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Environmental Impact Statement for the Global Laser Enrichment, LLC License Application for the Paducah Laser Enrichment Facility

Draft Report for Comment

Docket Number: 070-07033

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Cooperating Agency:

U.S. Army Corps of Engineers

Environmental Center of Expertise
Division of Rulemaking, Environmental, and Financial Support
Office of Nuclear Material Safety and Safeguards

ABSTRACT

The U.S. Nuclear Regulatory Commission (NRC) prepared this environmental impact statement (EIS) as part of its environmental review of the Global Laser Enrichment, LLC (GLE) application for a 40-year license to construct, operate, and decommission the Paducah Laser Enrichment Facility on GLE-owned property in McCracken County, Kentucky. The proposed federal action is the issuance of a license under Title 10 of the *Code of Federal Regulations* Part 70, "Domestic Licensing of Special Nuclear Material," that would authorize GLE to construct, operate, and decommission a facility that uses a laser-based isotope separation process to enrich uranium. The process would re-enrich depleted uranium hexafluoride (DUF_6) tails to natural levels and enrich natural-grade uranium hexafluoride to up to 8 percent uranium-235 by weight. The DUF_6 tails are residuals from past processing at the adjacent U.S. Department of Energy Paducah Gaseous Diffusion Plant, where they are in storage. The U.S. Army Corps of Engineers, Louisville District, is a cooperating agency on this EIS and will decide whether to either issue or deny a Department of the Army permit for the discharge of dredged or fill material into waters of the United States at the PLEF site.

The EIS describes the proposed facility layout and processes (operations building, support facilities, cylinder storage, utilities, monitoring systems), summarizes waste and effluent management and monitoring plans, and analyzes potential environmental impacts from the proposed action and the no-action alternative.

After weighing the environmental, economic, technical, and other benefits against environmental and other costs of the proposed action and the no-action alternative, the NRC staff's preliminary recommendation, unless safety issues mandate otherwise, is that the NRC issue the license to construct and operate the proposed enrichment facility to GLE. NRC staff based this preliminary recommendation on the following factors:

- The NRC staff's review of GLE's environmental report (included as part of the GLE license application) and associated responses from GLE to requests from the NRC staff for clarifying information;
- The NRC staff's review of comments received as part of the scoping process;
- The NRC staff's communications with federal, state, and local agencies, as well as tribal officials; and
- The NRC staff's independent environmental review.

Before identifying a final recommendation in the final EIS, the NRC staff will also consider comments received on this EIS from federal, state, local, and tribal officials and members of the public.

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ACRONYMS AND ABBREVIATIONS

°C	degrees Centigrade
°F	degrees Fahrenheit
µg	microgram(s)
AADT	annual average daily traffic
ac	acre(s)
ACHP	Advisory Council on Historic Preservation
ACP	American Centrifuge Plant
ADAMS	Agency-wide Documents Access and Management System
ADT	average daily traffic
ANSI	American National Standards Institute
APE	area of potential effects
BCE	before common era
BLM	U.S. Bureau of Land Management
BMP	best management practice
CAA	Clean Air Act of 1970, as amended
CE	common era
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
CH_4	methane
cm	centimeter(s)
CO	carbon monoxide
CO_2e	carbon dioxide equivalent(s)
CWA	Clean Water Act, as amended
dB	decibel(s)
dBA	A-weighted decibel(s)
DBA	design-basis accident
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DU	depleted uranium
DUF_6	depleted uranium hexafluoride
EIS	environmental impact statement
$ENUF_6$	equivalent natural uranium hexafluoride
EP	emergency plan

EPA	U.S. Environmental Protection Agency
ER	environmental report
EREF	Eagle Rock Enrichment Facility
ESA	Endangered Species Act of 1973, as amended
FEMA	Federal Emergency Management Agency
FR	*Federal Register*
FRNP	Four Rivers Nuclear Partnership (PGDP)
ft	foot (feet)
ft^3	cubic foot (feet)
FTE	full-time equivalent
FWS	U.S. Fish and Wildlife Service
GEIS	generic environmental impact statement
GHG	greenhouse gas
GLE	Global Laser Enrichment, LLC
gpd	gallon(s) per day
GWP	global warming potential
HALEU	high-assay low-enriched uranium
HAP	hazardous air pollutant
HEPA	high-efficiency particulate air (filter)
HF	hydrogen fluoride
HVAC	heating, ventilation, and air conditioning
in.	inch(es)
IPaC	information for planning and consultation
ISA	integrated safety analysis
KDAQ	Kentucky Division for Air Quality
KDEP	Kentucky Division for Environmental Protection
KDFWR	Kentucky Department of Fish and Wildlife Resources
KDOW	Kentucky Division of Water
KDWM	Kentucky Division of Waste Management
KEEC	Kentucky Energy and Environment Cabinet
KGS	Kentucky Geological Survey
KHC	Kentucky Heritage Council
km	kilometer(s)
KPDES	Kentucky Pollutant Discharge Elimination System
KTC	Kentucky Transportation Center

L	liter(s)
L_{dn}	day-night average sound level
L_{eq}	equivalent noise level
$L_{eq}(24)$	equivalent sound level over 24 hours
LEU	low-enriched uranium
LLRW	low-level radioactive waste
lpd	liter(s) per day
m	meter(s)
m^3	cubic meter(s)
MEI	maximally exposed individual
mi	mile(s)
MMT	million metric ton(s)
mph	mile(s) per hour
mrem	millirem(s)
m/s	meter(s) per second
MSA	Metropolitan Statistical Area
mSv	millisievert(s)
MSW	municipal solid waste
MT	metric ton(s)
MTU	metric ton(s) uranium
NAAQS	National Ambient Air Quality Standards
NEF	National Enrichment Facility
NEPA	National Environmental Policy Act of 1969, as amended
NHPA	National Historic Preservation Act of 1966, as amended
NO_2	nitrogen dioxide
NOI	notice of intent (to prepare an EIS)
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NRCS	Natural Resources Conservation Service
NR GEIS	new reactor generic environmental impact statement
NRHP	*National Register of Historic Places*
NUREG	NUclear REGulatory Commission (report)
OSHA	Occupational Safety and Health Administration
PGDP	Paducah Gaseous Diffusion Plant (DOE)
PLEF	Paducah Laser Enrichment Facility (GLE)
PM	particulate matter

$PM_{2.5}$	particles with an aerodynamic diameter of 2.5 micrometers or less
PM_{10}	particles with an aerodynamic diameter of 10 micrometers or less
PPE	plant parameter envelope
PSD	prevention of significant deterioration
RCRA	Resource Conservation and Recovery Act, as amended
RLECTS	Radioactive Liquid Effluent Collection and Transfer System
s	second(s)
SER	safety evaluation report
SF_6	sulfur hexafluoride
SGCN	species of greatest conservation need
SHPO	State Historic Preservation Office
SILEX	separation of isotopes by laser excitation
SO_2	sulfur dioxide
SPCC	spill prevention, control, and countermeasure (plan)
SPE	site parameter envelope
SSURGO	Soil Survey Geographic Database
SWPPP	stormwater pollution prevention plan
SWU	separative work unit
TEDE	total effective dose equivalent
U-235	uranium-235
UF_6	uranium hexafluoride
UO_2F_2	uranyl fluoride
U_3O_8	triuranium octoxide
UO_2	uranium dioxide
USACE	U.S. Army Corps of Engineers
USC	*United States Code*
VOC	volatile organic compound
WKWMA	West Kentucky Wildlife Management Area
wt%	percent by weight
yr	year

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) prepared this draft environmental impact statement (EIS) as part of its environmental review of the Global Laser Enrichment, LLC (GLE) application for a license to construct and operate the Paducah Laser Enrichment Facility (PLEF) in McCracken County, Kentucky. GLE submitted its license application for the PLEF to the NRC on June 27, 2025, consisting of an environmental report, a safety analysis report, and other relevant documents. The proposed enrichment facility would be located about 8 km (5 mi) west of Paducah on 130 hectares (322 acres) of greenfield property owned by GLE.

This EIS was prepared consistent with NRC's National Environmental Policy Act (NEPA) implementing regulations contained in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions" and the NRC staff guidance in NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs." The scope of the EIS includes an evaluation of the radiological and nonradiological environmental impacts of the NRC issuing GLE a license for the PLEF activities in McCracken County, Kentucky, as well as the environmental impacts of the no-action alternative (i.e., denying the license application).

The proposed federal action is the issuance of a license to GLE under 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material." If the NRC issues a license under the provisions of the Atomic Energy Act, it would authorize GLE to receive title to, own, acquire, receive, possess, use, transfer, and/or deliver source material, special nuclear material, and byproduct material, as specified in the license, for the purposes of constructing and then operating the PLEF for up to 40 years, in accordance with NRC regulations. The facility would use a laser-based isotope separation technology to re-enrich depleted uranium hexafluoride (DUF_6) tails to natural levels and to enrich natural-grade uranium hexafluoride to a maximum of 8 percent by weight uranium-235. The DUF_6 tails are residuals from past processing at the adjacent Paducah Gaseous Diffusion Plant, where they are being stored. The enriched uranium would be transported to fuel fabrication facilities to produce fuel for domestic commercial nuclear power reactors. The scope of activities to be conducted under the license would include construction, operation, and decommissioning of the proposed PLEF.

GLE has requested a license for a production capacity of up to 2,000 metric tons uranium per year of equivalent natural uranium hexafluoride and 6 million separative work units (SWUs) per year of low enriched uranium. A SWU represents the level of effort or energy required to raise the concentration of uranium-235 to a specified level. Preconstruction (i.e., site preparation) activities and construction activities for the proposed PLEF would be conducted from 2026 to 2030, with facility operation expected to begin in 2030. A four-year startup period would run concurrently with the construction activities, and the facility is currently projected to reach full production capacity in 2036. Decommissioning or potential license renewal activities would begin in advance of scheduled license expiration, which is anticipated to be 2066.

On August 4, 2025, NRC accepted GLE's license application for docketing and formal review. The NRC staff published a notice in the *Federal Register* on September 5, 2025, identifying the Agency's intent to conduct a scoping process and prepare an EIS. Issuance of this notice of intent (NOI) initiated a 30-day scoping period. In the NOI, the NRC invited members of the public and local, state, tribal, and federal government agencies to provide comments on the scope of the EIS. The scoping period ended on October 6, 2025. All comments received during the scoping period, and one that was received after the scoping period, were considered by the

NRC staff. A summary of the scoping process, the comments received, and NRC's overview of substantive comments are provided in this EIS.

The U.S. Army Corps of Engineers, Louisville District, is a cooperating agency on this EIS and will make a decision to issue or deny a Department of the Army permit for the discharge of dredged or fill material into waters of the United States at the PLEF site.

As federal agencies, the NRC and the U.S. Army Corps of Engineers are required to comply with the consultation requirements of the Endangered Species Act and the National Historic Preservation Act. Additionally, the NRC staff interacted with federal, state, local, and tribal agencies during preparation of this EIS to gather information on potential issues, concerns, and environmental impacts related to the proposed project. The coordination process with non-federal entities involved discussions with state agencies, including the Kentucky Heritage Council and Kentucky Radiation Health Branch, local organizations (e.g., county judge executives), and tribal representatives. Details regarding federally mandated agency consultations are provided in this EIS. The NRC staff addresses the issues and concerns raised by federal and non-federal entities in the individual resource sections in Chapter 3.

This EIS considers and weighs the radiological and nonradiological environmental impacts of the NRC issuing GLE a license to construct, operate, and decommission the PLEF. This evaluation considers potential impacts on land use, visual and scenic resources, air quality, geology and soils, surface water and groundwater resources, ecological resources, historic and cultural resources, noise, waste management, public and occupational health, transportation, and socioeconomics, as well as accident impacts; it also assesses the general costs and benefits of the project. Further, this EIS considers all comments received during the scoping period and describes any avoidance, minimization, or mitigation measures GLE would implement to avoid any potential significant adverse impact on the environment. This EIS also considers unavoidable adverse environmental impacts, the relationship between short-term uses of the environment and potential long-term productivity, and irreversible and irretrievable commitments of federal resources.

The NRC's environmental review guidance in NUREG-1748 categorizes the significance of potential environmental impacts as follows:

- SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.
- MODERATE: The environmental effects are sufficient to alter noticeably but not destabilize important attributes of the resource.
- LARGE: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

The NRC staff concludes that the potential impacts of issuing a license to GLE to receive, possess, use, transfer, and/or deliver source, byproduct, and special nuclear material to construct, operate, and decommission the PLEF would be SMALL to MODERATE for four resource areas – surface water, ecology, transportation, and socioeconomics (largely positive effect) – and SMALL for all other resource areas.

GLE would implement a range of mitigation actions to avoid or minimize impacts on the environment. Examples of these actions include adhering to best management practices provided in GLE's Stormwater Pollution and Prevention Program and its Spill Prevention and Control Plan, and GLE's waste management systems, engineering design features, and

contamination control and radiological safety procedures. Additionally, GLE would follow the requirements and general guidance of federal and state resource agencies regarding methods to avoid and minimize impacts at the project site.

The NRC's environmental review regulations in 10 CFR Part 51 that implement NEPA require the NRC to consider reasonable alternatives, including the no-action alternative, to a proposed action. Under the no-action alternative, the NRC would not approve the GLE license application for the proposed PLEF. The no-action alternative would result in GLE not constructing or operating the proposed PLEF. This EIS includes a comparison of the overall anticipated positive and negative impacts of the proposed action and the no-action alternative. The proposed action would have positive and negative impacts from environmental and economic perspectives. After assessing and weighing these impacts, the NRC staff concludes that the overall positive impacts of constructing, operating, and decommissioning the proposed GLE PLEF outweigh the negative impacts based upon the mostly SMALL environmental impacts, including small potential radiological impacts on human health; the positive economic impacts attributable to the project that would be anticipated to benefit communities near the PLEF; and its contributions to a domestic fuel supply that would support advanced reactors to power a new generation of safe, clean, and economical nuclear power.

After weighing the impacts of the proposed action and comparing them to those of the no-action alternative, the NRC staff, in accordance with 10 CFR 51.91(d) sets forth its preliminary NEPA recommendation regarding the proposed action, which is that NRC issue the license to GLE to possess and use source, byproduct, and special nuclear material at the PLEF, subject to the determinations in the NRC staff's safety review of the application. This preliminary recommendation is based on (1) the license application, which includes GLE's ER, safety analysis report, and supplemental documents and GLE's responses to the NRC staff's requests for additional information; (2) consultation with federal, state, tribal, and local agencies, and input from other stakeholders, including comments during the public scoping period; (3) independent NRC staff review; and (4) the assessments provided in this EIS. Before identifying a final recommendation in the final EIS, the NRC staff will consider comments received on this EIS from federal, state, local, and tribal officials and members of the public.

1 INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC, or Commission) has prepared this draft environmental impact statement (EIS) as part of its environmental review of an application submitted by Global Laser Enrichment, LLC (GLE). The application is for a license to construct and operate a uranium enrichment facility on greenfield property that GLE owns in McCracken County, Kentucky. This draft EIS assesses the potential environmental impacts of the GLE license application and the associated proposal to construct, operate, and decommission the enrichment facility; it also assesses potential impacts of the no-action alternative to the proposed action (i.e., denying the license application).

The proposed facility would use a laser-based isotope separation technology to enrich uranium for use in U.S. commercial nuclear power reactors.[1] GLE submitted its updated environmental report (ER) for the proposed Paducah Laser Enrichment Facility (PLEF) to NRC on June 13, 2025 (GLE 2025a). Two weeks later, GLE submitted its Safety and Safeguards Analysis Report and additional documents comprising its license application (GLE 2025b). On August 4, NRC accepted GLE's license application for docketing and formal review (NRC 2025a).

The NRC staff prepared this EIS in accordance with Section 193 of the Atomic Energy Act, as amended, which requires that an EIS be prepared for the issuance of a license for the construction and operation of a uranium enrichment facility. Section 51.20(b)(10) of Title 10, "Energy," Part 51, of the *Code of Federal Regulations* (10 CFR) also requires that an EIS be prepared for the issuance of a license for a uranium enrichment facility. NRC's regulations under 10 CFR Part 51 implement the requirements of the National Environmental Policy Act of 1969, as amended (NEPA). NEPA requires federal agencies to assess the potential impacts of their actions affecting the quality of the human environment and the potential impacts of alternatives. This draft EIS was prepared consistent with NEPA (42 U.S. Code [USC] 4321 *et seq.*) and NRC's implementing regulations and staff guidance for the environmental review of licensing actions associated with nuclear materials safety and security programs, as presented in NUREG-1748 (NRC 2003).

1.1 URANIUM ENRICHMENT

Uranium occurs naturally in the environment, consisting of about 99.3 percent by weight (wt%) uranium-238 (U-238) and 0.7 wt% of the fissile isotope uranium-235 (U-235). To produce nuclear fuel for conventional U.S. commercial reactors, the percentage of U-235 must be increased (enriched) by roughly 4- to 7-fold above natural levels, to between 3 and 5 wt%. Uranium enrichment is the process in the nuclear fuel cycle (Figure 1-1)[2] whereby the wt% of the U-235 isotope is increased, which decreases the wt% of U-238. The enriched uranium is then converted to the dioxide (UO_2) or metal alloys to fuel commercial reactors. Uranium enriched between 5 and 10 wt% U-235, or high-assay low-enriched uranium (HALEU), is being developed to enhance the performance of the nation's current fleet of light-water reactors.

With submittal of its license application to NRC, GLE seeks to construct and operate an enrichment facility using the Separation of Isotopes by Laser Excitation (SILEX) technology. The

[1] In this document, the term "PLEF" refers to the buildings and supporting facilities for the proposed uranium enrichment operations, while the term "PLEF site" refers to the approximately 130-hectare (ha) (322-acre [ac]) area that NRC would regulate, if the license were issued.

[2] Regarding the early stage of the nuclear fuel cycle, the NRC has no regulatory role in conventional uranium mines.

process would re-enrich depleted uranium hexafluoride (DUF_6) tails to natural levels and enrich natural-grade uranium hexafluoride to up to 8 percent U-235 by weight. The DUF_6 tails contain about 0.25 wt% U-235 and are residuals from past processing at the adjacent U.S. Department of Energy (DOE) Paducah Gaseous Diffusion Plant (PGDP), where they are being stored. The enriched uranium produced by the PLEF would be low-enriched uranium (LEU).[3]

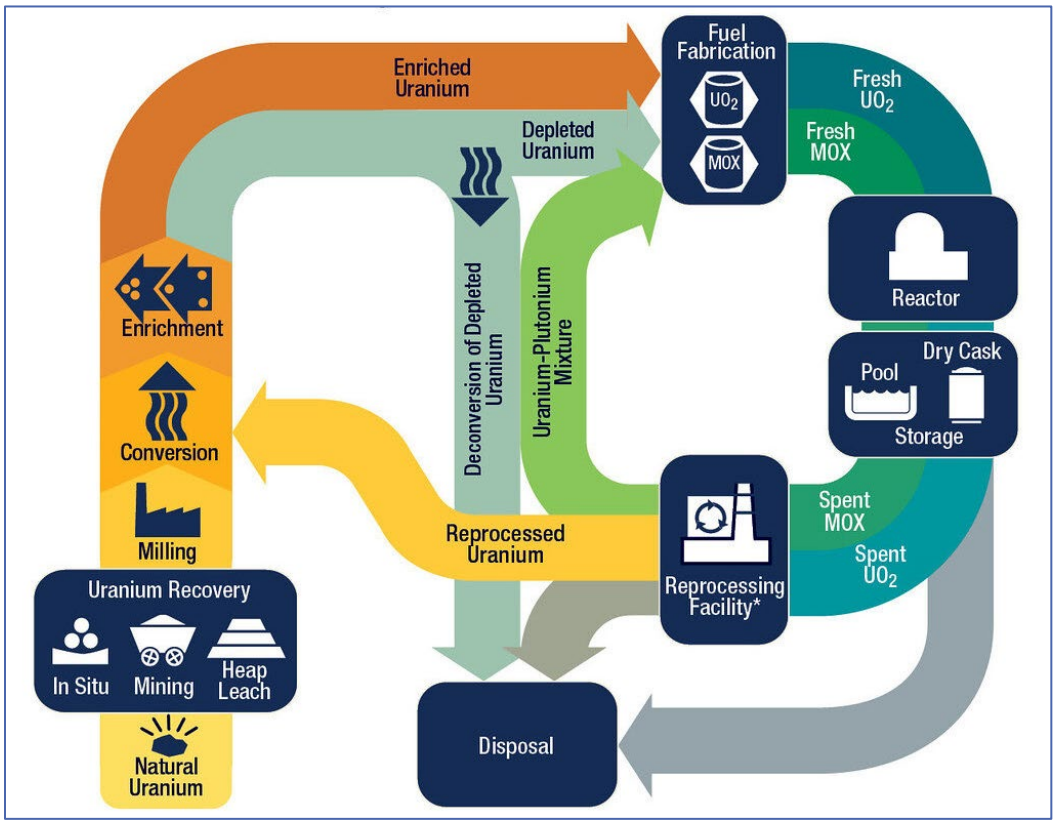

Figure 1-1 Nuclear Fuel Cycle (source: NRC 2020).

The GLE organization was formed in 2007 to commercialize the SILEX process at a test loop at the Global Nuclear Fuel-Americas, LLC, plant in Wilmington, North Carolina. That test facility is being used to advance performance and reliability of the GLE laser-based process and the equipment to be used for commercial laser enrichment (NRC 2026a). In 2016, GLE signed an agreement with the DOE Office of Environmental Management[4] to re-enrich the DUF_6 tails from its PGDP (DOE 2016a). In December 2024, GLE was selected as an awardee under the DOE's LEU Enrichment Acquisition Program to incentivize the build-out of new uranium production capacity in the United States (DOE 2024). GLE is the only awardee deploying a previously licensed laser enrichment technology. In October 2025, GLE announced completion of its demonstration testing of the uranium enrichment process at its Test Loop facility in Wilmington, North Carolina, as well as the independent, third-party validation of its laser technology that confirmed achievement of technology readiness level 6, endorsing plans to proceed to detailed design (GLE 2025c).

[3] In contrast, uranium used in military reactors and nuclear weapons has a much higher percentage of U-235 by weight and is called highly enriched uranium (HEU).

[4] The DOE and GLE contract is restricted from public access in compliance with 10 CFR 2.390.

Gaseous centrifuge is the primary uranium enrichment technology in commercial use in the United States. The gaseous diffusion technology was previously used in the United States to enrich uranium; however, it has relatively greater resource requirements, which makes it less attractive than gas centrifuge technology from both economic and environmental perspectives. Gas centrifuge technology is considered more efficient and substantially less energy-intensive than gaseous diffusion technology. The GLE laser-based technology that would be deployed at the proposed GLE PLEF is still under development; it is newer than gas centrifuge technology and, according to GLE, offers certain advantages over both the gaseous diffusion and centrifuge technologies (GLE 2025a). For example, GLE considers laser-based technology to have lower operating and capital costs compared to gaseous diffusion or centrifuge technologies. GLE further projects the GLE laser-based technology to have advantages of two earlier-generation laser-excitation technologies in terms of anticipated higher separation factors, lower energy intensity, lower cooling water requirements, and a smaller physical footprint (GLE 2025a, 2025b). Section 2.2.2 provides information about earlier-generation laser-excitation technologies, as well as alternative technologies.

1.2 PROPOSED FEDERAL ACTION

The NRC's proposed federal action is issuance of a license that would authorize GLE to construct and operate a laser-based uranium enrichment facility in McCracken County, Kentucky. The facility would be about 8 kilometers (km) (5 miles [mi]) west of Paducah (Figure 1-2). It would be decommissioned in the future under a separate NRC licensing action.

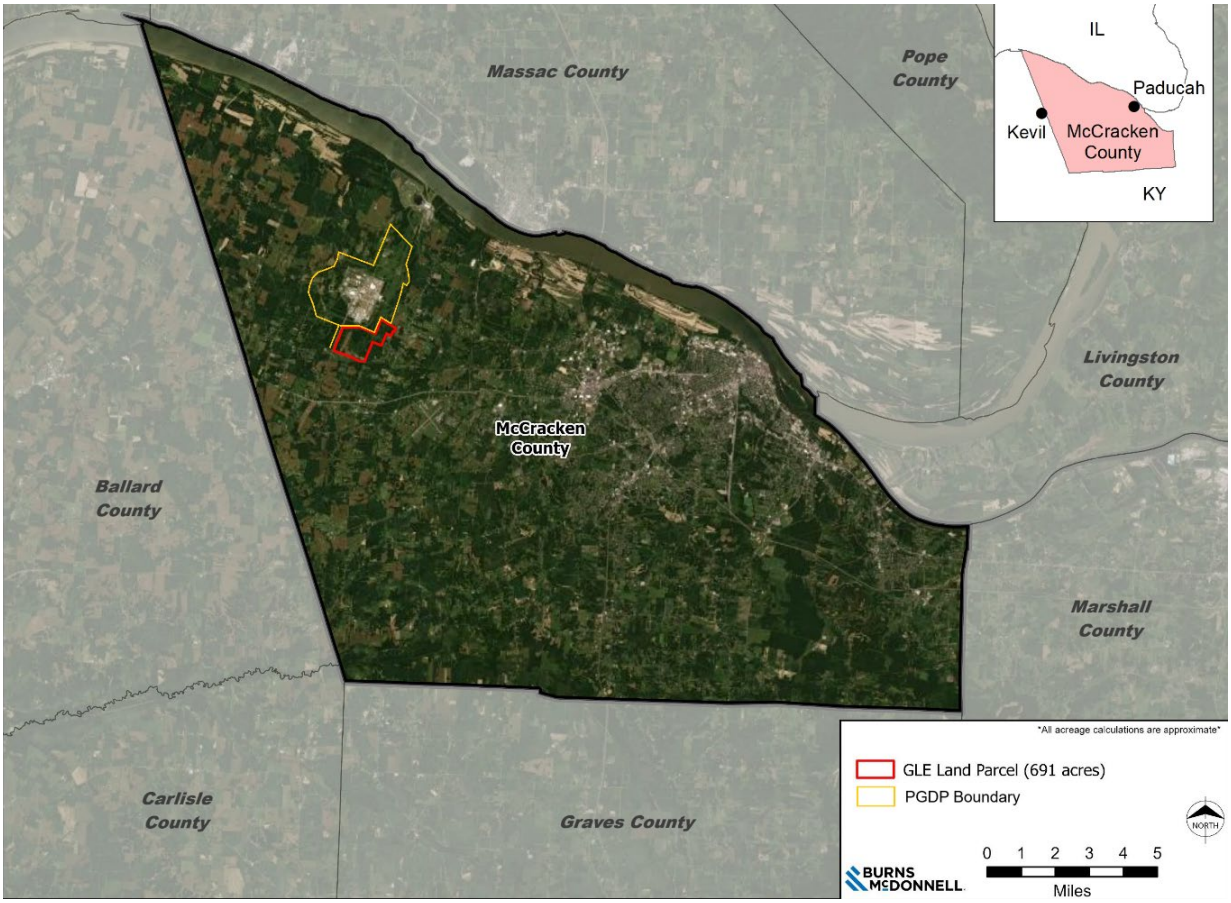

Figure 1-2 Location of the Proposed PLEF Site (modified from GLE 2025a).

The PLEF site is next to DOE's PGDP on about 130 ha (322 ac) of undeveloped land (Figure 1-3). It covers less than half of the approximately 280-ha (691-ac) land parcel GLE acquired in the fall of 2024, which had been managed by the State of Kentucky as a wildlife area since 1959 (GLE 2025a).

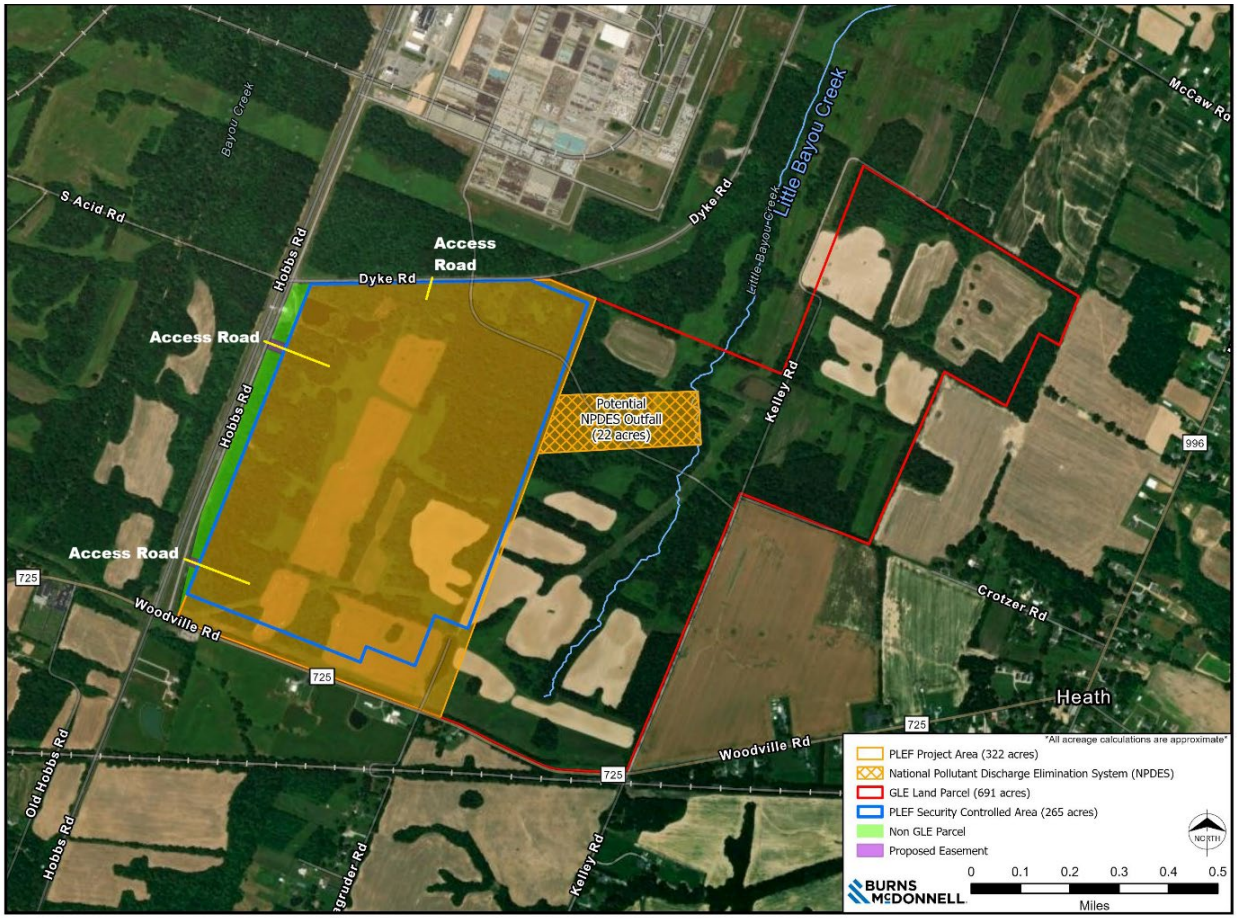

Figure 1-3 GLE Property and Proposed PLEF Site (modified from GLE 2025a).

If the NRC issues a license to GLE under the provisions of the Atomic Energy Act, the license would authorize GLE to receive title to, own, acquire, receive, possess, use, transfer, and/or deliver source material, special nuclear material, and byproduct material, as specified in the license, to construct and then operate for up to 40 years (in accordance with NRC regulations) a facility that uses laser-based isotope separation technology to re-enrich DUF_6 tails to natural levels and enrich natural-grade UF_6 to a maximum of 8 wt% U-235. The scope of activities to be conducted under the license would include construction, operation, and decommissioning of the proposed PLEF.

GLE has requested a license for a production capacity of up to 2,000 metric tons uranium (MTU) per year of equivalent natural uranium hexafluoride ($ENUF_6$) and 6 million separative work units (SWUs) per year of LEU. A SWU represents the level of effort or energy required to

raise the concentration of U-235 to a specified level.[5] Preconstruction (i.e., site preparation) activities and construction activities for the proposed PLEF would be conducted from 2026 to 2030, with facility operation expected to begin in 2030. A four-year start-up period would run concurrently with the construction activities, and the facility is currently projected to reach full production capacity in 2036. Decommissioning or potential license renewal activities would begin in advance of scheduled license expiration (anticipated to be 2066).

As a cooperating agency on this EIS, the U.S. Army Corps of Engineers' (USACE's) will decide whether to issue or deny a Department of the Army permit for the discharge of dredged or fill material into waters of the United States at the PLEF site.

1.3 PURPOSE AND NEED FOR THE PROPOSED FEDERAL ACTION

The NRC's mission is to "protect public health and safety and advance the nation's common defense and security by enabling the safe and secure use and deployment of civilian nuclear energy technologies and radioactive materials through efficient and reliable licensing, oversight, and regulation for the benefit of society and the environment" (NRC 2025b). Consistent with this mission, the purpose for the NRC action is to authorize GLE to construct and operate the PLEF to address the domestic deficit in enriched uranium capacity, thus advancing national energy security and helping the nation meet its growing nuclear energy needs.

Enriched uranium is needed to produce nuclear fuel for existing and projected U.S. commercial power reactors. Licensing the proposed PLEF would create new domestic capacity to produce needed enriched uranium to help meet growing nuclear fuel demands resulting from increased U.S. nuclear power plant applications and license renewals. It would also enable the productive disposition of depleted uranium tails from DOE's PGDP (GLE 2025a). Thus, the proposed action provides an option for re-enriching portions of DOE's DUF_6 inventory to meet future fuel needs for U.S. nuclear reactors.

The USACE is participating as a cooperating agency in the preparation of this EIS. This role is intended to confirm that the information presented in the EIS is adequate to fulfill the requirements of USACE regulations and the Clean Water Act.

1.4 NEPA PROCESS AND FEDERAL ENVIRONMENTAL REVIEW

NEPA established national environmental policy and goals to protect, maintain, and enhance the environment and established guidelines for federal agencies to implement these specific goals for actions under their jurisdiction. The purpose of this EIS is to assess the potential environmental impacts of GLE's proposal to construct, operate, and decommission the PLEF and the impacts of alternatives to the proposed action. The NRC staff prepared this EIS following NRC regulations at 10 CFR Part 51 and pursuant to guidance in NUREG-1748 (NRC 2003).

Development of this EIS also leverages, as applicable, the evaluations and findings outlined in the NRC's draft Generic Environmental Impact Statement for Licensing of New Nuclear Reactors (NRC 2024a, 89 FR 83632). (To simplify, that EIS is also referred to as the new reactor GEIS, or NR GEIS.) This EIS also considers the September 29, 2025, Council on

[5] An SWU is a unit of enrichment that measures the effort required to separate uranium isotopes. For about 114 kilograms (251 pounds) of natural uranium, it takes about 70 SWU to produce 10 kilograms (22 pounds) of uranium enriched to 5 percent uranium-235 by weight. It takes roughly 100,000 SWU of enriched uranium to fuel a typical 1,000-megawatt commercial nuclear reactor for a year (USEC 2009).

Environmental Quality (CEQ) memorandum "Implementation of the National Environmental Policy Act" (CEQ 2025), which provides guidance with the intent of expediting and simplifying the permitting process and promoting consistency in NEPA's implementation.

1.4.1 Notice of Intent to Conduct Scoping Process and Prepare EIS

The NRC staff published a notice in the *Federal Register* on September 5, 2025, identifying the Agency's intent to conduct a scoping process and prepare an EIS (NRC 2025c). Issuance of this notice of intent (NOI) initiated a 30-day scoping period. In the NOI, the NRC invited members of the public and local, state, tribal, and federal government agencies to provide comments on the scope of the EIS. The scoping period ended on October 6, 2025.

All comments received during the scoping period, notably written comments submitted to the NRC in electronic form (totaling nine submittals), were considered by the NRC staff. The NRC staff also considered a tenth written submittal received after the comment period closed. A summary of the scoping process, the comments received, and NRC's overview of substantive comments are provided in Appendix A of this EIS.

1.4.2 EIS Contents

The sections of this EIS include an evaluation of the radiological and nonradiological environmental impacts of the NRC issuing GLE a license to possess and use special nuclear material in association with GLE constructing, operating, and decommissioning the proposed PLEF. This EIS considers unavoidable adverse environmental impacts, the relationship between short-term uses of the environment and potential long-term impacts, and irreversible and irretrievable commitments of federal resources.

The EIS is organized as follows: Chapter 1 is this introduction. Chapter 2 provides a description of the proposed PLEF project, summarizing key design elements that frame the evaluation of potential environmental impacts; most of the design information is drawn from the ER (GLE 2025a). Chapter 2 also presents the NRC staff's evaluation of a range of alternatives to the proposed action, including the no-action alternative. Chapter 3 describes the affected environment for resource areas identified by the NRC staff through the scoping process, followed by the staff's evaluation of potential environmental impacts on each resource.

The staff independently verified and summarized the affected environment descriptions from the ER and other public documents, relying on incorporation by reference to the extent practicable to focus the EIS on key aspects. The staff developed evaluations of environmental impacts independently from the applicant but relied in part on impact data presented by the applicant after independent verification. Chapter 4 summarizes the staff's conclusions and recommendation to the Commission based on the environmental review. Chapter 5 provides references to documents cited throughout the EIS.

Appendix A summarizes the EIS scoping process and comments received, and it indicates where in the EIS NRC responds to substantive comments. Appendix B identifies regulations, permits, and consultations applicable to this process. Appendix C provides the plant parameter envelopes (PPEs) and site parameter envelopes (SPEs) from NRC's draft NR GEIS (see Section 1.4.3 below). Appendix D presents the list of environmental review correspondence. Appendix E identifies the agencies, organizations, and persons the NRC staff contacted during the PLEF environmental review. Appendix F lists the contributors to the EIS.

1.4.3 Generic Environmental Impact Statement for New Nuclear Reactors

The NRC is proposing to revise its regulations to codify the findings of the draft generic environmental impact statement (GEIS), NUREG-2249, “Generic Environmental Impact Statement for Licensing of New Nuclear Reactors” (NRC 2024a), which is referred to as the NR GEIS in this PLEF EIS. The NR GEIS analyzes the potential environmental impacts of the construction, operation, and decommissioning of a new nuclear reactor. The NR GEIS is intended to improve the efficiency of the NRC staff's environmental review of a new nuclear reactor application by identifying those potential environmental issues that are expected to be common, or generic, to the construction, operation, and decommissioning of many new nuclear reactors. Because that draft GEIS was initially developed using a technology-neutral, performance-based approach, its analyses can be used by any reactor.

The NRC staff evaluated whether the NR GEIS could likewise be used to improve the efficiency of the NRC staff's environmental reviews of fuel facilities, such as the proposed PLEF. Staff completed a crosswalk between the NR GEIS PPEs and SPEs and determined that select generic issues (Category 1) could also be relevant to fuel facilities, although not all of those issues are relevant to the proposed PLEF. This EIS incorporates NR GEIS Category 1 technical analyses and findings as described in Chapter 3 (Table 3-1) and Appendix C (Table C-1) for 34 environmental issues that are relevant to the proposed action.

1.4.4 Issues Studied in the EIS

To meet its NEPA obligations related to its review of the proposed PLEF, the NRC staff conducted an independent and detailed evaluation of the potential environmental impacts from constructing, operating, and decommissioning the proposed PLEF at its planned location. This EIS assesses the following resource areas:

- Land use
- Meteorology, climatology, and air quality
- Geology and soils
- Water resources
- Ecological resources
- Socioeconomics
- Historic and cultural resources
- Visual and scenic resources
- Noise
- Transportation
- Public and occupational health and safety
- Waste management
- Accidents
- Cost-benefit analysis

1.4.5 Issues Outside the Scope of the EIS

This EIS evaluates the environmental impacts of site preparation and construction, operation, and decommissioning of the proposed PLEF. Some issues and concerns raised during the public scoping process on the EIS (conducted September 5 through October 6, 2025) were determined to be outside the scope of the EIS. As a result, these issues and concerns are not addressed in the EIS:

- General concerns about the safety and feasibility of nuclear power and alternatives to nuclear power
- Safety of advanced nuclear reactors and the ability of advanced nuclear reactors to operate without the fuel that would be produced at the proposed PLEF

- Historical business and environmental practices of the DOE PGDP
- Nonproliferation
- Implementing International Atomic Energy Agency safeguards
- Renewable energy and broader energy policy considerations
- Influences of energy demand
- Technical readiness of laser enrichment
- Other fuel technologies

1.4.6 Concurrent NRC Reviews

The NRC process to review license applications consists of two separate, parallel reviews. The NRC staff's safety review evaluates an applicant's safety analysis report to ensure the application meets the NRC regulatory safety requirements. The NRC staff documents the findings of the safety review in a safety evaluation report. The NEPA environmental review is conducted under NRC's regulations at 10 CFR Part 51. As part of its environmental review, the NRC staff also conducts a review under Section 106 of the National Historic Preservation of 1966, as amended (NHPA), and a review under Section 7 of the Endangered Species Act of 1973, as amended (ESA). This EIS presents the results of the environmental evaluation. The NRC considers the findings of both the EIS and the safety evaluation report in making its decision to grant or deny the issuance of the license.

1.4.7 Construction Activities

The NRC defines construction activities for 10 CFR Part 70 facilities in 10 CFR 70.4, "Definitions," as the installation of foundations, or in-place assembly, erection, fabrication, or testing for any structure, system, or component of a facility or activity subject to the regulations in this part that are related to radiological safety or security. 10 CFR 70.4 also defines commencement of construction as taking any action defined as "construction" or any other activity at the site of a facility that has a reasonable nexus to radiological health and safety or common defense and security.

Activities that do not meet these definitions are not part of the NRC licensing action and could include activities such as clearing and grading, excavating, building of service facilities (e.g., paved roads, parking lots), erection of support buildings, and other associated activities. These activities (i.e., preconstruction or site preparation activities) may take place before an NRC license is issued and during the staff's review of an application.

GLE plans to conduct site preparation activities that are not a part of the NRC action before a license is issued including the following:

- Clearing and grubbing of vegetation
- Timber harvesting
- Topsoil removal and stockpiling
- Grading
- Groundwater monitoring well installation
- Filling a pond
- Baseline soil sampling
- Sediment sampling
- Relocation and construction of utilities

GLE's ER states that because detailed design plans are not yet available, GLE's impact analysis assumes that all of the PLEF site (130 ha [322 ac]) could experience land-disturbing activities. The impact analysis in this EIS encompasses activities that are not under the NRC's regulatory authority, including site preparation activities. The NRC staff has already included all activities in its environmental impacts analyses and considered those activities in the baseline conditions (i.e., affected environment) against which the environmental effects of the proposed agency action are evaluated. This method duly accounts for all the potential environmental impacts that cannot be avoided should the proposed action be implemented.

1.4.8 Related NEPA Documents

The NRC staff reviewed several NEPA documents relevant to the proposed PLEF as part of developing this EIS. Table 1-1 identifies nine of these documents.

1.5 APPLICABLE REGULATORY REQUIREMENTS, PERMITS, AND AUTHORIZATIONS

This section summarizes the major environmental requirements, agreements, executive orders, and permits relevant to the construction, operation, and decommissioning of the proposed PLEF. Regulations, permits, and authorizations are further discussed in Appendix B.

Table 1-1 NEPA Documents Reviewed

NEPA Document	Relevance to Development of the PLEF EIS
Draft Generic EIS for Licensing of New Nuclear Reactors (NRC 2024a)	Outlines parameter envelopes that frame the assessment of potential environmental impact levels in the PLEF EIS (see Section 1.4.3 and Appendix C of the PLEF EIS).
Supplemental EIS for Disposition of Depleted Uranium Oxide Conversion Product Generated from DOE's Inventory of Depleted Uranium Hexafluoride (DOE 2020)	Analyzes potential environmental impacts from the disposition of DUF_6 and other wastes at Portsmouth, Ohio, and Paducah, Kentucky, to one or more of the three disposal facilities. Its review of transportation impacts is relevant to the analyses for the proposed PLEF.
EIS for the Proposed GE-Hitachi Global Laser Enrichment, LLC, Facility in Wilmington, North Carolina (NRC 2012a)	Analyzes the potential environmental impacts of the proposed siting, construction, operation, and decommissioning of an enrichment facility using GLE laser-based technology in Wilmington, North Carolina. Its review of alternatives to the proposed action, including alternate technologies, and discussion of environmental impacts are relevant to the analyses for the proposed GLE PLEF.
EIS for the Proposed Eagle Rock Enrichment Facility in Bonneville County, Idaho (NRC 2011)	This EIS analyzes the potential environmental impacts of preconstruction activities and the construction, operation, and decommissioning of the proposed Eagle Rock Enrichment Facility (EREF) near Idaho Falls in Bonneville County, Idaho.

NEPA Document	Relevance to Development of the PLEF EIS
EIS for the Proposed American Centrifuge Plant in Piketon, Ohio (NRC 2006)	This EIS analyzes the potential environmental impacts of the proposed siting, construction, operation, and decommissioning of a gas centrifuge uranium enrichment facility at the existing DOE reservation in Piketon, Ohio. Its description of the purpose of and need for the proposed action, as well as its review of alternatives to the proposed action, are relevant to the proposed GLE PLEF analysis. The environmental impacts discussed for the proposed American Centrifuge Plant (ACP) are also relevant to the impact analyses for the proposed GLE PLEF, including the analysis of impacts associated with managing DUF_6 generated by the ACP, the National Enrichment Facility (NEF), the EREF, and the proposed GLE PLEF, as well as the existing DOE inventory of DUF_6.
EIS for the Proposed National Enrichment Facility in Lea County, New Mexico (NRC 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 of and need for the proposed action, as well as its review of alternatives to the proposed action, are relevant to the proposed GLE PLEF analysis. The environmental impacts discussed for the proposed NEF are also relevant to the impact analysis for the proposed GLE PLEF, including the analysis of impacts associated with the management of DUF_6 generated by the ACP, NEF, EREF, and the proposed GLE PLEF, as well as the existing DOE inventory of DUF_6.
EIS for the Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Paducah, Kentucky, Site (DOE 2004a)	Analyzes impacts associated with construction, operation, and decommissioning of a DUF_6 conversion facility at the Paducah, Kentucky site. Also evaluates impacts of transporting cylinders (DUF_6, enriched uranium, and empty) that used to be stored at the East Tennessee Technology Park (formerly called the K-25 site) near Oak Ridge, Tennessee, to Paducah. Also evaluated the transportation of DUF_6 conversion products and waste materials to a disposal facility, transportation and sale of the hydrogen fluoride (HF) produced as a conversion co-product; and neutralization of HF to calcium fluoride and its sale or disposal in the event that the HF product is not sold. Results are relevant to the management, use, and potential impacts associated with DUF_6 that would be generated at the proposed PLEF and the impacts of DUF_6 from the ACP, NEF, EREF, as well as the existing DOE inventory of DUF_6 at the PGDP site.
EIS for the Construction and Operation of a Depleted Uranium Hexafluoride Conversion Facility at the Portsmouth, Ohio, Site (DOE 2004b)	Very similar to the EIS for the Paducah, Kentucky, site, except this conversion facility is at the Portsmouth, Ohio, site.
Programmatic EIS for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride (DOE 1999)	Evaluates impacts of alternative options for managing DUF_6 stored at Paducah, Portsmouth, and the Oak Ridge K-25 site, including no action, long-term storage as UF_6, long-term storage or use as uranium oxide, use as uranium metal, or disposal. Results are relevant to the no-action alternative for the PGDP DUF_6 and to the proposed action.

1.5.1 Related State and Federal Actions

As a federal agency, the NRC is required to comply with the consultation requirements of the ESA and the NHPA. Additionally, the NRC staff interacted with federal, state, local, and tribal agencies during preparation of this EIS to gather information on potential issues, concerns, and environmental impacts related to the proposed project. The coordination process with non-federal entities included discussions with the Kentucky Radiation Health Branch, local organizations (e.g., county judge executives), and tribal representatives. Details regarding federally mandated agency consultations are provided in Section 1.5.2. The participation of the USACE as a cooperating agency is discussed in Sections 1.3 and 1.6 (NRC 2025d). The NRC staff addresses the issues and concerns raised by federal and non-federal entities in the individual resource sections in Chapter 3.

1.5.2 Status of Compliance

1.5.2.1 Endangered Species Act

The ESA 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 ESA requires consultation with the U.S. Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service to ensure that actions federal agencies authorize, permit, or otherwise carry out will not jeopardize the continued existence of any listed species or adversely modify designated critical habitats. The FWS has responsibility for certain species of Kentucky wildlife under the ESA, the Migratory Bird Treaty Act as amended (16 USC 701-715), and the Bald and Golden Eagle Protection Act, as amended (16 USC 668-668c). Consultation with the National Marine Fisheries Service is not required for this project.

The NRC staff designated GLE as the non-federal representative to conduct informal consultation with the FWS (NRC 2025e). GLE held a call with the FWS to introduce the project on April 7, 2025, and followed up by email on April 24, 2025 (GLE 2025d). GLE's email to the FWS included their determinations of protected species and an acoustic bat survey. The FWS responded by letter on June 18, 2025, stating that the FWS concurs with the determinations that the project is "not likely to adversely affect" federally listed species (FWS 2025). A listing of correspondence and persons contacted can be found in Appendices D and E, respectively.

1.5.2.2 National Historic Preservation Act, Section 106 Consultation

Section 106 of the NHPA requires federal agencies to account for the effects of their undertakings on historic properties and provide the Advisory Council on Historic Preservation (ACHP) with an opportunity to review and comment on the undertakings. The ACHP is an independent federal agency that promotes the preservation, enhancement, and productive use of our nation's historic resources. The NHPA-implementing regulations are found in 36 CFR Part 800, "Protection of Historic Properties." In accordance with 36 CFR 800.8, "Coordination with the National Environmental Policy Act," the NRC staff coordinated its NHPA Section 106 review with its NEPA environmental review.

The goal of the consultation is to identify historic properties the undertaking may potentially affect; assess the effects of the undertaking on these properties; and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties. As such, on December 23, 2025, the NRC staff contacted and initiated the NHPA Section 106 consultation with 12 federally recognized Indian tribes that have historic or current ties to the GLE PLEF project area to assist in identifying historic and cultural properties within the area of potential effects (APE)

(NRC 2025f). The NRC staff contacted the Absentee-Shawnee Tribe of Indians of Oklahoma, Cherokee Nation, Chickasaw Nation, the Delaware Nation of Oklahoma, Eastern Band of Cherokee Indians, Eastern Shawnee Tribe of Oklahoma, Miami Tribe of Oklahoma, Osage Nation, Peoria Tribe of Indians of Oklahoma, the Shawnee Tribe, the United Keetoowah Band of Cherokee Indians, and the Quapaw Nation. Of the twelve tribes, four expressed interest in consulting on the proposed project (Cherokee Nation 2026, Chickasaw Nation 2026, Eastern Band of Cherokee Indians 2026, Osage Nation 2026). The NRC staff also held two virtual, closed, government-to-government tribal information meetings on February 3 and 4, 2026, to discuss the NRC's Section 106 process and environmental review for GLE's proposed PLEF (NRC 2026b).

NRC staff contacted the Kentucky Heritage Council (KHC), which is the State Historic Preservation Office (SHPO), by letter on December 23, 2025, initiating the NHPA Section 106 consultation for the NRC staff's review of GLE's license application for the PLEF (NRC 2025f). The NRC staff's letter referenced a September 19, 2025, letter from the SHPO (KHC 2025b), in which the SHPO agreed with GLE's archaeology report without revision. Subsequently, NRC staff received a letter from the KHC dated January 20, 2026 (KHC 2026), with no additional comments beyond the SHPO's September 19, 2025, letter in which the SHPO agreed with GLE's archaeology report without revision; concurred with the eligibility determinations for the sites identified within the APE; and indicated that the undertaking would not be expected to adversely impact any of the resources (KHC 2025a, 2025b).

Additional correspondence was sent to these tribes and to the Kentucky SHPO in March 2026 documenting the NRC's finding that historic properties would not be adversely affected (NRC 2026c,d).

The status of the environmental regulatory requirements, permits, and consultations regarding the proposed PLEF is summarized in Table 1-2. Information about the requirements is presented in Appendix B. A list of correspondence and individual persons contacted can be found in Appendices D and E, respectively.

1.5.2.3 U.S. Environmental Protection Agency Region IV Review

The U.S. Environmental Protection Agency (EPA) reviews all EIS documents prepared by federal agencies in accordance with Section 309 of the Clean Air Act of 1970, as amended (CAA). The NRC staff will transmit this draft EIS to EPA Region IV upon publication. Should the EPA provide comments on the EIS, the NRC staff will discuss the comments with EPA Region IV during the preparation of the final EIS and address the comments accordingly.

1.6 COOPERATING AGENCY

In October 2025, the Louisville District of the USACE agreed to be a cooperating agency for the preparation of this EIS (USACE 2025). This role reflects the USACE's regulatory authority over the discharge of dredged or fill material (e.g., soil, rock, debris) at the PLEF site into waters of the United States. Additional information regarding the role of the USACE Louisville District is presented in Section 1.3.

Table 1-2 Potentially Applicable Permit and Approval Requirements for the Construction, Operation, and Decommissioning of the Proposed PLEF

Agency	Regulatory Authority	Permit or Approval	Activity Covered	Status
NRC	10 CFR Parts 30, 40, and 70, authorized by the Atomic Energy Act	NRC License	Receipt, possession, use, transfer, and/or delivery of source material, special nuclear material, and byproduct material	Under review
EPA	Clean Water Act; 40 CFR Part 112	Spill prevention, control, and countermeasure (SPCC) plans for construction and operation	Storage of oils during construction and operation	SPCC plans not yet prepared
USACE	Clean Water Act	Section 404 Permit	Dredging or filling waters of the United States	Permit application under review
FWS	ESA, Section 7; Migratory Bird Treaty Act; Bald and Golden Eagle Protection Act	Consultation regarding potential to adversely impact endangered protected species; concurrence with no adverse impact or consultation on appropriate mitigation measures	Effects on federally threatened and endangered species	On June 18, 2025, the FWS provided concurrence for determinations that the project is not likely to adversely affect federally listed species
Kentucky Division for Air Quality (KDAQ)	Clean Air Act	Construction and Operating Permit	Construction of a new air contaminant source	Permit application not yet submitted
Kentucky Department of Fish and Wildlife Resources (KDFWR) – Fisheries Division – Environmental Section	Endangered Species Act	Consultation regarding potential to adversely impact state endangered protected species	Effects on state threatened and endangered species	Request not yet submitted
KHC	National Historic Preservation Act Section 106	Consultation regarding potential to adversely impact historic resources	Effects on historic properties	On January 20, 2026, the KHC conveyed that the undertaking would not be expected to adversely impact any of the identified resources

Agency	Regulatory Authority	Permit or Approval	Activity Covered	Status
Kentucky Division of Water	Clean Water Act	Section 401 Water Quality Certification	Plan to work, or to deposit or place dredged or fill material, in streams or wetlands	Permit application not yet submitted
		Kentucky Pollutant Discharge Elimination System (KPDES) General Permit	Discharge of stormwater runoff from the site during facility construction	Permit application not yet submitted
		KPDES Individual Permit for Industrial and Sanitary Wastewater Treatment	Discharge of wastewater during facility operation	Permit application not yet submitted
		Construction Permit for Wastewater Treatment Plant	Discharge of wastewater from a treatment plant during facility operation	Permit application not yet submitted
Kentucky Division of Waste Management	Resource Conservation and Recovery Act	Hazardous Waste Permit	Hazardous Waste Generator Identification Number	Permit application not yet submitted
Kentucky Office of State Archaeology	Kentucky Administrative Regulations, Chapter 164, Archaeology Regulations, Sections 705 to 735	Kentucky Antiquity Act Permit	Archaeological sites and surveys	Kentucky Antiquity Act Permit 2024-56 obtained on September 30, 2024
Kentucky Transportation Cabinet	Kentucky Transportation Cabinet policy, guidance, and standards	Encroachment Permits and Traffic Impact Study	Access to development or land use, which will generate or has the potential to generate traffic volumes	Permit application not yet submitted
McCracken County	McCracken County Ordinances	Site Plan Permit	Required for site development	Permit application not yet submitted
		Stormwater Conveyance Permit	Management of stormwater	Permit application not yet submitted
		Building Permit	Building plan review	Permit application not yet submitted

2 PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The proposed federal action is the issuance of a license that would authorize GLE to receive title to, own, acquire, receive, possess, use, transfer, and/or deliver source material, special nuclear material, and byproduct material as specified in the license for the purposes of constructing, and then operating for up to 40 years, a facility that uses laser-based isotope separation technology to enrich uranium.

The proposed GLE PLEF would enrich uranium for use as fuel in the next generation of U.S. commercial nuclear reactors. If granted, GLE would begin construction of the proposed PLEF (anticipated in late 2026), commence commercial enrichment operations by 2030 or sooner, and in the following 6-year period, increase to an initial maximum target production capacity of 6 million SWUs at an enrichment of up to 8 wt% U-235. The PLEF would also process DUF_6 currently stored at the adjacent DOE PGDP, for a total throughput of 2,000 MTU per year.

2.1.1 Location and Description of the Proposed Site

GLE owns about 280 ha (691 ac) of land west of Paducah in McCracken County, Kentucky. The GLE property was formerly part of the West Kentucky Wildlife Management Area (WKWMA) that was managed by the KDFWR. GLE is proposing to build the PLEF on approximately 130 ha (322 ac) of the GLE property (Figure 1-2). The GLE property and proposed PLEF site are predominantly undeveloped, with agricultural fields and forested land.

The Ohio River is about 8 km (5 mi) northeast of the PLEF site, and it is the most prominent natural feature in the project vicinity. The nearest major population center is Paducah, Kentucky, 8 km (5 mi) east of the PLEF site. The nearest residence is on Woodville Road 47.5 meters (m) (150 feet [ft]) south of the PLEF site. The environmental characteristics of the proposed PLEF site and surrounding areas are described in more detail in Chapter 3 of this EIS.

The PLEF site is bordered by Woodville Road to the south, Hobbs Road to the west, and Dyke Road to the north. DOE owns Dyke Road, and north of Dyke Road is a portion of the WKWMA and the PGDP facility. Hobbs Road connects to U.S. Highway 60 (Highway 60) 4.8 km (3 mi) south of the PLEF. A gravel road, an extension of McGruder Road, extends a short way onto the southeast corner of the PLEF site.

Two proposed access roads (west entrances) would be constructed from Hobbs Road to the PLEF site, as illustrated in Figures 1-3 and 2-1. A third proposed access road would be constructed on the north side of the PLEF site to Dyke Road. GLE would use the west entrances to access the site during construction. The PLEF site does not have rail access (and GLE does not anticipate the use of freight rail for shipping needs), but freight service to the region is provided by Canadian National Railway with terminals located in Paducah and Calvert City, Kentucky.

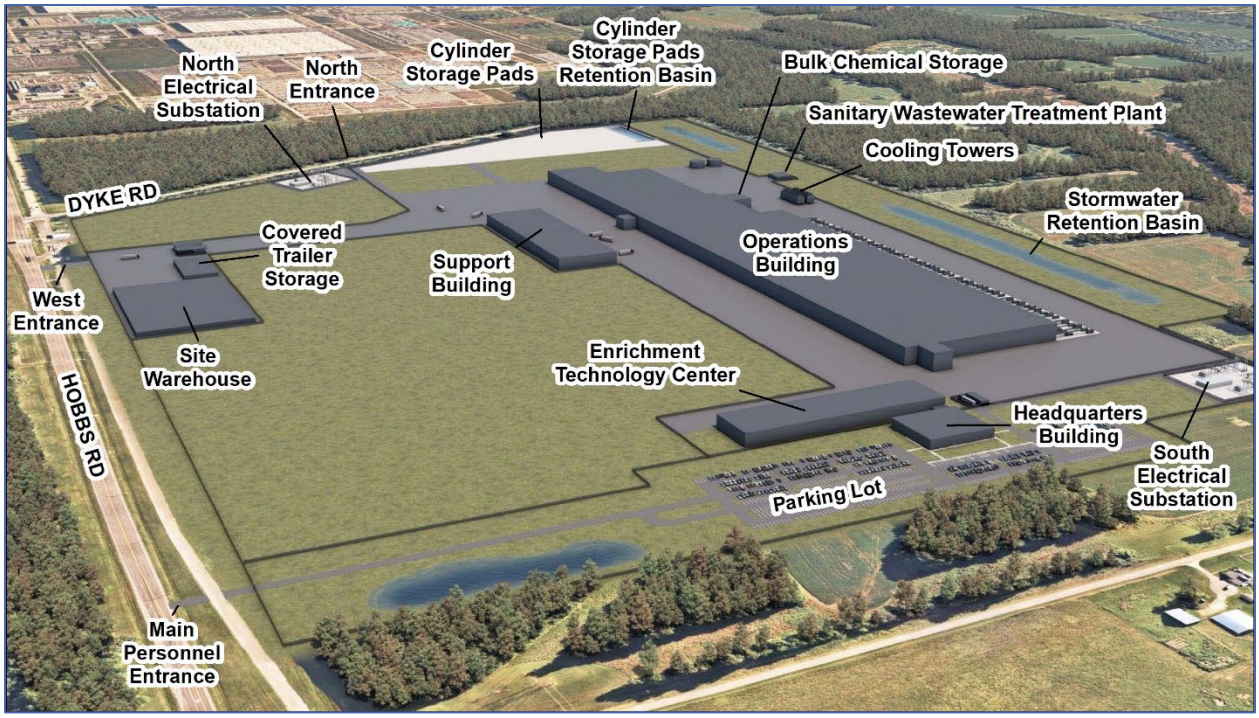

Figure 2-1 Proposed PLEF Conceptual Site Plan (modified from GLE 2025a).

The PLEF would consist of the primary facilities and areas listed below and shown in Figure 2-1.

- Operations building
- Headquarters building
- Vehicle and facility warehouse and maintenance
- Material and fabrication shop
- Liquid waste and bulk chemical storage
- Electrical substations (two)
- Sanitary wastewater treatment plant
- Covered trailer storage
- Cooling towers
- Cylinder storage pads (five)
- Cylinder storage pad retention basin
- North and west entrances
- Permanent parking areas
- Stormwater retention basins
- Stormwater and wastewater outfall

The primary purpose of the operations building would be to house the laser equipment and support systems needed to perform the enrichment process. The operations building would have two halls, one to bring DUF_6 tails (0.2 wt% U-235) to natural uranium levels (0.7 wt% U-235) and a second hall to enrich natural uranium to LEU+ (up to 8 wt% U-235) using the SILEX technology. The operations building would include the following process and support areas:

- Cylinder shipping and receiving area
- Cylinder handling vestibules
- UF_6 feed and vaporization area
- Cascade/gas handling area
- Blending area
- Sampling area
- Radioactive waste area
- Heating, ventilation, and air conditioning (HVAC) equipment area
- Decontamination/maintenance area
- Laboratory area
- Laser area

Facility operations would be supported by shipping and receiving, laboratory, quality control, research and development, uranium recovery, a sanitary system, and waste collection and disposal systems. The target production capacity would be up to 2,000 MTU per year of $ENUF_6$ and 6 million SWUs per year of LEU.

2.1.1.1 Supporting Infrastructure

New facility buildings and supporting infrastructure would include a diesel tank storage area and nitrogen storage. GLE would heat the PLEF using natural gas provided by an existing Atmos Energy natural gas line along Woodville Road.

New potable and process water supply lines to the PLEF would be connected to the existing Paducah Water Works water supply infrastructure. There would be up to two 12.2-m (40-ft) fire water tanks in the northeast corner of the PLEF site. Wastewater generated as a result of PLEF operations would include sanitary waste, stormwater runoff, cooling water blowdown from the HVAC cooling tower system, and liquid effluents that could be radioactive. Process and sanitary wastewater would be collected and treated onsite before being discharged to the planned outfall in Little Bayou Creek under a KPDES permit. Little Bayou Creek flows into the Ohio River.

Stormwater runoff from the PLEF would drain to a series of stormwater retention basins at the eastern and western boundaries of the site before discharging to the outfall. The cooling towers for the PLEF would be closed-loop systems that would not contact any uranium materials or uranium-contaminated wastewater streams. The cooling tower blowdown would be pumped directly to the planned outfall location.

Radioactive liquid effluents would be collected in a closed drain system in the operations building decontamination room; process area floor drains, sinks, sumps, and mop water; laboratory area floor drains, sinks, sumps, and mop water; building HVAC and cooling equipment condensate; and aqueous process liquids that have the potential to contain uranium. Details regarding PLEF wastewater sources, quantities, and planned wastewater management are provided in Section 3.12 of the ER (GLE 2025a).

GLE anticipates providing the PLEF with electrical power through transmission lines, which would be relocated to enable PLEF construction. New aboveground utility lines would connect the PLEF to two electrical substations proposed to be located inside the PLEF security fences. One would be to the northwest near Dyke Road, and the other would to the southeast, next to the Enrichment Technology Center parking lot (see Figure 2-1).

2.1.1.2 Site Workers and Vehicular Deliveries

GLE anticipates construction of the PLEF would last approximately 3 years. Construction would occur primarily during weekdays and daylight hours, subject to any local restrictions imposed by McCracken County. Construction might occasionally occur on weekends, as necessary, to reach construction deadlines. During the year when construction, start-up, and operation activities would potentially overlap, GLE estimates an annual labor force of up to 1,150 workers, with a maximum of 600 construction workers onsite. Accordingly, GLE anticipates up to 399 total vehicle trips from workers and deliveries during peak construction between 2027 and 2028. While site preparation activities might commence in 2026, the NRC staff expects the number of workers and associated trips to be smaller than those anticipated in 2027 and 2028 because limited activities would be completed prior to an NRC licensing decision.

The licensed term of the PLEF would be 40 years. During this period, GLE anticipates the maximum operational workforce at full capacity would reach 350 employees.

GLE estimates that 900 truck deliveries per year of uranium source material (UF_6 feed), 300 truck shipments per year of enriched fuel (UF_6 product), 800 truck shipments per year of UF_6 tails, 50 truck shipments per year of empty cylinders, and 36 truck shipments per year of low-level radioactive waste (LLRW) would be necessary during operation (GLE 2025a). Based on the average daily traffic of 740 trips per day during operation, an estimated 8 percent, or about 60 of these trips, would be for truck deliveries. This translates to about 7,500 roundtrips per year of nonradiological operational deliveries.

GLE anticipates that the decommissioning phase would take 10 years, from 2067 to 2077, and would require up to 50 decommissioning workers per year (GLE 2025a).

2.1.2 Technology and System Description

The proposed PLEF would employ the SILEX process, a third-generation laser-based technology for enriching natural uranium that was developed by Silex Systems Ltd, in partnership with GLE (and, formerly, the U.S. Enrichment Corporation). Isotopes of the same element, although 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 vaporized efficiently into individual atoms. In laser excitation enrichment, UF_6 vapor is illuminated with a tuned laser of a specific wavelength that is absorbed only by U-235 atoms while leaving other isotopes unaffected. The GLE laser-based enrichment process is summarized below from NRC (2012a) and the license application (GLE 2025b). However, the technical details of the GLE laser-based enrichment process are proprietary, subject to export control, and in many cases, may also fall into the categories of security-related, safeguards, or classified information; U.S. laws and regulations limit access to these types of information. As such, the details of this process are not contained in this EIS.

2.1.2.1 Fuel Enrichment

The proposed PLEF is designed to separate a feed stream of DUF_6 tails containing about 0.25 wt% U-235. GLE would re-enrich that uranium to natural-grade levels and then separate the UF_6 feed material into a product stream enriched to up to 8 w.% U-235. A tails stream that is depleted in U-235 would also be produced. Except for the actual step in the enrichment process that involves the use of lasers, the processes that would be used for receipt and handling of the feedstock and the enriched and DUF_6 streams are very similar to those used at other enrichment facilities.

The cylinders that would be used to transport and store UF_6 are industry-standard containers. The proposed PLEF is designed to produce an enriched UF_6 stream that is up to 8 w.% U-235 with a nominal capacity of 6 million SWU per year. The four major processing steps involved in enriching the natural UF_6 at the proposed PLEF would be (1) UF_6 feed and vaporization, (2) cascade/gas handling, (3) product withdrawal, and (4) tails withdrawal.

The UF_6 feed vaporization system would provide a continuous supply of gaseous UF_6 from the feed cylinders to the cascade/gas handling area where the enrichment would take place. Approximately 900 122-centimeter (cm) (48-inch [in.]) cylinders would be processed each year. Feed cylinders would be loaded into solid feed stations; vented for removal of light gases (primarily air and HF); and heated to sublime the UF_6 (converting it directly from solid to gas phase without going through the liquid phase). The light gases and UF_6 gas generated during

feed purification would be routed to the feed purification subsystem, where the UF_6 would be desublimed (converted directly from gas to solid phase without passing though the liquid phase).

The feed purification subsystem would remove any light gases such as air and HF from UF_6 prior to introducing it into the cascade/gas handling area. After purification, UF_6 from the solid feed stations would be routed to the cascade/gas handling area. The UF_6 in gaseous form would be exposed to laser-emitted light and separated into two streams: one enriched in U-235 and one depleted in U-235. Enriched UF_6 from the cascade/gas handling area would be transported to the product withdrawal area, where it would be placed in the product cylinders and desublimed. The heat from desublimation of the UF_6 would be removed by air. Filling of product cylinders would be monitored, and filled cylinders would be transferred to the sampling area for sampling and sent to the blending area or put into interim storage on the product pad. The enriched UF_6 in product cylinders forwarded to the blending area would be vaporized and pumped into receiver cylinders. During this process, the enrichment level of UF_6 put into the receiver cylinders would be carefully controlled to meet the customer specifications as well as transportation standards.

As a final step, the receiver cylinders would be sent back to the sampling area, where the UF_6 would be liquefied to create a homogenous mixture of UF_6 and would be sampled to make sure that it meets applicable requirements. A cylinder to be sampled would be moved into an autoclave with heating and cooling capability, where the UF_6 in the cylinder would be liquefied by electrically heated air, to homogenize it, and a representative sample of the contents would be taken. The UF_6 in the cylinder would then be solidified in the autoclave using cold air before removing the cylinder from the autoclave. The autoclaves would be designed to contain a UF_6 release within the autoclave.

2.1.2.2 Chemical Receipt, Storage, and Handling

The DUF_6 from the cascade/gas handling area would be transported to the tails withdrawal area, where it would be placed in the tails cylinders and desublimed. The heat of desublimation of the UF_6 would be removed by air. Filling of tails cylinders would be monitored, and filled cylinders would be transferred to the tails pad.

2.1.2.3 Shipping and Transportation

All shipments of nuclear materials and wastes would conform with NRC, U.S. Department of Transportation (DOT), and State of Kentucky requirements. Incoming feed material of UF_6 and DUF_6 would arrive by truck in approved containers licensed by the NRC. Final fuel forms would be delivered to customers by truck in approved containers licensed by the NRC. LLRW shipments would be appropriately packaged and analyzed for uranium content prior to shipment to a licensed disposal facility.

2.1.3 Waste and Effluent Management

The types of radioactive liquid, solid, and gaseous wastes generated by the operation of the PLEF include quality control laboratory wastes and routine wastes from maintenance activities (e.g., filter replacement and trash generated from decontamination). GLE would collect the liquid waste streams and chemically adjust the liquids as necessary to reuse them in the fuel enrichment process or prepare and package them for offsite disposal. Waste management at the PLEF is discussed in Section 3.12. The transportation of radioactive materials is addressed in Section 3.10.

2.1.4 Monitoring and Mitigation Programs

Mitigation measures to reduce potential adverse impacts that could result from the construction, operation, and decommissioning of the PLEF would be considered and implemented by GLE, including those described in Chapter 5 of the ER (GLE 2025a) and additional measures developed pursuant to consultations with regulatory agencies. The mitigation measures would involve incorporating appropriate engineering designs, better scheduling of work activities, establishing safe material processing and handling procedures, implementing worker training, following best management practices (BMPs), and employing personal protective equipment. Furthermore, sampling of air and liquid effluents from the facilities, monitoring of workers for industrial health and safety and radiation exposures, and monitoring of onsite and the surrounding environment for hazardous materials associated with the construction, operation, and decommissioning of the PLEF would be conducted to assess and demonstrate compliance with permit and regulatory requirements.

Periodic measurements of direct radiation dose, and sampling of air, groundwater, surface water, soil and sediment would be taken at specific locations in and around the PLEF as a means of monitoring the environment for impacts associated with the construction, operation, and decommissioning of the facility. The environmental monitoring program would fall under the oversight of GLE's quality assurance program for the PLEF and would be subject to periodic auditing by quality assurance personnel. The proposed locations for air, direct radiation dose, groundwater, surface water, soil, and sediment monitoring are provided in Chapter 6 of the GLE ER (GLE 2025a) and shown in Figure 2-2. Measures that GLE would implement to mitigate impacts on the environmental resources at the PLEF and its vicinity are described in Chapter 3 within the individual resource sections and summarized in Table 4-3.

2.1.5 Decommissioning Activities

Before decommissioning activities begin, GLE would prepare a decommissioning plan for submittal to the NRC pursuant to 10 CFR 70.38 ("Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas"). The decommissioning plan would provide information concerning the PLEF, the types of items to be decontaminated, the disposition of facilities used for hazardous materials, the assumptions upon which the costs of decommissioning are derived, and an estimated schedule for decommissioning and closing the facility. GLE intends to decommission and close the PLEF to reduce the level of radioactivity remaining in the facility to residual levels acceptable for release of the site for unrestricted use and for NRC license termination pursuant to 10 CFR 20.1401 ("General provisions and scope") and 10 CFR 20.1402 ("Radiological criteria for unrestricted use").

Prior to decommissioning, GLE would assess the radiological status of the PLEF. The decommissioning and closure activities would include cleaning and removing radioactive and hazardous waste contamination that might be present on materials, equipment, and structures. Radioactive equipment and materials would be disposed of according to local, state, and federal laws and regulations. Post-operational decommissioning activities would require up to 50 workers. GLE anticipates the average number of truck shipments from the site during decommissioning to be no more than the average daily truck traffic during the construction phase. Process equipment and building materials such as wood, concrete, and steel would be removed from the site. General guidelines that would apply to the decommissioning and closure effort are further discussed in Section 3.12.

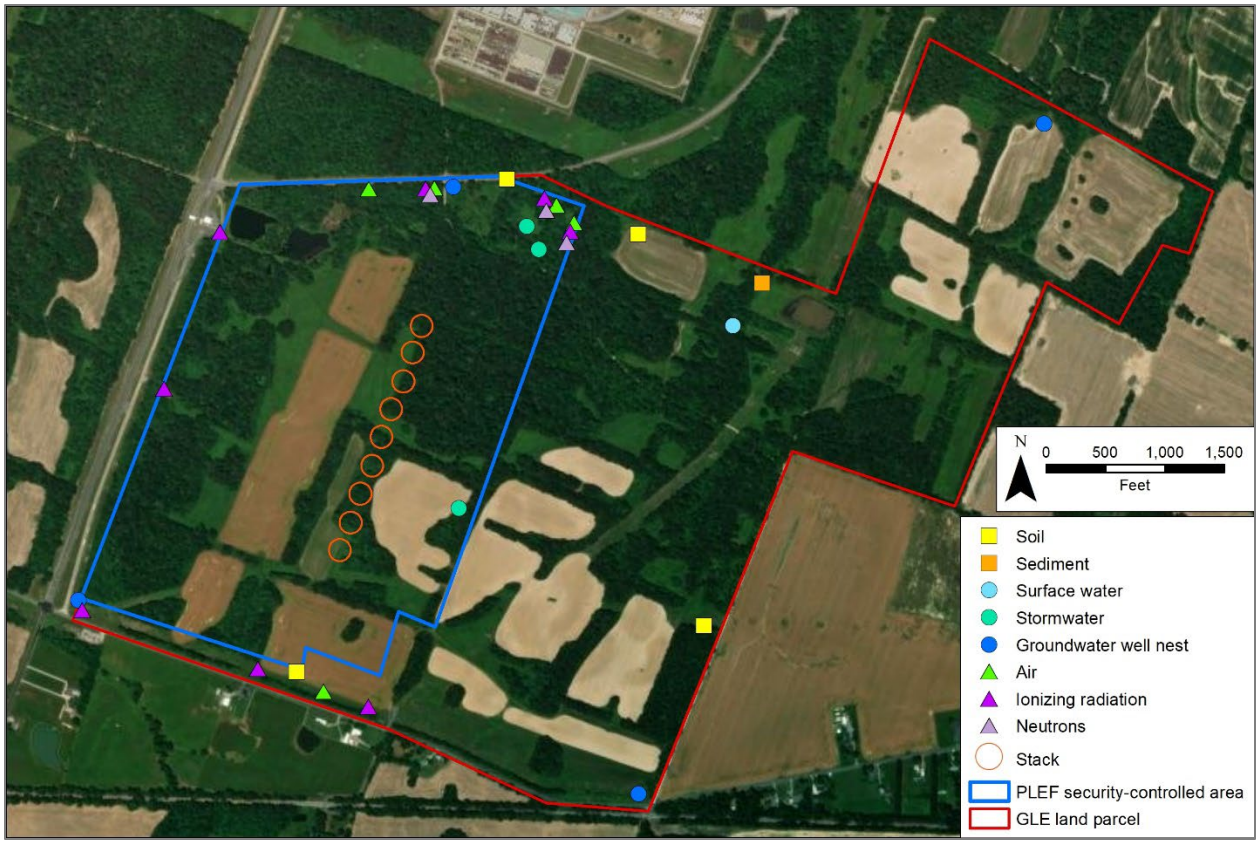

Figure 2-2 Proposed Monitoring Locations (modified from figures in GLE 2025a).

2.2 ALTERNATIVES

This section describes and compares the proposed federal action and alternatives. As discussed in Chapter 1, the proposed agency action is the issuance of a license under 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," to authorize GLE to possess and use special nuclear material to enrich uranium at the PLEF in McCracken County, Kentucky. GLE would construct, operate, and decommission the facility at the expiration of the license, if granted. This section also evaluates the no-action alternative, which is described in Section 2.2.1. Under the no-action alternative, the NRC would not issue GLE a license to possess and use special nuclear material to enrich uranium fuel for nuclear fuel fabrication facilities; therefore, construction, operation, and decommissioning of the proposed PLEF would not occur. The no-action alternative provides a basis for evaluating and comparing the potential impacts of the proposed action.

The NRC has implemented changes to its environmental review processes pursuant to the Fiscal Responsibility Act of 2023 NEPA Amendments (NRC 2025g). Because the NRC's proposed agency action is typically limited to a regulatory licensing decision (e.g., whether or not to issue a license), the scope the NRC's NEPA review of a proposed action is limited to only addressing the environmental effects of the proposed agency action and the no-action alternative, and it does not consider alternatives to the proposed action that the agency does not have the authority to implement (e.g., siting and energy alternatives). Section 2.2.2 discusses alternative uranium enrichment technologies. Section 2.2.3 discusses alternative

sites that GLE considered and provided in Section 2.2.3 of the ER (GLE 2025a) but that are not analyzed in detail in this EIS.

2.2.1 No-Action Alternative

Under the no-action alternative, the NRC would not issue a license to GLE to construct and operate a uranium enrichment facility at its PLEF site. The PLEF would not be available to enrich uranium for nuclear fuel fabrication facilities, and this domestic source of enriched described uranium would not be available to the nuclear industry. Plans to enrich uranium by other U.S. companies are under development, but no licenses have been issued. Furthermore, other planned domestic capacity of enriched uranium is unlikely to meet the estimates of future commercial demand (DOE 2026). If use of advanced reactors is demonstrated but domestic sources of fuel are limited, it is possible that advanced reactor deployment could be hindered.

The no-action alternative would not result in any of the potential environmental impacts at the PLEF site related to issuance of a special nuclear material license to GLE or the associated construction, operation, and decommissioning of the PLEF (see Sections 4.1 and 4.4). However, the no-action alternative would not meet the purpose and need for the proposal. In addition to the PLEF facility not being available as a supply source of U.S. enriched uranium, the negative consequences of the no-action alternative would include that the stockpile of legacy DUF_6 at the PGDP would not be reduced.

2.2.2 Alternative Technologies

Alternative technologies to the laser enrichment process are described in Section 2.3.3 of the EIS for GLE's Laser Enrichment Facility in Wilmington, North Carolina (NRC 2012a) and are briefly summarized here. A number of different processes have been developed for enriching uranium, but only three are considered candidates for commercial use: gaseous diffusion, gas centrifuge, and laser excitation. Of these, only the gaseous diffusion and gas centrifuge technologies have been deployed for large-scale industrial use to date. Other technologies – notably, electromagnetic isotope separation, liquid thermal diffusion, and early-generation laser enrichment – have proven too costly to operate; remain at the research and laboratory developmental scale; or in the case of laser excitation, have been superseded by a more advanced technology. Other commercial entities have pursued the gas centrifuge technology to enrich uranium in the United States. GLE eliminated that technology from consideration and selected the laser-based technology because it expects this technology to achieve a lower cost and smaller environmental impacts compared to the gas centrifuge technology (GLE 2008). The environmental impacts of the two technologies are compared in Table 2-6 of the EIS for the GLE facility in Wilmington (NRC 2012).

The NRC recognizes that the gas centrifuge technology is commercially viable and is a reasonable alternative to the proposed laser-based technology. The impacts associated with constructing, operating, and decommissioning a gas centrifuge enrichment facility were analyzed by NRC in previous EISs (NRC 2005, 2006, 2011). In those EISs, the NRC concluded that the impacts associated with the construction, operation, and decommissioning of the NEF in Lea County, New Mexico; the ACP in Piketon, Ohio; and the EREF in Bonneville County, Idaho, were acceptable for licensing those facilities unless safety issues mandated otherwise. Based on NRC's safety and environmental reviews, all of these facilities were granted licenses.

2.2.3 Site Alternatives

Prior to submitting its application to the NRC, GLE conducted a siting study to identify one or more suitable locations for the PLEF.[6] Relative suitability of 20 potential sites was considered as part of the siting screening process. The two top-ranked sites are located mostly within the GLE property. Results of GLE's siting process are summarized in Section 2.2.3 of the ER (GLE 2025a). The NRC is not evaluating those alternative sites.

[6] The siting study is restricted from public access in compliance with 10 CFR 2.390.

3 AFFECTED ENVIRONMENT AND POTENTIAL ENVIRONMENTAL IMPACTS

This chapter provides an overview of each environmental resource and the region of interest or potential project impact area. It also presents an assessment of potential impacts of the proposed action on the resource, that is, potential impacts of NRC's issuance of a license to authorize GLE to construct and operate the proposed PLEF. In addition, this chapter describes mitigation measures to reduce or avoid potential adverse impacts, where applicable. These include measures that (1) GLE has committed to in its license application, or (2) the environmental review team identified as having the potential to reduce environmental impacts, but that the applicant did not commit to in its application. The applicant's ER (GLE 2025a) is the main source of the information presented in this chapter.

Impacts of the no-action alternative are discussed in Sections 2.2, 4.1, and 4.4 of this EIS. Under the no-action alternative, environmental conditions at the proposed PLEF site would continue their current trajectories; no impacts of constructing, operating, or decommissioning the PLEF would occur; and no benefits from the PLEF would be realized.

Sections 3.1 through 3.13 address the potential environmental impacts of the proposed construction, operation, and decommissioning of the PLEF on the following resource areas: land use; meteorology, climatology, and air quality; geology and soils; water resources; ecological resources; historic and cultural resources; socioeconomics, visual and scenic resources, noise; transportation; public and occupational health and safety, waste management, and cost-benefit analysis.

The NRC staff uses the CEQ regulations-based standards of significance for assessing environmental impacts. These are described in the NRC guidance in NUREG-1748 (NRC 2003) and are summarized as follows:

- SMALL: The environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.
- MODERATE: The environmental effects are sufficient to alter noticeably, but not destabilize, important attributes of the resource.
- LARGE: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

These levels are used for describing the environmental impacts of the proposed action. Resource-specific effects or impact definitions from applicable environmental laws and executive orders, other than SMALL, MODERATE, and LARGE, are used where appropriate.

As introduced in Section 1.4.3, there are 34 issues in the NR GEIS that are relevant to the proposed PLEF and are determined to have a SMALL impact when they meet three criteria:

- The environmental impacts associated with the issues have been determined to apply either to all PPEs or SPEs.
- A single significance level (i.e., SMALL) has been assigned to the impacts.
- Mitigation of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant-specific mitigation measures are not likely to be sufficiently beneficial to warrant implementation.

In conducting its environmental review, the NRC staff did not identify any new and significant information for Category 1 issues relevant to the review of the license application for the PLEF. Therefore, staff did not conduct additional site-specific evaluations in addition to verifying that SPEs and PPEs for each issue were met. A summary of the Category 1 issues relevant to the proposed GLE PLEF are shown in Table 3-1. Table C-1 provides details showing that SPEs and PPEs for each issue are met. This EIS aligns with the conclusions of the NR GEIS for the listed Category 1 issues.

The affected environment is the environment that currently exists at the proposed PLEF site. Because existing environmental conditions are the result of past and present activities, this chapter considers the nature and impacts of these activities and how they shaped the current environment, including reasonably foreseeable environmental trends and planned actions. Planned actions may include site preparation activities that are not a part of the NRC action (see Section 1.4.7).

“Reasonably foreseeable” means sufficiently likely to occur such that a person of ordinary prudence would take it into account in reaching a decision. Reasonably foreseeable applies differently when analyzing the reasonably foreseeable effects of the proposed agency action and reasonably foreseeable environmental trends and planned actions with a close causal relationship to the proposed agency action.

Consistent with the requirements of NEPA §102(2)(C)(i) (42 U.S.C. §4332(2)(C)(i)), all federal agencies must evaluate the reasonably foreseeable environmental effects of the proposed agency action. “Effects” or “impacts” means changes to the human environment that are reasonably foreseeable and have a close causal relationship to the proposed agency action. A “but for” causal relationship is insufficient to make an agency responsible for a particular effect under NEPA. Environmental effects should generally not be considered if they are remote in time, geographically remote, or the product of a lengthy causal chain. Environmental effects do not include those effects that the agency has no ability to prevent due to the limits of its regulatory authority or that would occur regardless of the proposed action.

The description of the affected environment should be sufficient to support a reasoned explanation of NRC staff’s conclusions regarding the environmental effects of the proposed agency action. The discussion of baseline conditions should be informative but not speculative. To the extent environmental trends or planned actions are reasonably foreseeable and relevant to determining the environmental effects of the proposed agency action, NRC staff includes this information in the discussion of baseline conditions.

GLE anticipates providing the PLEF with electrical power through transmission lines, which would be relocated to enable PLEF construction. Relocated aboveground utility lines would connect the PLEF to two electrical substations proposed to be located inside the PLEF security fences. One would be to the northwest near Dyke Road, and the other would to the southeast, next to the Enrichment Technology Center parking lot (which is shown in Figure 2-1). The NRC has no jurisdiction over transmission lines and substations; however, relocation and construction of transmission lines, and construction and operation of substations, are considered here as part of construction and operation impacts.

Table 3-1 Applicable Category 1 (Generic) Issues Relevant to the Proposed GLE PLEF

Environmental Category	Phase	Issue	NR GEIS Section
Air Quality	Construction	Greenhouse gas (GHG) emissions during construction	3.3.2.1.2
	Operation	GHG emissions during operation	3.3.2.2.2
Water Resources	Operation	Water use conflict from plant municipal water demand	3.4.2.2.11
Terrestrial Ecology	Construction	Important species and habitats – other important species and habitats	3.5.2.1.6.2
	Operation	Exposure of terrestrial organisms to radionuclides	3.5.2.2.3
		Water use conflicts with terrestrial resources	3.5.2.2.7
		Effects of transmission line ROW management on terrestrial resources	3.5.2.2.8
		Effects of electromagnetic fields on flora and fauna	3.5.2.2.9
		Important species and habitats – other important species and habitats	3.5.2.2.10.2
Aquatic Ecology	Construction	Runoff and sedimentation from construction areas	3.6.2.1.1
		Building transmission lines, pipelines, and access roads across surface waterbodies	3.6.2.1.3
		Important species and habitats – other important species and habitats	3.6.2.1.4.2
	Operation	Stormwater runoff	3.6.2.2.1
		Exposure of aquatic organisms to radionuclides	3.6.2.2.2
		Effects of refurbishment on aquatic biota	3.6.2.2.3
		Impacts of transmission line ROW management on aquatic resources	3.6.2.2.5
		Important species and habitats – other important species and habitats	3.6.2.2.10.2
Radiological Environment	Construction	Radiological dose to construction workers	3.8.1.2.1
	Operation	Occupational doses to workers	3.8.1.2.2.1
		Maximally exposed individual annual doses	3.8.1.2.2.2
		Total population annual doses	3.8.1.2.2.3
		Nonhuman biota doses	3.8.1.2.2.4
Nonradiological Environment	Construction	Building impacts of chemical, biological, and physical nonradiological hazards	3.8.2.2.1
	Operation	Operation impacts of chemical, biological, and physical nonradiological hazards	3.8.2.2.2
Noise	Operation	Operation-related noise	3.9.2.2
Radiological Waste Management	Operation	LLRW	3.10.1.2.1
Nonradiological Waste Management	Construction	Construction nonradiological waste	3.10.2.2.1
	Operation	Operation nonradiological waste	3.10.2.2.2
Socioeconomics	Construction	Community services and infrastructure	3.12.1.1.1
		Economic impacts	3.12.1.1.3
		Tax revenue impacts	3.12.1.1.4
	Operation	Community services and infrastructure	3.12.1.2.1
		Economic impacts	3.12.1.2.3

3.1 LAND USE

This section provides an overview of the land use conditions in the Paducah, Kentucky–Illinois Metropolitan Statistical Area (Paducah MSA). It also presents potential impacts of the proposed action and associated mitigation measures.

3.1.1 Affected Environment

The PLEF site is located in the northwestern portion of rural McCracken County, Kentucky, about 8 km (5 mi) west of the city of Paducah. The Paducah MSA, as defined by the Office of Management and Budget, includes five counties: Ballard, Carlisle, Livingston, Massac, and McCracken. Massac County is in Illinois (the Ohio River forms the northern and western border of Kentucky with Illinois), and the other four are in Kentucky. Of the five, McCracken County is the most populated, and it includes Paducah.

- *McCracken County.* This county has approximately 67,900 residents, covers an area of 694 km^2 (268 mi^2), and has established zoning regulations. The Ohio River forms the northern border, and the Tennessee River defines the northeastern border. Paducah is the largest city in the MSA; it is the county seat and 16th largest municipality in Kentucky. As the most populous county in the Paducah MSA, McCracken County has the most land used as developed/populated areas, about 22 percent. About 17 percent of the county land is forest, and about 41 percent is agricultural land, which is a combination of pasture/hay and cultivated crops (USGS 2025).
- *Massac County.* This county has approximately 14,200 residents. It has not established county-wide zoning regulations. Zoning is managed at the municipal level, specifically by the City of Metropolis, the county seat. Developed/populated areas make up about 9 percent of the land in the county, while about 22 percent is forest and about 60 percent is agricultural land consisting of pasture/hay and cultivated crops (USGS 2025).
- *Livingston County*. The county is a rural community with approximately 8,900 residents. It has not established zoning regulations. Developed/populated areas make up about 6 percent of the land in the county, while about 37 percent is forest and about 41 percent is agricultural land, including pasture/hay and cultivated crops (USGS 2025).
- *Ballard County.* The county is a rural community with approximately 7,700 residents. It has not established county-wide zoning regulations. The economy is focused on agriculture, forestry, fishing, manufacturing, and construction. About 6 percent of county land is developed/populated areas, about 13 percent is forest, and about 58 percent is agricultural land. Nearly half of the agricultural land (about 48 percent) is cultivated crops alone (USGS 2025).
- *Carlisle County*. The county is a rural community with approximately 4,800 residents. It is in the far southwestern portion of Kentucky and is primarily farmland. About 6 percent of the land consists of developed/populated areas, and about 20 percent is forest. About 61 percent of the land is used as agricultural land, and about half of that is cultivated crops (USGS 2025).

Figure 3-1 illustrates the locations of different land use classes at the PLEF site and in the vicinity.

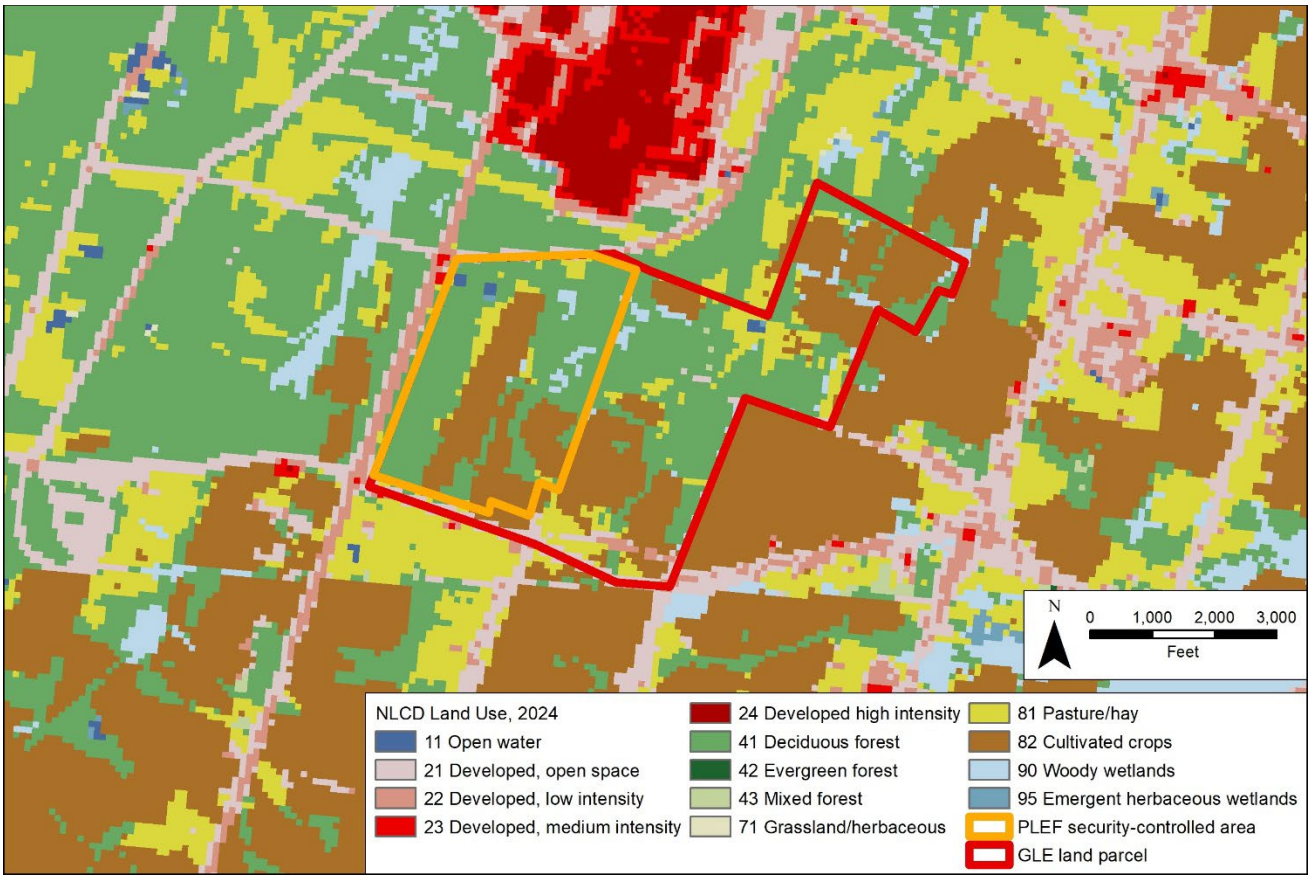

Figure 3-1 Land Use in the Vicinity of the PLEF Site (data source: USGS 2025).

Land within the GLE-owned land parcel is a fragmented combination of deciduous forest, pasture/hay, cultivated crops, open water, streams, and wetlands. Except for the land developed by DOE for the PGDP north of the proposed PLEF site, the areas around the GLE property have a similar (fragmented) mixture of deciduous forest, pasture/hay, and cultivated crops. Long ago, bottomland hardwood forests in the area were cleared and associated wetlands drained as lands were converted to agriculture. In the 1940s, the U.S. Department of Defense bought nearly 6,500 ha (16,000 ac) of land for the Kentucky Ordinance Works, which included the parcel now owned by GLE. After the war, the land was redistributed to the Atomic Energy Commission, Tennessee Valley Authority, and private individuals; some land was subsequently deeded or licensed to the KDFWR for wildlife management and wildlife-related activities (Logsdon 1995).

In late 2024, the KDFWR and its commission agreed to a land exchange for the property GLE obtained for the PLEF project. In exchange for the 320-ha (665-ac) parcel GLE acquired for the project, KDFWR accepted ownership of about 422 ha (1,043 ac) in Fulton County that was acquired by the Paducah-McCracken County Industrial Development Authority and funded by GLE, to be added to the Obion Creek Wildlife Management Area. As described by the commissioner of Kentucky Fish and Wildlife, the land exchange “will not only benefit Paducah and nearby communities, but it will also benefit many wildlife species and the outdoors enthusiasts who visit Western Kentucky” (KDFWR 2024).

Land use zoning regulations are designed to manage land development and are established by local governments. The legal framework for zoning in Kentucky is provided by Chapter 100 of the Kentucky Revised Statutes, while the Illinois framework is governed by the Illinois State code (65 ILCS 5). The PLEF site is on a land parcel of about 280 ha (691 ac) in McCracken County that is now zoned as a heavy industry zone. This designation permits power production, heavy manufacturing, and the handling of radioactive materials. The properties to the north and west of the site are also zoned as a heavy industry zone, while properties to the south and east are zoned as a rural residential district.

The Natural Resources Conservation Service (NRCS), which is part of the U.S. Department of Agriculture, has defined, and in cooperation with other federal, state, and local government organizations, has inventoried farmland of importance across the United States. Through its Soil Survey Geographic Database (SSURGO), NRCS soil survey staff has made available extensive soil data collected over the last century (NRCS 2024). As defined in 7 CFR Part 657, prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for those uses. It can be cultivated land, pasture, forest, or other land, but it is not urban or built-up land or water areas. Farmland of statewide importance does not meet the criteria for prime farmland on a national level, but state agencies still find it important. Farmland of statewide importance often meets almost all (but not all) of the criteria for prime farmland. From an analysis of the SSURGO data (NRCS 2024), Table 3-2 shows the distribution of prime farmland within Ballard, Carlisle, Livingston, Massac, and McCracken Counties.

From an analysis of the SSURGO data (NRCS 2024), the GLE land parcel contains areas classified as: “all areas are prime farmland,” “farmland of statewide importance,” and “prime farmland if drained,” with the last being the main class. Within the PLEF site, about 13 percent of the land is “not prime farmland,” about 12 percent is “farmland of statewide importance,” about 24 percent is “all areas are prime farmland,” and about 51 percent is “prime farmland if drained.” All land considered “not prime farmland” on the GLE land parcel is located within the PLEF project area.

Table 3-2 Percent of Prime Farmland in the Counties Within the Paducah MSA[a]

Farmland Classification	Ballard County	Carlisle County	Livingston County	Massac County	McCracken County
All areas are prime farmland	38	20	15	19	17
Farmland of statewide importance	13	4	0.4	28	8
Prime farmland if drained	34	3	0.1	27	33
Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	2	22	0.08	3	7
Prime farmland if protected from flooding or not frequently flooded during the growing season	0.9	10	25	0.3	7
Not prime farmland	13	41	60	22	28

[a] Values are rounded to the nearest integer or to one significant figure when less than 1. Data source: NRCS (2024).

Information about conservation areas, parks and recreation areas, and historic sites is summarized as follows:

- *Conservation areas.* There are no federally designated national conservation lands in the Paducah MSA. However, the PLEF site is adjacent to a state conservation area, the WKWMA, which receives approximately 27,000 person-use days annually (one person visiting for one day). The Ballard Wildlife Management Area is located approximately 18.5 km (11.5 mi) northwest of the site.
- *Parks and recreational areas.* McCracken County has numerous parks and recreational areas, including Noble Park and Stuart Nelson Park. Ballard County offers more than 12,000 ha (more than 30,000 ac) for outdoor activities, with a focus on waterfowl hunting. Massac County is home to Fort Massac State Park.
- *Historic sites.* McCracken County has 34 sites listed on the *National Register of Historic Places* (NRHP). Ballard County has six NRHP-listed sites: Ballard County Courthouse; Trimble House; Wickliffe Site; Juett, Dr. David Polk, Farmstead; Barlow House; and Lovelace, Andrew, Jr., House. Massac County has three NRHP-listed sites: Elijah P. Curtis House, Fort Massac Site, and Kincaid Mounds.

Historic sites are further discussed in Section 3.7.

3.1.2 Potential Impacts

Potential impacts of the proposed PLEF on land use during each of the three phases of the project are described below. The PLEF site is currently zoned for heavy industrial use, and the project would be consistent with this classification.

Site Preparation and Construction. Areas that would be affected by temporary site preparation and construction disturbance consist primarily of agricultural land and forested land typical of the surrounding landscape. GLE anticipates clearing an area of approximately 130 ha (322 ac) that encompasses undeveloped forested and crop land, open water, linear streams, and wetlands; the area to be cleared is within the PLEF project area (see Figures 1-3 and 3-1). This area is a small fraction of the WKWMA and does not impact access to nearby land for recreation. Direct impacts of removing 75 ha (185 ac) of forested land, which represents 57 percent of the PLEF site, would be minor, as this area accounts for a small fraction of local forested land and contains no special habitat. Direct impacts on prime farmland would also be minor. Nearly one-fourth (24 percent) of the PLEF project area is considered prime farmland and roughly half (51 percent) is considered “prime farmland if drained.” The proposed PLEF site accounts for a small fraction of prime farmland in McCracken County: approximately 0.6 percent of the prime farmland and approximately 0.7 percent of the prime farmland if drained.

Six ponds classified as palustrine unconsolidated bottom open water were identified within the PLEF project area. Together, these account for approximately 1.6 ha (4.1 ac), or 1.3 percent of the total PLEF site (GLE 2025a, Appendix K). GLE’s ER states that open water found at the PLEF is likely to have been constructed for recreational purposes. The PLEF project area also contains about 3.5 km (2.2 mi) of linear ephemeral streams, intermittent streams, and one perennial stream; the perennial stream is the Little Bayou Creek, which runs through the eastern edge of the PLEF site (GLE 2025a, Appendix K). Low-lying areas with the potential to be wetlands include 38 palustrine wetlands totaling 9.8 ha (24.3 ac), or 7.5 percent of the PLEF site (GLE 2025a, Appendix K). No floodplains are located on the PLEF site. Other water course features include agricultural ditches, roadside depressions, and erosional features. Changing

the ponds, streams, and wetlands on the PLEF site to a developed industrial property would change the water course through the site but would not make a noticeable difference to water courses in the site vicinity. Sections 3.4 and 3.5 of this EIS provide additional information about water courses and wetlands.

New PLEF structures would include the main operations building, administrative buildings, a parking lot, and outdoor UF_6 cylinder storage pads. Access to the site would be via three new roads with restricted access. All activities would be conducted on land zoned for heavy industrial use and would be consistent with that use. Local officials recently adopted a Paducah-McCracken County Comprehensive Plan that considers the future of the PGDP and the community's role in the energy sector (Paducah-McCracken County 2025). While the GLE property would continue to be private with limited access, use of the PLEF site would change from a fragmented mix of forested and crop land to heavy industrial use. This change in land use would be noticeable to passersby but would be consistent with industrial development that dominates land use to the north at the DOE PGDP. From this information, the NRC staff concludes that land use impacts during site preparation and construction resulting from land clearing construction activities would be SMALL.

Operation. The greatest potential for impacts on land use would occur during operation because it would occur over the proposed 40-year license period. However, land use associated with operation of the proposed GLE facility is consistent with other industrial development in the immediate area. The PLEF operation would be consistent with the site's existing zoning for heavy industrial use. The operation of a uranium enrichment facility is a change from the current land cover (undeveloped forest and crop land). It is possible that operation of the proposed PLEF could affect plans for nearby low-density residential land development to the east and south. However, residential developments already exist in the city of Kevil to the west of the site, in the city of Paducah to the east, and in smaller towns between Kevil and Paducah. The NRC staff concludes that land use impacts from operation would be SMALL because operation activities would be confined to the already-developed site, with the exception of wastewater discharges (which are addressed in Section 3.3, Water Resources).

Decommissioning. After operations cease, the ER states that GLE would decontaminate and decommission the buildings and equipment and restore the land for unrestricted use to allow for future redevelopment consistent with the site's zoning. The NRC staff concludes that land use impacts associated with decommissioning would be SMALL.

3.1.3 Mitigation Measures

GLE would maximize the use of non-wetland areas on the property and would use existing service roads and utility rights-of-way as much as possible to minimize the need for clearing additional wooded areas. In addition, GLE would obtain all necessary permits, such as a KPDES permit for the stormwater outfall, and would follow BMP conditions to control potential runoff. The USACE has regulatory authority over the discharge of dredged or fill material (e.g., soil, rock, debris) to waters of the United States at the PLEF site; and the USACE would require avoidance, minimization, and mitigation as part of any required permit.

3.2 METEOROLOGY, CLIMATOLOGY, AND AIR QUALITY

This section presents an overview of the meteorological, climatological, and air quality conditions in the PLEF area, together with potential impacts of the proposed action and associated mitigation measures.

3.2.1 Affected Environment

3.2.1.1 Meteorology and Climatology

The topography surrounding the PLEF site lacks sufficient relief to have an appreciable influence on local weather patterns. Locally, the terrain is generally flat except for the Ohio River north of the PLEF site, which lies approximately 30 m (100 ft) below the site elevation. Kentucky weather is primarily influenced by the position of the jet stream and its associated polar front, as well as by maritime tropical air from the Gulf of Mexico. The Gulf Stream and the semi-permanent Bermuda High located east of the state also influence Kentucky's weather to some extent (Hill and Mogil 2012). The state has a humid subtropical climate, which is temperate with moderately cold winters and warm humid summers (NCEI 2025a).

Meteorological data are available from the standard National Weather Service's Automated Surface Observing System at the Barkley Regional Airport, about 5 km (3 mi) southeast of the site. The parameters monitored include temperature, relative humidity, dew point, wind direction and speed, pressure, visibility, precipitation, snowfall, and sky conditions (IEM 2025; NCEI 2025b). Based on measurements for the 1991–2020 climate normals period, the mean annual temperature was 14.9°C (58.8°F). January was the coldest month with a normal daily minimum of about -2.6°C (27.3°F), and July was the warmest month, with a normal daily maximum of 32.2°C (89.9°F) (IEM 2025). During the last 41 years, the highest temperature reached 42°C (108°F) in June 2012, and the lowest reached -26.1°C (-15°F) in January 1985. Each year, about 50 days have maximum temperatures of at least 32°C (90°F), while about 83 days have minimum temperatures at or below freezing (0°C [32°F]), with about half a day below -17.8°C (0°F) (NCEI 2025a).

The mean annual precipitation in Kentucky is heaviest in the southern part of the state due to higher moisture levels from the Gulf of Mexico. The mean annual precipitation for the site area is nearly 128 cm (50.3 in.). Precipitation is fairly well distributed throughout the year, ranging from 7.9 cm (3.1 in.) in August to 13.1 cm (nearly 5.2 in.) in April (NCEI 2025a). On average, snow occurs as early as October and lasts as late as March; most of the snow falls from December through March. Snowfall is quite variable from year to year. During the period 1996–2024, the annual average snowfall at the airport is about 24.1 cm (9.5 in.), ranging from 1.8 cm (0.7 in.) to 72.6 cm (28.6 in.) (NCEI 2025a).

During the same period, winds at the Barkley Regional Airport blew most frequently from the south through southwest. The annual average wind speed was about 3.0 meters per second (m/s) (6.7 miles per hour [mph]). Average wind speeds tend to be higher in colder months and lower in warm months, with a winter high of 3.6 m/s (8.0 mph) and summer low of 2.3 m/s (5.1 mph) (NCEI 2025a). Figure 3-2 illustrates that average wind speeds reported at the airport have generally decreased from 1973 through 2024,[7] and it reflects data from Iowa Environmental Mesonet (IEM 2025). Figure 3-3 presents the wind rose for the airport for the period from 2015 through 2024 and reflects data from NCEI (2025b).

[7] Several plausible factors could explain this trend, including increased surface roughness near the anemometer (such as additional trees, buildings, or other structures); relocation, replacement, or height changes to the anemometer; shifts in large-scale climate patterns (for example, changes in storm tracks or jet-stream behavior); and modifications to data-processing or reporting practices.

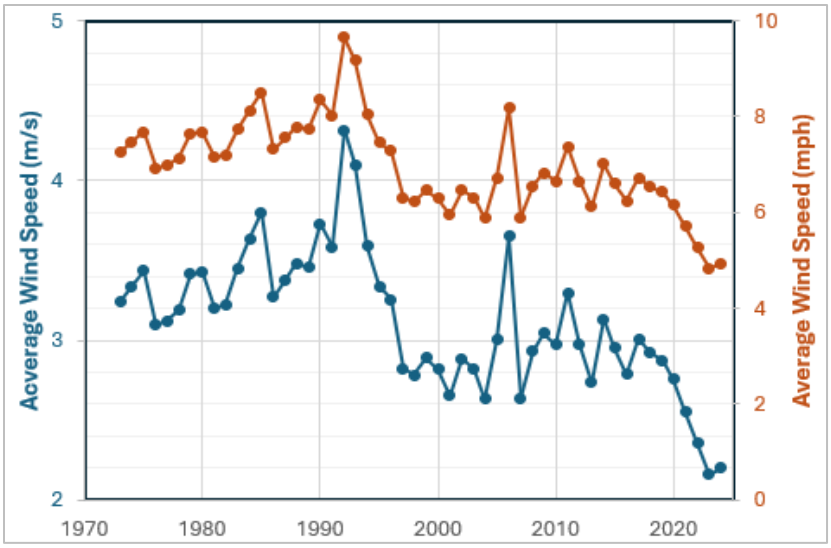

Figure 3-2 Trends in Average Wind Speeds at Barkley Regional Airport, 1973–2024 (data source: IEM 2025).

Severe weather events in McCracken County include thunderstorms, hail, winter storms, and tornadoes (NCEI 2025c). Since 1959, a total of 216 thunderstorm wind events have been reported in this county, with an average wind speed of approximately 22 m/s (50 mph) and a maximum recorded speed of 39 m/s (87 mph). In McCracken County, hail has been reported 72 times since 1956. Some of these hail events caused property or crop damage, and one resulted in injury. The largest hail recorded was in 2003 and measured 6.4 cm (2.5 in.) in diameter. Additional details regarding weather and meteorological data in the PLEF area are provided in Section 3.6 of the ER (GLE 2025a).

Kentucky is located just east of the area known as Tornado Alley. Since 1958, 28 tornadoes have been recorded in McCracken County. The strongest of them reached an intensity of F2 on the Fujita scale, or EF2 on the Enhanced Fujita scale, classified as causing considerable damage. The area has more recently experienced nine EF1 and six F1 tornadoes, which were associated with moderate damage. These tornadoes resulted in injuries and property damage within the county. McCracken County has historically experienced predominantly moderate-intensity tornado events. However, multiple studies have documented an eastward shift of the typical Tornado Alley toward the Mississippi and Ohio River Valleys. In recent years, western Kentucky – particularly areas along the Ohio River – has experienced an increase in both the frequency and intensity of tornado activity. This represents a significant departure from historical patterns and is associated with changing atmospheric conditions linked to a warming climate. Climate projections indicate that the Ohio River Valley is likely to experience increasingly severe and unpredictable weather patterns, including higher wind speeds and more intense rainfall events along with thunderstorms. The December 2021 tornado outbreak,[8] one of the deadliest in Kentucky's history, demonstrates that this region may experience catastrophic weather events that were once considered rare (NCEI 2021).

[8] On December 10, 2021, a potent storm system moving across the central United States produced severe weather throughout the region, including several long-track tornadoes. National Weather Service storm damage surveys determined that an EF4 tornado originated in far northwestern Tennessee and tracked across 11 counties in western Kentucky, including Graves and Marshall counties (which border McCracken County), causing catastrophic damage.

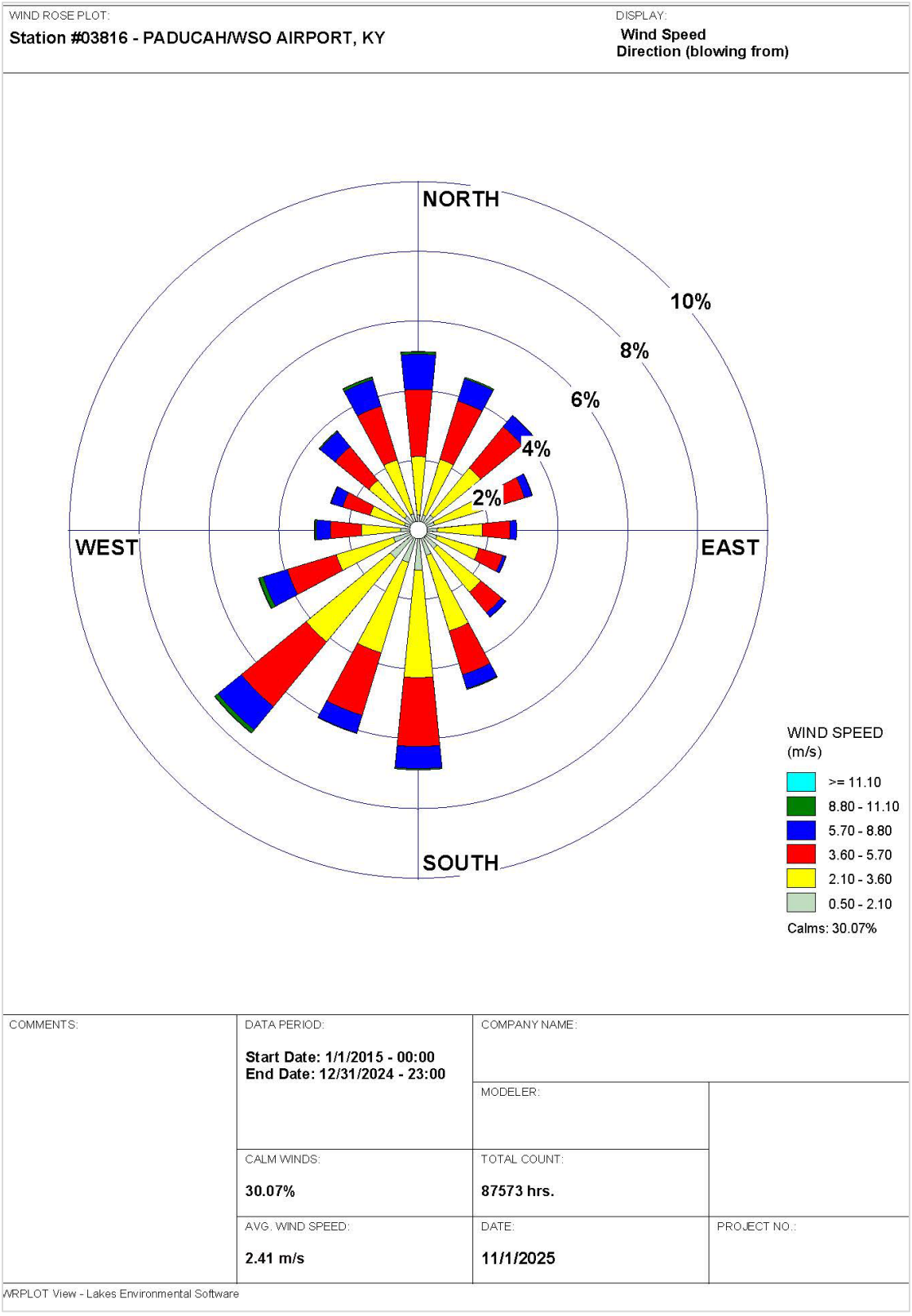

Figure 3-3 Wind Rose for Barkley Regional Airport, 2015–2024 Wind Data (data source: NCEI 2025b).

3.2.1.2 Air Quality

Pursuant to the CAA, the EPA is the federal agency responsible for developing, implementing, and enforcing national air pollution control programs. The CAA directs the EPA to establish National Ambient Air Quality Standards (NAAQS; 40 CFR Part 50) that limit the concentration of six criteria air pollutants, which consist of two levels of standards. Primary NAAQS set limits to protect public health, including the health of "sensitive" populations, such as people with asthma and other respiratory conditions, children, and the elderly. Secondary NAAQS set limits to protect public welfare, prevent visibility impairment, and prevent damage to animals, crops, vegetation, and buildings. The EPA has set NAAQS for the six criteria air pollutants: carbon monoxide (CO), lead, nitrogen dioxide (NO_2), ozone, particulate matter (PM),[9] and sulfur dioxide (SO_2) (EPA 2025a).

The State of Kentucky established State Ambient Air Quality Standards, which include the same six criteria air pollutants as the NAAQS, as well as additional pollutants such as gaseous fluorides, hydrogen sulfide, odors, and total fluorides that are not included in the NAAQS. These standards are set forth in Title 401 of the Kentucky Administrative Regulations, Chapter 53, Section 10 (401 KAR 053.010). The EPA has delegated authority to the KDAQ, within the Kentucky Energy and Environment Cabinet (KEEC), to implement and enforce federal air quality regulations under the CAA. KDAQ administers air permitting and compliance programs for sources in Kentucky, ensuring that state regulations meet or exceed federal requirements, with oversight provided by EPA Region 4, which has jurisdiction over Kentucky (KEEC 2022).

The EPA assigns area designations in 40 CFR Part 81 based on how the air quality of an area compares to the NAAQS. Areas where criteria pollutants are with the NAAQS are designated as "attainment areas" while areas in which criteria pollutants exceed the NAAQS are designated as "nonattainment areas." Areas that previously were nonattainment areas but where air quality has improved to meet the NAAQS are redesignated "maintenance areas," and any area that cannot be classified based on available information as meeting or not meeting the NAAQS for any pollutant is defined as an "unclassifiable area." McCracken County (which encompasses the PLEF site), along with the surrounding counties in both Kentucky and Illinois, is designated as being in attainment with the NAAQS for all criteria air pollutants (EPA 2025b).

The EPA's Prevention of Significant Deterioration (PSD) regulations (40 CFR 52.21) are designed to limit increases in air pollution in clean areas. They apply to a new major source or modification of an existing major source within an attainment or unclassifiable area. Federally designated Class I areas are the most stringently protected areas under the PSD program, and PSD permitting is specifically designed to prevent significant air quality degradation in these areas. Federally designated Class I areas include national parks, wilderness areas, and monuments, as specified in 40 CFR Part 81 ("Designation of Areas for Air Quality Planning Purposes"). The nearest Class I area to the PLEF site is the Mingo Wilderness Area in Missouri, about 115 km (72 mi) to the west, followed by Mammoth Cave National Park in Kentucky, about 227 km (141 mi) to the east.

Gases that trap heat in the atmosphere are known as GHGs and include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases such as hydrofluorocarbons and sulfur hexafluoride (SF_6). GHG emissions are largely attributable to human activities, including the combustion of fossil fuels for electricity generation, heating, and transportation. GHG

[9] PM includes PM_{10} or $PM_{2.5}$, which refer to particles with an aerodynamic diameter of 10 micrometers (mm) or less, or 2.5 mm or less, respectively. $PM_{2.5}$ is a subset of PM_{10}.

emissions inventories are typically expressed in terms of carbon dioxide equivalent (CO_2e), which represents the combined global warming potential (GWP)[10] of all GHGs, normalized to the warming effect of CO_2. This metric accounts for differences in the heat-trapping capacity of individual gases.

3.2.2 Potential Impacts

With regard to air quality, the proposed action would introduce new sources of air emissions during all three phases of the project: site preparation and construction, operation, and decommissioning. The sources, types of air pollutants emitted, assumptions used to estimate emissions, and resulting emission inventories for each phase are described below, together with the associated potential for air quality impacts. More detailed information on air emission sources, the types of air pollutants emitted, assumptions used for emission estimates, and resulting emissions inventories are provided in the ER (GLE 2025a, Section 4.6.2).

The NRC staff identified one NR GEIS Category 1 issue related to air quality during construction and operation that is relevant to the review of the GLE PLEF license application (see Tables 3-1 and C-1 of this EIS). The NRC staff relies on the technical argument in the NR GEIS to conclude there would be SMALL impacts from GHG emissions during construction and during operation. Therefore, this issue is not discussed in detail in this section; however, information about this issue may be included for additional context as it relates to other aspects of this resource area.

Site Preparation and Construction. During this phase, the proposed facility would be constructed in accordance with applicable codes and standards to withstand severe weather conditions (e.g., thunderstorms, hail, winter storms, and tornadoes, including those projected under a warming climate) and associated effects such as flooding and temporary loss of power.

With regard to air quality, fugitive dust emissions (PM_{10} and $PM_{2.5}$) from soil disturbance on exposed surfaces and unpaved roads would be a primary concern, as these emissions are often visible. Other PM emission sources include wind erosion over disturbed areas and material storage piles. In addition, exhaust emissions from construction equipment and commuter vehicles burning diesel and gasoline would release CO, nitrogen oxides (NO_x), and small quantities of SO_2, along with GHGs such as CO_2. Small amounts of volatile organic compounds (VOCs) would also be emitted from engine exhaust, vehicle refueling activities, onsite equipment maintenance, and the use of paints, solvents, or other materials associated with metal finishing or similar construction-related activities.

Estimated total air emissions during the first phase of construction (prior to facility operation) are summarized in Table 3-3. These emissions include fugitive dust associated with soil disturbance and wind erosion from disturbed surfaces and material storage piles, emissions from construction traffic on paved and unpaved roads, and engine exhaust emissions from construction equipment and vehicles.

Construction activities would occur during daytime hours under meteorological conditions favorable for air dispersion. In most cases, associated emissions – except for PM – are not

[10] GWP is a measure of how much energy a GHG absorbs over a specified period, relative to CO_2, which has a GWP of 1. GWP indicates how much more or less effective a gas is at trapping heat in the atmosphere over a given time horizon, typically 100 years. For reference, the 100-year GWPs of CH_4 and N_2O are about 28 (ranging from 27 to about 30) and 273, respectively, while SF_6 (one of the most potent GHGs) has an estimated GWP of 24,300.

expected to exceed the NAAQS at the property boundary. However, depending on meteorological conditions, activity levels (i.e., emission rates), and the proximity of emission sources to the property boundary, PM emissions might occasionally exceed applicable standards at the property boundary and in the immediate surrounding area.[11] Construction-related emissions typically decrease rapidly with distance from the source and are not expected to result in long-term air quality impacts. Upon completion of construction activities, associated emissions would cease. Worker and public exposure to dust would be monitored in accordance with GLE's Industrial Safety Program. BMPs would be applied to control fugitive dust in accordance with applicable federal and state permits and regulations.

The PLEF air emissions would not constitute a major source and therefore would not be subject to PSD regulations. Overall, potential air quality impacts from site preparation and construction of the PLEF would be localized and temporary, and measures would be implemented to mitigate impacts. (Potential air quality impacts are further discussed in Appendix C.) Thus, the NRC staff concludes that impacts on air quality during construction would be SMALL.

Operation. During this phase, the facility would be operated and maintained to withstand severe weather conditions (including those projected under a warming climate) and associated effects, such as flooding and temporary loss of power. Thus, the NRC staff concludes that air quality impacts during operation would be SMALL.

Table 3-3 Estimated Total Air Emissions at the PLEF Site During Construction (Tons)[a]

Pollutants	Mobile Internal Combustion Engines[b]	Construction Traffic Unpaved Roads	Construction Traffic Paved Roads	Earth Moving[c]	Total Tons
NO_x	16.92	—[d]	—	—	16.92
CO	122.9	—	—	—	122.89
VOCs	7.5	—	—	—	7.48
SO_2	0.2	—	—	—	0.16
PM_{10}	1.4	653.42	39.29	238.19	932.32
$PM_{2.5}$	1.4	65.34	9.64	49.54	125.91
HAPs[e]	0.45	—	—	—	0.45

[a] Source: Modified from Table 4-14 in GLE (2025a).

[b] Mobile internal combustion engines include construction equipment, on-road tailpipe emissions from commuter traffic, and equipment mobilization.

[c] Earthmoving includes fugitive emissions from excavation and backfilling activities, as well as windblown dust from any exposed areas.

[d] A hyphen indicates "not applicable."

[e] Sum of common combustion hazardous air pollutants (HAPs) including benzene, toluene, xylenes, 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, and polycyclic aromatic hydrocarbons.

[11] A temperature inversion typically forms on clear, calm nights due to radiative cooling of the Earth's surface, causing air temperature to increase with height. This phenomenon is usually strongest near sunrise, particularly during colder months, and generally dissipates within a few hours after sunrise. Under inversion conditions, the atmosphere becomes stable and inhibits vertical mixing, reducing the dispersion of air pollutants and potentially leading to elevated pollutant concentrations, particularly PM. Because construction activities typically begin at 7 a.m., early-morning hours – especially during colder months – may be affected by inversion conditions. To minimize air quality impacts, construction activities with high air emissions should be avoided during inversion periods whenever possible.

With regard to GHG emissions, laser-based uranium enrichment has the potential to consume far less energy and produce less waste than older enrichment technologies such as gaseous diffusion and gas centrifuge separation; however, it still requires a substantial amount of electricity. Due to the continuous and highly controlled nature of the process, enrichment facilities must be supplied by baseload power sources – such as nuclear, coal, or natural gas – rather than intermittent sources like solar or wind. In the Kentucky region, baseload electricity generation continues to rely heavily on fossil fuels.

Assuming an annual production capacity of 6 million SWUs using the SILEX laser enrichment method, total electricity consumption would be approximately 150 million kilowatt-hours per year, based on an energy intensity of 25 kilowatt-hours per SWU (Neve 2025). If all electricity were supplied by coal-fired power plants, which have a CO_2 emission factor of approximately 1.05 kilograms per kilowatt-hour, annual CO_2 emissions would be about 0.16 million metric tons (MMT) (EIA 2024). For context, total statewide CO_2 emissions from all electricity sources in Kentucky were approximately 53.1 MMT in 2024. Thus, electricity use associated with PLEF operation would account for roughly 0.3 percent of Kentucky's total annual CO_2 emissions. If natural gas were used instead of coal, this share would be reduced to approximately 0.12 percent.

While no industrial process is zero-carbon, laser enrichment has been estimated to result in substantially lower GHG emissions than older uranium enrichment technologies, such as gaseous diffusion and centrifuge enrichment, due to its lower energy requirements. Accordingly, laser enrichment would be expected to have relatively low GHG emissions within the nuclear fuel cycle.

With regard to other air emissions, sources during the operational phase can be divided into four categories: (1) process vents; (2) emergency diesel generators; (3) onsite miscellaneous sources; and (4) motor vehicles. General information used to estimate air emissions for each category is presented below. Total estimated air emissions for criteria air pollutants, VOCs, HAPs, and GHGs (presented as CO_2e) during PLEF operation are presented in Table 3-4.

Table 3-4 Estimated Total Air Emissions at the PLEF Site During Operation (Tons/Yr)[a]

Pollutant	Combustion Emissions			Fugitive Emissions Commuting Traffic Paved Roads[c]	Total
	Stationary Internal Combustion Engines	Auxiliary Emergency Diesel Generators	Mobile Internal Combustion Engines[b,c]		
NO_x	7.05	(7.05)	5.91	—[d]	12.96
CO	3.86	(3.86)	105.51	—	109.37
VOCs	0.47	(0.47)	5.91	—	6.38
SO_2	8.13×10^{-4}	(8.13×10^{-4})	0.14	—	0.14
PM_{10}	0.22	(0.22)	0.57	77.39	78.18
$PM_{2.5}$	0.22	(0.22)	0.57	19.00	19.78
HAPs[e]	2.14×10^{-3}	(7.05)	6.89×10^{-2}	—	9.03×10^{-3}
CO_2e	—	(802.67)	—	—	

[a] Source: Modified from Tables 4-15 and 4-16 in GLE (2025a).

[b] Mobile internal combustion engines include on-road tailpipe emissions from employee commuting.

[c] Maximum annual emissions based on the projected peak commuting workforce from commencement of operation through decommissioning.

[d] A hyphen indicates "not applicable" or "not available."

[e] Sum of common combustion HAPs including benzene, toluene, xylenes, 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, and polycyclic aromatic hydrocarbons.

Process Vents. The GLE laser-based technology at the PLEF is a closed process that does not require routine venting. Short-term gaseous releases could occur during equipment operation or UF_6 cylinder handling but would be contained within the main PLEF operations building and treated by the building's ventilation system. The ventilation air, potentially containing uranium isotopes, HF, and uranyl fluoride (UO_2F_2) would pass through high-efficiency particulate air (HEPA) filters and activated carbon beds designed to remove more than 99.8 percent of particulates and more than 99 percent of gases, with exhaust vented through nine roof stacks. No significant emissions of criteria air pollutants are expected during PLEF operation.

Emergency diesel generators. The project includes two 1,000-kW diesel-fired emergency generators to provide backup power during utility outages. The generators would operate on ultra-low sulfur diesel (up to 15 parts per million sulfur). Air emission estimates for the emergency diesel generators were calculated using emission factors from 40 CFR Part 60, Subpart IIII, and EPA AP-42, Section 3.4 (EPA 2025c), and conservatively assumed 500 hours of operation per year per unit. Because emergency engines are limited to 100 non-emergency operating hours annually under 40 CFR 60.4211(f)(2), actual emissions are expected to be substantially lower than the estimated values presented in Table 3-4.

Onsite miscellaneous sources. Miscellaneous air emission sources during PLEF operation would be associated with UF_6 cylinder handling and routine equipment maintenance. Diesel-powered vehicles (e.g., self-propelled gantry cranes) would be used as needed to transfer UF_6 cylinders between the PLEF operations building and cylinder storage pads. These vehicles would be refueled and maintained onsite, either at designated fueling areas located away from the main operations building or by refueling trucks. Diesel fuel for equipment and emergency generators would be stored in aboveground tanks meeting applicable regulatory and code requirements. Small quantities of organic solvents and lubricants would be used for vehicle and equipment maintenance and stored in containers with tight-fitting covers. Due to the intermittent use of these sources and the limited quantities of materials involved, air emissions from miscellaneous operational sources are expected to be low.

Motor vehicles. Air emissions would occur along roadways traveled by automobiles and trucks to and from the PLEF. Emissions associated with these motor vehicle trips were estimated using projected trip volumes, site-specific assumptions, and emission factors representative of average automobile and truck emissions for the year 2020.

Over the planned 40-year operating life of the PLEF, the proportion of lower-emitting motor vehicles – such as battery electric vehicles and fuel cell electric vehicles – is expected to increase, and average per-vehicle emission rates are expected to decline due to the continued phase-in of more stringent federal and state motor vehicle emission standards. Accordingly, assuming employment levels and transportation patterns remain constant, air emissions from motor vehicles traveling to and from the PLEF are expected to decrease over time relative to emissions estimated using current emission factors as shown in Table 3-4.

The laser uranium enrichment process would be conducted indoors within the main PLEF operations building, with heat from the process either discharged to cooling towers or used for building space heating. If cooling towers were used, they could emit PM, although levels would be very low because freshwater with few dissolved solids would be used. Any PM released

would primarily be in the form of tiny water droplets (drift), which are controlled by drift eliminators. These emissions are not included in Table 3-4.

Estimated total air emissions during the operational phase are presented in Table 3-4. In general, mobile and temporary sources are not subject to permit-related air regulations such as PSD or Title V (relevant to operating permits for air pollutants including GHGs), although they must still comply with applicable federal, state, or local emission standards. As shown in Table 3-4, the only planned stationary combustion sources are emergency diesel generators, and their emissions would be well below the major source permitting thresholds that would trigger air dispersion modeling by both the EPA and KDAQ requirements. However, operational emissions for this project do exceed Kentucky's Registration thresholds (401 KAR 52:070), which apply to moderate emitters that exceed minimal thresholds but are not large enough to require full permits.

As also shown in Table 3-4, operational emissions from the proposed PLEF would not exceed the PSD threshold of 250 tons/yr for any criteria air pollutant and therefore do not trigger air dispersion modeling. Furthermore, GHG emissions would be well below the reporting threshold of 25,000 MT of CO_2e per year, so no GHG reporting would be warranted.

To summarize, the facility's air emissions during operation would be controlled by design features and emission control systems. These systems, along with other planned mitigation measures, would minimize emissions to the atmosphere. Because these emissions are expected to be minimal, PLEF operation would not significantly alter the existing ambient air quality in the surrounding area. The PLEF air emissions would be below regulatory thresholds and managed in accordance with CAA and KDAQ requirements Therefore, the NRC staff concludes that air quality impacts resulting from PLEF operation would be SMALL.

Decommissioning. During this phase, dismantlement and site restoration activities would be conducted using standard industry practices and administrative controls to address severe weather and associated effects. Therefore, the NRC staff concludes that meteorological and climatological impacts during decommissioning would be SMALL.

With regard to air quality, the decontamination and removal of process equipment inside buildings are not expected to generate significant fugitive dust or other air emissions. Demolition of buildings and hard surfaces would require heavy construction equipment, producing fugitive dust that could be controlled with water sprays and other dust suppression measures. Truck traffic for removal of equipment, materials, and debris would depend on disposal destinations, such as landfills or recycling facilities. Fewer onsite workers would be required compared to construction, and emissions from mobile equipment are expected to be lower due to future lower-emitting vehicles and EPA standards.

Overall, air quality impacts during this stage are expected to be similar to or less than those during site preparation and construction, with similar mitigation measures implemented. Therefore, with appropriate mitigation measures, the NRC staff concludes that air quality impacts would be SMALL.

3.2.3 Mitigation Measures

During all three phases of the project, air emissions would be controlled by implementing a comprehensive program that incorporates multiple emission-control components to minimize impacts on air quality. GLE commits to Tier 3 diesel engine emission standards at a minimum.

During operation, the PLEF would employ a specially designed ventilation system in which exhaust air passes through HEPA filters to remove PM, followed by activated carbon beds for gas adsorption, to ensure compliance with all applicable laws and regulations. Implementation of monitoring and inspection programs to detect air emissions associated with equipment malfunctions would enable prompt corrective action.

3.3 GEOLOGY AND SOILS

This section presents an overview of regional and site-specific geology and soils in the project area, together with potential impacts of the proposed action and associated mitigations.

3.3.1 Affected Environment

3.3.1.1 Regional Geology and Physiography

The PLEF site is situated in the continental interior of the United States at the intersection of the northern extension of the Gulf Coastal Plains Physiographic Province and the southern border of the Interior Plains (Midcontinent). The region is characterized by unconsolidated marine and alluvial deposits. The Mississippi Embayment, which is the northernmost extent of the Gulf Coastal Plains, covers approximately 6,000 km^2 (2,300 mi^2) in Kentucky and is composed mainly of rolling hills and flat valleys. The Western Kentucky Coal Field is also in proximity to the site, representing the southern extent of the Illinois Basin. The Western Kentucky Coal Field is comprised of Pennsylvanian-age strata and ranges in physiography from dissected uplands to gently rolling hills and wide, flat bottomlands. There are no known karst features in the vicinity of the PLEF site (KGS 2026). The nearest karst area is across the Ohio River in Illinois, more than 16 km (10 mi) north of the site (Weary and Doctor 2014).

3.3.1.2 Stratigraphy

The regional stratigraphy of Kentucky reflects uplift, downwarping, and erosional sequences. Younger, coal-bearing Pennsylvanian-age rocks are found in the Illinois and Appalachian Basins. Unconsolidated Cretaceous, Tertiary, and Quaternary-age sediments make up the Mississippi Embayment. Quaternary-age deposits in Kentucky consist of alluvium, lacustrine, fluvial, terrace, and loess deposits. Pliocene- and Pleistocene-age continental deposits and gravels lie over older Eocene-age deposits. The older Paleogene-age deposits in the Mississippi Embayment (which include Paleocene and Eocene sediments) are primarily sedimentary units of sand, silt, and clay. Upper Cretaceous interbedded sands, silts, and gravels are also found in the area of the PLEF site.

3.3.1.3 Structure, Economic Mineral Resources, and Seismicity

The subsurface structure and economic mineral resources within the PLEF project area reflect the geologic framework of the Jackson Purchase Region of western Kentucky. Near-surface materials consist primarily of unconsolidated Quaternary deposits of loess, alluvial silts, sands, and clays overlying Paleocene and Cretaceous formations. These formations – most notably the Porters Creek and Clayton-McNairy Formations – are composed of micaceous silts, clays, and fine sands that exhibit high plasticity and low permeability.

Mineral resources in the region are generally limited to nonmetallic materials such as sand, clay, and gravel, which have historically been extracted for local construction and industrial uses. No significant metallic ore bodies or energy minerals have been identified within or adjacent to the PLEF site, and the area is not recognized for commercially exploitable mineral deposits. Large

underground coal mines in the region produce thermal and metallurgical coal for utilities and industrial use; however, Paducah is not a major active coal mining area.

The PLEF site lies within an area of recognized seismic risk due to its proximity to the New Madrid Seismic Zone, approximately 64 to 97 km (40 to 60 mi) to the southwest. Historical seismic events in this zone, notably the 1811-1812 earthquake sequence, produced ground motion and surface deformation throughout the region. The site itself is not located on a known active fault, although ground shaking from future New Madrid Seismic Zone events remains a credible hazard. The unconsolidated and fine-grained sediments in the project area could potentially amplify seismic waves and, in saturated zones, could be susceptible to cyclic or flow liquefaction under strong shaking. Soil units with high silt and clay fractions, such as those found within the PLEF area, could potentially exhibit moderate to high liquefaction potential. Ongoing GLE geotechnical investigations (GLE 2025a) include consideration of site vulnerability to a seismic event.

3.3.2 Potential Impacts

The proposed action would involve land-disturbing activities. The primary impacts would be on shallow soils, which are considered the upper 1 m (3 ft), including topsoil. Soil disturbance could result in both soil loss and impacts on surface water quality.

The proposed action would not create seismic impacts because there is no potential for induced seismicity from injection wells or other sources. An overview of potential impacts by main project phase is presented below, followed by a summary of mitigation measures.

Site Preparation and Construction. Site preparation would involve soil excavation, storage, and removal; development and use of borrow pits; erosion controls; and stormwater management. Construction would involve stripping topsoil, excavating for stormwater retention, backfilling, and grading, and the terrain would change in some areas. Overall terrain changes would be minimal because the area is gently sloping. Shallow soil would be disturbed for the construction of building footings and excavation of the stormwater retention basins. Construction of the proposed north and west access roads would involve excavating, backfilling, compaction, grading, and paving. Shallow soil disturbed during construction would either be reused or stockpiled for potential use in other areas of the site; no offsite disposal of soil is expected. These activities would be managed through planning and design, and relevant BMPs would be applied to control erosion, drainage, and stability. The NRC staff concludes that impacts on geology and soils would be SMALL.

Operation. No significant soil disturbance is planned during facility operation. Therefore, impacts would be less than those during site preparation and construction. The NRC staff concludes that potential impacts during operation would be SMALL.

Decommissioning. Decommissioning would involve removing building structures and foundations and establishing vegetative cover. Like during site preparation and construction, BMPs would be followed during decommissioning. Therefore, the NRC staff concludes that impacts on surface and subsurface soils and geology would be SMALL.

3.3.3 Mitigation Measures

The ER (GLE 2025a, Section 4.3.1.2) notes that activities resulting in soil disturbance would include erosion control plans and permits, and the project would follow the McCracken County Storm Water Conveyance and Management Ordinance (current regulations are found in

McCracken County 2026). GLE would follow BMPs associated with permit conditions and described in its Stormwater Pollution Prevention Plan (SWPPP) and SPCC plan.

The ER also states that to the extent practicable, areas disturbed during construction that are not later occupied by buildings or other structures would be planted with grasses and native shrub and tree species to minimize impacts. GLE plans to use soils from borrow pits located on the PLEF site accessible via existing roadbeds, if necessary for construction purposes, to minimize offsite disturbance. In addition, GLE would manage construction activities so that only designated areas within the PLEF site are disturbed and so that no heavy equipment or construction operations would affect areas outside of the PLEF site, unless specifically designated.

Radiological and nonradiological consequences from potential seismic hazards would be evaluated in accordance with 10 CFR Part 70 requirements to ensure that the likelihood of credible high-consequence events is highly unlikely or the consequences mitigated, and the likelihood of credible intermediate consequence events is unlikely or consequences are mitigated. Additional information can be found in Section 3.13 of this EIS.

3.4 WATER RESOURCES

This section provides an overview of existing water resource conditions at the PLEF site, including groundwater, surface water, and water use. It also describes potential impacts on water resources from the proposed action.

3.4.1 Affected Environment

3.4.1.1 Regional and Local Groundwater and Aquifers

The PLEF site is located in the Jackson Purchase Region of Western Kentucky within the upper Mississippi Embayment. This region's aquifer system is a thick trough in Mississippian-age carbonate bedrock, filled with overlying unconsolidated sediments. The hydrogeologic units in Western Kentucky include a series of aquifers and confining layers. The principal aquifer at the PLEF site is the upper part of the McNairy Formation, which consists of fine to medium sand with some clay, silt, gravel, and discontinuous coal seams. While coarse sand at the base of the McNairy is considered best for high water yield, groundwater is also expected to be found in the upper portion of the formation.

Groundwater is monitored at the PGDP site under several programs. The Kentucky Radiation Health Branch monitors 10 former residential wells surrounding the PGDP site, with analyses for VOCs (including trichloroethylene), polychlorinated biphenyls, radiological contaminants, and metals. These wells are all located hydraulically downgradient of the PLEF site (GLE 2025a; FRNP 2023, 2024, 2025a). The state-run, DOE-funded Agreement in Principle program monitors groundwater at 74 wells at or downgradient of PGDP and 15 residential wells downgradient of PGDP (Commonwealth of Kentucky 2022). Trichloroethylene and technetium-99 are the focus of that program (FRNP 2025b). Based on the subsurface conditions encountered during investigations at the PLEF in preparation for GLE's application (GLE 2025a), the plumes at the PGDP are hydraulically downgradient from the PLEF site.

In the PLEF vicinity, four monitoring well nests (three wells at each, targeting different units at depth) were installed at locations surrounding the PLEF site. Each nest has one well screened in the McNairy Formation, one in the overlying Porters Creek Formation, and one in surficial unconsolidated deposits. The ER (GLE 2025a, Appendix E) contains a summary of recent

groundwater samples from these wells and identifies concentrations at or above maximum contaminant levels the EPA has established for drinking water delivered to users at the tap. Four of the 12 monitoring wells had at least one exceedance. Most of these were inorganics (lead, arsenic, chromium), which could be naturally occurring. There was also one exceedance for methylene chloride, which is a common laboratory contaminant. No other inorganics, organics, or radionuclides are marked as exceedances in the report. There is no known PGDP site history suggesting satellite contamination sources offsite to the south in the PLEF site vicinity or other industrial land use in the PLEF vicinity.

3.4.1.2 Surface Water

Surface hydrology at the site of the proposed PLEF has not been significantly altered by past operation because the land had been a wildlife management area since the 1950s until its recent purchase by GLE. The site is located in the Bayou Creek watershed, and there are no reservoirs or dams in this watershed.

Surface water runoff from the site eventually discharges into Little Bayou Creek and Bayou Creek, which combine before entering the Ohio River. Both creeks flow generally to the northeast and are roughly parallel with each other, with the PGDP and PLEF sites in between them. The PLEF project area is not located in any flood hazard areas (Commonwealth of Kentucky 2026).

The KEEC classifies the surface waters of Little Bayou Creek and Bayou Creek as impaired. They are considered to not support warmwater aquatic habitat (KEEC 2020). Little Bayou Creek is rated as non-support for both warm water aquatic habitat and fish consumption. The non-support for warm water aquatic habitat is due to contaminants like copper, lead, and polychlorinated biphenyls, while fish consumption is not supported due to polychlorinated biphenyl contamination in fish tissue (GLE 2025a). The potential sources of these contaminants include illegal dumping and industrial discharges. As discussed in Section 3.1.1, the bottomland hardwood forests in the area were cleared and associated wetlands drained as lands were converted to agriculture. In addition, part of the PLEF was developed as a farmstead as evidenced by historical findings of late 19th to early 20th century, described in Section 3.7.1. GLE's ER describes the site as having a high erosion potential due to agricultural crops and steep slopes along streambeds. GLE plans to continue leasing land to grow agricultural crops on their parcel to the east and northeast of the proposed PLEF during the lifespan of the proposed action (GLE 2025a).

The DOE PGDP site conducts annual radiological sampling in Bayou Creek at a background location (L1) that is upgradient of PGDP and west of the proposed PLEF site. February 2025 results at this location available from Four Rivers Nuclear Partnership (FRNP 2026) were below detection limits for all parameters: americium-241, cesium-137, neptunium-237, plutonium-238, plutonium-239/240, technetium-99, thorium-230, total uranium, uranium-234, uranium-235, uranium-238, gross alpha, and gross beta. DOE also monitors radiological parameters monthly at permitted KPDES discharge outfalls and quarterly at Bayou Creek and Little Bayou Creek sampling stations located downgradient of those outfalls (FRNP 2023, 2024, 2025a).

During the dry period (with October typically the driest month), the flow in Little Bayou Creek is significantly lower than at other times of the year, and the adjacent PGDP site might contribute up to the entire flow during this period.

Field surveys conducted onsite in July 2024 to assess baseline conditions at the PLEF site identified six ponds (Section 3.1.1). Two of the six are located in the northwestern portion of the

site that the WKWMA previously called 3 Lane Pond. The joint pond collects surface water from the northwestern corner of the PLEF site, and GLE estimates that 3 Lane Pond receives nearly 24.7 MT (27.2 tons) of sediment per year from the PLEF site.

Additional information about aquatic resources at the site is discussed in Section 3.5 of this EIS (Ecological Resources).

3.4.2 Potential Impacts

Potential environmental impacts on surface water and groundwater associated with each of the project phases are described below. Potential impacts on wetlands are described in Section 3.5.2. The NRC staff identified one NR GEIS Category 1 issue related to water resources during operation that is relevant to the review of the GLE PLEF license application (see Tables 3-1 and C-1 of this EIS). The NRC staff relies on the technical argument in the NR GEIS to conclude there would be SMALL impacts from water use conflicts from plant municipal water demand. Therefore, this issue is not discussed in detail in this section; however, information about this issue may be included for additional context as it relates to other aspects of this resource area.

Site Preparation and Construction. GLE anticipates filling approximately 1.6 ha (4.1 ac) of open water features, about 3.5 km (2.2 mi) of linear streams, and 38 palustrine wetlands totaling 9.8 ha (24.2 ac). At the same time, land-disturbing activities such as vegetation removal, grading, and road development could increase sediment loads to Little Bayou Creek, Bayou Creek, and their unnamed tributaries. The potential also exists for incidental releases of contaminants like vehicle oil and grease or contaminants from activities such as concrete washout or foundation dewatering. Standard practices would be implemented to limit impacts on surface water and potential leaching to groundwater (GLE 2025a) including BMPs for controlling erosion, sediment, and pollutant runoff from construction sites (KEEC 2004, KTC 2009). Sanitary wastewater would be managed using portable toilets. Water for construction would be supplied by tanker trucks from offsite sources. Although groundwater is not expected to be impacted, because GLE currently anticipates filling 3 Lane Pond and wetland areas onsite, the NRC staff concludes that potential impacts on surface water resources during this phase would be MODERATE.

Operation. During operation, surface water quality could be impacted by stormwater runoff, including from retention basins and areas used to store fuel and UF_6 cylinders; sanitary and process wastewater discharges; and cooling tower blowdown. Such releases would be managed and minimized through a required KPDES permit, which would address all discharges during operation. As described in the ER (GLE 2025a), the KPDES permit would require GLE to develop a SWPPP to address potential impacts on surface water quality from stormwater runoff, including an Erosion and Sedimentation Control Plan. An SPCC plan would also be required to address general liquid chemical and fuel storage and usage. Stormwater and point-source discharges would be routed to the same outfalls to Little Bayou Creek.

As described in the ER (GLE 2025a), no more than trace levels of radiological constituents, if any, are anticipated to be released from the PLEF to the stormwater retention basins because of the procedures that would be in place for managing and monitoring stormwater from the UF_6 cylinder storage pads. Runoff from the UF_6 cylinder storage pads would flow to a lined retention basin for holding and monitoring prior to discharge to a stormwater retention basin.

As also described in the ER (GLE 2025a), liquid industrial process effluents containing radioactive materials would be processed by the Radioactive Liquid Effluent Collection and

Transfer System (RLECTS) using oil separation, dilution, and evaporation or equivalent. Following treatment and monitoring to meet 10 CFR Part 20 requirements, these liquids would be either recycled, monitored, and released to an approved KPDES outfall or collected for shipment to offsite radioactive liquid treatment facilities. Any potentially contaminated stormwater from UF_6 cylinder storage pads would also be processed by the RLECTS.

As described in the ER (GLE 2025a), water discharges to Little Bayou Creek under a KPDES permit during operation would include:

- Up to about 148,200 liters per day (lpd) (39,150 gallons per day [gpd]) of cooling tower blowdown from a closed-loop system not in contact with uranium materials.
- Up to 51,860 lpd (13,700 gpd) of treated sanitary wastewater from the onsite water treatment facility.
- Up to about 24,600 lpd (6,500 gpd) of process wastewater that is tested and is below permitted concentrations.

Sanitary wastewater would be treated in a dedicated onsite facility, rather than being sent to a municipal treatment facility, so there would be no impact associated with degradation of water quality from plant effluent discharges to municipal systems.

A set of four monitoring well nests on the perimeter of the PLEF site indicated generally northward groundwater flow in three monitored hydrogeologic units as shown in the ER (GLE 2025a, Figures 3-51 to 3-53). A hydraulic gradient is expected in the groundwater from the proposed PLEF site to the DOE PGDP site and finally to the Ohio River. For this reason, groundwater contaminants at the PGDP would not be expected to reach the hydraulically upgradient PLEF site.

Groundwater quality at the site is not expected to be affected by PLEF operation. The use of lined basins for potentially contaminated stormwater minimizes the potential to affect groundwater, as does the unsaturated zone thickness, which greatly limits surface water-groundwater interaction. GLE would supplement the existing groundwater monitoring program near the PLEF site by installing additional monitoring wells as part of the project's environmental measurements and monitoring programs (GLE 2025a, Section 4.4.1.4).

As described in the ER (GLE 2025a), water usage during PLEF operation would include:

- An estimated about 54,100 lpd (14,300 gpd) for potable water.
- Up to about 370,200 lpd (97,800 gpd) for process water; this presumably includes cooling tower makeup water.

The estimated total could be about 424,300 lpd (up to 112,100 gpd). For comparison, the PGDP is permitted to withdraw up to 113 million lpd (30 million gpd) from the Ohio River (FRNP 2023). Water for PLEF operation would not be obtained from onsite resources; it would be supplied by Paducah Water Works, which sources its water from the Ohio River and is also permitted to use groundwater. This municipal water utility serves approximately 70,000 people in McCracken and surrounding counties (KEEC 2024), and process water usage by the PLEF is expected to be a small portion of the utility's capability (GLE 2026a). Therefore, the impact on water availability is expected to be minimal. The use of lined retention ponds and BMPs would minimize impacts on groundwater quality. Because of the low likelihood of infiltration of affected surface water to groundwater, the NRC staff concludes that potential impacts on groundwater quality would be

SMALL. Considering both surface water and groundwater, the NRC staff concludes that potential impacts on water resources during operation would be SMALL.

Decommissioning. During decommissioning, onsite structures (except switchyards) and roads would be removed, the site would be graded, and vegetative cover would be established. Stormwater would continue to flow into retention basins. Erosion control BMPs and SPCC and SWPP measures like those applied during the construction would be followed during this phase. Water use during decommissioning is expected to be similar to or less than that during the operational phase. Therefore, the NRC staff concludes that potential impacts on water resources during decommissioning would be SMALL.

3.4.3 Mitigation Measures

GLE has committed to implementing measures to minimize impacts on surface water quality by following KPDES permit requirements for all stormwater, cooling tower blowdown, process effluent, and sanitary wastewater discharges. Activities resulting in soil disturbance would include erosion control plans and permits, and GLE would follow the McCracken County Storm Water Conveyance and Management Ordinance (current regulations are found in McCracken County 2026) and incorporate BMPs to control erosion, sediment, and pollutant runoff from construction sites (KEEC 2004; KTC 2009). GLE would obtain all necessary construction and stormwater KPDES permits, comply with all permit requirements and conditions, and implement the BMPs and protocols contained within the SPCC plan and SWPPP. Chemical herbicides and pesticides would only be used in site-specific locations and would only be applied by licensed herbicide and pesticide applicators under applicable regulations (302 KAR 26), decreasing the potential for contamination of surface waters. The USACE has regulatory authority over the discharge of dredged or fill material (e.g., soil, rock, debris) to waters of the United States at the PLEF site and would require avoidance, minimization, and mitigation as part of any required permit.

3.5 ECOLOGICAL RESOURCES

This section summarizes existing ecological conditions of terrestrial and aquatic plants and animals potentially affected by the construction, operation, and decommissioning of the PLEF project area. This section also discusses special-status plant and animal species that occur or have the potential to occur at the PLEF site and habitats that are important to those species.

Boston Government Services, LLC, contracted Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell), to produce a protected species report, a bat acoustic survey report, and a wetland delineation report that GLE used as the basis for the ecological resources section of the ER included as part of GLE's license application to NRC (GLE 2025a). The reports characterized the terrestrial vegetation and wildlife, aquatic species, and threatened and endangered species and their preferred habitats that were documented or could potentially be present at or in the vicinity of the PLEF. The reports consist of data that were collected in July 2024.

3.5.1 Affected Environment

The project area lies within EPA's Level IV Ecoregion 74b identified as the Loess Plains. The project area is situated in the Bayou Creek–Ohio River Basin and has been significantly altered by human activities. This area is primarily agricultural, with gently rolling uplands, broad bottomlands, and terraces. Historically, native vegetation was oak-hickory forests and bluestem

prairies. However, many of the grasslands and forested wetlands were converted to crop land long ago, and old-growth forest is not present at the site.

3.5.1.1 Biotic Communities

Field surveys of biotic communities in the project area conducted in July 2024 identified 11 major communities in various stages of succession. These are characterized as either natural (four) or anthropogenically influenced (seven). The four natural vegetative communities at the PLEF include two forest communities (plain forest birch and plain forest maple) swamp, and wet meadow/grassland. The remaining seven communities are classified as anthropogenically influenced and include agriculture, man-made (intentional wetlands and other features created for largely agricultural or recreational purposes), old field (areas previously impacted by human activity then abandoned), open water, urban, powerline corridors, and operational areas (parking areas and roads).

3.5.1.2 Terrestrial Wildlife

Wildlife and habitat surveys of the project area are described in the ER (GLE 2025a). Wildlife travel corridors, which are passageways used to access foraging, nesting, and breeding habitats, are a network of trails throughout the project area. During field surveys, signs of white-tailed deer were observed. Other species that could potentially inhabit the area include coyotes (*Canis latrans*), red foxes (*Vulpes vulpes)*, raccoons (*Procyon lotor)*, eastern cottontails (*Sylvilagus floridanus*), and various small rodents. Common birds like wild turkey (*Meleagris gallopavo)*, mourning dove (*Zenaida macroura*), and American robin (*Turdus migratorius*) are also likely to be found. Reptiles and amphibians such as garter snakes (*Thamnophis sirtalis*), eastern box turtles (*Terrapene carolina carolina*), and American toads (*Anaxyrus americanus)* could be found near wetlands and other water sources.

Migratory birds protected by the Migratory Bird Treaty Act and potentially found in the PLEF project area are listed in the ER (GLE 2025a). Based on surveys of the PLEF site, bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*) are unlikely to occur except to pass through the site, and no nests or suitable nesting habitat or food sources are present within the project area (GLE 2025a).

3.5.1.3 Aquatic Communities

Surveys of aquatic habitat in the PLEF area are described in the ER (GLE 2025a). Aquatic communities in the PLEF project area primarily consist of 19 small ephemeral streams, plus three intermittent streams with limited flow volume observed during the field surveys. The largest stream is Little Bayou Creek, a perennial stream characterized by observed flow and deep pools during the survey completed for the GLE license application (GLE 2025a). As described in Section 3.4.1.2, Little Bayou Creek is impaired, and the KEEC does not consider it supportive of warmwater aquatic habitat (KEEC 2020). Further, Little Bayou Creek is rated as non-support for both warm water aquatic habitat and fish consumption. The PLEF site may provide habitat for other aquatic species such as crayfish and other invertebrates and insects.

During the dry season, which extends from summer to early fall, the section of Little Bayou Creek just east of the PLEF may exhibit no-flow conditions. Past conversion of the grasslands and forested wetlands to agricultural land has degraded surface water quality in the area, and many local streams are now channelized with high levels of turbidity and siltation. The ER states that open water communities are likely to have been created for recreational purposes, and six

ponds are reported in the project area; fish present in the ponds are assumed to have been stocked (GLE 2025a).

3.5.1.4 Wetlands

Wetland surveys conducted between July 15 and 19, 2024, identified a total of 38 wetlands, 20 streams, and 6 ponds. Palustrine forested wetlands had the greatest footprint. Palustrine emergent, scrub-shrub, and aquatic bed wetlands are also present (GLE 2025a, Appendix K). As described in Section 3.1.2, there are 38 low-lying areas with the potential to be wetlands, totaling 9.8 ha (24.3 ac) or 7.5 percent of the PLEF site (GLE 2025a, Appendix K).

3.5.1.5 Environmentally Sensitive Areas

Environmentally sensitive areas include conservation areas or other areas of ecological importance. Most of the PLEF project area was until recently public land owned and leased by the KDFWR. The WKWMA consists of 2,600 ha (6,425 ac) within McCracken County used for recreational activities such as hunting, fishing, and horseback riding. The PLEF project area is not located in any flood hazard areas. Environmentally sensitive habitat for protected species is discussed in the ER (GLE 2025a, Appendix L) and Section 3.5.1.6 of this EIS.

3.5.1.6 Threatened and Endangered Species and Species of Concern

On July 8 and August 11, 2024, GLE's contractor, Burns and McDonnell, queried the FWS, through its Information for Planning and Consultation (IPaC) system, for a list of threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the PLEF action area and/or may be affected by the proposed project (GLE 2025a). The FWS IPaC species list was regularly checked during this environmental review.

In February 2026, the NRC staff obtained an updated species list from the FWS IPaC system (FWS 2026). The 2026 IPaC list reported 12 endangered species (three bats and nine mussels), two threatened species (both mussels), and one candidate species that may occur within and/or may be affected by the proposed PLEF. Two additional species, the tricolored bat (*Perimyotis subflavus*) and the monarch butterfly (*Danaus plexippus)*, are proposed for federal listing. The FWS notes that no critical habitat for any ESA-listed species is found within the PLEF project area (FWS 2026), and the 2024 onsite surveys indicated that streams in the PLEF area lack suitable size, substrate, and flows to support protected fish and mussel species (GLE 2025a). Additional information about the Section 7 consultation required under the ESA is provided in Sections 1.5.2.1 and B.3.2 of this EIS. The other two federally listed species with potential to occur in the PLEF area – the Indiana bat (*Myotis sodalis*) and the grey bat (*Myotis grisescens*) – are listed in Table 3-5. Biologists that conducted the acoustic bat survey in July 2024 for the GLE license application determined probable absence of the Indiana bat and potential presence of the gray bat (*Myotis grisescens*).

Table 3-5 Summary of Threatened and Endangered Species[a]

Common Name	Federal Listing	State Listing	Habitat Availability in the PLEF
Indiana bat	Endangered	Endangered	Potentially present: suitable habitat exists
Gray bat	Endangered	Threatened	Unlikely present: no cave habitat on PLEF site
Tricolored bat	Proposed endangered	SGCN	Present, upland forest in north area

Common Name	Federal Listing	State Listing	Habitat Availability in the PLEF
Monarch butterfly	Proposed threatened	SGCN	Potentially present: suitable habitat exists
Hooded merganser	—	SGCN	Potentially present: suitable habitat exists
Yellow-crowned night heron	—	SGCN	Potentially present: suitable habitat exists
Rosinweed	—	SGCN	Present, next to upland forest edges
Cotton mouse	—	SGCN	Potentially present: suitable habitat exists

[a] SGCN = species of greatest conservation need; a dash indicates not applicable (no federal listing). Sources: GLE (2025a), 50 CFR 17.11 and 17.12, KDFWR (2023), and OKNP (2025).

Indiana bats migrate seasonally between caves, where they hibernate during winter months, and their summer range, where they roost in dead, dying, or living trees with cracks, crevices, or exfoliating bark. Suitable summer habitat for Indiana bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel; it may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields, and pastures. No features that could be used as hibernacula (winter shelter) by the Indiana bat were identified at the PLEF during the habitat assessment, although trees at the PLEF were identified as suitable summer roosting, foraging, and commuting habitat (FWS 2025).

Gray bats are one of the few species of bats in North America that inhabit caves year-round, occupying cold hibernating caves or mines in the winter and warmer caves during summer. Foraging by gray bats during summer is strongly correlated with open water of rivers, streams, lakes, and reservoirs. Gray bats are highly dependent on aquatic insects, especially mayflies, caddisflies, and stoneflies, though they will also opportunistically consume beetles and moths. The gray bat is unlikely to occur at the site because no cave features were observed in or directly adjacent to the PLEF.

State threatened and endangered species and SGCN that have potential to be in McCracken County were identified using the KDFWR (2023) species list and the OKNP (2025) Kentucky Biological Assessment Tool. In addition to the federally listed bats, SGCN species with potentially suitable habitat in the PLEF area include hooded merganser (*Lophodytes cucullatus*), yellow-crowned night heron (*Nyctanassa violacea*), cotton mouse (*Peromyscus gossypinus*), and a rosinweed plant (*Silphium*) (Table 3-5). Details about the state and federally protected species that may be present at the PLEF site can be found in the ER (GLE 2025a), including habitat descriptions and results of protected bat surveys.

3.5.2 Potential Impacts

This section briefly summarizes potential impacts of each phase of the proposed action on ecological resources. For this analysis, it is conservatively assumed that the entire 130-ha (322-ac) PLEF site would be disturbed. Details regarding potential impacts are provided in the ER (GLE 2025a). The NRC staff identified four NR GEIS Category 1 issues related to terrestrial and aquatic ecology during construction that are relevant to the review of the GLE PLEF license application (see Tables 3-1 and C-1 of this EIS). The NRC staff relies on the technical arguments in the NR GEIS to conclude there would be SMALL impacts during construction on important terrestrial species and habitats; runoff and sedimentation from construction areas on aquatic ecology; building transmission lines, pipelines, and access roads across surface water bodies; or important aquatic species and habitats. Therefore, these issues are not discussed in

detail in this section. However, information about these issues may be included for additional context as it relates to other aspects of this resource area.

in addition, the NRC staff identified ten NR GEIS Category 1 issues related to biota and terrestrial and aquatic resources during operation that are relevant to the review of the GLE PLEF license application. The NRC staff relies on the technical arguments in the NR GEIS to conclude there would be SMALL impacts during operation on exposures of terrestrial species or aquatic organisms to radionuclides, water use conflicts with terrestrial or aquatic resources, effects of transmission line right-of-way management on terrestrial or aquatic resources, impacts on important terrestrial species and habitats, stormwater runoff on aquatic ecology, effects of electromagnetic fields on terrestrial resources, or effects of refurbishment on aquatic biota. Therefore, these issues are not discussed in detail in this section. However, information about these issues may be included for additional context as it relates to other aspects of this resource area.

Site Preparation and Construction. Most land-disturbing activities would occur during the first three years of construction (2027–2029). The main impact would be direct loss of natural and human-altered vegetation and wildlife habitats from potential development of the 130-ha (322-ac) site. Therefore, potential impacts on wildlife or wildlife habitat in the lands surrounding the PLEF would be indirect (e.g., impacts related to construction noise or artificial lighting). The quality of the contiguous forested habitat abutting the PLEF would be indirectly impacted by the creation of forest edges. Construction would primarily occur during daylight hours, and construction noise from vehicles and heavy machinery would persist at the site throughout the construction period. In addition, streams onsite or in the transmission line corridor could be affected by soil-disturbing activities that lead to soil erosion during site preparation and the building of the PLEF. Loss of vegetation coupled with the increase in impervious areas would result in increased stormwater runoff volumes. In addition, there could potentially be impacts on streams or other water bodies when constructing or relocating utilities. Potential impacts include the following:

- *Impacts on Terrestrial Biotic Communities.* Site preparation and construction would directly impact about 52 ha (129 ac) of plain forest maple and nearly 23 ha (56 ac) of plain forest birch, which together represent 57 percent of the PLEF project area. Agricultural and old-field communities would also be noticeably affected. Although these impacts would alter the habitat onsite, they would be localized and would not destabilize the existence of these communities offsite.
- *Impacts on Terrestrial Wildlife.* Mobile animals affected by habitat loss, like deer and turkey, would likely relocate to unaffected areas in the adjacent wildlife management area. However, less mobile animals such as invertebrates and small reptiles would be directly impacted and could be lost. Indirect impacts on wildlife could include increased noise and artificial light, vehicle strikes, and disruption of travel corridors, as well as increased resource competition in areas adjacent to the PLEF site due to the displacement of wildlife. Another indirect effect would be construction activities changing environmental conditions along undisturbed habitats adjacent to the project area, potentially favoring invasive species, stressing mature trees, and isolating some habitats, creating “habitat islands.” Overall, wildlife populations would be altered but activities would not destabilize the existence of these species in the surrounding area.
- *Impacts on Aquatic Habitat and Biota.* Most of the streams delineated onsite (totaling about 2 km, or nearly 1.3 mi) were identified as ephemeral and would not have suitable habitat for aquatic wildlife; therefore, aquatic wildlife would not be affected in these

stream segments. Intermittent streams totaling nearly 1.5 km (about 0.9 mi) and a perennial stream of about 0.27 km (nearly 900 linear feet) on the PLEF site might contain aquatic animals and the proposed action could affect aquatic wildlife in these stream segments. Potential effects of construction on aquatic species would depend on the type of impact (e.g., fill extents, pipe, box culvert, or bridge), species mobility, weather during construction, and amount of stream flow. However, the NRC staff anticipates that potential impacts on aquatic species would not destabilize the existence of these species in the surrounding area.

- *Wetlands*. Direct and permanent impacts on 38 wetlands totaling 9.8 ha (24.3 ac) wetlands would occur across the PLEF project area during site preparation and construction, including forested, scrub-shrub, aquatic bed, and emergent wetlands. Aquatic organisms present in these habitats would also be lost. Direct impacts on wetlands would be mitigated through additional efforts described in the ER (GLE 2025a) and summarized in Section 4.3 of this EIS (Mitigation Measures). A detailed construction design would determine the type and extent of direct impacts on wetlands during construction and provide final mitigations.

  Because of the amount of habitat removal and alteration, and potential loss of terrestrial and aquatic species that would occur as a result of the proposed action, the impacts on ecological resources would be noticeable. However, the NRC staff does not anticipate that impacts would destabilize the existence of habitats and species in the surrounding area. Therefore, the NRC staff concludes that direct and indirect impacts on ecological resources during this phase would be MODERATE with mitigation.

Operation. Potential impacts on ecological resources are summarized below.

- *Impacts on Terrestrial Habitats and Vegetative Communities.* Operation of the PLEF would not directly impact additional biotic communities beyond those affected during the construction phase. It is assumed that the entire site would be built out, with little natural habitat remaining. Vegetation along roadways and under power lines would be regularly maintained.
- *Impacts on Terrestrial Wildlife.* Human encounters with some wildlife could increase due to disruption of travel corridors and loss of habitat. Noises from the operation of the PLEF and from vehicles could also disturb wildlife, although these noise impacts are expected to be SMALL. The facility would be fenced, which is not expected to cause significant disruption to wildlife travel corridors. If wildlife were to create new corridors along the fence line and roads, that could potentially increase their vulnerability to predation and vehicle strikes. Wildlife nesting or inhabiting an area close to cylinder storage could incur radiological exposures. GLE would conduct periodic inspections of the cylinders and remove wildlife that might be inhabiting the area.
- *Impacts on Aquatic Habitat and Biota.* The proposed action would permanently impact streams and wetlands and create nearly 96 ha (236 ac) of impervious surfaces, resulting in reduced shallow groundwater recharge and increased stormwater runoff volumes that would be controlled with post-construction stormwater management BMPs (see Section 3.4.2). The PLEF project area represents only about 4 percent of the drainage area of Little Bayou Creek and only 1 percent of the drainage area of Bayou Creek. In addition, water quality impacts from sediment and radiological contaminants would be minimized using mitigation measures described in Sections 3.4.2 and 3.4.3.

- *Impacts on Wetlands*. PLEF operation would not directly impact additional wetlands beyond those impacted during the site preparation and construction phase.

From this information, the NRC staff concludes that direct and indirect impacts on ecological resources during this phase would be SMALL with mitigation.

Decommissioning. Impacts during decommissioning would be similar to those described for offsite impacts during site preparation and construction. No further onsite impacts would be expected beyond those associated with site preparation and construction and operation. Disturbed areas would be replanted in accordance with regulations and best practices at that time. Impacts from potential radiological exposures would be similar to or less than those during operation. NRC and EPA regulations for a decommissioning plan are designed to not only minimize impacts on humans but also to afford protection to ecological resources. The NRC staff concludes that overall impacts on aquatic habitat, wildlife, wetlands, and biotic communities from decommissioning the PLEF would be SMALL.

With regard to protected species, a detailed evaluation of potential impacts on state and federally protected species from PLEF construction, operation, and decommissioning can be found in Appendix L of the ER (GLE 2025a); potential impacts are highlighted in the text below. State and federally listed species potentially present in the PLEF project area were evaluated for potential impacts from the proposed action and given a designation of “no effect,” “may affect, not likely to adversely affect,” or “may effect, likely to adversely affect.”

The gray bat (*Myotis grisescens*) uses caves year-round and is unlikely to be impacted by tree clearing activities (FWS 2025). Protected bat species are not anticipated to roost at the site once it is developed. On behalf of NRC, GLE submitted a “no effect” determination letter to FWS for aquatic species, including all fish, reptiles and mussels due to the lack of suitable habitat in the PLEF project area and the lack of anticipated impacts on downstream aquatic habitat located offsite if mitigated by applicable state and federal regulations, permits, stormwater retention basins, BMPs, and erosion and sediment control features (Section 3.4.1.3). The Kentucky Field Office of the FWS reviewed the “no effect” determinations and replied “There is no requirement to request concurrence with a “no effect” determination; however, the KFO [Kentucky Field Office] acknowledges this determination and has no additional comments or concerns regarding these species” (FWS 2025).

Table 3-6 provides the species with “may affect, not likely to adversely affect” determinations for the ESA-listed species and the species proposed for listing that could potentially be present at the PLEF project area.

Table 3-6 Effect Determinations for Listed Species, Candidate Species, and Species Proposed for Listing

Common Name	Federal Listing	State Listing	Effects Determination
Insect			
Monarch butterfly	Candidate	Not listed	May affect, not likely to adversely affect
Mammals			
Indiana bat	Endangered	Endangered	May affect, not likely to adversely affect
Tricolored bat	Proposed endangered	Threatened	May affect, not likely to adversely affect

No ESA-designated critical habitat is located in the PLEF project area, so no direct effects on critical habitat would occur. In addition, no indirect effects on critical habitat located offsite are anticipated to occur due to the implementation of mitigation measures to minimize sediment and radiological and industrial contaminant inputs to waterways (see Sections 3.4.2 and 3.4.3).

3.5.3 Mitigation Measures

Multiple mitigation measures would be implemented to minimize impacts on ecological resources. These include the following:

- GLE would obtain all necessary construction and wastewater KPDES permits and would comply with all permit requirements and conditions. Additionally, GLE would follow the procedures and implement the BMPs and protocols contained within the SPCC plan and SWPPP.
- The USACE has regulatory authority over the discharge of dredged or fill material (e.g., soil, rock, debris) to waters of the United States at the PLEF site and would require avoidance, minimization, and mitigation as part of any required permit.
- Activities resulting in soil disturbance would require erosion control plans and permits to control soil and sediment erosion, and GLE would implement BMPs as required.
- Chemical herbicides and pesticides would only be used in site-specific locations and would only be applied by licensed herbicide and pesticide applicators under applicable regulations (302 KAR 26).
- Planting native grasses, shrubs, and trees in disturbed areas not occupied by buildings.

3.6 SOCIOECONOMICS

This section summarizes the socioeconomic environment of the PLEF area, including population, economic, and community characteristics, together with potential socioeconomic impacts of the proposed action.

3.6.1 Affected Environment

The PLEF site itself is located in the northwestern portion of rural McCracken County. The region of study for this analysis is the Paducah, Kentucky-Illinois Metropolitan Statistical Area (Paducah MSA), which includes McCracken, Ballard, Carlisle, Livingston, and Massac counties. The following information is summarized from the ER (GLE 2025a) except as noted.

Population and Projected Growth. In recent years, Ballard and McCracken counties have not experienced the growth many other counties have in Kentucky. Ballard County population declined by 4.9 percent between 2000 and 2020, losing 398 people. McCracken County grew by about 5.7 percent between 2010 and 2020, adding 3,695 people.

Economic Characteristics. The primary employers in the region include the healthcare and social assistance sector, followed by the retail trade sector, and then the manufacturing sector. Key regional industries include those related to the river port, agriculture, manufacturing, and tourism. The average unemployment rate in McCracken and Ballard counties has historically been higher than the state and national averages.

Social Infrastructure and Community Characteristics. The social infrastructure in the region, including public schools, healthcare, and emergency services, is well-established. Such infrastructure is summarized below.

- Public schools: There are 19 public schools in McCracken County and two in Ballard County. Both counties have a higher number of students per school compared to the state average.
- Medical services: There are two major hospitals in McCracken County and one in Ballard County, along with other healthcare facilities.
- Emergency services: Fire and rescue services for the PLEF site would be provided by local volunteer departments. The McCracken County Sheriff's Department would be the primary law enforcement agency.

3.6.2 Potential Impacts

The proposed action would impact local and regional socioeconomic conditions during each phase of the proposed project The NRC staff identified three NR GEIS Category 1 issues related to socioeconomics during construction and three issues during operation that are relevant to the review of the GLE PLEF license application (see Tables 3-1 and C-1 of this EIS). The NRC staff relies on the technical arguments in the NR GEIS to conclude there would be SMALL impacts on community services and infrastructure, the economy, and tax revenue during construction and operation. Therefore, these issues are not discussed in detail in this section; however, information about these issues may be included for additional context as it relates to other aspects of this resource area.

Site Preparation and Construction. Potential socioeconomic impacts during the site preparation and construction phase are summarized below.

- *Population*. It is estimated that between 20 and 40 percent of the PLEF site preparation and construction labor force would temporarily locate in the two-county region from elsewhere. With 65 percent of workers accompanied by their families, between approximately 275 and 550 people would be expected to enter the region during the peak years of PLEF site preparation and construction employment, 2029 to 2030. This influx would represent a temporary increase of 0.7 percent in the regional population at this time. The NRC staff concludes that project preconstruction and construction activities would result in a SMALL impact on population growth, with small population increases likely in McCracken and Ballard counties.
- *Employment.* Construction of the PLEF is assumed to begin in 2027 and last until 2036. Annual construction employment is estimated to start with approximately 150 workers in 2027 and peak in 2029 and 2030 at approximately 600 workers. Construction employment would then gradually decline until 2033, when approximately 50 construction workers would be onsite. Additional indirect employment would be generated during construction, as direct local spending on construction would lead to additional business and household spending throughout the regional and state economy. The NRC staff concludes that the project would have a MODERATE (positive) impact on regional employment during site preparation and construction.
- *Income*. Annual incomes of the estimated 120 and 240 new construction workers that would move into the region would total between $34.4 million and $68.8 million. Additional indirect income would be generated during construction, as direct local spending on construction would lead to additional business and household spending

throughout the regional and state economy. The NRC staff concludes that the project would have a MODERATE (positive) impact on regional income during site preparation and construction.

- *Housing.* GLE estimates in the ER (GLE 2025a) that during 2029 and 2030, between 275 and 550 workers and their families would come from outside the region during peak construction. Assuming each new worker represents a single household, the number of rental housing units required would represent between approximately 8 percent and 16 percent of the vacant housing units in the region based on 2020 data, or a maximum of 15 percent of the vacant rental housing stock in McCracken County based on projected data for 2029 and 2030. Current data from 2024 (USCB 2026) indicate that vacant rental housing numbers are similar to (within 4 percent lower than) those in 2020. The NRC staff concludes that the project would have a MODERATE impact on rental housing during construction.
- *Social infrastructure*. Children of construction, start-up and operation workers would represent an increase of less than 1.3 percent in total regional educational enrollment during the years 2029 and 2030, and 1.5 percent in McCracken County. Less than one each of a primary care physician, registered nurse, and dentist would be required to provide construction, start-up and operation workers and their families with the same level of medical and dental services that the region's current residents receive. As the expected increase in the population served would be less than 1 percent during the peak years of construction employment in 2029 and 2030, there would only be minor impacts on law enforcement and fire service and rescue. The project is not anticipated to significantly strain existing services. The NRC staff concludes that the impacts on social infrastructure, including public schools, healthcare services, and emergency services, would be SMALL.
- *Fiscal effects*. Income taxes levied by the state on construction worker wages and salaries would generate between $0.4 million and $0.9 million in the peak construction years 2029 and 2030, and between $0.2 million and $0.4 million in annual sales taxes in the same years. Annual income and sales tax revenues during each project phase would represent less than 0.1 percent of state tax revenues. The NRC staff concludes that the project would have a SMALL (positive) fiscal impact on local and state governments through increased tax revenues.

Operation. Potential socioeconomic impacts during the operation phase are summarized below.

- *Population*. During start-up, between 2029 and 2036, there would also be between 90 and 120 new workers and their families, which together with the number of construction workers and their families would represent a 1 percent increase in the regional population and a 1.3 percent increase in the McCracken County population. At the beginning of full operation in 2037, it is estimated that between 160 and 210 new residents would be located in the region, increasing population by less than 0.3 percent. The NRC staff concludes that start-up and operation activities would result in a SMALL impact on population growth, with small population increases likely in McCracken and Ballard counties.
- *Employment.* The PLEF is anticipated to begin operation in 2030 while still under construction, with approximately 550 workers required for start-up and operation during the initial 8-year period, 2029-2036. Approximately 350 workers would be required to operate the plant between 2036 and 2066. Additional indirect employment would be generated during start-up and operation as direct local spending on construction would

lead to additional business and household spending throughout the regional and state economy. The NRC staff concludes that the project would have a SMALL (positive) impact during operation.

- *Income*. Approximately 200 workers would be engaged in start-up activities beginning in 2029, producing an annual payroll of $24 million, with an additional 350 workers engaged in operational activities, with an annual payroll of $42 million beginning in 2030. Additional indirect income would be generated during start-up and operation would lead to additional business and household spending throughout the regional and state economy. The NRC staff concludes that the project would have a SMALL (positive) impact during operation

- *Housing.* GLE estimates that between 90 and 120 workers would come for start-up and operational activities. With a smaller in-migrating population expected during operation, impacts on the vacant owner-occupied housing stock in the region would be lower than during construction. The NRC staff concludes that the project would have a SMALL impact on owner-occupied housing during operation.

- *Social infrastructure*. Children of start-up and operation workers (and construction workers) would represent an increase of less than 1.3 percent in total regional educational enrollment during the years 2029 and 2030, and 1.5 percent in McCracken County. Less than one each of a primary care physician, registered nurse, and dentist would be required to provide start-up and operation (and construction) workers and their families with the same level of medical and dental services that the region's current residents receive. There would only be minor impacts on law enforcement and fire service and rescue; with fewer workers from outside the region required during operation, smaller impacts would be expected between 2037 and 2067. The project is not anticipated to significantly strain existing services. The NRC staff concludes that the impacts on social infrastructure, including public schools, healthcare services, and emergency services, would be SMALL.

- *Fiscal effects*. Start-up activities would generate approximately $0.2 million in annual state income tax revenue, and $0.1 million in annual sales taxes, while operation workers would generate approximately $0.4 million in annual state income tax revenue, and $0.2 million in annual sales taxes. Annual income and sales tax revenues during each project phase would represent less than 0.1 percent of state tax revenues. The NRC staff concludes that the project would have a SMALL (positive) fiscal impact on local and state governments through increased tax revenues.

Decommissioning. Potential socioeconomic impacts during the decommissioning phase are summarized below.

- *Population*. It is estimated that during decommissioning and continuing operation in 2065 and 2066, 500 new individuals are estimated to reside in the region, representing an increase of less than 0.5 percent. The NRC staff concludes that decommissioning activities would result in a SMALL impact on population growth, with small population increases likely in McCracken and Ballard counties.

- *Employment.* Decommissioning activities would employ 50 workers between 2065 and 2077. Additional indirect employment would be generated as direct local spending would lead to additional business and household spending throughout the regional and state economy. The NRC staff concludes that the project would have a SMALL (positive) impact during decommissioning.

- *Income*. It is estimated that 50 decommissioning workers would move into the region, producing $6 million in annual payroll. Additional indirect income would be generated as direct local spending would lead to additional business and household spending throughout the regional and state economy. The NRC staff concludes that the project would have a SMALL (positive) impact on regional income during decommissioning
- *Housing.* With a smaller in-migrating population expected during decommissioning, impacts on the vacant owner-occupied housing stock in the region would be lower than during construction and operation. The NRC staff concludes that the project would have a SMALL impact on owner-occupied housing during decommissioning.
- *Social infrastructure*. Children of decommissioning workers would represent an increase of less than 1 percent in total regional educational enrollment. Less than one each of a primary care physician, registered nurse, and dentist would be required to provide workers and their families with the same level of medical and dental services that the region's current residents receive. There would only be minor impacts on law enforcement and fire service and rescue. With fewer workers from outside the region required during decommissioning, the project is not anticipated to significantly strain existing services. The NRC staff concludes that the impacts on social infrastructure, including public schools, healthcare services, and emergency services, would be SMALL.
- *Fiscal effects.* Annual income and sales tax revenues during each project phase would represent less than 0.1 percent of state tax revenues. The NRC staff concludes that the project would have a SMALL (positive) fiscal impact on local and state governments through increased tax revenues.

3.6.3 Mitigation Measures

Because the proposed action is not anticipated to lead to any significant adverse socioeconomic effects, no specific mitigation measures have been defined.

3.7 HISTORIC AND CULTURAL RESOURCES

This section presents an overview of historic and cultural resources in the PLEF area, together with potential impacts of the proposed action.

As context, cultural resources are defined as any prehistoric or historic-age (at least 50 years old) district, site, building, structure, or object considered important to a culture, subculture, or community for scientific, historical, traditional, religious, or other reasons. Archaeological resources are the physical remains of past human activity. Cultural resources can also include traditional cultural places that are generally locations of importance to Native Americans.

Historic-age architectural resources include buildings, structures, landscapes, and objects that document the history of an area. Traditional resources can include archaeological or historic-age architectural resources, as well as places or natural features considered essential for preserving a group's traditional culture or practices. The NRHP is the nation's official inventory of significant prehistoric, historic-age, and ethnographic resources. A cultural resource becomes a historic property when it is listed on or is eligible for listing on the NRHP.

3.7.1 Affected Environment

Prehistory in North America ranges from roughly 12,000 BCE (before common era) to 1500 CE (common era). Prehistory is divided into several periods that are marked by changes in technology (e.g., projectile point shapes, pottery types) and changes in subsistence patterns, which often reflect wider changes in the environment. The prehistory of the continental Midwest is divided into four broad periods:

- *Paleoindian Period (12,000–8,000 BCE)*: Earliest recorded occupations of the region.
- *Archaic Period (8,000–1,200 BCE)*: More localized settlement and subsistence patterns replaced earlier patterns.
- *Woodland Period (1,200 BCE–1,000 CE)*: Development of local cultures and use of ceramics and burial mounds.
- *Mississippian Period (1,000–1,600 CE)*: Development of large permanent villages, often with ceremonial centers.

The PLEF project area lies within the Jackson Mississippi Embayment, which was given to the United States by the Chickasaw Indian Nation in 1819 as part of the Jackson Purchase (Curran 2024). McCracken County was formed in 1825, and Paducah is the county seat. From the outset, the area's economy focused on farming and relied on the Ohio and Tennessee Rivers and the Central Railroad for transportation. The main crop was tobacco, which was supported by enslaved labor. Farming continued to be an important part of the economy after the Civil War; in the 1900s, Paducah became more focused on industry. During World War II, the Kentucky Ordinance Plant and the DOE uranium enrichment plant were built near Paducah. Currently, recreation and tourism are the major industries for the region.

The NRC has determined that the APE, in the context of NHPA, for the proposed PLEF includes the area that may be directly or indirectly affected by land-disturbing or other operational activities associated with the PLEF. This determination is made irrespective of land ownership or control. The APE for the proposed PLEF covers about 130.1 ha (321.6 ac). An indirect APE extending out an additional 0.4 km (0.25 mi) from the APE was examined for potential visual impacts on historic or cultural resources from construction, operation, and decommissioning of the facility. The KHC concurred with this definition of APE via letters dated August 13 and December 5, 2024, and April 22, 2025 (GLE 2025a). Both the direct and indirect areas of the APE are shown in Figure 3-4.

The applicant's contractor reviewed information from the Kentucky Office of State Archeology and the KHC within the PLEF project area and a 2-km (1.2-mi) radius. No known archaeological sites were previously identified within the direct APE. The DOE PGDP is listed in the NRHP as a district. The PGDP is located directly to the north of the PLEF and is currently being decommissioned. As part of the environmental research for this project, the applicant arranged for an archaeological survey and a cultural resource assessment that were conducted in late 2024, to investigate archaeological and historic-age architectural resources within the APE. Three archaeological sites were documented (15McN253, 15McN254, and 15McN255), as well as one isolated find (IF 1). All the sites were of late 19th- to early 20th-century farmsteads. The isolated find was a single waste flake, likely of prehistory origin. The survey team recommended that none of the four were eligible for the NRHP due to their poor condition and low potential for containing information on the history of the region. The KHC identified that they would concur with a finding of no adverse effect for the undertaking (KHC 2025a,b).

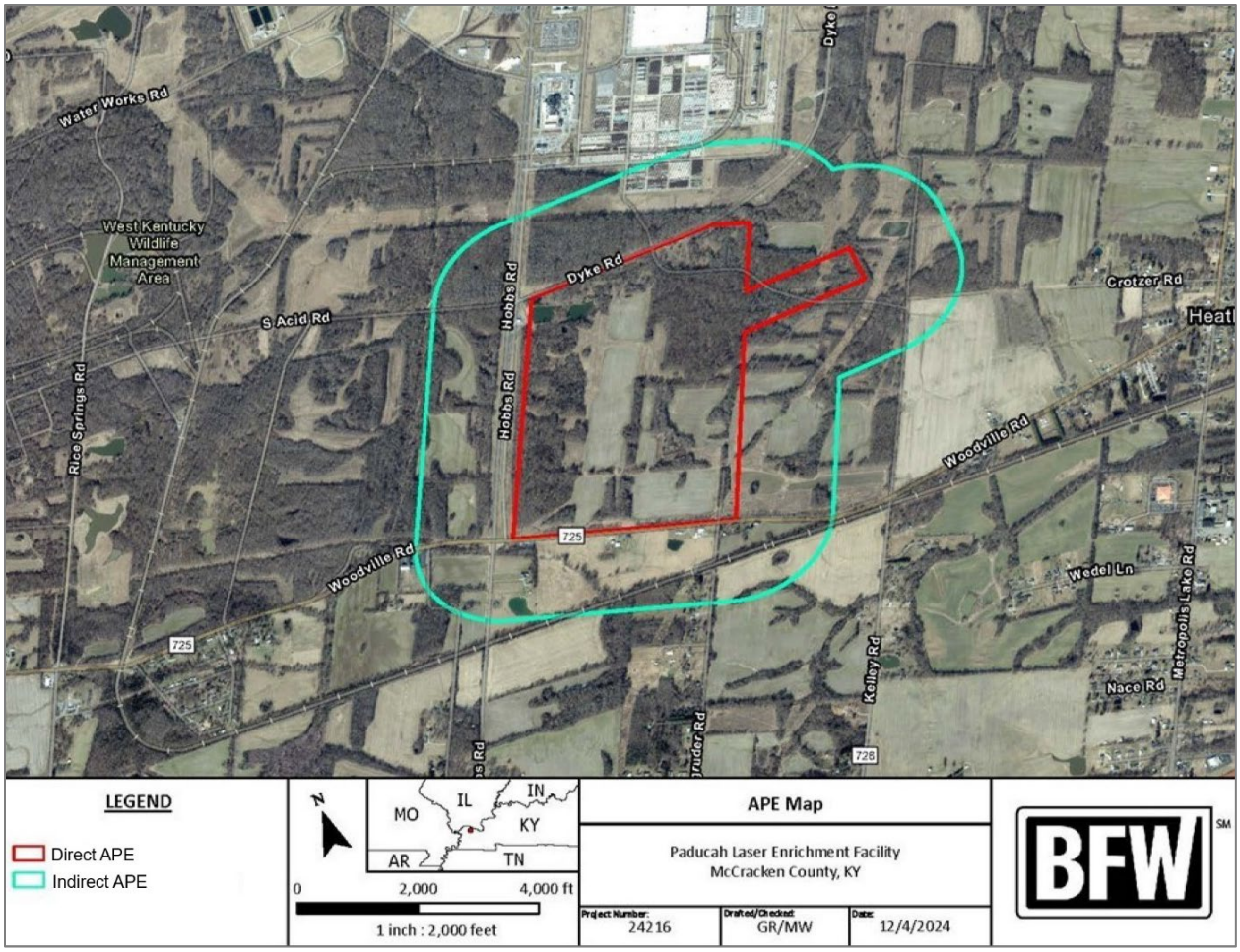

Figure 3-4 APE for the Proposed PLEF (modified from the ER, GLE 2025a).

With regard to historic-age architectural findings, a survey of standing structures in the indirect APE found one previously identified resource (a church built in 1968) and five unevaluated resources (including a cemetery associated with the church that was active from 1895–2006). Of these six, only the church and cemetery were considered potentially eligible for NRHP listing, as a district, due to (1) their association in the local contexts of Social History, Early Settlement, and Architecture and representation of the Gothic Revival Style; and (2) considerations for religious properties and for cemeteries. However, the proposed PLEF would not be visible at the church or cemetery; both are outside the direct sightline of the project due to the topography of the area (Winchester 2024).

3.7.2 Potential Impacts

The proposed PLEF involves site preparation and construction, operation, and decommissioning. Potential impacts on historic and cultural resources associated with these phases are summarized below.

Site Preparation and Construction. These activities will likely destroy the three archaeological sites and one isolated find identified in the site surveys within the APE. However, these cultural resources were not found to be eligible for listing in the NRHP; therefore, the NRC staff determined that these resources would not be adversely affected (NRC 2026b). The PGDP

is not anticipated to be affected by site preparation and construction activities; it is located outside of the area where ground disturbance would occur. The NRC staff concludes that the potential impact on historic properties would be SMALL.

Operation and Decommissioning. These activities are not expected to further impact cultural or historic resources in the project area. For the two historic-age architectural resources potentially eligible for the NRHP, the assessment found that due to their distance from the project area and local topography and vegetation, neither would be visible from the proposed facility nor therefore would not be affected by the project. Similarly, the PGDP is not anticipated to be indirectly affected by operation and decommissioning of the PLEF. Thus, the NRC staff concludes that the potential impact on historic properties would be SMALL.

3.7.3 Mitigation Measures

GLE does not plan to implement mitigation measures for historic and cultural resources because there are no adverse effects on NRHP-eligible properties within the direct or indirect APE.

3.8 VISUAL AND SCENIC RESOURCES

This section summarizes the visual and scenic characteristics of the site and potential impacts of the proposed PLEF, as well as mitigation measures.

3.8.1 Affected Environment

Land to the west of the property GLE purchased for the proposed PLEF site (which is adjacent to and south of the DOE PGDP with its multiple structures) is primarily undeveloped and forested, while land to the east and south was cleared many years ago for agricultural fields and private homes. Landscape characteristics are described in Section 3.9.3 of the ER. Trees and other vegetation on the GLE property and in the surrounding area limit visibility nearby. Photographs from eight key observation points around the proposed PLEF site are presented in Section 3.9.2 of the ER (GLE 2025a).

The height of existing trees ranges from about 15 to 21 m (50 to 70 ft). Visitors to the general area include tourists visiting Paducah and McCracken County parks, museums, and the wildlife management area. There are no designated scenic vistas or scenic roadways near the proposed site. Viewer groups in the area consist primarily of residents, agricultural users, commuters, and visitors to local parks and community facilities. Viewer sensitivity is generally modest to low, reflecting expectations shaped by an existing working landscape that includes industrial facilities, managed forests, and agricultural lands. No highly sensitive viewer groups associated with designated scenic vistas, scenic byways, or protected visual resources have been identified in the vicinity of the site.

A viewshed analysis was conducted to assess potential visibility for the proposed PLEF on the site. High-resolution topographic data (0.6-m [2-ft] contours) were used to define viewshed boundaries within a 3.2-km (2-mi) radius from a 24-m (78-ft) observer point in the west–southwest portion of the site (GLE 2025a, Figure 3-111). The U.S. Department of Agriculture's Light Detection and Ranging data and geographic information system software were used to identify areas of the landscape around the proposed PLEF that could be visible from the site, considering topographic elevations.

Although existing structures and vegetation in this location could influence actual visibility and alter viewshed boundaries (visible areas, shown in Figure 3-111 of the ER), the modeled viewshed was found to be consistent with an illustrative scenic quality rating assessment conducted for the proposed site. This assessment used an approach developed by the Bureau of Land Management (BLM) for BLM-managed lands and is described in Section 3.9.9 of the ER (GLE 2025a). The BLM approach considers scenic quality factors such as landform and vegetation and color, as well as scarcity, or uniqueness. Results of this assessment indicate that baseline conditions at the site are equivalent to the class with the least visual and scenic value.

3.8.2 Potential Impacts

This section describes the potential impacts on visual and scenic resources associated with the proposed PLEF, as well as potential mitigation measures. The proposed PLEF would result in some impacts on visual resources but would not significantly alter the viewshed or the character of the landscape. Construction-related visual impacts would be short-term, while operational visual impacts would continue for a longer period but would be stable. The level of change is expected to diminish over time as the facility becomes an established element of the visual environment and as vegetative screening matures.

Site Preparation and Construction. Site preparation would involve grading, trenching, excavation, and vegetation removal from the 130-ha (322-ac) PLEF project area. The extent of vegetation removal would be limited to the land area needed for the facility's operation, security, and utility requirements. Except for the electric power lines, utilities would be underground. Neighbors to the south and east of the proposed PLEF site would be those most likely to incur aesthetics impacts. A buffer of trees roughly 15 to 21 m (50 to 70 ft) high between the site and nearest neighbors to the south would remain. The closest home is about 46 m (150 ft) south of the property line along Woodville Road (GLE 2025a, Figure 3-112).

The tallest structure proposed for the site is the operations building on the east side of the PLEF project area (Figure 2-1) Its base height would be about 12 m (40 ft). The tallest of its nine stacks would extend to a total height of nearly 15 m (48 ft), which would be lower than the tallest trees surrounding the site. It is possible that the main tower (stack) of the operations building would be visible to vehicles traveling on Hobbs Road, Dyke Road, and briefly on Woodville Road. There could be two water tanks up to about 12 m (40 ft) high in the northeast corner of the PLEF site. A buffer of trees about 15 to 21 m (50 to 70 ft) high in that area would block views from travelers on Dyke Road.

To the south, although thick trees north of Woodville Road would shield views from most nearby residents, an agricultural access road creates a gap in the tree line southeast of the water tank that could make it visible to vehicles traveling along Woodville Road, and possibly one home. Views would be temporary if observable at certain angles, and this access area would be revegetated to reduce its visibility. The relatively flat topography and existing trees in the area would mitigate some of the visual impacts from viewpoints in the middle ground and background. The operations building is not likely to be visible from homes in Heath, Kentucky, or at farther distances, nor to area visitors.

Temporary visual intrusions into the landscape could result from the use of construction cranes to erect building structures and install equipment. No other impacts on visual or scenic resources would be expected during this period. For these reasons, the NRC staff concludes that impacts on visual resource during site preparation and construction of the PLEF would be SMALL.

Operation. Operation of the PLEF would require connections to existing utilities outside of the PLEF property boundaries. Local water and sewer connections would be underground and would not impact visual resources. Potential impacts associated with the PLEF buildings and water tanks would be as described above for the construction period. Therefore, the NRC staff concludes that impacts on visual and scenic resources during PLEF operation would be SMALL.

Decommissioning. Decommissioning of the PLEF would involve removing all structures, roads, and utilities, except for the switchyards, grading the site, and establishing vegetative cover. Some subsurface concrete foundation materials might remain. Therefore, no further changes to the visual/scenic resources impacts are expected during this phase compared with conditions during operation. For this reason, the NRC staff concludes that potential impacts on visual and scenic resources during decommissioning would be SMALL.

In terms of overall impact, when evaluated in relation to baseline visual conditions, regional visual ecology, and EPA Level IV Ecoregion characteristics—and considering implementation of the visual ecology-based mitigation measures described above—the proposed PLEF would not be expected to result in significant adverse visual impacts. While the project would introduce new visual elements and localized contrast, these changes would occur within a landscape that has a demonstrated capacity to accommodate visual modification without fundamentally altering overall visual character or scenic value. Thus, the NRC staff concludes that impacts on visual and scenic resources would be SMALL.

3.8.3 Mitigation Measures

GLE's ER Sections 4.9.4 and 5.9 state that GLE will implement the following mitigation measures to reduce impacts on scenic and visual resources:

- Maintaining, to the fullest width practicable, the existing tree buffer along the property line to limit visibility of PLEF structures and access-road traffic from offsite viewpoints in nearby residential areas.
- Using exterior building colors and landscaping that would soften the visual impact of the PLEF.
- Following construction, restoring all disturbed areas not used for permanent facilities to vegetated landscaping.
- Revegetate the agricultural access road located southeast of the PLEF site or other tree buffers, if necessary to screen views.

3.9 NOISE

This section presents an overview of existing acoustic conditions in the PLEF area and potential impacts of the proposed action, together with mitigation measures.

Sound is any variation in air pressure that the human ear can detect, and noise is generally defined as unwanted sound. Sound is characterized by amplitude (perceived as loudness) and frequency (perceived as pitch), and it is measured using the logarithmic decibel (dB) scale. Because human hearing is sensitive to frequencies between about 1 and 5 kHz, A-weighting is commonly used. A-weighted sound levels (expressed in dBA) approximate human hearing response and correlate well with perceived loudness (ASA 1983, 1985).

Time-varying sound is commonly described using the equivalent continuous sound level (L_{eq}) and the day–night average sound level (L_{dn}, also referred to as DNL). The L_{eq} represents the

constant sound level that contains the same total acoustic energy as a fluctuating sound over a specified period. L_{dn} represents the average sound exposure over a 24-hour period and includes a 10-dB penalty applied to nighttime hours (10 p.m. to 7 a.m.) to account for increased sensitivity to noise during those hours (NWCC 2002). Outside of controlled laboratory conditions, a 1-dB change is generally imperceptible, a 3-dB change is barely noticeable, and an increase of about 10 dB is perceived as roughly twice as loud and often results in an adverse community response.

The EPA's noise guidance recommends an L_{dn} of 55 dBA as sufficient to protect the public from the adverse effects of broadband environmental noise in typical outdoor and residential settings (EPA 1974). These values are not regulatory standards; rather, they are conservative recommendations intended to protect the most sensitive subpopulations and to provide an additional margin of safety. To prevent hearing loss from long-term exposure to nonimpulsive noise, the EPA also recommends that the $L_{eq(24\text{-}h)}$ not exceed 70 dBA when averaged over a 40-year exposure period. For the NRC, Section 5.3.4 of NUREG-1555 (NRC 2000) considers noise levels acceptable when the L_{dn} outside a residence is below 65 dBA, which is consistent with the U.S. Department of Housing and Urban Development exterior noise standard specified in 24 CFR 51.101(a)(8).

With regard to state standards, in 2015, Kentucky Revised Statutes 224.30–175 authorized local governments, including McCracken County, to adopt comprehensive noise regulation programs. A review of McCracken County ordinances found no numerical noise limits applicable to the PLEF site; therefore, the federal noise guidelines described above, are used to evaluate potential noise impacts.

3.9.1 Affected Environment

A baseline sound survey of the PLEF area was conducted from the evening of August 13, 2024, through the evening of August 14, 2024, to characterize the existing acoustic environment. The most acoustically sensitive land uses in the vicinity consist of the residential areas south of the project area. Other adjacent lands includes agricultural land and undeveloped land. Natural ambient sounds observed during the survey included birds singing/calling and insects chirping/peeping, while man-made sounds included local vehicular traffic, distant vehicular traffic on surrounding roads, and the Woodsville Road substation located across the street from the southwestern boundary of the PLEF site.

The sound survey involved placing two environmental sound monitors to continuously measure ambient sound levels near the property boundary in the direction of the nearest residences to the south (Figure 3-106 in GLE 2025a). One-hour equivalent continuous sound levels ($L_{eq(1\text{-}h)}$) calculated from the data collected at the first monitoring location (southwestern edge of the PLEF area) ranged from 48 to 71 dBA, or from 48 to 57 dBA when excluding the elevated reading (71 dBA) caused by heavy truck activity near the adjacent substation at 2 p.m. The $L_{eq(1\text{-}h)}$ at the second monitor (southeastern corner of the PLEF area) ranged from 49 to 61 dBA. Overall, noise levels at the second monitoring location were generally higher than those at the first, except for the peak observed at 2 p.m. at the first monitor. These measured levels are relatively high for a rural setting, suggesting that the monitors being positioned adjacent to the roads resulted in their being heavily influenced by passing traffic, albeit relatively light local traffic. The calculated L_{dn} values at the two monitoring locations were 61 and 60 dBA, respectively. These values exceed the EPA guideline level of 55 dBA L_{dn} but remain below the NRC acceptable limit of 65 dBA L_{dn}.

3.9.2 Potential Impacts

This section discusses the potential noise impacts of the proposed PLEF on the surrounding environment during the construction, operation, and decommissioning phases. Potential mitigation measures to minimize noise impacts under the proposed action are also presented.

Potential noise impacts from the proposed PLEF were assessed at two baseline monitoring locations (MP1 and MP2) and at the four nearest residences to the south (Res 1 to Res 4) using the predictive noise modeling software CadnaA (Computer-aided Noise Abatement). This software is a three-dimensional noise modeling program that accounts for such factors as air and ground absorption, terrain, and reflections and shielding associated with individual noise sources. The modeling analysis only evaluated noise contributions from sources related to the proposed PLEF and did not include other sources such as local traffic or wildlife. Potential noise impacts by project phase are summarized as follows.

The NRC staff identified one NR GEIS Category 1 issue related to noise during operation that is relevant to the review of the GLE PLEF license application (see Tables 3-1 and C-1 of this EIS). The NRC staff relies on the technical argument in the NR GEIS to conclude there would be SMALL impacts of operation-related noise. Therefore, this issue is not discussed in detail in this section; however, information about this issue may be included for additional context as it relates to other aspects of this resource area.

Site Preparation and Construction. As a conservative approach, construction noise from all equipment associated with both road construction and site preparation was modeled simultaneously to predict the highest potential noise impacts. The assumed construction noise sources included four dozers, four loaders, two graders, two rollers, one excavator, one water truck, and one paver. These construction noise sources are primarily mobile and would move across the PLEF site during daily construction activities and to different onsite locations over the course of the construction period. Accordingly, the equipment was modeled as being located at the center of the PLEF construction area to represent the average position of these sources during construction activities. Noise emission levels for the construction equipment were based on standard reference sources (FHWA 2006, FTA 2018). Operating hours for construction activities were assumed to occur between 7 a.m. and 7 p.m.

As shown in Figure 4-1 of the ER (GLE 2025a), modeling results indicate that noise levels at six receptor locations from the PLEF-related sources alone range between 46 and 55 dBA L_{dn}, and at four nearby residences range between 48 and 54 dBA L_{dn}. These levels are below both the EPA guideline level and the NRC acceptable limit. When combined with baseline sound levels (61 dBA L_{dn} at MP1 or 60 dBA L_{dn} at MP2 in Section 3.9.1), the resulting increase is expected to be up to 1 dBA, i.e., a combined level is 61 dBA L_{dn} at all receptors. In this case, combined noise levels might exceed the EPA guideline primarily due to high baseline levels but would remain below the NRC acceptable limit.

Construction activities are expected to generate short-duration noise from hauling equipment and handling or moving materials, which are typical of building construction. Traffic accessing the site would primarily consist of passenger vehicles and light trucks, resulting in a SMALL incremental noise impact on the community. Construction would occur only during daytime hours, when atmospheric sound attenuation is more favorable[12] and background noise levels

[12] Sound attenuation during daytime hours is generally more favorable because atmospheric conditions typically cause upward refraction of sound waves, reducing sound propagation to ground-level receptors.

are relatively higher.[13] Impacts from construction activities would be localized and temporary, and mitigation measures would be implemented to reduce noise levels. Overall, PLEF construction would increase ambient levels by no more than 1 dBA over the baseline conditions; therefore, the NRC staff concludes that noise impacts on neighboring communities would be SMALL.

Operation. Equipment used at the PLEF would primarily be housed within the Operations Building (OB). The main noise sources associated with PLEF operation would be the cooling towers serving the LEU Processing Building and the two transformers at each of the two substations. Other, smaller sources – such as rooftop air-handling units – are expected to have negligible impact at offsite receptors. Vehicular traffic to and from the PLEF site would include passenger vehicles for PLEF employees and trucks delivering materials.

As shown in Figure 4-2 of the ER (GLE 2025a), modeling results indicate that noise levels at receptor locations range from 36 to 45 dBA L_{dn}, well below both the EPA guideline level and NRC acceptable limit. When combined with baseline sound levels (61 dBA L_{dn} at MP1 or 60 dBA L_{dn} at MP2 in Section 3.9.1), the resulting increase is expected to be up to 0.1 dBA with combined levels ranging from 60 to 61 dBA L_{dn}. As with construction, combined noise levels may exceed the EPA guideline primarily due to high baseline levels but would remain below the NRC acceptable limit. PLEF operation would minimally increase ambient levels over the baseline conditions; therefore, the NRC staff concludes that noise impacts on neighboring communities during operation would be SMALL.

Decommissioning. Decommissioning would require many procedures and types of equipment similar to those used during typical construction activities. Decommissioning activities would generally be similar to construction activities but would occur on a more limited scale. Accordingly, potential noise impacts on surrounding communities would be comparable to those associated with construction. Any noise impacts during the decommissioning phase would be temporary in nature, and mitigation measures comparable to those implemented during construction would be applied, as appropriate. Therefore, the NRC staff concludes that potential noise impacts on surrounding communities during decommissioning would be SMALL.

The effects of noise on wildlife are well established, particularly with respect to behavioral changes, stress responses, and habitat displacement, although such effects are generally limited to certain noise-sensitive species. Many wildlife species avoid or reduce use of noisy areas, while others exhibit tolerance or habituation depending on species characteristics and environmental conditions. Noise generated by PLEF-related activities would be typical of industrial operations and would not include extremely high-intensity or impulsive sources, such as pile driving or blasting. Because predicted noise levels in the vicinity of the facility would increase only slightly above existing baseline conditions, the NRC staff concludes that potential noise impacts on wildlife during decommissioning would be SMALL.

[13] A temperature inversion typically forms on clear, calm nights when the Earth's surface cools rapidly, causing air temperature to increase with height. This phenomenon is usually strongest near sunrise, particularly during the colder months, and generally dissipates within a few hours after sunrise. Under inversion conditions, sound is refracted downward toward the ground, which can increase noise levels over a wide area compared to levels that would occur under standard (neutral) atmospheric conditions. Because construction activities begin at 7 a.m., early-morning hours – especially during colder months – might be affected by inversion conditions. To minimize community noise impacts, noisy construction activities should be avoided during inversion periods whenever possible.

Details about the noise modeling, including the software, associated assumptions, and results, are provided in Section 4.7.1 of the ER (GLE 2025a).

3.9.3 Mitigation Measures

As described above, noise impacts on neighboring communities and wildlife during construction – which would be localized and temporary in nature – are anticipated to be SMALL. Section 5.7 of the ER states that heavy truck and earth-moving equipment usage would be limited to daylight hours, no work would be planned on weekends or holidays, and noise-suppression systems on construction vehicles would be kept in proper operation.

3.10 TRANSPORTATION

This section describes the local and regional transportation infrastructure and conditions, together with potential impacts of the proposed action. Also included is a discussion of mitigation measures.

3.10.1 Affected Environment

The PLEF site is located adjacent to and north of Woodville Road (KY 725) with Hobbs Road (KY 1154) on the west and Kelley Road on the east. Woodville Road connects to U.S. Highway 60 (Highway 16, Hinkleville Road) via Hobbs Road about 0.5 mi (0.8 km) south–southwest of the adjacent DOE PGDP, and it would provide connections to interstate highway access from the PLEF site to locations throughout the United States (see Figure 3-4). Paducah's downtown and Ohio River and Tennessee River port districts could be accessed from the PLEF site by traveling east on Highway 60.

Based on DOT road classifications and Kentucky traffic count maps, Woodville Road and Hobbs Road are minor rural collector roads. The area of Highway 60 near the intersection of Hobbs Road is a principal rural arterial road that connects to Interstate 24 (I-24) to the east of Paducah and ends in the west at the town of Wickliffe, Kentucky. Access to Interstate 57 (I-57) west of Wickliffe is provided by Highways 51 in Illinois and Highway 62 in Missouri (KYTC 2024a).

Annual average daily traffic (AADT) counts provide traffic volumes based on a 24-hour, two-directional count at a given location. Raw traffic data are mathematically adjusted for vehicle type, as determined by an axle correction factor. The data are then statistically corrected by a seasonal variation factor that considers time of year and day of the week (KYTC 2024b). The locations of the roads and the traffic counts are shown in Figure 3-5. These counts include traffic to and from the DOE PGDP.

3.10.2 Potential Impacts

This section summarizes potential transportation impacts associated with the proposed action to construct, operate, and decommission the PLEF.

Under the proposed action, a new uranium enrichment facility would be developed next to the DOE PGDP site. Vehicles traveling to and from the PLEF site would use the existing public roadways described in Section 3.10.1 of this EIS. Materials, supplies, and equipment used for PLEF construction, operation, and decommissioning would be delivered by truck. Likewise, products and solid waste materials would be shipped from the PLEF site by truck. A new dedicated truck entrance from Hobbs Road and a similar personnel access road would be used by motor vehicle traffic to the PLEF.

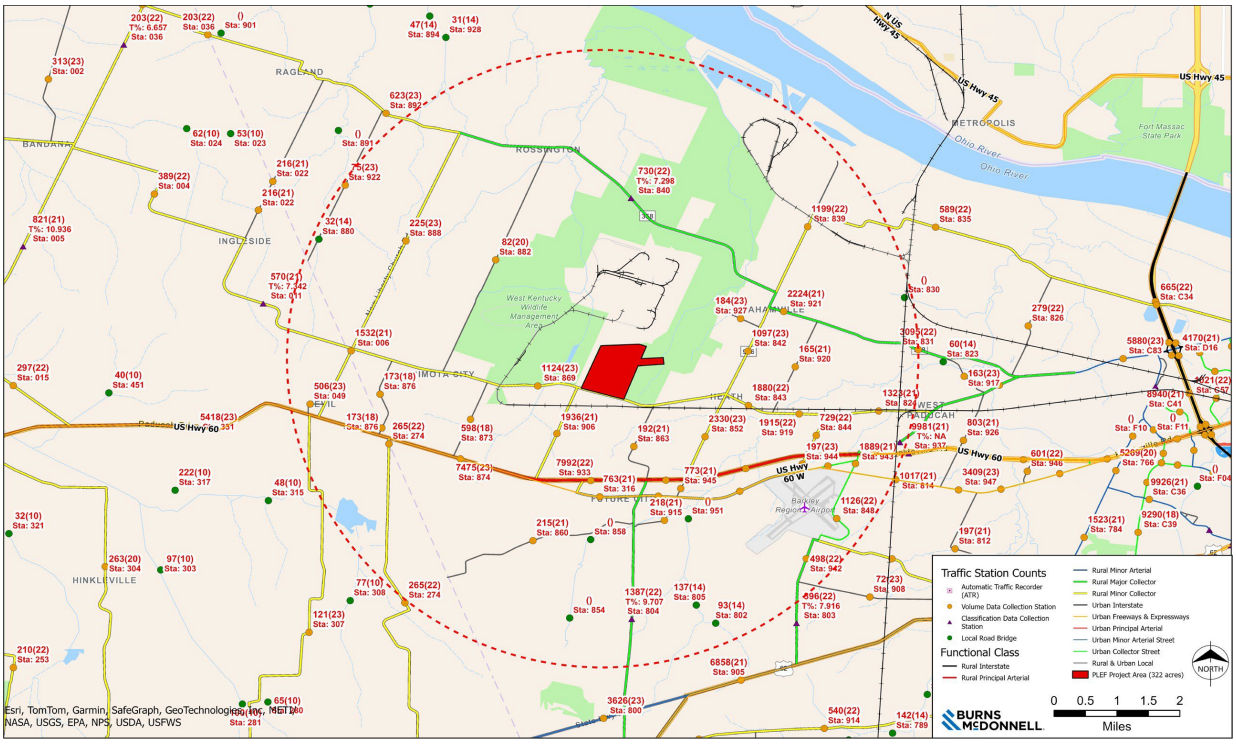

Figure 3-5 Roads and Annual Average Traffic Counts for Roadways Within an 8-km (5-mi) Radius of the PGDP Site (source: KYTC 2024b).

The volume of estimated traffic from supply shipments, waste shipments, and workers commuting has been estimated from information provided in the application. GLE does not propose using any rail, waterway, or air transport for any portion of the project. Therefore, potential impacts of rail or air shipments are not evaluated here. If rail shipments were needed to bring large items to nearby locations where rail service is available, they would not be expected to significantly impact rail traffic because such shipments would be infrequent and managed as routine railroad freight. Similarly, if air shipments were needed to bring specific items for the site, they would not be expected to significantly impact air traffic because the shipments would be infrequent and managed as routine air freight.

The mode of transportation during PLEF construction, operation, and decommissioning would consist of over-the-road trucks ranging from heavy-duty 18-wheeled delivery trucks to concrete mixing trucks, dump trucks, and flatbed light-duty trucks. These vehicles and equipment are typical of those used in industrial and commercial construction projects. The primary transportation mode for the workforce to and from the PLEF would be by car, van, or truck (GLE 2025b).

The potential environmental impacts of transporting nuclear materials including feed material and finished products are described in NRC's EIS for transportation, NUREG-0170 (NRC 1977). In NUREG-0170, the NRC evaluated the radiological impacts and consequences of normal transport and of transportation accidents for a range of transportation modes and assessed the adequacy of its regulations to provide safety assurance. The risk assessment of radiation doses to the public and workers under routine and accident transport conditions used conservative (protective) parameter estimates. The NRC concluded in NUREG-0170 that even with conservative assumptions, the transportation of radioactive materials provides adequate public safety. The radiological and nonradiological health and safety impacts on workers and the public

under normal and accident conditions from transportation to and from the PLEF are described in Section 3.11.

In NUREG-2125, the NRC investigated transportation safety for spent nuclear fuel (NRC 2014). That study reconfirms that radiological impacts from spent nuclear fuel transportation conducted in compliance with NRC regulations are low. They are, in fact, generally less than previous, already-low estimates for the transportation of radiological materials provided in NUREG-0170. In NUREG-2125, the NRC concluded that regulations for the transportation of radioactive material are adequate to protect the public against unreasonable risk.

Site Preparation and Construction. Each day, a varied mix of heavy-duty 18-wheeled tractor-trailer trucks, heavy-haul trucks (e.g., dump trucks and concrete-mixing trucks); and light-duty delivery trucks would be expected to travel to the PLEF site to deliver construction materials, supplies, and equipment. The number of truck deliveries and mix of truck types would depend on the stage of construction and types of construction activities. Heavy-duty trucks delivering materials from suppliers beyond the general vicinity of the PGDP would likely travel to the PLEF site via Highway 60 and then north on Hobbs Road. Trucks from local suppliers might access the site by traveling directly on Woodville Road. (If equipment or materials for the site were to arrive by barge at one of the terminals on the Tennessee River, the likely truck transport route from there to the site would be Third Street North to I-140 to I-24/ Highway 60 or Woodville Road/Cairo Road corridor to Hobbs Road. An alternate route would be Broad Street to Highway 60/62. During construction, incremental heavy-duty truck traffic on the main roadways in the vicinity of the PGDP is estimated to average approximately 35 trucks per day but would vary depending on the type and level of activity at the PLEF site.

Construction workers and truck drivers would access the site through the entrance from Hobbs Road, which would be separate from the entrance used by PLEF workers and motor vehicle traffic associated with the DOE PGDP. However, both facilities would use Hobbs Road for access. There are currently no residences along Hobbs Road from Woodville Road, and there are five residences along Hobbs Road between Woodville Road and Highway 60. Beyond construction contractors, site visitors (such as regulatory agency inspectors and GLE management staff) would make a relatively small number of vehicle trips to and from the site. Because site access would be restricted to authorized personnel, the number of these trips would be limited, and they are not expected to substantially affect transportation conditions.

Transportation impacts associated with building the PLEF would be temporary and variable over the construction period. On a day-to-day basis, the total vehicle trips to the site would be expected to vary significantly depending on the type of construction activities being conducted and the number of workers required for those activities (e.g., clearing and grading the site, erecting the building structures, installing utilities, finishing building interiors, and installing equipment inside buildings). Estimated traffic counts along routes to and from the site are provided in Table 3-7, with projections of the average daily traffic (ADT) based on the annual average number of workers estimated for the project.

Because most of the automobile and truck traffic to the PLEF site is expected to exit off of Highway 60, the most concentrated traffic impacts would likely occur along the roughly 0.5-mi (0.8-km) segment of Hobbs Road just north of Highway 60. The most recent AADT counts for traffic on Hobbs Road in the vicinity of the PGDP Site is 1,936 vehicles per day (KYTC 2024b). The projection of up to 815 ADT being added to the current AADT levels for the segment of Hobbs Road in the immediate vicinity of the intersection with Highway 60 could adversely impact the traffic flow and increase the potential for congestion at the Hobbs Road and Highway

60 intersection during peak commuting hours. Therefore, the NRC staff concludes that impacts on local transportation during PLEF construction would be MODERATE.

Table 3-7 Projected Vehicle Trips Associated with the PLEF

Phase	Year	Average Annual No. of Employees	Total Vehicle Trips	
			AM Peak Hour Trips	ADT
Site preparation and initial construction activities	2027–2028	325	388	815
Start-up operation, overlapping with one year of initial construction (2029) and four years of final construction activities	2029–2036	694	297	1,560
Production operation	2037–2067	350	140	740
Production operation and initial decommissioning activities	2065–2066	400	190	840
Decommissioning	2067–2077	50	50	105

Aside from the Hobbs Road and Highway 60 intersection, many PLEF employees who might be traveling from Illinois or northern sections of Paducah could use I-24 to the Cairo Road/ Woodville Road corridor, bypassing additional traffic on Hobbs Road near Highway 60; therefore, the NRC staff concludes that the regional transportation impacts during the construction phase would be SMALL.

Operation. The NRC staff evaluated traffic impacts from workers commuting to the PLEF, shipments of equipment and supplies to the PLEF, and shipments of fabricated fuel and wastes produced at the PLEF. Employee trips during PLEF operation are included in Table 3-7. DUF_6 feed material from the PGDP would be trucked to the site via a private access road or on Hobbs Road, mostly within the restricted access portion of this road that is associated with the PGDP. Transportation impacts from workers commuting to and from the PLEF and operational supply shipments consider the increase beyond ongoing vehicle trips to and from the DOE PGDP.

After PLEF site start-up activities conclude, an estimated permanent workforce of about 350 people would be involved in PLEF operation throughout the 40-year facility lifetime. Routes used by these workers would depend on where they live and could be similar to those used by the construction workers. Because the PLEF would operate on multiple shift schedules 24 hours per day and 7 days per week, not all of these workers would be onsite each day and during the same time periods. Peak traffic volumes entering and exiting the PLEF site would occur during a shift change.

As described for the construction period, some visitors would make occasional vehicle trips to and from the site. Because site access would be restricted to authorized personnel, the number of these trips would be limited, and they are not expected to substantially affect transportation conditions.

PLEF operation would result in additional vehicle traffic entering and exiting DOE's PGDP site at various times of the day and possibly night supply DUF_6 for the enrichment process. Those

trucks are expected to use Hobbs or Dyke Road, which is on DOE's PGDP property, and return via the same route. DUF_6 feed material could also be trucked to the PLEF from other U.S. locations, including other UF_6 conversion facilities such as the Honeywell facility across the Ohio River in Metropolis, Illinois, about 27 km (17 mi) north–northeast of the proposed PLEF site (80 km [50 mi]) by road). Feed material could also be shipped from Canada and, possibly, from the east coast or southern seaports where the material could be received from foreign suppliers. The number of shipments during PLEF operation are expected to approximate those for the DOE PGDP when it was operating.

The enriched UF_6 produced at the PLEF would be shipped offsite to various nuclear fuel fabricators for ultimate use in U.S. power reactors. The number of truck shipments of this product would be generally comparable to the number of shipments from the DOE PGDP when it was operating. An estimated 2,100 heavy-duty truck shipments are estimated per year (average six per day) when the PLEF is operating at full production capacity. Most of this traffic is projected to use Highway 60 east to I-24, while those ultimately traveling north would likely use Woodville Road. Trucks could also travel to or from PLEF via other interstate highway connections.

The DU generated as a byproduct of PLEF enrichment operations (i.e., the tails) would also be shipped offsite by truck. The GLE plans to return the tails to one of the DUF_6 storage facilities at a DOE site (PGDP or the Portsmouth site) or to a commercial DUF_6 conversion facility. Until such time that the tails can be shipped offsite to other facilities for further processing and ultimate disposal, they would be stored onsite.

Federal regulations in 10 CFR Part 61 ("Licensing Requirements for Land Disposal of Radioactive Waste") define three classes of LLRW based on the specific radioactive isotopes present, their concentrations, and their half-lives. Packaging requirements are established in 10 CFR Part 71 and 49 CFR Part 173. PLEF operation is expected to generate only Class-A LLRW, which GLE plans to ship to the EnergySolutions disposal facility in Clive, Utah.

Table 3-7 presents ADT projections for the PLEF operational period (and other phases). In addition to the 350 permanent workers that would be onsite during the initial start-up period for PLEF operation, there would be varying numbers of temporary technical staff and contractor construction workers onsite to complete the facility and gradually ramp operations up to full production levels. Thus, the highest number of ADT would be generated in the initial PLEF start-up due to the larger onsite work force, with a projected level in the range of 1,560 ADT. Once the start-up phase is completed, the number of daily vehicle trips generated by PLEF operation would decrease to a projected level in the range of 740 ADT until initial decommissioning activities commence, when the projected ADT would increase to 840 for a two-year period that overlaps with PLEF operation.

The addition of a projected 740 to 1,560 ADT for PLEF operations could adversely impact traffic flow on the segment of Hobbs Road in the immediate vicinity of the intersection with U.S. Highway 60. Adding this magnitude of ADT to the current AADT levels for the segment of Hobbs Road near the intersection of Highway 60 would noticeably increase the traffic volumes on the road and increase the potential for traffic congestion at the intersections of Hobbs Road/ Woodville Road and Hobbs Road/Highway 60 during peak commuting hours. Therefore, the NRC staff concludes that local transportation impacts during operation would be MODERATE.

Highway 60 and the Woodville Road/Cairo Road corridor connect directly to I-24, providing continuous interstate highway access from the PLEF site to destinations across the United

States. The entrance to the PLEF site from Hobbs Road would be within about 13 to 14 km (8 to 9 mi) of an interchange with I-24, therefore, the NRC staff concludes that regional transportation impacts during PLEF operation would be SMALL.

Radiological impacts on workers from incident-free transportation to and from the PLEF site have also been assessed. Incident-free means that radioactive material is transported without a traffic accident or other incident, resulting in no release of radioactive material to the environment. The radiological dose to which a person could be exposed as a result of materials being transported incident-free depends on several factors, including the external radiation levels of the package being transported, distance from the package to the exposed individual, exposure time per shipment, and number of shipments individuals are exposed to over a time period (e.g., shipments per year).

The shipment of radioactive materials associated with PLEF operation is regulated under the joint jurisdictions of the NRC and DOT. The NRC establishes requirements for the design and manufacture of packages for radioactive materials, whereas the DOT regulates the shipments while they are in transit and sets standards for package size and labeling. The radioactive material shipment requirements established by these agencies are codified in 10 CFR Part 71 ("Packaging and Transportation of Radioactive Material") and 49 CFR Part 173 ("Shipper–General Requirements for Shipments and Packagings"), respectively.

The criteria for packaging UF_6 for transport adopted by the NRC and DOT are established by the American National Standards Institute (ANSI) in ANSI N14.1 ("For Nuclear Materials - Uranium Hexafluoride - Packagings for Transport") (ANSI 2023). This standard includes specific information on design and fabrication requirements for the procurement of new UF_6 containers. The two container sizes approved for transporting UF_6 are cylinders with diameters of about 76 and 122 cm (30 and 48 in., respectively). UF_6 is shipped at ambient temperatures and remains in solid form during transport, thereby enhancing its stability and safety while in transit.

The potential radiological doses to the public and workers from incident-free transport of radioactive materials during PLEF operation were calculated using the NRC-RADTRAN (Radioactive Material Transport) computer code. The PLEF would receive shipments of UF_6 feed and would send shipments of UF_6 product, UF_6 tails, and LLRW offsite to other facilities. For the UF_6 feed and UF_6 product, material shipments would likely involve receiving UF_6 feed material from or shipping the UF_6 product to a combination of applicable facilities. All scenarios assume the materials are shipped by truck with a two-person crew.

The estimated radiological doses for incident-free transportation are well below the NRC limits for individual members of the public, represented by the total effective dose equivalent (TEDE) of 100 mrem/yr (10 CFR Part 20, "Standards for Protection Against Radiation"). Doses to in-transit truck crews and workers handling shipments would be monitored and mitigated using time, distance, and shielding to maintain worker doses as low as reasonably achievable. Because waste transportation undertaken in conjunction with the operation of the PLEF would comply with applicable DOT and NRC regulations, the NRC staff concludes that the impacts from transportation of radioactive waste produced during operation of the proposed facility would be SMALL.

Decommissioning. An estimated 50 onsite workers are projected to be needed during the decommissioning phase, which is 300 fewer than the number estimated for the operational phase. Decommissioning would include decontaminating and removing equipment and other materials for shipment offsite. The number of truck shipments will depend on the quantities of

used equipment and waste materials resulting from decommissioning. It is estimated that the average number of truck shipments would be similar to the average daily truck traffic during the initial three years of construction. The ADT estimates during decommissioning are included in Table 3-7. The reduced number of onsite workers compared with the operational phase would result in a corresponding reduction in the number of ADT on Hobbs Road, Highway 60, the Woodville Road/Cairo Road corridor, and connecting roadways.

Radioactively contaminated equipment and materials removed during decommissioning that require offsite disposal would be shipped to a licensed treatment or disposal facility (as appropriate for the material type) or disposed of in a manner authorized by the NRC. The transport of these shipments would comply with applicable NRC and DOT requirements in effect at the time of facility closure. These truck shipments would occur over the time anticipated to complete the decommissioning activities.

The number of truck trips from the PLEF site, the destinations for those trips, and the routes used would depend on the quantities and types of equipment and demolition material shipped offsite, as well as the locations of the treatment and disposal facilities available and with capacity to receive the shipments at the time that decommissioning begins. The transportation impacts associated with decommissioning the PLEF would be temporary and variable over the decommissioning period. Given the significant reduction in the number of onsite workers, the level of expected truck traffic, the relatively short duration for many of the expected decommissioning activities, and the transportation corridor improvements likely to have been made to the Paducah area by this time, the NRC staff concludes that the transportation impacts during decommissioning would be SMALL.

Transportation Accidents. The NRC has previously evaluated potential environmental impacts of the transportation of radioactive materials on public roads and by air. Radioactive materials that may present a hazard in transportation must be shipped in packages that satisfy DOT standards in 49 CFR Parts 100 to 177. The DOT standards for Type A packages address hazards encountered in normal transportation. Radioactive materials that exceed the limits for Type A packages must be shipped in Type B packages. Type B packaging provides a high degree of assurance that the package integrity will be maintained even during severe accidents, with essentially no loss of the radioactive contents or serious impairment of the shielding capability. Type B packaging must satisfy stringent testing criteria (as specified in 10 CFR Part 71) that were developed to simulate conditions of severe hypothetical accidents, including impact, puncture, fire, and immersion in water. The most widely recognized Type B packaging are the massive casks used to transport highly radioactive spent nuclear fuel from nuclear power stations (Leidos 2023).

The NRC examined the transportation of radioactive material in NUREG-0170 (NRC 1977). The NRC determined that the environmental impacts, radiological and nonradiological, of normal (incident-free) transportation of radioactive materials and the risks and consequences of accidents involving radioactive material shipments in packages that comply with DOT regulations (49 CFR Part 173) and for which the NRC has issued design approvals meeting the performance standards of 10 CFR Part 71, are SMALL (49 FR 9375).

Federal transportation regulations, shipping practices, and basic package designs for transporting radioactive material have remained essentially unchanged since 1977. In the case of HALEU fuel, package content limits have been reduced to compensate for higher enrichment levels. For example, the DN30-20 package is qualified to hold about half the mass of HALEU that could be transported in a cylinder designed for low enriched uranium (Leidos 2023). Recent

NRC assessments of the safety of radioactive materials transportation focused on shipping HALEU materials and are published in NUREG-2125; these assessments show that the potential environmental impacts associated with transportation of HALEU fuel materials are smaller than projected in 1977 (NRC 2014). The NRC staff concludes that the potential impacts from transportation of inbound fuel feedstock material and outbound final fuel product (including transportation of associated radioactive materials during operation) would be SMALL.

A similar assessment was performed by Leidos Inc. (2023) in a technical report that supports the DOE's programs to support commercial development of HALEU fuel. The Leidos report states (in Table 6-3, "Summary of the Transportation impacts for the Various Steps in a HALEU Fuel Cycle") that "the analysis of impact is based on the results presented in NUREG-1938 (NRC 2012a) and adjusted for the differences…in the form of UO_2 or metal in their respective transportation packages. Consistent with the NRC's conclusions in the enrichment facility NEPA document, the overall transportation impacts are SMALL."

3.10.3 Mitigation Measures

Transportation activities are a vital aspect of the proposed project that cannot be avoided, and negative impacts can be minimized by following established regulations and good practice. All shipments of nuclear materials, chemicals, and wastes would be carried out in accordance with NRC, DOT, and State of Kentucky requirements, including using truck placarding to identify contents and manifests. GLE sited the PLEF as close as possible to a highway to minimize truck travel on surface roadways in the area, which will limit the distance that truck traffic must travel on local streets to access the site. In addition, GLE designed restricted entrances along Hobbs Road that would limit transportation impacts on Woodville Road.

3.11 PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY

This section describes existing conditions and potential impacts of the proposed PLEF, as well as mitigation measures. Other sections of this EIS with relevant information include Section 3.2 (air quality impacts), Section 3.3 (water quality impacts), Section 3.9 (noise impacts), Section 3.10 (transportation impacts, including from workers commuting to/from the PLEF and shipment of materials), Section 3.12 (waste management), and Section 3.13 (accident impacts).

As framing context, an overview of applicable regulatory standards is presented below. Occupational health impacts would be controlled by the Occupational Safety and Health Administration (OSHA) regulations in 29 CFR Part 1910 ("Occupational Safety and Health Standards") that limit chemical exposures to workers. OSHA's regulations that protect workers from chemicals would also protect the public; for example, the control of chemicals and associated exposures on a construction site would effectively reduce the potential for fugitive emissions of chemicals to offsite locations. OSHA's regulations would also limit exposures to dust (PM) and reduce the potential for its offsite transport.

Potential radiological impacts during PLEF operation would be bounded by NRC regulations that limit worker exposures and environmental releases because the facility would be required to operate within these limits. NRC regulations include limits for radiation doses and a standard of operation requiring that actual doses be safe. The regulations in 10 CFR Part 20 ("Standards for Protection Against Radiation") require that licensees continually evaluate operational conditions to minimize radiation doses to workers and the public. The NRC regulations in 10 CFR 20.1301 (Dose limits for individual members of the public) require that the effective dose equivalent to individual members of the public does not exceed 100 millirems per year (mrem/yr), which corresponds to 1 millisieverts per year (mSv/yr). Furthermore, EPA regulations

in 40 CFR Part 190 ("Environmental Radiation Protection Standards for Nuclear Power Operations") restrict the annual dose equivalent to any actual member of the public to 0.25 mSv/yr (25 mrem/yr). These regulations also limit the maximum dose to any organ of the body to 0.25 mSv/yr (25 mrem/yr) for an actual person.

To limit radiological and chemical exposures associated with the PLEF, the GLE has committed to (1) controlling atmospheric releases to ensure that the concentrations at the point of discharge from the stacks would not exceed regulatory limits for exposures to workers and members of the general public; and (2) minimizing liquid releases and assuring that effluents at the point of discharge comply with applicable limits, including those in 10 CFR Part 20, Appendix B. Furthermore, gaseous emissions within the facility would not exceed the standards for toxic and hazardous substances identified in 29 CFR Part 1910, Subpart Z.

3.11.1 Affected Environment

Existing radiation sources at the proposed PLEF site include natural background sources and man-made sources, notably the adjacent DOE PGDP facility and the Honeywell UF_6 conversion facility located near Metropolis, Illinois, about 10 km (6 mi) northeast of the PLEF site.

Everything on Earth is continuously exposed to natural background radiation from radionuclides found throughout soils, rocks, and minerals. On average, the Earth's crust has about 1 part per million of natural uranium. Radon gas from the decay of uranium (and its progeny, radium) is released from geologic materials and soils to ambient air. Naturally occurring, low levels of uranium, radium, and other radionuclides are also found in drinking water and foods. The EPA estimates that the average annual dose to the public from ingested radioactivity is 34 mrem/yr (Mauro and Briggs 2005). In addition to terrestrial radiation and radon, cosmic rays from outer space is another continuous source of natural radiation exposure.

Man-made sources of radiation received by the general public include medical sources (such as diagnostic procedures and treatment using x rays and radioisotopes) and consumer products. On average, the annual radiation dose estimated for a member of the public in the United States is 620 mrem, with half coming from natural background radiation and the other half from man-made sources (NRC 2024b). In the State of Kentucky, the average annual doses from cosmic radiation, terrestrial radiation, and indoor radon, respectively, are 27.7 mrem/yr (0.277 mSv/yr), 27.8 mrem/yr (0.278 mSv/yr), and 470 mrem/yr (4.7 mSv/yr) (Mauro and Briggs 2005). McCracken County is a "Low Potential" zone for the presence of radon gas relative to other areas of Kentucky; therefore, the indoor radon dose at the PLEF would be lower than in other areas of the State (GLE 2025a, Section 3.3.1.6).

With regard to radiation exposures from man-made facilities in the vicinity of the proposed PLEF, both the DOE PGDP and the Honeywell facility could potentially contribute via direct exposure, atmospheric releases, and liquid effluent releases. However, because of the distance of the Honeywell facility from the PLEF site, its contribution to public exposures would be negligible compared to the potential contribution from the PGDP. DOE actively monitors radiological contaminants in air and effluents as part of the PGDP site's radiation monitoring program. Using data from 2022, DOE calculated potential radiological exposures associated with the PGDP via direct exposure, atmospheric releases, ingestion of surface water, and incidental ingestion of sediment. DOE estimated that the dose to the maximally exposed individual (MEI) near the GLE land parcel from PGDP operations and legacy site contamination would be 4.3 mrem/yr, mainly from direct exposure (GLE 2025a, Section 3.11.2).

The DOE PGDP also represents a potential source of chemical exposures. This facility converts UF_6 to triuranium octoxide (U_3O_8) using a dry conversion process. This process generates chemical products that are sold for commercial use, notable calcium fluoride and HF gas (converted to liquid form). The potential exists for accidents leading to direct or indirect releases of radioactive and chemical materials. Accidental releases would likely be more concentrated over a shorter period than routine releases. Concentration and exposure rates help determine whether there would be acute effects or chronic effects on the public or the environment. For radiation, an acute dose usually refers to a large dose received in a short period of time, while chronic dose refers to the sum of small doses received repeatedly over a long period of time. Information about potential impacts of radiological and nonradiological accidents is presented in Section 3.13 of this EIS.

3.11.2 Potential Impacts

This section summarizes potential health and safety impacts on the nearby public and on workers at the proposed PLEF from site preparation and construction, operation, and decommissioning for both radiological and nonradiological (chemical) exposures. The NRC staff identified one NR GEIS Category 1 issue related to the radiological environment and one related to the nonradiological environment during construction that are relevant to the review of the GLE PLEF license application (see Tables 3-1 and C-1 of this EIS). The NRC staff relies on the technical arguments in the NR GEIS to conclude there would be SMALL impacts of radiological dose to construction workers or building impacts of chemical, biological, and physical nonradiological hazards. In addition, the NRC staff identified three NR GEIS Category 1 issues related to the radiological environment and one related to the nonradiological environment during operation that are relevant to the review of the GLE PLEF license application. The NRC staff relies on the technical arguments in the NR GEIS to conclude there would be SMALL impacts of the radiological dose to workers; MEI annual doses; total population annual doses; or operation impacts of chemical, biological, and physical nonradiological hazards. Therefore, these issues are not discussed in detail in this section; however, information about these issues may be included for additional context as it relates to other aspects of this resource area.

Site Preparation and Construction. This section evaluates the potential for occupational injuries and illnesses associated with the proposed preconstruction and construction activities. It also evaluates the potential public and occupational health impacts from nonradiological and radiological releases during this phase. As described in the ER (GLE 2025a), fugitive emissions would be controlled using erosion controls and dust suppression. Spills of fuel or waste would be addressed by procedures that minimize the likelihood of accidents. Spill response programs, countermeasure plans, and spill-response plans would minimize the magnitude of impacts from accidental discharges (GLE 2025a, Section 4.12.2.1.1).

Occupational Injuries and Illnesses. The proposed action involves a major construction activity with the potential for industrial accidents related to construction vehicles, material-handling, and trips and falls. Resultant injuries could range from minor temporary injuries to long-term injuries and/or disabilities to fatalities. The proposed activities are not anticipated to be any more hazardous than those for a typical large industrial construction or demolition project. Health impacts associated with site preparation and construction activities were estimated using annual injury and illness data for heavy construction compiled by the U.S. Department of Labor, Bureau of Labor Statistics (BLS), representing North American Industry Classification System Code 237 (“Heavy and Civil Engineering Construction”). The most recent data available for incident rates for total recordable cases and lost workday cases,

in units of incidents per 100 full-time equivalents (FTEs), were obtained from BLS (BLS 2026, Table 1, Incident rates of nonfatal occupational injuries and illnesses industry and case types, Kentucky 2023). Using the estimated maximum of 600 construction workers at the proposed PLEF (Section 2.1.1.2) together with the injuries and illness rate of 2.1 per 100 FTEs for the heavy and civil engineering construction (BLS 2026), about 12 injuries are estimated per year during site preparation and construction activities.

Nonradiological Impacts. Occupational exposures during site preparation and construction activities would include exposure of construction workers to airborne fugitive dusts generated from vehicle traffic and heavy equipment use, exposure to pollutants emitted from diesel and gasoline powered equipment (e.g., CO, nitrogen and sulfur oxides, and PM), and exposure to vapors from fuels, paints, or solvents used during construction. Any such exposures would be expected to be minor and would be minimized using work practices and personal protective equipment specified in the construction health and safety plan. Construction activities would be subject to OSHA construction regulations in 29 CFR Part 1926 (“Safety and Health Regulations for Construction”). Such exposures would be typical of construction projects for industrial facilities. Worker exposures to low-level background emissions of uranium and HF from the proposed PLEF during the overlap period of its construction and early operation is discussed under facility operation; as noted, such exposures would be minor.

Impacts of air pollutants emitted during road construction, land clearing, and building construction activities are discussed in Section 3.2.2 of this EIS, including the NRC staff conclusion that impacts on air quality during site preparation and construction activities would be SMALL. These activities are not expected to cause any exceedances of ambient air quality criteria, with the possible exception of minor exceedances of short-term criteria for $PM_{2.5}$ and PM_{10} from fugitive dust emissions. Worker exposures would be limited through the use of dust masks or respirators, as appropriate.

Potential impacts on surface water and groundwater from wastewater discharges, spills, erosion, and runoff during site preparation and construction activities are described in Section 3.4.2 of this EIS. Surface water impacts would be minimized through the use of BMPs and engineering controls. Releases to streams would be in accordance with an NPDES permit. Temporary increases in sedimentation and turbidity in streams might occur from stormwater runoff from soils disturbed by construction activities. Like for surface waters, potential impacts on groundwater would be minimized by using BMPs and engineering controls to prevent or contain any spills of hazardous materials, including vehicle and equipment fuels. Thus, the NRC staff concludes that offsite incidental exposures to groundwater or surface water by members of the public would not be of concern. Drinking water for workers would be from an offsite source.

Radiological Impacts. Radiological impacts during site preparation and construction would primarily be incurred by the construction workers. Exposures to the offsite public would not be expected due to the distance from construction emission sources. Construction workers would not be monitored for radiation exposure by the onsite radiation exposure control program. Thus, the applicable dose limits for construction workers would be the same as those listed in Table 3-8 for the general public (i.e., 100 mrem/yr; 1 mSv/yr). Preconstruction and construction activities would not generate any radiological contamination, but these activities could disturb areas previously contaminated by deposition of contaminated particulates on soil due to air emissions from the DOE PGDP. Construction workers would also be exposed to emissions from the proposed PLEF during the overlap period of construction and early operation.

The main exposure pathways for construction personnel would be the direct dose from cylinder storage at the PLEF. Calculations performed by GLE estimated the construction worker dose to be less than 46.51 mrem/yr (GLE 2025a, Section 4.12.2.2.1). The total maximum possible dose to construction workers from all pathways combined is estimated to be less than 1 mSv/yr (100 mrem/yr), which is the limit established in 10 CFR 20.1301(a)(1). Based on this assessment, the NRC staff concludes that the impact on workers from radiological exposure during site preparation and construction would be SMALL. The dose to the offsite public would be significantly smaller than that for construction workers because there is no potential for measurable exposure from existing site contamination. Therefore, the NRC staff concludes that the potential impact on the health of the offsite public from site preparation and construction would be SMALL.

Operation. This section summarizes (1) potential public and occupational health impacts associated with nonradiological and radiological releases from the proposed PLEF and (2) impacts on worker safety, notably estimated occupational injuries and illnesses. As context for this assessment, the NRC has statutory responsibility, pursuant to the Atomic Energy Act of 1954, as amended (42 U.S. Code [USC] §2011 *et seq*.) to protect the health and safety of workers and the public. The NRC's regulations in 10 CFR Part 20 specify annual dose limits for workers, including 0.05 Sv (5 rem) TEDE.

The NRC regulations also identify limits for members of the public, including (1) an annual dose of 1 mSv (100 mrem) TEDE, with no more than 0.02 mSv (2 mrem) in any 1-hour period from any external sources, and (2) an annual dose limit of 0.5 mSv (50 mrem) for external sources. In addition, NRC regulations limit radiation doses to the public from airborne emissions to 0.1 mSv (10 mrem). The dose limits for individual members of the public from NRC-licensed activities are provided in Table 3-8. For context, these limits are a fraction of the estimated total individual radiation dose in the United States of 6.2 mSv/yr (620 mrem/yr) from natural and artificial sources combined (the latter includes medical imaging) (NRC 2024b).

In addition to meeting the NRC dose limits for individual members of the public, GLE would implement the guidance in NRC's Regulatory Guide 4.20 ("Constraint on Releases of Airborne Radioactive Materials to the Environment for Licensees other than Power Reactors") (NRC 2012b) to reduce exposures to the public from airborne radioactivity below the limits in 10 CFR 20.1301. GLE has further committed to restrict uranium concentrations at the point of discharge from the stacks to the values in 10 CFR Part 20, Appendix B, Table 2, column 1.

Table 3-8 Annual Dose Limits for Individual Members of the Public from Licensed Operation[a]

Dose Type	Dose Limit	Application
TEDE	1 mSv/yr (100 mrem/yr)	Unrestricted area
External dose rate	0.02 mSv/hr (2 mrem/hr)	Unrestricted area
External dose rate	0.5 mSv/yr (50 mrem/yr)	Continuous occupancy at unrestricted area boundary
TEDE	0.1 mSv/yr (10 mrem/yr)	Emission of airborne radioactive material

[a] See 10 CFR 20.1301 and 10 CFR Part 20, Appendix B. TEDE = total effective dose equivalent.

GLE would also implement a radiological effluent monitoring program to meet the regulatory requirements in 10 CFR 70.59 ("Effluent monitoring reporting requirements"). GLE would use the data from this monitoring program to perform semiannual assessments of emissions and calculate doses to members of the public to ensure that limits established in 10 CFR 20.1301 are met (GLE 2025a).

The OSHA General Industry Standards (29 CFR Part 1910) establish practices and procedures, exposure limits, and equipment specifications to preserve worker health and safety. These include standards for occupational exposure to hazardous chemicals in laboratories found at 29 CFR 1910.1450 (“Occupational exposure to hazardous chemicals in laboratories”), and personal protective equipment standards are found at 29 CFR Part 1910, Subpart I (“Personal protective equipment”). Note that these include regulations related to laser safety, 29 CFR 1910.133 (“Eye and face protection”), which would apply to the protection of worker health. GLE would identify personal protective equipment requirements based on the nature of the work and the radiological and/or chemical hazards present; the equipment could include protective clothing (e.g., anti-contamination clothing, gloves, and shoe covers), safety shoes (e.g., steel-toe, composite-toe), hard hats, safety glasses, and respirators.

GLE would be required to meet the occupational dose limits for workers as stated in 10 CFR 20.1201 (“Occupational dose limits for adults”). The principal occupational limits for workers in a uranium facility are 50 mSv/yr (5 rem/yr) TEDE or the equivalent dose to any organ or organs that would concentrate inhaled or ingested uranium. Additional limits apply to exposure to the skin and the lens of the eye. Workers would be monitored for radiation exposure to ensure the occupational dose limits are met. GLE would also be required to mitigate risk to workers from accident conditions in accordance with 10 CFR 70.61 (“Performance requirements”). The PLEF would comply with all applicable health and safety regulations.

As described in Section 3.2, air emissions from the PLEF would be maintained below regulatory thresholds and would be managed in accordance with the CAA and State of Kentucky’s air permitting requirements. Potential impacts on visibility would be minor because the PLEF would constitute a minor air pollutant source. During operation, the PLEF would use specially designed ventilation systems and HEPA filters to limit air emissions and ensure compliance with all applicable laws and regulations.

Based on the anticipated chemical release, the PLEF would be classified as a minor-source operator (GLE 2025a), and GLE’s air permits would require GLE to monitor and evaluate nonradiological pollutant emissions. Chemical emissions would also be monitored under GLE’s environmental monitoring plan. GLE would apply mitigation measures to reduce the hazards of chemical spills or accidents as discussed in Section 3.4.3. These measures would include meter vessel volume limits, level alarms and interlocks, containment enclosures, welded piping, overflow collection systems, and access controls. PLEF operation would be designed to ensure that all current and proposed chemical-use hazards are evaluated, and appropriate measures would be taken to ensure safe operations. The industrial hazards for the PLEF are those considered typical for similar industrial facilities and include exposure to chemicals and accidents ranging from minor cuts to harm from industrial machinery (GLE 2025a).

The PLEF would store bulk chemicals in the form of solids, liquids, compressed gases, and cryogenic liquids to support manufacturing operations. Outdoor chemical and gas storage tanks for cryogenic liquids (argon), liquids, and compressed gases would be constructed of appropriate containment materials according to building and fire codes. Tanks and piping would be welded construction designs to mitigate releases. Tanks and transfer systems would be inspected, tested, and maintained as recommended by applicable industry codes and standards.

The PLEF would be required to maintain an NRC-approved Emergency Plan (EP), which would provide resources, training, and procedures to mitigate the impact and severity of radiological or

nonradiological accidents. The EP would define the coordination of GLE's actions with the NRC, DOE, the Federal Emergency Management Agency, McCracken County, and the State of Kentucky regarding emergency response and facility security. GLE's NPDES permit would require a SPCC plan during construction and operation to prevent and control accidental chemical releases.

Public Health. With regard to nonradiological impacts, the PLEF would operate a proprietary, non-combustion, closed-system process inside the main OB, and no gaseous criteria air pollutants (e.g., CO, NO_2, SO_2) or VOCs would be produced by this process. The use of air emission control systems and implementation of mitigation measures would reduce the levels of pollutant emissions to the atmosphere. The main emissions of concern for nonradiological health effects are HF and uranium (including per its chemical toxicity). UF_6 would be used in the facility, and both UF_6 and HF could be released under various accident scenarios. If UF_6 were released, it would react with moisture in the air (humidity) to form HF. Fluoride monitors on the vent stacks would be employed to detect incidental releases, and the in-stack filter would be analyzed for fluoride content either daily or weekly. The HF emissions would be kept below the KDAQ permit limits. Therefore, the NRC staff concludes that potential public health impacts from nonradiological air emissions during normal operation would be SMALL.

Bulk chemicals would be stored at the PLEF during the operational period in the form of solids, cryogenic liquids to support manufacturing operations, other liquids, and compressed gases. Outdoor chemical and gas storage tanks for cryogenic liquids (argon), other liquids, and compressed gases would be constructed of appropriate containment materials according to building and fire codes. Tanks and piping would be welded construction designs to mitigate releases. Tanks and transfer systems would be inspected, tested, and maintained as recommended by applicable industry codes and standards. Liquid releases would be managed as described in the ER (GLE 2025a) and summarized in Section 3.12 of this EIS. Potential nonradiological releases to surface water and groundwater during the operational period, including cooling tower blowdown and liquid wastes from decontamination, cleaning, and laboratory processes, would be small and would not be expected to degrade existing water quality offsite (see Section 3.4 of this EIS). Therefore, the NRC staff concludes that potential health impacts on the public associated with liquid releases would also be SMALL.

With regard to potential routine radiological impacts, operation of the proposed PLEF could result in radiation exposures by members of the public via ingestion or inhalation of uranium released from the facility or from direct external exposure to radiation emitted by the uranium at the facility. The two pathways of concern potentially leading to public intake of uranium would be airborne emissions and liquid releases. With respect to releases to air, any UF_6 gas released inside the operations building during plant operations and repair activities would be sent through ventilation system employing a high-efficiency, multi-stage, emissions control system that incorporates HEPA filters to remove PM and activated carbon beds to sorb gases, thereby minimizing outside releases. Liquid releases could result from decontamination, cleaning, and maintenance of failed equipment or equipment being serviced and any associated releases of radioactive liquids to surface water. However, these liquids would be treated and sampled to limit releases via a permitted outfall. Exposure of members of the public to direct external radiation could potentially occur from emission of radiation from uranium in process lines; in cylinders in storage areas; and during handling, temporary storage, and transportation within and outside of the site. The direct radiation emitted by the uranium in the operations building would be substantially attenuated by the walls of the storage cylinder, and building walls, process lines and equipment in the proposed PLEF.

Uranium emissions were estimated based on monitoring data from the Global Nuclear Fuel-Americas, LLC, Fuel Manufacturing Operations facility, which has comparable UF_6 handling and emissions controls. Because the proposed PLEF does not include some processes conducted at that facility (e.g., conversion of UF_6 to UO_2), actual uranium emissions are expected to be lower.

- *Public Dose from Direct Gamma Radiation*. The presence of radioactive materials at the proposed PLEF, mainly stored at the storage pad, would present the possibility for any members of the public visiting onsite and those offsite to receive a radiation dose directly from gamma rays (photons) emitted from these materials. Isotopes of uranium could be present in quantities large enough to provide the potential for the members of the public to receive a measurable external radiation dose. The ER presents dose estimates for two hypothetical individual members of the public: one assumed to be located at the site boundary close to the storage pad (who could potentially receive a dose of about 18.3 mrem/yr), and the other assumed to be continuously present in the unrestricted area (who could potentially receive a dose of about 16.1 mrem/yr) (GLE 2025a, Table 4-29).
- *Public Dose from Airborne Releases of Radioactive Materials*. The proposed PLEF would release small amounts of uranium to the atmosphere through rooftop stacks. There are no publicly available source test data available for quantifying the level of air emissions from the GLE laser-enrichment process. Air emission estimates from GLE's laser enrichment facility in Wilmington, North Carolina, can be used as context for emission estimates from the PGDP. DOE (2023) showed that both the overall emissions and emissions from individual uranium isotopes from the PLEF are expected to be significantly lower than from the PGDP site (GLE 2025a, Tables 4-27 and 4-28). Therefore, the doses calculated for the PGDP from the gaseous effluent release pathway are assumed to represent the bounding dose for PLEF operation. The effective dose for the MEI from PGDP gaseous releases was calculated to be 0.00143 mrem/yr. This includes the estimated dose from inhalation, air submersion, direct external dose from deposited contamination, and ingestion of contaminated food grown onsite (FRNP 2023).
- *Public Dose from Liquid Releases of Radioactive Materials*. The proposed PLEF would generate process and sanitary liquid effluent streams. Process wastewaters, including from decontamination, cleaning, and laboratory activities within the main operations building and other wastewaters that could contain radioactive materials would be sent to RLECTS. RLECTS is a closed-drain system where the liquid effluents would be monitored, to be recycled or discharged to local receiving waters, or shipped off site for treatment and disposal. Cooling tower blowdown would be discharged to local receiving waters. Sanitary wastewater would be collected and treated onsite before being discharged to local receiving waters. All liquid effluent discharges would be through an approved KPDES outfall in compliance with acceptable discharge limits.

  On average, PLEF operation would send 24,605 lpd (6,500 gpd) of liquid wastewater to the onsite collection tanks; would discharge 148,199 lpd (39,150 gpd) of cooling tower blowdown to the planned outfall to Little Bayou Creek; and would generate 51,800 lpd (13,700 gpd) of sanitary wastewater (GLE 2025a). The liquid effluent releases are expected to be much lower than those from the DOE PGDP. Therefore, doses calculated for the liquid effluent release pathway for the PGDP are assumed to represent the bounding dose for proposed PLEF operation. The effective dose for the MEI from PGDP liquid effluent releases was calculated to be 0.041 mrem/yr from incidental ingestion of

surface water and 0.03 mrem/yr from incidental ingestion of contaminated sediment (FRNP 2023).

As described in the ER (GLE 2025a), GLE would implement a radiological effluent monitoring program to meet the regulatory requirements in 10 CFR 70.59 and would use the data from this program to assess doses to members of public from accidental gaseous releases or to verify that monitored effluents satisfy the public dose limits defined in 10 CFR 20.1301 (see Table 3-8 of this EIS). These data would also be used to assess compliance with technical specifications of the license regarding emission concentrations. The dose assessment shows that hypothetical public doses from PLEF emissions are not expected to exceed 1 mSv/yr (100 mrem/yr).

Environmental effluent releases would be monitored at release points or the property boundary and reported to the NRC on a semiannual basis. In addition, doses to the public would be calculated on an annual basis using NRC-approved computer codes. As described in the ER (GLE 2025a), GLE has committed to complying with NRC's Regulatory Guide 1.111 methods for estimating atmospheric transport and dispersion (including accounting for terrain features in valleys). If necessary, the NRC staff would stipulate license conditions to ensure PLEF operation complies with the guidance in NUREG-1520 (NRC 2015). The environmental monitoring program would also identify radiological concentrations in groundwater and surface water and any long-term accumulation of uranium in soil.

Because the potential health impact on the maximally exposed member of the public would be small, the potential health impact on members of the public who receive lower radiation exposures would also be small. By protecting the most exposed individual, the NRC regulations protect the entire population of potentially exposed individuals. Based on the bounding dose assessment for the proposed PLEF, the NRC staff concludes that the impact of operating the facility would be SMALL.

Occupational Health and Safety. Operation of the PLEF would result in potential direct and indirect worker exposures to radiological and nonradiological hazardous materials. During normal operation, worker exposures would be controlled to assure compliance with regulatory standards, including NRC occupational dose limits in 10 CFR 20.1201 and OSHA standards for exposures to toxic and hazardous substances defined in 29 CFR Part 1926, Subpart Z. The PLEF would establish and implement a chemical safety program and other occupational programs to minimize worker health impacts, including associated with accidents such as electrical shock and asphyxiation for personnel engaged in activities such as facility maintenance and testing.

Laboratory and maintenance activities would be conducted with ventilation control (e.g., fume hoods) and/or use of respiratory protection as required by the project's Industrial Safety Program. Based on GLE's estimate of the maximum PLEF workforce of 550 full-time employees (GLE 2025a, Section 4.10.2.1.2), it is estimated that 10 worker injuries could potentially occur per year. This estimate is based on data from BLS (2026), which identifies an injury rate of 1.9 total recordable cases per 100 FTEs for Kentucky in calendar year 2023, representing the chemical manufacturing industry (North American Industry Classification System Code 325). This translates to a total recordable incident rate of about 1.8 (from 2,000 annual work hours per employee divided by 1,100,000 total annual hours for 550 workers). For context, this is below the most recent national average of 2.3 for all private industries (NSC 2026).

The PLEF would monitor workers for radiation exposures in accordance with 10 CFR Part 20 and would limit worker risks from accident conditions in accordance with 10 CFR 70.61. Data from 2023 show that the average worker dose (as TEDE) at a fuel cycle facility (spanning fuel

fabrication, processing, uranium enrichment, and UF_6 production facilities) was 80 mrem (0.8 mSv) (Brock et al. 2025, Table 3-1). This level of radiation exposure represents a fraction of the annual average background radiation dose received by the U.S. public (620 mrem). The PLEF would maintain compliance with NRC and OSHA regulations as a prerequisite for maintaining an NRC operating license. Existing regulatory requirements have been effective in keeping average radiation exposures in fuel cycle facilities to a small fraction of natural and human-made background radiation. Therefore, the NRC staff concludes that potential direct and indirect impacts on workers from the proposed PLEF would be SMALL.

Decommissioning. The potential public and occupational health and safety impacts of decommissioning activities involve exposures that are similar to the operational phase of the facility but would involve lower quantities of radioactive and chemical materials. The NRC and OSHA regulations would continue to control public and occupational exposures, and air permits would remain in effect. Worker injuries and potential accidental fatalities associated with decommissioning would be bounded by those estimated for the construction period. During decommissioning, potential impacts would derive mainly from the residues of radiological and chemical materials that were used during operation. The methods that were applied to prevent or control impacts during operation would be used during decommissioning to protect public and occupational health. Significant sources of radioactive materials and chemicals would be removed from the facility or otherwise controlled prior to structural demolition. Potential health and safety impacts related to demolition would be controlled like for the construction safety practices, with radiological and chemical safety programs as appropriate. Therefore, the NRC staff concludes that potential public and occupational health and safety impacts during decommissioning would be SMALL.

3.11.3 Mitigation Measures

The proposed action is not anticipated to result in significant public or occupational health or safety impacts. Current processes, programs, and regulations would be in place to reduce the potential for adverse health and safety effects. No additional mitigation measures would be indicated beyond those that would be implemented under NRC, OSHA, and EPA regulations and the project's integrated safety analysis.

3.12 WASTE MANAGEMENT

This section describes waste management under current site conditions, as well as potential waste management impacts of the proposed PLEF.

3.12.1 Affected Environment

The proposed PLEF site is on undeveloped land, and there are currently no wastes generated at this site.

3.12.2 Potential Impacts

This section describes potential waste management impacts of the proposed action and associated mitigation measures. Waste management considers the wastes that would be generated during PLEF construction, operation, and decommissioning; these materials include the DUF_6 that would be generated during PLEF operation. As described in the ER (GLE 2025a), PLEF wastes would be managed in accordance with GLE's solid, hazardous, and radioactive waste management program.

Construction wastes would be typical of those for an industrial facility. During PLEF operation, wastes would include gaseous, liquid, and solid wastes from the uranium enrichment process. Waste materials would include radioactive waste (DUF_6 tails and material contaminated with UF_6), listed or characteristic hazardous materials as defined by the Resource Conservation and Recovery Act (RCRA, 40 CFR Part 261) and nonhazardous materials, which are any other wastes not identified as radioactive or hazardous. Hazardous materials include any fluids, equipment, and piping contaminated as defined in 40 CFR Part 261, such as cleaning solvents and pesticides, that would be used during construction, operation, and maintenance. The following overview uses available information and waste data from facilities generally similar to the proposed PLEF (see GLE 2025a).

The NRC staff identified one NR GEIS Category 1 issue related to nonradiological waste management during construction and the same issue during operation that are relevant to the review of the GLE PLEF license application (see Tables 3-1 and C-1 of this EIS). The NRC staff relies on the technical arguments in the NR GEIS to conclude there would be SMALL impacts from construction nonradiological waste and operation nonradiological waste. Therefore, these issues are not discussed in detail in this section; however, information about these issues may be included for additional context as it relates to other aspects of this resource area.

Site Preparation and Construction. Construction activities would generate solid waste materials, mainly refuse and construction debris typical of industrial construction projects. These would be collected and transported offsite for recycling or disposal. The specific compositions and quantities for these construction waste types will depend on the final facility design. No radioactive waste is expected to be generated from construction during the initial 3-year construction phase. Hazardous waste generated during the construction phase would be temporarily stored onsite and then shipped to a licensed offsite facility. Wastewater discharges would be managed under a KPDES permit. Waste management services in the area have the capacity to manage wastes expected from site preparation and construction. Therefore, the NRC staff concludes that the associated waste and wastewater management impacts would be SMALL.

Operation. Normal operation of the proposed PLEF would generate wastewaters that would be treated onsite before discharge; it would also generate solid wastes that would be treated onsite or offsite and shipped offsite for disposal. Table 3-9 summarizes the types and estimated amounts of wastes to be generated, together with their proposed disposition. GLE requested a license to process DU that may contain trace quantities of fission products as a consequence of previous processing of historical feed of recycled uranium at other facilities. It is anticipated that trace quantities of activation products could be present in the cylinders, primarily in the heels.[14] GLE does not anticipate cleaning or refurbishing the cylinders prior to their return.

Table 3-9 Wastes Estimated to Be Generated During Normal Operation

Waste Type	Estimated Quantity	Proposed Management
Sanitary waste	51,860 lpd (13,700 gpd)	Treat onsite and discharge to Little Bayou Creek via an approved KPDES outfall
Cooling tower blowdown	114,130 lpd (39,150 gpd)	Send to onsite liquid effluent treatment system; discharge treated nonradiological effluent via the planned outfall location in Little Bayou Creek

[14] Heels are the small amount of solid residues that can remain in the cylinder after the DUF_6 has been removed, i.e., after the cylinder has been evacuated or “heeled.”

Waste Type	Estimated Quantity	Proposed Management
Stormwater runoff	Varies depending on precipitation	Route to onsite stormwater retention basins, and discharge to Little Bayou Creek per KPDES permit
Radioactive liquid effluent	24,600 lpd (6,500 gpd)	Send to onsite Radioactive Liquid Effluent Collection and Treatment System; treated effluent would be released via an approved KPDES outfall
Municipal solid waste (MSW)	345 MT/yr (380 tons/yr)	Send offsite to a regional landfill for disposal
Nonhazardous industrial wastes	129 MT/yr (143 tons/yr)	Send offsite to Heritage Environmental Services
Hazardous waste	15 MT/yr (16 tons/yr)	Send offsite to Heritage Environmental Services
LLRW	415 MT/yr (458 tons/yr)	Send offsite to the Energy Solutions facility in Utah
Depleted UF_6 (tails)	16,475 MT/yr (18,161 tons/yr)	Transport cylinders with UF_6 tails by truck to DU conversion facilities offsite, subject to availability

Regarding wastewaters, the facility's *w*astewater management systems would handle sanitary wastewater, facility cooling tower water, stormwater, and process wastewater, as summarized below from the ER (GLE 2025a). The first three systems deal with nonradioactive effluents, and the fourth would remove any uranium or other metals left in the water as a result of the uranium enrichment process.

- *Sanitary Wastewater*. Operation of PLEF would generate approximately 51,860 lpd (13,700 gpd) of sanitary wastewater. The sanitary wastewater would be treated onsite in a sanitary wastewater treatment plant and monitored for KPDES permit requirements. The sanitary wastewater treated would be discharged through an approved KPDES outfall to Little Bayou Creek.

- *Cooling Tower Blowdown*. The cooling towers for the PLEF would be closed-loop systems that would not contact any uranium materials or uranium-contaminated wastewater streams. The cooling tower blowdown would be pumped directly to the planned outfall location in Little Bayou Creek. Cooling tower blowdown from PLEF operation would add approximately 148,200 lpd (39,150 gpd) to the planned outfall.

- *Stormwater*. Stormwater runoff from the PLEF would be routed to stormwater retention basins and would be monitored for compliance with KPDES permit requirements before being discharged to a KPDES-permitted outfall to Little Bayou Creek which flows into the Ohio River. Runoff from the UF_6 cylinder storage pads would be routed to a retention basin, where it would be monitored before being released to a stormwater retention basin if the radionuclide concentration(s) were below the acceptable level(s).

- *Process Wastewater*. Daily PLEF operation is expected to generate approximately 24,600 lpd (6,500 gpd) of radioactive wastewater from decontamination, cleaning, and laboratory activities within the main operations building (GLE 2025a). This wastewater would be sent to the RLECTS, a closed-drain system, from which liquid effluents would be discharged to collection tanks where they would be sampled for solids and radioactive content to determine contaminant levels and assess the viability of untreated release to an approved KPDES outfall. The liquid radioactive waste in separation collection tanks would be treated to separate oils and likewise sampled for radioactive content. The liquid effluents would be either released untreated to an approved KPDES outfall, recycled, or shipped offsite to a commercial treatment and disposal facility.

Regarding solid wastes, PLEF operation would generate (1) refuse and other nonhazardous solid waste, (2) wastes designated as RCRA hazardous wastes, and (3) LLRW. In addition, depleted uranium would be produced by the uranium-enrichment process. No high-level radioactive wastes or mixed wastes would be generated by PLEF operation. Potential impacts of solid waste disposition are summarized below. The potential impacts of transporting solid wastes from the PLEF are discussed in Section 3.10 of this EIS.

- *Nonhazardous/Nonradioactive Waste*. PLEF operation would generate an estimated 345 MT/yr (380 tons/yr) of MSW and an additional 129 MT/yr (143 tons/yr) of other nonhazardous industrial solid wastes. The MSW would be collected on a regular basis and sent to a RCRA-permitted Subtitle D commercial landfill for disposal at the Heritage Environmental Services in Indianapolis, Indiana, about 64 km (40 mi) from the PLEF site. Impacts on the landfill operations would be SMALL because the PLEF MSW would contribute an additional 1.4 percent to the landfill's current receipt rate. Other nonhazardous, nonradioactive industrial waste would either be packaged and shipped directly to that facility or routed through that it for reuse, reclamation, or treatment. The NRC staff concludes that potential impacts would be SMALL because 129 MT/yr (143 tons/yr) represents less than 0.02 percent of the yearly industrial waste capacity of the landfill (which is 660,000 tons/yr).

- *Hazardous Waste*. PLEF operation would generate approximately 15 MT/yr (16 tons/yr) of RCRA hazardous waste. The nonradioactive portion would be temporarily stored onsite. The waste would be shipped to a RCRA-permitted Subtitle C facility at Heritage Environmental Services in Indianapolis, Indiana, or an equivalent facility for treatment, storage, and disposal. The waste would be transported four times a year in DOT-approved shipping containers. The NRC staff concludes that potential impacts are expected to be SMALL because Heritage Environmental services has enough capacity for the disposal of 15 MT/yr (16 tons/yr) of hazardous waste.

- *LLRW*. A variety of uranium-contaminated wastes would be expected to be generated from operating the proposed PLEF. Except for the DUF_6 tails, the majority of the LLRW (416 MT/yr [458 tons/yr]) would be the combustible and non-combustible portions of contaminated used items, with an additional 1,271 kilograms/yr (2,800 pounds/yr) of sludge from the treatment of process wastewater, followed by waste from feed sampling and analysis (59 kilograms/yr [129 pounds/yr]) (GLE 2025a). This LLRW would be shipped in LLRW Type A containers to the Clive facility, which is about 2,377 km (1,477 mi) by road from PLEF site. That facility can only accept Class A radioactive and mixed waste. (The PLEF would not generate any greater-than-Class A waste.) The impact would be considered SMALL because approximately 416 MT/yr (458 tons/yr) of waste is a small fraction of the waste disposed of in the Clive Facility (which in 2024 exceeded 3 million cubic feet).

- *DUF_6 Tails.* PLEF operation would generate an estimated 16,475 MT/yr (18,161 tons/yr) of DUF_6 tails from the enrichment of natural uranium. These tails would be temporarily stored onsite on an outdoor storage pad in standard steel cylinders used for storing UF_6. The storage pad would include design elements and safety procedures for cylinder handling activities to avoid or minimize the potential for adverse health and safety impacts. Workers would be trained in safe cylinder handling and cylinder maintenance procedures. The annual impacts from onsite storage would be temporary and would continue until the DUF_6 cylinders were removed from the PLEF site. In the event of an accident handling cylinders, the potential waste impacts would depend on the type and

magnitude of the incident, as described in the license application, but could result in a variety of waste types (GLE 2025b).

Enriched uranium would be shipped offsite to conversion facilities for further processing, subject to facility availability. Secondary tails produced during enrichment of the DUF_6 from DOE's PGDP would be returned to the PGDP, with small quantities of cylinders temporarily stored onsite. At nearly 22,500 square meters (242,000 square feet), the current storage pad design is large enough to accommodate up to 6,230 48-in.-diameter cylinders, which is the inventory expected from 10 years of PLEF operation. Additional area is available at the PLEF site for expansion if more room is needed. If further expansion of the storage pad were needed in the future, GLE would be required to prepare a license amendment and prepare the requisite safety and environmental analyses for that expansion at that time.

The maximum amount of new DUF_6 tails that would be generated by the PLEF over a 40-year operating period is estimated to be 290,574 MT (320,303 tons), assuming a 6 million-SWU/yr plant that averages up to 8 wt% enrichment. For the disposition of the DU tails, GLE proposes that they be transported from the PLEF to a DOE conversion facility (at the adjacent PGDP or the facility in Portsmouth, Ohio) or to a commercial facility, for conversion from DU tails to uranium dioxide (UO_2) or triuranium octaoxide (U_3O_8). After conversion, the wastes would be transported to a licensed disposal facility. Potential impacts of this transportation are discussed in Section 3.10.2.

Impacts from transporting the converted depleted uranium oxide from the conversion facilities to potential disposal sites such as the commercial facility in Clive, Utah, or a DOE facility in Nevada (the Nevada Test Site) have been previously evaluated for the DU stored at DOE's Portsmouth and Paducah sites (DOE 2004a, 2004b). The NRC staff concludes that transportation impacts for shipping depleted uranium oxide (originating from the PLEF) from the Paducah or Portsmouth conversion facility to either potential disposal site would be SMALL.

The above assumptions and data indicate that potential impacts from GLE's solid, hazardous, and radioactive wastes during operations would be managed in accordance with regulatory requirements, and that sufficient capacity would be available for the wastes generated. Therefore, the NRC staff conclude that impacts from waste management during operation would be SMALL.

Decommissioning. After PLEF operations end, process wastewaters would no longer be generated. Fewer workers would be onsite, so sanitary wastewaters would decrease. Stormwater and radioactive effluents would be managed as during the operational phase. Therefore, the wastewater management impact from decommissioning would be small. Regarding solid wastes, nonradioactive waste generated onsite would be shipped offsite to salvage or disposal facilities, as appropriate. The demolition material would be shipped offsite. Hazardous waste materials removed during decommissioning would be shipped to a RCRA-permitted Subtitle C treatment, storage, and disposal facility or an appropriate licensed recovery facility. Radioactive-contaminated equipment and materials removed during decommissioning would be shipped to a licensed treatment or disposal facility authorized by the NRC. Therefore, the NRC staff concludes that solid waste management impacts resulting from decommissioning the PLEF would be SMALL.

3.12.3 Mitigation Measures

With regard to mitigating potential impacts, the handling and disposition of waste materials are governed by various federal and state regulations, and GLE has outlined waste minimization and pollution-prevention practices encompassing waste generation, collection, removal, and disposal. The GLE waste management program intends to minimize the generation of waste through reduction, reuse, or recycling (GLE 2025a). With an emphasis on pollution prevention and waste minimization, GLE's program includes identifying methods to minimize the volume of regulated wastes through waste segregation and substitution of nonhazardous materials, in accordance with RCRA regulations. The laser enrichment process reduces the amount of waste generated for production of the same amount of enriched product compared to other enrichment processes. The PLEF design would also incorporate features to minimize the release of chemicals or other nonradioactive materials into the environment. .

3.13 ACCIDENTS

This section summarizes existing conditions in the PLEF area and potential impacts of the proposed action, as well as mitigation measures.

3.13.1 Affected Environment

The proposed PLEF site is on undeveloped land, and there are currently no facilities or hazards at this site.

3.13.2 Potential Impacts

This section discusses impacts associated with potential radiological and hazardous chemical accidents that might occur at the PLEF. The NRC staff performed an independent verification of GLE's technical report to analyze potential accident scenarios and associated consequences at the PLEF and presented the results in its SER. The NRC's SER, which is a technical evaluation of the proposed enrichment process, is part of the regulatory process that the NRC uses to decide whether to issue a special nuclear material license for possession and use of special nuclear material for the PLEF. The term "accident," as used in this section, refers to any off-normal event that may affect the health or safety of facility workers and/or members of the public due to the release of, or exposure to, radioactive material or hazardous chemicals. The accidents described in this section are associated with processes and activities that would occur at the PLEF.

Site Preparation and Construction. No assessment of radiological or hazardous chemical accidents is associated with this phase; as indicated above, the accident assessment focuses on the processes and activities during the operation phase.

Operation. The GLE's license application for the PLEF (GLE 2025b) describes accidents on a nodal basis, where the process hazard analysis nodes represent systems or processes. The "What-If?" analysis method is used to identify the hazards for PLEF processes. This method is consistent with the guidance provided in NUREG-1513, *Integrated Safety Analysis Guidance Document* (NRC 2001). The hazard identification process documents hazards that are: radioactive, fissile, flammable, explosive, toxic, and/or reactive. This process results in identifying radiological or chemical characteristics that have the potential to adversely affect site workers, the public, or the environment. Most hazards are assessed individually for the potential impact on the discrete components of the process systems. However, the credible hazards from fires are also assessed on a facility-wide basis from external to the process

system and external events derived from natural phenomenon or from man-made causes. The consequences of concern for the proposed PLEF are related to either the release of UF_6 due to loss of confinement or a nuclear criticality[15] accident. The latter would result in the release of prompt radiation and airborne fission products. In general, loss of confinement would initially result in moisture in ambient air reacting with the UF_6 and forming UO_2F_2 and HF. The latter would be in a gaseous form and could be transported in air through the facility and potentially beyond the site boundary. This gas[16] is considered a hazardous chemical with the potential to injure facility workers and the public.

The unmitigated consequences of analyzed accidents were evaluated using methods described in NUREG/CR-6410, *Nuclear Fuel Cycle Facility Accident Analysis Handbook* (NRC 1998). Mitigations are designed so intermediate-consequence events would be unlikely and high-consequence events would be highly unlikely. The proposed PLEF accident mitigations would be designed and built to withstand any internal (e.g., caused by a component failure), or external (e.g., caused by a weather or natural phenomena event) analyzed accident, without loss of capability needed to mitigate consequences. The direct radiation exposure and chemical/radiological inhalation exposure to workers and the public from nuclear criticality accidents were found to dominate the final determinations of the severity of accidental releases.

This EIS considers hypothetical accidents that are bounding for the PLEF and applies the consequences estimated for those bounding accidents as the basis for determining the environmental impacts from potential accidents at the proposed facility. Although some types of accidents could involve both radiological and chemical hazards, for this EIS, the radiological and chemical hazards of potential accidents are considered separately. Radiological and chemical consequences of hypothetical accidents at the PLEF are discussed later in this section. GLE considered a variety of potential accidents, including the following.

- Cylinder storage and handling area accident
- Feed and vaporization system accident
- Product withdrawal system accident
- Tail withdrawal system accident
- Blending system accident
- Liquid sampling system accident
- RLECTS accident
- Solid waste handling system accident
- Monitored central exhaust system accident
- Decontamination/maintenance area accident
- Cold trap purification system accident
- Laboratory operations accident
- Online gas sampling system accident,
- External event (natural phenomena and man-made) accident
- Large fire events accident

[15] Criticality is defined as the condition in which each nuclear fission event releases a sufficient number of neutrons to achieve a self-sustaining series of reactions.

[16] For licensed material or hazardous chemicals produced from licensed materials, chemicals of concern are those that, in the event of release, have the potential to exceed the performance requirements established in 10 CFR 70.61.

GLE (2025a) evaluated the consequences of accidents at the proposed PLEF and the controls (e.g., items relied on for safety) it would use to prevent or mitigate the consequences of accidents against NRC's performance requirements for accidents set forth in 10 CFR 70.61 "Performance Requirements". These require that GLE limit the risks of credible high-consequence and intermediate-consequence radiological and/or chemical events by applying engineered controls and/or administrative controls to reduce the likelihood and consequences of these events and ensure that all nuclear processes are subcritical under normal and credible abnormal conditions. To comply with 10 CFR 70.61, the PLEF must have controls that:

- For any credible high-consequence radiological and/or chemical accident, either reduce the likelihood of the accident such that it would be highly unlikely or reduce the consequences such that they would either be intermediate- or low-(less-than-intermediate) consequence;
- For any credible intermediate-consequence radiological and/or chemical accident, either reduce the likelihood of the accident such that it would be unlikely or reduce the consequences such that they would be low-consequence (i.e., less-than-intermediate consequence); and
- Limit the risk of nuclear criticality accident by ensuring that under normal and credible abnormal conditions, all nuclear processes are subcritical (i.e., the likelihood of a criticality excursion is beyond extremely unlikely).

Threshold consequence levels that define high- and intermediate-consequence radiological or chemical accidents for the purposes of evaluating compliance are described in 10 CFR 70.61 and summarized in Section 3.11.2. An unlikely accident is an accident that is not likely to occur during the lifetime of the facility.

Radiological Accidents. This subsection discusses the potential onsite and offsite radiological consequences of hypothetical unmitigated accidents at the PLEF and controls to prevent or mitigate the potential consequences. The threshold consequence values that define high- and intermediate-consequence radiological accidents are provided in 10 CFR 70.61. Under 10 CFR 70.64(b), the facility design is required to incorporate a defense-in-depth approach to accident prevention and mitigation. GLE applied a conservative method to estimate the source term, which is the fraction of the uranium inventory that would be released by an accident (NUREG/CR-6410). Because of these conservative initial conditions and assumptions, the bounding radiological accident is a hypothetical radioactive material release with a maximized source term and all material in the source term being released to the environment (no mitigation). The bounding radiological accidents that could impact the public and the environment, as identified in the integrated safety analysis summary (GLE 2025b, Section 4.18), include (1) large fire events within the operations building; and (2) nuclear criticality inside the operations building.

The consequences for the hypothetical fire accidents were determined to be high for workers and the public but intermediate for the environment. The consequences for the criticality accident were determined to be high for workers, low for members of the public, and not applicable to environmental impact because the detrimental effect is primarily direct radiation. Therefore, both design-basis accidents (DBAs) represent accident scenarios with high consequences, and GLE is required to design and operate the PLEF such that the likelihood of the DBAs is highly unlikely. The threshold for a highly unlikely event is one event in 100,000 years. Similarly, accident scenarios that were determined to result in intermediate consequences must either be mitigated to reduce the consequences to a low-consequence category or reduce the likelihood of the accident to unlikely.

GLE has proposed confinement barriers within the operations building to ensure that the licensed material must penetrate at least one, and often two, confinement barriers before reaching external site workers or the public. Examples of confinement barriers for the operations building include process systems piping and equipment boundaries; storage containers; cylinders, gloveboxes, tanks, handling devices; ventilation system dynamic confinement and filtration; building structural shell. Fire suppression systems and equipment are proposed in and throughout the facility. Automatic sprinkler protection is provided throughout the operations building and licensed material areas of the storage building.

GLE has proposed passive engineered controls, active engineered controls, augmented administrative controls, and administrative controls that would prevent the loss of confinement or nuclear criticality accidents or mitigate their consequences (GLE 2025b). As described in the ER (GLE 2025a), preventive controls for the criticality scenario would include maintaining safe geometry of all vessels, containers, and equipment that contain fissile material and limiting the concentration and/or mass of fissile material in those vessels to a specified amount. Mitigative controls would include criticality monitoring and alarm systems and emergency response training.

The NRC staff's safety review will determine if the controls are designed, implemented, and maintained to ensure they are available and reliable to perform their preventative and mitigating functions when needed. The NRC staff will also determine whether the controls are sufficient to ensure that the likelihood and/or consequences of any credible radiological accidents at the PLEF would be reduced such that the proposed facility would be in compliance with the performance requirements outlined in 10 CFR 70.61. The NRC staff concludes that the impacts of potential nuclear or radioactive material accidents at the proposed PLEF would be SMALL because the likelihood of such an accident is very low.

*Hazardous Chemical Accidents***.** This subsection discusses the potential consequences of onsite and offsite hazardous chemical exposures from hypothetical accidents at the PLEF and engineered and administrative controls to prevent or mitigate the potential consequences. Chemical exposures to workers or members of the public, involve possible loss of confinement due to mechanical failures, natural phenomenon events, human errors, and fires. GLE presents a detailed analysis of accidents, consequences, mitigations, and impacts in its ISA. The accidents involve release of UF_6 that could initially result in reacting with moisture in ambient air, forming UO_2F_2 and HF. Both HF and uranium have the potential to injure facility workers and the public at elevated, chronic exposure levels.

The hypothetical chemical accidents evaluated for the PLEF are severe accidents, which would bound other potential accidents. The results of the chemical accident analyses were compared to the threshold consequences in 10 CFR 70.61 and to the EPA's acute exposure guideline levels (EPA 2025d). For the chemicals analyzed, the material at risk was based on the estimated maximum inventory of each chemical at the PLEF. In addition, no credit was taken for depletion or plate-out of any chemicals, either within the PLEF or during atmospheric transport to receptor locations. The bounding nonradiological accidents that could impact the public and the environment, as identified in GLE's ISA (GLE 2025e), include a major fire due to a flammable gas explosion inside the operations building. The ISA determined that the flammable combustible liquid fuel fire would result in a high consequence for the public from the release of UF_6.

To evaluate possible chemical exposures to members of the public, GLE assumed the releases would occur at ground level and calculated airborne chemical concentrations at the location of a

maximally exposed offsite individual at a point along the PLEF site boundary and at the location of the nearest resident. To assess potential health impacts associated with these concentrations are compared with protective action criteria limits. In anticipation of a possible uncontrolled release, these limits may also be used to estimate the consequences of the possible uncontrolled release and to plan emergency responses (DOE 2016b).

The NRC staff considered the consequences of the chemical accidents that GLE stated would be bounding chemical accidents for the PLEF. The NRC staff determined that unmitigated, credible accidents could be high-, intermediate-, or low-consequence for chemical exposure to members of the public or facility workers, depending on the type and quantity of chemicals involved.

GLE has proposed various controls (including passive and active engineering design features and administrative controls) that would prevent the initiation of hazardous chemical accidents or mitigate their consequences. These mitigations generally involve use of confinement boundaries and barriers in process areas, to confine spills or releases and protect workers from liquid sprays, other active and passive engineering controls, and administrative controls.

The analyses presented in GLE's ISA indicate that sufficient mitigation and prevention controls are designed for the PLEF to reduce the consequences and likelihoods of potential high- and intermediate-category accidents sufficiently to satisfy 10 CFR 70.61 requirements. The NRC staff conducted an independent review of the consequences of hazardous chemical accidents at the proposed PLEF and of the engineered and administrative controls (e.g., items relied on for safety) proposed by GLE. The NRC staff determined that the controls would be designed, implemented, and maintained to ensure they are available and reliable to perform their preventive and mitigative functions when needed. The NRC staff also determined that the controls are sufficient to ensure that the likelihood and/or consequences of any credible hazardous chemical accident at the proposed PLEF would be reduced such that the proposed facility would be in compliance with the performance requirements in 10 CFR 70.61. Thus, the NRC staff concludes that the impacts from such accidents would be SMALL.

NRC notes that in August 2025, the DOE and General Matter reached an agreement for the development and operation of a new uranium enrichment facility on a 40-ha (100-ac) undeveloped parcel on the PGDP site. Construction is anticipated to begin in 2026. Potential public radiological and chemical exposures from accidents at the new facility would be similar to the illustrative exposures NRC staff evaluated in this EIS for the proposed PLEF. The total doses to all hypothetical public receptors from both the PLEF and General Matter facilities would remain below the regulatory dose limit of 100 mrem/yr.

Decommissioning. No assessment of radiological or hazardous chemical accidents is associated with this phase; as described for site preparation and construction, the accident assessment focuses on the processes and activities during the operation phase.

3.13.3 Mitigation Measures

The proposed action is not anticipated to result in significant public or occupational health or safety impacts. Current processes, programs, and regulations would be in place to reduce the potential for adverse health and safety effects. No additional mitigation measures would be indicated beyond those that would be implemented under NRC, OSHA, and EPA regulations and the project's integrated safety analysis.

4 CONCLUSIONS AND RECOMMENDATIONS

This EIS describes the environmental review conducted by NRC staff of a GLE application for a license pursuant to 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," and Part 51, "Environmental Protection Regulations for Domestic Licensing And Related Regulatory Functions." If approved, the license would allow GLE to possess and use special nuclear material and to construct and operate its PLEF on its 130-ha (322-ac) greenfield site in McCracken County, Kentucky (GLE 2025a). This EIS follows the requirements in 10 CFR Part 51, which are the NRC's regulations that implement NEPA. This chapter presents conclusions and recommendations based on the NRC staff's environmental review of the GLE application. Section 4.1 summarizes the environmental impacts from construction, operation, and decommissioning of the GLE PLEF and the no-action alternative. Section 4.2 discusses the unavoidable impacts of the proposed action and identifies resource commitments. Section 4.3 summarizes mitigation measures identified by GLE and the NRC staff. Section 4.4 presents the staff's cost-benefit analysis. Section 4.5 presents the NRC staff's conclusions and recommendations.

4.1 IMPACTS OF ALTERNATIVES

4.1.1 Proposed Action

The NRC staff concludes that issuing a license to GLE to possess and use special nuclear material at the PLEF would have SMALL environmental impacts, and in some cases SMALL to MODERATE environmental impacts. Table 4-1 summarizes the potential environmental impacts of the proposed PLEF. This table highlights information from Chapter 3 and from the cost-benefit analysis in Section 4.4. Anticipated impact levels are compared with those for no action in Table 4-2. As shown in Table 4-2, the NRC staff concludes that potential impacts of the proposed action would be SMALL to MODERATE for four resource areas – surface water, ecology, transportation, and socioeconomics (largely positive) – and SMALL for all the others. The NRC staff also considers the reasonably foreseeable effects of actions with a close causal relationship to the proposed agency action (e.g., site preparation activities that are not a part of the NRC action) regardless of which agency (federal or non-federal) or person undertakes them.

4.1.2 No Action

No alternative locations for the PLEF were proposed for analysis beyond the initial site selection criteria screening (see Section 2.2.3). Therefore, the only identified alternative to the proposed action is the no-action alternative. Under this alternative, the NRC would not issue a license to GLE for the possession and enrichment of uranium at its PLEF. The no-action alternative would have SMALL impacts for every resource area at the proposed site because there would be no change in current conditions (Table 4-2). GHG generation is considered in a nation-wide context; thus, the NRC staff considers the carbon footprint a relevant factor in evaluating distinctions between alternatives, including the no-action alternative. For activities related to transporting materials, the no-action alternative would generate fewer emissions than the proposed PLEF because no materials would be transported. The adverse environmental impacts from the no-action alternative would be SMALL. However, this alternative would not fulfill the purpose and need for the proposed action and would hinder future development of domestic advanced reactors.

Table 4-1 Summary of Environmental Impacts of the Proposed PLEF

Resource Area	Summary of Impact	Impact Level
Land use	The PLEF site is on private land zoned for heavy industrial use, and it would be consistent with that use and with other industrial development in the immediate area. Approximately 130 ha (322 ac) of forested and former agricultural land would be cleared for the PLEF, but public access to much larger areas of nearby land for recreation would continue. Operation activities would be confined to the PLEF site, with the exception of wastewater discharge. Decommissioning activities is expected to result in release of the land for unrestricted use to allow for future redevelopment consistent with its zoning.	SMALL
Air quality	Air emissions would include PM_{10} and $PM_{2.5}$, CO, NO_x, SO_2, CO_2, and VOCs. During construction, these emissions would not constitute a major source and would not be subject to PSD regulations. Air quality impacts would be localized and temporary. Emissions typically decrease rapidly with distance from the source and are not expected to result in long-term air quality impacts. During operation, emissions would not exceed the PSD threshold for criteria air pollutants and would be well below the GHG emissions reporting threshold but would likely exceed Kentucky's Registration thresholds. PLEF operation would not significantly alter the existing ambient air quality in the surrounding area. Air quality impacts during decommissioning would be similar to or less than those during site preparation and construction.	SMALL
Geology and soils	During construction, emplacement of building footings and excavation of the stormwater retention basins would disturb shallow soils. Construction of the access roads would involve excavating, backfilling, compaction, grading, and paving. Shallow soil disturbed during construction would either be reused or stockpiled for potential use in other areas of the site. Terrain changes would be minimal because the area is gently sloping. No significant soil disturbance is planned during facility operation. Decommissioning would involve removing building structures and foundations and establishing vegetative cover. Potential seismic hazards would be mitigated through design to ensure that the PLEF structures can withstand the local geotechnical and seismic conditions consistent with NRC and U.S. Geological Survey guidance for critical facilities in seismically active regions.	SMALL
Surface water	The potential for soil erosion and incidental releases of contaminants to affect surface water quality during construction would be minimized through the requirements of a KPDES stormwater construction permit and the use of BMPs. Water for construction would be supplied by tanker trucks from offsite sources. During operations, surface water quality could be impacted by stormwater runoff, sanitary and process wastewater discharges, and cooling tower blowdown, which would be managed and minimized through a KPDES permit (which would include a SWMPP and SPCC). PLEF is expected to release only trace levels of radiological constituents, if any, to the stormwater retention basins. Water would be discharged to Little Bayou Creek under a KPDES permit. Water use during decommissioning is expected to be similar to or less than during operation.	SMALL to MODERATE
Groundwater	The likelihood of affected surface water infiltrating to groundwater is low. PLEF would use lined basins for potentially contaminated stormwater, the unsaturated zone thickness greatly limits surface water–groundwater interaction, and monitoring wells would be installed, supplementing the existing groundwater monitoring program. Groundwater quality at the PLEF site is not expected to be affected by construction, operation, or decommissioning activities.	SMALL

Resource Area	Summary of Impact	Impact Level
Ecology	Potential impacts on wildlife or wildlife habitat would result from loss of vegetation and habitat during construction. Indirect impacts on wildlife or their habitats in lands surrounding the PLEF could result from construction noise and lighting. Impacts on terrestrial biotic communities and wildlife populations during construction would be localized and would not destabilize the existence of these communities and species offsite in the surrounding area. Most of the streams onsite do not have suitable habitat for aquatic wildlife. Effects of construction on aquatic species within intermittent streams and the perennial stream would depend on the type of impact, species mobility, weather during construction, and amount of stream flow. Direct and permanent impacts on aquatic resources would occur across the PLEF project area, as determined by final design. Operation would not directly impact biotic communities beyond those affected during construction. Human encounters with some wildlife during operation could increase due to disruption of travel corridors and loss of habitat. PLEF operation would not directly impact additional wetlands beyond those impacted during construction. Reduced shallow groundwater recharge and increased stormwater runoff volumes would be controlled with post-construction stormwater management BMPs. No further onsite impacts would be expected during decommissioning beyond those associated with construction and operation. Protected bat species are unlikely to be impacted by tree clearing activities and are not anticipated to roost at the site once it is developed. The NRC staff received concurrence from the FWS that the project would have “no effect on protected” aquatic species, including all fish, reptiles and mussels, and a “may affect, not likely to adversely affect” on the monarch butterfly, Indiana bat, tricolored bat, and cotton mouse. No ESA-designated critical habitat is located in the PLEF project area, so no direct effects on critical habitat would occur.	SMALL to MODERATE
Socioeconomics	Employment construction would range from 50 to 600 workers, the latter during peak construction, requiring approximately 8 to 16 percent of the vacant rental housing units in the region. Approximately 350 workers would be required to operate the plant, and decommissioning activities would employ 50 workers. With a smaller in-migrating population expected during operation, impacts on vacant owner-occupied housing stock in the region would be lower. Additional indirect employment would lead to additional business and household spending throughout the regional and state economy. Annual incomes of constructions workers who would move into the area would total between $34.4 million and $68.8 million. During operation, annual payrolls would total $42 million, and decommissioning would produce $6 million in annual payroll. The project is not anticipated to significantly strain existing public schools, healthcare services, or emergency services. Worker wages and start-up activities would generate income tax revenue levied by the state, resulting in a positive fiscal impact on local and state governments.	SMALL to MODERATE
Historic and cultural resources	Construction activities will likely destroy the three archaeological sites and one isolated find identified in the site surveys, but none of the four are eligible for listing on the NRHP. Two architectural resources potentially eligible for the NRHP would not be visible from the proposed PLEF (and vice versa). Consultation with the KHC confirms there would be no adverse effects from this undertaking.	SMALL

Resource Area	Summary of Impact	Impact Level
Visual and scenic resources	Temporary visual intrusions into the landscape could result from the use of construction cranes, but no other impacts on visual or scenic resource would be expected during construction. The tallest proposed structure would be about 15 m (48 ft), lower than the tallest trees surrounding the site. A buffer of trees would block views from travelers on Dyke Road and from the nearest neighbors to the south. The proposed PLEF would result in some impacts on visual and scenic resources but would not significantly alter the viewshed or the character of the landscape.	SMALL
Noise	Modeling of construction noise levels indicates that PLEF construction would increase ambient levels by no more than 1 dBA over baseline conditions. Combined levels might exceed the EPA guideline primarily due to high baseline levels but would remain below the acceptable limit. Operation would minimally increase ambient levels over baseline conditions. Noise levels during decommissioning would be similar to those during construction.	SMALL
Transportation	Transportation impacts during construction would be temporary and variable. Construction activities would require heavy-duty 18-wheeled tractor-trailer trucks, heavy-haul trucks, and light-duty delivery trucks to deliver construction materials, supplies, and equipment, as well as construction workers commuting to the site. During operation, traffic impacts would occur from workers commuting to the PLEF, shipments of equipment and supplies to the PLEF, and shipments of fabricated fuel and wastes produced at the PLEF. During both construction and operation, the increase in ADT could adversely impact traffic flow and increase the potential for congestion at the Hobbs Road and Highway 60 intersection during peak commuting hours. During decommissioning, the average number of truck shipments would be similar to those during the initial three years of construction. Impacts on ADT would be less than those during construction and operation. The estimated radiological doses for incident-free transportation are well below the NRC limits for individual members of the public. Doses to in-transit truck crews and workers handling shipments would be monitored and mitigated using time, distance and shielding to maintain worker doses as low as reasonably achievable. During decommissioning, the transport of radioactively contaminated equipment and materials shipments would comply with applicable NRC and DOT requirements at that time.	SMALL to MODERATE
Public and occupational health and safety	Radiological impacts during site preparation and construction would primarily be incurred by construction workers from cylinder storage at the PLEF; estimated doses are expected to be below the limit established in 10 CFR 20.1301(a)(1). During operation, PLEF would adhere to NRC requirements for radiation doses to the public and OSHA standards to protect worker health and safety. Workers would be monitored for radiation exposure to ensure occupational dose limits are met. During decommissioning, impacts would be similar to but generally lower than those during operation.	SMALL

Resource Area	Summary of Impact	Impact Level
Waste management	PLEF wastes would be managed in accordance with GLE's solid, hazardous, and radioactive waste management program. Construction wastes would be typical of those for an industrial facility. Hazardous wastes would be temporarily stored onsite before being shipped offsite to a licensed facility. Wastewater discharges would be managed under a KPDES permit. During operation, the facility's *w*astewater management systems would handle sanitary wastewater, facility cooling tower water, stormwater, and process wastewater. The process wastewater would be sent to the RLECTS. DUF_6 tails would be temporarily stored onsite on an outdoor pad before being shipped offsite to a conversion facility (or facilities) for further processing. The storage pad would include design elements and safety procedures for cylinder handling activities to avoid or minimize the potential for adverse health and safety impacts. During decommissioning, hazardous waste materials removed would be shipped to a RCRA-permitted Subtitle C treatment, storage, and disposal facility; radioactively contaminated equipment and materials would be shipped to a licensed treatment or disposal facility authorized by the NRC.	SMALL
Accident impacts	The analysis presented by GLE in the Integrated Safety Analysis indicates that sufficient mitigation and prevention controls are designed for the PLEF to reduce the consequences and likelihoods of potential high- and intermediate-category accidents sufficiently to satisfy 10 CFR 70.61 requirements. GLE has proposed various controls (including engineering design features and administrative controls) that would prevent the initiation of nuclear or radioactive material accidents, or mitigate their consequences, in compliance with 10 CFR 70.61 and other NRC regulations applicable to radiological accident consequences.	SMALL

Table 4-2 Comparison of the Proposed Action and the No-Action Alternative

Impact Consideration	Proposed Action	No Action
Strengthens domestic supply chain for reactor fuel	YES	NO
Land use	SMALL	SMALL
Air quality	SMALL	SMALL
Geology and soils	SMALL	SMALL
Water resources	SMALL to MODERATE	SMALL
Ecological resources	SMALL to MODERATE	SMALL
Socioeconomics	SMALL to MODERATE	SMALL
Historic and cultural resources	SMALL	SMALL
Visual and scenic resources	SMALL	SMALL
Noise	SMALL	SMALL
Transportation	SMALL to MODERATE	SMALL
Public and occupational health and safety	SMALL	SMALL
Waste management	SMALL	SMALL
Accidents	SMALL	SMALL

4.2 RESOURCE COMMITMENTS ASSOCIATED WITH THE PROPOSED ACTION

4.2.1 Irreversible and Irretrievable Commitments of Resources

This section describes the irreversible and irretrievable commitment of that would be associated with constructing, operating, and decommissioning the proposed PLEF. An irreversible commitment of resources refers to environmental resources that would be irreparably changed by the construction, operation, and decommissioning activities authorized by an NRC licensing decision and by those activities authorized by a USACE (as a cooperating agency) permitting decision, where the environmental resources could not be restored at some later time to the resource's state before the relevant activities. An irretrievable commitment of resources refers to the use or consumption of resources that are neither renewable nor recoverable for future use.

The focus of this evaluation is on the irreversible and irretrievable commitment of federal resources for the proposed PLEF. Four such resources would be irreversibly and irretrievably committed: (1) the DUF_6 from the DOE PGDP that would be processed during PLEF operation; (2) the small piece of DOE land committed to the access road from the PGDP during site preparation and construction; (3) waters of the United States that would be altered during site preparation and construction and decommissioning; and (4) federal resources in terms of labor time and cost, notably NRC and USACE effort committed during the process, including for oversight activities during PLEF operation.

Commitment of the DUF_6 resource is considered to have a beneficial impact on the nuclear fuel cycle (converting a currently unused resource to fuel) and on waste management (reducing the potential for releases from this material that has been in long-term storage at the PGDP and the associated potential for human exposures and health effects). The DOE land that would be committed for the access road constitutes a very small fraction of DOE's land parcel and would have a minimal impact on that federal resource. The portions of streams and wetlands that would be irreversibly and irretrievably committed, as waters of the United States, would be minimized through BMPs. The federal agency labor commitments would be irreversible and irretrievable.

Beyond these federal resources, other resources that would be committed to construct, operate, and decommission the PLEF would be those common to industrial sites. These include capital, labor, water, energy, fossil fuels, chemicals, and other natural and manufactured resources. In general, these resources would be irretrievable except for the materials GLE would recover for reuse, reprocessing, or recycling as part of its waste minimization program, including during decommissioning. For example, mineral and other geologic resources such as concrete, granular material, steel, and asphalt would be irreversibly committed during PLEF construction; however, some of these (notably steel) might be retrieved during decommissioning. In addition, a small volume of soils and sediments would be lost to wind and water erosion during construction and decommissioning. Nonradiological resources to protect worker health and safety, such as personal protective equipment, would also be irretrievably committed.

Energy would be consumed in the form of fuel and electricity for equipment, vehicles, and facility operation. The fuel and electricity would be acquired from offsite commercial sources. Water would be obtained from existing water supply systems. These resources are readily available nearby, and the amounts required are not expected to deplete available supplies or exceed available system capacities.

Under NEPA, the review team would study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning

alternative uses of available resources. In reviewing the potential impacts associated with the proposed action, the review team did not identify any unresolved conflicts concerning alternative uses of available resources.

Based on the information and analyses in this EIS, the NRC staff is considering a preliminary recommendation to the NRC Commission to move forward in the decision process for the proposed action, toward issuing a special nuclear material license for the proposed PLEF in McCracken County, Kentucky, unless safety issues mandate otherwise. The NRC staff identifies this preliminary recommendation after considering the environmental effects of the proposed action and the reasonable alternative (no action), including weighing the respective costs and benefits.

4.2.2 Relationship Between Short-Term Uses and Long-Term Productivity

The construction, operation, and decommissioning of the PLEF would result in short-term uses of the environment, as described in Chapter 3. “Short-term” is the period during which construction, operation, and decommissioning activities would take place.

Construction, operation, and decommissioning would require short-term use of the environment and commitment of certain resources, including land and energy. The proposed action and the no-action alternative would differ with regard to local short-term uses of the environment but would not differ with regard to maintenance and enhancement of long-term productivity of the human environment.

Construction, operation, and decommissioning would transform approximately 130 ha (322 ac) of land to industrial use during the short term. This change would align with the current zoning and intended use of this land. The PLEF would change the viewshed of the existing landscape for users of a small portion of an adjacent road. Construction, operation, and decommissioning could also displace wildlife through destruction of habitat or noise. Wildlife could return to the site once construction or decommissioning is completed, if suitable habitat is present. Mineral and other geological resources would be consumed for facility construction. Water would be required for various purposes during construction, operation, and decommissioning of the PLEF as described in Section 2.1.1.1.

Air emissions from construction, operation, and decommissioning would introduce small amounts of radiological and nonradiological constituents at the PLEF site. However, such emissions are not expected to affect air quality or radiation exposure to the extent that they would impair public health or long-term productivity of the environment. Noise emitted by construction, operation, and decommissioning activities would increase the ambient noise levels onsite and in adjacent offsite areas. However, increases in noise levels would adhere to local noise ordinances and would be consistent with the industrial zoning designation of the PLEF. Noise levels would return to background levels once construction and decommissioning activities are complete.

The additional demands on community services resulting from construction, operation, and decommissioning of the PLEF are anticipated to be generally proportional to the number of workers and their families moving into the region. These additional demands would be generally offset by the increased revenues collected as taxes by local governments from these workers as well as from PLEF operation. Worker and delivery vehicle-related traffic would be short term during peak construction and decommissioning activities and work shifts; therefore, they would not affect long-term productivity.

The management and disposal of LLRW, hazardous waste, and nonhazardous waste would require an increase in energy and consume space at treatment, storage, and disposal facilities. The incremental use of land to meet waste disposal needs would reduce the long-term productivity of that land.

Extension or installation of service lines (e.g., electric power, water) during construction of the PLEF would connect the facility to utility providers. This additional infrastructure would be available and beneficial for any future use of the facility after its decommissioning.

4.3 MITIGATION MEASURES

Potential measures to mitigate adverse environmental impacts associated with the proposed action of constructing, operating, and decommissioning the PLEF are identified and addressed in this section, in accordance with 10 CFR Part 51, Subpart A, Appendix A. Each of the mitigation measures identified fits one of the following definitions under the regulation: (1) avoid the impact altogether by not taking a certain action or parts of an action; (2) minimize impacts by limiting the degree or magnitude of the action and its implementation; (3) repair, rehabilitate, or restore the affected environment; (4) reduce or eliminate impacts over time by preservation or maintenance operation during the life of the action; or (5) compensate for the impact by replacing or substituting resources or environments. They are actions or processes (e.g., process controls and management plans) that would be implemented to control and minimize potential adverse impacts associated with the proposed action.

GLE must comply with applicable laws and regulations, including obtaining all appropriate construction and operating permits. Applicable laws and regulations are discussed in Chapter 1 and Appendix B of this EIS. The mitigation measures proposed by GLE, many of which are related to compliance, are discussed in Chapter 5 of the ER (GLE 2025a) and discussed in Section 4.3.1.

Based on the potential impacts identified in Chapter 3 of this EIS, the NRC staff has identified additional potential mitigation measures for the proposed action. These mitigation measures are described in Section 4.3.2. The proposed mitigation measures provided in Sections 4.3.1 and 4.3.2 do not include environmental monitoring activities, which are discussed in Chapter 2.

4.3.1 Summary of Mitigation Measures Identified by the Applicant

GLE identified a suite of mitigation measures in the ER (GLE 2025a) that could reduce the environmental impacts associated with the proposed action. Key measures that extend beyond compliance are highlighted in Table 4-3.

4.3.2 Potential Mitigation Measures Identified by the NRC

The NRC reviewed the mitigation measures proposed by GLE and finds that these measures are sufficiently protective of human health and the environment. The NRC identified additional mitigation measures as recommendations (Table 4-4). While the NRC cannot impose mitigation outside its regulatory authority under the Atomic Energy Act, these additional mitigation measures in Table 4-4 could potentially reduce the impact of the proposed action. No additional mitigation measures were identified for socioeconomics, transportation, accidents, waste management, or decontamination and decommissioning.

Table 4-3 Summary of Mitigation Measures Proposed by GLE *(Source: GLE 2025a)*

Resource Area	Impact Type	Proposed Mitigation Measure
Land use	Land disturbance	GLE would use existing service road routes and utility rights-of-way (ROWs) to the fullest extent practicable to minimize the need for ground disturbance. GLE's design would maximize the use of non-wetlands areas for the PLEF. GLE would implement BMPs to mitigate stormwater runoff.
Air quality	Emissions	At a minimum, GLE would use Tier 3 diesel engines. GLE would implement a comprehensive program that incorporates multiple air emission-control components to minimize impacts on air quality.
Soil	Soil disturbance	GLE would manage construction activities so that no heavy equipment or construction activities would affect areas outside of the PLEF and use soils from on-site borrow pits accessible via existing roadbeds to minimize disturbance to areas outside of the PLEF site. GLE would obtain all necessary KPDES permits and implement the erosion prevention and sediment control plan to mitigate erosion as GLE would plant grasses and native shrub and tree species in areas not occupied by buildings or other structures to minimize impacts.
Water resources	Groundwater use and surface water quality	GLE would abide by KPDES construction and industrial wastewater discharge permit conditions and BMPs in the GLE SWPPP and SPCC plan. Plant grasses and native shrub and tree species in areas not occupied by buildings or other structures to minimize impacts. Provide water needed for construction via tanker truck from off-site potable water sources rather than using site groundwater.
Ecology	Habitat disturbance	GLE would obtain and comply with construction and wastewater KPDES permit requirements and conditions and follow the procedures and implement the BMPs and protocols contained within the SPCC and SWPPP. GLE's contractor would use chemical herbicides and pesticides only in site-specific locations and use an herbicide and pesticide applicator licensed under applicable regulations, (302 KAR 26). GLE would plant native grasses, shrubs, and trees in disturbed areas not occupied by buildings.
Visual resources	Visual disturbance	GLE located the PLEF buildings away from site boundaries bordering existing development along Woodville Road, Hobbs Road, or Dyke Road. GLE would maintain the existing tree buffer along the property line to limit visibility of proposed structures and access-road traffic from off-site viewpoints in nearby residential areas. GLE would use exterior building colors and facility landscaping to soften the visual impact. GLE would revegetate the agricultural access road located southeast of the PLEF or add tree buffers, if necessary, to screen views. Following construction, GLE would restore disturbed areas not used for permanent facilities to vegetated conditions.
Noise	Noise emissions	GLE would limit heavy truck and earth-moving equipment usage to daylight hours and would not plan construction activities on weekends or holidays. GLE would keep noise-suppression systems on construction vehicles in proper operation.

Resource Area	Impact Type	Proposed Mitigation Measure
Transportation	Traffic volume	GLE sited the facility near an interstate highway interchange to minimize truck travel distance on local surface streets and to facilitate employee commuter traffic. GLE has designed restricted entrances along Hobbs Road that would limit transportation impacts on Woodville Road. GLE would work with the state of Kentucky to evaluate driveway and roadway improvement options to minimize impacts.
Waste management	Volume of wastes to be managed	GLE would implement a waste minimization plan to reduce the quantities of waste generated at the PLEF that require on-site management and disposal. GLE would identify methods to minimize the volume of regulated wastes through waste segregation and substitution of nonhazardous materials, in accordance with RCRA regulations. GLE chose the laser enrichment process, which reduces the amount of waste generated for production of the same amount of enriched product compared to other enrichment processes. GLE would incorporate a PLEF design that minimizes the release of chemicals or other nonradioactive materials into the environment.

Table 4-4 Summary of Potential Mitigation Measures Identified by the NRC Staff

Resource Area	Activity	Proposed Mitigation Measure
Air quality	Construction, operation, and decommissioning emissions	Post speed limits (e.g., 10 mph) visibly within the construction site and enforce them to minimize airborne fugitive dust. Use Tier 4 engines whenever practicable. Cover stockpiled materials with tarpaulins or geotextiles when they are potential sources of fugitive dust. Install wind fencing around disturbed areas where fugitive dust could affect areas beyond the PLEF boundary (e.g., nearby residences to the south). Limit access to the construction site and staging areas to authorized vehicles only, through the designated treated roads. Stage construction to limit the exposed/disturbed area at any given time, when practical. Train workers to comply with the speed limit, use good engineering practices, minimize drop height of materials, minimize disturbed areas. Avoid construction activities during low-wind, stable atmospheric conditions (i.e., temperature inversions), which most frequently occur around sunrise during colder months and can result in elevated PM concentrations. Assure all heavy equipment meets emission standards specified in the State Code of Regulations, and assure routine preventive maintenance, including tuneup to the manufacturer's specification, is implemented to ensure efficient combustion and minimum emissions. Fuel all diesel engines used in the facility and auxiliary diesel generator units with ultra-low sulfur diesel with a sulfur content of 15 parts per million or less. Limit idling of diesel equipment to no more than 10 minutes, unless idling must be maintained for proper operation; for example, drilling, hoisting, and trenching. Implement dust control measures during road construction and land clearing, such as more frequent water spraying and the application of an appropriate dust suppressant.
Geology and soil resources	Soil disturbance and contamination	Inspect outgoing trucks and remove any loose soils from truck bed edges. Install a truck wash station onsite to remove soils from truck tires. Place gravel construction pads at the entrances/exits of construction areas. Conduct vehicle decontamination prior to demobilization.
Surface water resources	Runoff	Limit cut/fill slopes to a horizontal-vertical ratio of 3:1 or less. Suspend general construction activities during storms and impending precipitation. Construct stream crossings (i.e., install culverts) following at least 48 hr of dry weather. Divert stream flow during stream-crossing construction to minimize excavation in flowing water.
Groundwater resources	Infiltration	Use low-water-consumption landscaping. Install low-flow toilets, sinks, and showers. Perform localized floor washing using mops and self-contained cleaning machines to reduce water usage compared to conventional washing techniques.

Resource Area	Activity	Proposed Mitigation Measure
Ecological resources	Habitat disturbance and avoidance	Reduce or prevent the collection, harassment, or disturbance of plants, wildlife, and their habitats (particularly threatened, endangered, and sensitive species) through employee and contractor education on applicable state and federal laws. Additionally, instruct all personnel to avoid harassment and disturbance of local plants and wildlife; make personnel aware of the potential for wildlife interactions around facility structures; and ensure that food refuse and other garbage is not available to scavengers. Establish a trash abatement program that focuses on containing trash and food in closed containers and removing them periodically to reduce their attractiveness to opportunistic species, such as bears, coyotes, and feral dogs. Avoid known locations of State-listed plant species and establish a setback distance (minimum 60 m [200 ft]) to prevent any destructive impacts associated with construction and decommissioning activities. Minimize the number of areas where wildlife could hide or be trapped (e.g., open sheds, pits, uncovered basins, and laydown areas). Develop an integrated vegetation management plan for the control of noxious weeds and invasive plant species. Restrict preconstruction activities and the harvesting of trees to periods when the ground is dry. Backfill open trenches as quickly as is reasonable. If trenches are necessary, ensure that they are closed overnight; inspect trenches left open overnight and remove animals prior to backfilling. Place escape ramps in trenches at less than 45-degree angles to provide exit strategies for animals. To the extent practicable, avoid the use of guy wires, which pose a collision hazard for birds. Avoiding direct impacts on federally protected bat species by clearing forest habitats (to develop the facility) during the cold season when the bats are not present. Install animal-friendly fencing around the PLEF site so wildlife cannot be injured by or entangled in the site's security fence. Collect seed from the rosinweed species onsite and provide to the KDFWR to reseed at an appropriate location within the WKWMA. To minimize habitat loss and fragmentation, reestablish as much habitat as possible after construction is complete by maximizing the area reclaimed or revegetated during operation. Prevent the establishment and spread of invasive species and noxious weeds within the transmission line ROW, along the access road, and in associated areas of ground surface disturbance or vegetation cutting. Monitor the area regularly and eradicate invasive species immediately. Place fencing/barriers and use signs around wetland areas. Use silt fencing and cover soil stockpiles to prevent sediment runoff.
Visual and scenic resources	Visual changes	Design exterior lighting to minimize nighttime visual impacts while meeting safety and operational requirements. As appropriate, fully shielded or full cut-off fixtures could be used to limit light spill and glare beyond the site boundary, and lighting intensity and color temperature could be selected to minimize contrast with the surrounding nighttime environment. Post signs to prevent unauthorized excavation.

Resource Area	Activity	Proposed Mitigation Measure
Noise	Noise reduction	Utilize quiet equipment or methods to minimize noise emissions during an activity, including using construction equipment with the manufacturer's noise-control devices. Operate equipment with internal combustion engines at the lowest operating speed to minimize noise emissions. Close engine housing doors during operation of the equipment to reduce noise emissions from the engine. Avoid equipment engine idling. Utilize quieter, less-tonal back-up alarms on construction equipment that are in compliance with OSHA standards. Prohibit heavy truck and earth-moving equipment usage after twilight and during early morning hours. Use a quieter, high-efficiency transformer to mitigate noise from the proposed electrical substation.
Transportation	Traffic reduction	Schedule truck deliveries and shipments as well as PLEF operations worker shift changes for off-peak traffic periods to reduce potential congestion on local roadways during peak worker commuting periods. Construct roadway improvements to Hobbs Road to improve traffic flow and minimize congestion during peak traffic hours. Implement voluntary programs to encourage carpooling for workers commuting to the PLEF to help reduce congestion by minimizing the additional number of vehicle trips necessary during peak commuting periods.

4.4 COSTS AND BENEFITS OF THE PROPOSED ACTION AND THE NO-ACTION ALTERNATIVE

NEPA and the CEQ require that all agencies of the Federal Government prepare detailed environmental statements on proposed major federal actions significantly affecting the quality of the human environment. One of NEPA's principal objectives is to require each federal agency to consider, in its decision-making process, the environmental impacts of each proposed major action. In particular, Section 102(B) of NEPA requires all federal agencies to the fullest extent possible to:

> "*identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by Title II of this Act, which will ensure that presently unquantified environmental amenities and values may be given appropriate consideration in decision-making along with economic and technical considerations"* (42 U.S. Code 4321).

Neither NEPA nor the CEQ requires the positive and negative impacts of a proposed action to be quantified in dollars or any other common metric. The intent of this section is not to identify and quantify all potential positive impacts of the proposed action and compare them to all potential negative impacts. Instead, it identifies the major positive and negative impacts, both socioeconomic and environmental in nature, in order to assist in the decision-making process.

The purpose of this section is to identify potential societal benefits and costs of the proposed agency action and a reasonable range of alternatives. This section focuses on benefits and costs of importance to inform the decision-making process. This section compares the impact conclusions reached in this EIS.

To estimate the private, or internal, net benefits, projected annual costs are subtracted from projected annual revenues over the lifetime of a project (construction through decommissioning). These totals are then summed, and their present value is computed using two alternative discount rates, as suggested in the Office of Management and Budget Circular A-4 (OMB 2023). Private benefits and costs of the proposed PLEF are described in Appendix Q of the ER (GLE 2025a).

External benefits and costs are assessed by examining the societal impacts of a proposed action, including impacts on the environment and local populations. For the PLEF, these impacts are described in Section 3.12. Where impacts can be quantified, it is sometimes possible to attach a per-unit value to the impact, providing a dollar estimate of the costs and benefits. To estimate total net benefits, total costs are subtracted from total benefits. It should be noted that not all costs and benefits are quantified, and not all the quantified costs and benefits have values associated with them. Quantified and valued externalities are not necessarily the largest or most significant of the external costs and benefits; therefore, it is important to carefully consider both qualitative and quantitative benefits and costs in evaluating the overall benefits and costs of a proposed action.

4.4.1 No Action

Under the no-action alternative, the land parcel on which the proposed PLEF would be located would not be developed as an enrichment facility, and no PLEF-related impacts on the environment and surrounding communities would be expected. However, not constructing the PLEF would result in forgoing the benefits that the PLEF would convey. Over time, if demand for fuel for nuclear power plants grows, there may be increasing shortages of suitable enriched

uranium. Thus, the no-action alternative has the potential to impose external costs due to increased fuel costs and unreliable supplies.

4.4.2 Proposed Action

The proposed action has the potential to create both external benefits and costs. External benefits would include impacts on energy security, enriched uranium production, reduced emissions, energy efficiency, economic and fiscal impacts. External costs include the cost of constructing and operating the PLEF, and a range of potential environmental impacts including impacts on land use, transportation, geology, groundwater, surface water, floodplains, wetlands, water use, ecological resources, air quality, public and educational services, housing, public and occupational health, and waste management.

Table 4-5 summarizes the benefits and costs estimated to result from the proposed action. Anticipated benefits include socioeconomic and environmental benefits. Profits earned by GLE from PLEF operation and additional jobs and spending in the regional economy can be regarded as external financial benefits. Similarly, additional tax revenues that would be received by federal, state, and local governments as a result of the proposed action can also be regarded as a socioeconomic benefit.

Environmental benefits of the proposed action include increased energy security due to the increased quantity and reliability of enriched uranium supply, possible increases in the share of electric power that is generated by nuclear plants, and the use of a less energy-intensive enrichment technology. The PLEF would provide enriched uranium to fuel existing and potential new U.S. nuclear power plants, and nuclear power plants provide a critical source of base-load electricity without emitting air pollutants associated with combustion-related power generation.

The estimated environmental and socioeconomic costs of the PLEF are generally SMALL, and many of the potential external costs could be offset by mitigation measures. These costs include increases in traffic associated with the PLEF; small increases in releases to surface water; small increases in air emissions; and potential impacts on some ecological species of interest, although no significant adverse effects are expected.

The overall impact of the PLEF on social welfare includes both the environmental and socioeconomic costs and benefits described here and the private costs and benefits experienced by the PLEF owners. Considering both private and external benefits and costs, it is anticipated that the proposed PLEF would result in positive net benefits.

Table 4-5 Summary of Estimated External Benefits and Costs

Cost-Benefit Category	Description	Scale of Impacts
Benefits		
Energy security	Increased availability of enriched uranium would reduce reliance on foreign sources; PLEF would establish advanced uranium-enrichment technology in the United States.	LARGE
Enriched uranium fuel	Increased availability of enriched uranium would help address the projected U.S. shortfall of SWU.	LARGE
Reduced pollutant emissions	Increased nuclear power generation could reduce the use of fossil fuel-fired plants, reducing associated pollutant emissions.	MODERATE
Energy efficiency	The SILEX technology would use less electric power than existing uranium enrichment technologies.	MODERATE

Cost-Benefit Category	Description	Scale of Impacts
Employment, payroll and purchase income	The PLEF would employ up to 1,150 workers during construction and start-up, overlapping with operation; 350 would continue during operation until the final year; regional income would increase due to employee payroll and local purchases of goods and services.	MODERATE
Tax income	Sales and tax income would increase due to GLE and employee spending; income from corporate taxes would increase due to tax on GLE profits.	SMALL
Costs		
Construction and operating costs	Proprietary information.	MODERATE
Land use	PLEF would be built on undeveloped land zoned for heavy industrial use, adjacent to an existing DOE uranium enrichment plant and other industrial manufacturing operations; no impact on surrounding land use is expected.	SMALL to MODERATE
Transportation	Up to 815 ADT counts during construction and 740-1,560 ADT during operation; congestion could occur in the immediate area between site entrances on Hobbs Road and the U.S. Highway 60 interchange.	SMALL regionally, MODERATE locally
Soils	Terrain changes during site preparation would be minimal because the area is gently sloping. Shallow soil would be disturbed for the construction of building footings and the excavation of stormwater retention ponds. Construction of the proposed north and west access roads would involve excavation, backfilling, compaction, grading, and paving. Shallow soil disturbed during construction would either be reused or stockpiled for potential use in other areas of the site; no offsite disposal of soil is expected. Construction and decommissioning would not involve additional soil disturbance.	SMALL
Water resources	No significant adverse impact on nearby wells are anticipated because there would be no changes in withdrawals and no impacts expected to groundwater quality.	SMALL
	A small increase in surface water runoff discharge is anticipated during operation; with mitigation, no significant adverse impacts on surface water quality or quantity are anticipated.	SMALL
	Anticipated short-term increase in soil erosion during site preparation would be mitigated by construction BMPs, minimizing the potential impact of sediment on surface waters.	SMALL
	The site is not in a floodplain; runoff might increase floodwaters.	SMALL
	Wetlands within the project area would be directly impacted; impacts would be mitigated.	MODERATE
Air quality	Impacts from air emissions would not substantially change the ambient air quality in the vicinity of the site.	SMALL
Ecological resources	Three federally listed threatened or endangered species might be affected, but adverse impacts are not likely to be significant.	SMALL to MODERATE
Social services	Small increases in regional population would not burden housing, schools, police and fire services, or healthcare.	SMALL
Noise	Noise modeling indicates impacts from construction, operation, and decommissioning would be SMALL	SMALL to MODERATE

Cost-Benefit Category	Description	Scale of Impacts
Public and occupational health	Some increase in work-related injuries due to construction; no adverse health impacts projected for either employees or residents due to radiological or nonradiological releases.	SMALL
Wastewater	Process waste would be treated prior to release to an anticipated new KPDES permitted outfall. Liquid radioactive waste would be treated and either recycled, monitored and released to an approved KPDES outfall, or collected for shipment to offsite radioactive liquid treatment facilities. Sanitary wastewater would be treated onsite through an approved sanitary wastewater treatment package plant prior to discharge through an approved KPDES outfall. Stormwater would be routed to a stormwater wet retention basin prior to release.	SMALL
Solid waste	Municipal, industrial nonhazardous, hazardous, and LLRW would be collected and transported offsite for appropriate disposition (recycling, treatment, and/or disposal). UF_6 tails would be temporarily stored at the PLEF before being shipped to a licensed conversion facility.	SMALL

4.5 PRELIMINARY/FINAL RECOMMENDATION

After weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering the alternatives, the NRC staff's draft recommendation, unless safety issues mandate otherwise, is the issuance of a license to authorize GLE to possess and use special nuclear material to enrich uranium. The NRC staff based its recommendation on the following factors:

- The NRC staff's review of GLE's ER and responses to clarification requests;
- The NRC staff's consultation with federal and state agencies, as well as tribal officials;
- The NRC staff's independent environmental review; and
- The NRC staff's consideration of public comments.

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APPENDIX A:

SUMMARY OF COMMENTS RECEIVED DURING THE SCOPING PERIOD

The scoping process for this environmental impact statement (EIS) began on September 5, 2025, with publication in the *Federal Register* (90 FR 42988) of the U.S. Nuclear Regulatory Commission's (NRC's) notice of intent to conduct a scoping process to gather information necessary to prepare an EIS to evaluate the environmental impacts of issuing a license to Global Laser Enrichment, LLC (GLE, the applicant) to construct and operate a uranium enrichment facility in McCracken County, Kentucky. The scoping process was performed in accordance with Section 51.29 of Title 10 of the *Code of Federal Regulations* (CFR) Part 51, (Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions), which implements the National Environmental Policy Act of 1969, as amended (NEPA). During the scoping process, the NRC invited potentially affected federal, state, local, and tribal government agencies; members of the public; interested and concerned people and organizations; and the license applicant to identify issues and provide recommendations to the agency on the scope of the EIS.

This appendix summarizes substantive comments and information the NRC gathered during the scoping period, which started September 5 and continued through October 6, 2025. Table A-1 contains a list that identifies the individuals who provided unique communications and comments; their affiliation, if provided; and the Agencywide Documents Access and Management System (ADAMS) accession number that can be used to locate the correspondence. Following the conclusion of the scoping period on October 6, 2025, the NRC staff reviewed 11 individual documents containing comments that were submitted online at www.regulations.gov and sent by email to GLE-PLEF-EIS@nrc.gov. One of the documents was emailed after the end of the scoping period; nevertheless, the NRC staff considered this comment as part of this scoping summary. No comments were received by regular mail.

Table A-1 Individuals Providing Comments During the Scoping Comment Period

Commenter	Affiliation	Comment Source	ADAMS Accession Number
Bryant, Don		Email and Regulations.gov	ML25281A111
Ernstberger, Audrey	Kentucky Resources Council and Kentucky Conservation Committee (KRC/	Email and Regulations.gov	ML25281A117
Marida, Patricia		Email and Regulations.gov	ML25281A107
Lodge, Terry	Ohio Nuclear Free Network	Email and Regulations.gov	ML25281A106
Herrick, Will		Regulations.gov	ML25317A561
Anonymous		Regulations.gov	ML25317A571
Herrick, Will		Regulations.gov	ML25317A563
Gellert, Sally		Regulations.gov	ML25317A565
Porterfield, Donivan		Regulations.gov	ML25317A573
Jiang, Yue	The Breakthrough Institute	Regulations.gov	ML25317A587
Moore, Erica		Email	ML26055A275

Along with summarizing substantive topics from the comment correspondence, this appendix indicates the EIS sections that are responsive to the comments. Comments relating to issues that are not significant (i.e., not substantive) such as those of a general nature, including opinions on the proposed action, as well as comments determined to be outside the scope of the environmental review, will not be considered further by the staff. These comments include nuclear proliferation issues, renewable energy and broader energy policy considerations, influences of energy demand, technical readiness of laser enrichment, fuel technologies not evaluated in this EIS, and remediation of past contamination in the region.

Health and safety issues will be considered in detail in the NRC staff's safety evaluation report (SER) prepared as part of the licensing review. Section 3.11 provides information on public and occupational health and safety, and Section 3.13 provides information on accidents, as they relate to potential environmental impacts. The EIS and the SER are related in that they may cover the same topics and may contain similar information, but the analysis in the EIS focuses on an assessment of potential environmental impacts. In contrast, the SER deals primarily with safety evaluations and procedural requirements or license conditions to ensure the health and safety of workers and the general public.

The NRC staff received comments seeking clarification on the proposed project and federal action, particularly, commenters were unclear about the nature of the lasing media and materials anticipated to be processed at the PLEF, NRC's selected level of environmental review, and International Atomic Energy Agency reporting. Commenters stated that the no-action alternative should be considered and expressed concerns over the comparison of technology alternatives. Information about the proposed action, the NRC's environmental review process, permits and consultations, and alternatives that the NRC is evaluating are addressed in Chapters 1 and 2 of the EIS. Further comments within the scope of the EIS were received for the topics summarized in the following list. The NRC considers and evaluates the potential environmental impacts of the construction, operation, and decommissioning of the proposed project in Chapter 3; potential impacts of the no-action alternative are discussed in Sections 2.2.1, 4.1.1, and 4.4.1.

- Land use
    - Concerns about the proposed action limiting access to safe green spaces and outdoor recreation areas and the potential effects on community wellbeing (mental and physical) from those limitations.
    - Importance of contiguous forests in mitigating invasive and parasitic species; noise, air, and water pollution; and reducing human intrusion; and the threat of habitat reduction.
    - Concerns that land and water resources in the site vicinity are contaminated or unusable for fishing, gardening, or recreation; effects of legacy contamination on health and quality of life in the region.

  The NRC staff discusses access to recreational land in the area in Section 3.1.1, as well as the (fragmented) nature of the forest and other land types in the area. The NRC staff discusses potential contamination of water resources in Section 3.4.2.

- Extreme weather and air emissions
    - Impact of increasing frequency and intensity of tornadoes and other extreme weather events in Western Kentucky.

  - Potential effect of the proposed project on greenhouse gases.
  - Questions about the proposed facility's air emission control system.

  The NRC staff discusses tornadoes, other extreme events, greenhouse gases, and air emission controls in Sections 3.2 and 3.11.2.

- Seismicity
  - Potential for seismic activity in the New Madrid Seismic Zone to exacerbate contaminant migration or compromise containment systems resulting in environmental impacts, including contamination of agricultural and residential areas and downstream and downwind populations.
  - Anthropogenic seismicity and related concerns for groundwater remediation, heavy construction, and subsurface alteration.
  - Combined effects of seismic hazards, anthropogenic ground disturbance, and climate-driven weather events causing contaminant migration or damage to containment systems.

  In Section 3.3.2, the NRC staff discusses natural and anthropogenic seismicity and potential impacts. In Sections 3.3.2 and 3.11.2, the NRC staff discusses implications for contaminant migration and containment system damage.

- Surface water and groundwater
  - Impacts on surface water resources nearby, including potential alteration of natural water flow and introduction of chemical pollutants, and concerns about groundwater–surface water interactions.
  - Groundwater characterization and monitoring of constituents.
  - Potential implications of contaminants in effluent and stormwater runoff.

  In Section 3.4.2, the NRC staff discusses water flow and potential impacts on surface water and wetlands, as well as groundwater characterization and monitoring. In Sections 3.4.2 and 3.11.2, the NRC staff discusses potential implications of contaminants in effluent and stormwater runoff.

- Ecological resources
  - Potential impacts on wetlands.
  - Potential impacts on protected species, including habitat disruption, contamination, noise, and light pollution.

  In Section 3.5.2, the NRC staff discusses potential impacts of habitat disruption, contamination, noise, and artificial light on biota; noise impacts are also discussed in Section 3.9.2. Consultation related to protected species under Section 7 of the Endangered Species Act is discussed in Sections 1.5 and 3.5.2.

- Costs
  - Costs of laser enrichment, ranging from financial costs to environmental costs to public health.

  The NRC staff discusses potential financial impacts in Sections 3.6.2 and 4.4 and discusses; public health in Section 3.11.2. Potential environmental impacts are discussed in the impacts subsection of each resource topic in Chapter 3.

- Transportation
  - Potential impacts of transporting DUF_6 cylinders and enriched uranium to and from the PLEF through populated areas and the associated risks in the event of a vehicle accident.

  In Section 3.10.2, NRC staff discusses potential transportation impacts, including risks associated with a vehicle accident.

- Public and occupational health and safety
  - Controls to ensure that proposed operations would not compromise established criticality safety controls.
  - Radiological environmental monitoring program.
  - The spread of potential radiological contamination onsite and offsite of the proposed facility.
  - A request for a health risk assessment evaluating direct and indirect exposure pathways, including airborne particulates, contaminated groundwater and surface water, bioaccumulation in fish and crops, and residual contamination in soils.
  - Past epidemiological studies of workers at the Paducah Gaseous Diffusion Plant, radiological exposures of workers at nuclear sites, and general concerns about community health.
  - Differences between the laser-based enrichment process compared to centrifuge and gaseous diffusion processes, and whether the laser-based enrichment process may result in unique isotopic signatures.
  - Laser safety, including the use of interlocks.

  in Section 3.11.2, NRC staff discuss health and safety. In conjunction with the safety analysis documented in the NRC's SER, this section discusses the potential impacts on workers and the public, considering both radiological and nonradiological hazards and both direct and indirect exposure pathways. NRC staff discuss radiological exposures of workers at nuclear sites in Section 3.11.1, climate events are discussed in Section 3.2, and seismicity is discussed in Section 3.3. Operational safety issues are not within the scope of this EIS; however, the NRC staff is preparing a safety evaluation report as part of its review of GLE's license request that will document safety findings.

- Waste management
  - Management of process waste and radiologically and chemically contaminated materials from decommissioning.

  In Section 3.12.2, NRC staff discusses management of process waste and radiologically and chemically contaminated materials from decommissioning.

- Accidents
  - Concerns about accidents during operations.
  - Direct health effects on downstream and downwind populations in the event of accidental releases due to equipment failure, malfunction, or operator error.

  The NRC staff discusses accidents and potential effects of releases under multiple accident scenarios in Section 3.13. In Section 3.11, NRC staff discuss radiological exposures of the public under both routine and accident conditions.

- Combined effects
  - General comments that the EIS should assess cumulative impacts from the proposed project in combination with other past, present, and reasonably foreseeable future actions in the region.
  - Concern that a fuel fabrication facility licensed in Wilmington, North Carolina, could be sited in Paducah, Kentucky, if the proposed action is approved, and that this foreseeable action should be evaluated in the EIS.

  The NRC staff discusses the impact of past actions (notably at the adjacent DOE PGDP), in the affected environment subsections of multiple resource areas in Chapter 3. In Section 1.1, NRC staff discusses the test facility licensed in Wilmington, North Carolina. The licensed GLE facility in Wilmington, NC, is used to demonstrate the SILEX technology. The proposed PLEF would convert DU (including tails) to produce enriched uranium that would be further processed at another facility not located on the PLEF site. The NRC staff has not received an application for a fuel fabrication facility in the area.

APPENDIX B:

LAWS AND REGULATIONS, PERMITS, CONSULTATIONS, AND EXEMPTIONS

B.1 LAWS AND REGULATIONS

B.1.1 Atomic Energy Act of 1954, as amended *(42 U.S.C. 2011 et seq.)* and the Energy Reorganization Act of 1974 *(42 U.S.C. 5801 et seq.)*

The Atomic Energy Act, as amended, and the Energy Reorganization Act of 1974 (Title 42, Section 5801 *et seq*. of the United States Code [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 PLEF is approved, the NRC would license and regulate the receipt, possession, use, storage, and transfer of special nuclear, source, and byproduct material to protect public health and safety as stipulated in the following regulations:

10 CFR 20 Standards for Protection Against Radiation. These standards relate to radiation dose limits to individual workers and members of the public.

10 CFR 40 Domestic Licensing of Source Material. This regulation establishes the procedures and criteria for the issuance of licenses to receive, possess, use, transfer, or deliver source material.

10 CFR 70, Domestic Licensing of Special Nuclear Material. This regulation establishes procedures and criteria for the issuance of licenses to receive title to own, acquire, deliver, receive, possess, use, and transfer special nuclear material.

10 CFR 73 Physical Protection of Plants and Materials. This regulation establishes requirements for physical protection systems for the protection of special nuclear material at fixed sites and in transit and of plants in which special nuclear material is used.

10 CFR 74, Material Control and Accounting of Special Nuclear Material. This regulation establishes requirements for control and accounting of special nuclear material, including documentation of transfer of material.

10 CFR 95, Facility Security Clearance and Safeguarding of National Security, Information and Restricted Data. This regulation establishes procedures for obtaining facility security clearance and for safeguarding Secret and Confidential National Security Information and Restricted Data received or developed in conjunction with activities licensed, certified, or regulated by the NRC.

40 CFR 190, Subpart B, Environmental Standards for the Uranium Fuel Cycle. These standards establish the maximum doses to the body organs resulting from operational, normal releases and received by members of the public.

B.1.2 National Environmental Policy Act of 1969, as amended *(42 U.S.C. 4321 et seq.)*

The National Environmental Policy Act (NEPA) 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 NEPA requirements and NRC regulations for implementing NEPA (10 CFR 51).

10 CFR 51 Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions. These regulations relate to the submission of the ER and conjunction with the license application for a nuclear facility.

B.1.3 Clean Air Act of 1970, as amended *(42 U.S.C. 7401 et seq.)*

The Clean Air Act (CAA) establishes regulations to ensure air quality and authorizes individual States to manage permits. The CAA requires:

- U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) 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*.);
- Establishment of national standards of performance for new or modified stationary sources of atmospheric pollutants (42 U.S.C. 7411);
- Specific emission increases to be evaluated so as to prevent a significant deterioration in air quality (42 U.S.C. 7470 *et seq*.); and
- 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 EPA.

The CAA requires sources to meet standards and obtain permits to satisfy those standards. The Kentucky Division for Air Quality implements the CAA in the State of Kentucky.

B.1.4 Clean Water Act of 1977 *(amending the Federal Water Pollution Control Act of 1948)*, as amended *(33 U.S.C. 1251 et seq.)*

The Clean Water Act (CWA) requires the 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 CWA requires a National Pollutant Discharge Elimination System (NPDES) permit before discharging any point source pollutant into surface waters of the United States. The NPDES permit program contains a program applicable to discharges of stormwater to waters of the United States from construction and industrial operations.

Section 404 of the CWA authorizes the U.S. Army Corps of Engineers (USACE) to issue permits for the discharge of dredged or fill material into the waters of the United States.

In Kentucky, implementation and enforcement of Sections 401 and 402 of the CWA have been delegated to the Kentucky Energy and Environment Cabinet, Department of Environmental Protection (KDEP) Division of Water (KDOW).

B.1.5 Resource Conservation and Recovery Act of 1976 (amending the Solid Waste Disposal Act of 1965), as amended *(42 U.S.C. 6901 et seq.)*

The Resource Conservation and Recovery Act (RCRA), as amended, requires the 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 EPA approval. The Kentucky Division of Waste Management Hazardous Waste Branch (HWB) is responsible for managing the hazardous waste generator registrations and annual reports for the Commonwealth of Kentucky.

40 CFR 262 Standards Applicable to Generation of Hazardous Waste. All large- and small-quantity generators (nonhazardous solid waste and hazardous wastes) are required to obtain an EPA identification number.

B.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 generated at the PLEF would be shipped to the EnergySolutions disposal facility in Clive, Utah.

B.1.7 Emergency Planning and Community Right-to-Know Act of 1986 *(42 U.S.C. 11001 et seq.)*

The Emergency Planning and Community Right-to-Know Act of 1986 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 Act requires emergency planning and notice to communities and government agencies concerning the presence and release of specific chemicals. The EPA implements this Act under regulations found in 40 CFR Parts 355, 370, and 372.

B.1.8 Safe Drinking Water Act of 1974, 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 by establishing minimum national standards for public water supply systems. This Act also protects underground sources of drinking water from contaminated releases and spills. In In Kentucky, the KDOW is responsible for public water systems to ensure public health protection.

B.1.9 Noise Control Act of 1972, as amended *(42 U.S.C. 4901 et seq.)*

The Noise Control Act delegates the responsibility for noise control to State and local governments. Commercial facilities are required to comply with federal, state, interstate, and local requirements regarding noise control. In Kentucky, noise control falls under Subchapter 30 of the Kentucky Revised Statutes.

B.1.10 National Historic Preservation Act of 1966, as amended *(16 U.S.C. 470 et seq.)*

The National Historic Preservation Act (NHPA) was enacted to protect the nation's cultural resources. The Act created a national historic preservation program, including the *National Register of Historic Places* (NRHP) and the Advisory Council on Historic Preservation (ACHP). Section 106 requires federal agencies to consider the effects of their undertakings on historic properties. The ACHP regulations implementing Section 106 of the Act are found in 36 CFR

Part 800. The regulations call for public involvement in the Section 106 consultation process, as well as consultation with Indian tribes and the State Historic Preservation Office.

B.1.11 Endangered Species Act of 1973, as amended *(16 U.S.C. 1531 et seq.)*

The Endangered Species Act (ESA) 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 (FWS) 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 FWS works in coordination with the Kentucky Fish and Wildlife Commission to implement the ESA.

B.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 United States. The Act is designed to assure the safety of workers in the workplace; provide training, outreach, and education; establish partnerships; and encourage continual improvement in workplace safety and health. The Act is administered and enforced by the Occupational Safety and Health Administration (OSHA), a U.S. Department of Labor agency.

29 CFR 1910 Occupational Safety and Health Standards. This regulation describes the OSHA general industry regulations.

B.1.13 Hazardous Materials Transportation Act of 1975 *(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 (DOT) regulations provided in 49 CFR 171 through 179. Furthermore, 49 CFR 173, Subpart I, contains regulations regarding packaging for the transportation of radionuclides. The transport of radioactive materials to and from the proposed PLEF would be required to comply with these regulations.

B.1.14 United States Enrichment Corporation Privatization Act of 1996 *(42 U.S.C. 2011 et seq.)*

The United States Enrichment Corporation Privatization Act establishes a disposal option for depleted uranium if it is determined to be low-level radioactive waste. The Act allows any person licensed by the NRC to operate a uranium enrichment facility to request that the U.S. Department of Energy authorize an exception for disposal as low-level radioactive waste depleted uranium, it generated.

B.1.15 Environmental Standards for the Uranium Fuel Cycle *(40 CFR 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. (See Section B.1.1 for related NRC requirements, 10 CFR 20*, Standards for Protection Against Radiation*.)

B.1.16 Farmland Protection Policy Act of 1981 *(Public Law 97-98, 7 U.S.C. 4201)*

The Farmland Protection Policy Act is intended to minimize the impact that federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. Federal programs are administered to be compatible with state, local units of government, and private programs and policies to protect farmland. For the purpose of this Act, farmland includes prime farmland, unique farmland, and land of statewide or local importance.

B.2 PERMITS

B.2.1 Federal Permits and Approvals

Table B-1 Federal Permits or Approvals

Permit or Approval	Agency	Regulatory Authority	Activity Covered	Status
NRC License	NRC	10 CFR Part 70 10 CFR Part 40 10 CFR Part 30	Receipt, possession, use, transfer, and/or delivery of source material, special nuclear material, and byproduct material	GLE submitted application for a license to construct and operate a uranium enrichment facility submitted June 13, 2025; NRC accepted the application for review August 4, 2025.
Environmental Impact Statement	NRC	40 CFR Parts 1500–1508 10 CFR Part 51	Analysis of potential impacts associated with preconstruction and construction, operation, and decommissioning of the PLEF in support of NRC decision-making	In process (draft EIS)
Section 404 Permit	U.S. Army Corps of Engineers	USACE 40 CFR Part 230, authorized by the CWA, 33 CFR Parts 320–331	Permit authorizing the discharge of dredged or fill material into the waters of the United States	Permit application not yet submitted
Certificate of Registration	Department of Transportation	49 CFR Part 107	Transportation of hazardous materials	To be obtained

B.2.2 State and Local Permits and Approvals

Table B-2 State and Local Permits and Approvals

Permit or Approval	Agency	Regulatory Authority	Activity Covered	Status
Air Quality Permits	Kentucky Division for Air Quality	Clean Air Act	Construction and operation	Application not yet submitted
401 Water Quality Certification	Kentucky Division of Water	Clean Water Act	Verification by the Commonwealth of Kentucky that the PLEF facility would not degrade State waters or violate water quality standards	Application not yet submitted
KPDES General Permit for Construction Stormwater Management	Kentucky Division of Water	Clean Water Act	Required for all stormwater discharges from construction activities. Requires the development of a Stormwater Pollution Prevention Plan	Application not yet submitted
KPDES Individual Permit for Industrial and Sanitary Wastewater Treatment (operation)	Kentucky Division of Water	Clean Water Act	Required when discharge from a point source flows into waters of the United States. Includes monitoring and reporting requirements	Application not yet submitted
Construction Permit for Wastewater Treatment Plant	Kentucky Division of Water	Clean Water Act	Required prior to the start of construction on a wastewater collection system and wastewater treatment plant	Application not yet submitted
Permit to Construct Across or Along a Stream/Floodplain	Kentucky Division of Water	Clean Water Act	Required for development in, along, or across a stream	Application not yet submitted
Groundwater Protection Plan	Kentucky Division of Water	Clean Water Act	Required for activities that have the potential to pollute groundwater	To be obtained
Hazardous Waste Generator Identification Number Requirement	Kentucky Division of Waste Management	Resource Conservation and Recovery Act	Requirement to obtain an EPA identification number from the Commonwealth of Kentucky	To be obtained
Hazardous Waste Management Treatment, Storage, and Disposal Facility Permit	Kentucky Division of Waste Management	Resource Conservation and Recovery Act	Required for operation of a treatment, storage, or disposal facility for the management of hazardous waste	To be obtained
Hazardous Waste Transporter Identification Number Requirement	Kentucky Division of Waste Management	Resource Conservation and Recovery Act	Requirement to obtain an EPA identification number from Commonwealth of Kentucky	To be obtained
Driveway Permit	Kentucky Transportation Cabinet (KYTC)	KYTC Permits Manual	Required for entrances and other correlated roadway modifications	To be obtained

Permit or Approval	Agency	Regulatory Authority	Activity Covered	Status
Site Plan Permit	McCracken County	McCracken County Ordinances	A site plan must be submitted for review for all structures, buildings, and uses that require a permit and must be approved by the Planning and Zoning Administrator, the County Engineer, and the Floodplain Manager	To be obtained
Stormwater Conveyance Permit	McCracken County	McCracken County Ordinances	A plan and permit are required that describe how stormwater runoff erosion and sediment resulting from the development will be controlled or managed	To be obtained
Building Permit	McCracken County	McCracken County Ordinances	After a site plan is approved, a building permit may be issued by the Building Inspector	To be obtained

B.3 CONSULTATIONS

B.3.1 National Historic Preservation Act Section 106 Consultation

As described in B.1.10, Section 106 of the NHPA requires a federal agency to determine whether its proposed undertaking is the type of activity that could affect historic properties. If so, the agency must consult with the appropriate State Historic Preservation Officer or Tribal Historic Preservation Officer. The Kentucky Heritage Council (KHC), an agency of the Kentucky Tourism, Arts and Heritage Cabinet, serves as the State Historic Preservation Office (SHPO) and is responsible for the identification, protection, and preservation of prehistoric resources and historic buildings, sites and cultural resources throughout Kentucky.

Serving as the SHPO, KHC reviews archaeological surveys conducted to identify and evaluate the significance of archaeological remains that may be damaged or destroyed by an action. If a federal undertaking is in conflict with the preservation of a historic property, KHC seeks to eliminate or minimize the effect on the property through mitigation procedures.

The consultation process under Section 106 is discussed in Section 1.5.2.2 of this EIS.

B.3.2 Endangered Species Act Section 7 Consultation

As described in B.1.11, the ESA 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 FWS of the U.S. Department of the Interior 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 FWS provided a list of known species within the PLEF project area. In August 2024, the FWS identified 13 endangered species, two threatened species, and 1 candidate species as potentially occurring within the PLEF area. If the proposed action could adversely affect any of these species (see Section 3.4 of this EIS), then formal consultation with the FWS would be required.

The consultation process under Section 7 of the ESA is discussed in Section 3.5 of this EIS. To summarize, the NRC staff designated GLE as the non-federal representative to conduct informal consultation with the FWS (NRC 2025). GLE held a call with the FWS to introduce the project on April 7, 2025, and followed up by email on April 24, 2025 (GLE 2025). GLE's email to FWS included their determinations of protected species and an acoustic bat survey. The FWS responded by letter on June 18, 2025, stating the FWS concurs with the determinations that the project is "not likely to adversely affect" federally listed species (FWS 2025).

B.4 EXEMPTIONS

The NRC regulations at 10 CFR 51.71(d) require that the NRC staff conduct a cumulative effects analysis for draft EISs. Executive Order 14300, "Ordering the Reform of the Nuclear Regulatory Commission," Section 5(c) (90 FR 22587), issued May 23, 2025, directs the NRC—in consultation with the Council on Environmental Quality—to revise its NEPA regulations to reflect the Fiscal Responsibility Act of 2023 and Executive Order 14154, "Unleashing American Energy" (90 FR 8353). These revisions must align with Section 102 of NEPA, which requires analysis only of reasonably foreseeable environmental effects and does not include the term "cumulative." Despite these changes, current NRC regulations at 10 CFR Part 51 still mandate cumulative effects analysis. However, Executive Order 14154 also directs the Council on Environmental Quality to revoke its NEPA implementing regulations, including the definition of "cumulative effects" and related guidance.

In light of NEPA Section 102, Executive Orders 14154 and 14300, and under 10 CFR 51.6, "Specific Exemptions," the NRC staff has determined that an exemption from the requirements to perform a cumulative effects analysis in this EIS is authorized by law and otherwise in the public interest. Accordingly, the NRC staff did not perform such an analysis for this EIS. This exemption from cumulative effects analyses only pertains to requirements in the NRC's NEPA implementing regulations in 10 CFR Part 51. This exemption does not affect requirements in other statutes such as the Endangered Species Act of 1973, as amended, and the National Historic Preservation Act of 1966, as amended.

B.5 REFERENCES

10 CFR Part 51. *Code of Federal Regulations*. Title 10, Energy, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." Nuclear Regulatory Commission, Washington, D.C.

90 FR 8353. "Unleashing American Energy". January 20, 2025. *Federal Register*, Executive Office of the President. Available at https://www.federalregister.gov/documents/2025/01/29/2025-01956/unleashing-american-energy. Last accessed March 11, 2026.

90 FR 22587. "Ordering the Reform of the Nuclear Regulatory Commission". May 23, 2025. *Federal Register*, Office of the President. Available at https://www.federalregister.gov/documents/2025/05/29/2025-09798/ordering-the-reform-of-the-nuclear-regulatory-commission. Last accessed Mar. 11, 2026

Endangered Species Act of 1973 (ESA). 16 U.S.C. Chapter 35 §1531 *et seq.*

Fiscal Responsibility Act of 2023, Public Law No. 118-5, Div. C, §321, 137 Stat. 10, 38-46.

FWS (U.S. Fish & Wildlife Service). 2025. *FWS 2025-0021187; BGS Paducah, McCracken County, Kentucky*. Letter from J. Lillpop, Acting Field Supervisor, Kentucky Ecological Services

Field Office, to T. Knowles, Global Laser Enrichment, LLC, addressing the Endangered Species Act. ADAMS Accession No. ML25169A393.

GLE (Global Laser Enrichment, LLC). 2025. *Email to USFWS Project Code 2025-0021187 Regarding GLE PLEF Project* (April 24). ADAMS Accession No. ML25127A231.

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

National Historic Preservation Act of 1066 (NHPA). 54 U.S.C. §300101 *et seq*.

NRC (U.S. Nuclear Regulatory Commission). 2025. *Designation of Global Laser Enrichment, LLC, as the Non-Federal Representative for Consultation Under the Endangered Species Act*. Letter from R. Sun, Environmental Project Management Branch 2, Division of Rulemaking, Environment, and Financial Support, Office of Nuclear Material Safety and Safeguards, Washington, D.C., to L. Andrews, Field Supervisor, Kentucky Ecological Services, Field Office, U.S. Fish and Wildlife Service, Frankfurt, KY (Feb. 5). ADAMS Accession No. ML25028A228.

APPENDIX C:

ASSESSMENT OF PARAMETER ENVELOPES FROM THE GEIS FOR NEW REACTORS

This appendix summarizes information for the plant parameter envelopes (PPEs) and site parameter envelopes (SPEs) presented in the U.S. Nuclear Regulatory Commission (NRC) generic environmental impact statement for licensing of new nuclear reactors (NRC 2024, referred to as the new reactor GEIS, or NR GEIS) that are relevant and appropriate to the consideration of potential environmental impacts of the proposed Global Laser Enrichment (GLE) Paducah Laser Enrichment Facility (PLEF). The NR GEIS is discussed in Section 1.4 and in multiple sections in Chapter 3 of this EIS.

C.1 EVALUATION OF NRC GEIS ENVELOPES AND PLEF CONTEXT

The NR GEIS presents PPEs and SPEs corresponding to a SMALL potential for adverse environmental effect during facility construction, operation, and decommissioning. Table C-1 highlights values and assumptions for PPEs and SPEs from the NR GEIS that are relevant and appropriate to the proposed PLEF, together with supporting information from GLE's environmental report (GLE 2025a) and Chapter 3 of this EIS. This evaluation provides context for the analysis of potential impacts of the proposed PLEF on the human environment during construction, operation, and decommissioning.

C.2 REFERENCES

302 KAR 26. Title 302, Kentucky Administrative Regulations, Chapter 26, "Pesticides."

DOE (U.S. Department of Energy). 1999. *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-term Management and Use of Depleted Uranium Hexafloride*. DOE/EIS-0269 (April). Available at https://www.energy.gov/sites/default/files/2021-07/eis-0269-vol1-depleted-duf6-1999-04.pdf. Last accessed Feb. 16, 2026

GLE (Global Laser Enrichment, LLC). 2025a. *Environmental Report for the Paducah Laser Enrichment Facility*. (June 13). ADAMS Accession No. ML25164A077.

IAEA (International Atomic Energy Agency). 1992. *Effects of Ionizing Radiation on Plants and Animals at Levels Implied by Current Radiation Protection Standards*, Technical Reports Series No. 332, IAEA, Vienna (1992).

IAEA. 2026. *Depleted Uranium*. Available at https://www.iaea.org/topics/spent-fuel-management/depleted-uranium. Last accessed Feb. 16, 2025.

NCRP (National Council on Radiation Protection and Measurements). 1991. *Effects of Ionizing Radiation on Aquatic Organisms*. NCRP Report No. 109. Bethesda, MD.

NRC (U.S. Nuclear Regulatory Commission). 2024. *Generic Environmental Impact Statement for Licensing of New Nuclear Reactors*, Draft Report for Comment. NUREG-2249 (Sep.). ADAMS Accession No. ML24176A220.

NRC. 2025. *NRC Approves Updated Mission Statement*. Office of Public Affairs (Jan. 24). Available at https://www.nrc.gov/cdn/doc-collection-news/2025/25-005.pdf. Last accessed Jan. 11, 2026.

Peterson, J. 2026. Personal communication from Jason Peterson, General Manager of Paducah Water, to Amy Minor, NRC Project Officer (Jan. 30).

Table C-1 Plant Parameter and Site Parameter Envelopes from the New Reactor GEIS

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Air Quality		
Construction		
Greenhouse gas emissions during construction	Greenhouse gases emitted by equipment and vehicles during the 97-year GHG life-cycle period would be equal to or less than 2,534,000 MT of CO_2e. Appendix H of this *[NR]* GEIS contains the staff's methodology for developing this value, which includes emissions from construction, operation, and decommissioning. As long as this total value is met, the impacts for the life-cycle of the project and the individual phases of the project are determined to be SMALL.	Greenhouse gases emitted by equipment and vehicles during the 97-year life-cycle period would be less than 2,534,000 MT of CO_2e.
Operation		
Greenhouse gas emissions during operation	Greenhouse gases emitted by equipment and vehicles during the 97-year GHG life-cycle period would be equal to or less than 2,534,000 MT of CO_2e. Appendix H of this *[NR]* GEIS contains the staff's methodology for developing this value, which includes emissions from construction, operation, and decommissioning. As long as this total value is met, the impacts for the life-cycle of the project and the individual phases of the project are determined to be SMALL.	Greenhouse gases emitted by equipment and vehicles during the 97-year life-cycle period would be less than 2,534,000 MT of CO_2e.
Water Resources		
Operation		
Water use conflict from plant municipal water demand	The amount available from municipal water systems exceeds the amount of municipal water required by the plant (gallons per minute [gpm]).	According to Jason Peterson (General Manager of Paducah Water) – Paducah Water Works has more capacity than GLE has requested (GLE 2026a).
	Usage amount is within the existing capacity of the system(s), accounting for all existing and planned future uses.	According to Jason Peterson (General Manager of Paducah Water Works) - Capacity is available, and no additional infrastructure is needed to support the PLEF.
	An agreement or permit for the usage amount can be obtained from the municipality.	According to Jason Peterson (General Manager of Paducah Water Works) - an agreement can be executed at any time.

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Terrestrial Ecology		
Construction		
Important species and habitats – Other important species and habitats	Applicants would communicate with State natural resource or conservation agencies regarding wildlife and plants and implement mitigation recommendations of those agencies.	ER Appendix L contains (Protected Species Report) provides KDFWR's protected species list for McCracken County and the Office of Kentucky Nature Preserves (OKNP) Kentucky Biological Assessment Tool, demonstrating GLE's communication with State natural resource or conservation agencies. In addition, GLE will obtain all necessary permits and comply with required mitigation measures to limit impacts on the environment.
Operation		
Exposure of terrestrial organisms to radionuclides	Applicants would demonstrate in their application that any radiological nonhuman biota doses would be below International Atomic Energy Agency (IAEA) and National Council on Radiation Protection and Measurements (NCRP) guidelines.	ER Section 4.5.2.1.2 (Operation) states doses will be below IAEA and NCRP guidelines.
Water use conflicts with terrestrial resources	Total plant water demand would be less than or equal to a daily average of 6,000 gallons per minute.	ER Section 3.4.5.2 (Site Water Use) states that GLE's proposed water use is a total water draw up to 424,345 liters per day (lpd), (112,100 gallons per day [gpd]) or less than 78 gpm.
	If water is withdrawn from flowing water bodies, average plant water withdrawals would not reduce flow by more than 3 percent of the 95 percent exceedance daily flow and would not prevent maintenance of applicable instream flow requirements.	No water would be withdrawn from flowing water bodies.
	Any water withdrawals would be in compliance with any EPA or State permitting requirements.	No water would be withdrawn from brackish non-flowing water bodies such as estuaries.
	Applicants would be able to demonstrate that hydroperiod changes are within historic or seasonal fluctuations.	No groundwater dewatering would occur that changes in water levels or results in a reduction of hydroperiod.

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Effects of transmission line ROW management on terrestrial resources	Vegetation in transmission line ROWs would be managed following a plan consisting of integrated vegetation management practices.	ER Section 3.5.3.3.6 (Powerline Corridor) explains that powerline corridors in the PLEF Project Area are linear easements containing electrical transmission lines owned and maintained by the Kentucky Utilities Company. ER Section 2.1.2.1.1 states that should additional clearing be required to accommodate utility transmission lines, such actions would be conducted in compliance with applicable regulations and regulatory approvals.
	All ROW maintenance work would be performed in compliance with all applicable laws and regulations.	ER Section 2.1.2.1.1 states that should additional clearing be required to accommodate utility transmission lines, such actions would be conducted in compliance with applicable regulations and regulatory approvals.
	Herbicides would be applied by licensed applicators, and only if in compliance with applicable manufacturer label instructions.	ER Section 4.4.2.2.1.2 (Operation states that chemical herbicides and pesticides would only be used in site-specific locations and would only be applied by licensed herbicide and pesticide applicators under applicable regulations.
Effects of electromagnetic fields on flora and fauna	Based on the literature review in the License Renewal GEIS, the staff determined that this is a Category 1 issue and impacts would be SMALL regardless of the length, location, or size of the transmission lines. The staff did not recommend any mitigation in the License Renewal GEIS; hence, none is needed here. The staff did not rely on any PPE and SPE values or assumptions in reaching this conclusion.	ER Section 2.1.2.1.1 states that should additional clearing be required to accommodate utility transmission lines, such actions would be conducted in compliance with applicable regulations and regulatory approvals.
Important species and habitats – Other important species and habitats	Applicants would communicate with State natural resource or conservation agencies regarding wildlife and plants and implement mitigation recommendations of those agencies.	ER Appendix L contains (Protected Species Report) provides KDFWR's protected species list for McCracken County and the Office of Kentucky Nature Preserves (OKNP) Kentucky Biological Assessment Tool, demonstrating GLE’s communication with State natural resource or conservation agencies. In addition, GLE will obtain all necessary permits and comply with required mitigation measures to limit impacts on the environment.

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Aquatic Ecology		
Construction		
Runoff and sedimentation from construction areas	Temporarily disturbed lands would be revegetated using regionally indigenous vegetation once the lands are no longer needed to support building activities.	ER Section 5.9 states that following construction, GLE plans to restore all disturbed areas not used for permanent facilities to a vegetated landscape.
	Applicant would obtain approval, if required, under NWP [Nationwide Permit] 7 in 33 CFR Part 330.	GLE will obtain and comply with required permits.
Building transmission lines, pipelines, and access roads across surface waterbodies	Pipelines would be extended under (or over) surface through directional drilling without physically disturbing shorelines or bottom substrate.	There are no shorelines or bottom substrate at the GLE PLEF that would be disturbed.
	Access roads would span streams and other surface waterbodies with a bridge or ford, and any fords would include placement and maintenance of matting to minimize physical disturbance of shorelines and bottom substrates.	No bridges or fords are planned.
	No access roads would be extended across stream channels over 10 ft in width (at ordinary high water).	No access roads planned to be installed across stream channels.
	Any bridges or fords would be removed once no longer needed, and any exposed soils or substrate would be revegetated using regionally indigenous vegetation appropriate to the landscape setting.	No bridges or fords are planned.
	Any mitigation measures indicated in the NWPs or other permits would be implemented.	GLE will obtain and comply with required permits.
	BMPs would be used for erosion and sediment control.	GLE will obtain and comply with required permits, including conditions for erosion and sediment control.
Important species and habitats – Other important species and habitats	Applicants would communicate with State natural resource or conservation agencies regarding aquatic fish, wildlife, and plants and implement mitigation recommendation of those agencies.	GLE is coordinating with the Kentucky Division of Water to obtain a Section 401 Water Quality Certification.

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Operation		
Stormwater runoff	Preparation, approval by applicable regulatory agencies, and implementation of a stormwater management plan.	GLE will obtain a KPDES General Permit for Construction Stormwater Management and a McCracken County Stormwater Conveyance Permit and is required to submit a Kentucky Division of Water-approved Groundwater Protection Plan.
	Obtaining and compliance with any required permits for the storage and use of hazardous materials issued by federal and state agencies under the Resource Conservation and Recovery Act (RCRA).	GLE will follow up and obtain a RCRA permit from the Kentucky Division of Waste Management, if necessary.
	BMPs would be used for stormwater management.	GLE will implement BMPs required in a KPDES General Permit for Construction Stormwater Management.
Exposure of aquatic organisms to radionuclides	Applicants would demonstrate in their application that any radiological nonhuman biota doses would be below IAEA and NCRP guidelines.	ER Section 4.5.2.1.2 (Operation) states doses will be below IAEA and NCRP guidelines.
Effects of refurbishment on aquatic biota	BMPs would be used for erosion, sediment control, and stormwater management.	GLE will obtain a KPDES General Permit for Construction Stormwater Management and a McCracken County Stormwater Conveyance Permit and comply with BMPs outlined in those permits. In addition, it is required to submit a Kentucky Division of Water-approved Groundwater Protection Plan that includes proposed mitigation measures to protect groundwater.
	Exposed soils would be restored as soon as possible with regionally indigenous vegetation.	ER Section 5.9 states that following construction, GLE plans to restore all disturbed areas not used for permanent facilities to a vegetated landscape.

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Impacts of transmission line right of way management on aquatic resources	Vegetation in transmission line ROWs would be managed following a plan consisting of integrated vegetation management practices.	Per ER Section 3.5.3.3.6, powerline corridors in the PLEF Project Area are linear easements containing electrical transmission lines owned and maintained by the Kentucky Utilities Company. Once the PLEF has been constructed, vegetation maintenance practices would be similar to existing industry standard maintenance practices. Chemical herbicides and pesticides would only be used in site-specific locations and would only be applied by licensed herbicide and pesticide applicators under applicable regulations, (302 KAR 26), decreasing the potential for the entry of herbicides and pesticides into receiving waters. In addition, the implementation of BMPs and other practices to contain and prevent the release of herbicides and pesticides would minimize impacts.
	All ROW maintenance work would be performed in compliance with all applicable laws and regulations.	Per ER Section 3.5.3.3.6, powerline corridors in the PLEF Project Area are linear easements containing electrical transmission lines owned and maintained by the Kentucky Utilities Company. Once the PLEF has been constructed, vegetation maintenance practices would be similar to existing industry standard maintenance practices. Chemical herbicides and pesticides would only be used in site-specific locations and would only be applied by licensed herbicide and pesticide applicators under applicable regulations, (302 KAR 26), decreasing the potential for the entry of herbicides and pesticides into receiving waters. In addition, the implementation of BMPs and other practices to contain and prevent the release of herbicides and pesticides would minimize impacts.

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
*Impacts of transmission line right of way management on aquatic resources (**Cont.**)*	Herbicides would be applied by licensed applicators, and only if in compliance with applicable manufacturer label instructions.	Per ER Section 3.5.3.3.6, powerline corridors in the PLEF Project Area are linear easements containing electrical transmission lines owned and maintained by the Kentucky Utilities Company. Once the PLEF has been constructed, vegetation maintenance practices would be similar to existing industry standard maintenance practices. Chemical herbicides and pesticides would only be used in site-specific locations and would only be applied by licensed herbicide and pesticide applicators under applicable regulations, (302 KAR 26), decreasing the potential for the entry of herbicides and pesticides into receiving waters. In addition, the implementation of BMPs and other practices to contain and prevent the release of herbicides and pesticides would minimize impacts.
	BMPs would be used for erosion and sediment control.	GLE will obtain a KPDES General Permit for Construction Stormwater Management and a McCracken County Stormwater Conveyance Permit and comply with BMPs outlined in those permits. In addition is required to submit a Kentucky Division of Water-approved Groundwater Protection Plan that includes proposed mitigation measures to protect groundwater.
Important species and habitats – Other important species and habitats	Applicants would communicate with State natural resource or conservation agencies regarding aquatic fish, wildlife, and plants and implement mitigation recommendations of those agencies.	GLE is coordinating with the Kentucky Division of Water to obtain a Section 401 Water Quality Certification.

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Radiological Environment		
Construction		
Radiological dose to construction workers	For protection against radiation, the applicant must meet the regulatory requirements of:	
	10 CFR 20.1101 Radiation Protection Programs (10 CFR Part 20) if issued a license	GLE must meet the requirements in this regulation to obtain a license.
	10 CFR 20.1201 Occupational dose limits for adults	GLE must meet the requirements in this regulation to obtain a license.
	10 CFR 20.1301 Dose limits for individual members of the public	GLE must meet the requirements in this regulation to obtain a license.
	Appendix B of 10 CFR Part 20 *Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage*	GLE is required to meet this regulation.
	10 CFR 50.34a (10 CFR Part 50) Design objectives for equipment to control releases of radioactive material in effluents—nuclear power reactors	GLE is not required to meet this regulation because the PLEF is not a nuclear power reactor.
	10 CFR 50.36a Technical specifications on effluents from nuclear power reactors	GLE will meet the requirements in this regulation.
	Application contains sufficient technical information for the staff to complete the detailed technical safety review.	The application contains sufficient technical information for the staff to complete the detailed technical safety review as documented in the acceptance letter at ML25202A201.
	Application will be found to be in compliance by the staff with the above regulations through a radiation protection program and an effluent release monitoring program.	A safety evaluation report will document application compliance by the staff with the above regulations through a radiation protection program and an effluent release monitoring program.

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Operation		
Occupational doses to workers	For protection against radiation, the applicant must meet the regulatory requirements of:	
	10 CFR 20.1101 Radiation Protection Programs (10 CFR Part 20) if issued a license	GLE must meet the requirements in this regulation to obtain a license.
	10 CFR 20.1201 Occupational dose limits for adults	GLE must meet the requirements in this regulation to obtain a license.
	Appendix B of 10 CFR Part 20 *Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage*	GLE will meet the limits in Appendix B of 10 CFR Part 20.
	10 CFR 50.34a (10 CFR Part 50) Design objectives for equipment to control releases of radioactive material in effluents—nuclear power reactors	GLE is not required to meet this regulation because the PLEF is not a nuclear power reactor.
	10 CFR 50.36a Technical specifications on effluents from nuclear power reactors	GLE is not required to meet Part 50 regulations for effluent criteria but will meet the 10 CFR 70.59 criteria for effluent monitoring*
	Application contains sufficient technical information for the staff to complete the detailed technical safety review.	The application contains sufficient technical information for the staff to complete the detailed technical safety review as documented in the acceptance letter at ML25202A201.
	Application will be found to be in compliance by the staff with the above regulations through a radiation protection program and an effluent release monitoring program.	A safety evaluation report will document application compliance by the staff with the above regulations through a radiation protection program and an effluent release monitoring program.

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Maximally exposed individual annual doses	For protection against radiation, the applicant must meet the regulatory requirements of:	
	10 CFR 20.1101 Radiation Protection Programs (10 CFR Part 20-TN283) if issued a license.	GLE must meet the requirements in this regulation to obtain a license.
	10 CFR 20.1301 Dose limits for individual members of the public.	GLE must meet the requirements in this regulation to obtain a license.
	Appendix B of 10 CFR Part 20 *Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage*	GLE will meet the limits in Appendix B of 10 CFR Part 20.
	10 CFR 50.34a (10 CFR Part 50-TN249) Design objectives for equipment to control releases of radioactive material in effluents—nuclear power reactors	GLE is not required to meet this regulation because the PLEF is not a nuclear power reactor.
	10 CFR 50.36a Technical specifications on effluents from nuclear power reactors	GLE is not required to meet Part 50 regulations for effluent criteria but will meet the 10 CFR 70.59 criteria for effluent monitoring*
	Application contains sufficient technical information for the staff to complete the detailed technical safety review.	The application contains sufficient technical information for the staff to complete the detailed technical safety review as documented in the acceptance letter at ML25202A201.
	Application will be found to be in compliance by the staff with the above regulations through a radiation protection program and an effluent release monitoring program.	A safety evaluation report will document application compliance by the staff with the above regulations through a radiation protection program and an effluent release.

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Total population annual doses	For protection against radiation, the applicant must meet the regulatory requirements of:	
	10 CFR 20.1101 Radiation Protection Programs (10 CFR Part 20-TN283) if issued a license	GLE must meet the requirements in this regulation to obtain a license.
	10 CFR 20.1301 Dose limits for individual members of the public	GLE must meet the requirements in this regulation to obtain a license.
	Appendix B of 10 CFR Part 20 *Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage*	GLE will meet the limits in Appendix B of 10 CFR Part 20.
	10 CFR 50.34a (10 CFR Part 50-TN249) Design objectives for equipment to control releases of radioactive material in effluents—nuclear power reactors.	GLE is not required to meet this regulation because the PLEF is not a nuclear power reactor.
	10 CFR 50.36a Technical specifications on effluents from nuclear power reactors.	GLE is not required to meet Part 50 regulations for effluent criteria but will meet the 10 CFR 70.59 criteria for effluent monitoring*
	Application contains sufficient technical information for the staff to complete the detailed technical safety review.	The application contains sufficient technical information for the staff to complete the detailed technical safety review as documented in the acceptance letter at ML25202A201.
	Application will be found to be in compliance by the staff with the above regulations through a radiation protection program and an effluent release monitoring program.	A safety evaluation report will document application compliance by the staff with the above regulations through a radiation protection program and an effluent release monitoring program.
Nonhuman biota doses	Applicants would demonstrate in their application that any radiological nonhuman biota doses would be below IAEA (1992) and NCRP (1991) guidelines.	ER Section 4.5.2.1.2 Operation states doses will be below IAEA and NCRP guidelines.
Nonradiological Environment		
Construction		
Building impacts of chemical, biological, and physical nonradiological hazards	The applicant must adhere to all applicable federal, state, local, or tribal regulatory limits and permit conditions for chemical hazards, biological hazards, and physical hazards.	GLE will adhere to all applicable federal, state, local or tribal regulatory limits and permit conditions for chemical hazards, biological hazards, and physical hazards as documented in the environmental and safety reviews.
	The applicant will follow nonradiological public and occupational health BMPs and mitigation measures, as appropriate.	GLE will follow nonradiological public and occupational health BMPs and mitigation measures, as appropriate, as documented in the environmental and safety reviews.

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Operation		
Operation impacts of chemical, biological, and physical nonradiological hazards	The applicant must adhere to all applicable federal, state, local or tribal regulatory limits and permit conditions for chemical hazards, biological hazards, and physical hazards.	GLE will adhere to all applicable federal, state, local or tribal regulatory limits and permit conditions for chemical hazards, biological hazards, and physical hazards as documented in the environmental and safety reviews.
	The applicant will follow nonradiological public and occupational health BMPs and mitigation measures, as appropriate.	GLE will follow nonradiological public and occupational health BMPs and mitigation measures, as appropriate, as documented in the environmental and safety reviews.
Noise		
Operation		
Operation-related noise	The noise level would be no more than 65 dBA at site boundary, unless a relevant State or local noise abatement law or ordinance sets a different threshold, which would then be the presumptive threshold for PPE purposes.	Modeling results indicate that noise associated with the operation of a new reactor would be 38 dBA mitigated and would not routinely exceed 65 dBA at the site boundary.
	If an applicant cannot meet the 65 dBA threshold through mitigation, then the applicant must obtain a variance or exception with the relevant State or local regulator.	The 65-dBA threshold is planned to be met, with no exception needed.
	The project would implement BMPs, including such as modeling, foliage planting, construction of noise buffers, and the timing of construction and/or operation activities.	GLE proposed BMPs are (1) heavy truck and earth-moving equipment usage would be limited to daylight hours; (2) no work would be planned on weekends or holidays; (3) noise-suppression systems on construction vehicles would be kept in proper operation.

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Radiological Waste Management		
Operation		
Low-level radioactive waste (LLRW)	Applicants must meet the regulatory requirements of 10 CFR Part 20 (e.g., 20.1406 and Subpart K), 10 CFR Part 61, 10 CFR Part 71, and 10 CFR Part 72. Quantities of LLRW generated at a new nuclear reactor would be less than the quantities of LLRW generated at existing nuclear power plants, which generate an average of 21,200 ft^3 (600 m^3) and 2,000 curies (Ci) (7.4×10^{13} becquerel [Bq]) per year for boiling water reactors and half that amount for pressurized water reactors.	GLE will not store high-level radioactive waste or greater than Class C waste, therefore, 10 CFR Part 72 does not apply to the PLEF. GLE must meet the relevant requirements in 10 CFR Parts 20, 61, and 71 to obtain a license. From the ER (GLE 2025a, Table 4-36), operation of the PLEF would generate an estimated 15 MT/yr (16 tons/yr) of wastes designated as RCRA hazardous wastes, 124 MT/yr (137 tons/yr) of combustible LLRW, 59 kilograms/yr (129 pounds/yr) of laboratory LLRW from UF_6 cylinder sampling and analysis, 292 MT/yr (321 tons/yr) of noncombustible LLRW requiring off-site disposal, 1,271 kilograms/yr (2,800 pounds/yr) of liquid effluent treatment system filtrate/sludge, and 16,475 MT/yr (18,161 tons/yr) of DUF_6 (UF_6 tails) All but the DUF_6 would be dispositioned as waste; the DUF_6 is considered a potential resource. Applying a density of 5.1 g/cm^3 for DU (DOE 1999), the combined combustible, noncombustible, lab LLRW, and filtrate/sludge corresponds to less than 100 m^3/yr. (1 MT is 1,000 kilograms, 1 m^3 is 1 million cm^3.) With regard to activity, using specific activities from IAEA (2026), if it were conservatively assumed that these four waste streams (about 417 MT/yr, or 417,000 kilograms/yr) were natural uranium (specific activity 25.4 Bq/mg), the total activity would be 286 Ci – which is well below 2,000 Ci. (1 Ci is 3.7×10^{10} Bq; note the specific activity of DU is 14.8 Bq/mg, less than 60 percent of that for natural uranium.)

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Nonradiological Waste Management		
Construction		
Construction nonradiological waste	The applicant must meet all the applicable permit conditions, regulations, and BMPs related to solid, liquid, and gaseous waste management.	GLE will comply with waste management permit conditions regulations and implement required BMPs.
	For hazardous waste generation, applicants must meet conformity with hazardous waste quantity generation levels in accordance with RCRA.	GLE will comply with comply with RCRA requirements.
	For sanitary waste, applicants must dispose of sanitary waste in a permitted process.	ER Section 4.13.2.2, Sanitary wastewater would be collected and treated onsite before being discharged to local receiving waters under a KPDES permit.
	For mitigation measures, the applicant would perform mitigation measures to the extent practicable, such as recycling, process improvements, or the use of a less hazardous substance.	GLE will implement a waste minimization plan as described in ER Section 4.13.3.
Operation		
Operation nonradiological waste	The applicant must meet all the applicable permit conditions, regulations, and BMPs related to solid, liquid, and gaseous waste management.	GLE will comply with waste management permit conditions regulations and implement required BMPs.
	For hazardous waste generation, applicants must meet conformity with hazardous waste quantity generation levels in accordance with RCRA.	GLE will comply with comply with RCRA requirements.
	For sanitary waste, applicants must dispose of sanitary waste in a permitted process. For mitigation measures, the applicant would perform mitigation measures to the extent practicable, such as recycling, process improvements, or the use of a less hazardous substance.	ER Section 4.13.2.2.1.3 (Sanitary Waste Management) - To provide onsite sanitary wastewater treatment, a package plant will be selected and purchased. After treatment and monitoring, treated sanitary wastewater would be discharged through an approved KPDES outfall to Little Bayou Creek. GLE will implement a waste minimization plan as described in ER Section 4.13.3.

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Socioeconomics		
Construction		
Community services and infrastructure	The housing vacancy rate in the affected economic region does not change by more than 5 percent, or at least 5 percent of the housing stock remains available after accounting for in-migrating construction workers.	In the unlikely event that all new workers and their families settled in McCracken County, this would still only represent, at most, 15 percent of all available housing units in the year 2029 during the peak; thus, at least 5 percent of the housing stock would remain available.
	Student:teacher ratios in the affected economic region do not exceed locally mandated levels after including the school age children of the in-migrating worker families.	Adding at most 156 students in the region (McCracken and Ballard Counties) where 21 schools are located would not increase the student:teacher ratios above KY state mandates – which for primary grades is 24 students to 1 teacher/ (https://apps.legislature.ky.gov/law/kar/titles/702/003/190/).
Economic impacts	The economic impacts of construction and operation of a new nuclear reactor are expected to be beneficial; therefore, this is a Category 1 issue. If, during the project-specific environmental review, the NRC staff determines a detailed analysis of economic costs and benefits is needed for analysis of the range of alternatives considered or relevant to mitigation, the staff may require further information from the applicant.	The economic impacts are expected to be beneficial.
Tax revenue impacts	The tax revenue impacts of construction and operation of a new nuclear reactor are expected to be beneficial; therefore, this is a Category 1 issue. If, during the project-specific environmental review, the NRC staff determines a detailed analysis of tax revenue costs and benefits is needed for analysis of the range of alternatives considered or relevant to mitigation, the staff may require further information from the applicant.	The tax revenue impacts are expected to be beneficial.

Issue	PPE/SPE Values and Assumptions for NR GEIS Category 1 Conclusions	Information Supporting Why NR GEIS PPE/SPE Values and Assumptions Are Bounding for the GLE PLEF
Operation		
Community services and infrastructure	The housing vacancy rate in the affected economic region does not change by more than 5 percent, or at least 5 percent of the housing stock remains available after accounting for in-migrating construction workers.	The PLEF workers would represent approximately 7 percent of the 1,495 housing units for sale or rent in 2020.
	Student:teacher ratios in the affected economic region do not exceed locally mandated levels after including the school age children of the in-migrating worker families.	Adding at most 156 students in the region (McCracken and Ballard Counties) where 21 schools are located would not increase the student:teacher ratios above KY state mandates, which for primary grades is 24 students to 1 teacher (https://apps.legislature.ky.gov/law/kar/titles/702/003/190/).
Economic impacts	The economic impacts of construction and operation of a new nuclear reactor are expected to be beneficial; therefore, this is a Category 1 issue. If, during the project-specific environmental review, the NRC staff determines a detailed analysis of economic costs and benefits is needed for analysis of the range of alternatives considered or relevant to mitigation, the staff may require further information from the applicant.	The economic impacts are expected to be beneficial
Tax revenue impacts	The tax revenue impacts of construction and operation of a new nuclear reactor are expected to be beneficial; therefore, this is a Category 1 issue. If, during the project-specific environmental review, the NRC staff a detailed analysis of tax revenue costs and benefits is needed for analysis of the range of alternatives considered or relevant to mitigation, the staff may require further information from the applicant.	The tax revenue impacts are expected to be beneficial.

APPENDIX D:

ENVIRONMENTAL REVIEW CORRESPONDENCE

This appendix provides a chronological listing of correspondence between the U.S. Nuclear Regulatory Commission (NRC), Global Laser Enrichment, LLC (GLE, or applicant), and other correspondence related to the NRC staff's environmental review. All documents, with the exception of those containing proprietary information, have been placed in the NRC's Public Document Reading Room at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland, and they are electronically available from the NRC's Agencywide Document Access and Management System (ADAMS). Table D-1 lists the environmental review correspondence by date and includes the ADAMS accession number for each document. The docket number for the GLE PLEF is 07007033.

Table D-1 Environmental Review Correspondence and Consultation for Licensing, Construction, Operation, and Decommissioning of the GLE PELF

Date	Originator	Correspondence	ADAMS Accession Number (ML)
7/2/2024	NRC	Request for an Exemption Pursuant to 10 CFR 70.17 and 10 CFR 51.6 from the Requirements of 10 CFR 51.60(a) and 70.21(1) for Timing of Submittal of the Environmental Report (ER) for the GLE Paducah Laser Enrichment Facility (PLEF)	ML24193A060
8/19/2024	NRC	Approval of GLE Request for an Exemption Pursuant to 10 CFR 70.17 and 10 CFR 51.6 from the Requirements of 10 CFR 51.60(a) and 70.21(1) for Timing of Submittal of the ER for the GLE PLEF	ML24184B970
12/2/2024	NRC	Summary Of September 23, 2024 Pre-Application Meeting With GLE For The ER For The PLEF In McCracken County, Kentucky	ML24291A280
12/30/2024	GLE	ER for the PLEF	ML24365A109
1/24/2025	NRC	Summary of NRC and GLE Meeting January 24, 2025	ML25041A235
1/29/2025	NRC	Designation Of GLE As the Nonfederal Representative For the Proposed GLE PLEF	ML25028A228
1/31/2025	NRC	Email Regarding Designation of GLE as the Non-Federal Representative for Section 7 Consultation	ML25037A045
2/18/2025	NRC	Email GLE Notice to USACE Regarding Non-Federal Representative	ML25050A321
4/9/2025	NRC	GLE PLEF Pre-Application Meeting Regarding Environmental Protection	ML25099A016
4/24/2025	GLE	Email to FWS Project Code 2025-0021187 Regarding GLE PLEF Project	ML25127A231
4/24/2025	GLE	GLE to FWS, Request for Concurrence with "not likely to jeopardize" determination for tricolored bat	ML25174A157

Date	Originator	Correspondence	ADAMS Accession Number (ML)
5/7/2025	GLE	GLE Supplemental ER Submittal	ML25097A173
5/7/2025	GLE	Supplement to GLE PLEF ER Appendix E Subsurface Investigation in GLE Study Area Seasonal Variation	ML25097A174
5/29/2025	NRC	Trip Report for the Proposed GLE PLEF	ML25136A292
6/13/2025	GLE	GLE ER for the PLEF	ML25164A077
6/18/2025	FWS, Kentucky Ecological Services Field Office	FWS to GLE, Endangered Species Act Concurrence for PLEF	ML25169A393
7/3/2025	GLE	GLE PLEF - USACE ID No.: LRL-2025-00040 Additional Information - Supplement to Delineation Report	ML25195A102
8/4/2025	NRC	Acceptance of GLE PLEF License Application	ML25202A201
8/6/2025	NRC	Request For Library to Maintain a Copy of the ER for the Proposed GLE PLEF in McCracken County, Kentucky	ML25218A202
9/2/2025	NRC	FRN - GLE PLEF Notice of Intent to Conduct Scoping Process and Prepare Environmental Impact Statement	ML25239A015
9/19/2025	Kentucky Heritage Council	Kentucky Heritage Council Response to Phase I	ML25289A264
10/22/2025	NRC	GLE PLEF Cooperating Agency Invitation	ML25288A102
10/31/2025	U.S. Army Corps of Engineers	Response to Cooperating Agency Invitation for GLE PLEF	ML25307A001
12/10/2025	GLE	GLE - ER for the PLEF, Enclosure 3 PROPRIETARY AND CONFIDENTIAL	ML25345A071
12/23/2025	NRC	NRC Letter to Kentucky SHPO Initiating Section 106 for GLE's PLEF in McCracken County, Kentucky	ML25353A577
1/21/2026	Kentucky Heritage Council	Kentucky SHPO Response to S106 Initiation Letter	ML26026A120
1/30/2026	GLE	Follow-up Questions Regarding GLE PLEF Water Utility	ML26050A213
3/19/2026	NRC	NRC Letter to Kentucky SHPO Finding of No Adverse Effects for GLE's PLEF in McCracken County, Kentucky	ML26050A146

ADAMS = Agencywide Documents Access and Management System, CFR = Code of Federal Regulations, ER = Environmental Report, FRN = Federal Register Notice, FWS = U.S. Fish and Wildlife Service, LLC = Limited Liability Company, PLEF = Paducah Laser Enrichment Facility, SHPO = State Historic Preservation Office, USACE = U.S. Army Corps of Engineers.

APPENDIX E:

AGENCIES, ORGANZATIONS, AND PERSONS CONTACTED DURING THE PLEF ENVIRONMENTAL REVIEW

The U.S. Nuclear Regulatory Commission (NRC) contacted federal, state, tribal, and local agencies listed in Table E-1 during the NRC staff's environmental review of the proposed Global Laser Enrichment, LLC (GLE) Paducah Laser Enrichment Facility (PLEF). This list excludes the U.S. Army Corps of Engineers because they are a cooperating agency.

Table E-1 Agencies, Organizations, and Persons Contacted by the NRC During the GLE PLEF Environmental Review

Name	Affiliation	Contact Information
Bruce Wilcox	Greater Paducah Economic Development	300 South 3rd Street Paducah, KY 42003
Chair Wena Supernaw	Quapaw Nation	5681 South 630 Road Quapaw, OK 74364
Chief Benjamin Barns	Shawnee Tribe	P.O. Box 189 Miami, OK 74354
Chief Craig Harper	Peoria Tribe of Indians of Oklahoma	118 South Eight Tribes Trail Miami, OK 74355
Chief Douglas Lankford	Miami Tribe of Oklahoma	3410 P St NW Miami, OK 74354
Chief Glenna Wallace	Eastern Shawnee Tribe of Oklahoma	12755 S 705 Rd Wyandotte, OK 74370
Chief Jeff Wacoche	United Keetoowah Band of Cherokee Indians	P.O. Box 746 Tahlequah, OK 74465
Craig Potts	Kentucky Heritage Council	410 High Street Frankfort, Kentucky 40601
Director Andrea Hunter	Osage Nation	1071 Grandview Ave Pawhuska, OK 74056
Governor Bill Anoatubby	Chickasaw Nation	520 East Arlington Ada, OK 74820
Governor John Johnson	Absentee-Shawnee Tribe of Indians of Oklahoma	2025 S Gordon Cooper Drive Shawnee, OK 74801
Judge Executive Craig Clymer	McCracken County	300 Clarence Gaines Street Paducah, KY 42003
Lee Andrews	U.S. Fish and Wildlife Service Kentucky Ecological Services Field Office	JC Watts Federal Building 330 West Broadway, Rm 265 Frankfort, KY 40601
Matthew McKinley	Kentucky Department for Public Health	75 East Main Street, Frankfort, KY 40621

Name	Affiliation	Contact Information
Mayor George Bray	City of Paducah	300 South 5th Street Paducah, Kentucky 42002
President Deborah Dotson	Delaware Nation	31064 State Highway 281, Building 100 Anadarko, OK 73005
Principal Chief Michell Hicks	Eastern Band of Cherokee Indians	88 Council House Loop Road Cherokee, NC 28719
Ryan Anderson	U.S. Department of Energy	1017 Majestic Drive, Suite 200 Lexington KY 40513
Sandra Wilson	Paducah Area Chamber of Commerce	300 South 3rd Street Paducah, Kentucky 42003
Tribal Historic Preservation Officer Elizabeth Toombs	Cherokee Nation	P.O. Box 948 Tahlequah, OK 74465

APPENDIX F:

LIST OF CONTRIBUTORS

Name	Education/Expertise	Contribution
Argonne National Laboratory		
Tim Allison	M.S., Mineral and Energy Economics; M.A., Geography, B.A., Economics and Geography; more than 35 years of experience in economic and energy analyses	Socioeconomic resources, cost-benefit analysis
Georgia Anast	B.A., Mathematics and Biology; more than 40 years of experience in environmental impact assessment, public comment analyses and quality assurance	Public comment syntheses
Kevin Beckman	B.S., Mathematics and Computer Science: 15 years of experience in computational modeling, environmental impact analyses, and quality assurance	EIS document manager
Young-Soo Chang	Ph.D., Chemical Engineering; 40 years of experience in air quality, health risk, and engineering system analyses	Meteorology, climatology, and air quality; noise
Jing-Jy Cheng	Ph.D. Macromolecular Science and Engineering, M.S. and B.S., Chemical Engineering; 35 years of experience in radiological impact analyses, including RESRAD modeling	Monitoring and mitigation
Laura Fox	B.S., Biology; 14 years of experience in environmental impact assessments	Assessment methods and compliance
Chris Howell	B.S, Business; 23 years of experience in cultural and historic resource analyses and consultations, in particular tribal consultations	Cultural and historic resources and consultations
Kevin Hickey	Ph.D. and B.S., Environmental Engineering; 5 years of experience with chemical exposure modeling and health risk analyses	Public and occupational health and safety, chemical
Sunita Kamboj	Ph.D. and M.S., Radiological Engineering; C.H.P; 40 years of experience in radiological impact analyses, including RESRAD modeling	Public and occupational health and safety, radiological; waste management
David LePoire	Ph.D. and M.S., Computer Science; B.S., Physics; 40 years of experience in systems analyses and radiological impact assessments, including RESRAD modeling	Argonne co-project manager; transportation, integrated impact analyses
Margaret MacDonell	Ph.D., Civil/Environmental Health Engineering; B.S., Biology; 40 years of experience in environmental technology and health risk analyses, including radiological and chemical risks	Argonne project manager

Name	Education/Expertise	Contribution
Daniel O'Rourke	M.S., Industrial Archaeology; B.A., History and Anthropology; 33 years of experience in cultural, historic, and other environmental impact analyses	Cultural and historic resources, and consultations
John Quinn	Ph.D. and M.S, Hydrogeology; B.S.E, Geo-Engineering; B.S. Geoscience; 33 years of experience in geohydrology analyses and environmental impact assessments	Geology and soils, water resources
Jordan Sector	M.L.A and B.L.A, Landscape Architecture; PMP; B.A. Community Development; B.S. Applied Ecology; more than 25 years of experience in scenic and visual impact analyses	Visual and scenic resources
Lee Walston	M.S., Biology; B.S., Zoology/Animal Biology; more than 20 years of experience in ecological impact analyses and biological assessments	Ecological resources
Ellen White	M.P.P., Public Policy; B.A., Environmental Studies; more than 20 years of experience in environmental and socioeconomic analyses	Regulations, permits, and consultations
Charley Yu	Ph.D. and B.S., Nuclear Engineering; M.S. Health Physics; 40 years of experience in radiological modeling and impact assessments, including as RESRAD program lead	Senior technical reviewer
Emily Zvolanek	M.S., Geographic Information Systems; B.S., Environmental Science; 20 years of experience in geographic information systems, land use, demography, and environmental impact studies	Land use and demography, geospatial mapping, and analyses
U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards		
Amy Minor	B.A., Environmental Studies; more than 25 years of experience in environmental impact analyses, agency coordination, and industrial and nuclear facilities	NRC Environmental Project Manager and Contracting Officer
Diana Diaz-Toro	B.S., Chemical Engineering; Master's in Business Administration; 23 years of experience in environmental impact analyses, agency coordination, and nuclear facilities	NRC Environmental Project Manager and Alternate Contracting Officer
Patrick Donohue	B.S., Earth Science; 12 years of experience in environmental geology, remediation, and federal and local government environmental reviews	Environmental Project Manager
Briana Arlene	B.S., Conservation Biology; Master's Certification in Environmental Policy; 20 years of experience in ecological impact analyses and biological assessments	Biologist