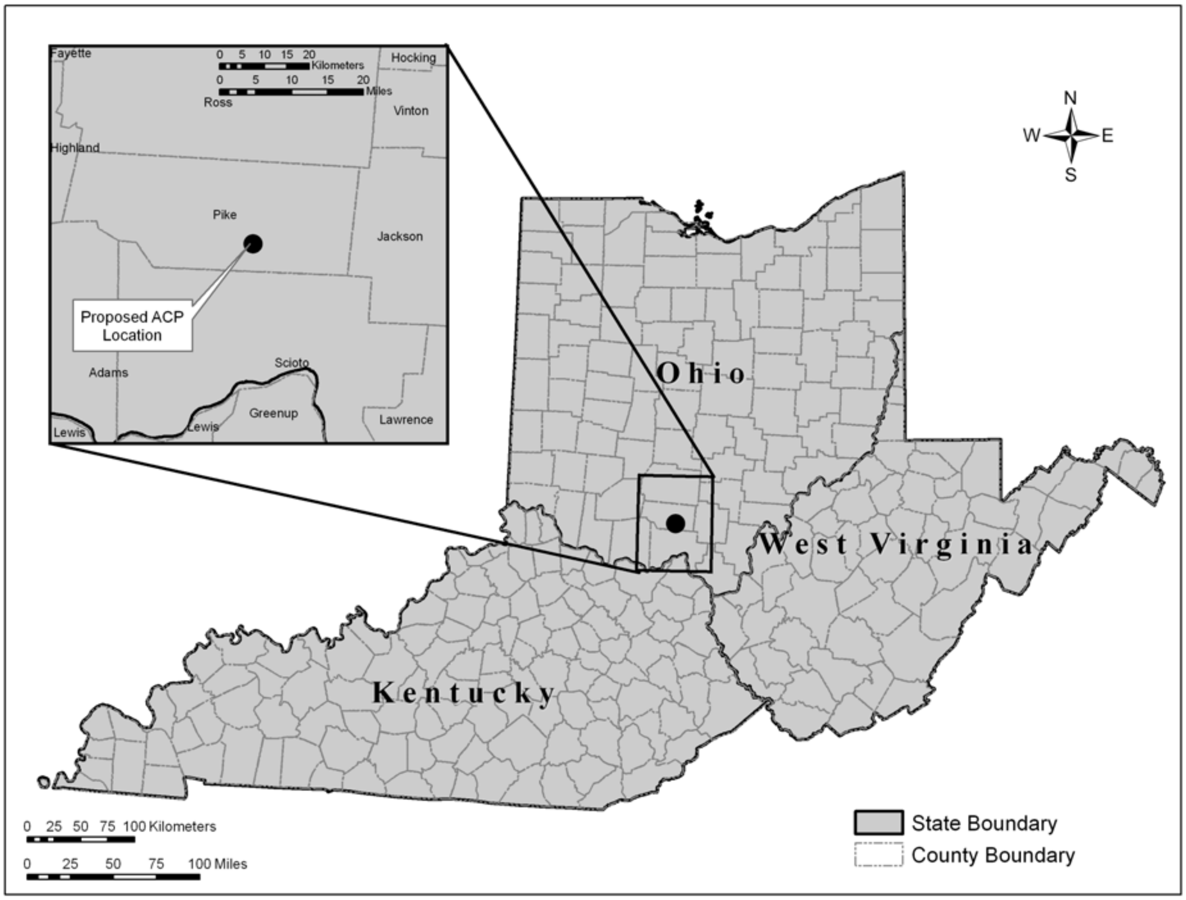

Figure 1-1 Location of the Proposed American Centrifuge Plant

The NRC's Office of Nuclear Material Safety and Safeguards prepared this EIS as required by Title 10, "Energy," of the *U.S. Code of Federal Regulations* (10 CFR) Part 51. These regulations implement the requirements of the *National Environmental Policy Act of 1969*, as amended (Public Law 91-190). The Act requires the Federal Government to assess the potential environmental impacts of its proposed actions.

1.2 The Proposed Action

The proposed action is the issuance of an NRC license for USEC under the provisions of the *Atomic Energy Act*. The license would authorize USEC to possess and use special nuclear material, source material, and byproduct material at the proposed ACP, in accordance with the NRC's regulations in

10 CFR Parts 30, 40, and 70, respectively. The scope of activities to be conducted under the license would include the construction, operation, and decommissioning of the proposed plant.

USEC has proposed that the ACP be located in leased portions of the U.S. Department of Energy (DOE) reservation in Piketon, Ohio. The Portsmouth Gaseous Diffusion Plant, which has been shut down since May 2001, is also located on the DOE reservation in Piketon. The ACP would consist of refurbished existing buildings, newly constructed facilities, and adjacent areas at the Portsmouth plant.

The proposed ACP is intended to help fulfill the terms of a DOE-USEC Agreement signed on June 17, 2002. Among other requirements, this agreement calls for USEC to deploy an advanced technology enrichment plant, meet the need for lower cost production of enriched uranium, and replace the aging gaseous diffusion technology formerly used at the Portsmouth plant and currently used to enrich uranium at the Paducah Gaseous Diffusion Plant in Paducah, Kentucky. Both the Portsmouth and Paducah plants are owned by DOE but operated by USEC's wholly owned subsidiary, the United States Enrichment Corporation. After the proposed ACP becomes operational, production of enriched uranium would ultimately cease at the Paducah plant and be replaced by the proposed new gas centrifuge process at the Portsmouth site. Decontamination and decommissioning of facilities at Paducah currently leased to the United States Enrichment Corporation would begin once the Paducah Gaseous Diffusion Plant ceases operation (USEC, 2005).

Uranium ore usually contains approximately 0.72 weight percent uranium-235, and this percentage is significantly less than the 3 to 5 weight percent uranium-235 required by nuclear power plants as fuel for electricity generation. Therefore, uranium must be enriched in one of the steps of the nuclear fuel cycle (Figure 1-2) so it can be used in commercial nuclear power plants. Enrichment is the process of increasing the percentage of the naturally occurring and fissile uranium-235 isotope and decreasing the percentage of uranium-238.

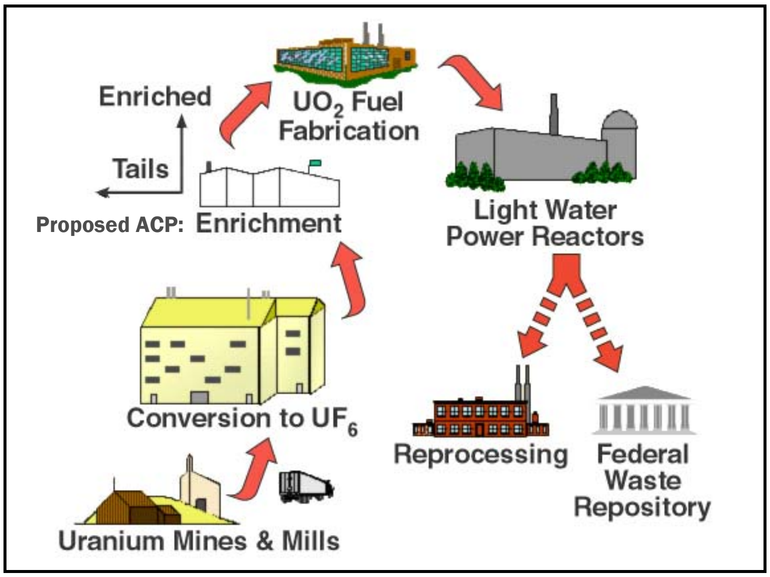

Figure 1-2 Nuclear Fuel Cycle (NRC, 2004a)

USEC's license application seeks authorization to produce enriched uranium up to 10 percent by weight of uranium-235, although enrichment would normally be less than 5.5 percent by weight of uranium-235 to meet the needs of most power plants. Enriched uranium from the proposed ACP would be used in commercial nuclear power plants, and is termed low-enriched uranium in contrast to highly enriched uranium used in military reactors and nuclear weapons. The proposed ACP would not alter the total amount of enriched uranium used in the U.S. nuclear fuel cycle because the amount of enriched uranium produced at the proposed ACP would only substitute for enriched uranium from other sources, as discussed further in this document.

USEC has requested a license for a production capacity of 3.5 million separative work units (SWUs) per year. A SWU is a measure of enrichment in the uranium enrichment industry; it represents the level of effort or energy required to raise the concentration of uranium-235 to a specified level, and is an indicator of the amount of enriched uranium. Because USEC has indicated a potential for future expansion to 7.0

million SWU, this EIS also examines the impacts of the additional construction and operations that would increase the plant's production capacity to approximately 7 million SWUs annually.

1.3 Purpose and Need for the Proposed Action

The purpose of the proposed action would be to allow USEC to construct and operate a plant to enrich uranium up to 10 percent by weight of uranium-235, with an initial production capacity of 3.5 million SWUs potentially expandable to 7 million SWUs, using gas centrifuge technology at the DOE reservation in Piketon, Ohio. The proposed action is intended to satisfy the overall need for an additional reliable and economical domestic source of enriched uranium and to replace existing aging and less efficient production facilities.

For the purpose of this EIS, the need for the proposed ACP is organized by:

- The need for enriched uranium to fulfill electricity requirements;
- The need for domestic supplies of enriched uranium for national energy security; and
- The need for upgraded uranium enrichment technology in the U.S.

The following sections discuss each of these needs and how they are addressed by the proposed action.

1.3.1 The Need for Enriched Uranium to Fulfill Electricity Requirements

Enriched uranium from the proposed ACP would be used in commercial nuclear power plants. Such plants are currently supplying approximately 20 percent of the nation's electricity requirements (EIA, 2005). As the demand for electricity increases in the future, the need for enriched uranium to fuel nuclear power plants is also expected to increase.

> ***How Much Is A Megawatt?***
>
> *One megawatt roughly provides enough electricity for the demand of 400 to 900 homes. The actual number is based on the season, time of day, region of the country, power plant capacity factors, and other factors.*
>
> *Source: Bellemare, 2003.*

By 2020, the U.S. is estimated to need about 393 gigawatts or 393,000 megawatts of new generating capacity (DOE, 2003). To meet this growing demand, installed nuclear-generating capacity in the U.S. is projected to increase from approximately 98 gigawatts (98,000 megawatts) in 2001 to about 103 gigawatts (103,000 megawatts) in 2025. This amounts to an increase in U.S. nuclear capacity of more than 5 gigawatts (5,000 megawatts), which is the equivalent of adding about five large nuclear power reactors. In actuality, approximately 3.5 gigawatts (3,500 megawatts) of the new capacity is projected to come from the uprating of existing plants, rather than constructing new facilities (EIA, 2005). As of June 2004, the NRC had granted 102 uprates and was reviewing 10 uprate applications (NRC, 2004b). As a further indicator of the growth in nuclear-generating capacity, domestic nuclear facilities reported a record high median three-year design electrical rating capacity factor[1] of 89.7 percent for the period 2001–2003 as compared to 70.8 percent for the period 1989–1991 (Blake, 2004).

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[1] This factor reflects the amount of energy a facility generates in one year divided by the total amount it could generate if it ran at full capacity.

These forecasts of nuclear power generating capacity suggest a continuing, if not increasing, demand for enriched uranium. Table 1-1 shows uranium enrichment requirements in the U.S. for the next two decades as forecasted by the Energy Information Administration. The Energy Information Administration forecast shows a growth in demand from 11.5 SWUs in 2002 to 14.2 SWUs in 2025.

Table 1-1 Projected Uranium Enrichment Demand in the U.S. for 2002-2025 in Million SWUs

Year	EIA Forecast [a]
2002	11.5 (actual) [b]
2003	12.0 (actual) [b]
2005	14.6
2010	12.9
2015	15.4
2020	13.5
2025	14.2

Notes:
EIA - Energy Information Administration.
[a] EIA, 2003.
[b] EIA, 2004a.

The demand for enriched uranium in the U.S. is currently being fulfilled by three main categories of supply:

- Domestic production of enriched uranium. The only uranium enrichment facility currently operating in the U.S. is the Paducah Gaseous Diffusion Plant, run by USEC's subsidiary, the United States Enrichment Corporation. One other enrichment facility presently exists in the U.S., the Portsmouth Gaseous Diffusion Plant, but it ceased production in May 2001 and is in cold standby (a condition under which the plant could be returned to a portion of its previous production capacity in approximately 18-24 months).

- The Megatons-to-Megawatts program. Under this program, the United States Enrichment Corporation implements the 1993 government-to-government agreement between the U.S. and Russia that calls for Russia to convert 500 metric tons (550 tons) of highly enriched uranium from dismantled nuclear warheads into low-enriched uranium. This is the equivalent of about 20,000 nuclear warheads. The United States Enrichment Corporation purchases the enriched portion of the "down blended" material, tests it to make sure it meets specifications, adjusts the enrichment level if needed, and then sells it to its electric utility customers for fuel in commercial nuclear power plants. The activities in the United States all now take place at the Paducah plant. (USEC, 2004a)

- Other foreign sources. Other countries that produce and export enriched uranium to the U.S. include China, France, Germany, the Netherlands, and the United Kingdom.

The current U.S. demand for enriched uranium is 12 million SWUs per year (EIA, 2004). Annually, the United States Enrichment Corporation produces approximately 10.5 million SWUs, of which 6.7 million SWUs is sold for use in the U.S. and 3.8 million SWUs is exported (USEC, 2005). That means that the United States Enrichment Corporation currently fulfills approximately 56 percent of the U.S. demand (USEC, 2005). Of the amount sold for use in the U.S., 1.7 million SWUs (14 percent of U.S. demand) comes from the Paducah Gaseous Diffusion Plant (EIA, 2004a) and 5 million SWUs (42 percent of U.S. demand) from the Megatons-to-Megawatts program (USEC, 2005), which is dependent on deliveries from Russia. Therefore, up to 86 percent of the U.S. demand is currently supplied by foreign sources. However, the United States Enrichment Corporation produces approximately 5 million SWUs (which constitutes 42 percent of U.S. demand) at the Paducah Gaseous Diffusion Plant (USEC, 2005). Theoretically, this enrichment capacity could be sold only to the U.S. market, thus reducing the overall foreign dependence to approximately 7 million SWUs (58 percent of U.S. demand).

DOE anticipates "the inevitable cessation of all domestic gaseous diffusion enrichment operations" due to the higher cost of aging diffusion facilities like Paducah relative to new centrifuge technology (DOE, 2001a). Existing U.S. sources will not be able to provide a dependable and economical domestic supply to meet the continuing U.S. demand for enriched uranium in the future. The Megatons-to-Megawatts program is only planned to be available until 2013, after which the nation could have a significant shortfall in supply if the agreement is not renewed. Therefore, new domestic sources of enriched uranium are needed to replace the aging, energy-intensive Paducah gaseous diffusion facility even if the Megatons-to-Megawatts program is extended beyond 2013.

At the initial licensed capacity of 3.5 million SWUs, the proposed ACP would provide roughly 29 percent of the U.S. enrichment needs. Additionally, the NRC is evaluating the Louisiana Energy Services' proposed National Enrichment Facility as part of a separate proposed action (NRC, 2005) with an output of an additional 3 million SWU (25 percent). The combined output from the proposed ACP and National Enrichment Facility (6.5 million SWUs or 54 percent of U.S. demand) could offset the current output from the aging Paducah Gaseous Diffusion Plant and allow the Paducah plant to be retired. In addition, if USEC were to expand to a 7 million SWU capacity, USEC could contribute up to 58 percent of U.S. enrichment needs, in addition to the 25 percent that Louisiana Energy Services could produce.

Although the U.S. is a substantial net importer of enriched uranium, the United States Enrichment Corporation also provides enriched uranium to foreign customers, as noted above, which is indicative of utility customer preferences for multiple suppliers. An exclusive focus on domestic supply and demand projections clearly indicates a need for the ACP facility, but the reality of global trade in enriched uranium also provides another context for assessing the significance of any potential domestic supply shortfall, because global enrichment forecasts indicate that international supply and demand will be in very close balance after 2010 (ERI, 2004; Grigoriev, 2002; NUKEM, 2002; DOE, 2001a; Combs, 2004a). These enrichment demand forecasts reflect global nuclear generation capacity forecasts, but the Energy Information Administration has subsequently increased its forecast for 2020 world nuclear generation capacity by about 5 percent (EIA, 2004b), indicating that earlier enrichment demand forecasts were conservative. Supply forecasts reflect current sources of enriched uranium, the anticipated loss of supply from diffusion technology facilities like Paducah, new supply from the proposed National Enrichment Facility and the proposed ACP, and continuation of current levels of supply from the Russian highly enriched uranium agreement. The current Russian highly enriched uranium agreement actually expires in 2013, and while an extension of that agreement through 2020 is a reasonable assumption, any reduction in Russian highly enriched uranium supply after 2013 could shift the close balance after 2010 to a global supply shortfall. Recent global market forecasts by Cornell (2005), Euratom (2005), and Combs (2004b) agree that there will be a need for the proposed licensed capacity of both the ACP and National Enrichment Facility, and possibly additional capacity at one or both facilities, even if the Russian agreement is renewed. The U.S. market would be especially vulnerable to any unforeseen global supply shortfall if the Paducah facility closes, as expected, without an offsetting increase in supply from the combined output of the ACP and the National Enrichment Facility.

1.3.2 The Need for Domestic Supplies of Enriched Uranium for National Energy Security

With all domestic production now coming from a single plant—the aging gaseous diffusion plant in Paducah—there is some reliability risk of U.S. domestic enrichment capability. A supply disruption associated with the Paducah plant production or the Megatons-to-Megawatts deliveries could impact national energy security because domestic commercial reactors, which supply approximately 20 percent of the nation's electricity requirements (EIA, 2005), would be fully dependent on foreign sources for enrichment services.

In a 2002 letter to the NRC, DOE indicated that domestic uranium enrichment had fallen from a capacity greater than domestic demand to a level that was less than half of domestic requirements (DOE, 2002a). In this letter, DOE:

- Referenced interagency discussions led by the National Security Council where there was a clear determination that the U.S. should maintain a viable and competitive domestic uranium enrichment industry for the foreseeable future;

- Estimated that 80 percent of projected demand for nuclear power in 2020 could be fueled from foreign sources;

- Noted the importance of promoting the development of additional domestic enrichment capacity to maintain a viable and competitive domestic uranium enrichment industry for the foreseeable future;

- Noted that there was sufficient domestic demand to support multiple uranium enrichment facilities and that competition is important to maintain a healthy industry, and encouraged the private sector to invest in new uranium enrichment capacity; and

- Indicated its support for the deployment of the proposed National Enrichment Facility gas centrifuge technology by expressing its support for Urenco to partner with a U.S. company or companies, transferring Urenco's technology to new U.S. commercial uranium enrichment facilities.

DOE's 2002 letter reinforces the Administration's energy policy, which was released in May 2001 (NEP, 2001). This policy called the expansion of nuclear energy dependence "a major component of our national energy policy."

The proposed ACP would contribute to the attainment of these national energy security policy objectives by helping maintain a reliable and economical domestic source of enriched uranium. Beginning production in 2009 and achieving an annual production capacity of 3.5 million SWUs by 2011, the proposed ACP would provide roughly 25 percent of the projected U.S. enrichment services demand (EIA, 2003).

1.3.3 The Need for Upgraded Uranium Enrichment Technology in the U.S.

In addition to advancing national energy security goals, the proposed ACP would help accomplish the goals of the June 17, 2002 DOE-USEC Agreement to "facilitate the deployment of new, cost effective advanced enrichment technology in the U.S. on a rapid schedule." It would enable USEC to operate a modern, more efficient, and less costly enrichment plant to supplement and replace its more than 50-year old gaseous diffusion plants (USEC, 2004b).

Gaseous diffusion technology has relatively large resource requirements that make it less attractive than gas centrifuge technology, from both an economical and environmental perspective. Most importantly, gaseous diffusion plants require large amounts of power. USEC reports that the cost for electricity to run such plants represents approximately 60 percent of the total production cost. Two coal-fired power plants routed through four switchyards provide the electrical supply necessary to operate the gaseous diffusion process at Paducah. In addition to being energy-intensive, a plant using the gaseous diffusion process requires large-scale use of Freon and non-contact cooling water. (USEC, 2005)

The gas centrifuge technology is known to be more efficient and require less energy to operate than the gaseous diffusion technology currently in use. According to USEC, the energy requirements of a gas centrifuge plant are about five percent of that required by a comparably sized gaseous diffusion plant, resulting in a considerably lower operating cost. At the same time, the gas centrifuge technology does not require such large-scale use of Freon and requires much less use of cooling water. The gas centrifuge technology is also modular, allowing production capacity to be easily geared up or down in response to market demands. (USEC, 2005)

1.4 Scope of the Environmental Analysis

To fulfill its responsibilities under the *National Environmental Policy Act*, the NRC has prepared this EIS to analyze the environmental impacts (i.e., direct, indirect, and cumulative impacts) of the proposed ACP as well as reasonable alternatives to the proposed action. The scope of this EIS includes consideration of both radiological and nonradiological (including chemical) impacts associated with the proposed action and the reasonable alternatives. The EIS also addresses the potential environmental impacts relevant to transportation.

In addition, this EIS identifies resource uses, monitoring, potential mitigation measures, unavoidable adverse environmental impacts, the relationship between short-term uses of the environment and long-term productivity, and irreversible and irretrievable commitments of resources.

The development of this EIS is the result of the NRC staff's review of the USEC license application (USEC, 2004b) and its supporting Environmental Report (USEC, 2005) as well as public and agency comments on the Draft EIS. This review has been closely coordinated with the development of the Safety Evaluation Report being prepared by the NRC to evaluate, among other aspects, the health and safety impacts of the proposed action. The Safety Evaluation Report is the outcome of the NRC safety review of the USEC license application.

The NRC Environmental and Safety Reviews

The focus of an EIS is a public review and presentation of the environmental impacts of a proposed action.

In addition to meeting its responsibilities under the National Environmental Policy Act, *the NRC prepares a Safety Evaluation Report to analyze the safety of the proposed action and assess its compliance with applicable NRC regulations.*

The safety and environmental reviews are conducted in parallel. Although there is some overlap between the content of a Safety Evaluation Report and EIS, the intent of the documents is different.

To aid in the decision process, the EIS summarizes some of the more detailed analyses included in the Safety Evaluation Report. For example, the EIS does not address how accidents are prevented; rather, it addresses the environmental impacts that would result, should an accident occur.

Much of the information describing the affected environment in the EIS also is applicable to the Safety Evaluation Report (e.g., demographics, geology, meteorology).

Source: NRC, 2003; NRC, 2002.

1.4.1 Scoping Process and Public Participation Activities

The NRC regulations in 10 CFR Part 51 contain requirements for conducting a scoping process prior to the preparation of an EIS. Scoping was used to help identify the relevant issues to be discussed in detail and to help identify issues that are beyond the scope of this EIS, that do not warrant a detailed discussion, or that are not directly relevant to the assessment of potential impacts from the proposed action.

On October 15, 2004, the NRC published in the *Federal Register* (69 FR 61268) a Notice of Intent to prepare an EIS for the construction, operation, and decommissioning of the proposed ACP and to conduct the scoping process for the EIS. The Notice of Intent summarized the NRC's plans to prepare the EIS and presented background information on the proposed ACP. For the scoping process, the Notice of Intent invited comments on the proposed action and announced a public scoping meeting to be held concerning the project.

On November 8, 2004, the NRC published a notice in the *Federal Register* (69 FR 64794) postponing the public scoping meeting for the proposed ACP. The NRC took this step in order to allow members of the public adequate access to USEC's license application and Environmental Report before the scoping meeting. These documents had been temporarily unavailable to the public due to a security review, by agency experts, of NRC's Agencywide Documents Access and Management System. After the documents were made publically available, the NRC published another notice in the *Federal Register* (69 FR 78058; December 29, 2004) announcing a new date, January 18, 2005 for the meeting.

On January 18, 2005, the NRC staff toured the proposed ACP site and held the public scoping meeting in Piketon, Ohio. During the scoping meeting, a number of individuals offered oral and written comments and suggestions to the NRC concerning the proposed ACP and the development of the EIS. In addition, the NRC received written comments from various individuals during the public scoping period that ended on February 1, 2005. The NRC carefully reviewed and identified substantive scoping comments (both oral and written). These comments were then consolidated and categorized by topical areas.

After the scoping period, the NRC issued the *Environmental Scoping Summary Report: Proposed USEC Inc. American Centrifuge Plant in Piketon, Ohio* in April 2005 (see Appendix A). The report identifies categories of issues to be analyzed in detail and issues determined to be beyond the scope of the EIS.

1.4.2 Issues Studied in Detail

As stated in the Notice of Intent, the NRC identified issues to be studied in detail as they relate to implementation of the proposed action. The public identified additional issues during the subsequent public scoping process. Issues identified by the NRC and the public that could have short- or long-term impacts from the potential construction and operation of the proposed ACP include:

- Need for the facility;
- Compliance with applicable regulations;
- Alternatives;
- Decommissioning;
- Cumulative impacts;
- Land use;
- Transportation;
- Accidents;
- Geology and soils;
- Water resources;
- Ecological resources;
- Air quality;
- Noise;
- Historic and cultural resources;
- Visual and scenic resources;
- Socioeconomic impacts;
- Public and occupational health;
- Waste management;
- Depleted uranium disposition;
- Environmental justice;
- Costs and benefits; and
- Resource commitments.

1.4.3 Issues Eliminated from Detailed Study

The NRC has determined that detailed analysis for mineral resources is not necessary because there are no known nonpetroleum mineral resources at the proposed site that would be affected by any of the alternatives being considered. In addition, detailed analysis of the impact of the proposed ACP on connected actions that include the overall nuclear fuel cycle activities were not considered. The proposed ACP would not measurably affect the mining and milling operations and the demand for enriched uranium (it would instead provide a replacement supply to meet current and projected demands, as discussed in Section 1.3). The amount of mining and milling is dependent upon the stability of market prices for uranium balanced with the concern of environmental impacts associated with such operations (NRC, 1980). The demand for enriched uranium in the U.S. is primarily driven by the number of commercial nuclear power plants and their operation. The proposed ACP would only result in the creation of new transportation routes within the fuel cycle to and from the enrichment facility. The existing transportation routes between the other facilities are not expected to be altered. Because the environmental impacts of all of the transportation routes other than those to and from the proposed ACP have been previously analyzed, they are eliminated from further study (NRC, 1980; NRC, 1977).

1.4.4 Issues Outside the Scope of the EIS

The following issues raised during the scoping process have been determined to be outside the scope of the EIS:

- Nonproliferation;
- Safety and security;
- Credibility; and
- Terrorism.

As noted in Section 1.4, some of these issues are analyzed in detail in the NRC's Safety Evaluation Report, and are only summarized in the EIS. For example, within the area of safety and security, the Safety Evaluation Report analyzes the probabilities and consequences of various accidents at the ACP, as well as measures to prevent those accidents and mitigate their effects. This EIS does not go into the same level of detail, but summarizes, in Section 4.2.12.3 and Appendix H, the accident analysis from the Safety Evaluation Report for the purpose of assessing the potential environmental impacts of accidents.

1.4.5 Related National Environmental Policy Act and Other Relevant Documents

The following *National Environmental Policy Act* documents were reviewed as part of the development of this EIS.

- *Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico, Final Report, NUREG-1790, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, June, 2005.* This EIS analyzes the potential environmental impacts of the proposed siting, construction, operation, and decommissioning of a gas centrifuge uranium enrichment facility near Eunice, New Mexico. Its description of the purpose and need of the proposed action, as well as its review of alternatives to the proposed action, are highly relevant to the proposed ACP analysis, because the technologies and production capacities being proposed at the ACP and the National Enrichment Facility are similar. The environmental impacts discussed for the proposed National Enrichment Facility are also relevant to the impact analysis for the proposed ACP, especially the analysis of cumulative impacts associated with the management of wastes from the two facilities.

- *Final Environmental Impact Statement for the Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Portsmouth, Ohio, Site. DOE/EIS-0360, Oak Ridge Operations, Office of Environmental Management, U.S. Department of Energy, June, 2004.* This site-specific EIS analyzes the construction, operation, maintenance, and decommissioning of the proposed depleted uranium hexafluoride (UF_6) conversion facility at three alternative locations within the Portsmouth, Ohio, site; transportation of all cylinders (depleted UF_6, enriched uranium, and empty) currently stored at the East Tennessee Technology Park near Oak Ridge, Tennessee, to Portsmouth; construction of a new cylinder storage yard at Portsmouth (if required) for cylinders from the East Tennessee Technology Park; transportation of depleted UF_6 conversion products and waste materials to a disposal facility; transportation and sale of the hydrogen fluoride produced as a conversion co-product; and neutralization of hydrogen fluoride to calcium fluoride and its sale or disposal in the event that the hydrogen fluoride product is not sold. The affected environment characterized in this EIS is the same as the environment at the proposed ACP, because the two facilities would be near each other on DOE's Portsmouth Reservation. In addition, the results presented in this EIS are relevant to the management, use, and potential impacts associated with the depleted UF_6 that would be generated at the proposed ACP.

- *Final Environmental Impact Statement for the Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Paducah, Kentucky, Site. DOE/EIS-0359, Oak Ridge Operations, Office of Environmental Management, U.S. Department of Energy, June, 2004.* This site-specific EIS considers the construction, operation, maintenance, and decommissioning of the proposed depleted UF_6 conversion facility at three locations within the Paducah, Kentucky site, which is a DOE facility; transportation of depleted UF_6 conversion products and waste materials to a disposal facility; transportation and sale of the hydrogen fluoride produced as a conversion co-product; and neutralization of hydrogen fluoride to calcium fluoride and its sale or disposal in the event that the hydrogen fluoride product is not sold. The results presented in this EIS are relevant to the management, use, and potential impacts associated with the depleted UF_6 that would be generated at the proposed ACP.

- *Environmental Assessment of the USEC Inc. American Centrifuge Lead Cascade Facility in Piketon, Ohio, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, January, 2004.* This Environmental Assessment supported the NRC's decision to issue Material License No. 70-7003 to authorize USEC to possess and use source and special nuclear material at the Lead Cascade Demonstration Facility. Beginning in late 2005, this facility will provide a real-time demonstration of the basic building block for the commercial-scale gas centrifuge process proposed at the ACP and will provide information on the reliability, performance, and cost of the centrifuge machines and auxiliary systems. The Lead Cascade facility will have up to 240 operable centrifuges for testing, and will recycle tails and product with no product withdrawals except for sampling. It will be located within some of the same buildings proposed to be used by the proposed ACP. Many aspects of this Environmental Assessment relate directly to the commercial-scale plant now being proposed by USEC, assuming the Lead Cascade facility tests prove successful.

- *Environmental Assessment for the Leasing of Facilities and Equipment to USEC Inc. DOE/EA-1451, U.S. Department of Energy, October 2002.* This Environmental Assessment analyzed the environmental impacts of leasing facilities and equipment to USEC that would be used in its Gas Centrifuge Research and Development Project at East Tennessee Technology Park. The purpose of this research and development project was to develop an economically attractive gas centrifuge machine and process using DOE's centrifuge technology. This Environmental Assessment includes an analysis of potential impacts associated with the fabrication, assembly, and testing of centrifuge components, which is relevant to the proposed manufacturing and assembly of centrifuges for the ACP.

- *Environmental Assessment: Disposition of Russian Federation Titled Natural Uranium. DOE/EA-1290, Office of Nuclear Energy, Science and Technology, U.S. Department of Energy, June 1999.* This Environmental Assessment analyzed the environmental impacts of transporting natural UF_6 from the gaseous diffusion plants to the Russian Federation. Transportation by rail and truck were considered. The Environmental Assessment addresses both incident-free transportation and transportation accidents. The results presented in this Environmental Assessment are relevant to the transportation of UF_6 for the proposed ACP.

- *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride. DOE/EIS-0269, Office of Nuclear Energy, Science and Technology, U.S. Department of Energy, April 1999.* This EIS analyzes strategies for the long-term management of the DUF_6 inventory currently stored at three DOE sites near Paducah, Kentucky; Portsmouth, Ohio; and Oak Ridge, Tennessee. This EIS also analyzes the potential environmental consequences of implementing each alternative strategy for the period from 1999 through 2039. The results presented in this EIS are relevant to the management, use, and potential impacts associated with the depleted UF_6 that would be generated at the proposed ACP.

- *Environmental Assessment for the Reindustrialization Program at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio. DOE/EA-1346, Oak Ridge Operations Office, U.S. Department of Energy, May 2001.* This environmental assessment evaluated the potential impacts of transferring by lease and/or disposal, land and facilities located on the DOE reservation in Piketon, OH, as part of a reindustrialization program. Under the proposed action DOE would transfer land and facilities to a community reuse organization, the Southern Ohio Diversification Initiative, or other entities, should DOE determine them suitable.

- *Environmental Assessment for the Winterization Activities in Preparation for Cold Standby at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio. DOE/EA-1392, Oak Ridge Operations Office, U.S. Department of Energy, June 2001.* This environmental assessment evaluated the potential impacts of winterizing activities to include the installation and operation of a hot water heating facility and associated recirculating pipes and gas lines, as well as ongoing cold standby operations.

1.5 Applicable Statutory and Regulatory Requirements

This section provides a summary of major environmental requirements, agreements, Executive Orders, and permits relevant to the construction, operation, and decommissioning of the proposed ACP, in addition to the NRC regulatory requirements previously identified in section 1.2.

1.5.1 Federal Laws and Regulations

1.5.1.1 *National Environmental Policy Act of 1969*, as amended (42 U.S.C. §4321 et seq.)

The *National Environmental Policy Act* establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment to ensure for all Americans a safe, healthful, productive, and aesthetically and culturally pleasing environment. The Act provides a process for implementing these specific goals within the Federal agencies responsible for the action. This EIS has been prepared in accordance with *National Environmental Policy Act* requirements and NRC regulations (10 CFR Part 51) for implementing the *National Environmental Policy Act*.

1.5.1.2 *Atomic Energy Act of 1954,* as amended (42 U.S.C. §2011 et seq.)

The *Atomic Energy Act*, as amended, and the *Energy Reorganization Act of 1974* (42 U.S.C. §5801 et seq.) give the NRC the licensing and regulatory authority for nuclear energy uses within the commercial sector. If the license application for the proposed ACP is approved, the NRC would license and regulate the possession, use, storage, and transfer of byproduct, source, and special nuclear materials to protect public health and safety as stipulated in 10 CFR Parts 30, 40, and 70.

1.5.1.3 *Clean Air Act,* as amended (42 U.S.C. §7401 et seq.)

The *Clean Air Act* establishes regulations to ensure air quality and authorizes individual States to manage permits. The *Clean Air Act*: (1) requires the U.S. Environmental Protection Agency (U.S. EPA) to establish National Ambient Air Quality Standards as necessary to protect the public health, with an adequate margin of safety, from any known or anticipated adverse effects of a regulated pollutant (42 U.S.C. §7409 et seq.); (2) requires establishment of national standards of performance for new or modified stationary sources of atmospheric pollutants (42 U.S.C. §7411); (3) requires specific emission increases to be evaluated so as to prevent a significant deterioration in air quality (42 U.S.C. §7470 et seq.); and (4) requires specific standards for releases of hazardous air pollutants (including radionuclides) (42 U.S.C. §7412). These standards are implemented through plans developed by each State and approved by the U.S. EPA. The *Clean Air Act* requires sources to meet standards and obtain permits to satisfy those standards. The proposed ACP may be required to comply with the *Clean Air Act* Title V, Sections 501–507, for sources subject to new source performance standards or sources subject to National Emission Standards for Hazardous Air Pollutants.

1.5.1.4 *Clean Water Act,* as amended (33 U.S.C. §1251 et seq.)

The *Clean Water Act* requires the U.S. EPA to set national effluent limitations and water-quality standards, and establishes a regulatory program for enforcement. Specifically, Section 402(a) of the Act establishes water-quality standards for contaminants in surface waters. The *Clean Water Act* requires a National Pollutant Discharge Elimination System permit before discharging any point source pollutant into U.S. waters. The Ohio EPA administers this program in Ohio, with review and support from U.S. EPA Region 5. The National Pollutant Discharge Elimination System General Permit for Industrial Storm Water is required for point source discharge of storm water runoff from industrial or commercial facilities to State waters. Construction of the proposed ACP would require a National Pollutant Discharge Elimination System Construction Storm Water General Permit from the Ohio EPA. Section 401(a)(1) of the *Clean Water Act* requires States to certify that the permitted discharge would comply with all limitations necessary to meet established State water-quality standards, treatment standards, or schedule of compliance.

1.5.1.5 *Resource Conservation and Recovery Act,* as amended (42 U.S.C. §6901 et seq.)

The *Resource Conservation and Recovery Act*, as amended, requires the U.S. EPA to define and identify hazardous waste; establish standards for its transportation, treatment, storage, and disposal; and require permits for persons engaged in hazardous waste activities. Section 3006 (42 U.S.C. §6926) allows States to establish and administer these permit programs with U.S. EPA approval. U.S. EPA Region 5 has delegated regulatory jurisdiction to the Ohio EPA for nearly all aspects of permitting as required by the *Resource Conservation and Recovery Act*. U.S. EPA regulations implementing the *Resource Conservation and Recovery Act* are found in 40 CFR Parts 260 through 283. Regulations imposed on a generator or on a treatment, storage, and/or disposal facility vary according to the type and quantity of material or waste generated, treated, stored, and/or disposed. The method of treatment, storage, and/or disposal also impacts the extent and complexity of the requirements. The proposed ACP would be classified as a large quantity generator of hazardous waste (meaning it is expected to generate more than 1,000 kilograms (2,200 pounds) of such waste per month) (USEC, 2005). Hazardous wastes would not be treated or disposed onsite; instead, USEC plans to store such wastes onsite for less than 90 days and then transfer them to appropriately permitted treatment, storage, and disposal facilities.

1.5.1.6 *Low-Level Radioactive Waste Policy Act of 1980,* as amended (42 U.S.C. §2021 et seq.)

The *Low-Level Radioactive Waste Policy Act of 1980* amended the *Atomic Energy Act* to specify that the Federal Government is responsible for disposal of low-level radioactive waste generated by its activities and that States are responsible for disposal of other low-level radioactive waste. The *Low-Level Radioactive Waste Policy Act of 1980* provides for and encourages interstate compacts to carry out the State responsibilities. Low-level radioactive waste would be generated from activities conducted from the proposed ACP. The State of Ohio is a member of the Midwest Compact.

1.5.1.7 *Emergency Planning and Community Right-to-Know Act of 1986* (42 U.S.C. §11001 et seq.) (also known as SARA Title III)

The *Emergency Planning and Community Right-to-Know Act of 1986*, which is the major amendment to the *Comprehensive Environmental Response, Compensation, and Liability Act* (42 U.S.C. **§**9601*)*, establishes the requirements for Federal, State, and local governments; Indian tribes; and industry regarding emergency planning and "Community Right-to-Know" reporting on hazardous and toxic chemicals. The "Community Right-to-Know" provisions increase the public's knowledge and access to information on chemicals at individual facilities, their uses, and releases into the environment. States and communities working with facilities can use the information to improve chemical safety and protect public health and the environment. This Act requires emergency planning and notice to communities and government agencies concerning the presence and release of specific chemicals. The U.S. EPA implements this Act under regulations found in 40 CFR Parts 355, 370, and 372. This Act would require the proposed ACP to report on hazardous and toxic chemicals used and produced at the facility, and to establish emergency planning procedures in coordination with the local communities and government agencies.

1.5.1.8 *Safe Drinking Water Act,* as amended (42 U.S.C. §300f et seq.)

The *Safe Drinking Water Act* was enacted to protect the quality of public water supplies and sources of drinking water. The Ohio EPA, under 42 U.S.C. §300g-2 of the Act, established standards applicable to public water systems. These regulations include maximum contaminant levels (including those for radioactivity) in public water systems. Other programs established by the *Safe Drinking Water Act* include the Sole Source Aquifer Program, the Wellhead Protection Program, and the Underground Injection Control Program. In addition, the Act provides underground sources of drinking water with protection from contaminated releases and spills. The proposed ACP would not use onsite ground-water or surface-water supplies, but rather would obtain potable water from a nearby public water supply system and non-potable cooling water (primarily for tower water cooling and a lesser amount for machine cooling water) from a nearby water treatment facility.

1.5.1.9 *Noise Control Act of 1972,* as amended (42 U.S.C. §4901 et seq.)

The *Noise Control Act* delegates the responsibility of noise control to State and local governments. Commercial facilities are required to comply with Federal, State, interstate, and local requirements regarding noise control. The proposed ACP would be located in Pike County, which does not have a local noise control ordinance.

1.5.1.10 *National Historic Preservation Act of 1966,* as amended (16 U.S.C. §470 et seq.)

The *National Historic Preservation Act* was enacted to create a national historic preservation program, including the National Register of Historic Places and the Advisory Council on Historic Preservation. Section 106 of the Act requires Federal agencies to take into account the effects of their undertakings on historic properties. The Advisory Council on Historic Preservation regulations implementing Section 106 of the Act are found in 36 CFR Part 800. These regulations were revised on July 6, 2004 (69 FR 40544) and became effective on August 5, 2004. The regulations call for public involvement in the Section 106 consultation process, including Indian tribes and other interested members of the public, as applicable. The NRC has initiated the Section 106 consultation process and entered into consultation with the Ohio Historic Preservation Office and interested Indian tribes (see Section 1.5.6 and Appendix B).

1.5.1.11 *Endangered Species Act of 1973,* as amended (16 U.S.C. §1531 et seq.)

The *Endangered Species Act* was enacted to prevent the further decline of endangered and threatened species and to restore those species and their critical habitats. Section 7 of the Act requires consultation with the U.S. Fish and Wildlife Service of the U.S. Department of the Interior or the National Marine Fisheries Service of the U.S. Department of Commerce to determine whether endangered and threatened species or their critical habitats are known to be in the vicinity of the proposed action, and to determine whether the proposed Federal action may affect listed species or critical habitat. The NRC has completed the consultation process with the U.S. Fish and Wildlife Service for the proposed ACP (see Section 1.5.6 and Appendix B).

1.5.1.12 *Occupational Safety and Health Act of 1970,* as amended (29 U.S.C. §651 et seq.)

The *Occupational Safety and Health Act* establishes standards to enhance safe and healthy working conditions in places of employment throughout the U.S. The Act is administered and enforced by the Occupational Safety and Health Administration, a U.S. Department of Labor agency. The identification, classification, and regulation of potential occupational carcinogens are found in 29 CFR §1910.101, while the standards pertaining to hazardous materials are listed in 29 CFR §1910.120. The Occupational Health and Safety Administration regulates mitigation requirements and mandates proper training and equipment for workers. The proposed ACP would be required to comply with the requirements of these regulations.

1.5.1.13 *Hazardous Materials Transportation Act* (49 U.S.C. §1801 et seq.)

The *Hazardous Materials Transportation Act* regulates transportation of hazardous material (including radioactive material) in and between States. According to the Act, States may regulate the transport of hazardous material as long as they are consistent with the Act or the U.S. Department of Transportation regulations provided in 49 CFR Parts 171 through 177. 49 CFR Part 173, Subpart I contains other regulations regarding packaging for transportation of radionuclides. Transportation of the depleted uranium cylinders from the proposed ACP would require compliance with the U.S. Department of Transportation regulations.

1.5.1.14 *Environmental Standards for Uranium Fuel Cycle* (40 CFR Part 190, Subpart B)

These regulations establish maximum doses to the body or organs of members of the public, as a result of operational normal releases from uranium fuel cycle activities, including uranium enrichment. These regulations were promulgated by U.S. EPA under the authority of the *Atomic Energy Act of 1954*, as amended, and have been incorporated by reference in the NRC regulations in 10 CFR §20.1301(e). The proposed ACP would be required to comply with these regulations for its releases from normal operations.

1.5.2 Applicable Executive Orders

- *Executive Order 11988* (Floodplain Management) directs Federal agencies to establish procedures to ensure that the potential effects of flood hazards and floodplain management are considered for any action undertaken in a floodplain and that floodplain impacts be avoided to the extent practicable.

- *Executive Order 12898* (Environmental Justice) calls for Federal agencies to address environmental justice in minority populations and low-income populations (59 FR 7629), and directs Federal agencies to identify and address, as appropriate, disproportionately high and adverse health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. In response to this Executive Order, the NRC has issued a final policy statement on the "Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions" (69 FR 52040; August 24, 2004) and environmental justice procedures to be followed in NEPA documents prepared by the NRC's Office of Nuclear Material Safety and Safeguards (NRC, 2003).

1.5.3 Applicable State of Ohio Requirements

Certain environmental requirements, including some discussed earlier, have been delegated to State authorities for implementation, enforcement, or oversight. Table 1-2 provides a list of State environmental requirements.

Table 1-2 State of Ohio Environmental Requirements

Law/Regulation	Citation	Requirements
Air Quality Protection		
Title V Permit Rules	ORC, Title 37, Chapter 3704 "Air Pollution Control," and implementing regulations in OAC, Chapter 3745-77	Establishes the policies and procedures by which the Ohio EPA will administer the Title V permit program under the *Clean Air Act*. Requires Title V sources, as defined by OAC 3745-77-02, to apply for and obtain a Title V permit prior to operation of the source facility.
Permits to Install New Sources of Pollution	ORC, Title 37, Chapter 3704 "Air Pollution Control," and implementing regulations in OAC 3745-31	Requires a permit prior to the installation of a new source of air pollutants, or the modification of an air contaminant source. Discusses exemptions and conditions under which approval will be granted. Also requires an impact analysis to determine if the air contaminant source will cause or contribute to violations of the National Ambient Air Quality Standards.
Air Permits to Operate and Variances	ORC, Title 37, Chapter 3704 "Air Pollution Control," and implementing regulations in OAC 3745-35	Requires a permit prior to the operation or use of any air contaminant source in violation of any applicable air pollution control law, unless a variance has been applied for and obtained from the Director of Environmental Protection.

Table 1-2 State of Ohio Environmental Requirements (continued)

Law/Regulation	Citation	Requirements
Accidental Release Prevention Program	ORC, Title 37, Chapter 3704 "Air Pollution Control," and implementing regulations in OAC 3745-104	Establishes the policies and procedures by which the Ohio EPA will administer the Accidental Release Prevention Program, or Risk Management Plan program under the *Clean Air Act Amendments of 1990*. Requires the owner or operator of a stationary source that has more than a threshold quantity of a regulated substance to comply with all the provisions of the rule, including creating a hazard assessment, risk management plan, a prevention program, and an emergency response program.
General Conformity Rules	ORC, Title 37, Chapter 3704 "Air Pollution Control," and implementing regulations in OAC 3745-102	Establishes Ohio's rules on "general conformity," a process mandated by the *Clean Air Act* to ensure that Federal actions uphold the State Implementation Plan and do not contribute to air quality violations within the State. Discusses which Federal actions are subject to the conformity requirements, the procedures for conformity analysis, public participation/consultation, and the final conformity determination.
Water Resources Protection		
Ohio National Pollutant Discharge Elimination System Permits	ORC Title 61, Chapter 6111,"Water Pollution Control" and implementing regulations in OAC 3745-33 and 3745-38	Initiates plans and programs for the prevention, control, and abatement of new or existing pollution of the waters of the State of Ohio. Requires an Ohio individual or general permit prior to any discharge of sewage, industrial waste, or other waste as defined by divisions (B) to (D) of Section 6111.01 of the Ohio Revised Code. Requires the compliance of each point source with authorized discharge levels, monitoring requirements, and other appropriate requirements.
Permits to Install New Sources of Pollution	ORC Title 61, Chapter 6111,"Water Pollution Control" and implementing regulations in OAC 3745-31	Requires a permit prior to the installation of a new source of water pollutants, or the modification of any pollutant discharge source.
Water Quality Standards	ORC Title 61, Chapter 6111,"Water Pollution Control" and implementing regulations in OAC 3745-1	Establishes water quality standards for surface waters in the State of Ohio, including beneficial use designations, numeric water quality criteria, and the anti-degradation waterbody classification system.
Section 401 Water Quality Certifications	ORC Title 61, Chapter 6111,"Water Pollution Control" and implementing regulations in OAC 3745-32 and 3745-45	Requires a Section 401 water quality certification and payment of applicable fees before the issuance of any Federal permit or license to conduct any activity that may result in any discharge to waters of the State.

Table 1-2 State of Ohio Environmental Requirements (continued)

Law/Regulation	Citation	Requirements
Public Water Systems Licenses to Operate	ORC Title 61, Chapter 6109, "Safe Drinking Water" and implementing regulations in OAC 3745-84	Requires a public water systems license prior to operating or maintaining a public water system.
Design, Construction, Installation, and Upgrading for Underground Storage Tank systems	ORC Title 37, Chapter 3737, "Underground Storage Tanks" and implementing regulations in OAC 1301: 7-9-06	Establishes performance standards and upgrading requirements for USTs containing petroleum or other regulated substances. Requires an installation or upgrading permit for each location where such installation or upgrading is to occur prior to beginning either an installation or upgrading of a tank or piping comprising an underground storage tank system.
Registration of Underground Storage Tank System	ORC Title 37, Chapter 3737, "Underground Storage Tanks" and implementing regulations in OAC 1301: 7-9-04	Establishes annual registration requirements for underground storage tanks containing petroleum or other regulated substances.
Flammable and Combustible Liquids	ORC Title 37, Chapter 3737, "Fire Marshal; Fire Safety" and implementing regulations in OAC 1301: 7-7-28	Requires a permit to install, remove, repair, or alter a stationary tank for the storage of flammable or combustible liquids or modify or replace any line or dispensing device connected thereto.
Waste Management and Pollution Prevention		
Generator Standards	ORC Title 37, Chapter 3734, "Solid and Hazardous Waste" and implementing regulations in OAC 3745-52-11 and 3745-52-12	Requires any person who generates a waste in the State of Ohio, as defined in rule 3745-51-02 of the Administrative Code, to determine if that waste is a hazardous waste. Requires a generator identification number from U.S. EPA or Ohio EPA prior to treatment, storage, disposal, transport, or offer for transport of hazardous waste.
Licensing Requirements for Solid Waste, Construction, and Demolition Debris Facilities	ORC Title 37, Chapter 3734, "Solid and Hazardous Waste" and implementing regulations in OAC 3745-37 and 3745-29	Requires an annual license for any municipal solid waste landfill, industrial solid waste landfill, residual solid waste landfill, compost facility, transfer facility, infectious waste treatment facility, or solid waste incineration facility prior to operation. New facilities must obtain a permit to install prior to construction. Also, requires a license to establish, modify, operate, or maintain a construction and demolition debris facility.
Radiation Generator and Broker Reporting Requirements	OAC 3701: 1-54-02	Requires completion of a low-level radioactive waste generator report within 60 days of beginning to generate low-level waste in Ohio. Additionally, requires each generator to submit an annual report on the state of low-level waste activities in their facility and pay applicable fees.

Table 1-2 State of Ohio Environmental Requirements (continued)

Law/Regulation	Citation	Requirements
Hazardous Waste Management System, Permits	ORC Title 37, Chapter 3734, "Solid and Hazardous Waste" and implementing regulations in OAC 3745-50-40	Requires operation permits for any new or existing hazardous waste facility.
Emergency Planning and Response		
Hazardous Chemical Reporting	ORC Title 37, Chapter 3750, "Emergency Planning" and implementing regulations in OAC 3750-30	Requires the submission of Material Safety Data Sheets and an annual Emergency and Hazardous Chemical Inventory to local emergency response officials for any hazardous chemicals that are produced, used, or stored at the facility in an amount that equals or exceeds the threshold quantity.
Emergency Planning Requirements of Subject Facilities	ORC Title 37, Chapter 3750, "Emergency Planning" and implementing regulations in OAC 3750-20	Requires any facility having an extremely hazardous substance present in an amount equal to or exceeding the threshold planning quantity to notify the emergency response commission and the local emergency planning committee within 60 days after onsite storage begins. Also, requires the designation of a facility representative who will participate in the local emergency planning process as a facility emergency coordinator.
Toxic Chemical Release Reporting	ORC Title 37, Chapter 3751, "Hazardous Substances" and implementing regulations in OAC 3745-100	Establishes reporting requirements and schedule for each toxic chemical known to be manufactured (including imported), processed, or otherwise used in excess of an applicable threshold quantity. Applies only to facilities of a certain classification.
Biotic Resources Protection		
State Endangered Plant Species Protection	ORC Title 15, Chapter 1518, "Endangered Species"	Establishes criteria for identifying threatened or endangered species of native Ohio plants and prohibits injuring or removing endangered species without permission.
State Endangered Fish and Wildlife Species Protection	ORC Title 15, Chapter 1531, "Division of Wildlife," Section 1531.25 and implementing regulations in OAC 1501:31-23-01	Grants the Chief of the Division of Wildlife with the approval of the Wildlife Council, the power to adopt, modify, and repeal rules to restrict the taking or possession of native wildlife, or any eggs or offspring thereof, that he/she finds to be threatened with statewide extinction. Establishes and requires periodic update to a list of endangered fish and wildlife species native to Ohio.
Permits for Impacts to Isolated Wetlands	ORC Title 61, Chapter 6111,"Water Pollution Control"	Requires a general or individual State isolated wetland permit prior to engaging in an activity that involves the filling of an isolated wetland.

Table 1-2 State of Ohio Environmental Requirements (continued)

Law/Regulation	Citation	Requirements
Cultural Resources Protection		
Ohio Historical Society	ORC Title 1, Chapter 149, Section 149.30	Creates the Ohio Historical Society and Advisory Board. Outlines the Society's duties for the preservation of Ohio's designated or potentially designated historic and archaeological objects, sites, and properties.
State Registry of Archaeological Landmarks	ORC Title 1, Chapter 149, Section 149.51	Directs the Ohio Historical Society to maintain a State Registry of Archaeological Landmarks. Prohibits any person from excavating or destroying such land, or from removing skeletal remains or artifacts from any land placed on the registry without first notifying the Director of the Historical Society.
Survey and Salvage; Discoveries; Preservation	ORC Title 1, Chapter 149, Section 149.53	Directs all State departments, agencies, and political subdivisions to cooperate with the Ohio Historical Society in the preservation of archaeological and historic sites and the recovery of scientific information from such sites. Also, requires State agencies and contractors performing work on public improvements to cooperate with archaeological and historic survey and salvage efforts and to notify the Society or the Board about archaeological discoveries.

Sources: http://www.epa.state.oh.us/dapc/regs/regs.html and http://onlinedocs.andersonpublishing.com.

1.5.4 Permit and Approval Status

Several construction and operating permit applications would be prepared and submitted, and regulator approval and/or permits would be received prior to construction or facility operation. Table 1-3 lists the required Federal, State, and local permits and their status.

1.5.5 Cooperating Agencies

During the scoping process, no Federal, State, or local agencies were identified as potential cooperating agencies in the preparation of this EIS.

1.5.6 Consultations

As a Federal agency, the NRC is required to comply with the consultation requirements in the *Endangered Species Act of 1973*, as amended, and the *National Historic Preservation Act of 1966*, as amended. For this proposed action, the NRC conducted these consultations as well as consultations in accordance with the *Fish and Wildlife Coordination Act of 1934* and the *Farmland Protection Policy Act of 1981*. All consultation letters related to each of these laws are presented in Appendix B of this EIS and are summarized below.

Table 1-3 Potentially Applicable Requirements for the Construction and Operation of the American Centrifuge Plant

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
Air Quality Protection			
Title V Operating Permit: Required for sources that are not exempt and are major sources, affected sources subject to the Acid Rain Program, sources subject to new source performance standards, or sources subject to National Emission Standards for Hazardous Air Pollutants.	Ohio EPA; U.S. EPA	*Clean Air Act* (CAA), Title V, Sections 501-507 (*U.S. Code*, Title 42, Sections 7661-7661f [42 USC 7661- 7661f]); *Ohio Administrative Code* (OAC) 3745-77-02	United States Enrichment Corporation is the holder of a final Title V Operating Permit (Facility ID 0666000000) with an issue date of July 31, 2003 and effective date of August 21, 2003. The plant is subject to 40 CFR Part 61, Subpart H (40 CFR Part 61, Subpart H), "National Emissions Standards for Emissions of Radionuclides," which is included in the terms and conditions of the Title V Operating Permit.
Ohio Permit to Install: Required for (1) any source to which one or more of the following CAA programs would apply: prevention of significant deterioration, nonattainment area, New Source Performance Standards, and/or National Emission Standards for Hazardous Pollutants; and (2) any source to which one or more of the following State air quality programs would apply: Gasoline Dispensing Facility Permit, Direct Final Permit, and/or Small Maximum Uncontrolled Emissions Unit Registration.	Ohio EPA	CAA, Title I, Sections 160-169 (42 USC 7470-7479); OAC 3745-31-02	USEC has determined that the prevention of significant deterioration, nonattainment area, and NSPS programs do not apply to the proposed ACP. However, air emission sources at the proposed ACP would require an Ohio Permit to Install and USEC would submit a timely application to the Ohio EPA.

Table 1-3 Potentially Applicable Requirements for the Construction and Operation of the American Centrifuge Plant (continued)

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
Ohio Permit to Operate: Required for (1) any source to which one or more of the following CAA programs would apply: prevention of significant deterioration, nonattainment area, New Source Performance Standards, National Emission Standards for Hazardous Air Pollutants; and (2) any source to which one or more of the following State air quality programs would apply: State Permit to Operate and/or registration of operating unit with potential air emissions of an amount and type considered minimal. This permit is not required, however, for any facility that must obtain a Title V Operating Permit.	Ohio EPA	CAA, Title I, Sections 160-169 (42 USC 7470-7479); OAC 3745-35-02	United States Enrichment Corporation is the holder of a final Title V Operating Permit (Facility ID 0666000000) with an issue date of July 31, 2003 and effective date of August 21, 2003. New sources at the proposed ACP requiring a Permit to Install would be incorporated in the Title V Operating Permit.
Risk Management Plan: Required for any stationary source that has a regulated substance (e.g., chlorine, hydrogen fluoride, nitric acid) in any process (including storage) in a quantity that is over the threshold level.	U.S. EPA; Ohio EPA	CAA, Title 1, Section 112(R)(7) (42 USC 7412); 40 CFR Part 68; OAC 3745-104	USEC has determined that no regulated substances would be stored at the proposed ACP in quantities that exceed the threshold levels. Accordingly, a Risk Management Plan would not be required.
***Clean Air Act* Conformity Determination**: Required for each criteria pollutant (i.e., sulfur dioxide, particulate matter, carbon monoxide, ozone, nitrogen dioxide, and lead) where the total of direct and indirect emissions in a nonattainment or maintenance area caused by a Federal action would equal or exceed threshold rates.	Ohio EPA	CAA, Title 1, Section 176(c) (42 USEC 7506); 40 CFR Part 93; OAC 3745-102	Pike County, Ohio has been designated as "Cannot be Classified or Better Than Standard" for criteria pollutants. Because the county is in attainment with National Ambient Air Quality Standards for criteria pollutants and contains no maintenance areas, no *Clean Air Act* conformity determination is required for any criteria pollutant that would be emitted as a result of the Proposed Action. Existing air quality on the site is in attainment with National Ambient Air Quality Standards for the criteria pollutants.

Table 1-3 Potentially Applicable Requirements for the Construction and Operation of the American Centrifuge Plant (continued)

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
Water Resources Protection			
National Pollutant Discharge Elimination System Permit: Construction Site Storm Water: Required before making point source discharges into waters of the State of storm water from a construction project that disturbs more than 2 hectares (5 acres) of land.	Ohio EPA	*Clean Water Act* (CWA) (33 USC 1251 et seq.); 40 CFR Part 122; OAC-3745-33-02, 3745-38-02, and 3745-38-06	Construction of the proposed ACP and new cylinder storage yards would require a permit for the construction site storm water discharges. United States Enrichment Corporation is the holder of Permit number 0IS00023AD. If requested, a Storm Water Pollution Prevention Plan would be submitted to the Ohio EPA at the appropriate time. Storm water would discharge through existing outfalls covered by a permit.
National Pollutant Discharge Elimination System Permit: Industrial Facility Storm Water: Required before making point source discharges into waters of the State of storm water from an industrial site.	Ohio EPA	CWA (33 USC 1251 et seq.); 40 CFR Part 122; OAC-3745-33-02, 3745-38-02, and 3745-38-06	Storm water would be discharged from the proposed ACP site during operations. Storm water would discharge through existing outfalls covered by a permit.
National Pollutant Discharge Elimination System Permit: Process Water Discharge: Required before making point source discharges into waters of the State of industrial process wastewater.	Ohio EPA	CWA (33 USC 1251 et seq.); 40 CFR Part 122; OAC-3745-33-02, 3745-38-02, and 3745-38-06	The proposed ACP would process industrial wastewater through an existing permitted facility and through existing outfalls covered by the permit.
Ohio Surface Water Permit to Install: Required before constructing sewers or pump stations.	Ohio EPA	OAC-3745-31-02	If required, before construction of sewer lines and pump stations at the proposed ACP, a Permit to Install to modify the existing National Pollutant Discharge Elimination System permit would be submitted to the Ohio EPA at the appropriate time.
Ohio Surface Water Permit to Install: Required before constructing any wastewater treatment or collection system or disposal facility.	Ohio EPA	OAC-3745-31-02	If required, a Permit to Install to modify the existing National Pollutant Discharge Elimination System permit would be submitted to the Ohio EPA at the appropriate time.

Table 1-3 Potentially Applicable Requirements for the Construction and Operation of the American Centrifuge Plant (continued)

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
Spill Prevention Control and Countermeasures Plan: Required for any facility that could discharge oil in harmful quantities into navigable waters or onto adjoining shorelines.	U.S. EPA	CWA (33 USC 1251 et seq.); 40 CFR Part 112	A Spill Prevention Control and Countermeasures plan would be required. The United States Enrichment Corporation's plan is currently being revised to incorporate changes in plant operation and to reflect new requirements mandated in the *Federal Register* on July 17, 2002. The U.S. EPA requires plan approval by August 17, 2005 and implementation by February 18, 2006. USEC would revise the plan to include proposed ACP operations at the appropriate time.
***Clean Water Act* Section 401 Water Quality Certification**: Required to be submitted to the agency responsible for issuing any Federal license or permit to conduct an activity that may result in a discharge of pollutants into waters of a state.	Ohio EPA	CWA, Section 401 (33 USC 1341); ORC Chapters 119 and 6111; OAC Chapters 3745-1, 3745-32, and 3745-47	USEC believes that it would not be required to obtain a *Clean Water Act* Section 401 Water Quality Certification for construction or operation of the proposed ACP or new cylinder storage yards. If USEC determines that a Federal license or permit is required (e.g., a *Clean Water Act* Section 404 Permit), a *Clean Water Act* Section 401 Water Quality Certification would be requested from the Ohio EPA at the appropriate time.
Public Water System: A completed application for an initial public water system license is required prior to the operation of the public water system.	Ohio EPA	OAC-3745-84-01 (B)(b)	USEC would procure water from a qualified vendor, which draws water from groundwater wells sunk near the Scioto River. USEC would not operate a public water system subject to these requirements.

Table 1-3 Potentially Applicable Requirements for the Construction and Operation of the American Centrifuge Plant (continued)

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
Underground Storage Tank Installation Permit: Required before beginning installation of an underground storage tank system (i.e., a tank and/or piping of which 10 percent or more of the volume is underground and that contains petroleum products or substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act, except those hazardous substances that are also defined as hazardous waste by the Resource Conservation and Recovery Act).	Ohio Department of Commerce, Ohio Bureau of Underground Storage Tank Regulations	OAC 1301:7-9-06(D)	Two existing UST systems are anticipated to be used by the proposed ACP. Registration number: 66005107-R00010. Tank Numbers: T00007 and T00016.
New Underground Storage Tanks System Registration: Required within 30 days of bringing a new underground storage tank system into service.	U.S. EPA; Ohio Bureau of Underground Storage Tank Regulations	RCRA, as amended, Subtitle I (42 USC 6991a-6991i); 40 CFR §280.22; OAC 1301:7-9-04	If new underground storage tank systems would be installed at the proposed ACP the Registration would be filed at the appropriate time. No new systems are currently planned.
Above Ground Storage Tank: A Permit to Install required to install, remove, repair or alter any stationary tank for the storage of flammable or combustible liquids.	Ohio Department of Commerce, State Fire Marshal	OAC 1301:7-7-28(A)(3) 40 CFR §112.8	New Above ground Storage fuel storage tanks would be required for the proposed ACP. Permits to install would be filed at the appropriate time.
Waste Management and Pollution Prevention			
Submit Determination Results: Required when a person who generates waste in the State of Ohio or a person who generates waste outside the State that is managed inside the State determines that the waste he/she generates is hazardous waste.	Ohio EPA	OAC 3745-52-11	Upon characterization of newly generated waste streams from the proposed ACP, notification would be made to the Ohio EPA.
Registration and Hazardous Waste Generator Identification Number: Required before a person who generates over 100 kg (220 lb) per calendar month of hazardous waste ships the hazardous waste off-reservation.	U.S. EPA; Ohio EPA	RCRA, as amended (42 USC 6901 et seq.), Subtitle C; OAC 3745-52-12	United States Enrichment Corporation has Hazardous Waste Generator Identification Number OHD987054723.

Table 1-3 Potentially Applicable Requirements for the Construction and Operation of the American Centrifuge Plant (continued)

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
Construction and Demolition Debris Facility License: Required before establishing, modifying, operating, or maintaining a facility to dispose of debris from the alteration, construction, destruction, or repair of a man-made physical structure; however, the debris to be disposed of must not qualify as solid or hazardous waste; also, no license is required if debris from site clearing is used as fill material on the same site.	Ohio EPA or Pike County Board of Health	OAC 3745-37-01	Construction debris would not be disposed of onsite at the proposed ACP. Therefore, no Construction and Demolition Debris Facility License would be required.
Low-Level Radioactive Waste Generator Report: Required within 60 days of commencing the generation of low-level waste in Ohio.	Ohio Department of Health	OAC 3701:1-54-02	USEC would file a Low-Level Radioactive Waste Generator Report with the Ohio Department of Health at the appropriate time. ODH ID Number 52-2109255.
Hazardous Waste Facility Permit: Required if hazardous waste will undergo nonexempt treatment by the generator, be stored onsite for longer than 90 days by the generator of 1,000 kg (2,205 lb) or more of hazardous waste per month, be stored onsite for longer than 180 days by the generator of between 100 and 1,000 kg (220 and 2,205 lb) of hazardous waste per month, disposed of onsite, or be received from off-reservation for treatment or disposal.	U.S. EPA; Ohio EPA	RCRA, as amended (42 USC 6901 et seq.), Subtitle C; OAC 3745-50-40	Hazardous waste would not be disposed of onsite at the proposed ACP. Also, USEC does not plan to store any hazardous wastes that are generated onsite for more than 90 days. However, should waste require storage onsite for greater then 90 days for characterization, profiling, or scheduling for treatment or disposal, a Hazardous Waste Facility Permit would be required and submitted at the appropriate time.
Depleted UF_6 Management Measures: Establishes requirements for management, inspection, testing, and maintenance associated with the depleted UF_6 storage yards and cylinders owned by USEC at the DOE reservation as stipulated in the ACP License Application.	Ohio EPA	OAC 3745-266; 40 CFR Part 266, Subpart N	USEC would manage the depleted UF_6 tails cylinders in accordance with 40 CFR Part 266, Subpart N and Ohio Administrative Code Chapter 3745-266 while in storage.

Table 1-3 Potentially Applicable Requirements for the Construction and Operation of the American Centrifuge Plant (continued)

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
Low-Level Mixed Waste: Low-level mixed waste is a waste that contains both low-level radioactive waste and RCRA-regulated hazardous waste.	Ohio EPA	OAC 3745-266; 40 CFR Part 266, Subpart N	USEC would manage low-level mixed waste in compliance with 40 CFR Part 266, Subpart N and Ohio Administrative Code Chapter 3745-266.
Industrial Solid Waste Landfill Permit to Install: Required before constructing or expanding a solid waste landfill facility in Ohio.	Ohio EPA	OAC 3745-29-06	Industrial solid waste would not be disposed of onsite at the proposed ACP. Therefore, no Industrial Solid Waste Landfill Permit to Install would be required.
Emergency Planning and Response			
List of Material Safety Data Sheets: Submission of a list of material Safety Data Sheets is required for hazardous chemicals (as defined in 29 CFR Part 1910) that are stored onsite in excess of their threshold quantities.	Local Emergency Planning Commission; Ohio State Emergency Response Commission	Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), Section 311 (42 USC 11021); 40 CFR §370.20; OAC 3750-30-15	USEC would prepare and submit a List of Material Safety Data Sheets at the appropriate time.
Annual Hazardous Chemical Inventory Report: Submission of the report is required when hazardous chemicals have been stored at a facility during the preceding year in amounts that exceed threshold quantities.	LEPC; Ohio State Emergency Response Commission; local fire department	EPCRA, Section 312 (42 USC 11022); 40 CFR §370.25; OAC 3750-30-01	United States Enrichment Corporation would prepare and submit an Annual Hazardous Chemical Inventory Report each year. United States Enrichment Corporation Facility ID Number 45661NTDST3930U.
Notification of On-Site Storage of an Extremely Hazardous Substance: Submission of the notification is required within 60 days after on-site storage begins of an extremely hazardous substance in a quantity greater than the threshold planning quantity.	Ohio State Emergency Response Commission	EPCRA, Section 304 (42 USC 11004); 40 CFR §355.30; OAC 3750-20-05	United States Enrichment Corporation would prepare and submit the Notification of On-Site Storage of an Extremely Hazardous Substance at the appropriate time, if such substances are determined to be stored in a quantity greater than the threshold planning quantity at the proposed ACP. Facility ID Number 45661NTDST3930U.
Annual Toxics Release Inventory Report: Required for facilities that have 10 or more full-time employees and are assigned certain Standard Industrial Classification codes.	U.S. EPA; Ohio EPA	EPCRA, Section 313 (42 USC 11023); 40 CFR Part 372; OAC 3745-100-07	United States Enrichment Corporation would prepare and submit a Toxics Release Inventory Report to the U.S. EPA each year. Facility ID Number 45661NTDST3930U.

Table 1-3 Potentially Applicable Requirements for the Construction and Operation of the American Centrifuge Plant (continued)

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
Transportation of Radioactive Wastes and Conversion Products Certificate of Registration: Required to authorize the registrant to transport hazardous material or cause a hazardous material to be transported or shipped.	U.S. Department of Transportation	*Hazardous Materials Transportation Act* (HMTA), as amended by the *Hazardous Materials Transportation Uniform Safety Act* of 1990 and other acts (49 USC 1501 et seq.); 49 CFR §107.608(b)	United States Enrichment Corporation Certificate of Registration Number 052803005022LN.
Transportation of Radioactive Wastes and Conversion Products Packaging, Labeling, and Routing Requirements for Radioactive Materials: Required for packages containing radioactive materials that will be shipped by truck or rail.	U.S. Department of Transportation	HMTA (49 USC 1501 et seq.); Atomic Energy Act (AEA), as amended (42 USC 2011 et seq.); 49 CFR Parts 172, 173, 174, 177, and 397	When shipments of radioactive materials are made, USEC would comply with U.S. Department of Transportation packaging, labeling, and routing requirements.
Land Resource Protection			
Farmland Protection and Policy Act: Prime farmland is land that has the best combination of physical and chemical characteristics for producing crops of statewide or local importance. Prime farmland is protected by the Farmland Protection and Policy Act of 1981 which seeks "… to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmlands to nonagricultural uses…"	U.S. Department of Agriculture	Farmland Protection and Policy Act (FPPA) of 1981 Public Law 97-98; 7 USC 4201[b]; 7 CFR Part 7	Consultation letters are included in Appendix B of this EIS and summarized in Section 1.5.6.4. The Natural Resources Conservation Service has concluded that the proposed site does not contain prime soils, so the Farmland Protection and Policy Act does not apply.

Table 1-3 Potentially Applicable Requirements for the Construction and Operation of the American Centrifuge Plant (continued)

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
Biotic Resource Protection			
Threatened and Endangered Species Consultation: Required between the responsible Federal agencies and affected states to ensure that the project is not likely to: (1) jeopardize the continued existence of any species listed at the Federal or State level as endangered or threatened; or (2) result in destruction of critical habitat of such species.	U.S. Fish and Wildlife Service (FWS); Ohio Department of Natural Resources	Endangered Species Act of 1973, as amended (16 USC 1531 et seq.); ORC 1531.25-26 and 1531.99	Consultation letters are included in Appendix B of this EIS and summarized in Section 1.5.6.1. NRC's review and subsequent analysis of the information provided by the FWS and the Ohio Department of Natural Resources has concluded that threatened or endangered species or their critical habitat are not likely to be adversely affected.
***Clean Water Act* Section 404 (Dredge and Fill) Permit**: Required to place dredged or fill material into waters of the U.S., including areas designated as wetlands, unless such placement is exempt or authorized by a nationwide permit or a regional permit; a notice must be filed if a nationwide or regional permit applies.	U.S. Army Corps of Engineers	CWA (33 USC 1251 et seq.); 33 CFR Parts 323 and 330	Construction of the proposed ACP would not result in dredging or placement of fill material into wetlands within the jurisdiction of the U.S. Army Corps of Engineers.
Ohio General Permit for Filling Category 1 and Category 2 Isolated Wetlands: Required where the proposed project involves the filling or discharge of dredged material into Category 1 and Category 2 isolated wetlands, causing impacts that total 0.20 hectares (0.5 acres) or less.	Ohio EPA	*Ohio Revised Code* (ORC) Sections 6111.021-6111.029	Construction of the proposed ACP would not result in dredging or placement of fill material into wetlands within the jurisdiction of the Ohio EPA isolated wetlands program.
Ohio Individual Isolated Wetland Permit: Required where the proposed project involves the filling or discharge of dredged material into Category 1 and Category 2 isolated wetlands, causing impacts that total greater than 0.20 hectares (0.5 acres) for Category 1 isolated wetlands and/or greater than 0.20 hectares (0.5 acree) but not exceeding 1.21 hectares (3 acres) for Category 2 isolated wetlands.	Ohio EPA	ORC Sections 6111.021-6111.029	Construction of the proposed ACP would not result in dredging or placement of fill material into wetlands within the jurisdiction of the Ohio EPA isolated wetlands program.

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
Cultural Resources Protection			
Archaeological and Historical Resources Consultation: Required before a Federal agency approves a project in an area where archaeological or historic resources might be located.	Ohio State Historic Preservation Officer	*National Historic Preservation Act* of 1966, as amended (16 USC 470 et seq.); *Archaeological and Historical Preservation Act* of 1974 (16 USC 469-469c-2); Antiquities Act of 1906 (16 USC 431 et seq.); *Archaeological Resources Protection Act* of 1979, as amended (16 USC 470aa-mm)	NRC has consulted with the Ohio State Historic Preservation Officer and Indian tribes regarding previous archaeological and architectural surveys at the DOE reservation. Consultation letters are included in Appendix B of this EIS and summarized in Section 1.5.6.2. In consultation with the Ohio State Historic Preservation Officer and the Indian tribes, NRC has concluded that the proposed action would have no effect (direct or indirect) on the eligible or potentially eligible properties on or immediately adjacent to the DOE reservation.

Source: USEC, 2005.

1.5.6.1 *Endangered Species Act of 1973* Consultation

The *Endangered Species Act* was enacted to prevent the further decline of endangered and threatened species and to restore those species and their critical habitats. Section 7 of the Act requires consultation with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service to ensure that actions they fund, authorize, permit, or otherwise carry out will not jeopardize the continued existence of any listed species or adversely modify designated critical habitats.

NRC initiated consultation with the U.S. Fish and Wildlife Service in September 2004 by reviewing the information that the FWS submitted to USEC on June 21, 2004 regarding the threatened, endangered, proposed, and candidate species, and designated critical habitats that may be present in the project area. In a phone conversation on September 23, 2004 between the NRC and the U.S. Fish and Wildlife Service, the U.S. Fish and Wildlife Service indicated that the information presented in the letter was still current and accurate.

The U.S. Fish and Wildlife Service letter dated June 21, 2004, states that the proposed project lies within the range of the Federally endangered Indiana bat *(Myotis sodalis*), and within the range of timber rattlesnake (*Crotalus horridus*), a species of concern and Ohio-listed endangered species. After publication of the Draft EIS, the NRC provided the FWS, on November 1, 2005, with its finding of “no effect” on listed species and critical habitat. The FWS provided its concurrence on November 16, 2005.

1.5.6.2 *National Historic Preservation Act of 1966* Section 106 Consultation

To comply with Federal historic preservation laws and regulations as well as mandates of the *National Environmental Policy Act*, the NRC is required to identify historic properties in the area potentially affected by its actions and to consider potential effects on those properties. The principal driver for this process is Section 106 of the *National Historic Preservation Act*, as amended (16 U.S.C. 470 et seq.), and implementing regulations at 36 CFR Part 800, as amended through August 2004. Under Section 106, Federal agencies are required to consider the effects of their undertakings on historic properties; 36 CFR Part 800 spells out the process by which this is done in consultation with the State Historic Preservation Officer and other consulting parties. The *National Historic Preservation Act* and 36 CFR Part 800 also specify that consultation in the Section 106 process should provide Indian tribes the opportunity to identify concerns about historic properties on or off Tribal lands, present views about an undertaking's effects on such properties, and participate in the resolution of adverse effects.

This EIS process has offered State agencies, Federally recognized Indian tribes, other organizations, and individuals that may be concerned with the possible effects of the proposed action on historic properties an opportunity to participate in the consultation process required by Section 106. The following subsections summarize the consultations with the various agencies, tribes, organizations, and individuals contacted during the ongoing consultation process.

Advisory Council on Historic Preservation

By letter dated May 20, 2005, the NRC notified the Advisory Council on Historic Preservation, Office of Federal Agency Programs of their proposed licensing activity and intent to use the NRC's *National Environmental Policy Act* review process to satisfy the Section 106 requirements as specified at 36 CFR §800.8. NRC provided the Advisory Council on Historic Preservation a review of the current consultation activities with the Ohio State Historic Preservation Officer and the Indian tribes and indicated that the EIS would be provided to the Advisory Council on Historic Preservation for review.

By letter dated September 6, 2005, the NRC provided a copy of the DEIS to the Advisory Council on Historic Preservation, specifying where information about historic properties and NRC's preliminary findings of effect could be found.

By letter dated January 27, 2006, in fulfillment of 36 CFR 800.8(c)(2)(ii), the NRC referred to the Advisory Council on Historic Preservation the objections of a consulting party (Mr. Geoffrey Sea) to the NRC's compliance with Section 106 through use of its NEPA process and of the NRC's finding of no effect on historic properties that was presented in the DEIS. The NRC included a listing of Section 106 correspondence and provided a link to the NRC website where the correspondence is available. The NRC requested that the Council review the objection of the consulting party and provide its findings.

The NRC received no response to the objection from the Advisory Council within 30 days.

Ohio Historic Preservation Office

By letter dated December 28, 2004, the NRC initiated the Section 106 consultation process with the Ohio State Historic Preservation Officer. This letter requested information on other parties that may be entitled to be consulting parties by the proposed action, as well as notified the office of NRC's intent to use the EIS process for Section 106 purposes as described in 36 CFR §800.8. The letter included portions of the Environmental Report prepared by USEC that indicated that the proposed action would not have adverse effects on historical resources included or eligible for inclusion in the National Register of Historic

Places, should not impact the historical integrity of the Portsmouth reservation, and should not result in any impact to Native American Indian tribal, religious, or cultural sites.

The Ohio State Historic Preservation Officer responded by letter dated February 2, 2005 (see Appendix B) stating that the proposed project would not adversely affect the Portsmouth Gaseous Diffusion Plant historic property; however, it recommended that the NRC provide a more detailed discussion of the previous studies that occurred on the DOE reservation and recommended that the NRC consider notifying Native American Federally Recognized Tribal Authorities that were historically associated with the area. A listing of potentially interested Federally Recognized Tribal Authorities was included to the letter to the NRC, as well as a point of contact at the Pike County Commissioners.

By letter dated September 6, 2005, the NRC provided a copy of the DEIS to the Ohio State Historic Preservation Officer, specifying where information about historic properties and NRC's preliminary findings of effect could be found.

The Ohio State Historic Preservation Officer responded by letter dated October 5, 2005 (see Appendix B) with comments intended to provide clarification regarding the discussions of cultural resources and the statement, "Within the integrated National Environmental Policy Act review process, this reaffirms our interpretation that the proposed American Centrifuge Plant undertaking will not adversely affect historic properties."

Federally Recognized Indian Tribes

Based on information found in the Tribal Leaders Directory issued by the Bureau of Indian Affairs, the information provided by the Ohio State Historic Preservation Officer, and information from the National Park Service, National Center for Cultural Resources, NRC has identified 17 Federally recognized Indian tribes with ties to the region that may be interested in being a consulting party. By letters dated March 14 or March 18, 2005, NRC provided each tribe with a brief description of the proposed actionand initial cultural resource review information, inquiring if the tribe had any information or concerns regarding historic sites or other cultural resources in the area. The letters also notified the Indian tribes of NRC's intent to use the EIS process for Section 106 purposes as described in 36 CFR §800.8. The NRC staff followed up the initial letters with telephone calls to elicit information from the tribes regarding their interest in participating in the Section 106 consultation process. Most tribes indicated that they had no specific information or interest. After the initial letters were sent to the tribes, a follow-up phone call in June 2005 was placed to each tribe that had not responded or electronic communication was continued with some tribes that requested such methods. This process was repeated in August 2005. Through these various phone and electronic communications the NRC was able to determine that 15 of 17 recognized tribes either had no additional information or no interest in participating in the Section 106 process. The NRC designated the Seneca Nation as a consulting party based on their interest in the project. NRC provided a copy of the DEIS to the Seneca Nation on September 6, 2005; and sent a letter providing new information about an earthen embankment at the DOE well field on December 19, 2005. NRC received an email from the Seneca Nation on January 10, 2006 stating no further concerns.

NRC received two letters from tribes independent of the formal consultation process initiated in March 2005. One letter from the Tribal Historic Preservation Officer of the Absentee Shawnee Tribe of Oklahoma was included in a petition filed electronically on February 28, 2005, in an adjudicatory hearing on this licensing, received later in hard copy. The letter explained that the tribe considers that it is descendant from the people of the Hopewell culture who built the many earthwork sites in the region. The letter refers to "the Barnes Works in Scioto Township" (a reference to the Scioto Township Works) as "one of the largest sacred sites in North America" (see Appendix B). The letter indicated that the tribe expected to be included as a consulting party in the Section 106 process. Independent of this request, NRC had already sent a letter to the Absentee Shawnee on March 14, initiating consultation. Based on the February letter from the Absentee Shawnee, NRC designated the Absentee Shawnee as a consulting party. Subsequently, NRC left telephone messages with the tribe on June 2 and August 24, 2005; sent a copy of the DEIS on September 6, 2005; and sent a letter providing new information about an earthen embankment at the DOE well field on December 19, 2005. NRC received no responses from the tribe.

A second letter, from the chief of the Shawnee Nation, United Remnant Band (a State-recognized tribe in Ohio) was included in a plea in the adjudicatory hearing filed on March 30, 2005 and was submitted electronically on October 27, 2005 as attachments to DEIS comments from another party. The letter states that the tribe has ties to the site in Pike County, near the Scioto River and considers the earth works and other ceremonial and cultural features there to be sacred (see Appendix B). By letter of November 29, 2005 to the tribe, NRC sent a copy of the DEIS and new information about an earthen embankment at the DOE well field. NRC requested the tribe to comment on its inventory and evaluation effort and preliminary determination of effect on the Scioto Township Works site and to provide information about the site's importance to the tribe to be considered in the FEIS. NRC received no response from the tribe.

Other Organizations

By letter dated March 14, 2005, the NRC contacted the Pike County Commissioners and provided the County with a brief description of the proposed action, the initial cultural resource review information, and inquired if the County had any information regarding historic sites or cultural resources in the area. NRC sent copies of the DEIS to the commissioners in a mailing of September 6, 2005. The NRC received no comments from the commissioners. .

Interested Members of the Public

Through the NRC's scoping process, additional information about cultural resources in the area was obtained from interested members of the public. Additionally, information was also received through the adjudicatory hearing that is taking place on this license application. This information was considered in preparation of the EIS.

The NRC received a request on August 9, 2005, from the owner of a neighboring property requesting consulting party status. In consultation with the Ohio State Historic Preservation Officer on August 25, 2005, NRC granted consulting status to the property owner, Mr. Geoffrey Sea. By letter of September 6, 2005, NRC designated Mr. Sea as a consulting party, transmitted the DEIS, and requested comments on the DEIS and NRC's preliminary findings of effect on historic properties. NRC received attachments to DEIS comments from Mr. Sea via email on October 27. On November 23, 2005, NRC received an email from Mr. Sea stating objections to NRC's use of the NEPA process for Section 106 compliance, posing questions about the DEIS findings of effect, and stating that Mr. Sea would forward full comments on the DEIS directly to the Advisory Council on Historic Preservation. By email of December 7, NRC responded to Mr. Sea's questions and requested the text of Mr. Sea's comments. By letter of December 19, 2005, NRC transmitted new information on the origin of the earthen embankment at the DOE well field to Mr. Sea. NRC received no DEIS comments from Mr. Sea other than the attachments sent in October.

1.5.6.3 *Fish and Wildlife Coordination Act of 1934* Consultation

The consultation component of the *Fish and Wildlife Coordination Act*, requires that "whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatever, including navigation and drainage, by any department or agency of the U.S., or by any public or private agency under Federal permit or license, such department or agency first shall consult with the U.S. Fish and Wildlife Service, Department of the Interior, and with the head of the agency exercising administration over the wildlife resources of the particular State wherein the impoundment, diversion, or other control facility is to be constructed, with a view to the conservation of wildlife resources by preventing loss of and damage to such resources as well as providing for the development and improvement thereof in connection with such water-resource development." Because the proposed action does not involve such modifications to a stream or other body of water, the NRC is not implementing consultations under the *Fish and Wildlife Coordination Act*. The NRC is consulting with the U.S. Fish and Wildlife Service and the State agency that exercises administrative control over the wildlife resources under the *Endangered Species Act*.

1.5.6.4 *Farmland Protection Policy Act of 1981* Consultation

This Act requires consultation with the U.S. Department of Agriculture, Natural Resources Conservation Service, to determine if the proposed action would convert protected farmland to non-agricultural use. For lands protected by the Act, scoring the relative value of the land for preservation is performed by the Natural Resources Conservation Service and the project proponent on a "Form AD-1006." If the Farmland Conversion Impact Rating is below 160, no further analysis is necessary. Scores between 160 and 200 may have potential impacts and require additional review and further consideration of alternatives that would avoid or lessen the conversion and lower the impact rating score.

NRC reviewed the correspondence from the District Conservationist of the Natural Resources Conservation Service in Waverly, Ohio. This letter, dated December 5, 2003, indicates that all of the proposed ACP facilities in the southwest quadrant of the central area would be located on non-prime soils (Borchelt, 2003). For the cylinder storage yard (X-745H) in the northern portion of the reservation, NRC consulted with the Pike Soil and Water Conservation District and the District Conservationist of the U.S. Department of Agriculture and found that the yard would also be located on non-prime soils (Yost, 2005). Because the proposed activities would be conducted on non-prime soils, the Farmland Protection Policy Act would not apply.

1.6 Organizations Involved in the Proposed Action

Two organizations have specific roles in the implementation of the proposed action:

- USEC Inc. (abbreviated as USEC for the purpose of this EIS) is the NRC license applicant. If the license is granted, USEC would be the holder of an NRC license for the possession and use of special nuclear material, source material, and byproduct material at the proposed ACP. USEC would be responsible for constructing, operating, and decommissioning the proposed facility in compliance with that license and applicable NRC regulations. USEC is a global energy company and its wholly owned subsidiary, the United States Enrichment Corporation, is the world's leading supplier of enriched uranium fuel for commercial nuclear power plants. The NRC has issued Certificates of Compliance for that subsidiary to operate the Paducah and Portsmouth Gaseous Diffusion Plants. More recently, the NRC has issued a license to USEC to construct and operate the Lead Cascade Demonstration Facility described above. Consistent with the requirements in 10 CFR §76.22 and in connection with the issuance of these Certificates and the Lead Cascade license, the NRC has determined that USEC is neither owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government. All of the principal officers of USEC are citizens of the U.S. USEC, including its wholly owned subsidiaries, was organized under Delaware law in connection with the privatization of the United States Enrichment Corporation. It is listed on the New York Stock Exchange, and private and institutional investors own the outstanding shares of USEC. USEC's principal office is located in Bethesda, Maryland. (USEC, 2004b)

- The NRC is the licensing agency. The NRC has the responsibility to evaluate the license application for compliance with the NRC regulations associated with uranium enrichment facilities. These include standards for protection against radiation in 10 CFR Part 20 and requirements in 10 CFR Parts 30, 40, and 70 that would authorize USEC to possess and use special nuclear material, source material, and byproduct material, respectively, at the proposed ACP. The NRC is responsible for regulating activities performed within the proposed ACP through its licensing review process and subsequent inspection program. To fulfill the NRC responsibilities under the *National Environmental Policy Act*, the environmental impacts of the proposed action are evaluated in accordance with the requirements of 10 CFR Part 51 and documented in this EIS.

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2. ALTERNATIVES

This chapter describes the proposed action of issuing a U.S. Nuclear Regulatory Commission (NRC) license to USEC Inc. (USEC) to possess and use special nuclear material, source material, and byproduct material at the proposed ACP, and alternatives. Also, alternatives for the disposition of depleted uranium hexafluoride (UF_6) resulting from enrichment operations over the lifetime of the proposed ACP are analyzed. As required by the *National Environmental Policy Act*, this chapter also presents a no-action alternative. Under the no-action alternative USEC would not construct, operate, or decommission the ACP. The no-action alternative provides a basis for comparing and evaluating the potential impacts of the proposed action.

Section 2.1 presents technical details of the proposed action and connected actions, including descriptions of the proposed site, gas centrifuge enrichment technology, and the activities at the proposed ACP: refurbishment and construction; manufacturing and assembly; operation; and decontamination and decommissioning. It also describes the related action of ceasing uranium enrichment operations at the Paducah Gaseous Diffusion Plant. Section 2.2 describes the no-action alternative. Section 2.3 discusses alternatives to the proposed action that were considered but eliminated, including alternative sites, enrichment technologies other than the proposed centrifuge technology, and sources for enriched product. The chapter concludes with a comparison of predicted environmental impacts for each alternative and a preliminary recommendation from NRC staff regarding the proposed action.

2.1 Proposed Action

The proposed action is the issuance of an NRC license for USEC to possess and use special nuclear material, source material, and byproduct material at the proposed ACP in Piketon, Ohio. The NRC license, if granted, would be for a period of 30 years. If an NRC license is issued, USEC plans to start construction of the ACP in 2007, begin commercial centrifuge operations in 2009, and ramp up to the 3.5 million separative work unit (SWU) design capacity by 2011.

Although the proposed action is the issuance of a license to possess and use nuclear material, this Environmental Impact Statement (EIS) analyzes activities that would occur as the result of the license because these activities - construction, operation, and decommissioning of the proposed ACP - may have the potential for environmental impacts. For purposes of this analysis, these activities are organized into four phases:

(1) Refurbishment, site preparation, and construction of new facilities;
(2) Centrifuge manufacture and equipment assembly;
(3) Facility operation; and
(4) Decontamination and decommissioning.

In addition, USEC indicates in its Environmental Report (USEC, 2005b) that subsequent to beginning operations at the ACP, the uranium enrichment operations currently taking place at the Paducah Gaseous Diffusion Plant in Kentucky would cease. Therefore, the impacts of ceasing operations at the Paducah, Kentucky plant are also analyzed in this EIS. For the purpose of this analysis, cessation of uranium enrichment operations at Paducah would include stopping uranium enrichment plant operations, but would not include decommissioning of the Paducah Gaseous Diffusion Plant, changes to any other activities at that site, or any alternate uses of the site in the future. Those other actions at Paducah would be the subject of other decisions and other environmental reviews.

2.1.1 Location and Description of Proposed Site

The U.S. Department of Energy (DOE) reservation, on which the proposed ACP would be sited, is located in Pike County, Ohio, one of the State's less populated counties. The reservation is located in the town of Piketon, between Chillicothe and Portsmouth, Ohio, approximately 113 kilometers (70 miles) south of Columbus, Ohio. Figure 2-1 shows the location of the DOE reservation within the surrounding county.

The DOE reservation consists of approximately 1,497 hectares (3,700 acres), which includes a 526 hectare (1,300 acre) central area surrounded by a perimeter road. Within this central area approximately 304 hectares (750 acres) are located in a controlled access area. The proposed ACP would be located in the southwest quadrant of this central area approximately 2.5 kilometers (1.5 miles) east of U.S. Route 23. The land surrounding the reservation is sparsely populated, with the nearest residential center, Jasper, located approximately 1.9 kilometers (1.2 miles) to the northwest of the proposed site. The nearest major population center is Piketon, located approximately 6.4 kilometers (4 miles) north of the DOE reservation on U.S. Route 23. The land outside the Perimeter Road but still within the reservation is used for a variety of purposes, including a water treatment plant, lagoons for the process wastewater treatment plant, sanitary and inert landfills, and open and forested buffer areas. Most site developments are located within the fenced central area, which is largely devoid of trees, with grass and paved roadways dominating the open space. The proposed ACP would be situated on approximately 81 hectares (200 acres) of the southwest quadrant of the controlled access area. The proposed ACP site boundary would lie along the Perimeter Road on the western edge of the central area, approximately 568 meters (1,865 feet) from the closest DOE reservation boundary. The distance from the ACP to the nearest member of the public (i.e., actual permanent residence) is about 914 m (3,000 ft) (USEC, 2005b). The environmental characteristics of the proposed site and surrounding areas are described in detail in Chapter 3 of this EIS.

2.1.2 Gas Centrifuge Enrichment Process

The proposed ACP would employ a gas centrifuge technology for enriching natural uranium. Figure 2-2 shows the basic components of a gas centrifuge. A centrifuge consists of a large rotating cylinder (rotor) and piping to feed uranium hexafluoride (UF_6) gas into the centrifuge, and then withdraw enriched and depleted UF_6 gas streams. The rotor spins at a high rate of speed inside a protective casing, which maintains a vacuum around the rotor and provides physical containment of the rotor in the event of a major machine failure (USEC, 2004).

The UF_6 gas enters the centrifuge through a fixed pipe. The centrifugal force produced by the spinning rotor creates radial separation, in which the heavier uranium-238 hexafluoride molecules concentrate near the rotor wall and the lighter uranium-235 hexafluoride molecules collect closer to the axis of the rotor (USEC, 2004). In addition to the radial separation of isotopes, separation along the vertical axis (axial) is also induced in response to a thermal gradient along the length of the rotor (Green, 2003). The hotter gas stream rises, while the relatively cooler gas stream flows downward. Figure 2-2 shows the components of a gas centrifuge, including the flow of UF_6 gas. The combination of radial and axial separation results in a relatively large assay change between the top and bottom of the centrifuge. Enriched UF_6 is extracted by a scoop at the top of the centrifuge while depleted material is removed from a scoop at the bottom (USEC, 2004).

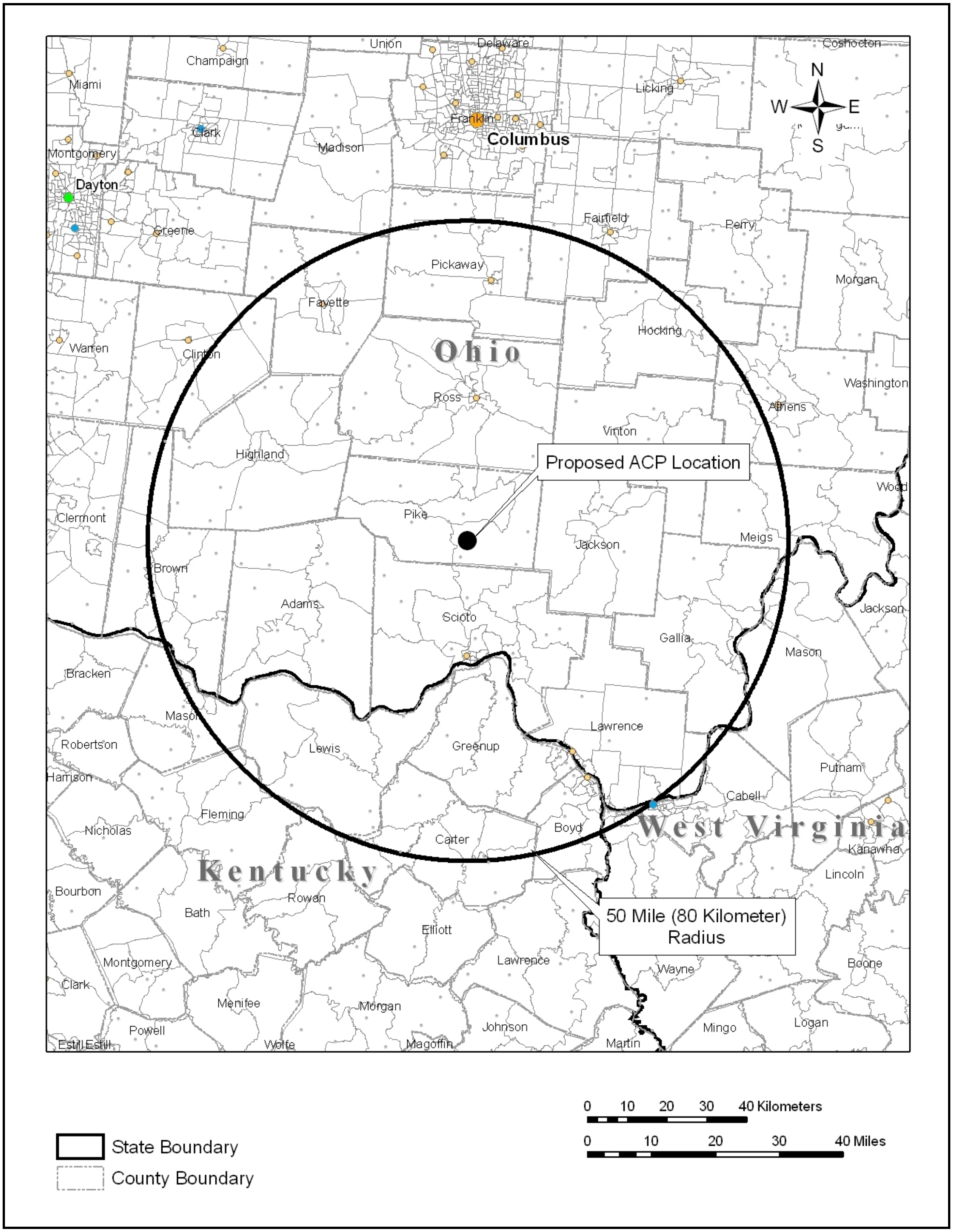

Figure 2-1 Location of the Proposed ACP Site

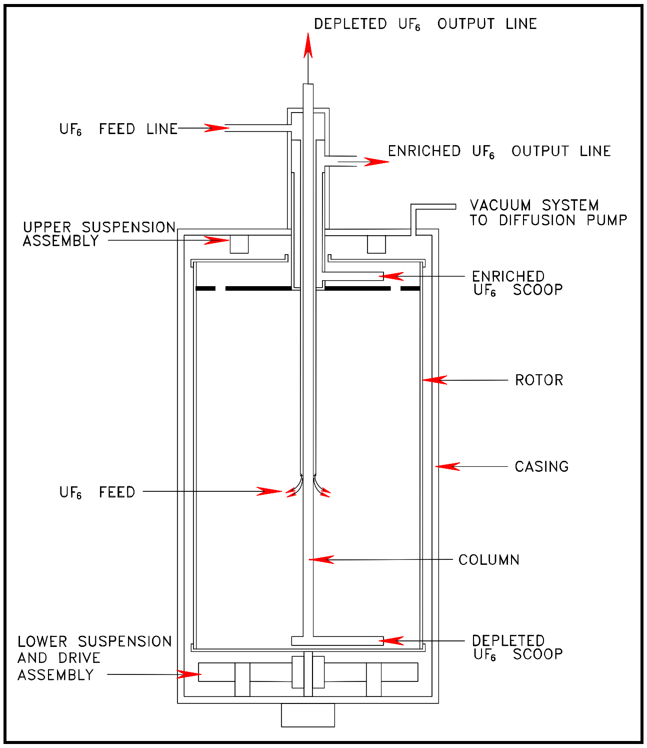

Figure 2-2 Schematic of a Gas Centrifuge (USEC, 2005b)

Enriching Uranium

Uranium is a naturally occurring radioactive element. In its natural state, uranium contains approximately 0.72 percent by weight of the uranium-235 isotope, which is the fissile isotope of uranium. There is a very small (0.0055 percent) quantity of the uranium-234 isotope, and most of the remaining mass (99.27 percent) is the uranium-238 isotope. All three isotopes are chemically identical and only differ slightly in their physical properties. The most important difference between the isotopes is their mass. This small mass difference allows the isotopes to be separated and makes it possible to increase (i.e., "enrich") the percentage of uranium-235 in the uranium to levels suitable for nuclear power plants.

Most civilian nuclear power reactors use low-enriched uranium fuel containing 3 to 5 percent by weight of uranium-235. Uranium for most nuclear weapons is enriched to greater than 90 percent.

To start the enrichment process, the UF_6 *is heated, which causes the material to sublime (change directly from a solid to a gas). The* UF_6 *gas is then fed into the enrichment cascade where it is processed to increase the concentration of the uranium-235 isotope.*

Source: WNA, 2003.

The enrichment level achieved by a single centrifuge is not sufficient to obtain the desired concentration of up to 10 percent by weight of uranium-235 in a single step; therefore, a number of centrifuges are connected in series to increase the concentration of the uranium-235 isotope (USEC, 2004). Additionally, a single centrifuge cannot process a sufficient volume for commercial production, which makes it necessary to connect multiple centrifuges in parallel to increase the volume flow rate. The arrangement of centrifuges connected in series to achieve higher enrichment and in parallel for increased volume is known as a "cascade."

The centrifuge technology to be used at the proposed ACP is modular by design; the basic building block of enrichment capacity is a cascade of centrifuge machines. Once a complete cascade of centrifuge machines has been installed, the equipment would be placed into service producing enriched material. USEC would construct and install centrifuge machines in subsequent phases until it reaches a capacity of 3.5 million separative work units per year by 2011. As needed, enrichment capacity could continue to be increased up to 7 million separative work units per year.

What is a Separative Work Unit?

A separative work unit is a unit of measurement used in the nuclear industry, just as the units of a calorie, watt, decibel, ampere, volt, etc., are used in other industries. A separative work unit pertains to the process of enriching uranium so it can be used as fuel for nuclear power plants.

A separative work unit is a unit of measurement of the effort needed to separate uranium-235 and -238 atoms in natural uranium in order to create a final product that is richer in uranium-235 atoms. It is calculated by a standard formula. For example, if you begin with 100 kilograms (220 pounds) of natural uranium, it takes about 60 separative work units to produce 10 kilograms (22 pounds) of uranium enriched in uranium-235 content to 4.5 percent. It takes on the order of 100,000 separative work units of enriched uranium to fuel a typical 1,000 megawatt commercial nuclear reactor for a year. A 1,000 megawatt plant can supply the electricity needs for a city of about 600,000 people.

Source: USEC, 2001.

2.1.3 Description of the Proposed American Centrifuge Plant

The proposed ACP would be comprised of various buildings and areas that house systems and equipment necessary to support the uranium enrichment process. Table 2-1 shows the existing buildings and new buildings that would be built as part of the proposed action. Figure 2-3 shows the locations of proposed ACP facilities on the DOE reservation. For their analysis, the NRC staff reviewed figures that included the building numbers of the proposed locations of the ACP facilities; however, the figures shown in this EIS have had the building numbers removed pursuant to 10 CFR 2.390.

Primary facilities are those critical to the enrichment process, while secondary facilities provide indirect support to the process. These facilities are described in Sections 2.1.3.1 and 2.1.3.2. These sections are followed by summary descriptions of Proposed Operational Systems (Section 2.1.3.3) and Utilities and Other Services (Section 2.1.3.4).

Table 2-1 American Centrifuge Plant Facilities

Existing Facilities	Approx. Size (m^2)[a]	Primary	Secondary
X-3001 Process Building	28,242	X	
X-3002 Process Building	28,242	X	
X-3012 Process Support Building	4,482	X	
X-3346 Feed and Customer Services	14,307	X	
X-7726 Centrifuge Training and Testing	4,599	X	
X-7725 Recycle/Assembly Facility	41,136	X	
X-7727H Interplant Transfer Corridor	2,090	X	
X-2232C Interconnecting Process Piping	762 m[b]	X	
X-745G-2 Cylinder Storage Yard	12,542	X	
X-7725A Waste Accountability Facility	2,731		X
X-112 Data Processing Building	2,787		X
X-1020 Emergency Operations Center	667		X
X-6000 Pumphouse and Air Plant	1,657		X
X-6002 Boiler System and Oil Storage Facility	16,187		X
X-7721 Maintenance, Stores and Training Building	2,731		X
X-7745R Recycle/Assembly Storage Area	19,992		X
Total Area for Existing Facilities	**182,391**[b]		
New Facilities	**Approx. Size**	**Primary**	**Secondary**
X-3003 Process Building	28,242	X	
X-3004 Process Building	28,242	X	
X-3034 Process Support Building	4,459	X	
X-3346A Feed and Product Shipping and Receiving	2,118	X	
X-3356 Product & Tails Withdrawal Building	3,930	X	
X-3366 Product & Tails Withdrawal Building	3,930	X	
X-7727H Interplant Transfer Corridor Extension	2,415	X	
X-2232C Interconnecting Process Piping Addition	610 m [b]	X	
X-7756S Cylinder Storage Yard	1,301	X	
X-7746W Cylinder Storage Yard	12,263	X	
X-7746E Cylinder Storage Yard	6,968	X	
X-7746S Cylinder Storage Yard	3,066	X	
X-7746N Cylinder Storage Yard	12,634	X	
X-745H Cylinder Storage Yard	98,474	X	
X-7766S Cylinder Storage Yard	1,301	X	
X-2215A Power Ductbank Trench System	1,519		X
X-2220D Communications Ductbank Trench System	922		X
X-7725B Chemical Storage Building	1,394		X
Total Area for New Facilities	**213, 175**[b]		

Notes:
[a] m^2 = square meters; ft^2 = square feet.
To convert from m^2 to ft^2 multiply by 10.76.
[b] Interconnecting Process Piping is linear, not m^2 . This piping is also not included in the totals.
Sources: USEC, 2004; USEC, 2005b; USEC 2005c.

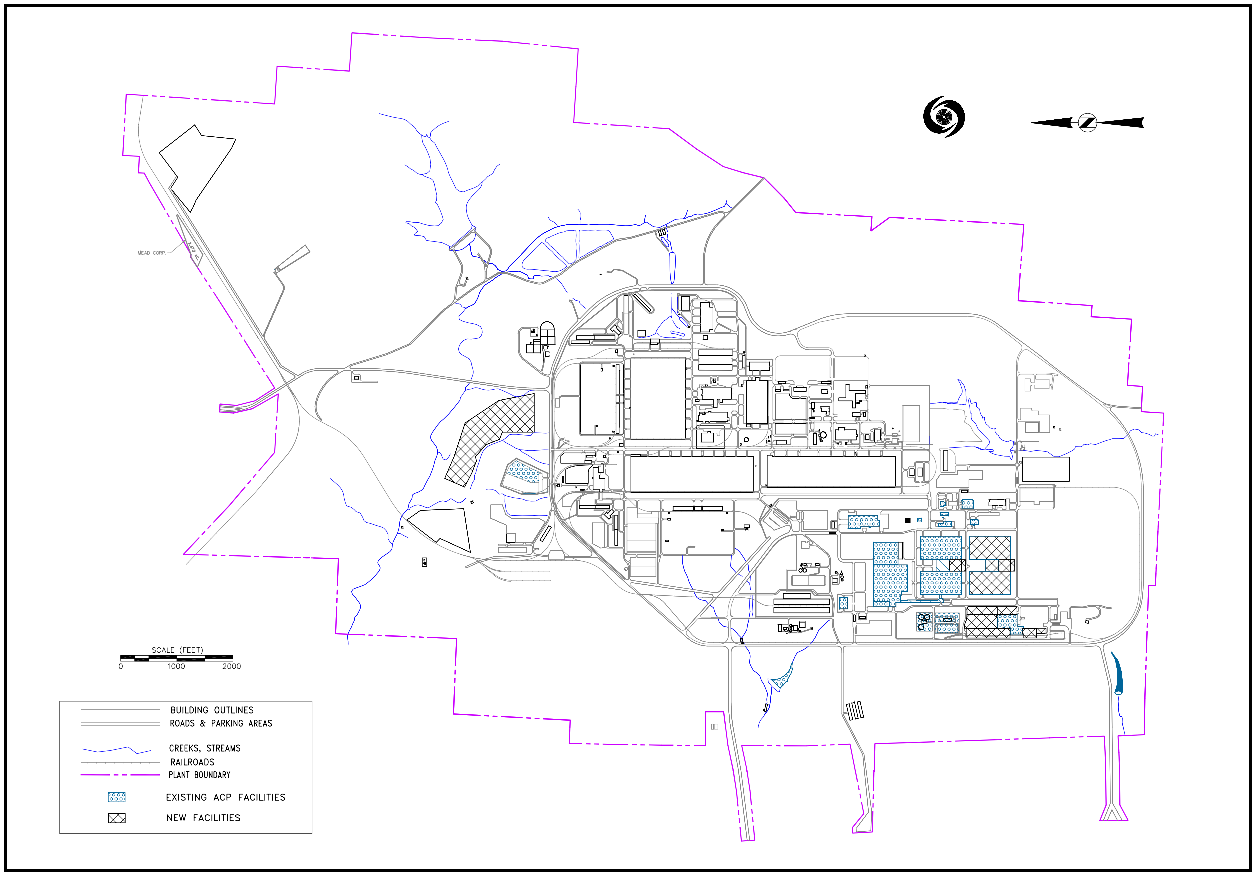

Figure 2-3 Locations of Proposed ACP Facilities (USEC, 2005b)
Building numbers have been withheld pursuant to 10 CFR 2.390.

2.1.3.1 Primary Facilities

Primary facilities are those where licensed material would be found and are considered to be key facilities in support of the uranium enrichment process. The primary facilities are located or would be constructed adjacent to each other in the southwest quadrant of the central area of the DOE reservation, as shown in Figure 2-4. The only exceptions are the X-745G-2 and X-745H cylinder storage yards, which are located in the northeast part of the DOE reservation just north of the Perimeter Road.

<u>Process Buildings</u>

The primary purpose of the process buildings would be to house the centrifuge machines and support systems necessary to perform the actual enrichment process. The X-3001 and X-3002 Process Buildings are existing facilities that are similar in construction, layout, and design. Each building has a large high bay process area and two utility areas. The height of each building is approximately 27 meters (87 feet) in the high bay area and 15 meters (49 feet) in the utility areas. A transfer aisleway provides access between the two buildings. The nearest reservation boundary is 794 meters (2,606 feet) to the west of the X-3001 Process Building. (USEC, 2004)

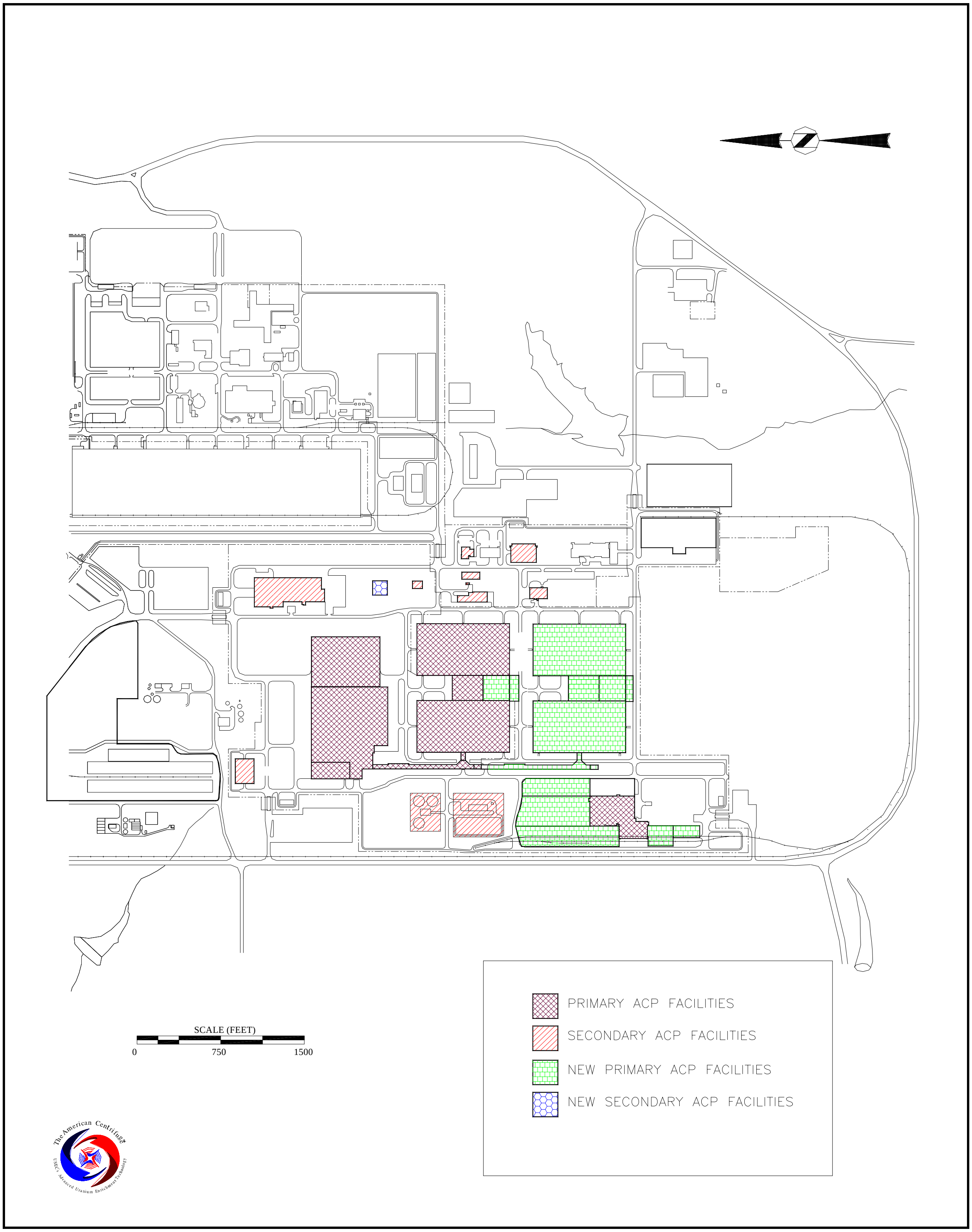

Figure 2-4 Locations of Process Buildings and other Primary Facilities (USEC, 2005d)
Building numbers have been withheld pursuant to 10 CFR 2.390.

At the north and south ends of the X-3001and X-3002 Process Buildings are equipment/utility bays and mezzanines where auxiliary equipment is housed. Items in these areas consist of heating and ventilation equipment, cooling water pumps, vacuum pumps, electrical switchgear, and standby electrical equipment (i.e., diesel generators, battery rooms, and uninterruptible power supply systems). Building vents for the purge and evacuation vacuum systems are also located in the buildings. The vents are monitored and are permitted through the Ohio Environmental Protection Agency (Ohio EPA). (USEC, 2004)

The centrifuge machines would be installed in the high bay area in a cascade arrangement. The cascades would be supplied UF_6 feed via a header from the X-3346 Feed and Customer Services Building. The machines in each cascade would be grouped into stages that are connected in series. The feed, product, and tails lines to and from each centrifuge within a stage would connect into stage headers that convey the UF_6 streams between stages. The depleted material from the bottom stage would be piped to the X-3356 Product and Tails Withdrawal Building to be withdrawn as tails. The enriched material from the top stage would be piped to the X-3356 building to be withdrawn as product. The cascade enrichment would normally be less than 5 percent uranium-235 by weight, but enrichment levels up to 10 percent uranium-235 by weight would be allowed. (USEC, 2004)

Two new process buildings, X-3003 and X-3004, would be constructed as part of the proposed ACP. The layout, design, and purpose of these new facilities would be identical to that of the existing process buildings. The proposed location for the X-3003 and X-3004 Process Buildings is directly south of the X-3001 and X-3002 Process Buildings. (USEC, 2004)

Process Support Buildings

The X-3012 Process Support Building is an existing facility that would house the equipment and personnel in support of operations in the X-3001 and X-3002 Process Buildings. The X-3012 building is located between the X-3001 and X-3002 buildings. The nearest reservation boundary is 922 meters (3,024 feet) to the west of the X-3012 Process Support Building. (USEC, 2004)

The X-3012 Process Support Building is divided into an operational area and a maintenance area by a machine transfer aisleway. The operational area is located in the north section of the building and includes the Area Control Room for the X-3001 and X-3002 Process Buildings. The Area Control Room would provide the central operating functions to monitor and control both the X-3001 and X-3002 Process Building machines and processes. Other features of the operational area include staff offices and amenities, a battery room, a switchgear room, and heating, ventilation, and air conditioning rooms. A mezzanine above the north section contains the mechanical equipment room for the building. The maintenance area, located in the south section of the building, includes maintenance shops, storage areas, a battery charging room, staff offices and amenities, and a mezzanine area with additional office areas, and heating, ventilation, and air conditioning rooms. (USEC, 2004)

A new X-3034 Process Support Building would be constructed as part of the proposed action. This facility would be adjacent to and would serve to support the new X-3003 and X-3004 Process Buildings. (USEC, 2004)

Feed and Customer Services Building

The X-3346 Feed and Customer Services Building is located approximately 305 meters (1,000 feet) south-southwest of the X-3001 Process Building. The X-3346 building is connected to the X-3001 and X-3002 buildings by the X-2232C Interconnecting Process Piping. The nearest reservation boundary is 568 meters (1,865 feet) to the west of the X-3346 building. (USEC, 2004)

The X-3346 building has two distinct areas of operation to meet process feed, sampling, and transfer requirements. The first area, referred to as the Feed Area, would support the front end of the overall enrichment process by housing the equipment necessary to provide UF_6 feed (e.g., electrically heated feed ovens). UF_6 feed would be processed to purify the gas before being fed into the process piping. There are separate manifolds that direct each stream to the X-3001 and X-3002 Process Buildings. The Feed Area has scales for weighing the feed cylinders. The location of the feed oven would provide the crane sufficient room to transport the UF_6 cylinders between rows of ovens. Cylinders would be placed on rail carts that move the cylinders into and out of the feed ovens without lifting them up and moving them over feed ovens, autoclaves, or other cylinders. (USEC, 2005c)

The second area, referred to as the Customer Services Area, would house the sampling equipment necessary to ensure that customer products meet specifications and to transfer enriched UF_6 material to customer product cylinders. The 10-ton source cylinders filled with enriched product would be transferred from the X-3356 Product and Tails Withdrawal Building to the Customer Services Area. Cylinder sampling and transfer of enriched product would be the only operation at the proposed ACP that would require the handling of liquid UF_6 (to ensure a homogenized sample); therefore, the Customer Services Area would be the only location at the proposed ACP where liquid UF_6 may be present. Cylinder sampling and transfer operations involving liquid UF_6 would occur entirely within containment autoclaves, which are pressure vessels designed to contain a UF_6 release should an accident occur during sampling and transfer activities. (USEC, 2004)

The basic approach to sampling and transfer operations would be as follows. The containment autoclaves would be electrically heated to liquefy the UF_6 contained in the 10-ton source cylinders. Any approved UF_6 container may be heated for sampling and transfer purposes. The liquid would then be sampled and transferred to 30B customer product cylinders (typically three to four). The receiving UF_6 cylinder lines and valves would be kept warm during the transfer. The customer product cylinders are then cooled until the UF_6 has re-solidified. The autoclaves are supplied with cooling capability to expedite the cylinder heel cool-down process and shorten the cycle time. (USEC, 2004)

The X-3346 building is equipped with specialized support systems to allow the purge and evacuation of indoor air in the event of liquid UF_6 releases. Local area gulper (vacuum) systems are used to collect any small releases of UF_6 that might occur during operations. The purge and evacuation vents are monitored and permitted through the Ohio EPA. Other major support equipment includes refrigeration units, precision scales, and cranes. (USEC, 2004)

Centrifuge Training and Test Facility

The X-7726 Centrifuge Training and Test Facility is connected and adjacent to the northwest corner of the X-7725 Recycle/Assembly Facility. The nearest reservation boundary is 741 meters (2,431 feet) to the west of the facility. (USEC, 2004)

The X-7726 facility was originally built to support training of plant personnel for centrifuge assembly and testing. Under the proposed action, this facility may initially be used for centrifuge component manufacturing and centrifuge machine assembly. Specific activities that would occur in the X-7726 facility include receiving material and centrifuge components, inspecting and testing components or subassemblies, assembling the components into centrifuge machines, evacuating and leak-checking the final assembly, and repairing any machine or subassemblies as needed. There are various support areas throughout the building to provide the necessary ancillary support for the centrifuge assembly operations and personnel. These areas include mechanical equipment rooms, electrical equipment rooms, freight and personnel elevators, HVAC equipment rooms, maintenance areas, and staff offices and amenities. In addition, an overhead crane system traverses the length of the X-7726 facility for movement of centrifuge machines and other large components. (USEC, 2004)

After the X-7725 Recycle/Assembly Facility becomes available for use, these activities would be performed there and the X-7726 Centrifuge Training and Test Facility would become a machine component preparation area and a training area for centrifuge subassembly preparation, column assembly, and machine assembly. The X-7726 facility may also be used for select repair of failed centrifuge machines or for disassembly of failed machines for failure analysis. (USEC, 2004)

Recycle/Assembly Facility

The X-7725 Recycle/Assembly Facility is connected to the X-7726 Centrifuge Training and Test Facility and the X-7727H Interplant Transfer Corridor. It is located just to the north of the X-3001 and X-3002 Process Buildings and the nearest reservation boundary is 741 meters (2,431 feet) to the west. (USEC, 2004)

The X-7725 facility provides an area for the manufacture, assembly, testing, and maintenance of centrifuge machines. Two dedicated rooms are located in the southwest corner to support the maintenance and operation of the centrifuge transporters and other mobile equipment. Other support areas include mechanical equipment rooms, electrical equipment rooms, a battery charging room, HVAC equipment rooms, maintenance areas, and staff offices and amenities. An overhead crane system traverses the buffer storage area and assembly area for movement of centrifuge machines and other large components. (USEC, 2004)

The assembly of centrifuge machines would begin with receipt of centrifuge machine components. These components would then be stored and staged for assembly. Centrifuge components and subassemblies would be assembled into a complete centrifuge machine on one of the machine assembly stands. Depending on the speed of assembly, completed centrifuges would either be transported for installation or stored in the buffer storage area for later installation. Some completely assembled centrifuge machines would undergo UF_6 testing in the Gas Test Stands to verify the correct placement of machine components and the proper operation of the centrifuge machine. The Gas Test would be performed prior to moving the centrifuge machines to the process building for installation. (USEC, 2004)

Interplant Transfer Corridor

The X-7727H Interplant Transfer Corridor is an elongated structure that connects the X-7725 Recycle/Assembly Facility and X-3001 Process Building. It provides a protected pathway to transport centrifuge machines between the X-7725 Recycle/Assembly Facility or X-7726 Centrifuge Training and Testing Facility and the Process Buildings. The X-7727H corridor also serves as a shipping and receiving area for equipment and components during construction and operation activities. The nearest reservation boundary is 756 meters (2,480 feet) to the west of the X-7727H corridor. Under the proposed action, the corridor would be extended, involving minor excavation and construction of an additional 2,423 square meters (26,078 square feet) of corridor, extending from the X-3001 Process Building to the X-3003 Process Building. (USEC, 2004)

Interconnecting Process Piping

The X-2232C Interconnecting Process Piping is the piping that connects the X-3346 building to the X-3001 and X-3002 buildings, and connects the X-3001 and X-3002 buildings to the adjacent X-3356 building. The nearest reservation boundary is 678 meters (2,225 feet) to the west of the X-2232C piping. An additional 1,555 meters (5,100 ft) of X-2232C Interconnecting Process piping would be constructed under the proposed action to provide service to the X-3003 and X-3004 Process Buildings and the X-3366 Product and Tails Withdrawal Building. (USEC, 2004)

This piping is typically located in a series of elevated enclosures or modules that run from the X-3346 building to the X-3001 building valve house (approximately 518 meters [1,700 feet]) and then to the X-3002 valve house (approximately 224 additional meters [800 feet]). The standard X-2232C piping module is approximately 12 meters (40 feet) long, but non-standard pipe lengths and shapes may also be used to give extra clearance across roadways. The X-2232C piping enclosures are insulated to minimize heat loss and heated to prevent the freeze-out of UF_6. (USEC, 2004)

Feed and Product Shipping and Receiving Building

The X-3346A Feed and Product Shipping and Receiving Building would be constructed approximately 91 meters (300 feet) south of the existing X-3346 Feed and Customer Services Building. The proposed facility would contain the operations associated with receiving full UF_6 feed cylinders and returning empty feed cylinders to vendors, as well as the receipt of empty customer product cylinders and shipment of full customer product cylinders to customers. The nearest reservation boundary would be 555 meters (1,820 feet) to the west of the X-3346A building. (USEC, 2004)

The X-3346A building would be connected to the X-3346 Feed and Customer Services Building by a crane rail system that serves both facilities. X-3346A would have doors on the north and south sides for either tractor-trailer trucks, straddle carriers, or cranes utilized for movement of cylinders. The building would also contain a large shipping and receiving area, cylinder staging area, offices, and a trucker's rest area. (USEC, 2004)

Product and Tails Withdrawal Buildings

The X-3356 and X-3366 Product and Tails Withdrawal Buildings would be constructed to house the UF_6 and depleted UF_6 withdrawal equipment. The X-3356 facility would be located between the X-3001 and X-3002 Process Buildings, next to the X-3012 Process Support Building. Similarly, the X-3366 facility would be located between the new X-3003 and X-3004 Process Buildings. The nearest reservation boundary would be 918 meters (3,010 feet) to the west of the X-3356 building. (USEC, 2004)

Both buildings would have two distinct areas of operation to meet process withdrawal requirements, one for product withdrawal and the other for depleted UF_6 tails withdrawal. Product withdrawal would use cold traps to desublime the enriched product from a gas phase directly to a solid phase. The enriched product would then be transferred to 48X source cylinders, which are kept in interim storage until shipped to the X-3346 Feed and Customer Services Building for sampling. The west side of the X-3356 building would house the tails withdrawal equipment. Tails withdrawal would be performed via compression and direct desublimation of the UF_6 gas. The process is designed so that two uranium assays may be simultaneously withdrawn. The solid tails would then be transferred into tails cylinders. (USEC, 2004)

Cylinder Storage Yards

The uranium enrichment process relies on the use of cylinders to allow movement and storage of UF_6 material outside of the enrichment process. The cylinder yards would provide this storage for feed uranium, depleted uranium (tails), and enriched (product) uranium awaiting shipment. The yards are constructed with sealed airport runway-quality concrete. UF_6 cylinders may be stored in any storage yard, although cylinders of a certain type may be routinely stored in a particular yard. All of the cylinder storage yards are designed primarily for storage of 2.5, 10, and 14-ton UF_6 cylinders. (USEC, 2004)

The X-745G-2 Cylinder Storage Yard is located outside the Perimeter Road to the north of the GDP X-344 UF_6 Sampling Facility. The X-745G-2 is the only yard that does not require new construction. Seven new cylinder storage yards, X-7766S, X-7746W, X-7746E, X-7746S, X-7746N, X-745H, and X-7756S would be constructed to support the proposed ACP. The locations of all the cylinder storage yards are provided in Figure 2-5. With the exception of the X-745H Cylinder Storage Yard, all new construction would occur within the proposed ACP site, adjacent to the X-3346 Feed and Customer Services and X-3356 Product and Tails Withdrawal buildings. The X-745H Cylinder Storage Yard would be located to the northeast of the existing X-745G-2 Cylinder Storage Yard, outside the Perimeter Road. The nearest reservation boundary is to the west approximately 604 meters (1,982 feet) from the proposed X-7746N, S, E, and W Cylinder Storage Yards; 918 meters (3,010 feet) from the proposed X-7756S Cylinder Storage Yard; and 862 meters (2,827 feet) from the existing X-745G-2 Cylinder Storage Yard. (USEC, 2004)

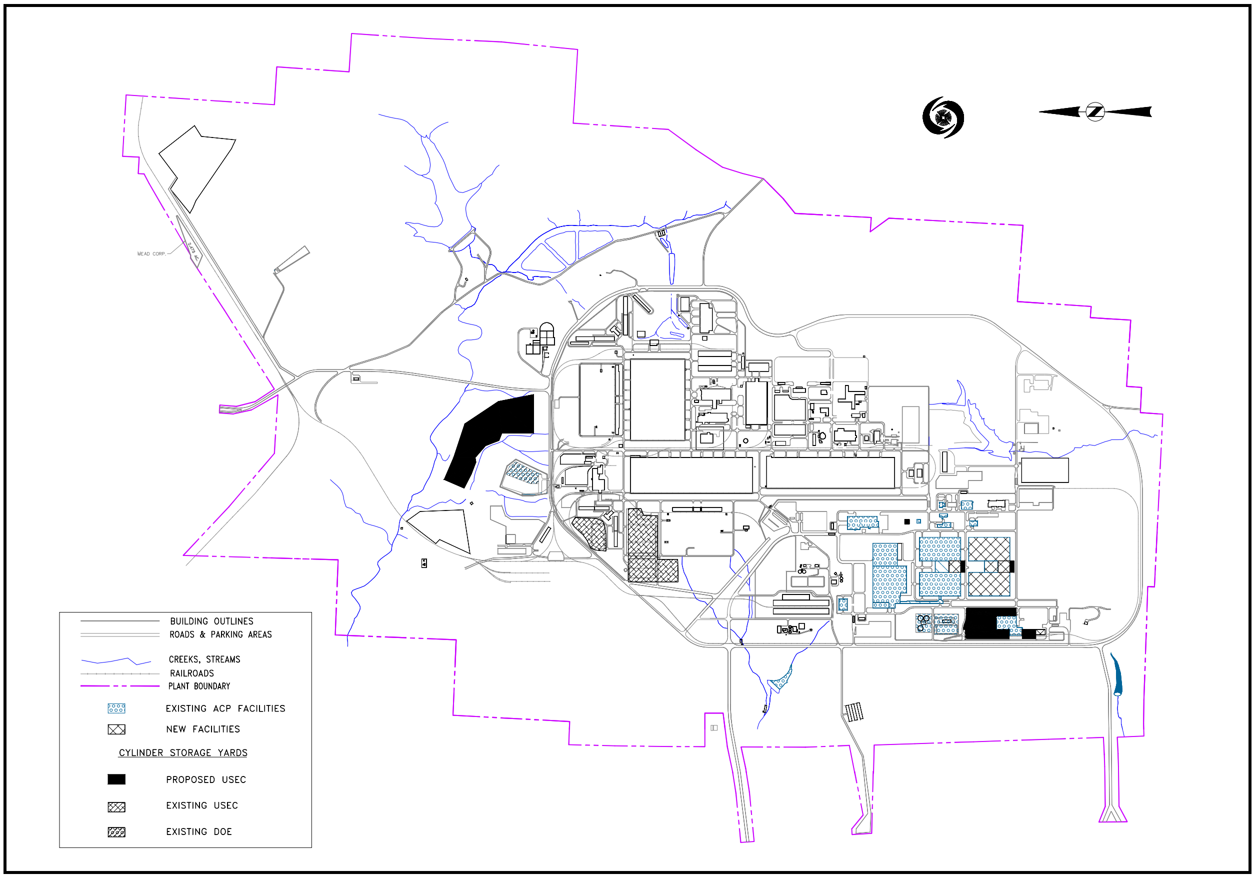

Figure 2-5 Locations of Cylinder Storage Yards (USEC, 2005b)

2.1.3.2 Secondary Facilities

In addition to the primary facilities, there are a number of secondary facilities and areas that would provide indirect support to the ACP enrichment process. No special nuclear material, depleted uranium, or other radiological materials would be found in these facilities and areas (USEC, 2004). The secondary facilities include a waste facility, storage facilities, and various support buildings and infrastructure for utilities and services. Some of these utilities and support services would be procured and others would be provided by USEC. The secondary facilities and areas leased to USEC to support the proposed ACP would include the following:

- *Waste Accountability Facility* - The X-7725A facility is located in the southwest quadrant of the DOE reservation north of the X-7725 facility. This facility serves as a storage area for equipment and parts necessary for the maintenance and repair of the process and process support equipment. (USEC, 2004)

- *Data Processing Building* - The X-112 Data Processing Building, located east of the X-3002 Process Building, provides secure housing for the data systems and personnel required to support ACP data processing. (USEC, 2004)

- *Emergency Operations Center* - The X-1020 EOC, located east of the X-3002 Process Building, serves as a central location to coordinate any emergencies that occur on the DOE reservation. (USEC, 2004)

- *Pumphouse and Air Plant, and Cooling Tower* - The X-6000 Pumphouse and Air Plant, located east of the X-3002 building, contains: the Cooling Tower Pump House and the Air Generation Plant. The building contains the necessary equipment and systems to distribute dry compressed air to the proposed ACP and to provide the requisite water to the X-6001 Cooling Towers for the removal of heat from the process buildings. The X-6001 tower also contains the necessary equipment, systems, fans, piping, and hardware structures to satisfy the necessary cooling requirements for the process buildings. (USEC, 2004)

- *Boiler System and Oil Storage Facility* - The X-6002 system is a gas-fired boiler system located northeast of the X-3002 Process Building. The boiler system provides recirculating hot water for building and process heat. The boiler normally is operated on natural gas, but it can also use fuel oil (USEC, 2004). The X-6002A Oil Storage Facility is located east of the X-3002 building and supplies fuel oil to the X-6002 system when required. It is expected that natural gas would be used approximately 90 percent of the time and fuel oil for approximately 10 percent of the time. (USEC, 2005c)

- *Maintenance, Stores, and Training Building* - The X-7721 building, located northeast of the X-3002 Process Building, provides areas for maintenance shops, stores and receiving activities, and training (USEC, 2004).

- *Recycle/Assembly Storage* - The X-7745R storage area is a concrete pad immediately adjacent to and east of the X-7725 facility. This area is used mainly for clean, non-contaminated, outside, horizontal rack storage of centrifuge casings before they are moved inside the building for machine assembly. Other centrifuge components and miscellaneous items may also be temporarily stored in this area. (USEC, 2004)

- *Power Ductbank Trench System* - This system includes 18 concrete vaults and an underground trench that provides supporting infrastructure to the electrical system. (USEC, 2005c)

- *Communications Ductbank Trench System* - This system includes four concrete vaults and an underground trench that provides supporting infrastructure to the communications system. (USEC, 2005c)

- *Chemical Storage Building* - The X-7725C building, located north of the X-3001 Process Building, provides a clean, non-contaminated, and protected storage area for manufacturing chemicals. (USEC, 2004)

- *Aboveground and Underground Storage Tanks* - Aboveground and underground storage tanks would be installed at various locations within the immediate vicinities of the four process buildings and support facilities. The size, location, and contents type of each aboveground storage tank would vary according to operational needs. Tanks would be constructed of materials compatible with the product to be stored and the conditions of storage (e.g., pressure and temperature), and will meet operational regulatory requirements. A secondary means of containment for tanks storing petroleum products, as required by 40 CFR 112.8, would provide for the entire capacity of the aboveground storage tank and any precipitation that might accumulate. Fuel would be transferred from fuel-bearing aboveground storage tanks to a 100 gallons per day (approximate) tank inside the process buildings to supply standby generators in case of power failures. (USEC, 2004)

  The fuel would be fed via aboveground and underground piping. The piping system would conform to standards for fuel distribution pressure piping, would be designed to minimize abrasion and corrosion, and would allow for expansion and contraction. Fuel lines and tanks would be labeled in accordance with regulatory standards. Spill cleanup materials, such as absorbent pads and/or spill pallets, would be available at hose connections. In accordance with Federal and State laws, proper safety procedures, spill prevention plans, and spill response plans would be used to minimize impacts from accidental discharges. (USEC, 2004)

2.1.3.3 Operational Systems

The DOE reservation has several operational systems in place to ensure security of the facilities and to respond to emergencies. The proposed ACP would utilize these existing systems, which include:

- *Evacuation Public Address System* - The Evacuation Public Address system provides instructions or notification in the event of an incident requiring evacuation or sheltering of reservation or plant personnel. The X-1020 Emergency Operations Center Public Address system control console is continuously manned. During emergencies, the Public Address system is not used for routine traffic. The Public Address system serves most occupied plant facilities. (USEC, 2004)

- *Public Warning Siren System* - The Public Warning Siren System is used to provide notification to the public within a two-mile radius of the DOE reservation in the event of an incident requiring evacuation or sheltering of the public. The system is comprised of sirens on poles/towers around a two-mile radius and an electronic siren controller at the X-1020 Emergency Operations Center and local sheriff’s department. (USEC, 2004)

- *Security Access Control and Alarm System* - Due to the classified and proprietary nature of the ACP activities and equipment, access to areas classified as Limited Security Areas, Exclusion Area(s), and Vault-type Room(s) would be controlled utilizing a Security Access Control and Alarm System. The system consists of an Intrusion Detection System to provide interior protection and an Access Control System to provide high-security entry controls. The two subsystems report to a single operator’s workstation forming a single security system. (USEC, 2004)

- *Security Fencing and Portals* - The ACP would be within a securely fenced area consisting of approximately three and a half miles of eight foot high chain-linked fence and barbed wire encompassing approximately 81 hectares (200 acres) of the southwest quadrant of the central area described in Section 2.1.1 above. Various gates support normal operation and provide emergency exits. The fence is routinely patrolled and maintained. (USEC, 2004)

  Access to the central area would consist of portals and gates at specific locations. When in use, portals would be staffed and gates (when open) would be under surveillance by Guard Force personnel with communications equipment. Alternatively, the portals would be equipped with rotogates with an electronic badge reader. Portals would be secured with high security locks when not in use. Signs would be posted at the access portals and gates identifying contraband items that are not permitted without specific approval. Existing lighting at the portals and gates would assist Guard Force personnel and building or plant personnel in detecting unauthorized persons. Standby light would be available in the event of an extended power outage. (USEC, 2004)

2.1.3.4 Procured Utilities and Other Services

Some of the utilities and support services necessary for the operation of the proposed ACP would be procured and provided through existing buildings and services. Utilities procured include high voltage electrical power, water for fire-fighting, sanitary water, sanitary sewer, communications, and non-potable cooling water. Support services procured would include emergency response, training, maintenance, environmental management, and administrative support. Agreements, including performance requirements, have been established for those services not self-performed by USEC to help ensure they are available and reliable. The electrical, water, and sewage systems that would be procured are:

- *Electrical Distribution Systems* - Electrical power is supplied from the external 345 kilovolts power grid at 345 kilovolts through the X-530A Switch yard to the X-5001 Substation. At the X-5001 Substation, the electrical power is stepped down in voltage to 13.8 kilovolts then supplied through the X-5000 Switch House to the various centrifuge process buildings and other centrifuge support buildings. The distribution voltages are further stepped-down as necessary, depending on the facility requirements. (USEC, 2004)

- *Water Systems*– Water used at the reservation is supplied by a vendor from wells sunk into the Scioto River alluvium (see Chapter 3 for more detail). The raw water is pumped from wells at three locations along the Scioto River. There is also a backup system that can draw directly from the Scioto River when the wells are unable to produce sufficient water to meet the reservation demand. No known public or private water is withdrawn from the Scioto river downstream of the ACP. The well fields and pump house are located where flooding is anticipated, so the equipment is designed and installed to operate without adverse effect (i.e., the well pumps can operate under water). (USEC, 2004)

- *Sewage Treatment*– The X-6619 Sewage Treatment Plant services the entire DOE reservation and currently operates under the United States Enrichment Corporation National Pollutant Discharge Elimination System (NPDES) permit. Sewage from the reservation facilities is fed into a series of underground sanitary sewers. The plant’s sanitary sewers feed into one of several lift stations located around the DOE reservation. From the lift stations, the sewage is pumped to the X-6619 facility. In accordance with the United States Enrichment Corporation National Pollutant Elimination Discharge System permit, the design capacity of the Sewage Treatment Plant is 2,275,032 liters per day (601,000 gallons per day) and is currently operating at 40 percent of that capacity. (USEC, 2005c)

  The X-6619 is an activated-sludge facility utilizing the plug flow process, aerobic digestion, secondary clarification, and granular-media filtration for effluent polishing (tertiary treatment). Post-chlorination followed by de-chlorination with sulfur dioxide is used to meet National Pollutant Elimination Discharge System effluent standards. The treated effluent is discharged to the Scioto River via an underground pipeline to a permitted outfall. An automated sampler collects a weekly composite sample of the liquid effluent for radiological analysis and other required analyses. This existing monitoring system and resulting data would be available as a means of assuring that no unanticipated discharge of licensed material occurred. (USEC, 2005b)

2.1.3.5 Local Road and Rail Network

Intraplant Roadways

The DOE reservation is accessed by small roads that intersect with the Perimeter Road from four directions. The area of the reservation where the proposed ACP would be located has an extensive roadway system. The buildings/facilities on the reservation are serviced with a system of roads, which as a rule generally follow a north-south grid. The system is in generally good condition due to road repaving projects. Except during shift changes, traffic levels on the site access roads and Perimeter Road are low. Peak traffic flows occur at shift changes and the principal traffic areas during peak morning/afternoon traffic are at locations where parking lot access roads meet the Perimeter Road. The DOE reservation has 12 parking lots varying in capacity from approximately 50 to 800 vehicles. Total parking capacity is approximately 4,400 vehicles. (USEC, 2004) Under the proposed action, approximately 10,033 square meters (108,000 square feet) of new roads and parking areas would be constructed to support the ACP (USEC, 2005b).

Offsite Road Network

The DOE reservation is served by two of southern Ohio's major highway systems: U.S. Route 23 and Ohio SR 32/124. The DOE reservation can be accessed by the Main Access Road, a four-lane interchange with U.S. Route 23. This access route accommodates the plant traffic flow. (USEC, 2005b)

The DOE reservation is 5.6 kilometers (3.5 miles) from the intersection of the U.S. Route 23 and Ohio SR 32/124 interchange. Both routes are four lanes with U.S. Route 23 traversing north-south and Ohio SR 32 traversing east-west. Approximately 113 kilometers (70 miles) north of the plant, U.S. Route 23 intersects I-270, I-70, and I-71. Trucks also may access I-64 approximately 32.2 kilometers (20 miles) southeast of Portsmouth. (USEC, 2005b)

SR 32/124/50 runs 298 kilometers (185 miles) east-west from Cincinnati, and through Piketon to Parkersburg, West Virginia. To the west, SR 32 provides access to Cincinnati's three interstate highways, I-71, I-74, and I-75. To the east, SR 32/50 is linked with I-77. (USEC, 2005b)

Rail

The proposed site has rail access, and several track configurations are possible within the site. The Norfolk Southern rail line is connected to the CSX Transportation Inc. line via a rail spur entering the northern portion of the site. This onsite system is currently used infrequently. Track in the vicinity of Piketon, Ohio allows a maximum speed of 96.6 kilometers per hour (60 miles per hour). The CSX Transportation Inc. line also provides access to other rail carriers. (USEC, 2005b)

2.1.4 Description of the Phases of the Proposed Action

Activities at the proposed ACP would be comprised of four distinctive phases starting with refurbishment, site preparation, and construction, and ending with decontamination and decommissioning. Each of these phases is described in separate sections below, followed by a fifth section that describes the cessation of uranium enrichment operations at the Paducah Gaseous Diffusion Plant, which, while not part of the proposed action, would likely result from start-up of operations at the proposed ACP. (USEC, 2005b)

2.1.4.1 Refurbishment, Site Preparation, and Construction

Prior to operation, a number of activities would be required to refurbish, prepare, and construct facilities necessary for uranium enrichment at the proposed site.

Refurbishment Activities

A number of existing facilities at the proposed ACP have already undergone preliminary refurbishment to build the USEC American Centrifuge Lead Cascade facility. The environmental impacts of the Lead Cascade facility were analyzed in an Environmental Assessment published by NRC in January 2004 (NRC, 2004). Refurbishment of the existing facilities in the proposed ACP would continue as part of the proposed action. Specific refurbishment activities that would be completed are listed in Table 2-2.

Table 2-2 Refurbishment Activities for the Proposed ACP

Refurbishment Activity	Location
Preliminary facility repairs and modifications; maintenance servicing of support equipment	X-7726 Centrifuge Training and Test Facility, X-7727H Interplant Transfer Corridor, X-3012 Process Support Building, X-3346 Feed and Customer Services Building, X-2232C Interconnecting Process Piping, XT-847 Waste Management Staging Facility, and the X-710 Technical Services Facility.
Partial relocation of DOE operations and office space	X-3012 Process Support Building
Partial or complete clean out and disposal of material (e.g., old centrifuges associated with the Gas Centrifuge Enrichments Plant built onsite in the early 1980s, parts, classified material, records, miscellaneous equipment)	X-3001 and X-3002 Process Buildings
Disposal of stored hazardous waste and subsequent modification of the RCRA Part B permit to reflect a new storage area for the proposed ACP	X-7725 Recycle/Assembly Building
Relocation of the X-6002 Heat Plant	From X-3002 building to an area adjacent to X-6002A

Sources: NRC, 2004; USEC, 2005b

The relocation of the X-6002 Heat Plant would consist of the removal and relocation of system components and piping. Construction would take place between the X-6002A Oil Storage Facility and the X-7721 Maintenance, Stores, and Training Building, located northeast of the X-3002 building. Approximately four acres of soil disturbance is anticipated, but appropriate design reviews would be performed prior to construction to identify the detailed scope of the project effort. The DOE air permits would be transferred to USEC and incorporated in the site's *Clean Air Act* Title V air permit. USEC would also utilize applicable erosion control measures and storm water run off controls to minimize these effects during the relocation and removal effort (USEC, 2005b).

Site Preparation and Construction Activities

As part of the proposed ACP, eight primary facilities, three secondary facilities, and seven cylinder storage yards would be constructed. These facilities and their approximate sizes are listed in Table 2-1 and described in Sections 2.1.3.1 and 2.1.3.2.

With the exception of the X-745H Cylinder Storage Yard, the proposed construction areas were previously graded and improved during the construction phase of the former DOE Gas Centrifuge Enrichment Plant in the early 1980's (USEC, 2004). Some additional site preparation would be necessary, however, and an estimated 146,865 cubic meters (192,099 cubic yards) of earth would be excavated, with 37,385 cubic meters (48,899 cubic yards) of that being backfilled. An estimated 109,480 cubic meters (143,200 cubic yards) of earth would be placed in a borrow area on the DOE reservation for future use (USEC, 2005b).

Soil disturbance from project activities would occur in construction lay-down areas, altering the soil profile and leading to a possible temporary increase in erosion because of storm water runoff and wind. Engineering controls and best management and construction practices would be implemented to minimize removal and erosion of soils. Physical barriers, such as silt fences and temporary berms would be utilized to reduce impacts on surface water quality from silt and erosion (USEC, 2005b).

Construction activities would comply with all applicable permits. Best management practices would be followed to minimize solid waste and hazardous material generation during construction. A minimal amount of oils or solvents would be used during construction to decrease potential leakage to groundwater. If a spill occurs, trained, qualified professionals would promptly deploy spill cleanup materials. Affected soils would be sampled, analyzed, and managed according to appropriate procedures that encompass State and Federal requirements.

Dust suppression techniques would be used to mitigate excessive releases of fugitive dust and particulate matter during site preparation activities, although the site is located in a county that is exempt from the restrictions on emissions for fugitive dust specified in Ohio Administrative Code 3745-17-08.

<u>Management of Wastes from Refurbishment, Site Preparations, and Construction</u>

Refurbishment and construction activities would generate solid sanitary/industrial waste, low-level radioactive waste from the former Gas Centrifuge Enrichment Plant, hazardous waste regulated under the *Resource Conservation and Recovery Act*, and recyclables. Sanitary/industrial waste would include normal building construction materials such as steel beams, plywood and concrete, and general building trash such as paper and packing products, wood, and cement. Sanitary/industrial waste from maintenance of support equipment would be non-regulated lubricants, cleaning materials, and general maintenance debris. Incandescent and fluorescent light bulbs, lead acid and non-lead acid batteries, aerosol cans, etc. would be generated throughout the project and would be handled in accordance with established recycling and hazardous waste management programs. Low level radioactive waste, and hazardous and non-hazardous wastes would be handled according to procedures that comply with NRC, State, and Federal requirements. As previously mentioned, reasonable efforts would be taken to minimize the amount of waste generated during this phase using USEC-approved waste minimization and pollution prevention policies. The majority of the wastes generated during the refurbishment phase would occur in the X-3001, X-3002, and X-3346 buildings. Table 2-3 presents a summary of the major sources of waste and projected annual rates of waste generation from this life-cycle phase.

2.1.4.2 Manufacturing and Equipment Assembly

This section summarizes the proposed activities for manufacturing and assembling centrifuges for the proposed ACP. A description of airborne emissions, liquid wastes, and solid wastes expected to be generated from these activities is also provided.

Table 2-3 Waste Generation during Refurbishment and Construction

Material/Activity	Type of Waste	Projected Annual Rate
Centrifuge parts, piping, and excess equipment from the former Gas Centrifuge Enrichment Plant	Low-level radioactive waste	7,793-8,509 m^3[a]
Rags, wipes, and aerosol cans	RCRA-regulated	3-17 m^3
Paper, construction debris, wood, etc.	Sanitary/industrial	1,270 t
Circuit boards, bulbs, lead parts	Recyclables	144-184 m^3

Notes:
[a] This waste will only be generated one-time during refurbishment and construction. It is not a waste generated annually.
m^3 = cubic meters; t = metric tons; RCRA = *Resource Conservation and Recovery Act*.
To convert m^3 to ft^3 multiply by 35.31.
To convert t to tons multiply by 1.1.
Source: USEC, 2005b.

Manufacturing and Assembly Activities

New centrifuges and related components would be manufactured onsite at the proposed ACP or at a commercial manufacturing plant located off the DOE reservation. For offsite manufacturing, USEC is contemplating three different candidate locations in different States across the country. Centrifuge components from an offsite manufacturing plant would be transported by truck to the proposed ACP for assembly and installation.

Centrifuge manufacturing features a filament winding process. This process typically uses materials such as carbon fibers, resin systems (resins, hardeners, and modifiers), prepregs (fibers/resin system), and other chemicals for cleaning parts and for support of the manufacturing process. Final curing of the resulting parts occurs in a curing oven or hood. Solvents are used to clean the produced parts and manufacturing equipment.

Control of combustible materials used in the manufacture of centrifuge components includes storage in National Fire Protection Association 30-approved flammable storage cabinets or areas and the use of local ventilation. The approved storage areas and flammable storage cabinets would be located away from licensed material. Back-up power ensures continued ventilation in the event of loss of power. Inadequate ventilation flow from the hoods and cabinets triggers an alarm.

Onsite centrifuge manufacturing, assembly, testing, and maintenance operations would occur primarily in the X-7725 Recycle/Assembly facility, which would house up to six centrifuge assembly positions and six column assembly stands. The X-7726 Centrifuge Training and Test facility would have two centrifuge assembly positions and one column assembly stand and would be used initially for centrifuge component manufacturing and machine assembly, then for assembly training and machine component preparation only. These locations would also receive and store parts for the centrifuge machine assembly.

The assembly and testing of sub-assemblies and assemblies would be an ongoing activity through the production of approximately 24,000 completed centrifuges and sufficient spares to operate the enrichment plant at the potential capacity of 7 million separative work units annually (USEC, 2005b). Each of the manufacturing and assembly areas would have multiple workstation and equipment sets to allow for the production of up to 16 machines per day (USEC, 2005b). Overhead cranes, fork trucks, and parts elevators would deliver material to the assembly stands. Lifting fixtures and other assembly tooling would be required during the assembly of the centrifuges. Completed machines may be moved via crane to an adjacent storage location until they can be moved again by crane or moved directly to a transporter for movement to the process buildings.

Gross leak testing of the machines using UF_6 may be performed in the X-7725 Recycle/Assembly facility Gas Test Stands or in the process buildings after installation prior to being placed into service. No process gas (UF_6) testing of the machines would take place in the assembly areas. The Gas Test Stands would be in a separate room within the X-7725 facility, which has its own ventilation and emission control system. UF_6 for the test stands would be supplied from a small cylinder within this room. Testing activities could also include mechanical testing and planned failure testing of smaller parts or sub-assemblies.

Management of Wastes from Manufacturing and Equipment Assembly

The common chemicals that may be used and released are acetone, alcohols, carbon dioxide, ethanol, Freon 134, resin products, solvent vapors, and n-methylpyrrolidone. The airborne emissions generated by the processes would be confined and captured by the use of hoods or local ventilation capture systems that divert emissions to permitted vents. Where required (e.g. for volatile organic vapors), emission control equipment, such as air flow monitored hoods and local exhaust systems, would be used as part of the permitted emission vent system. Airflow from the hoods would be monitored to ensure adequate flow and alarm if a reduced flow is detected so that operations can be curtailed (USEC, 2005b).

Exhaust from the test stands would pass through alumina traps to a continuously monitored vent. The vent would be equipped with continuous gas flow monitoring instrumentation with local readout, as well as the analytical instrumentation required to continuously sample, monitor, and alarm UF_6 breakthrough in the effluent gas stream (USEC, 2005b).

Some hazardous wastes would be generated through the use of solvents and would be in the form of excess spent solvent, rags, wipes and other material that come into contact with the spent solvents. Wastes would be stored in approved storage areas in flammable storage cabinets/areas according to National Fire Protection Association 30 requirements prior to removal for disposal. Excess fibers, reacted resins, and curing agents would be considered sanitary/industrial waste. Solvents for cleaning would be used during assembly of parts (either sub-assembly or final assembly), which would generate some air emissions, a small quantity of sanitary waste (dry wipes, rags, etc.), and hazardous wastes from the solvent cleaning (USEC, 2005b). Table 2-4 provides a summary of solid waste expected to be generated during the manufacturing phase.

2.1.4.3 Facility Operation

This section provides an overview of the production activities that would be carried out to operate the proposed ACP. The overall process of uranium enrichment at the proposed ACP can be divided into six basic operations: (1) receipt of UF_6 feed material; (2) feeding UF_6 into the enrichment process; (3) enrichment, where the UF_6 assay is increased to its desired uranium-235 content; (4) material withdrawal, where enriched UF_6 and depleted UF_6 is removed from the enrichment process; (5) UF_6 sampling and transfer, where enriched UF_6 is sampled to ensure it meets customer specifications and the enriched UF_6 product material is transferred to customer product cylinders; and (6) shipment of UF_6 cylinders to customers.

Each of these operations is briefly described below, followed by a discussion of waste management and the activities associated with conversion and disposal of depleted UF_6.

Table 2-4 Solid Waste Generation during Manufacturing

Material/Activity	Type of Waste	Projected Annual Rate
Spent solvent rags, wipes from parts cleaning operations in support of start-up and testing activities	RCRA-regulated	9-11 m^3
General maintenance and proposed ACP materials in support of start-up and testing activities	Non-regulated[a]	5-6 m^3
Packing material, paper, wood, etc. in support of start-up and testing activities	Sanitary/industrial	392-490 t

Notes:
[a] A Non-Regulated Waste is any discarded material that is excluded under the Ohio Administrative Code - OAC 3745-51-04, does not exhibit a characteristic of a hazardous waste under OAC 3745-51-20 to 3745-51-24, or does not meet any of the listing descriptions in OAC 3745-51-31 to 3745-51-33.
m^3 = cubic meters; t = metric tons; RCRA = *Resource Conservation and Recovery Act*
To convert m^3 to ft^3 multiply by 35.31.
To convert t to tons multiply by 1.1.
Source: USEC, 2005b.

Receipt of UF_6 Feed Material

USEC intends to use natural uranium in the form of UF_6 for the proposed ACP. The intention is to not introduce feedstock contaminated with significant concentrations of other nuclides into the process. Feed material that meets the American Standards for Testing and Materials specification for recycled feed may be used, and may contain radionuclides such as uranium-236 and technetium-99. The UF_6 would be transported to the plant in 48-inch (48X or 48Y), 10-ton or 14-ton cylinders that are designed, fabricated, packaged and shipped in accordance with American National Standards Institute N14.1, Uranium Hexafluoride-Packaging for Transport (ANSI, 1990). Feed cylinders would be typically transported to the site by 18-wheeled tractor-trailer trucks. It is anticipated that approximately 1,100 shipments of feed cylinders per year would arrive at the proposed ACP (USEC, 2005b). Expected feed suppliers include the Cameco Corporation (Ontario, Canada) and Honeywell Specialty Chemical Plant (Metropolis, Illinois), as shown in Figure 2-6.

Feed Operations

UF_6 feed cylinders would be transported to the feed area of the X-3346 Feed and Customer Services building and placed inside feed ovens. Feed ovens are not pressurized, but do restrict air-leakage to provide efficient heating of the cylinders. Each feed oven is equipped with a UF_6 leak detector. The ovens would heat the cylinders utilizing electrically heated air at a constant temperature of approximately 85 degrees Celsius (185 degrees Fahrenheit). (USEC, 2004)

The feed process has several stages. UF_6 is sublimed from the solid phase into the gas phase and monitored for the presence of light gases (e.g., nitrogen oxide, oxygen, hydrogen fluoride, etc.). It is then purified, held, mixed, and pressure-controlled before entering the process buildings. There are two feed headers located in the feed area that direct each stream to the X-3001 and X-3002 Process Buildings via the X-2232C Interconnecting Process Piping. Any solid UF_6 left in the cylinder after the feed rate declines to a predetermined level goes to a freezer-desublimer in a process called "heeling." This process removes residual UF_6 “heels” from a cylinder when it can no longer be used to feed material into the cascade. The emptied feed cylinder would then be placed into storage. (USEC, 2004)

Figure 2-6 Incoming UF_6 Feed Material

Enrichment Operations

The uranium enrichment process as described in Section 2.1.2 would occur within the X-3001, X-3002, X-3003, and X-3004 Process Buildings. Each building would contain multiple cascades to optimize operating costs and production flexibility. Each cascade would be capable of enriching UF_6 gas to the desired product assay. Enrichment would normally be less than 5.5 percent by weight of uranium-235, although USEC's license application seeks authorization to produce enriched uranium up to 10 percent by weight of uranium-235. (USEC, 2004)

Figure 2-7 shows the proposed flow of feed, enriched, and depleted UF_6 material and cylinders during full operation of the ACP. Incoming UF_6 feed gas would be distributed to the feed control systems for each cascade. The feed flow rates to each cascade would be automatically adjusted to ensure the desired feed is added to the cascade to support the production rate. As the feed enters the cascade, it mixes with material already in the cascade and separates into enriched and depleted material streams. The proportion of feed that becomes enriched product is controlled by the stage control valves, which would be adjusted to provide the desired product and tails assays. This process would continue until the material exits the top of the cascade as enriched product or the bottom of the cascade as depleted tails material, and is sent to the X-3356 Product and Tails Withdrawal building. (USEC, 2004)

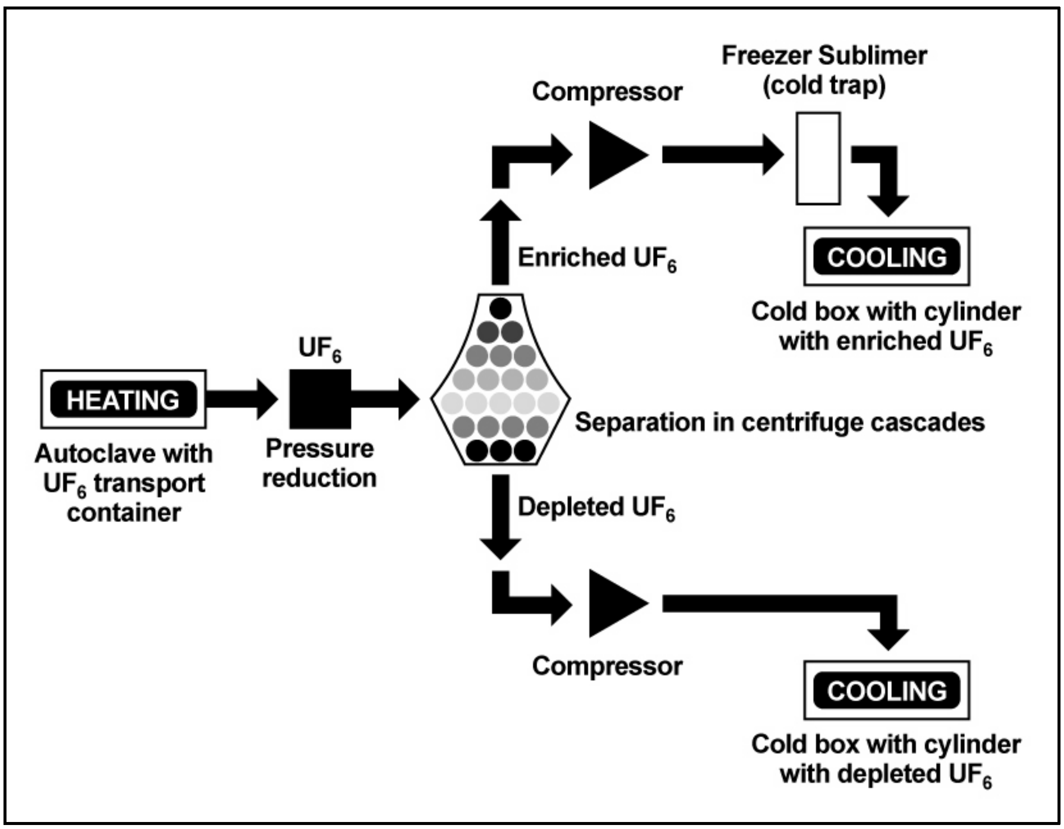

Figure 2-7 Enrichment Operations Flow

Product and Tails Withdrawal

Product withdrawal would occur in the X-3356 and X-3366 Product and Tails Withdrawal buildings. As many as three different product assays can be fed from the process buildings to the X-3356 and X-3366 buildings. Product material first transitions from the gas to the solid phase via cold traps, with the off-gas passing through backup traps and vented through an evacuation system. From the cold traps, the enriched product is transferred into 48X source cylinders located in cold boxes. The filled 48X source cylinders are then moved to interim storage and subsequently moved to the X-3346 building sampling and transfer area. (USEC, 2004)

Tails withdrawal would occur in the same buildings and would be accomplished through compression and direct deposition of UF_6 material into tails cylinders. This process does not involve UF_6 pressures above atmospheric pressure, which helps to prevent gas leakage. The tails withdrawal design incorporates the capability for simultaneously withdrawing two uranium assays (USEC, 2004). The compression train consists of centrifugal compressors arranged in series with coolers and with recycle capability. Tails withdrawal can also be used for emergency inventory removal.

The major components that would support the withdrawal operations are withdrawal (compression) trains, cold boxes, cold traps, assay spectrometers, and vents. The Area Control Room within the X-3356 and the X-3366 buildings would house the assay spectrometers for monitoring tails and product withdrawal, control equipment, and alarms associated with the withdrawal operation.

Sampling and Transfer Operations

UF_6 sampling and transfer operations for UF_6 product material would be carried out in the product operations area of the X-3346 Feed and Customer Services building. Autoclaves with heating and cooling capability liquefy UF_6 in the source cylinder in order to obtain a homogenized sample, as mandated by the American Society for Testing and Materials sampling standards. Liquid UF_6 would then be transferred into customer product cylinders and the autoclave would cool the remaining UF_6 heels in the source cylinders until they are solid (USEC, 2004). The autoclaves are pressure vessels and are designed to contain a UF_6 release. Electrically heated hot air is the heating medium and cold air is used for cooling.

The major components that comprise the sampling and transfer operations are autoclaves, cold traps, and vents. The Area Control Room within the X-3346 building would house the monitoring, control, and alarm equipment associated with the feed operations and sampling and transfer operations.

Shipment of Enriched Product to Customers

The X-3346A Shipping and Receiving building would be the shipping point for all cylinders leaving the ACP. Filled customer product cylinders (30-inch, 2.5-ton cylinders) would be transported to customers (nuclear fuel fabrication facilities), while emptied feed cylinders would be returned to vendors. All cylinders would be prepared for shipment and shipped in accordance with NRC and U.S. Department of Transportation regulatory requirements (USEC, 2004). Figure 2-8 shows the destinations of outgoing enriched uranium customer product cylinders.

All cylinders from the proposed ACP would be transported by 18-wheeled tractor-trailer trucks. These cylinders would be designed, fabricated, and shipped in accordance with the American National Standards Institute standard for packaging and transporting UF_6 cylinders, ANSI N14.1 (USEC, 2005b). A shipment frequency of 1-20 cylinders per five days is typical, with an annual total of approximately 1,200 cylinders. Table 2-5 shows the expected recipients of product and the average number of customer product cylinders they would receive yearly.

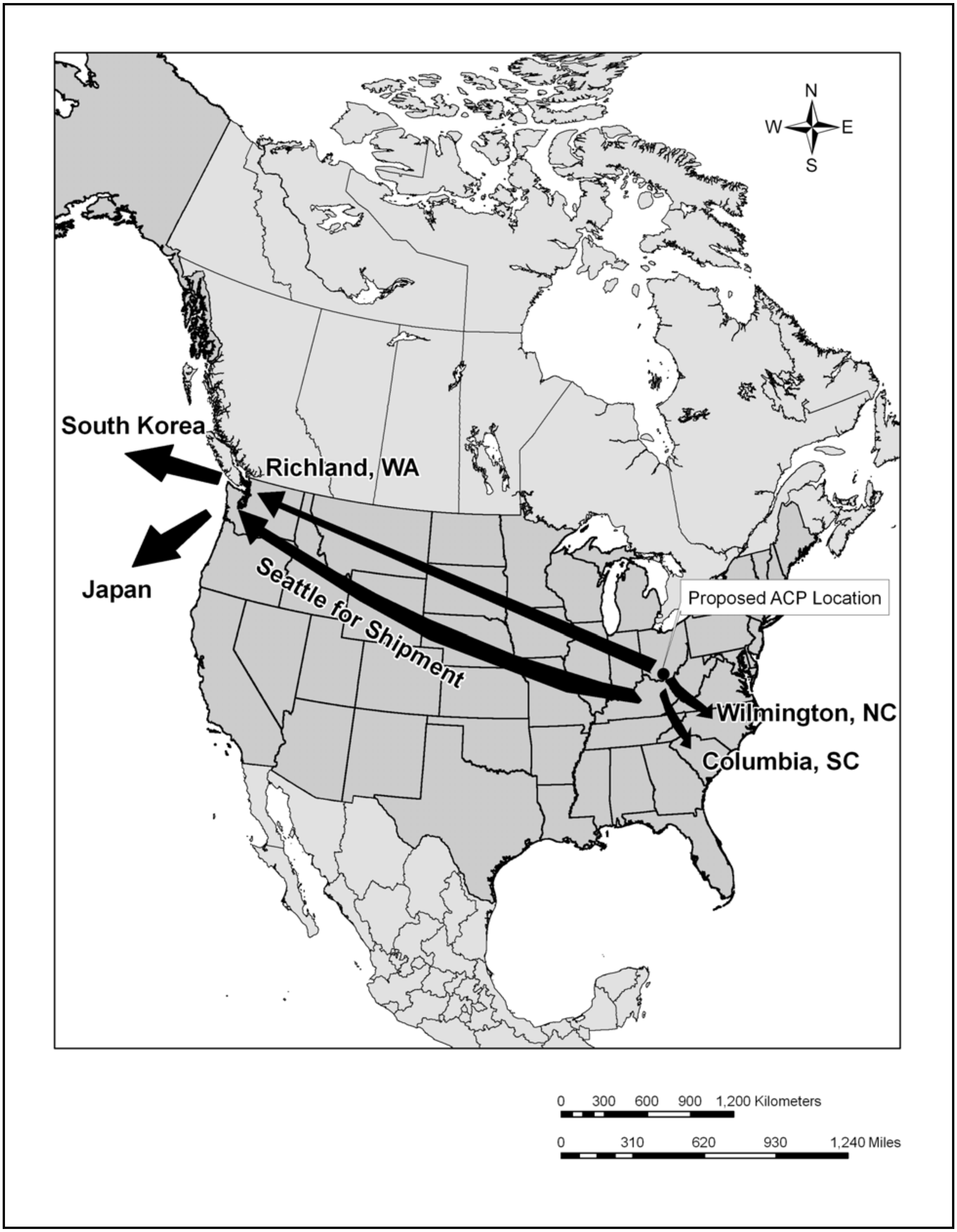

Figure 2-8
Destination of Outgoing Customer Product

Approximately 50 30-inch heel cylinders would be shipped to vendors monthly for cleaning and recertification, or washing only (USEC, 2005b). These cylinders have heel weights of less than 25 pounds. The planned vendors are Westinghouse (Columbia, SC), and Framatome (Richland, Washington).

Table 2-5 Expected Product Recipients

Company	Location	Yearly Average
Framatome ANP Inc.	Richland, Washington	300 cylinders
Global Nuclear Fuel - Americas	Wilmington, North Carolina	400 cylinders
Westinghouse Electric Corporation	Columbia, South Carolina	350 cylinders
Korea Nuclear Fuel Company	Korea	70 cylinders
Mitsubishi Nuclear Fuel Co., Ltd.	Japan	75 cylinders

Source: USEC, 2005b.

Management of Wastes from Facility Operation

Waste generated by the proposed ACP would be collected, handled, packaged, segregated, stored, and shipped for offsite treatment and disposal in accordance with plant procedures and applicable State and Federal regulations. The regulatory requirements associated with waste management are described in Chapter 1, Section 1.5. The proposed ACP would obtain waste management services from a qualified provider licensed by the NRC or an Agreement State. Potential waste streams generated include low level mixed waste, low level radioactive waste, hazardous waste regulated under the *Resource Conservation and Recovery Act*, sanitary/industrial waste, recyclable waste, and classified waste. The proposed ACP is not projected to generate any polychlorinated biphenyls or asbestos-containing waste that would be regulated under the *Toxic Substances Control Act*. Activities would be evaluated for waste minimization opportunities to reduce the volume and toxicity of waste generated to the degree determined to be economically practicable. Waste products would be categorized based upon various factors, which includes laboratory analysis, radiological assessment, process knowledge, material safety data sheets, and non-destructive analysis.

The proposed ACP would also maintain and use gaseous and liquid effluent treatment systems, as appropriate, to maintain releases of radioactive material to unrestricted areas below the limits specified in 10 CFR 20.1301 and 40 CFR Part 190, and in accordance with its “As Low As Reasonably Achievable” principle as defined in 10 CFR 20.1003. These treatment systems are described below.

Air Emissions Monitoring and Treatment Systems

The primary facilities described in Section 2.1.3 would be equipped with various air emissions monitoring and treatment systems. Since there is potential for the release of hydrofluoric acid gas during operation of the ACP, the vent systems in each primary facility would have integral gas flow monitoring instrumentation with local readouts (for total gas flow and accumulated radioactivity in the sample traps). They would also contain analytical instrumentation to continuously sample, monitor, and to alarm if UF_6 should escape in the effluent gas stream. The centrifuge process buildings vent the purge vacuum and evacuation vacuum systems through a shared set of alumina traps. Gases evacuated from process systems in the feed and withdrawal buildings would pass through cold traps to desublime the potentially high concentrations of UF_6 and separate it from the non-UF_6 gases. Residual gases leaving the cold trap would pass through a set of alumina traps to remove any trace quantities of UF_6 prior to the gases being vented to atmosphere. When an evacuation system cold trap becomes full, it would be valved off from the vent and its contents desublimed to a drum so the material could be fed back into the enrichment plant. The cold traps can be bypassed to allow rapid evacuation of a volume not containing radioactive material. The alumina traps are not bypassed. In compliance with the policies of USEC's Radiation Protection Program, the ventilation air in the primary facilities would be continuously monitored and the data would be verified quarterly to enure that ventilation exhausts are less than 11 x 10^{-08} becquerel per milliliter (3 x 10^{-13} microcuries per milliliter) uranium (USEC, 2005b).

A portable gulper (vacuum) system would be used for localized exhaust on applications ranging from pigtail operations to small-scale maintenance tasks. The gulper inlet duct or hose would be placed near the work area. Any escaping airborne contamination would be removed from the source and passed through the duct or hose and into the filter bank, where, depending on the operation, gases are neutralized and the particulates removed. The resultant exhaust would be clean air that would typically be discharged into the work area.

Based on historic experience and operating plans, the radionuclides anticipated to be present in gaseous effluents are uranium-234, -235, and -238. The intention is to not introduce feedstock contaminated with significant concentrations of other nuclides into the process. Feed material that meets the American Standards for Testing and Materials specification for recycled feed may be used, and may contain radionuclides such as uranium-236 and technetium-99. Due to historic contamination of the nuclear feed cycle and of the site, however, technitium-99 may eventually appear in some gaseous effluents. The radionuclides anticipated to be present in liquid effluents are, uranium-234, -235, -238, and technitium-99 due to historic contamination of the site. Consequently, ACP emissions will be analyzed for these four nuclides routinely. The "As Low As reasonably Achievable" goal for airborne radioactive releases from the ACP is 5 percent (5.0 x 10^{-06} sievert per year [0.5 millirem per year]) of the NRC 10 CFR 20.1101 constraint of 0.0001 sievert per year (10 millirem per year) for the most exposed member of the public. This is less than the 10 millirem per year goal recommended in NRC Regulatory Guide 8.37, Regulatory Position C.1.2 (USEC, 2005b).

Liquid Effluent Collection and Treatment Systems

The proposed ACP would be equipped with various liquid effluent collection and treatment systems. The centrifuges and other support equipment are cooled by a closed-loop Machine Cooling Water system to minimize the amount of water potentially contaminated by uranium. There would be no routine blowdown from the Machine Cooling Water system. Waste heat from the Machine Cooling Water system would be discharged via heat exchangers to the Tower Water Cooling system, which would be cooled by a single cooling tower. Waste heat from the cold trap refrigeration systems in X-3346 Feed and Customer Services and X-3356 Product and Tails Withdrawal buildings would also be discharged to the Tower Water Cooling system. Currently, the Tower Water Cooling system discharges its blowdown to the Portsmouth Gaseous Diffusion Plant Recirculating Cooling Water system under a service agreement, which in turn discharges its blowdown directly to the Scioto River via an underground pipeline (permitted outfall 004). The Recirculating Cooling Water system does not provide any treatment of the Tower Water Cooling system blowdown; it simply provides a convenient pathway to a suitable permitted discharge point. At some point in the future, the Tower Water Cooling system blowdown will likely be modified to bypass the Recirculating Cooling Water system and discharge directly to the Recirculating Cooling Water discharge pipeline. No licensed material is anticipated in the Tower Water Cooling system blowdown (USEC, 2005b).

In the interim, the Portsmouth Gaseous Diffusion Plant Recirculating Cooling Water system has ample capacity to accept the Tower Water Cooling system effluent without either physical modification or adjustment to its discharge limits. Discharges from the Recirculating Cooling Water system are monitored by an automated sampler, which collects a weekly composite sample of the liquid effluent for radiological analysis as well as sample(s) for other required analyses. Historical data indicate that there is reasonable assurance that no unanticipated discharge of licensed material has occurred (USEC, 2005b).

Leakage from the Machine Cooling Water system and incidental spills of water elsewhere in the ACP would be collected by the Liquid Effluent Collection system. The proposed collection system consists of a set of drains and underground collection tanks for the collection and containment of leaks and spills of chemically treated water. The drains are located throughout the DOE reservation. The tanks have a capacity of 550 gallons (gal) each and would be monitored by liquid level gauges mounted above grade on pipe stands. Water accumulated in the tanks would be sampled and analyzed prior to disposal. If the contents meet the requirements of 10 CFR 20.2003, they may be pumped to the reservation sanitary sewer system. Otherwise the tank contents would be containerized for off-site disposal. An integrity assurance plan would assure that the tanks are not leaking as the ACP takes possession of them. Following completion of this integrity assurance plan, inventory monitoring of the tank contents would be used to detect leaks from the Liquid Effluent Collection System (USEC, 2004).

Storm water runoff from the proposed ACP, along with some once-through cooling water, would drain to a pair of existing holding ponds, the X-2230N West Holding Pond and the X-2230M Southwest Holding Pond. These ponds provide an area for settling suspended solids, dissipation of chlorine, and oil diversion and containment before discharging to unnamed tributaries of the Scioto River. An automated sampler collects a weekly composite sample of the liquid effluent for radiological analysis as well as other required analyses (USEC, 2005b).

An inspection and maintenance program would be conducted for the proposed ACP's UF_6 cylinders to ensure that no licensed material is released to the storage pads (USEC, 2005b). Cylinder storage yards would have flat airport runway-quality concrete and would be sealed. The pad would be designed so that spills of liquids could be promptly contained and cleaned up, limiting decontamination of areas to the pad surfaces. Similarly, the floor designs in the process buildings would ensure that any spills of liquids can be contained and cleaned up, limiting decontamination of areas to floor surfaces (USEC, 2005b).

The radionuclides anticipated to be present in ACP liquid effluents are uranium-234, -235, -238, and technitium-99, due to historic contamination of the DOE reservation. Technitium-99 is a fission product that has contaminated much of the national fuel cycle and is present on the Piketon site. Measured technitium-99 concentrations in site outfalls have been falling for several years, but are still sometimes detected. Consequently, effluents from the proposed ACP would be analyzed for these four nuclides routinely. The "As Low As Reasonably Achievable" goal for liquid effluent radioactive releases from the ACP is 5.0×10^{-07} sievert per year (0.05 millliren per year). This is less than the 10 millliren per year goal recommended in NRC Regulatory Guide 8.37, Regulatory Position C.1.2 (USEC, 2005b).

<u>Solid Waste Handling, Storage, and Transport</u>

Satellite accumulation areas would be established throughout the proposed ACP as necessary to support waste handling, storage, and transport activities. Waste is then moved to the XT-847 Waste Management Staging Facility to be sampled and measured to assist in determining the proper waste characterization and disposal or treatment method.

Operations for long-term storage and preparation of waste for off-reservation shipment include sampling, batching, blending, glove box operations, nondestructive assay measurements, dry active waste and contaminated metal sorting, repackaging, and overpacking (USEC, 2005b). Sampling and batching of some solid waste, especially that with airborne potential, would be performed within a glove box enclosure. Sampling and batching of some liquid waste would be performed by utilizing a blending unit system that is specifically designed for liquid waste collection and sampling. Sampling, batching, and repackaging may also be performed elsewhere on-site, as necessary. The nondestructive assay equipment located within the XT-847 facility includes a low density waste assay monitor and box monitor. This equipment is utilized to measure the activity of waste in a variety of containers including small diameter containers, drums, and boxes (USEC, 2005b).

Waste could also be repackaged and/or overpacked within the XT-847 facility. Prior to off-reservation shipment or upon discovery, damaged containers would be repackaged using either a similar container or an 85 or 110-gallon overpack. The contents of a leaking or damaged waste container may be repackaged by hand, or by utilizing a barrel lift, forklift, forklift rotator attachment, pump, or other means of transfer. Waste would be containerized and labeled in accordance with applicable U.S. Department of Transportation regulations and site procedures. Some general types of waste packaging include:

- Solid Waste — 5, 30, 55, or 110 gallon drums; small diameter containers
- Liquid Waste — polybottles; 5, 30, or 55 gallon drums
- Corrosives, Acids — polybottles or polydrums
- Scrap Metal/Dry Active Waste — B25 boxes or other similar boxes; various drums

Contaminated scrap metal, dry active waste, and other boxed waste may be stored outside. Typically, these B25 boxes would be stored on the XT-847 facility west pad; however, they may be stored outside elsewhere on the DOE reservation. If outdoor storage of waste is necessary in other than B25 boxes, radioactive wastes with removable contamination are packaged in containers, wrapped, or covered to prevent the release of radioactivity (USEC, 2005b).

Waste would be typically removed from the generating facilities and transferred to the XT-847 Waste Preparation facility prior to final disposal; however, in some instances, waste may be shipped off-reservation directly from other on-site areas. Sanitary/industrial waste would be transported to the USEC-approved onsite landfill. Hazardous waste would be stored on-site for up to 90 days prior to off-reservation shipment. Classified wastes[1] would be stored in accordance with the appropriate security and regulatory requirements and would be disposed at an appropriate site in accordance with regulatory requirements. Low level mixed waste and low level radioactive waste would be stored on-site in compliance with NRC, Federal, and State regulatory requirements until shipped off-reservation to a licensed Treatment, Storage, Disposal, Recycling facility. Shipments of low level mixed waste would occur approximately every 90 days. The low level mixed waste is exempted from the storage requirements of the *Resource Conservation and Recovery Act* as defined in OAC 37451-03. Low level mixed waste is eligible for this conditional exemption as it is a hazardous waste and would be generated and managed by USEC as described in 40 CFR Part 266, Subpart N and OAC 3745-266 (USEC, 2005b).

Low level radioactive waste and low level mixed waste generated at the proposed ACP would be containerized and given a unique identification number. The identification numbers would be entered and maintained in a computer-based database, and the database would be regularly updated to reflect location, characterization, treatment data, and waste disposal information. Table 2-6 presents a summary of solid waste generated during the operations phase.

[1] A waste that is classified because of its configuration, composition, contamination, or contained information.

Management and Disposal of Depleted UF_6 from Facility Operation

Approximately 41,105 Type 48G cylinders of depleted UF_6 would be generated by the 7 million SWU plant operating full time for 30 years (USEC, 2005b). These cylinders would contain approximately 512,730 metric tons (535,200 tons) of depleted UF_6. The depleted UF_6 would be stored onsite in cylinders prior to management or disposal in accordance with USEC's disposal strategy and applicable regulations under 40 CFR Part 266 and OAC 3745-266 (USEC, 2004). Figure 2-9 shows some example depleted UF_6 cylinders. Cylinders would be managed in accordance with NRC, U.S. EPA and Ohio EPA rules for storage, treatment, transportation and disposal of mixed wastes. These requirements include waste storage compatibility, personnel training, emergency planning, and full compliance with the NRC license.

Table 2-6 Solid Waste Generated during Facility Operations

Material/Activity	Type of Waste	Projected Annual Rate
Paper, office waste, bathroom supplies	Sanitary/industrial	227-272 t
Classified Waste[a]	Non-regulated[b]	9-11 m^3
Classified Waste[a]	Low-level radioactive waste	12-15 m^3
General maintenance, plant materials, laboratory, lubricants, vacuum system components, etc.	Mixed/RCRA	9-11 m^3
General maintenance, plant materials, laboratory, lubricants, vacuum system components, etc.	RCRA-regulated	2-3 m^3
General maintenance, plant materials, laboratory, lubricants, vacuum system components, etc.	Non-regulated[b]	5-6 m^3
General maintenance, plant materials, laboratory, lubricants, vacuum system components, etc.	Low-level radioactive waste	170-340 m^3
Polychlorinated biphenyl waste	TSCA-regulated	none projected
Asbestos waste	TSCA-regulated	none projected
fluorescent bulbs, circuit boards, lead-acid batteries, used oil	Recyclables	57 m^3

Notes:
[a]A Classified Waste is a waste that is classified because of its configuration, composition, contamination, or contained information.
[b]A Non-Regulated Waste is any discarded material that is excluded under the Ohio Administrative Code - OAC 3745-51-04, does not exhibit a characteristic of a hazardous waste under OAC 3745-51-20 to 3745-51-24, or does not meet any of the listing descriptions in OAC 3745-51-31 to 3745-51-33.
m^3 = cubic meters; t = metric tons; RCRA = *Resource Conservation and Recovery Act;* TSCA = *Toxic Substances Control Act*.
To convert m^3 to ft^3 multiply by 35.31.
To convert t to tons multiply by 1.1.
Source: USEC, 2005b.

Figure 2-9 Example of Depleted UF_6 Cylinders (Urenco, 2003)

The cylinders primarily used for storage of tails are known as Model 48G cylinders. These cylinders are made of carbon steel and are about 4 feet in diameter, 12 feet long, and weigh about 30,000 pounds when full (USEC, 2005b). While a cylinder is being filled, it is cooled so that the gaseous depleted UF_6 is solidified. Once the depleted UF_6 is solidified, a filled cylinder is then moved to a cylinder yard where it is stacked in place. The cylinders would be inspected and maintained while being stored onsite. Maintenance activities would include periodic inspection for corrosion, valve leakage, or distortion of cylinder shape. Repainting of the cylinders would be conducted as indicated by the inspections. Depleted UF_6 may be transferred into new cylinders during plant operation in the event that cylinder inspection indicates potential loss of cylinder containment.

Depleted UF_6 Conversion Process

Depleted UF_6 conversion is a continuous process in which depleted UF_6 is vaporized and converted to triuranium octaoxide (U_3O_8) by reaction with steam and hydrogen in a fluidized-bed conversion unit. The hydrogen is generated using anhydrous ammonia, although an option of using natural gas is being investigated. Nitrogen is also used as an inert purging gas and is released to the atmosphere through the building stack as part of the clean off-gas stream. The depleted powder is collected and packaged for disposition. The process equipment would be arranged in parallel lines. Each line would consist of two autoclaves, two conversion units, a hydrofluoric acid recovery system, and process off-gas scrubbers. Equipment would also be installed to collect the hydrofluoric acid co-product and process it into any combination of several marketable products. A backup hydrofluoric acid neutralization system would be provided to convert up to 100 percent of the hydrofluoric acid to calcium fluoride for storage and/or sale in the future, if necessary.

Source: (DOE, 2004a; DOE 2004b).

DOE has decided to construct and operate a new UF_6 conversion facility at the DOE reservation in Piketon (DOE, 2004b). The facility will convert DOE's inventory of depleted UF_6 now located at the Piketon reservation and at the East Tennessee Technology Park in Oak Ridge, Tennessee to a more stable chemical form (triuranium octaoxide [U_3O_8] or uranium dioxide [UO_2]) acceptable for transportation, beneficial use/reuse, and/or disposal. A related objective is to provide cylinder surveillance and maintenance of the DOE inventory of depleted UF_6, low-enrichment UF_6, natural assay UF_6, and empty and heel cylinders. The location of this conversion facility on the reservation property is directly north of the proposed ACP. The facility will have a construction period of two years, an operational period of 18 years, and a decontamination and decommissioning period of three years. Construction began in the summer of 2004. The environmental impacts of the proposed UF_6

conversion facility are addressed in detail in a separate EIS published by DOE in June 2004 (DOE, 2004b).

USEC proposes to transport the depleted UF_6 generated at the proposed ACP to this new UF_6 conversion facility on the DOE reservation in Piketon. This plan is based on Section 3113 of the *1996 United States Enrichment Corporation Privatization Act* that states the DOE "shall accept for disposal low-level radioactive waste, including depleted uranium if it were ultimately determined to be low-level radioactive waste, generated by [...] any person licensed by the Nuclear Regulatory Commission to operate a uranium enrichment facility under Sections 53, 63, and 193 of the *Atomic Energy Act of 1954* (42 U.S.C. 2073, 2093, and 2243)." On January 18, 2005, the Commission issued its ruling that depleted uranium is considered a form of low-level radioactive waste (NRC, 2005). The Commission also stated that disposal of depleted uranium tails at a DOE facility represents a plausible strategy for the disposition of depleted uranium tails (NRC, 2005).

Once converted to U_3O_8 or UO_2, the depleted uranium from the proposed ACP would be temporarily stored onsite and then shipped offsite for disposal. During its evaluation of disposal of depleted uranium in a licensed low-level radioactive waste disposal facility, the NRC staff determined that at least one facility (the Envirocare facility in Clive, Utah) is currently licensed to accept the material. Other disposal facilities, such as the DOE-operated Nevada Test Site facility, may also be able to accept this material and additional evaluations of these facilities may be required prior to disposal (DOE, 2004b).

2.1.4.4 Decontamination and Decommissioning

At the end of useful plant life, the proposed ACP would be decontaminated and decommissioned such that the facilities would be returned to DOE in accordance with the requirements of the Lease Agreement with DOE and in accordance with applicable NRC license termination requirements. Decontamination and decommissioning of the proposed ACP would be funded in accordance with the Decommissioning Funding Plan for the proposed ACP (USEC, 2005a). The Decommissioning Funding Plan, prepared by USEC in accordance with 10 CFR 70.25(a), provides information required by 10 CFR Part 70 regarding USEC's plans for funding the decommissioning of the proposed ACP and the disposal of depleted uranium tails generated as a result of plant operations. Funding would be provided by USEC by means of a surety bond or alternate financial assurance mechanism in accordance with NRC guidance in 10 CFR 70 and NUREG-1757 (NRC, 2003).

The intent of decommissioning is to return the proposed ACP site to a state that meets NRC requirements for release for unrestricted use after decontamination and decommissioning is completed (USEC, 2004). It is anticipated that at the end of the useful life of the plant, most of the buildings and outdoor areas of the plant would already meet NRC requirements for unrestricted use in accordance with 10 CFR 20.1402. Any buildings, outdoor areas, or equipment that do not already meet the NRC requirements at the time the ACP ceases operations would be decontaminated and decommissioned in accordance with the Decommissioning Plan for the site. The site decommissioning costs estimated in the Decommissioning Funding Plan are based on decontamination of the plant to the radiological criteria for unrestricted use in 10 CFR 20.1402. The total estimated cost of decommissioning a 7 million SWU plant in 2004 dollars is currently $435 million, not including the cost of disposal of depleted uranium tails generated by plant operations, which will be funded separately by USEC (USEC, 2005b). The surety bond or other financial mechanism would be updated throughout the operating life of the ACP in accordance with 10 CFR 70.25(e).

It is anticipated that the proposed ACP would generate approximately 19,030 metric tons (20,980 tons) per year of depleted UF_6. In total, approximately 41,105 cylinders containing more than 512,730 metric tons (535,200 tons) of depleted UF_6 would be generated by the 7 million separative work unit plant operating full time for 30 years (USEC, 2005b). USEC has assumed that the depleted UF_6 would be processed in a DOE-operated conversion facility and then shipped offsite for disposal. Based on the amount of depleted UF_6 anticipated to be generated over the operating life of the proposed ACP, the estimated financial liability for depleted UF_6 disposal is approximately $1.8 billion in 2004 dollars This financial liability would be incrementally funded by USEC over the course of plant operating life as the depleted UF_6 is generated. The Decommissioning Funding Plan cost estimate for depleted UF_6 disposal is based on the assumption that the depleted UF_6 would be converted to a stable form (U_3O_8 or UO_2) and disposed of in accordance with the *USEC Privatization Act*, other applicable statutory requirements, and requirements applicable to DOE-operated depleted UF_6 conversion facilities and/or other licensed facilities.

Decontamination and decommissioning activities for the proposed ACP are anticipated to occur approximately 30 years in the future, and therefore only a general description of the activities that would be conducted for the proposed ACP can be developed at this time for the EIS. The facility will follow NRC decommissioning requirements in 10 CFR 70.38.

The NRC anticipates that decontamination and decommissioning will involve the following activities:

- Installation of decontamination facilities;
- Purging of process systems and equipment;
- Dismantling and removal of facilities and equipment;
- Decontamination and destruction of confidential materials;
- Decontamination of equipment, facilities, and structures;
- Survey and spot decontamination of outdoor areas;
- Removal and sale of any salvaged materials;
- Removal and disposal of wastes;
- Management and disposal of depleted uranium; and
- Final radiation survey to confirm that the release criteria have been met.

2.1.4.5 Ceasing Operations at Paducah

Enrichment operations at the Paducah Gaseous Diffusion Plant will ultimately cease after the ACP becomes operational. The control and categorization of the land for industrial use within the boundaries of the Paducah site would not change as a result of cessation of enrichment plant operations.

Decommissioning of the Paducah Gaseous Diffusion Plant and any other future use of the enrichment plant buildings, structures, or land are not considered part of the proposed action considered in this EIS. Decisions concerning decommissioning and any other future use of the enrichment plant would be the subject of other decisions and other environmental reviews.

2.2 No-Action Alternative

Under this alternative, the NRC would not approve the license application for the proposed ACP. The no-action alternative would result in USEC not constructing, operating, or decommissioning the proposed ACP at the DOE reservation in Piketon, Ohio. Under the no-action alternative, the uranium fuel fabrication facilities in the United States would continue to obtain low-enriched uranium from the currently available sources. Currently, the only domestic source of low-enriched uranium available to fuel fabricators is from production of the Paducah Gaseous Diffusion Plant and the down blending of highly enriched uranium under the "Megatons to Megawatts" program, as described in Section 1.3.1 of this EIS. Foreign enrichment sources are currently supplying as much as 86 percent of the U.S. nuclear power plants' demand (EIA, 2004).

Currently, the "Megatons to Megawatts" program will expire by 2013, potentially eliminating down blending as a source of low-enriched uranium. Opened in 1952, the Paducah Gaseous Diffusion Plant utilizes gaseous diffusion technology, a process that is more energy intensive and requires higher energy consumption than the newer gas centrifuge technology. Additional domestic enrichment facilities utilizing a more efficient technology in the future could be constructed. In 2003, Louisiana Energy Services submitted a license application to the NRC to construct, operate, and decommission a gas centrifuge uranium enrichment facility near Eunice, New Mexico. The proposed facility, called the National Enrichment Facility, would produce enriched uranium-235 up to 5 weight percent with an annual production level of 3 million separative work units. If the proposed National Enrichment Facility begins operations, this would represent a more efficient and less costly means of producing low-enriched uranium than the current gaseous diffusion technology at the Paducah Gaseous Diffusion Plant.

Another aspect of the no-action alternative specific to the DOE Portsmouth Reservation is that the buildings and land proposed to be used for the ACP would not be available for reindustrialization. The DOE evaluated the land, buildings, and facilities at the DOE Portsmouth Reservation for potential reindustrialization as well as the potential impacts of various reindustrialization programs at the reservation in DOE/EA-1346 (DOE, 2001). DOE concluded that approximately 526 hectares (1,300 acres) or about 35 percent of the reservation is available for transfer and that the facilities that are under lease to USEC are not available for reindustrialization, as such activities are crucial to fulfilling DOE’s nuclear energy mission. Appendix C of DOE/EA-1346 contains a list of all the buildings and facilities on the reservation and whether or not they are available for the reindustrialization program. Once the USEC lease would expire, DOE would re-evaluate its mission needs and other considerations (e.g., contamination) and would determine which facilities would become available for the reindustrialization program and which would remain under DOE control. Because for the foreseeable future the buildings and land proposed to be used for the ACP currently are leased by USEC for the development and operation of the Lead Cascade Facility and the impacts associated with reindustrialization have been evaluated in DOE/EA-1346, no reindustrialization activities are associated with the no-action alternative.

2.3 Alternatives Considered but Eliminated

As required by NRC regulations, the NRC staff has considered other alternatives to the construction, operation, and decommissioning of the proposed ACP. The range of alternatives was determined by considering the underlying need and purpose for the proposed action. This analysis led to the following set of reasonable alternatives:

- An alternative of constructing the ACP at the existing Paducah Gaseous Diffusion Plant;
- Alternative sites within the DOE reservation at Piketon;
- Alternative sources from down blending highly enriched uranium;
- Alternative sources of low-enriched uranium;
- Alternative technologies available for uranium enrichment; and
- Alternative conversion and disposition methods for depleted UF_6.

These alternatives were considered but eliminated from further analysis due to economic, environmental, national security, or technological maturity reasons. The following sections discuss these alternatives and the reasons the NRC staff eliminated them from further consideration.

2.3.1 Construction and Operation of the ACP at the Paducah Gaseous Diffusion Plant in Paducah, Kentucky

The construction and operation of the ACP at the Paducah Gaseous Diffusion Plant was considered as a reasonable alternative to the proposed action. Figure 2-10 shows the location of the Paducah Gaseous Diffusion Plant in relation to the DOE reservation in Piketon, Ohio.

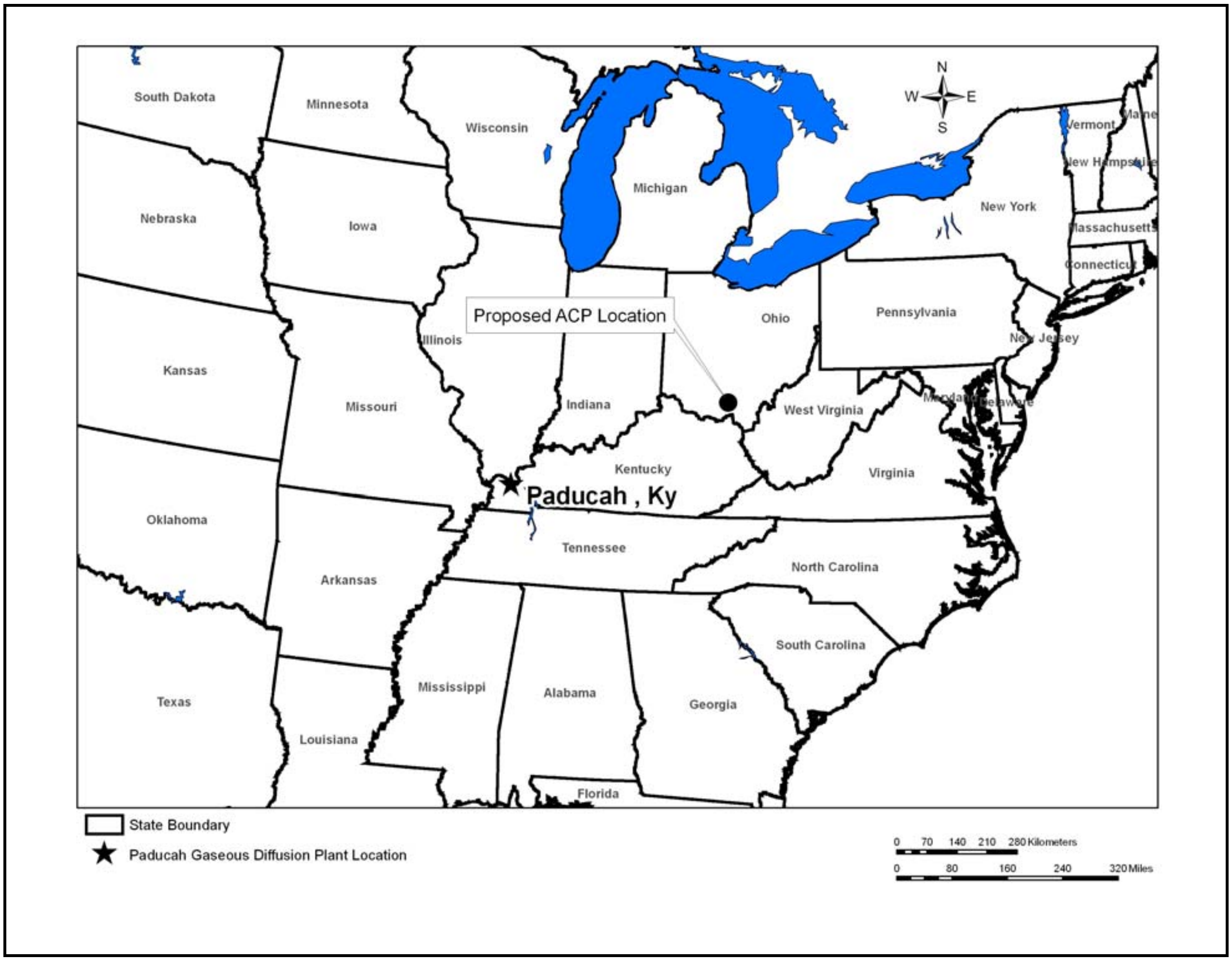

Figure 2-10 Location of the Paducah Gaseous Diffusion Plant

NRC staff concludes that while both sites are suitable on the basis of environmental, socioeconomic, and regulatory factors, the site in Paducah, Kentucky had a number of disadvantages. For example, seismic factors at Paducah would increase the cost of construction, could make the engineering effort more complex, and could make the plant safety considerations more uncertain. Overall, the NRC staff found that the selection of the Paducah site would result in somewhat greater environmental impacts due primarily to the need for construction of all new buildings, and the attendant excavation and land disturbance.

Table 2-7 provides a comparative analysis of the key environmental factors of the Piketon site versus the Paducah site. Based on this comparison, the NRC staff concludes that the Paducah site offers no environmental advantages and can be dropped from more detailed consideration in this EIS.

Table 2-7 Comparison of Environmental Impacts at Alternative Site Locations

Resource Area	Piketon[1]	Paducah	Greater Impact
Land Use	• The ACP would refurbish and use existing buildings and utilities. • Some new process buildings, support facilities, and cylinder yards would be constructed on previously disturbed land.	• All primary and secondary facilities for the ACP would be newly constructed and would disturb previously undeveloped and uncontaminated areas of the Paducah DOE reservation (managed lawns and fields). Utilities are already available onsite.	Paducah
Historic and Cultural Resources	• The impacts to historic and cultural resources identified onsite and around the site's perimeter would be small.	• The State Historic Preservation Officer would be consulted prior to construction at Paducah; however, potential impacts to historic and cultural resources are unknown.	Unknown
Visual/Scenic Resources	• Changes to existing facilities and construction of new buildings would be consistent with existing site architectural features. Neither these changes nor the new construction would alter the existing visual characteristics of the site. • There are no existing State nature preserves or scenic rivers at Piketon.	• Architectural consistency would be maintained to ensure blending of the ACP construction with existing facilities. • There are no existing State nature preserves or scenic rivers at Paducah.	Same
Air Quality	• Pike County and the proposed ACP site are in National Ambient Air Quality Standard (NAAQS) attainment for criteria pollutants. • Air quality impacts associated with construction will have no lasting significant impacts on air quality. • The average calculated hydrogen fluoride (HF) concentration is 2.35×10^{-3} micrograms per cubic meter at the location of the Maximally Exposed Individual. • The maximum emission rate anticipated under normal operations is 1.1 millicuries of uranium per week, or up to 0.057 curies per year.	• McCracken County is in NAAQS non-attainment for 8-hr ozone. The Paducah Gaseous Diffusion Plant site itself, however, is in attainment for all criteria pollutants. • Air quality impacts associated with construction will have no lasting significant impacts on air quality. • The average calculated HF concentration is 2.27×10^{-3} micrograms per cubic meter at the location of the Maximally Exposed Individual. • The projected maximum emission rate for the ACP is 1.86 millicuries per week, or 0.097curies per year of total uranium.	Paducah

Table 2-7 Comparison of Environmental Impacts at Alternative Site Locations (continued)

Resource Area	Piketon[1]	Paducah	Greater Impact
Geology and Soils	• Soil disturbance from project activities would occur in construction lay-down areas, destroying the soil profile and leading to a possible temporary increase in erosion due to storm water runoff and wind. Engineering controls and best management and construction practices would be implemented to minimize the extent of excavation, erosion, and sediment runoff.	• The nature of the impacts would be the same as that for Piketon, except they would be more extensive due to the need for all new construction.	Paducah
Water Resources	• Best management and construction practices and erosion controls would minimize potential impacts to surface and ground water during construction. • The Liquid Effluent Collection system, monitoring of liquid release points, and complying with all NPDES permitting requirements would minimize potential impacts to surface and ground water during plant operation.	• Best management and construction practices and erosion controls would minimize potential impacts to surface and ground water during construction. • Safety procedures, spill prevention plans, and spill response plans would avoid impacts from accidental discharges during plant operation.	Same
Ecological Resources	• Some threatened or endangered species, including the Indiana bat (*Myotis sodalis*), Virginia meadow-beauty (*Rhexia virginica*), and Carolina yellow-eyed grass (*Xyris difformis*) are present or potentially located in the surrounding region. None of the proposed site preparation and construction activities would occur in any of the jurisdictional or nonjurisdictional wetlands on the DOE reservation.	• Some threatened or endangered species including the Indiana bat (*Myotis sodalis*), the tuberculed-blossom pearly mussel (*Epioblasma torulora*), pink-mucket pearly mussel (*Lampsilis orbiculata*), and the orange-footed pearly mussel (*Plethobasus cooperrianus*) are present or potentially located in the surrounding region. Wetlands are in the area, but are not located in the immediate vicinity of the proposed construction area.	Same

Table 2-7 Comparison of Environmental Impacts at Alternative Site Locations (continued)

Resource Area	Piketon[1]	Paducah	Greater Impact
Socioeconomic	• 3,362 direct and indirect jobs per year are expected during the construction phase. • Facility operations are expected to create 1,500 direct and indirect jobs. • No significant impacts to tax revenue, population characteristics, housing availability, or community are expected.	• 3,899 direct and indirect jobs per year are expected during the construction phase. • Facility operations are expected to create 1,860 direct and indirect jobs. • No significant impacts to tax revenue, population characteristics, housing availability, or community are expected.	Paducah
Environmental Justice	• No disproportionately high and adverse impacts to minority or low-income populations within an 80-kilometer (50-mile) radius of the Piketon site.	• No disproportionately high and adverse impacts to minority or low-income populations within an 80-kilometer (50- mile) radius of the Paducah site (DOE, 2004a).	Same
Noise Impacts	• Construction noise levels are estimated to reach a 53 day-night average noise level, which meets the standards for community noise levels at the nearest residence. • No adverse impacts from operational noise are expected at the closest residential receptor due to low operational noise, attenuation from the building, and distance attenuation of over 914 meters (3,000 feet).	• Noise associated with the construction phase would be temporary and not expected to significantly increase overall noise levels at the Paducah site. • Operation of the centrifuge system is not expected to increase the noise levels outside the proposed facilities.	Same

Table 2-7 Comparison of Environmental Impacts at Alternative Site Locations (continued)

Resource Area	Piketon[1]	Paducah	Greater Impact
Transportation	• The proposed action will not significantly change the Level of Service classifications for U.S. Route 23 or SR 32. • During site preparation and construction, the expected number of injuries to workers is 93 and expected number of fatalities is 1.03. For drivers transporting material and equipment to and from the site, the expected number of injuries is 3.61and expected number of fatalities is 0.10. • During facility operation, the expected number of injuries to workers is 7.9 and expected number of fatalities is 0.09. For drivers transporting material and equipment to and from the site, the expected number of injuries is 0.19 and expected number of fatalities is 0.01.	• Transportation impacts during site preparation and construction would be approximately double that of Piketon due to the need for all new facility construction. • All other transportation impacts would be approximately the same.	Paducah
Public and Occupational Health	• Construction and industrial activities would be managed under the OSHA industrial regulations (29 CFR 1910) and in compliance with site licenses and permits. • The use of spill response plans, safety procedures, spill controls, countermeasures plans, and spill response equipment in accordance with Federal and State laws, would minimize the likelihood and severity of potential impacts from accidental discharges. • The radiological risk for all receptor groups is below applicable criteria.	• Construction and industrial activities would be managed under the OSHA industrial regulations (29 CFR 1910) and in compliance with site licenses and permits. • The use of spill response plans, safety procedures, spill controls, countermeasures plans, and spill response equipment in accordance with Federal and State laws, would minimize the likelihood and severity of potential impacts from accidental discharges. • The radiological risk for all receptor groups is below applicable criteria.	Same

Resource Area	Piketon[1]	Paducah	Greater Impact
Waste Management	• The projected annual rate of sanitary/industrial waste is 2,240 tons • The projected annual rate of RCRA and Mixed/RCRA waste is 1,510 cubic feet. • The projected annual rate of LLRW is 313,020 cubic feet. • The projected annual rate of non-regulated waste is 800 cubic feet. • The project annual rate of recyclables is 6,500 cubic feet. • The proposed ACP is expected to generate approximately 512,730 metric tons (535,200 tons) of tails over its 30-year license period (about 41,105 tails cylinders).	• Quantities of waste are assumed be the same as the proposed Piketon site for all activities except construction, which would generate more at Paducah. • Sanitary/industrial waste in the construction phase at Paducah is projected to be double that of Piketon, due to the need for all new buildings.	Paducah

2.3.2 Other Alternative Sites

USEC used a site-selection process to identify viable alternative sites for the construction, operation, and decommissioning of the proposed ACP. The NRC staff has evaluated that process and determined that it is rational and objective, and that its results are reasonable. The candidate sites and the reasons they were not chosen as the preferred site location are described in the following sections.

Alternative Locations at the DOE Reservation in Piketon, Ohio

The DOE reservation in Piketon was evaluated to identify alternative locations for the ACP and three possible sites were identified, as shown in Figure 2-11. Location A is the preferred location for the ACP and is discussed in detail as the proposed action. This location is within the existing footprint of the DOE Gaseous Diffusion Plant facility and would be classified as a "brownfield" site. Further, compared to the other potential site locations, this location is the most isolated from the property boundary, which would likely result in a lower potential dose to the general public from any accidental or operational releases during construction, operation, and decommissioning of the proposed ACP.

Location B is located in the southeast portion of the site. This location consists of a level to very gently rolling grass field to a rolling forested hill. The level area was graded during the construction of the Gaseous Diffusion Plant in the 1950s and has been maintained as grass fields.

Location C is located in the northeast portion of the site and, like Location B, consists of a level to very gently rolling grass field to a rolling forested hill. It too was graded during the construction of the Gaseous Diffusion Plant and has been maintained as grass fields.

Locations B and C were not selected as the preferred alternative primarily due to the lack of existing buildings, extensive site preparation that would be needed, lack of access to utility services, and new construction that would be required. Neither location B or C had an environmental advantage over Location A or afforded the advantages offered by Location A, which is the site of the former Gas Centrifuge Enrichment Plant buildings.

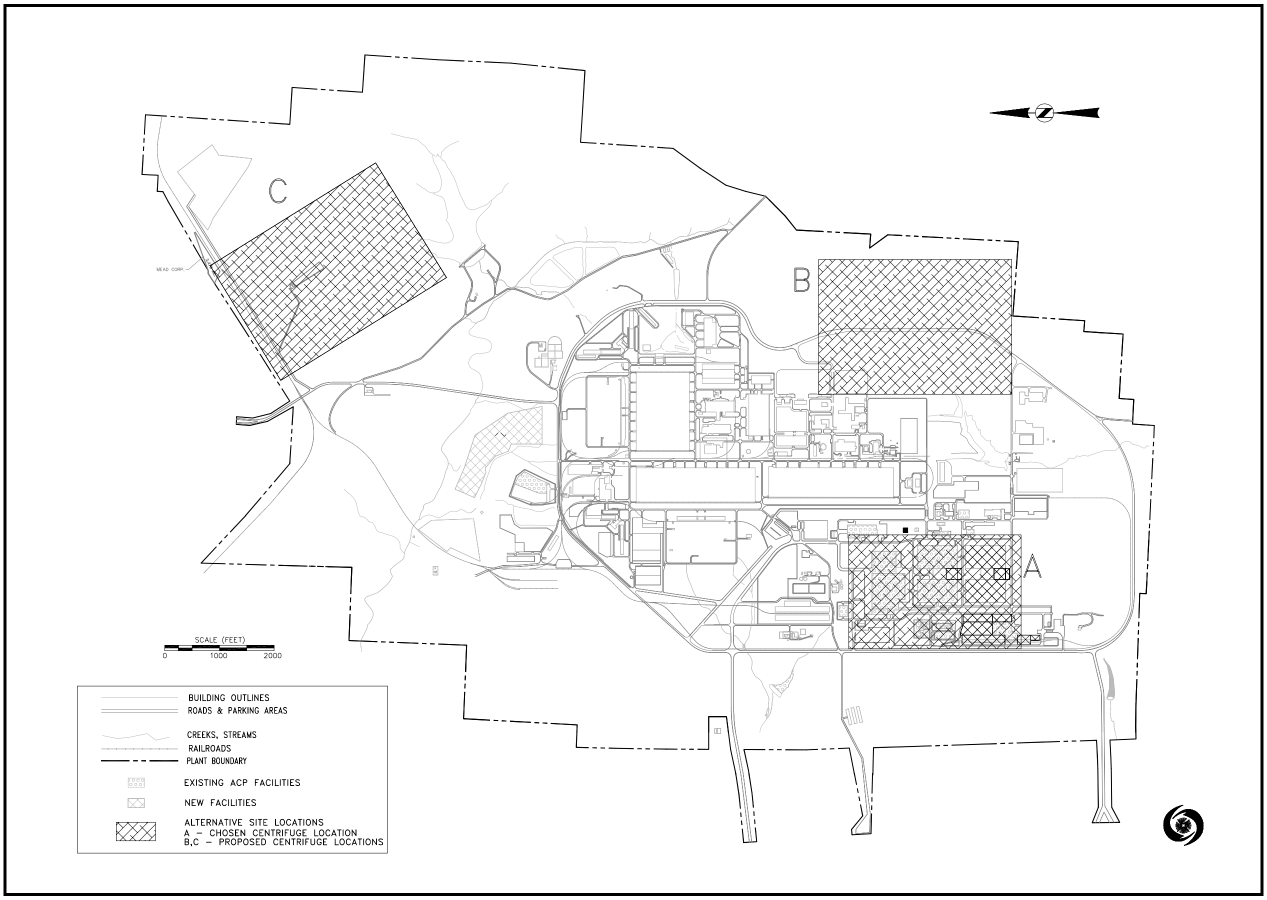

Figure 2-11 Alternative Sites at the DOE Reservation for the Proposed ACP

<u>Construct and Operate the ACP at a Non-Gaseous Diffusion Plant Location</u>

This alternative involves constructing and operating the ACP at an undisturbed "green field" site, or a disturbed site other than one of the existing Gaseous Diffusion Plants in Piketon, Ohio or Paducah, Kentucky. This alternative was not selected as the preferred alternative because it is inconsistent with the DOE-USEC Agreement and because the Gaseous Diffusion Plant sites provide schedule, regulatory, and cost advantages over other sites. The DOE-USEC Agreement stipulates that USEC deploy the ACP at either the DOE reservation in Piketon or Paducah. Also, no other sites offered the unique combination of (1) readily accessible environmental data; (2) past history and experience in uranium enrichment; and (3) the availability of skilled labor with uranium enrichment industry experience. A "green field" situation would not have readily accessible environmental data for the purpose of impact assessment and performance monitoring. Without available skilled labor with uranium enrichment experience, USEC would have to either provide training or relocate trained personnel at added expense. The environmental impact of this alternative would be either to disturb a "green field" site or to possibly introduce emission and effluents associated with uranium enrichment to an existing industrial site.

None of the alternatives considered would be obviously superior to the proposed location for the ACP at the DOE reservation in Piketon, Ohio.

2.3.3 Alternate Sources from Down Blending Highly Enriched Uranium

This alternative involves not constructing a domestic uranium enrichment plant to replace existing Gaseous Diffusion Plant production. Instead, an equivalent amount of separative work units would be obtained from down blending highly enriched uranium from either United States or Russian nuclear States or Russian nuclear warheads, or from the Nuclear Fuel Services facility in Erwin, Tennessee.

This alternative was not selected as the preferred alternative because it does not meet the commitments in the DOE-USEC Agreement, which requires that an ACP be constructed and operated. This alternative was also eliminated since it would be contrary to Congressional intent and common defense and security and does not meet the need as discussed in Section 1.3. USEC is the Executive Agent for a U.S. Government agreement that purchases low-enriched uranium that is derived from down blending of highly enriched uranium from Russian warheads. In February 1993, the U.S. Government agreed to purchase from Russia 500 metric tons (492 tons) of highly enriched uranium extracted from dismantled nuclear weapons over a 20-year period, which expires in 2013 (USEC, 2005b). It is uncertain whether this agreement will be extended beyond 2013.

Currently, the equivalent separative work units from down blended highly enriched uranium complements domestic separative work unit production at the Paducah Gaseous Diffusion Plant. While the U.S. Government may wish to extend this arrangement to continue the reduction of the number of nuclear weapons in the world, it is doubtful that the agreement would replace rather than complement domestic separative work unit production. As discussed in Section 1.3, it is a national priority to increase domestic supplies of enriched uranium to improve national energy security.

2.3.4 Alternative Sources of Low-Enriched Uranium

The NRC staff examined two alternatives to fulfill U.S. domestic enrichment needs. These alternatives, for reasons summarized below, were eliminated from further consideration.

Re-Activate the Portsmouth Gaseous Diffusion Facility at Piketon

United States Enrichment Corporation closed the Portsmouth Gaseous Diffusion Plant (located in Piketon) in May 2001 to reduce operating costs (DOE, 2003). United States Enrichment Corporation cited long-term financial benefits, more attractive power price arrangements, operational flexibility for power adjustments, and a history of reliable operations as reasons for choosing to continue operations at the Paducah Gaseous Diffusion Plant. In a June 2000 press release, United States Enrichment Corporation explained that they "...clearly could not continue to operate two production facilities." Key business factors in United States Enrichment Corporation's decision to reduce operations to a single production plant included long-term and short-term power costs, operational performance and reliability, design and material condition of the plants, risks associated with meeting customer orders on time, and other factors relating to assay levels, financial results, and new technology issues (USEC, 2000).

The NRC staff does not believe that there has been any significant change in the factors that were considered by United States Enrichment Corporation in its decision to cease uranium enrichment at Piketon. In addition, the gaseous diffusion technology is more substantially energy intensive than gas centrifuge. The higher energy consumption results in larger indirect impacts, especially those impacts which are attributable to significantly higher electricity usage (e.g., air emissions from coal-fired electricity generation plants) (DOE, 1995). The age of the existing Gaseous Diffusion Plant also calls into question its overall reliability. Therefore, this proposed alternative was eliminated from further consideration.

Purchase Low-Enriched Uranium From Foreign Sources

There are several potential sources of enrichment services worldwide. However, United States reliance on foreign sources of enrichment services, as an alternative to the proposed action, would not meet the national energy policy objective of a "...viable, competitive, domestic uranium enrichment industry for the foreseeable future" (DOE, 2000). For this reason, the NRC staff does not consider this alternative to meet the purpose and need for the proposed action, and eliminated it from further study.

2.3.5 Alternative Technologies for Enrichment

A number of different processes have been invented for enriching uranium, but only two have been proven suitable for commercial and economic use. Only the gaseous diffusion process and the gas centrifuge technology have reached the maturity needed for industrial use. Other technologies—namely the Electromagnetic Isotope Separation Process, Liquid Thermal Diffusion, and a laser enrichment process—have proven too costly to operate or remain at the research and laboratory developmental scale and have yet to prove themselves to be economically viable.

Electromagnetic Isotope Separation Process

Figure 2-12 shows a sketch of the Electromagnetic Isotope Separation Process. In this process, a monoenergetic beam of ions of normal uranium travels between the poles of a magnet. The magnetic field causes the beam to split into several streams according to the mass of the isotope. Each isotope has a different radius of curvature and follows a slightly different path. Collection cups at the ends of the semicircular trajectories catch the homogenous streams. Because the energy requirements for this process proved very high—in excess of 3,000 kilowatt hour per separative work unit—and the production was very slow (Heilbron et al., 1981), electromagnetic isotope separation was removed from further consideration.

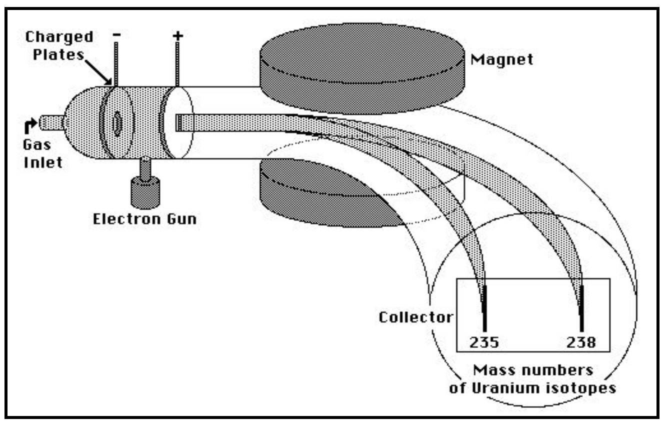

Figure 2-12 Electromagnetic Isotopic Separation Process (Milani, 2005)

Liquid Thermal Diffusion

The liquid thermal diffusion process was investigated in the 1940s. Figure 2-13 is a diagram of this process. It is based on the concept that a temperature gradient across a thin layer of liquid or gas causes thermal diffusion that separates isotopes of differing masses. When a thin, vertical column is cooled on one side and heated on the other, thermal convection currents are generated and the material flows upward along the heated side and downward along the cooled side. Under these conditions, the lighter UF_6 molecules diffuse toward the warmer surface and heavier UF_6 molecules concentrate near the cooler side. The combination of this thermal diffusion and the thermal convection currents causes the lighter uranium-235 molecules to concentrate on top of the thin column while the heavier uranium-238 goes to the bottom. Taller columns produce better separation. Eventually, a facility using this process was designed and constructed at Oak Ridge, Tennessee, but it was closed after about a year of operation because of cost and maintenance concerns (Settle, 2004). Based on high operating costs and high maintenance requirements, the liquid thermal diffusion process has been eliminated from further consideration.

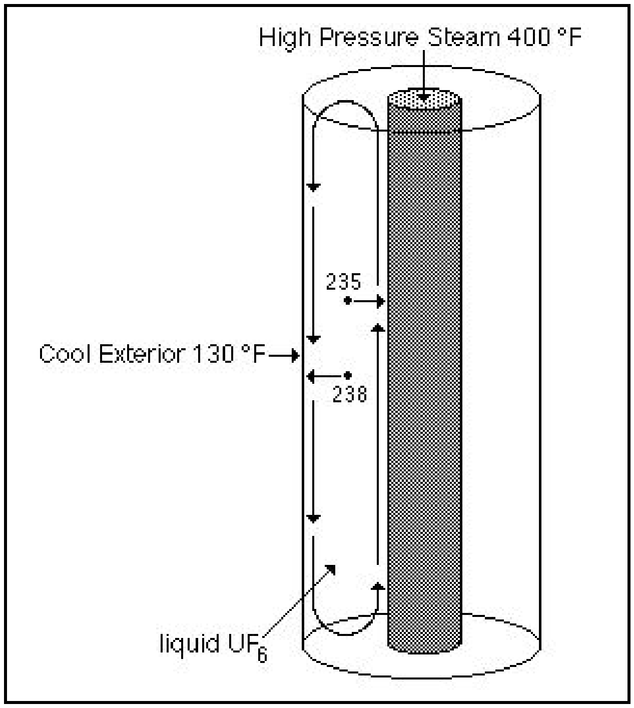

Figure 2-13 Liquid Thermal Diffusion Process (Milani, 2005)

Gaseous Diffusion Process

The gaseous diffusion process is based on molecular effusion, a process that occurs whenever a gas is separated from a vacuum by a porous barrier. The gas passes through the holes because there are more "collisions" with holes on the high-pressure side than on the low-pressure side (i.e., the gas flows from the high-pressure side to the low-pressure side). The rate of effusion of a gas through a porous barrier is inversely proportional to the square root of its mass. Thus, lighter molecules pass through the barrier faster than heavier ones. Figure 2-14 is a diagram of a single gas diffusion stage. The gaseous diffusion process consists of thousands of individual stages connected in series to multiply the separation factor. The gaseous diffusion plant in Paducah, Kentucky, contains 1,760 enrichment stages and is designed to produce UF_6 enriched up to 5.5 percent uranium-235. The design capacity of the Paducah Gaseous Diffusion Plant is approximately 8 million separative work units per year, but it has never operated at greater than 5.5 million separative work units. Paducah consumes approximately 2,200 kilowatt hours per kilogram of separative work unit, which is less than the electromagnetic isotopic separation process or liquid thermal diffusion process but still higher than the 40 kilowatt hours per kilogram of separative work unit possible in modern gas centrifuge plants (DOE, 2000; Urenco, 2004).

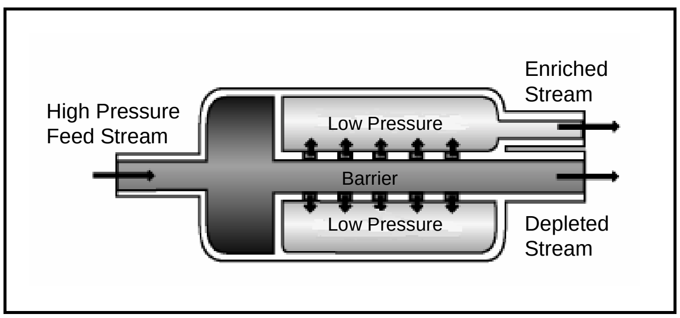

Figure 2-14 Gaseous Diffusion Stage (FAS, 2000)

The gaseous diffusion process is a 50-year-old technology that is energy intensive and has been eliminated from further consideration.

Laser Separation Technology

Laser separation technology encompasses two known developmental technologies that have yet to reach the maturity stage for industrial use. These are the Atomic Vapor Laser Isotope Separation and the Separation of Isotopes by Laser Excitation processes.

The Atomic Vapor Laser Isotope Separation process, diagrammed in Figure 2-15, is based on different isotopes of the same element. The isotopes, though chemically identical, have different electronic energies and absorb different colors of laser light. The isotopes of most elements can be separated by a laser-based process if they can be efficiently vaporized into individual atoms. In Atomic Vapor Laser Isotope Separation enrichment, uranium metal is vaporized and the vapor stream is illuminated with a laser light of a specific wavelength that is absorbed only by uranium-235. The laser selectively adds enough energy to ionize or remove an electron from uranium-235 atoms while leaving the other isotopes unaffected. The ionized uranium-235 atoms are then collected on negatively charged surfaces inside the separator unit. The collected material (enriched product) is condensed as liquid on the charged surfaces and then drains to a caster where it solidifies as metal nuggets. In June 1999, citing budget constraints, USEC stopped further development of the Atomic Vapor Laser Isotope Separation program (USEC, 1999).

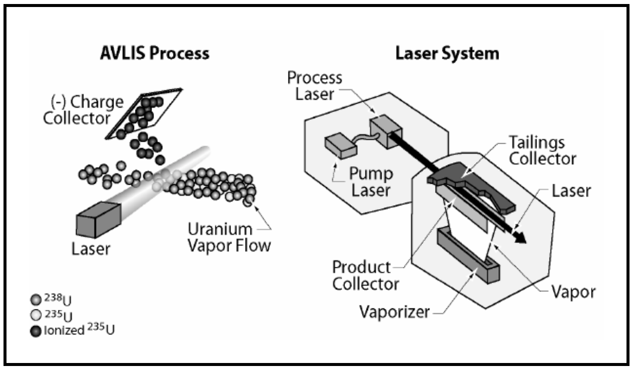

Figure 2-15 Atomic Vapor Laser Isotope Separation Process (Hargrove, 2000)

The Separation of Isotopes by Laser Excitation technology, developed by Silex Systems Ltd., uses a similar process to the Atomic Vapor Laser Isotope Separation process. The Separation of Isotopes by Laser Excitation process uses UF_6 vapor that passes through a tuned laser and an electromagnetic field to separate the isotopes of UF_6. The process is still under development and will not be ready for field trials for several years. USEC ended its support of the Separation of Isotopes by Laser Excitation program on April 30, 2003, in favor of the proposed American Centrifuge Plant (USEC, 2003).

Because neither the Atomic Vapor Isotope Separation process nor the Separation of Isotopes by Laser Excitation process is ready for commercial production of low-enriched uranium, these processes have been eliminated from further consideration.

Conclusion

The NRC considered the feasibility of utilizing alternative methods for producing low-enriched uranium. Gaseous diffusion and liquid thermal diffusion technology would be far more costly then the centrifuge technology proposed. The other technologies reviewed: the electromagnetic isotope separation process; and the laser separation technology, have not been sufficiently developed for commercial application. Accordingly, these technologies were not considered reasonable alternatives.

2.3.6 Depleted UF_6 Management Alternatives

DOE has evaluated the potential impacts of various disposition options in its "Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride" (DOE, 1999). These include (1) storage as depleted UF_6 for up to 40 years, (2) long-term storage as depleted U_3O_8, (3) use of depleted U_3O_8, and (4) use of uranium metal. The Programmatic EIS also evaluated the potential environmental impacts of disposal in shallow earthen structures, below-grade vaults, and underground mines.

For the proposed ACP, NRC considered as reasonable alternatives for depleted UF_6 disposition the (1) onsite storage in anticipation of future use as a resource, and (2) conversion at facilities other than the new facility that DOE is now building at Piketon. These alternatives and the reasons they are not evaluated in detail in this EIS are presented in the following subsections.

Use of Depleted UF_6

DOE has evaluated a number of alternatives and potentially beneficial uses for depleted UF_6, and some of these applications have the potential to use a portion of the existing depleted UF_6 inventory (DOE, 1999; Brown et al., 1997). However, the current depleted UF_6 consumption rate is low compared to the depleted UF_6 inventory (DOE, 1999b), and the NRC has assumed that excess DOE and commercial inventory of depleted UF_6 would be disposed of as a waste product (NRC, 1995).

The NRC staff has determined that unless USEC can demonstrate a use for uranium in the depleted tails as a potential resource, the depleted UF_6 generated by the proposed ACP should be considered a waste product. Because the current available inventory of depleted uranium in the form of metal (UF_6 and U_3O_8) is in excess of the current and projected future demand for the material, this EIS will not further evaluate depleted UF_6 disposition alternatives involving its use as a resource, including continued storage at the proposed ACP site for more than 30 years in order to be used in the future.

If storage of depleted UF_6 beyond 30 years occurs, then the impacts described in Chapter 4 of this EIS would be extended for that storage period. If a use for depleted UF_6 is found, it could reduce the environmental impacts associated with its disposition. However, the likelihood of a significant commercial market for the depleted UF_6 generated by the proposed ACP is considered to be low.

Conversion at Alternate Sites

Other depleted UF_6 management alternatives include conversion at the DOE conversion facility in Paducah, Kentucky, or at an existing fuel fabrication facility. DOE has issued a Final EIS to construct and operate a conversion facility at Paducah (DOE, 2004a; DOE, 2004b). Additionally, DOE has issued its Record of Decision and construction of the Paducah conversion facility began in July 2004 (DOE, 2004c; DOE, 2004d). Since the shipment of the ACP's depleted UF_6 to Paducah for treatment offers no environmental advantage over onsite conversion at the Piketon facility, this alternative will not be analyzed further in this EIS.

Another potential strategy would be to perform the conversion of depleted UF_6 to U_3O_8 at an existing fuel fabrication facility. The existing fuel fabrication facilities are Global Nuclear Fuel-Americas, LLC, in Wilmington, North Carolina; Westinghouse Electric Company, LLC, in Columbia, South Carolina; and Framatome ANP, Inc., in Richland, Washington. These facilities have existing processes and conversion capacities and also use Type 30B cylinders. Therefore, the existing fuel-fabrication facilities would need to install new equipment to handle the larger Type 48G cylinders. The facilities would probably need to install separate capacity to process the depleted UF_6 to avoid quality control issues related to processing enriched UF_6. The facilities would also need to manage and dispose of the hydrofluoric acid that would be generated from the conversion process. Furthermore, these existing facilities have not expressed an interest in performing these services, and the cost for the services would be difficult to estimate. For these reasons, this alternative is eliminated from further consideration in this EIS.

2.4 Comparison of Predicted Environmental Impacts

Chapter 4 of this EIS presents a more detailed evaluation of the environmental impacts of the proposed action and the no-action alternative. Table 2-8 summarizes the environmental impacts for the proposed and the no-action alternative.

Table 2-8 Summary of Environmental Impacts for the Proposed ACP and the No-Action Alternative

Affected Environment	Proposed Action: ***USEC would construct, operate, and decommission the proposed ACP in Piketon, Ohio.***	No-Action Alternative: ***The proposed ACP would not be constructed, operated, and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Land Use	SMALL. Site preparation and construction activities would occur on approximately 22 hectares (55 acres) of land, which comprises about 1 percent of the total 1,497 hectare (3,700)-acre DOE reservation. The changes would occur on previously disturbed land that is not considered prime farmland, and would be consistent with current land use.	SMALL. Under the no-action alternative, no local impact would occur because the proposed ACP would not be constructed or operated. Existing land use would continue and the property would be available for alternative use. There also would be no land disturbances. Existing activities such as enrichment services from existing uranium enrichment facilities (including the possible re-opening of the gaseous diffusion plant at the Piketon site), from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities could be constructed in the future and would have land use impacts similar to those of the proposed action, depending onsite conditions either at a new location or an existing industrial site. Impacts to land use would be expected to be SMALL.

Table 2-8 Summary of Environmental Impacts for the Proposed ACP and the No-Action Alternative (continued)

Affected Environment	Proposed Action: ***USEC would construct, operate, and decommission the proposed ACP in Piketon, Ohio.***	No-Action Alternative: ***The proposed ACP would not be constructed, operated, and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Historical and Cultural Resources	SMALL. Within and adjacent to the area of potential effect (the DOE reservation boundary), while the impacts may be noticeable, there would be no indirect or direct effect on the eligible or potentially eligible sites for the National Register of Historic Places. Also, construction of new buildings and refurbishment of existing buildings would result in buildings of design, size, and function similar to the existing buildings, and therefore would not alter the historic setting of the existing Gaseous Diffusion Plant district. Additional disturbance of the site is not anticipated during decommissioning. Any such changes to buildings or structures would be evaluated by the appropriate agency for historic and cultural resources impacts prior to any implementation.	SMALL. Under the no-action alternative, the site would continue to be used for commercial industrial purposes and historical and cultural resources would be unaffected. The existing activities such as enrichment services from existing uranium enrichment facilities (including the possible re-opening of the gaseous diffusion plant at the Piketon site), from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities could be constructed in the future and could have potential impacts to historical and cultural resources if at a new location. Impacts to historical and cultural resources at these other sites would have to be controlled in accordance with applicable Federal and State historic preservation laws and regulations. The impacts would be expected to be SMALL if built and operation at an exisiting industrial site. The impacts could be SMALL to MODERATE if additional domestic enrichment facilities were located at a new site, depending on specific site conditions.

Table 2-8 Summary of Environmental Impacts for the Proposed ACP and the No-Action Alternative (continued)

Affected Environment	Proposed Action: *USEC would construct, operate, and decommission the proposed ACP in Piketon, Ohio.*	No-Action Alternative: *The proposed ACP would not be constructed, operated, and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.*
Visual and Scenic Resources	SMALL. The Bureau of Land Management Visual Resources Management rating system classifies the proposed ACP site as Class III or IV, meaning it has moderate to little scenic value. Construction of the ACP would not alter the site's classification. No scenic rivers, nature preserves, or unique visual resources exist in the project area. No impacts are expected from decommissioning. Any such changes would be evaluated by the appropriate agency prior to implementation.	SMALL. Under the no-action alternative, the visual and scenic resources would remain the same as described in the affected environment section. The existing activities such as enrichment services from existing uranium enrichment facilities (including the possible re-opening of the gaseous diffusion plant at the Piketon site), from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities could be constructed in the future with a possible impact on visual and scenic resources similar to that of the proposed action, depending onsite conditions either at a new location or an existing industrial site. Impacts to visual and scenic resources would be expected to be SMALL.

Table 2-8 Summary of Environmental Impacts for the Proposed ACP and the No-Action Alternative (continued)

Affected Environment	Proposed Action: ***USEC would construct, operate, and decommission the proposed ACP in Piketon, Ohio.***	No-Action Alternative: ***The proposed ACP would not be constructed, operated, and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Air Quality	SMALL to MODERATE. Airborne emissions from site preparation and construction should not result in exceedances of air quality standards, with the possible exception of short-term increases in particulate matter. Radiological releases from soil disturbances and decommissioning of the Gas Centrifuge Enrichment Plant would be small and controlled. Emissions from diesel generators would not cause air quality problems and maximum predicted concentrations of hydrogen fluoride resulting from ACP operations are below safe levels. Based on the maximum radiological emission rates for the ACP and the comprehensive site monitoring program, the expected impact to air quality from the plant's radiological emissions is also expected to be SMALL. Impacts from decommissioning could result in the emission of solvents, but in small amounts and only for a short period of time.	SMALL. Under the no-action alternative, air quality in the general area would remain at its current levels described in the affected environment section. The existing activities such as enrichment services from existing uranium enrichment facilities (including the possible re-opening of the gaseous diffusion plant at the Piketon site), from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities could be constructed in the future. Depending on the construction methods and design of these facilities, the likely impact on air quality would be similar to that of the proposed action. Impacts to air quality would be expected to be SMALL.

Table 2-8 Summary of Environmental Impacts for the Proposed ACP and the No-Action Alternative (continued)

Affected Environment	Proposed Action: ***USEC would construct, operate, and decommission the proposed ACP in Piketon, Ohio.***	No-Action Alternative: ***The proposed ACP would not be constructed, operated, and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Geology and Soils	SMALL. Most of the site is an existing industrial facility with altered natural soils. The soils are cohesive and over-consolidated and have low potential for liquefaction. There is little likelihood of impact from soil compaction or subsidence. The flat terrain where the ACP buildings would be located, and the dense soil, low moisture content, and vegetative cover in the area of a new large cylinder storage yard (X-745H), make landslides unlikely. Construction activities would not alter current drainage and would not disturb any soils that qualify for protection as prime farmland. There would be a potential for increased erosion and siltation of streams near the construction site of the new large cylinder storage yard, but both of these potential impacts should be minimized by the use of standard best management practices. The potential for soil contamination during operations would be SMALL. Impacts from decommissioning would not exceed those identified for site preparation and construction. Any removal of contaminated soils would be limited in scope and the impact would be SMALL.	SMALL. Under the no-action alternative, existing land use would remain intact. The geology and soils of the proposed site would remain unaffected because no land disturbance would occur. Natural events such as wind and water erosion would remain as the most significant variable associated with the geology and soils of the site. The existing activities such as enrichment services from existing uranium enrichment facilities (including the possible re-opening of the gaseous diffusion plant at the Piketon site), from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities could be constructed in the future with a likely impact on geology and soils similar to that of the proposed action, depending on site conditions either at a new location or an existing industrial site. Impacts to geology and soils would be expected to be SMALL.

Table 2-8 Summary of Environmental Impacts for the Proposed ACP and the No-Action Alternative (continued)

Affected Environment	Proposed Action: *USEC would construct, operate, and decommission the proposed ACP in Piketon, Ohio.*	No-Action Alternative: *The proposed ACP would not be constructed, operated, and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.*
Water Resources	SMALL. Potential stream sedimentation from construction activities would be minimized by the use of silt fences and other best management practices. Any impacts to stream water quality would be of short duration. None of the proposed site preparation and construction activities would occur within a 100-year floodplain. Groundwater withdrawals would increase by 12 percent over current usage rates, but would still be only 31 percent of the total design capacity of the site's well fields, would not affect groundwater availability, and would not pose an increased risk of subsidence. Wastewater would continue to discharge from permitted NPDES outfalls and would not alter the current water quality of the discharge. In addition, the water quality at NPDES outfalls would continue to be monitored. The additional sanitary waste water treated at the onsite water treatment plant would represent up to a 90 percent increase in the volume of sanitary water treated at the plant, but would only increase the total volume up to 75 percent of the plant's design capacity. The potential for leaks or spills that could contaminate water resources would be limited by (1) the leak collection system associated with the ACP; (2) implementation of best management practices; and (3) an approved Spill Prevention Control and Countermeasures Plan. During decontamination and decommissioning, smaller ground water withdrawals needed to support these activities (compared to withdrawals during operations), would cause a SMALL impact. With continued controls in place, the impacts associated with liquid discharges, and the likelihood and severity of potential spills during decontamination and decommissioning would be minimized and any resulting impacts should be SMALL.	SMALL. Under the no-action alternative, water resources would remain the same as described in the affected environment section. Water supply and demand would continue at current rates. The existing flow of stormwaters on the site would continue, and existing potential groundwater contamination pathways would remain the same. The existing activities such as enrichment services from existing uranium enrichment facilities (including the possible re-opening of the gaseous diffusion plant at the Piketon site), from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities could be constructed in the future. Depending on the construction methods, design, and location of these facilities, the likely impact on water resources (including water usage) would be similar to that of the proposed action. Impacts to water resources would be expected to be SMALL.

Table 2-8 Summary of Environmental Impacts for the Proposed ACP and the No-Action Alternative (continued)

Affected Environment	Proposed Action: *USEC would construct, operate, and decommission the proposed ACP in Piketon, Ohio.*	No-Action Alternative: *The proposed ACP would not be constructed, operated, and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.*
Ecological Resources	SMALL. Construction of the X-745H Cylinder Storage Yard would result in increased erosion, stormwater runoff, and loss of 10 hectares (24 acres) of managed grassland and old fields, but would not require the removal of any upland or riparian forests. Implementation of the best management practices described in section 4.2.5.1 on soil impacts together with the fact that the upland mixed hardwood forest and the riparian forest adjacent to the managed field and old field would not be disturbed would reduce a potentially moderate impact to a SMALL impact. Such measures would reduce erosion and ensure that the existing forested buffer area between the proposed cylinder storage yard and the riparian areas associated with the tributaries and Little Beaver Creek would be preserved. Such measures would reduce the level and amount of sedimentation and erosion that would occur in the adjacent surface waters, and would preserve the existing forested buffer areas. The X-745H Cylinder Storage Yard is located approximately 500 meters (1,640 feet) from suitable summertime habitat for the Indiana bat, although studies have not documented the presence of the bat on the DOE reservation. Because the existing buffer area (upland and riparian forests) would not be removed and it is only considered potential summertime habitat, the impact would be SMALL. Ecological impacts associated with ACP decommissioning are anticipated to be bounded by the ecological impacts associated with ACP site preparation and construction.	SMALL. Under the no-action alternative, the land use would continue as it is currently, and the ecological resources would remain the same as described in the affected environment section. Land disturbances would also be avoided. The existing activities such as enrichment services from existing uranium enrichment facilities (including the possible re-opening of the gaseous diffusion plant at the Piketon site), from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities could be constructed in the future and would have impacts similar to those of the proposed action, depending on the site conditions either at a new location or an existing industrial site. Impacts to ecological resources would be expected to be SMALL.

Table 2-8 Summary of Environmental Impacts for the Proposed ACP and the No-Action Alternative (continued)

Affected Environment	Proposed Action: ***USEC would construct, operate, and decommission the proposed ACP in Piketon, Ohio.***	No-Action Alternative: ***The proposed ACP would not be constructed, operated, and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Socio-economics	SMALL to MODERATE. ACP construction and operation would result in a MODERATE increase in regional employment and a SMALL increase in regional tax revenues. Impacts to population characteristics, housing resources, community and social services, and public utilities are projected to be SMALL. Decontamination and decommissioning of the proposed ACP also would generally have SMALL impacts. An average of 841 direct and indirect jobs are expected to be created. State income tax, State sales tax, and county-level tax revenues would significantly increase as a result of decontamination and decommissioning. Likewise, decontamination and decommissioning activities are not expected to lead to housing shortages or increases in rental rates in the region. The small influx of workers would also have a small effect on public utilities, fire, law enforcement, healthcare, and administrative levels of service.	SMALL to MODERATE. Under the no-action alternative, socioeconomics in the local area would continue as described in the affected environment section. The existing activities such as enrichment services from existing uranium enrichment facilities (including the possible re-opening of the gaseous diffusion plant at the Piketon site), from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities could be constructed in the future. Depending on the construction methods, design of the facilities, and local demographics, the likely socioeconomic impact would be similar to that of the proposed action. Socioeconomic impacts would be expected to be SMALL to MODERATE. Long-term uncertainty in future supplies of low-enriched uranium could be affected without replacement enrichment capacity for the existing U.S. enrichment facility or from the potential ending of the "Megaton to Megawatts" program in 2013.

Table 2-8 Summary of Environmental Impacts for the Proposed ACP and the No-Action Alternative (continued)

Affected Environment	Proposed Action: ***USEC would construct, operate, and decommission the proposed ACP in Piketon, Ohio.***	No-Action Alternative: ***The proposed ACP would not be constructed, operated, and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Environmental Justice	SMALL. Within an 80-kilometer (50-mile) radius around the proposed ACP site, there are 18 Census tracts that have populations qualifying as low-income and two Census tracts that have populations qualifying as minority. The closest of these tracts is 28 kilometers (17 miles) from the proposed site. The proposed action would not result in disproportionately high and adverse impacts to any of these populations.	SMALL. Under the no-action alternative, no changes would occur to environmental justice issues, other than those that already may exist in the community. No disproportionately high and adverse impacts would be expected. The existing activities such as enrichment services from existing uranium enrichment facilities (including the possible re-opening of the gaseous diffusion plant at the Piketon site), from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities could be constructed in the future, and environmental justice concerns would need to be evaluated on a site-specific basis. The impacts could be similar to those of the proposed action if the location has a similar population distribution or is located at a similar industrial site. Environmental justice impacts would be expected to be SMALL under most likely circumstances.

Table 2-8 Summary of Environmental Impacts for the Proposed ACP and the No-Action Alternative (continued)

Affected Environment	Proposed Action: ***USEC would construct, operate, and decommission the proposed ACP in Piketon, Ohio.***	No-Action Alternative: ***The proposed ACP would not be constructed, operated, and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Noise	SMALL. Estimated construction noise levels at the site are below acceptable guidelines. No adverse noise impacts from ACP operations are expected at the closest residence due to low operational noise, the attenuation provided by the building façade, and distance attenuation of over 900 meters (3,000 feet). Noise during decommissioning would be generated from operation of heavy construction equipment and vehicles needed to move equipment, scrap metal, and waste. These noise levels are anticipated to be similar to those generated during construction of the proposed ACP. These noise level is within acceptable guidelines and would cause a SMALL impact.	SMALL. Under the no-action alternative, there would be no construction or operational activities or processes that would generate noise. Noise levels would remain as is currently observed at the site. The existing activities such as enrichment services from existing uranium enrichment facilities (including the possible re-opening of the gaseous diffusion plant at the Piketon site), from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities could be constructed in the future. Depending on the construction methods, design of these facilities, and surrounding land uses, the likely noise impact would be similar to that of the proposed action. Noise impacts would be expected to be SMALL.

Table 2-8 Summary of Environmental Impacts for the Proposed ACP and the No-Action Alternative (continued)

Affected Environment	Proposed Action: *USEC would construct, operate, and decommission the proposed ACP in Piketon, Ohio.*	No-Action Alternative: *The proposed ACP would not be constructed, operated, and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.*
Transportation	SMALL to MODERATE. Increased truck and vehicle traffic should result in SMALL changes in current levels of congestion and delays on U.S. Route 23 and Ohio State Road 32, and MODERATE increases in the number of traffic accidents resulting in injuries or fatalities. Radiation exposures resulting from the planned shipments of radioactive materials are estimated to cause 0.02 latent cancer fatalities per year of operation or about one cancer fatality over thirty years of operation. The probability of a severe transportation accident that releases sufficient quantities of UF_6 that could pose a health risk is low, but that the consequences of such an accident, should it occur, are high (resulting in an overall MODERATE rating). Impacts associated with decommissioning should be far less than that for site preparation and construction.	SMALL to MODERATE. Under the no-action alternative, traffic volumes and patterns would remain as described in the affected environment section. The current volume of radioactive material and chemical shipments would not increase. The existing activities such as enrichment services from existing uranium enrichment facilities (including the possible re-opening of the gaseous diffusion plant at the Piketon site), from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities could be constructed in the future, with a likely impact on transportation similar to that of the proposed action, depending on site conditions at either a new location or an existing industrial facility. Impacts to transportation would be expected to be SMALL to MODERATE.

Table 2-8 Summary of Environmental Impacts for the Proposed ACP and the No-Action Alternative (continued)

Affected Environment	Proposed Action: *USEC would construct, operate, and decommission the proposed ACP in Piketon, Ohio.*	No-Action Alternative: *The proposed ACP would not be constructed, operated, and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.*
Public and Occupational Health	SMALL. Occupational injuries and illnesses associated with the proposed site preparation and construction are estimated to be 11.7 incidents per 100,000 full-time equivalents (the number of workers per year) and 0.59 fatalities. The total maximum possible dose to construction workers is approximately 0.22 millisieverts per year (22 millirem), which is less than the 10 CFR Part 20 regulatory limit of 1 millisievert (100 millirem). The maximum annual dose to members of the public resulting from routine exposures is 0.01 millisieverts (1 millirem) per year for a hypothetical person living at the northern boundary of the DOE reservation. This predicted dose is significantly below the 10 CFR Part 20 limit of 1 millisieverts (100 millirem) and the 40 CFR Part 190 limit of 0.25 millisieverts (25 millirem) for uranium fuel-cycle facilities. Occupational injuries and illnesses associated with the proposed facility operation are estimated to be 2.5 incidents per 100,000 full-time equivalents (the number of workers per year) and 0.41 fatalities. The uranium concentration in workplace air is estimated to be approximately 0.7 milligram per cubic meter, which is less than the National Institute of Occupational Safety and Health standard. Occupational radiation exposure is expected to meet USEC's annual administrative limit of 10 millisieverts (1,000 millirem), which is well below the 10 CFR Part 20.1201 limit of 50 millisieverts (5,000 millirem).	SMALL to MODERATE. Under the no-action alternative, the public and occupational health would remain as described in the affected environment section. No additional radiological exposures are estimated to the general public other than from background radiation levels. The existing activities such as enrichment services from existing uranium enrichment facilities (including the possible re-opening of the gaseous diffusion plant at the Piketon site), from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities could be constructed in the future. Depending on the construction methods and design of these facilities, the likely public and occupational health impacts from normal operations and accidents would be similar to the proposed action. Public and occupational health impacts for additional domestic enrichment facilities would be expected to be SMALL to MODERATE.

Table 2-8 Summary of Environmental Impacts for the Proposed ACP and the No-Action Alternative (continued)

Affected Environment	Proposed Action: ***USEC would construct, operate, and decommission the proposed ACP in Piketon, Ohio.***	No-Action Alternative: ***The proposed ACP would not be constructed, operated, and decommissioned. Enrichment services would continue to be met with existing domestic and foreign uranium enrichment suppliers.***
Waste Management	SMALL. Site preparation, construction, and operations would generate varying amounts of low-level radioactive, low-level mixed, hazardous, sanitary/industrial, and recyclable wastes. All of these wastes would be managed in accordance with existing procedures for controlling contaminant releases and exposures. With the exception of the depleted uranium, all of the wastes would also be generated at volumes that are well within existing management capacities. Over its 30-year lifetime, the ACP would generate approximately 41,105 cylinders of depleted UF_6, containing approximately 512,730 metric tons (535,200 tons) of material. All of this UF_6 could be converted to a more stable form at the new DOE conversion facility at Piketon, which would require DOE to significantly extend the life of this facility. The converted material would then be shipped by rail to an acceptable western disposal site, where sufficient capacity exists and where the disposal impacts should be SMALL.	SMALL. Under the no-action alternative, new wastes including sanitary, hazardous, low-level radioactive wastes, or mixed wastes would not be generated that would require disposition. Local impacts from waste management would be expected to remain SMALL. The existing activities such as enrichment services from existing uranium enrichment facilities (including the possible re-opening of the gaseous diffusion plant at the Piketon site), from foreign sources, and from the "Megatons to Megawatts" program would have impacts as previously analyzed in their respective NEPA documentation and historical environmental monitoring. Additional domestic enrichment facilities could be constructed in the future. Depending on the construction methods, design of these facilities, and the status of depleted UF_6 conversion facilities, the likely waste management impacts would be similar to that of the proposed action. For additional domestic enrichment facilities, impacts from waste management would be expected to be SMALL to MODERATE.

2.5 Staff Recommendation Regarding the Proposed Action

After weighing the impacts of the proposed action and comparing alternatives, the NRC staff, in accordance with 10 CFR § 51.71(e), sets forth its NEPA recommendation regarding the proposed action. The NRC staff recommends that, unless safety issues mandate otherwise, the proposed license be issued to USEC. In this regard, the NRC staff has concluded that environmental impacts are generally small, and taken in combination with the applicable environmental monitoring program described in Chapter 6 and the proposed mitigation measures discussed in Chapter 5, would eliminate or substantially lessen any potential adverse environmental impacts associated with the proposed action.

The NRC staff has concluded the overall benefits of the proposed ACP outweigh the environmental disadvantages and costs based on consideration of the following:

- The need for an additional, reliable, economical, domestic source of enrichment services; and
- The environmental impacts from the proposed action are generally SMALL, although they could be as high as MODERATE in the areas of air quality, socioeconomics, and transportation.

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