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Environmental Impact Statement for the Project IKE Enrichment Facility in Roane County, Tennessee

Draft Report for Comment

Docket Number: 070-7038

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Environmental Review Materials Branch
Office of Nuclear Material Safety and Safeguards

ABSTRACT

This environmental impact statement (EIS) evaluates the potential environmental impacts of the U.S. Nuclear Regulatory Commission (NRC) issuing a 40-year license to Orano Enrichment USA, LLC (Orano) to construct and operate a gas centrifuge uranium enrichment facility in Roane County, Tennessee, known as Project IKE. The proposed federal action is the issuance of a license pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," 10 CFR Part 40, "Domestic Licensing of Source Material," and 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material." The facility would use a gas centrifuge-based isotope separation technology to enrich natural-grade uranium hexafluoride to a maximum of 10 percent uranium-235 by weight, for use in nuclear fuel applications.

The IKE facility would be located on a 188-acre portion of 624 acres of undeveloped land within the city limits of Oak Ridge, Tennessee. The site was acquired from the U.S. Department of Energy (DOE) through the Oak Ridge Industrial Development Board.

This EIS describes the proposed facility layout and processes (operations buildings, 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.

The NRC staff concludes that impacts of the proposed action would be SMALL with mitigation. Mitigation measures involve best management practices and monitoring. Some socioeconomic impacts could be SMALL to MODERATE, with the latter being beneficial impacts. The EIS identifies mitigation measures, environmental monitoring, regulatory requirements, and irreversible/irretrievable resource commitments to inform the staff decisions and public review.

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 Orano to construct and operate the proposed uranium enrichment facility. The NRC staff based this preliminary recommendation on the following factors:

- The NRC staff's review of Orano's environmental report (which is part of the Orano license application) and associated responses from Orano to requests from the NRC staff for clarifying information;
- The NRC staff's review of comments received as part of the EIS scoping process;
- The NRC staff's communications with Federal, State, and local agencies, and with 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, Tribal, and local 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
ARAP	Aquatic Resource Alteration Permit
BCE	before common era
BLM	U.S. Bureau of Land Management
BLS	Bureau of Labor Statistics
BMP	best management practice
CAA	Clean Air Act of 1970, as amended
CE	common era
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended
CFR	*Code of Federal Regulations*
CH_4	methane
cm	centimeter(s)
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent(s)
CWA	Clean Water Act of 1977, 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
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
ETTP	East Tennessee Technology Park
FIR	Federal industry and research
FR	*Federal Register*
ft	foot (feet)
ft^3	cubic foot (feet)
FWS	U.S. Fish and Wildlife Service
GEIS	generic environmental impact statement
GEVS	gaseous effluent ventilation system
GHG	greenhouse gas
gpd	gallon(s) per day
gpm	gallon(s) per minute
GWP	global warming potential
HA	Habitat Area (State designated)
HALEU	high-assay low-enriched uranium
HAP	hazardous air pollutant
HEPA	high-efficiency particulate air (filter)
HF	hydrogen fluoride
HUC	Hydrologic Unit Code
HVAC	heating, ventilation, and air conditioning
in	inch(es)
km	kilometer(s)
L	liter(s)
lb	pound(s)
L_{dn}	day-night average sound level
L_{eq}	equivalent noise level
$L_{eq(1\text{-}h)}$	equivalent sound level over 1 hour
$L_{eq(24\text{-}h)}$	equivalent sound level over 24 hours
LEU	low-enriched uranium
LLRW	low-level radioactive waste

LOS	level of service
lpd	liter(s) per day
m	meter(s)
m^3	cubic meter(s)
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
N_2O	nitrous oxide
NA	Natural Area (State designation)
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
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)
ORETTC	Oak Ridge Enhanced Technology and Training Center
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
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
ROI	region of influence
ROW	right of way
s	second(s)
SF_6	sulfur hexafluoride
SGCN	species of greatest conservation need
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SPCC	spill prevention, control, and countermeasure (plan)
SPE	site parameter envelope
SR	State Route
SSURGO	Soil Survey Geographic Database
SWPPP	stormwater pollution prevention plan
SWU	separative work unit(s)
TCA	Tennessee Code Annotated
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TEDE	total effective dose equivalent
THC	Tennessee Historical Commission
TVA	Tennessee Valley Authority
UF_6	uranium hexafluoride
UO_2	uranium dioxide
UO_2F_2	uranyl fluoride
U_3O_8	triuranium octoxide
USACE	U.S. Army Corps of Engineers
USC	United States Code
VOC	volatile organic compound
yr	year(s)

CONVERSION TABLE

To convert English to metric equivalents

Multiply	By	To Obtain
acres (ac)	0.4047	hectares (ha)
cubic feet (ft^3)	0.02832	cubic meters (m^3)
cubic yards (yd^3)	0.7646	cubic meters (m^3)
curies (Ci)	3.7×10^{10}	becquerels (Bq)
degrees Fahrenheit (°F) −32	0.5555	degrees Celsius (°C)
feet (ft)	0.3048	meters (m)
gallons (gal)	3.785	liters (L)
gallons (gal)	0.003785	cubic meters (m^3)
inches (in)	2.540	centimeters (cm)
miles (mi)	1.609	kilometers (km)
pounds (lb)	0.4536	kilograms (kg)
rads	0.01	grays (Gy)
rems	0.01	sieverts (Sv)
short tons (tons)	907.2	kilograms (kg)
short tons (tons)	0.9072	metric tons (t)
square feet (ft^2)	0.09290	square meters (m^2)
square yards (yd^2)	0.8361	square meters (m^2)
square miles (mi^2)	2.590	square kilometers (km^2)
yards (yd)	0.9144	meters (m)

Note: Not all units may appear in this document.

To convert metric to English equivalents

Multiply	By	To Obtain
becquerels (Bq)	2.7×10^{-11}	curies (Ci)
centimeters (cm)	0.3937	inches (in.)
cubic meters (m^3)	35.31	cubic feet (ft^3)
cubic meters (m^3)	1.308	cubic yards (yd^3)
cubic meters (m^3)	264.2	gallons (gal)
degrees Celsius (°C) +17.78	1.8	degrees Fahrenheit (°F)
grays (Gy)	100	rads
hectares (ha)	2.471	acres
kilograms (kg)	2.205	pounds (lb)
kilograms (kg)	0.001102	short tons (tons)
kilometers (km)	0.6214	miles (mi)
liters (L)	0.2642	gallons (gal)
meters (m)	3.281	feet (ft)
meters (m)	1.094	yards (yd)
metric tons (t)	1.102	short tons (tons)
sieverts (Sv)	100	rems
square kilometers (km^2)	0.3861	square miles (mi^2)
square meters (m^2)	10.76	square feet (ft^2)
square meters (m^2)	1.196	square yards (yd^2)

Note: Not all units may appear in this document.

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) prepared this draft environmental impact statement (EIS) as part of its environmental review of the Orano Enrichment USA, LLC (Orano) application for a license to construct and operate the Project IKE gas centrifuge uranium enrichment facility in Roane County, Tennessee. Orano submitted the application to the NRC by letters dated January 30, 2026, and March 27, 2026, consisting of an environmental report, a safety analysis report, and other relevant documents. The proposed enrichment facility would be located within the city limits of Oak Ridge, Tennessee, on a 188-acre portion of a 624-acre parcel of undeveloped land.

This EIS was prepared consistent with the 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 NRC guidance in NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs." The scope of the EIS includes an evaluation of the environmental impacts of the NRC staff issuing Orano a license for the Project IKE activities in Roane County, Tennessee, 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 Orano pursuant to 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," 10 CFR Part 40, "Domestic Licensing of Source Material," and 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material." If the NRC license is issued under the provisions of the Atomic Energy Act, it would authorize Orano 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 IKE facility for up to 40 years, in accordance with NRC regulations.

The facility would use a gas centrifuge enrichment technology to increase the percentage of uranium-235 above naturally occurring levels. The requested license would authorize Orano to enrich uranium hexafluoride to a maximum of 10 percent uranium-235 by weight for use in nuclear fuel applications. The proposed facility would increase the nation's capacity to enhance the domestic supply chain for low-enriched uranium (LEU), which is used to manufacture fuel for U.S. commercial reactors. Orano has requested a license for a maximum annual enrichment capacity of 7.4 million separative work units (SWUs) per year of LEU. 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 at the site would begin in 2027; if the license is approved, Orano would begin NRC-authorized construction of the IKE facility in 2028. Operation is expected to begin in early 2032, with a multi-year startup period running concurrently with construction activities that would continue through 2039. The facility is projected to reach full production capacity in 2036. Potential license renewal activities would begin in advance of scheduled license expiration. Orano anticipates that decommissioning activities could begin in 2072 and be completed by 2079.

On May 21, 2026, the NRC staff accepted Orano's license application for docketing and formal review. The NRC staff published a notice in the *Federal Register* (FR) on June 11, 2026 (91 FR 35584), 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 staff invited members of the public and local, State, Tribal, and Federal agencies to provide comments on the scope of the EIS. The scoping period ended on July 13, 2026. All comments received during the scoping period were considered by the NRC staff. A summary of the scoping process, the comments received, and an overview of substantive comments are provided in Appendix A of this EIS.

As a Federal agency, the NRC is required to comply with the consultation requirements of the Endangered Species Act and the National Historic Preservation Act. Additionally, the NRC staff interacted with other Federal agencies, Tribal nation representatives, and State and local agencies and officials during preparation of this EIS to gather information on potential issues, concerns, and environmental impacts related to the proposed project. Details regarding Federally mandated agency consultations are provided in this EIS. The issues and concerns raised by Federal and non-Federal entities are addressed in the individual resource sections in Chapter 3.

This EIS considers and weighs the environmental impacts of the NRC staff issuing Orano a license to construct, operate, and decommission the IKE facility. This evaluation considers potential impacts on land use, air quality, geology and soils, surface water and groundwater resources, ecological resources, historic and cultural resources, visual and scenic 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 describes avoidance, minimization, and other mitigation measures Orano would implement to limit 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 will 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 Orano to receive, possess, use, transfer, and/or deliver source, byproduct, and special nuclear material to construct, operate, and decommission the IKE facility would be SMALL to MODERATE for socioeconomics (with the latter being beneficial) – and SMALL for all other resource areas.

Orano would implement a range of mitigation measures to avoid or minimize impacts on the environment. Orano would adhere to best management practices provided in Orano's stormwater pollution prevention plan; spill prevention, control, and countermeasures plan; waste management systems; engineering design features; and contamination control and radiological safety procedures. Additionally, Orano would follow the protective requirements and general guidance of Federal and State resource agencies regarding methods to avoid and minimize potential impacts.

The NRC's environmental review regulations in 10 CFR Part 51 that implement NEPA require the NRC to consider reasonable alternatives to a proposed action, including the no-action alternative. Under the no-action alternative, the NRC staff would not approve the Orano license application for the proposed IKE facility. The no-action alternative would result in Orano not constructing or operating the proposed IKE facility. 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 both 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 IKE facility outweigh the negative impacts based upon the SMALL environmental impacts; the positive economic impacts attributable to the project that would be anticipated to benefit communities near the IKE facility; 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 reactors.

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 51.71(f), concludes its preliminary NEPA recommendation regarding the proposed action, which is that an NRC license be issued to Orano to possess and use source, byproduct, and special nuclear material at the IKE facility, subject to the determinations in the NRC staff's safety review of the application. This preliminary recommendation is based on (1) Orano's license application, including its environmental report, safety analysis report, and supplemental documents, as well as Orano's responses to the NRC staff's requests for additional information; (2) consultation with Federal, State, Tribal, and local officials and inputs from other stakeholders, including comments received 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, Tribal, and local officials and members of the public.

1 INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC) has prepared this environmental impact statement (EIS) as part of its environmental review of the Orano Enrichment USA, LLC (Orano) application for a license to receive, acquire, possess, and transfer byproduct, source, and special nuclear material for the purpose of constructing and operating the Project IKE Enrichment Facility in Roane County, Tennessee.[1] The requested license would authorize Orano to possess equipment capable of enriching uranium, to construct and operate a uranium enrichment facility, and 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 a facility that performs the mechanical separation of isotopes using a fast-rotating cylinder (centrifuge) to enrich uranium. The license would authorize Orano to enrich natural-grade uranium hexafluoride (UF_6) to a maximum of 10 percent uranium-235 by weight.

Orano submitted its environmental report (ER) for the proposed IKE facility to NRC on January 30, 2026 (Orano 2026a) and submitted further documents that completed the license application on March 27, 2026 (Orano 2026b). On May 21, 2026, NRC accepted Orano's license application for docketing and formal review (NRC 2026a). Orano submitted an initial revision of the ER to NRC on July 9, 2026 (Orano 2026c) and a second revision on October 9, 2026 (Orano 2026d).

NRC staff prepared this EIS in accordance with Section 193 of the Atomic Energy Act of 1954, as amended (AEA), 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 Part 51), 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 NRC's NEPA implementing regulations and staff guidance for 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, and it consists of about 99.3 percent uranium-238 and 0.7 percent of the fissile isotope uranium-235 by weight. To produce nuclear fuel for U.S. commercial reactors, the percentage of uranium-235 must be increased (enriched) by roughly four- to seven-fold above natural levels, i.e., to 3 to 5 percent by weight. Uranium enrichment is the process in the nuclear fuel cycle (Figure 1-1)[2] whereby the weight percent of the uranium-235 isotope is increased, which decreases the weight percent of uranium-238.

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[1] Orano is a regional subsidiary of Orano SA, a French multinational nuclear fuel cycle corporation majority-owned by the French state. The IKE name relates to President Dwight ("Ike") Eisenhower's Atoms for Peace speech about using atomic energy for peaceful means and the public good. In this EIS, the term "IKE facility" refers to the buildings and supporting facilities for the proposed enrichment operations, while the term "IKE site" refers to the land parcel on which the facility would be located.

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

The enriched uranium is then converted to the dioxide form (UO_2) or metal alloys to fuel commercial reactors; mixed oxide fuel could also be used.

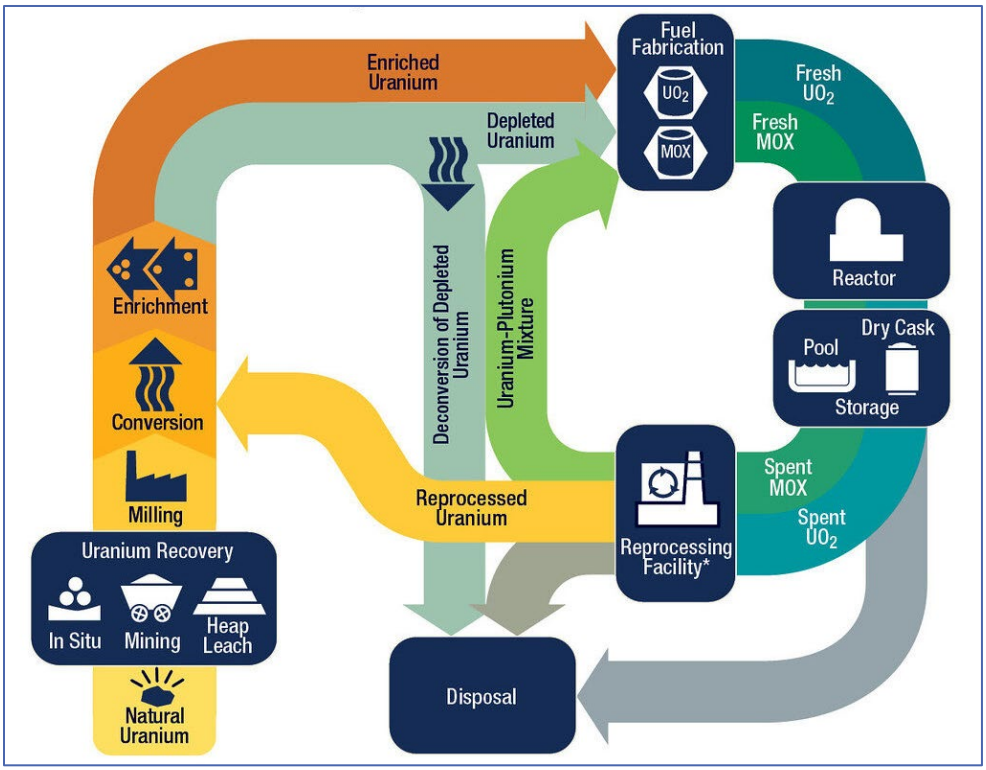


Figure 1-1 Nuclear Fuel Cycle (Source: NRC 2026b)

With submittal of its license application to NRC, Orano seeks to construct and operate a uranium enrichment facility. This facility would use gaseous centrifuge technology, which is the primary uranium enrichment technology in commercial use in the United States. Orano would enrich uranium to higher levels and then separate the UF_6 feed material into a product stream enriched up to a maximum of 10 percent uranium-235 by weight. The enriched uranium produced by the IKE facility would be low-enriched uranium (LEU).[3]

1.2 PROPOSED FEDERAL ACTION

The proposed Federal action is the issuance of a license pursuant to 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," 10 CFR Part 40, "Domestic Licensing of Source Material," and 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," that would authorize Orano to construct and operate a gas centrifuge uranium enrichment facility in Oak Ridge, Tennessee (Figure 1-2). If licensed, the facility would be decommissioned in the future under a separate NRC licensing action.

The IKE facility would be located on an 188-acre portion of the 624-acre IKE site. This site is on undeveloped land within the city limits of Oak Ridge, Tennessee, and it is part of the Self-Sufficiency Parcel 2 (SSP-2) that was formerly owned by the U.S. Department of Energy (DOE)

[3] LEU is for commercial nuclear energy reactors. In comparison, uranium used in military reactors and nuclear weapons has a much higher percentage of uranium-235 (90 or more percent by weight) and is called high-enriched uranium.

and transferred to the Oak Ridge Industrial Development Board on March 6, 2026 (DOE 2026a). On March 27, 2026, the Board signed a development agreement for the transfer of that 624-acre land parcel to Orano USA (City of Oak Ridge 2026).

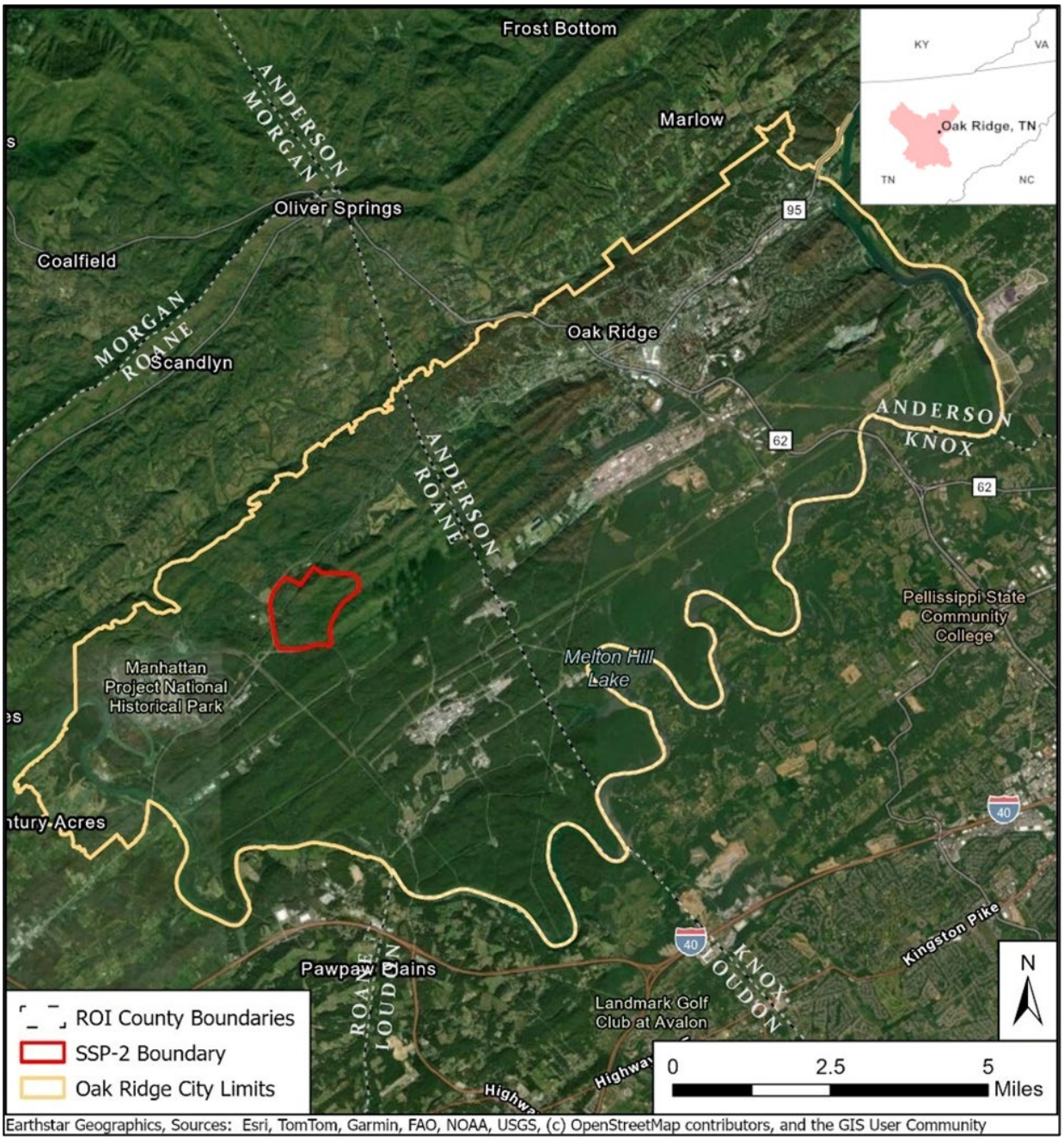


Figure 1-2 Location of the Proposed IKE Site (Source: Modified from Orano 2026d)

If the NRC issues a license to Orano under provisions of the AEA, the license would authorize Orano 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, in accordance with NRC regulations, a facility that uses centrifuge isotope separation technology to enrich natural-grade

UF_6 to a maximum of 10 percent uranium-235 by weight. The scope of activities to be conducted under the license would include construction and operation of the proposed IKE facility (see Section 1.4.8 for further information).

Orano has requested a license for a production capacity of up to 2,000 metric tons uranium (MTU) per year of equivalent natural uranium hexafluoride and a maximum of 7.4 million separative work units (SWU) per year of LEU (Orano 2026d). A SWU represents the level of effort or energy required to raise the concentration of uranium-235 to a specified level.[4]

As summarized in the ER (Orano 2026d), if the license is approved, Orano would begin construction of the IKE facility in 2027. Operation is expected to begin by 2032, with a multi-year startup period running concurrently with construction activities that would continue through 2039. Orano would then operate the facility for 40 years in accordance with the license. Decommissioning would involve the sequential shutdown of the separation building modules, with a gradual decrease in production; it is projected to begin in 2072 and would be completed in 2079 (depending on longer-term schedule changes per a potential future license renewal) (Orano 2026d).

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 2025a). Consistent with this mission, the purpose for the NRC action is to allow Orano to safely construct and operate a uranium enrichment facility to address the substantial U.S. 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 IKE facility would create new domestic capacity to produce enriched uranium to help meet growing nuclear fuel demands resulting from increased U.S. nuclear power plant applications and license renewals.

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 Orano's proposal to construct, operate, and decommission the IKE facility and the impacts of alternatives to the proposed action. The NRC staff has prepared this EIS consistent with 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 NUREG-2249 (NRC 2026c), *Generic Environmental Impact Statement for Licensing of New Reactors* ("NR GEIS"). This EIS also considers the September 29, 2025, Council on

[4] An SWU is a unit of enrichment that measures the effort required to separate uranium isotopes. For about 251 pounds (lb) of natural uranium, it takes about 70 SWUs to produce 22 lb of uranium enriched to 5 percent uranium-235 by weight. It takes roughly 140,000 SWUs of enriched uranium to fuel a typical 1,000-megawatt (MW) commercial nuclear reactor for a year (WNA 2026).

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

Orano submitted its ER for the proposed IKE facility to the NRC on January 30, 2026, and completed its license application on March 27, 2026 (Orano 2026a,b). On May 21, 2026, the NRC staff notified Orano that its application (including the ER) provided sufficient information for the NRC to proceed with a detailed review (NRC 2026a). The NRC staff published a notice in the *Federal Register* (FR) on June 11, 2026, identifying the agency's intent to conduct a scoping process and prepare an EIS (NRC 2026d). 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 July 13, 2026. All comments received during the scoping period were considered by the NRC staff. A concise summary of the scoping process, the comments received, and NRC's overview of substantive comments is provided in Appendix A of this EIS.

1.4.2 EIS Contents

The sections of this EIS include an evaluation of the environmental impacts of the NRC issuing Orano a license to possess and use special nuclear material in association with Orano constructing, operating, and decommissioning the proposed IKE facility. 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 an introduction. Chapter 2 provides a description of the proposed IKE facility, summarizing conceptual design elements drawn from the ER (Orano 2026d) and license application (Orano 2026b). Chapter 2 also presents the NRC staff's evaluation of the no-action alternative. Chapter 3 describes the affected environment, 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 preliminary NEPA recommendation. Chapter 5 provides references to documents cited throughout the EIS.

Consistent with 10 CFR Part 51, this EIS incorporates material by reference where doing so reduces bulk without impeding review. Incorporated material is identified at the point of use by document and section and is summarized so that this EIS can be read without retrieving the referenced document. All material incorporated by reference is publicly available. The NRC staff has independently evaluated the reliability of incorporated material in accordance with 10 CFR 51.70 (b). Conclusions in this EIS are the NRC staff's own and are not incorporated from any other document.

Appendix A summarizes the EIS scoping process and the comments received. Appendix B identifies regulations, permits, and consultations applicable to the environmental review. Appendix C provides the plant and site parameter envelopes from NRC's new reactor GEIS (see Section 1.4.3). Appendix D presents the list of environmental review correspondence.

Appendix E lists the agencies, organizations, and persons NRC staff contacted during the environmental review. Appendix F presents the list of contributors to this EIS.

1.4.3 Generic Environmental Impact Statement for New Nuclear Reactors

The NRC recently finalized the NR GEIS (NRC 2026c), which 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 the NR GEIS was initially developed using a technology-neutral, performance-based approach, its analyses may be applied to any reactor.

As part of a broader effort to identify existing information and analyses that are relevant to this environmental review and can be appropriately utilized to avoid unnecessary duplication of effort, the NRC staff evaluated whether certain generic analyses and findings in the NR GEIS are relevant and can be appropriately utilized in the different context of this proposed uranium enrichment facility. The NRC staff concluded that some but not all of the generic analyses and findings in the NR GEIS are in fact relevant and appropriate to corresponding issues for this proposed agency action, based on a determination that the site and plant parameter envelopes and assumptions in the NR GEIS are met. Accordingly, this EIS incorporates the specific NR GEIS technical analyses and findings that the NRC staff determined are relevant and appropriate to utilize in this review, as identified in Chapter 3 (Table 3-1) and described in Appendix C (Table C-1).

1.4.4 Issues Studied in the EIS

To meet its NEPA obligations related to its review of the proposed IKE facility, the NRC staff conducted an independent and detailed evaluation of the potential environmental impacts from constructing, operating, and decommissioning the proposed IKE facility at its planned location and potential impacts of the no-action alternative. 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
- 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 IKE facility. Some issues and concerns raised during the public scoping process on the EIS (June 11 through July 13, 2026) 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
- The ability of advanced nuclear reactors to operate without the fuel that would be produced at the proposed IKE facility
- Historical business and environmental practices of the DOE
- Energy policy considerations
- Influences of energy demand
- Fuel technologies not evaluated in this EIS

1.4.6 Environmental Review

This EIS constitutes the NRC staff's review of potential environmental impacts from the proposed action of issuing a license to Orano to construct and operate a gas centrifuge uranium enrichment facility in Oak Ridge, Tennessee, as required under 10 CFR 51.70 et seq., "Draft environmental impact statement—general."

This environmental review spans the project life cycle, covering potential impacts from the construction, operation, and decommissioning phases of the proposed IKE facility. Orano's license application requests a license for 40 years. Therefore, the time frame of analysis for this proposed action is 40 years. At the end of the 40-year license period, Orano would have the option to renew the license and, if pursued, a separate environmental and safety review would be conducted at that time.

This EIS presents the NRC staff's analysis that considers and weighs the environmental impacts of construction, operation, and decommissioning of Orano's proposed IKE facility. It also considers impacts of the no-action alternative, as well as mitigation measures available for reducing or avoiding adverse environmental effects of the proposed action. It also provides the NRC staff's preliminary recommendation regarding issuance of the license for the proposed IKE facility in Oak Ridge, Tennessee.

1.4.7 Concurrent Nuclear Regulatory Commission 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 environmental review is conducted under NRC's regulations at 10 CFR Part 51 and evaluates the environmental impacts of the proposed action and no-action alternative. As part of its environmental review, the NRC staff also conducts a review under Section 106 of the National Historic Preservation Act 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 review. 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.

1.4.8 Site Preparation and Construction Activities

The 2011 Final Rule for *Licenses, Certifications, and Approvals for Materials Licensees* (76 FR 56951) revised the NRC's definition of "construction" in Title 10 of the *Code of Federal Regulations* (10 CFR) Parts 30, 36, 39, 40, 51, 70, and 150. The Final Rule was issued, in part, to eliminate certain inconsistencies that existed within the NRC's regulations with respect to the use and definition of the terms ''construction'' or ''commencement of construction'' for certain materials licensees for purposes of its environmental reviews. Activities that do not meet the definition of construction are defined as preconstruction activities or site preparation because they have no nexus to radiological health and safety or common defense and security and, therefore, are not under NRC jurisdiction.

The NRC defines construction activities, for example, in 10 CFR Part 70 (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, excavation, and grading; building of service facilities, paved roads and parking areas, erection of support buildings, and other associated activities. These site preparation (or preconstruction) activities may take place before an NRC license is issued and during the staff's review of the application.

Before a license is issued, site preparation activities would be conducted that are not a part of the NRC action, including the following:

- Clearing and grubbing of vegetation
- Timber harvesting
- Topsoil removal and stockpiling
- Grading
- Groundwater monitoring well installation
- Baseline soil sampling
- Sediment sampling
- Relocation of obstructing utilities.

Orano's ER indicates that its impact analysis assumes 188 acres of the IKE site could be affected by construction activities (Orano 2026d). The impact analysis in this EIS encompasses activities that are not under the NRC's regulatory authority, including site preparation and construction activities that have no nexus to radiological health and safety or defense and security. The NRC staff included all site preparation activities listed above, which are not included in the definition of "construction activities" (see example definition from 10 CFR 70.4), in its analyses of direct and indirect impacts in this EIS. The site preparation activities are used as the baseline to evaluate additional impacts from reasonably foreseeable actions within each resource area, which accounts for all potential impacts that cannot be avoided should the proposed action be implemented.

1.4.9 Related NEPA and Other Relevant Documents

The NRC staff reviewed a number of NEPA documents relevant to the proposed project as part of developing this EIS; several of these are briefly summarized in Table 1-1.

Table 1-1 NEPA Documents Reviewed

NEPA Document	Relevance to Development of This EIS
EIS for the TRISO-X Special Nuclear Material License Application for a Fuel Fabrication Facility (NRC 2026e)	Adjacent to the proposed project IKE site, describes local and regional environmental resources relevant to both locations.
Generic EIS for Licensing of New Nuclear Reactors (NRC 2026c)	Outlines parameter envelopes that frame the assessment of potential environmental impact levels in the EIS (see Section 1.4.4, Table 3-1, and Appendix C of this EIS).
EIS for the Proposed Eagle Rock Enrichment Facility in Bonneville County, Idaho (NRC 2011)	Analyzes the potential environmental impacts of site preparation (preconstruction) activities and the construction, operation, and decommissioning of the proposed Eagle Rock Enrichment Facility (EREF) near Idaho Falls in Bonneville County, Idaho.
EIS for the Proposed American Centrifuge Plant in Piketon, Ohio (NRC 2006)	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 current analysis. The environmental impacts discussed for the proposed American Centrifuge Plant (ACP) are also relevant to the current analyses, including the analysis of impacts associated with managing DUF_6 generated by the proposed facility.
EIS for the Proposed National Enrichment Facility in Lea County, New Mexico (NRC 2005)	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 current analysis. The environmental impacts discussed for the proposed National Enrichment Facility are also relevant to the impact analysis for the proposed IKE facility, including the analysis of impacts associated with managing DUF_6 generated by the facility

1.5 APPLICABLE REGULATORY REQUIREMENTS, PERMITS, AND AUTHORIZATIONS

This section summarizes the major environmental requirements, agreements, executive orders, and permits relevant to the proposed IKE facility. Regulations, permits, and authorizations are also described in Appendix B. The status of the environmental regulatory requirements, permits, and consultations potentially necessary for the proposed IKE facility are provided in Table 1-2; additional details are provided in the ER (Orano 2026d,e,f; Table 1-2).

Table 1-2 Potentially Applicable Permit and Approval Requirements for the Proposed IKE Facility

Agency	Regulatory Authority	Permit or Approval	Activity Covered	Status
NRC	10 CFR Parts 30, 40, and 70, authorized by the AEA	NRC license	Receipt, possession, use, transfer, and/or delivery of source material, special nuclear material, and byproduct material	Addressed in license application.
U.S. Environmental Protection Agency (EPA)	Clean Water Act (CWA); 40 CFR Part 112	Spill prevention, control, and countermeasure (SPCC) plans for construction and operation	Storage of oils during construction and operation	Orano has not yet prepared SPCC plans.
U.S. Army Corps of Engineers (USACE), Nashville District	CWA, 40 CFR Part 230; authorized by the CWA, 33 CFR 320-331	Jurisdictional determination of waters of the United States	Determination of area regulated by USACE	On November 21, 2025, Orano submitted the Preliminary Jurisdictional Determination to USACE.
		Section 404 Permit	Discharge of dredged or fill material into waters of the United States, including wetlands	USACE 15-day comment period was resolved with no public comment. Per the USACE mitigation recommendation, Orano has purchased licensed stream bank credits.
U.S. Department of Transportation (DOT)	49 CFR Part 107	Certificate of Registration, Pipeline and Hazardous Materials Safety Administration	Transportation of hazardous materials	Orano has not yet applied for the certificate.

Agency	Regulatory Authority	Permit or Approval	Activity Covered	Status
U.S. Fish and Wildlife Service (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 November 24, 2025, Orano provided a draft Biological Assessment to FWS, NRC, DOE and USACE; formal consultation with FWS regarding the proposed action was initiated on May 26, 2026, and completed on October 27, 2026.
Tennessee Wildlife Resources Agency	ESA, Section 7; Tennessee Code Annotated (TCA) Section 70-8-101 to 70-8-112; Rules of the Tennessee Wildlife Resources Agency, Chapter 1660-01-32	Consultation regarding species listed by the State as endangered, threatened, or in need of management	Potential for adverse effects on State-listed species	Orano has informally discussed State-listed species with the agency.
Tennessee Department of Environment and Conservation (TDEC) Division of Air Pollution Control	Clean Air Act (CAA), Title V, Minor Source, or Permit By Rule	Permit for air emissions, permit to construct	Foundations for equipment emitting regulated pollutant	Permit application not yet submitted.
		Air Pollution Control Operating Permit	Required to operate a new air contaminant source, the Facility has at least one (and possibly several) new effluent discharge stack	Permit application not yet submitted.
TDEC Division of Water Resources	CWA, ARAP/401 WQC; TCA Section 69-3-101	Aquatic Resource Alteration Permit (ARAP)/401 Water Quality Certification (WQC) (tied to USACE Section 404 wetland impacts permit)	ARAP permit from TDEC (for Section 401 WQC) required prior to earthwork (as is the Section 404 Permit	Final ARAP/401 Permit NRS26.099 was submitted on September 30, 2026; the 30-day public notice process began on October 16, 2026. Proof of publication will follow public notification period.

Agency	Regulatory Authority	Permit or Approval	Activity Covered	Status
TDEC Division of Water Resources (cont.)	Tennessee Water Quality Control Act, codified at Tennessee Compilation of Rules & Regulations, Chapter 0400-40-05	National Pollutant Discharge Elimination System (NPDES) permit	Effluent release	Permit application in process.
		Stormwater Permits (TN R100000)	Construction stormwater	Permit application in process.
TDEC, Division of Land Protection-Waste Management Branch	Rules of TDEC Division of Solid Waste Management, Chapter 0400-12-01 (Hazardous Waste Program)	Resource Conservation and Recovery Act, as amended (RCRA) Hazardous Waste Permit, Part A	Hazardous waste classification, record-keeping, notification, accumulation, and transport, to be obtained prior to generation	Pending applicability, the application for EPA ID per EPA Form 8700-12 is in process.
		RCRA Hazardous Waste Permit, Part B	Generation of hazardous waste (related to facility design, waste characterization, security, inspections)	Pending applicability, administrative and technical evaluation, in process.
TDEC, Division of Radiological Health	Rules of TDEC Chapter 0400-20-10; TCA Sections 4-5-201, 68-202-101, and 68-202-201 (et seq.)	Specific and General Radioactive Material Licenses	Manufacture, production, receipt, possession, use, transfer, ownership, or acquisition of radioactive material; and packaging and transportation of radioactive material	Application not yet submitted.
		Specific and General Radioactive Material Licenses	Use of X-ray apparatus, including analytical X-ray equipment	Application not yet submitted.
	10 CFR Part 20; Tennessee Division of Radiological Health Rules Chapter 0400-20-05, TCA Sections 4-5-201 et seq. and 68-202-203 and 206	Specific and General Radioactive Material Licenses	Occupational and public dose limits; effluent limits; general survey and monitoring; security of stored material; general disposal requirements	Application not yet submitted.

Agency	Regulatory Authority	Permit or Approval	Activity Covered	Status
Tennessee Historical Commission, State Historic Preservation Officer (SHPO)	NHPA, Section 106, 36 CFR Part 800	Required consultations	Impacts on historic and/or cultural sites	On July 10, 2026, the SHPO concurred with the NRC staff finding of no historic properties affected. Consultation was concluded on August 13, 2026.
Tennessee Department of Transportation (TDOT)	Rules of TDOT, Chapter 1680-10-01	Commercial Entrance Permit, required for any new access to a State-managed highway.	Construction of access road and/or heavy haul road	Permit application not yet submitted.
City of Oak Ridge Planning & Development Department	Oak Ridge, Tennessee, City Code, Title 14 (Zoning and Land Use Control)	Land Disturbance Permit, tied to new commercial build, non-residential review; need not be issued separately for a new build (nonresidential)	Required for an activity that disturbs more than one acre of land; requires attachment of a TDEC Notice of Coverage under the General NPDES Permit for Stormwater Discharges associated with Construction Activity	Permit application not yet submitted.
City of Oak Ridge Planning & Development Department, Codes Enforcement Division	Oak Ridge, Tennessee, City Code, Title 12 (Building, Utility Etc. Codes)	Building Permit to construct new commercial building (nonresidential); may require a Commercial Plan Review.	Facility construction	Permit application not yet submitted.
City of Oak Ridge Planning & Development Department	Oak Ridge, Tennessee, City Code, Title 12 (Building, Utility Etc. Codes)	Electrical, Mechanical, and Plumber's Work Permits (trade permits) must be submitted to City of Oak Ridge and licensed	Trades for new build non-residential (note the building permit is needed before seeking trade permits)	Permit application not yet submitted.
	Oak Ridge, Tennessee, City Code, Title 14 (Zoning and Land Use Control), Chapter 3 (Zoning)	Zoning Approval	Approval for construction of the uranium enrichment facility.	Application in process; required public meetings are anticipated in January 2027.

Agency	Regulatory Authority	Permit or Approval	Activity Covered	Status
City of Oak Ridge Fire Department, Fire Prevention Office	Oak Ridge, Tennessee, City Code, Title 7 (Fire Protection and Fireworks), Chapter 1 (Fire Code)	Fire Safety Permit	Compliance with fire safety regulations; initial and regular inspections required for fire suppression systems	To be obtained; per ongoing discussions with the City of Oak Ridge Fire Marshal, permit would be needed by vertical construction/ final design phase.

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 consulted with Federal, State, and local agencies and Tribal officials during preparation of this EIS to gather information on potential issues, concerns, and environmental impacts related to the proposed action. The coordination process with non-Federal entities included discussions with the State, local organizations, and Tribal officials. Details regarding Federally mandated agency consultations are provided in Section 1.5.2. Cooperating agency information is presented in Section 1.6. 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 of 1973, as Amended (16 USC 1531 et seq.)

Congress enacted the ESA in 1973 to protect and recover imperiled species and the ecosystems upon which they depend. The ESA provides a program for the conservation of endangered and threatened plants and animals (collectively, listed species) and the habitats in which they are found. The U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service jointly administer the ESA and are charged with identifying species that warrant listing, dividing responsibilities based on species habitats.

As a Federal agency, the NRC must comply with the ESA as part of any action authorized, funded, or carried out by the agency. Section 7(a)(2) requires that Federal agencies consult with the FWS and National Marine Fisheries Service, as appropriate, to ensure that the proposed action is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. No marine or anadromous species have the potential to occur in the area of the proposed facility.

Biological assessments are required for any agency action that is a “major construction activity” (50 CFR 402.12(b). A major construction activity is a construction project or other undertaking having construction-type impacts that is a major Federal action significantly affecting the quality of the human environment under the NEPA (51 FR 19926). Federal agencies may fulfill their obligations to consult with the Services under ESA Section 7 and to prepare a biological assessment, if required, in conjunction with the interagency cooperation procedures required by other statutes, including NEPA (50 CFR 402.06(a)). In such cases, the Federal agency should include the results of ESA Section 7 consultation(s) in the NEPA document (50 CFR 402.06(b)). Additionally, Federal agencies may designate a non-Federal representative to conduct certain consultation activities on behalf of the agency, in accordance with the provisions at 50 CFR 402.08.

The NRC staff has fulfilled the ESA Section 7 responsibilities for the proposed IKE facility in conjunction with the DOE and USACE. The agencies submitted a biological assessment to the FWS and requested to initiate formal consultation on May 26, 2026 (DOE et al. 2026). Following consultation and the FWS’s review of the proposed agency actions, the FWS determined that the proposed actions could be considered under the FWS’s 2026 programmatic biological opinion, *Conservation Strategy for Indiana and Northern Long-eared Bats in Tennessee*. During consultation, Orano committed to implementing conservation measures and best management practices (BMPs) consistent with the programmatic biological opinion. Orano also requested to make a voluntary contribution to the Imperiled Bat Conservation Fund to address adverse

effects to the Indiana and northern long-eared bats through the framework established in the programmatic biological opinion. Under the opinion's Conservation Strategy, Imperiled Bat Conservation Fund, contributions are an accepted recovery-focused conservation option for small or time-sensitive projects. Following execution of this contribution, the FWS determined that Orano's participation in the Conservation Strategy and use of the Imperiled Bat Conservation Fund as the recovery-focused conservation option satisfies ESA Section 7(a)(2) by ensuring effects are minimized and mitigated consistent with the programmatic biological opinion and its Incidental Take Statement. The FWS (2026a) documented the conclusion of consultation in a letter dated October 27, 2026. Section 3.5.1.5 of this EIS provides more information on the ESA consultation, and Appendix D of this EIS lists correspondence related to this consultation.

1.5.2.2 NHPA Section 106 Consultation

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties. Section 106 consultations are discussed in Section 3.7, Appendix B (B.1.10 and B.3.1), Appendix D (Table D-1), and Appendix E (Table E-1) of this EIS.

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 CAA. The NRC staff will transmit this 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

No Federal, State, Tribal, or local agency is formally cooperating in the preparation of this EIS. In April 2026, the NRC staff invited DOE to be a cooperating agency on this EIS (NRC 2026f), and in that month, the NRC and DOE staff signed a Memorandum of Understanding to cooperate (NRC and DOE 2026). However, DOE will now complete its regulatory action under a separate NEPA review (DOE 2026b). That separate NEPA review is being conducted in cooperation with the USACE, and it will address site preparation activities that require a property deed amendment from DOE and issuance of a Clean Water Act (CWA) Section 404 permit from USACE.

2 PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The proposed Federal action is the issuance of a license that would authorize Orano 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 gas centrifuge technology to enrich uranium. The proposed facility would enrich uranium for use as fuel in U.S. commercial nuclear reactors.

The facility would use the gas centrifuge enrichment technology that has been successfully applied in commercial operations for 50 years. This technology used by the Orano parent company has been safely implemented at the Georges Besse 2 facility at the Tricastin site in France, which commenced operations in December 2010. The facility would have a maximum annual enrichment capacity of 7.4 million SWUs at an enrichment of up to 10 percent uranium-235 by weight. Orano anticipated initiating site preparation activities in late 2026. If the requested license is granted, Orano anticipates beginning construction in 2027 and commencing operation by January 2032 (Orano 2026d, Table 1-1).

2.1.1 Location and Description of the Proposed Site

The location and description of the proposed IKE site are described in Section 3.1 of the ER (Orano 2026d), which is incorporated by reference and summarized here. The IKE facility would be about 6.4 miles southwest of downtown Oak Ridge, on a portion of the 624 acres recently transferred from DOE via the Oak Ridge Industrial Development Board. As part of Self-Sufficiency Parcel 2 (SSP-2), this land represents a small fraction of the approximately 33,000-acre Oak Ridge Reservation (ORR) owned by DOE.[5] The proposed IKE facility would occupy about 188 acres on the western side of the IKE site, as illustrated in Figures 2-1 and 2-2. A more detailed conceptual layout is provided in the ER (Orano 2026d, Figure 4-20).

Tennessee State Route 58 and State Route 95 (Oak Ridge Turnpike at that location) form the western and southern boundaries of the site. Existing dirt roads provide access from these highways to the site, and a main access road would provide access from the Oak Ridge Turnpike immediately west of the site.

[5] Part of the ORR was impacted by past operations that began under the Manhattan Project, and an extensive federal cleanup effort has been under way since 1989. Buildings and impacted soil have been addressed, and remaining cleanup efforts are focused on residual groundwater contamination present in certain areas. In December 2025, the EPA and DOE Oak Ridge Office of Environmental Management confirmed that about half of the ORR was not impacted by historical operations, does not require cleanup, and is suitable for reuse (DOE 2025a). Prior to its transfer, the clean parcel determination pursuant to Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA) Section 120(h)(4) meant that the EPA designated the parcel as “uncontaminated” and therefore “there is no indication that the release or disposal of hazardous substances or petroleum products has resulted in an environmental condition that poses a threat to human health or the environment” (DOE 2025b). To date, DOE has transferred more than 2,500 acres to the local community for private use and economic development (DOE 2026c).

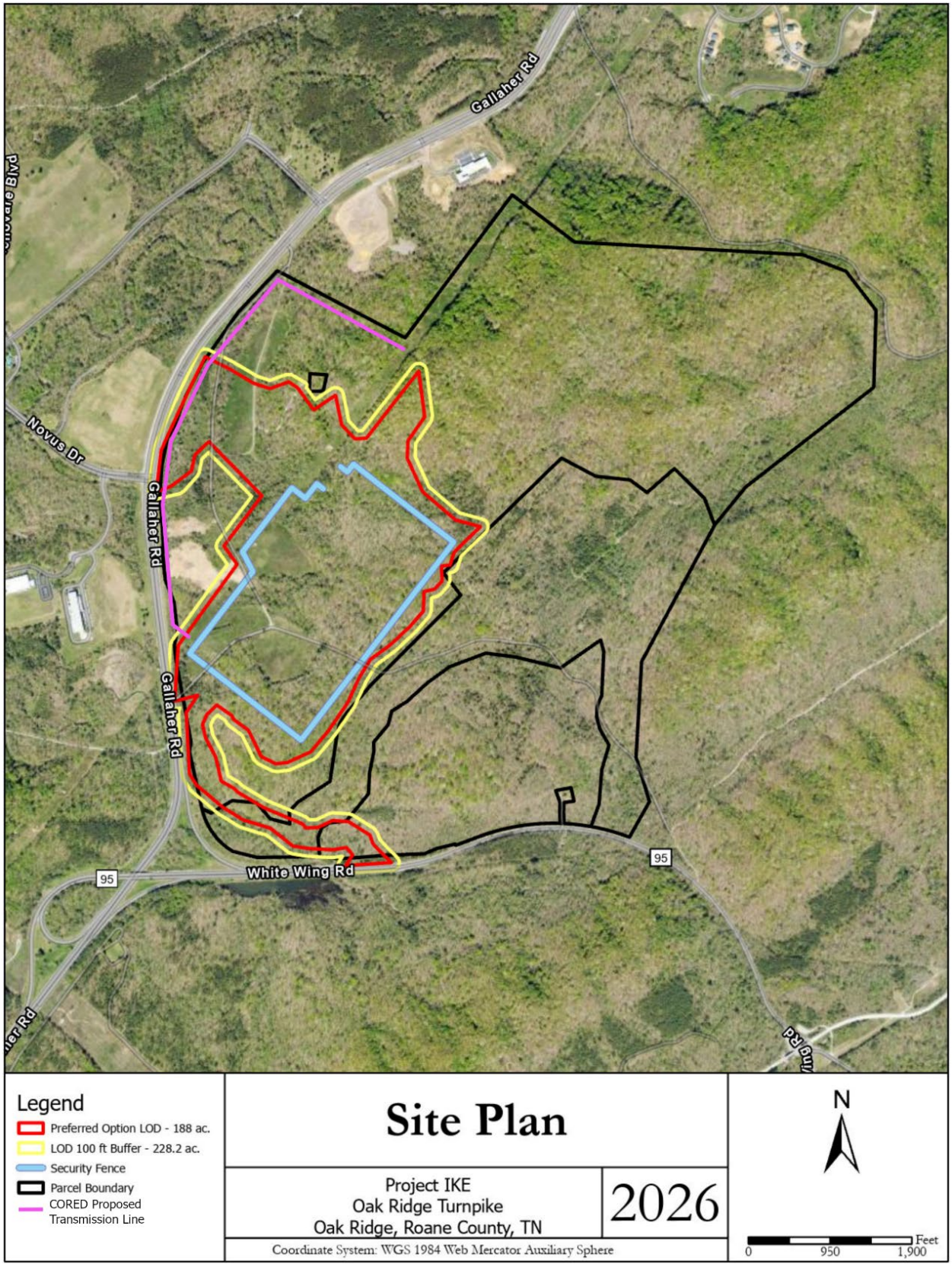


Figure 2-1 Site Plan and Proposed Transmission Line (Source: Orano 2026d)

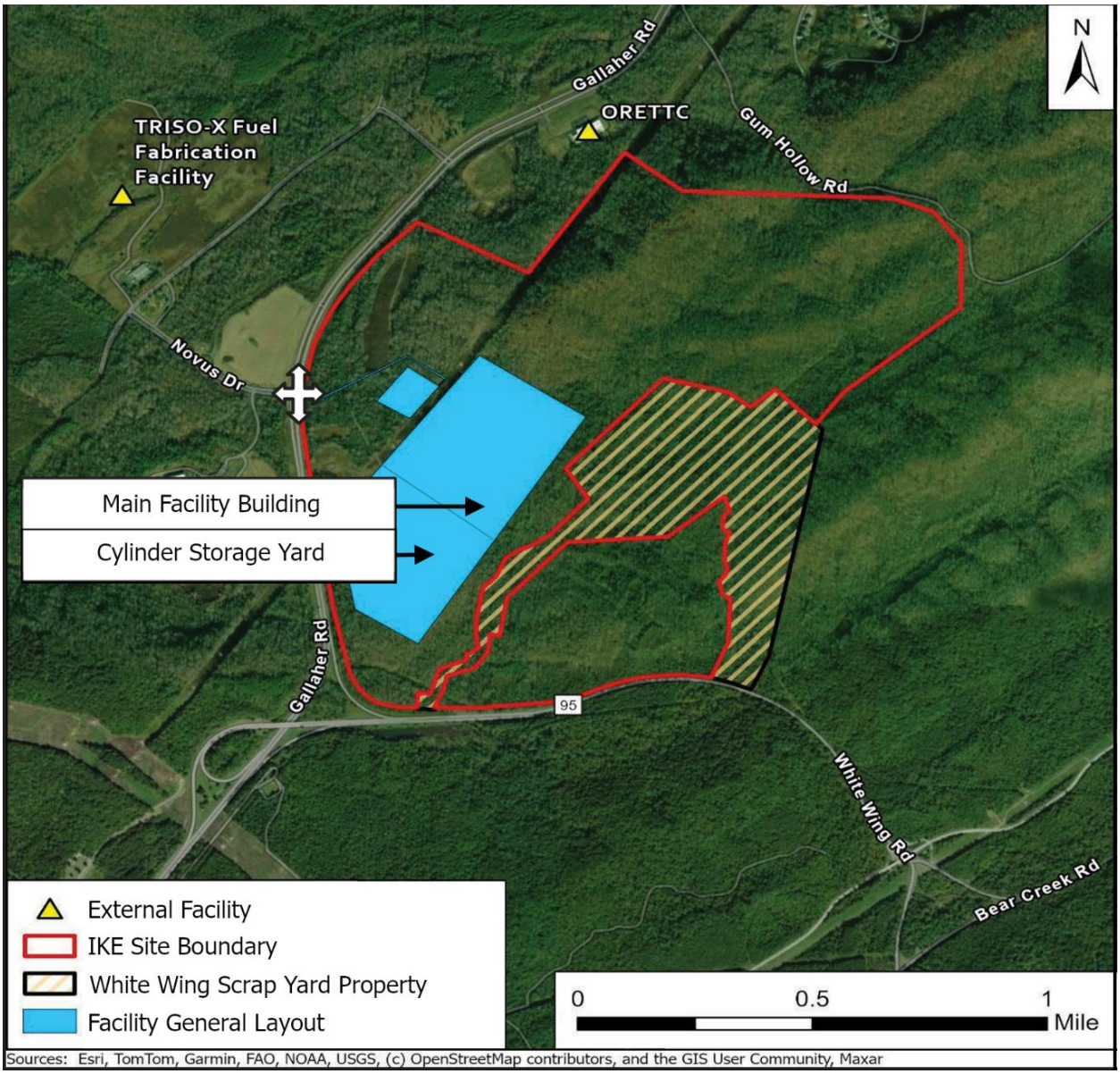


Figure 2-2 General Layout of the Proposed Facility (Source: Modified from Orano 2026d)

A portion of the SSP-2 parcel (SSP-2a) that remains part of the ORR has been consigned to the National Nuclear Security Administration in support of two facilities. One is the Oak Ridge Enhanced Technology and Training Center (ORETTC) situated on 81 acres, and the other is the 24-acre Enhanced Emergency Response Facility. Those two facilities are about 0.8 mile north of the proposed IKE facility. A third facility, the Oak Ridge National Laboratory (ORNL) Carbon Fiber Technology Center, is about 0.5 mile west of the proposed IKE facility, and NAC Philotechnics (a waste management, decommissioning, and radiological services company) is approximately 0.9 mile northwest. The TRISO-X facility being developed by X-Energy is about 1 mile northwest of the proposed IKE facility, while the Clinch River small modular reactor owned by the Tennessee Valley Authority (TVA) is about 4.6 miles southeast of the site.

The surrounding region consists of Roane County, Tennessee, with small portions including Anderson County, Loudon County, and Morgan County. The City of Knoxville is 24 miles directly

east of the site. The nearest residence is 1.2 miles northeast of the site. Public use areas include a hiking trail north and west of the site referred to as the North Boundary Greenway and the Wheat Trail to the south and west of the site (City of Oak Ridge 2021). The nearest agricultural farm is nearly 4 miles south-southwest of the site, and the nearest feedlot and dairy operations are about 18 miles south-southwest of the site.

Water would be supplied to the site by the Oak Ridge municipal water services via underground water lines. The City of Oak Ridge municipal wastewater treatment system would provide sanitary sewage treatment services for sanitary and uncontaminated liquid wastes from the IKE facility.

Electrical service would be provided via a 161-kilovolt transmission line that currently bisects the site, beginning on State Route (SR) 95 just north of the intersection with SR 58 and running northeast to a point southeast of the ORETTC facility. TVA plans to relocate this transmission line to the western edge of the site along SR 95. TVA has jurisdiction over transmission lines and has addressed that activity under a separate NEPA review (TVA 2026a); it is not part of the proposed NRC action. Figure 2-1 shows the site property boundary and location of the security fence and buffer (this figure also identifies the location where TVA plans to relocate its transmission line).

The IKE facility would consist of the primary facilities described as follows; further details are provided in the ER (Orano 2026d, Figure 4-20) and in an online overview (Orano 2026g). The feed material for the enrichment process is UF_6, with a natural composition of isotopes uranium-234, uranium-235, and uranium-238. The enrichment process involves the mechanical separation of the isotopes using a fast-rotating cylinder (centrifuge) and is based on a difference in centrifugal forces due to differences in the molecular weight of the uranium isotopes. No chemical or nuclear reactions would take place during this separation process.

Following the separation process, the product stream would consist of enriched uranium-235 while the residual stream (tails) would be depleted in this isotope. The feed, product, and depleted uranium streams would all be in the form of UF_6.

The UF_6 feed would arrive from conversion facilities as a solid under partial vacuum in 48-inch diameter transportation cylinders. Product material would be collected in standard containers 30 inches in diameter and transported to a fuel fabricator. The depleted UF_6 material would be collected in standard containers 48 inches in diameter and placed in temporary storage onsite.

The principal operational structures are listed below; further details are provided in the ER (Orano 2026d):

- Separations building modules — four buildings, each containing two centrifuge cascade modules and a process service corridor that would connect the modules to UF_6 annexes.
- UF_6 annexes (handling areas), where feed, product take-off, and tails take-off stations would feed the cascades and withdraw the product and tails.
- Blending, sampling, and preparation building, where liquid sampling, blending and transfer, cylinder defrost, precise weighing, and cylinder inspection and preparation would be performed.
- Technical support building, which would house radiological support areas for the facility, such as liquid effluents treatment, solid waste processing, decontamination, chemical analysis, and maintenance functions.

- Operation support building, which would house showers, changing areas, medical and security services, and a break area.
- Centrifuge assembly building, where centrifuges would be assembled and tested prior to their installation in the separations building modules.
- Cylinder receipt and shipping building, which would provide centralized receipt and shipping of cylinders and other goods via overland trucks and cylinder flow to and from the facility from the cylinder storage pads.
- Feed storage pad, where feed cylinders would be stored prior to their use in the facility.
- Empty/tails cylinder storage pad, where empty and tails cylinders would be stored.
- Full product cylinder storage pad, where product cylinders would be pre-staged prior to their shipment to customers.
- Electrical services buildings — two buildings, which would provide a range of power management, conversion, and backup diesel generation capabilities.
- Mechanical services buildings — two buildings, which would provide pumping, cooling, and process air capabilities.
- Administration building, which would house most of the facility's office space, conference rooms, dining, and administrative functions. This building's security space would serve as the single point of personnel entry to the facility to perform site security functions.
- Storage pad adjacent to the centrifuge assembly building for supplemental storage of secured parts.
- Guard house, which would provide a vehicle entry point to the facility for private vehicles and trucks.
- Gasoline and diesel fueling station, which would provide a fuel stop for facility vehicles.

2.1.1.1 Site Workers and Vehicular Deliveries

Orano anticipates construction activities would extend from 2027 through 2039, and facility operation would begin by 2032 (Orano 2026d, Table 1-1). Construction would occur primarily during weekdays and daylight hours, subject to any local restrictions imposed by the City of Oak Ridge or Roane County. The peak construction period would be 2027–2028. Orano anticipates 590 construction workers onsite daily, with up to 608 total daily vehicle round trips from workers and deliveries combined (Orano 2026d, Table 4-1; Orano 2026f).

The licensed operational life of the IKE facility would be 40 years. During this period, Orano anticipates 390 operation workers would be onsite daily, on average. During the period of several years when construction and operation activities overlap, the combined number of daily trips for employees, visitors, construction workers, and material delivery/waste removal personnel is estimated to total 994, on average (Orano 2026d, Table 4-2; Orano 2026f).

Orano (2026d) estimates that facility operation would entail 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 48G cylinders, and 36 truck shipments per year of low-level radioactive waste (LLRW). Based on a projected average daily traffic count of 982 trips/day during operation, an estimated 8 percent, or about 80 of these trips, would be for truck deliveries.

Orano anticipates that decommissioning would be conducted over eight years, from 2072 through 2079, and would require up to 50 direct workers and 215 indirect workers per year (Orano 2026f, Tables 1-1 and 7-1). Decommissioning would involve the sequential shutdown of the separation building modules, with a gradual decrease in production. Staffing and shipments for decommissioning activities would be substantially lower than for construction activities.

2.1.2 Technology and System Description

The proposed IKE facility would employ the centrifuge process, a technology for enriching natural uranium. Isotopes of the same element, although chemically identical, have different masses. The centrifuge enrichment process is summarized below from the ER (Orano 2026d). The technical details of the Orano 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, to which access is limited by U.S. laws and regulations. For this reason, the EIS does not include a detailed description of the process.

The gas centrifuge enrichment process and the principal facility systems are described in Section 2.1.2.2 of the ER (Orano 2026d), which is incorporated by reference and summarized here. The NRC staff reviewed the process description for consistency with the license application and with the staff's ongoing safety review.

The proposed IKE facility is designed to separate a feed stream of UF_6 containing naturally occurring proportions of uranium isotopes (about 0.7 percent uranium-235, 99.3 percent uranium-238, and 0.0055 percent uranium-234 by weight) into a product stream that is enriched in the uranium-235 isotope and a tails stream that is depleted in the uranium-235 isotope. The processes that would be used for receipt and handling of the feedstock and the enriched uranium and DUF_6 streams are very similar to those used at other enrichment facilities.

The feed material is composed of natural uranium. The uranium-235 enrichment would be accomplished by mechanically separating the uranium isotopes in a fast-rotating centrifuge, exploiting the difference in molecular weight between isotopes; no chemical or nuclear reaction is involved in this separation process. The activities would take place in the centrifuge cascade halls and UF_6 annexes housing feed, product take-off, and tails take-off stations; a blending, sampling, and preparation building; a technical support building housing liquid effluent treatment, solid waste processing, decontamination, and chemical analysis; a cylinder receipt and shipping building; and electrical services buildings providing power management, conversion, and backup diesel generation.

The cylinders that would be used for transporting and storing UF_6 are industry-standard containers. The proposed IKE facility is designed to produce an enriched UF_6 stream that is up to 10 percent uranium-235 by weight, with a nominal capacity of 6 million and maximum of 7.4 million SWUs per year. The main processing steps involved in enriching natural uranium at the facility would be (1) UF_6 feed and vaporization, (2) cascade/gas handling, (3) product withdrawal, and (4) tails withdrawal.

The feed purification subsystem would remove any light gases such as air and HF from UF_6 prior to introducing it into the gas handling area. After purification, UF_6 from the solid feed stations would be routed to the gas handling area and the UF_6 in gaseous form would be separated into two streams by the centrifuges: one enriched in uranium-235 and one depleted in uranium-235.

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.

The DUF_6 from the 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 (dissipated in) the surrounding air. Filling of tails cylinders would be monitored, and filled cylinders would be transferred to the tails pad.

All shipments of nuclear materials and wastes would conform with NRC, U.S. Department of Transportation (DOT), and State of Tennessee 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. The LLRW would be appropriately packaged and analyzed for uranium content prior to shipment to a licensed LLRW disposal site. Transportation is discussed in Section 3.10 of this EIS.

2.1.3 Waste and Effluent Management

The types of radioactive liquid, solid, and gaseous wastes generated by the operation of the IKE facility include quality control laboratory wastes and routine wastes from maintenance activities (e.g., trash generated from decontamination, and filter replacement). Orano would collect the liquid waste stream in process tanks and treat it with filtration and chemical precipitation processes to remove residual contaminants, notably uranium and fluorine. The liquid would then be heated to evaporate the water, and the residual sludge generated from the treatment would be packaged for offsite disposal as LLRW. More details are provided in Section 4.12.3.1.2 of the ER (Orano 2026d). Waste management for the IKE facility is discussed in Section 3.12 of this EIS.

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 IKE facility would be considered and implemented by Orano, including those described in Chapter 5 of the ER (Orano 2026d) 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 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 onsite and in the surrounding environment for hazardous materials associated with the construction, operation, and decommissioning of the IKE facility would be conducted, to demonstrate compliance with permit and regulatory requirements.

Periodic measurements of direct radiation dose and sampling of air, groundwater, surface water, soil and sediment at specific locations in and around the IKE facility, as well as periodic surveys of flora and fauna of the land surrounding the IKE facility would be taken, as a means of monitoring the environment for impacts associated with the construction, operation, and decommissioning of the facility. The environmental monitoring program would be subject to

periodic auditing by quality assurance personnel. The proposed locations for air, direct radiation dose, vegetation, groundwater, surface water, soil and sediment monitoring are provided in Chapter 6 of the ER (Orano 2026d) and shown in Figures 2-3 through 2-5.

Programs that Orano would implement to mitigate impacts on the environmental resources at the IKE facility and its vicinity are described within the individual resource subsections in Chapter 3 and summarized in Table 4-3.

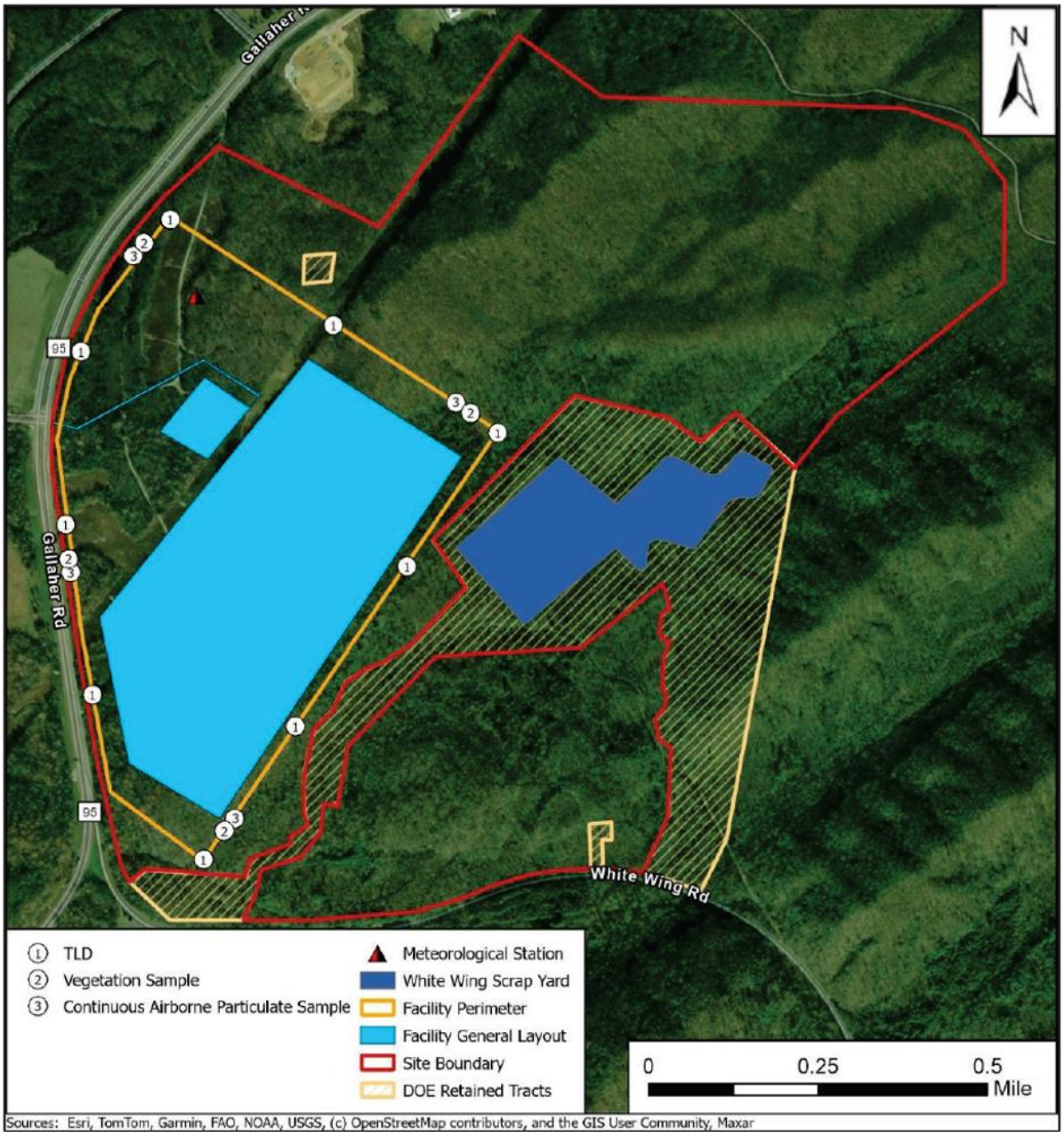


Figure 2-3 Proposed Monitoring Locations for Direct Radiation Dose, Air, and Vegetation (Source: Modified from Orano 2026d)

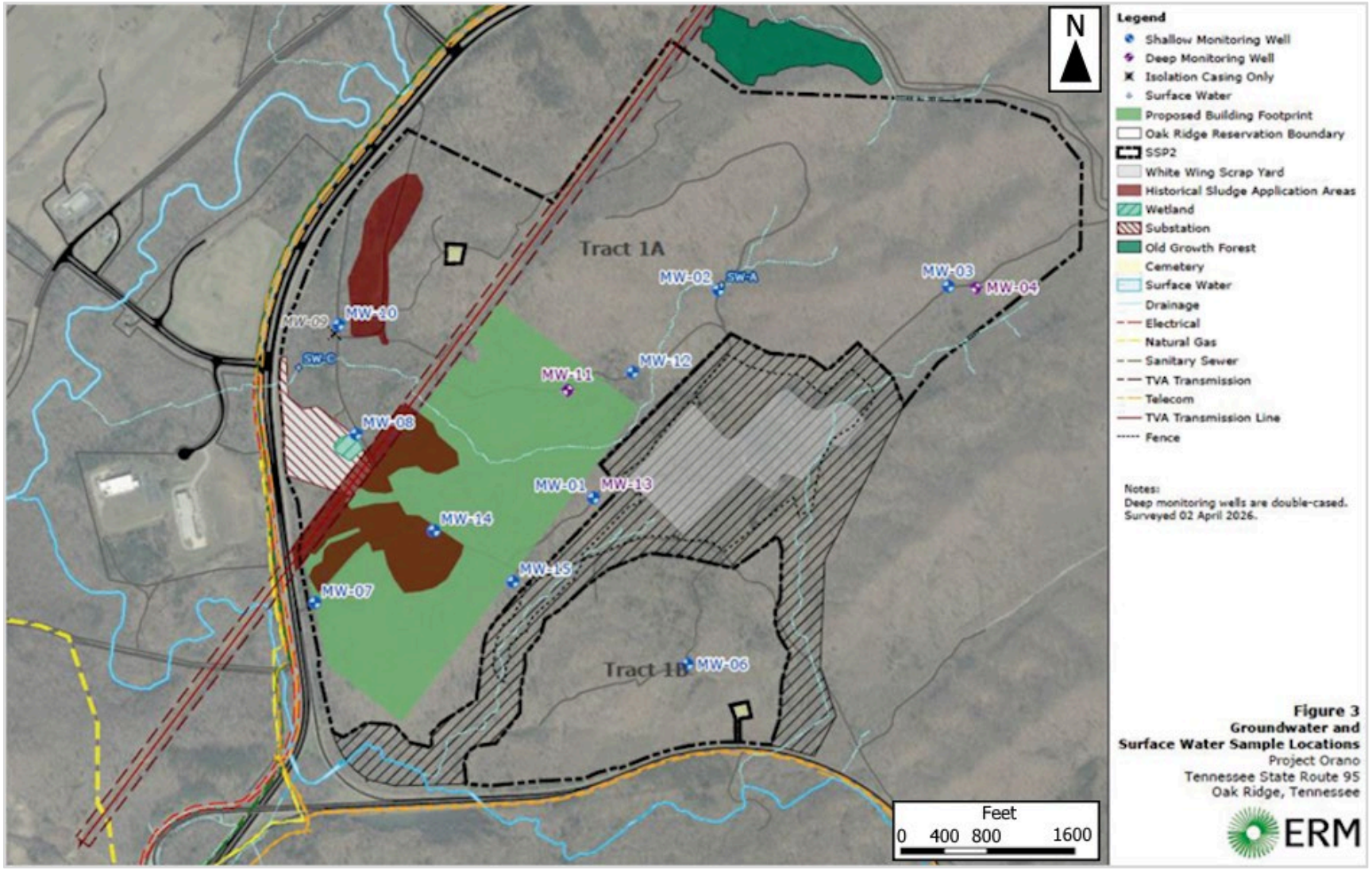


Figure 2-4 Proposed Monitoring Locations for Surface Water and Groundwater (Source: Modified from Orano 2026d)

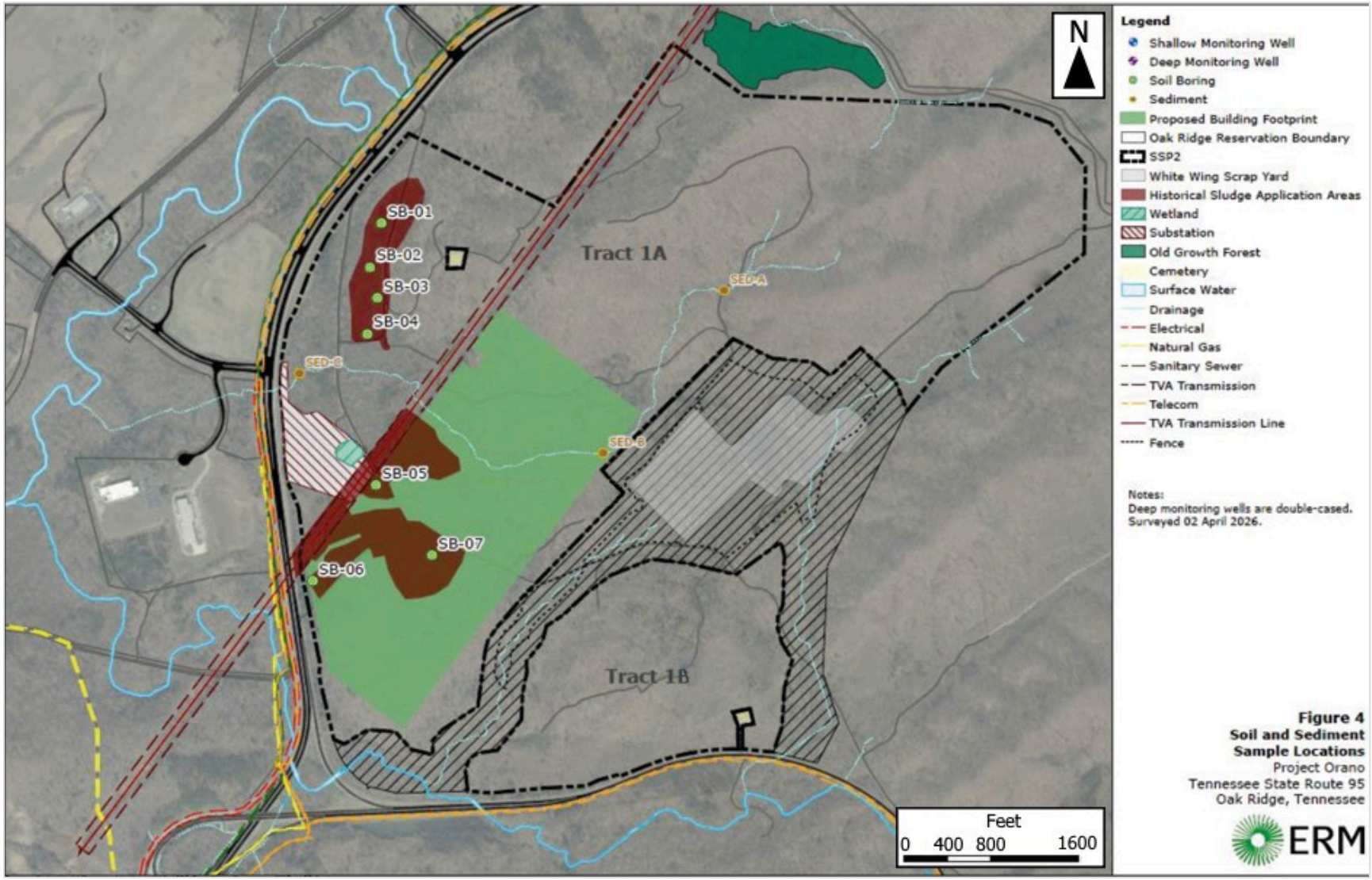


Figure 2-5 Proposed Monitoring Locations for Soil and Sediment (Source: Modified from Orano 2026d)

2.1.5 Decommissioning Activities

Before decommissioning activities begin, Orano 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 IKE facility, the types of items to be decontaminated, the disposition of facilities used for hazardous materials, the assumptions upon which the cost of decommissioning is derived, and an estimated schedule for decommissioning and closing the facility. Orano intends to decommission and close the IKE facility to reduce the level of radioactivity remaining in the facility to residual levels acceptable for release of the facility 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, Orano would assess the radiological status of the IKE facility. The decommissioning and closure activities would include cleaning and removing radioactive and hazardous waste contamination that may be present on materials, equipment, and structures. Radioactive equipment and materials would be disposed of according to local and Federal laws and regulations. Post-operational decommissioning activities would require up to 50 workers. Orano 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. Building materials, such as wood, concrete, and steel, and process equipment would be removed from the site. Disposition of materials associated with facility decommissioning is discussed in Section 3.12.2.

2.2 ALTERNATIVES

This section describes and compares the proposed Federal action and alternatives. As discussed in Chapter 1, the proposed Federal action is the issuance of a license pursuant to 10 CFR Part 30, “Rules of General Applicability to Domestic Licensing of Byproduct Material,” 10 CFR Part 40, “Domestic Licensing of Source Material,” and 10 CFR Part 70, “Domestic Licensing of Special Nuclear Material,” to authorize Orano 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 IKE facility in Oak Ridge, Tennessee. Orano would construct, operate, and decommission the facility at the expiration of the license, if granted.

This section also evaluates the no-action alternative. Under the no-action alternative, the NRC would not issue Orano a license for the proposed IKE facility. The no-action alternative provides a basis for evaluating and comparing the potential impacts of the proposed action.

Section 2.2.1 describes the no-action alternative. Section 2.2.2 discusses alternative uranium enrichment technologies. Section 2.2.3 describes site alternatives that were considered but not analyzed in detail.

2.2.1 No-Action Alternative

Under the no-action alternative, the NRC would not issue a license to Orano for the construction and operation of a uranium enrichment facility. The facility would not be available to enrich uranium for nuclear fuel fabrication facilities, and this domestic source of enriched uranium would not be available to the nuclear industry. Plans to enrich uranium by other U.S. companies are under development, but no new facilities have been constructed. Furthermore, other planned capacity of enriched uranium is unlikely to meet the estimates of future commercial

demand. If use of advanced reactors is demonstrated but domestic sources of fuel are limited, it is possible that advanced reactor deployment could be hindered.

If a source of fuel for advanced reactors is limited, such that nuclear power plants are unable to supply power needed for the U.S. electric grid, other sources of power generation such as fossil-fuel-based power plants could be added to the electric grid or remain in operation longer. Fossil-fuel use contributes to greenhouse gas (GHG) emissions and other forms of air pollution that are not associated with nuclear power plants. The no-action alternative would not result in any of the potential environmental impacts related to issuance of a license to Orano or the associated construction, operation, and decommissioning of the IKE facility. Negative consequences of the no-action alternative would include that the U.S. deficit in uranium enrichment capacity would not be reduced, nor would the stockpile of legacy DUF_6 be reduced. There could be a potential for public exposures to contaminants released from the stockpile of legacy DUF_6 under hypothetical scenarios (and associated impacts) if no action were taken.

2.2.2 Alternative Technologies

Alternative technologies to the gas centrifuge enrichment process are described in Section 2.1.5 of the ER (Orano 2026d) and briefly summarized here. Although several different processes have been invented for enriching uranium, only two have operated on a commercial scale: gaseous diffusion and gas centrifuge. Orano also considered laser isotope separation as an emerging technology type. The gas centrifuge technology was selected because it is well established (including years of operation at Orano's facility in France) and is the sole enrichment process being used in LEU enrichment facilities.

Other commercial entities have applied the gas centrifuge technology to enrich uranium in the United States. The impacts associated with the construction, operation, and decommissioning of a gas centrifuge enrichment facility were analyzed by NRC in previous EISs (NRC 2005, 2006, 2011). In those EISs, the NRC staff concluded that the impacts associated with the construction, operation, and decommissioning of the National Enrichment Facility in New Mexico, the American Centrifuge Plant in Ohio, and the EREF in Idaho, were acceptable for licensing those facilities unless safety issues mandated otherwise. Based on NRC's safety and environmental reviews, all of those facilities were granted licenses.

2.2.3 Site Alternatives

Prior to submitting its application to the NRC, Orano conducted a siting study to identify one or more suitable locations for the proposed IKE facility. As described in the ER (Orano 2026d), Orano defined three site selection objectives related to technical, environmental, and operational requirements and defined four criteria reflecting seismological and climatological factors to identify regions of the United States that could be suitable for an enrichment facility. Orano then considered ten criteria in addition to discussions held with local government officials and economic development organizations to identify and screen six candidate sites. The top two ranked sites are located in Idaho and in Roane County, Tennessee. The screening process and results are described in the ER (Orano 2026d, Sections 2.1.3 and 2.1.4). The NRC staff is not evaluating alternative sites.

3 AFFECTED ENVIRONMENT AND POTENTIAL ENVIRONMENTAL IMPACTS

This chapter provides a discussion of each environmental resource and assesses the potential impacts of the proposed action on the resource (i.e., NRC issuance of a license to authorize Orano to construct and operate the proposed IKE facility). This chapter also describes mitigation measures to reduce or avoid potential adverse impacts, where applicable; these include measures that (1) Orano has committed to in its license application or (2) the NRC staff identified as having the potential to reduce environmental impacts, but that the applicant did not commit to in its application. Except as otherwise noted, the applicant's ER (Orano 2026d) is the main source of the information presented in this chapter.

Under the no-action alternative, current environmental conditions at the proposed IKE site would remain the same without the construction and operation of the proposed IKE facility and associated impacts. Potential adverse effects of site preparation and construction, operation, and decommissioning would not occur, and neither would any associated benefits.

Sections 3.1 through 3.13 address the potential environmental impacts 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; waste management; and accidents. Existing conditions for these resource areas are described in Chapter 3 of the ER (Orano 2026d), and those descriptions are incorporated into this EIS by reference.

As discussed in Section 1.4.8 of this EIS, preconstruction or site preparation activities are not part of the NRC's licensing action; these activities may be subject to the regulatory authority of another Federal, State, or local agency. Orano plans to conduct site preparation activities including tree clearing and grading of the site that require a property deed amendment from DOE and issuance of a CWA Section 404 permit from USACE. The DOE and USACE are separately cooperating on a NEPA review regarding these site preparation activities.

Orano's ER (Orano 2026d) describes the impacts of both construction and site preparation combined. This EIS presents the total impact of these joint activities and is therefore a conservative assessment of impacts. For any resource area where impacts are greater than SMALL (adverse), this EIS further defines the impact contribution from NRC-authorized construction.

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

- SMALL: The environmental effects are not detectable or are so minor that they will 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.

Consistent with the introductory explanation in Section 1.4.3, the NRC staff has determined that 31 issues in the NR GEIS involve generic analyses and determinations that are relevant and appropriate to utilize in connection with this environmental review of the corresponding issues for the proposed IKE facility. For each of these issues, the staff determined that the site parameter envelope (SPE) and plant parameter envelope (PPE) values and assumptions in the NR GEIS are met. Each of the issues was assigned a finding of SMALL impacts in the NR GEIS, meaning that the environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

Therefore, the NRC staff did not conduct additional site-specific evaluations beyond verifying that SPEs and PPEs for each issue were met. Table 3-1 lists the Category 1 issues for which generic analyses and findings in the NR GEIS were determined to be relevant to the proposed IKE enrichment facility. Table C-1 provides details showing the NR GEIS site and plant parameter envelope values and assumptions for each issue and explains why they are met.

The affected environment is the environment that currently exists at the proposed IKE site. Because existing environmental conditions are the result of past and present activities, Chapter 3 of this EIS considers the nature and impacts of these activities and how they shape 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 1.4.8).

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” mean 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.

3.1 LAND USE

This section presents an overview of the land use conditions at the proposed IKE site and surrounding area, the potential impacts of the proposed action and mitigation measures.

3.1.1 Affected Environment

The overview of land use at the IKE site and surrounding area is incorporated by reference and summarized here from the ER (Orano 2026d, Section 3.1) and the EIS for the adjacent TRISO-X facility (NRC 2026e). The TRISO-X facility is 0.85 mile from the proposed IKE site, and the information about regional and local land use presented in that EIS is also relevant to the IKE site (see Table 1-1). The IKE site is in Roane County, Tennessee, within the city limits of Oak Ridge. The 624-acre site consists of undeveloped, forested land and is bounded by the Oak Ridge Turnpike (SR 95) to the west and White Wing Road (SR 95) to the south. Most of the 5-mile radius of the site is in Roane County, Tennessee; small parts of the area include Anderson County, Loudon County, and Morgan County (see Figure 1-2). Predominant land uses in the surrounding area include Federal industrial and research operations, such as the East Tennessee Technology Park (ETTP) and ORNL.

Table 3-1 Category 1 (Generic) Issues Relevant to the Proposed IKE Facility

Category	Phase	Issue	GEIS Section
Water resources	Construction	Water use conflict due to plant municipal water demand	3.4.2.1.8
		Degradation of water quality from plant effluent discharges to municipal systems	3.4.2.1.9
	Operation	Water use conflict from plant municipal water demand	3.4.2.2.11
		Degradation of water quality from plant effluent discharges to municipal systems	3.4.2.2.12
Terrestrial ecology	Construction	Important species and habitats — other important species and habitats	3.5.2.1.6
	Operation	Permanent and temporary loss or disturbance of habitats	3.5.2.2.1
		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 right of way (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
	Operation	Stormwater runoff	3.6.2.2.1
		Exposure of aquatic organisms to radionuclides	3.6.2.2.2
		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
Environmental hazards — Radiological environment	Operation	Nonhuman biota doses	3.8.1.2.2.4
Environmental hazards — 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	Construction	Construction-related noise	3.9.2.1
	Operation	Operation-related noise	3.9.2.2
	Construction	Construction nonradiological waste	3.10.2.2.1

Category	Phase	Issue	GEIS Section
Nonradiological waste management	Operation	Operation nonradiological waste	3.10.2.2.2
Socioeconomics	Construction	Community services and infrastructure	3.12.2.1.1
		Economic impacts	3.12.2.1.3
		Tax revenue impacts	3.12.2.1.4
	Operation	Community services and infrastructure	3.12.2.2.1
		Economic impacts	3.12.2.2.3
		Tax revenue impacts	3.12.2.2.4

Zoning at and around the proposed site is described in Section 3.1.7 of the ER (Orano 2026d), which is incorporated by reference and summarized here. As established by Article IX, Section 9.06 of the City of Oak Ridge Zoning Ordinance (City of Oak Ridge 2025), the site is zoned for Federal industry and research (FIR). The ordinance defines lands zoned FIR as:

> *"established for the United States Government Oak Ridge Reservation and its operation within its boundaries. Whenever land is transferred from the ORR to the City of Oak Ridge or to a private company for the purposes not directly related to the mission of the DOE, the City of Oak Ridge Planning Commission shall study and make recommendations to the city council concerning the appropriate zoning district designation."*

From USGS data, as cited in the ER (Orano 2026d), the majority of land in the region, about 64 percent, is forest lands (approximately 37,200 acres); 17 percent is developed lands (about 9,800 acres), 13 percent is agricultural land (about 7,300 acres), and 5 percent is waters or wetlands (about 2,700 acres) (USGS 2024). The main land uses within a 5-mile radius of the site center are summarized in Table 3-2. Updated data from USGS (2026a) indicate that current percentages are similar to previous values, with about 65 percent as forest lands (about 33,000 acres); 18 percent as developed lands (about 9,000 acres), 10 percent as agricultural land (about 5,300 acres), and 5 percent is waters or wetlands (about 2,400 acres). Local trails include the North Boundary Connector Trail (Greenway) north and west of the site and the Wheat Trail south and west of the site (City of Oak Ridge 2021), as well as DOE natural areas, Campbell Bend Barrens and Crowder Cemetery State Natural Areas, and the Gallaher (Smith) and Hembree cemeteries. Prominent developed lands involve industrial and research operations, including at ETTP and ORNL; recent developments include the TRISO-X facility (NRC 2026e). As illustrated in Figure 3-1, land use in the area of the proposed IKE facility is mixed, with a fragmented combination of cultivated crops, pasture/hay, and deciduous forest (Orano 2026d; NRC 2026e; USGS 2024, 2026a).

The Federally owned ORR encompasses about 37,000 acres in Roane County and Anderson County, of which about two-thirds (25,000 acres) remains undeveloped. Developed areas consist of three DOE-owned, contractor-operated sites: the 2,200-acre ETTP (former site of the K-25 facility, it now contains the Heritage Center Industrial Park and the Horizon Center Industrial Park), ORNL, and the Y-12 National Security Complex (DOE 2020a, NRC 2026e). Private companies manage the day-to-day operations at these sites in accordance with Federal laws, DOE Orders, and State laws and regulations.

Table 3-2 Regional Land Use[a]

National Land Cover Dataset Class	Area (acres)	Area (percent)[b]
Deciduous forest	30,827	53
Hay/pasture	7,347	13
Mixed forest	5,041	9
Developed, open space	3,899	7
Developed, low intensity	3,187	5
Developed, medium intensity	1,769	3
Woody wetlands	1,621	3
Evergreen forest	1,373	2
Open water	1,013	2
Developed, high intensity	913	2
Shrub/scrub	635	1
Herbaceous	465	0.8
Barren land	66	0.1
Emergent herbaceous wetlands	40	0.1
Total	***58,196***	***100***

[a] Source: USGS 2024, as cited in Orano 2026d.

[b] Percentages are rounded; numbers do not sum exactly due to rounding.

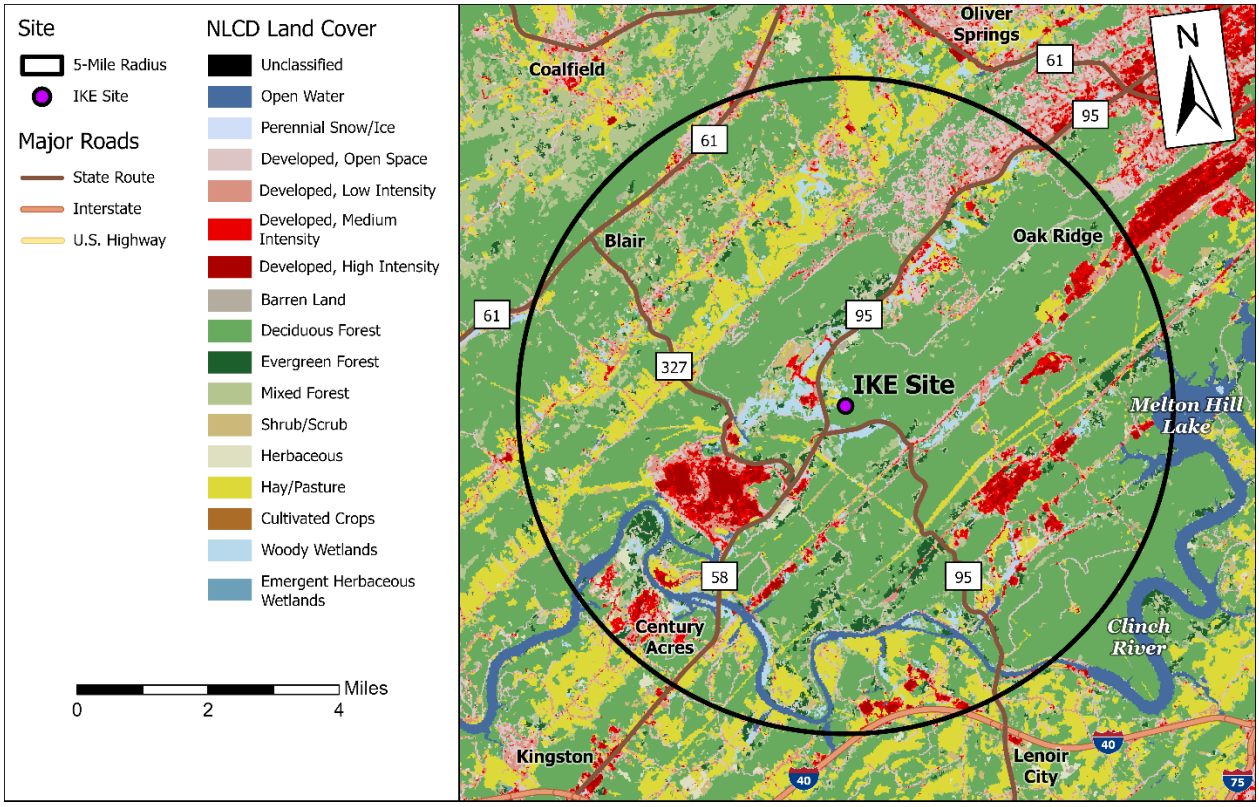


Figure 3-1 Land Use in the Vicinity of the IKE Site (Data source: USGS 2026a)

Government-sponsored activities in Oak Ridge began during the Manhattan Project in the early 1940s and have continued to this day. Both past and present activities involve hazardous chemicals and radioactive materials. In 1989, the EPA designated the entire ORR as a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site with its listing on the National Priorities List. About 15 percent of the ORR was contaminated by hazardous and radioactive materials from past operations, including waste sites and remediation areas (NRC 2026e). The DOE retains ownership of several tracts of land in SSP-2, including the two cemeteries, Bear Creek, and White Wing Scrap Yard (Orano 2026d); the scrap yard and surrounding land retained by DOE are outlined in Figure 2-3. More than 60 years ago, the scrap yard served as an aboveground disposition area for contaminated equipment and scrap from ORNL, Y-12, and K-25 facilities. Following several interim cleanups, DOE recently completed site preparation and field characterization to accelerate progress toward transferring the property for beneficial use (UCOR 2025). By late summer 2026, the main footprint of the scrap yard (39 acres) had been deforested to facilitate subsurface remediation, and contaminated soil and debris, including asbestos-containing material, had been removed from the northern portion and shipped to nearby ORR landfills (DOE 2026e; UCOR 2026a).

The IKE facility would be on 188 acres of the 624-acre IKE site, which is a portion of the SSP-2 land parcel that was part of the larger ORR owned by DOE. Nearby areas were previously surveyed for sensitive ecological resources, including the 110-acre site on which the TRISO-X facility is being developed, which lies within the approximately 1,000-acre Horizon Center Industrial Park (ORIDB/OREDI 2026). Parts of the surrounding ORR are recognized as an Important Bird Area by the National Audubon Society.

Regional population centers, utilities, and transportation infrastructure are described in Section 3.1.3 of the ER (Orano 2026d) and in the TRISO-X EIS (NRC 2026e). Those descriptions are incorporated by reference and briefly summarized here. The IKE site is within the city limits of Oak Ridge, which is the major population center in the area. The city center is about 6.4 miles northeast of the site. Other nearby towns include Oliver Springs, Kingston, and Lenoir City (see Figure 3-1). Municipal utilities available from Oak Ridge include potable water, sewer, gas, electrical, garbage collection, telephone, cable, and internet service (City of Oak Ridge 2025).

The main transportation corridors within the region are described in Section 3.10 of this EIS. Transportation infrastructure in the site area includes Tennessee State Routes 58 and 95 (Oak Ridge Turnpike), Interstate 75, Interstate 40, several other Tennessee highways, and local roads (see Figure 3-1). CSX Transportation Class I Railroad provides freight rail service in Anderson County, and a CSX operating agreement extends service into Roane County along State Route 61, with a mainline extension to the ETTP adjacent to State Route 327.

There are no airports near the site. The closest primary airport in the region is McGhee Tyson Airport, which is south-southwest of Knoxville, Tennessee. That airport serves both public and military operations. The closest private airport is the Oliver Springs Airport. The Clinch River flows in the region, downstream of Melton Hill Lake and Dam (see Figure 3-1). This river is a component of the navigable river channels on the Cumberland and Tennessee Rivers and is a part of the U.S. Inland Waterway System (USACE 2024). As described by the Directory of Tennessee's Forest Industries (TDOA 2012) and summarized in the TRISO-X EIS (NRC 2026e), wood-consuming industries in or near the region include secondary wood/sawmills located in Roane County. The mills process primary materials such as hardwood lumber or paper into other products, including furniture.

Considering the broader region of about 60,000 acres (of which the ORR accounts for more than half), the amount of prime farmland soils within the land use study area can be estimated from available NRCS soils data and historical DOE environmental documentation for the site (NRCS 2026a, DOE 1996). From that information, approximately 7,225 acres or 12 percent of the land use study area is considered prime farmland. Another 195 acres (0.3 percent) is considered prime farmland if drained or prime farmland if protected from flooding or not frequently flooded during the growing season (NRC 2026e). An overview of prime farmland data is provided in Table 3-3. An earlier DOE environmental assessment for the site area noted that because these soils are present on land within the city limits of Oak Ridge, the prime farmland soils designation is waived and other uses of the lands are permitted (DOE 1996). The NRCS (2026b) states that prime farmland does not apply to areas that are not available for crop production (or to urban areas).

Table 3-3 Prime Farmland in the Region[a]

National Land Cover Dataset (NLCD) Class	Area (acres)	Area (percent)
All areas are prime farmland	7225	12.4
Not prime farmland	50,803	83.3
Prime farmland if drained	21	0.0035
Prime farmland if protected from flooding or not frequently flooded during the growing season	174	0.25
Total	***58,196***	***100.00***

[a] Source: USGS 2024, as cited in Orano 2026d.

As described in the ER (Orano 2026d, Section 3.1.5.1), there are 617 farms in Roane County encompassing more than 47,000 acres, with an average size of about 77 acres. From available (2017) data, land in farms consisted of cropland (32 percent), pastureland (27 percent), woodland (35 percent), and other (5 percent) (USDA 2017). Only about 37 acres of Roane County farmland is irrigated (USDA 2017). The areas of prime farmland in Roane and surrounding counties are presented in Table 3-4.

Table 3-4 Percent of Prime Farmland in the Counties in the Vicinity of the IKE Site[a]

County	Total Land Area (acres)	Prime Farmland (acres)	Prime Farmland (percent)[b]
Roane	231,040	34,656	15
Anderson	215,680	17,254	8
Loudon	146,560	46,900	32
Morgan	334,080	10,022	3
Total	***927,360***	***108,832***	***12***

[a] Source: Orano 2026d.

[b] Percentages are rounded to the nearest integer.

3.1.2 Potential Impacts

The IKE site is zoned for FIR use, and the project would be consistent with this classification. Potential impacts of the proposed facility on land use are described as follows.

Site preparation and construction, operation, and decommissioning of the IKE facility would not directly impact or change the land use of the developed lands in Oak Ridge and the surrounding towns, including schools, ORR facilities, including the forested natural areas, and

the transportation infrastructure (i.e., roadways or railroads). Potential transportation impacts are discussed in Section 3.10.

Site Preparation and Construction. Site preparation activities would involve disturbing approximately 188 acres of undeveloped, forested land. (These activities would precede the construction that would be within the NRC scope, see Section 1.4.8.) The impact of altering this relatively small portion of forested land, which represents 30 percent of the IKE site, would be minor because this area accounts for less than 1 percent of adjacent undeveloped land and contains no special habitat. This land disturbance would not impact access to nearby public land for recreation. Impacts on prime farmland would likewise be minor because the proposed IKE site accounts for a small fraction of prime farmland in the county.

New structures would include administrative buildings and parking areas (which would be part of site preparation), as well as the outdoor UF_6 cylinder storage pads and main operations buildings. Access to the site would be via a new access road developed as part of site preparation activities. All activities would be conducted on land zoned for research and industrial use and would be consistent with that use. The IKE site would be private with limited access, and the change from generally forested land to research and industrial use could be noticeable to passersby but would be consistent with the industrial development that dominates the use of lands directly adjacent to the site. Therefore, the NRC staff concludes that impacts of site preparation and construction on land use would be SMALL.

Operation. The greatest potential for impacts on land use would occur during facility operation because it would occur over the proposed 40-year license period. However, land use associated with operation of the proposed facility would be confined to the already-developed IKE site. Furthermore, facility operation would be consistent with the site's FIR zoning and with other industrial land use in the area, including multiple facilities located across the highway west of the IKE site. From this information, the NRC staff concludes that land use impacts from facility operation would be SMALL.

Decommissioning. After facility operation ceases, Orano would decontaminate and decommission the buildings and equipment and restore the land to enable future redevelopment consistent with the site's zoning. These activities would be consistent with existing zoning and would not be expected to impact nearby land use. Therefore, the NRC staff concludes that land use impacts associated with decommissioning would be SMALL.

3.1.3 Mitigation Measures

Orano would minimize the facility footprint to limit land use impacts (Orano 2026d, Section 5.1). Because the proposed action would result in minimal land use impacts, no additional mitigation measures have been identified by the NRC staff.

3.2 METEOROLOGY, CLIMATOLOGY, AND AIR QUALITY

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

3.2.1 Affected Environment

3.2.1.1 Meteorology and Climatology

The IKE site lies between the Great Smoky Mountains and the Cumberland Mountains in the Ohio Valley climate region and experiences the full range of four seasons. The area is classified as humid subtropical and typically experiences hot, humid summers and cool to mild winters. The topography surrounding the IKE site, which is located within the Ridge and Valley Province of East Tennessee, has a significant influence on local weather patterns. Locally, the terrain is characterized by a series of parallel, northeast-trending ridges and valleys. The facility is flanked by Black Oak Ridge to the northwest and Chestnut Ridge to the southeast. These ridges tend to channel winds along the valley axis and can influence localized precipitation and temperature patterns.

Because the IKE and TRISO-X sites share the same local climate regime, the regional meteorology and climatology descriptions in Section 3.2.1 of the TRISO-X EIS (NRC 2026e) are incorporated by reference and summarized here. The site lies between two mountain ranges, which deflect and reduce wind velocities. Summer frontal systems can produce thunderstorm lines and, rarely, tornadoes; summer precipitation is largely from air-mass thunderstorms driven by daytime heating and local terrain. The fall season sees some precipitation; however, August through October are often the driest months of the year. Precipitation events are significant in the winter months, often occurring every 3 to 5 days. Snow and ice are not generally associated with these events. Meteorological data from ORNL meteorological Towers C and D provide data representative of the valley conditions at the IKE site and are summarized below from NRC (2026e):

- *Temperature:* Based on climate normals from 1991 to 2020, the average maximum monthly temperatures ranged from nearly 48°F in January to nearly 89°F in July. The average liquid equivalent precipitation ranged from 5.5 inches in February to 3.2 inches in October. Historical extremes in the Oak Ridge area have reached a high of 105°F and a low of -17°F.
- *Precipitation:* Mean annual precipitation for the site area is approximately 54 inches. Precipitation is well distributed throughout the year, with a slight peak in July due to convective thunderstorms and a secondary peak in winter. Annual average snowfall is approximately 6 to 10 inches, although it is highly variable.
- *Wind:* Local wind patterns are strongly bi-modal, blowing most frequently from the southwest and northeast, aligned with the orientation of the valley. The annual average wind speed is approximately 4.5 to 6.5 miles per hour (mph). For the 5-year period (2016–2020), the wind rose at Tower D (15 m) is presented in Figure 3-2.
- *Severe weather*: Severe weather events in Roane County include thunderstorms, hail, winter storms, and occasional tornadoes. Since 1950, several tornadoes have been recorded in the county, though the surrounding ridges (such as the Cumberland Plateau to the west) often act to weaken storm systems as they enter the valley. However, the region remains susceptible to high-wind events and intense rainfall that can lead to localized flooding.

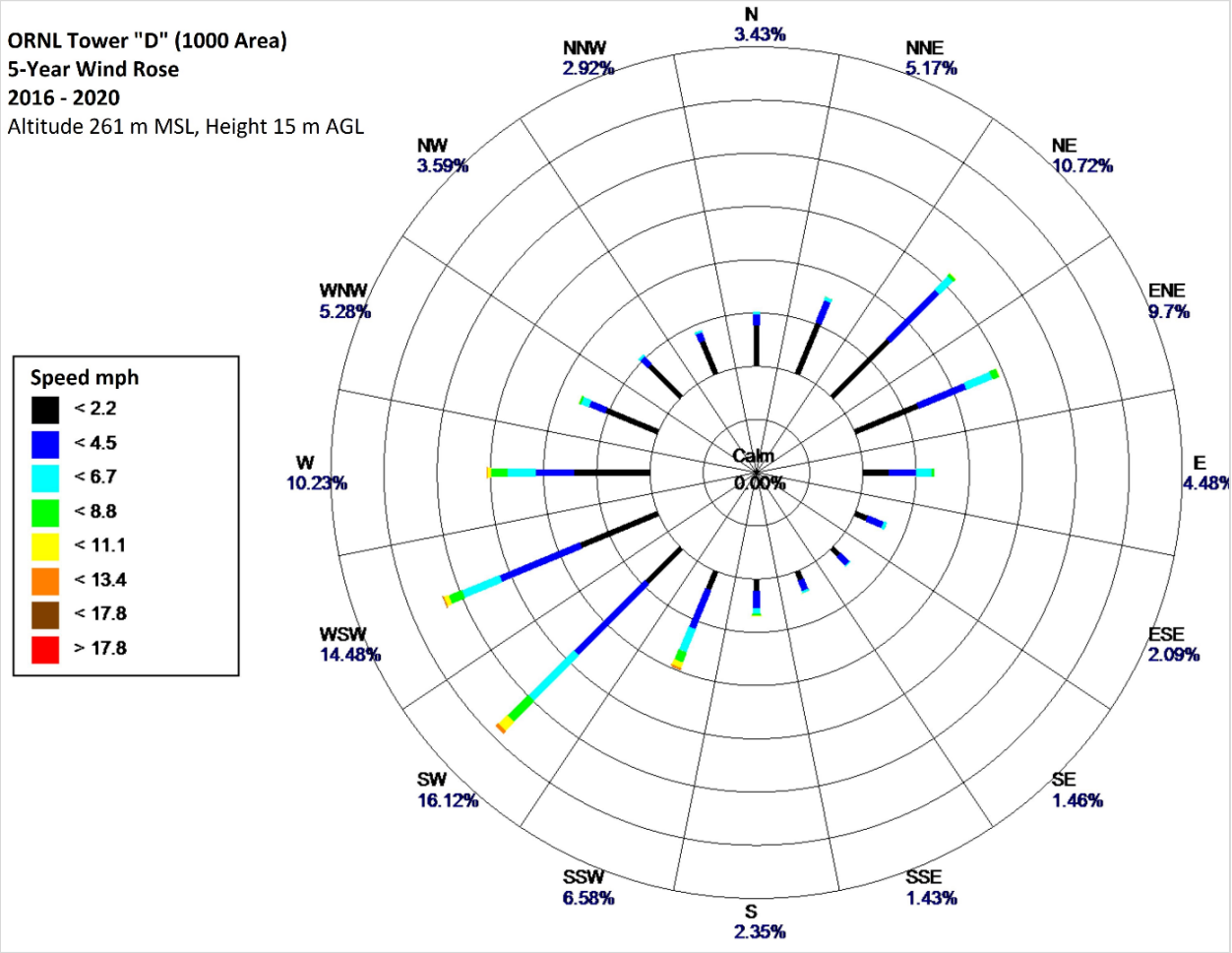


Figure 3-2 Wind Rose at Tower D (15 m), 2016–2020 (Source: ORNL undated)

3.2.1.2 Air Quality

Pursuant to the CAA, the EPA is the responsible Federal agency for developing, implementing, and enforcing national air pollution control programs. The CAA directs the EPA to establish National Ambient Air Quality Standards (NAAQS), 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 six criteria air pollutants: carbon monoxide (CO), lead, nitrogen dioxide, ozone, particulate matter (PM)[6], and sulfur dioxide (SO_2) (EPA 2026a).

The EPA assigns area designations in 40 CFR Part 81 based on how the air quality of an area compares to the NAAQS. Areas with air quality that is as good as or better than NAAQS are designated as "attainment areas," while areas in which air quality is worse than 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

[6] PM includes PM_{10} and $PM_{2.5}$, which refer to particles with an aerodynamic of 10 micrometers (µm) or less, or 2.5 µm or less, respectively. Note that $PM_{2.5}$ is a subset of PM_{10}.

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." The IKE facility is located in Roane County, which is currently designated as being in attainment with the NAAQS for all criteria air pollutants.

The proposed IKE site is within the Eastern Tennessee–Southwestern Virginia Interstate Air Quality Control Region (36 FR 22428). Air quality monitors are located throughout multiple surrounding counties. There is only one nonattainment area listed in Tennessee: Sullivan County, for SO_2 (EPA 2026b). More detailed information for the criteria air pollutants in the vicinity of the IKE site, all demonstrating compliance with the NAAQS, is provided in the ER (Orano 2026d, Section 3.6).

The EPA's Prevention of Significant Deterioration (PSD) regulations (40 CFR 52.21) are designed to limit the growth of 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 EPA delegated the authority to implement and enforce these standards to TDEC in Tennessee. Ambient air quality in the vicinity of the ORR is relatively good, and is influenced by the large amount of surrounding forested land. The site is designated as a Class II area under the PSD regulations. The nearest Class I area (requiring the highest level of protection) is the Great Smoky Mountains National Park, located approximately 35 miles to the southeast.

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 emissions inventories are typically expressed in terms of carbon dioxide equivalent (CO_2e), which represents the combined global warming potential (GWP)[7] 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

The proposed action would introduce sources of air emissions during 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. The ER provides more details about air emission sources, the types of air pollutants emitted, input assumptions, and resulting emissions inventories (Orano 2026d,f).

[7] 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.

The categories of pollutant emissions expected from an industrial facility of this type, and the regional regulatory framework governing them, are described in Section 3.2.2 of the TRISO-X EIS (NRC 2026e), which is incorporated by reference. The NRC staff used that discussion to frame the emission categories evaluated here and independently evaluated the IKE-specific emission estimates provided in the ER. The IKE facility would comply with all applicable regulatory requirements of the CAA and TDEC requirements to minimize impacts on air quality. The IKE facility would be classified as a minor source of regulated air pollutants under the CAA permitting program; therefore, significant impacts on ambient air quality are not expected.

Impacts on a Class I area, notably the Great Smoky Mountains, would be unlikely. Crosswind transport of emissions to this area would not likely adversely affect air quality or air-quality-related values in this area (NRC 2026e).

The gas centrifuge technology that the IKE facility would use is significantly more energy-efficient than older gaseous diffusion methods. Total electricity consumption is estimated based on the maximum capacity of 7.4 million SWUs per year. Tennessee's baseload electricity generation includes reliance on fossil fuels; the high efficiency of the centrifuge process would result in a lower carbon footprint per SWU compared to legacy technologies.

Site Preparation and Construction. During this phase, the proposed facility would be designed and 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 temporary loss of power. The use of gasoline- and diesel-fueled vehicles and heavy equipment during site preparation and construction would cause visible emissions. The types of vehicles, machinery, and equipment that would be used for the IKE facility would be similar to those used for construction of the TRISO-X fuel fabrication facility, as described in the TRISO-X EIS (NRC 2026e, Section 3.3.3.1.1). The vehicles, machinery, and equipment would be powered by gasoline or diesel engines and would produce emissions intermittently throughout construction when they are in use. As described in the ER (Orano 2026d), emissions during site preparation and construction would be below the levels classified as significant by TDEC (per Tennessee Rule 1200-03-09-.01). In addition, the emissions would be short term and intermittent, lasting the duration of site preparation and construction, and would be moderated by engine maintenance in accordance with manufacturers' specifications. Orano would apply for an air quality construction permit through the TDEC and would adhere to any permit requirements provided therein.

During site preparation and construction, fugitive dust emissions (PM_{10} and $PM_{2.5}$) would be generated from soil disturbance due to commuter vehicles and construction vehicles driving on exposed surfaces and unpaved roads. Other PM emission sources include wind erosion over disturbed areas and material storage piles. Exhaust emissions from construction equipment and commuter vehicles burning diesel and gasoline would also 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, refueling activities, onsite equipment maintenance, and the use of paints, solvents, or other materials associated with metal finishing or similar construction-related activities.

Exhaust emissions from on-road vehicles and non-road equipment were estimated using emission factors from EPA's MOVES5 model (EPA 2024). Fugitive dust emissions and associated control efficiencies were determined using EPA's *Compilation of Air Emissions Factors from Stationary Sources* (AP-42), specifically Section 13.2.3 ("Heavy Construction

Operations," EPA 1995) and Section 13.2.2 ("Unpaved Roads," EPA 2006). Estimated air emissions during site preparation for the peak year (2028) are summarized in Table 3-5. Site preparation and construction activities would continue after the facility begins operating. However, those activities would occur primarily indoors and would not involve ground disturbance or the outdoor use of large construction equipment, so they are not expected to contribute to project-related air quality impacts.

Table 3-5 Estimated Air Emissions at the IKE Site During Site Preparation[a]

Pollutants	Onsite Construction Equipment and Vehicles	Fugitive Dust	Offsite Vehicles[b]	Total Emissions	
				Onsite Only	Onsite and Offsite
CO	2.43	—[c]	40.51	2.43	42.93
NO_x	5.23	—	9.14	5.23	14.36
PM_{10}	0.38	135.06	0.45	135.44	135.89
$PM_{2.5}$	0.36	32.66	0.45	33.03	33.48
SO_2	<0.01	—	—	<0.01	<0.01
VOCs	0.43	—	2.96	0.43	3.38
CO_2[d]	27,000	—	5,715	27,000	32,715

[a] Air emissions in this table reflect the peak year for site preparation (2028). Units are tons except for CO_2, which is in metric tons. Estimates assume a work schedule of 10 hours per day and 250 days per year. The underlying data are from the ER (Orano 2026d,f) and AECOM (2025).

[b] Assumes that 590 light-duty gasoline commuter vehicles travel 50 miles per day (round trip), and 18 heavy-duty diesel trucks travel 500 miles per day (round trip).

[c] A dash indicates not applicable or not available.

[d] Although estimates tabulated for the ER (Orano 2026d,f; Tables 4-22 and 4-23) report an annual emission for CO_2 only, the combined contributions of CH_4 and N_2O from heavy equipment and offsite vehicles typically accounts for less than 3 percent and 1 percent of the total CO_2 emissions, respectively.

Site preparation (also referred to as preconstruction) activities would occur during daytime hours under meteorological conditions favorable for air dispersion. In most cases, associated emissions — except for PM — are not 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 the standards at the property boundary and in the immediate surrounding area.[8] 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 site preparation activities, associated emissions would cease. Specific mitigation measures to control fugitive dust would be identified in a dust control plan or similar document prepared

[8] 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 concentrations, particularly of PM. Because construction activities typically begin at 7 a.m., early-morning hours, air quality conditions may be affected by inversion conditions, especially during colder months. To minimize air quality impacts, construction activities with high air emissions would be avoided during inversion periods whenever possible.

prior to project initiation, in accordance with applicable Federal and State permits and regulations.

The estimated emissions presented in Table 3-5 are for 2028, the peak year of site preparation activities. (The Orano ER [2026d,f] and AECOM [2025] generally refer to these as construction activities, which would precede NRC-authorized construction.) Emissions during these site preparation activities would be greater than those during the NRC-authorized construction phase, particularly for PM. Therefore, emissions associated with NRC-authorized construction would account for only a portion of the emissions presented in Table 3-5.

Air emissions from the IKE facility 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 IKE facility would be localized and temporary. Therefore, provided that appropriate mitigation measures are implemented, the NRC staff concludes that impacts on air quality during preconstruction and NRC-authorized construction combined would be SMALL.

Operation. Air emission sources during the operational phase can be divided into four categories: process vents; emergency diesel generators; onsite miscellaneous sources; and motor vehicles. General information used to estimate air emissions for each category is incorporated by reference from the ER (Orano 2026d) and summarized here. The diesel generators represent the primary source of emissions during operation. Other minor sources would be present but would be minimal sources of emissions compared to the generators. Estimated air emissions for criteria air pollutants, VOCs, and CO_2 from onsite diesel generators and offsite vehicles (both commuter vehicles and delivery/shipment trucks) during IKE facility operation are presented in Table 3-6. Note that air emissions in this table represent the peak operational year (2035) and include concurrent construction emissions occurring in that same year.

For offsite vehicle traffic, it is assumed that 980 light-duty gasoline vehicles (590 commuters associated with construction and 390 with operation) and 14 heavy-duty diesel trucks would be used (2 associated with construction and 12 with operation). Throughout this period, the facility would be operated and maintained to withstand severe weather conditions and associated effects, such as temporary loss of power.

Process vents. The IKE facility would be equipped with a gaseous effluent ventilation system (GEVS). Short-term gaseous releases could occur during equipment operation or UF_6 cylinder handling but would be contained within the separations building modules; UF_6 annexes; and blending, sampling and preparation building/technical support building. Such releases would be routed and treated by the GEVS. (Operation is a closed process that does not require routine venting.) Process vents would be equipped with high-efficiency particulate air (HEPA) filters and activated carbon beds to remove more than 99.8 percent of particulates and more than 99 percent of gases (such as HF). Total operational emissions would remain well below PSD and CAA Title V major source thresholds.

Emergency diesel generators. Diesel-fired emergency generators would be used to provide backup power during utility outages. These would be the only planned stationary combustion sources, and they would operate intermittently for testing. The generators would use ultra-low-sulfur diesel (up to 15 ppm sulfur). Air emission estimates for the emergency diesel generators were calculated using emission factors from Subpart IIII of 40 CFR 60 and Section 3.4 of EPA AP-42 (EPA 2025) and conservatively assumed 500 hours of operation per year per unit. Because emergency engines are limited to 100 nonemergency 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 3-6.

Table 3-6 Estimated Air Emissions During Operation from Onsite Standby Diesel Generators and Offsite Vehicles[a]

Pollutant	Diesel Generators[b]	Offsite Vehicles[c]	Total Emissions
CO	7.21	92.68	99.89
NO_x	66.53	11.95	78.48
PM_{10}	0.49	0.79	1.28
$PM_{2.5}$[d]	0.49	0.79	1.28
SO_2	—[e]	—	—
VOCs	1.45	6.51	7.96
CO_2[f]	4,327	9,742	14,069

[a] Air emissions in this table reflect the peak year during which time operation would overlap with construction activities (2035); thus, the estimates include concurrent emissions occurring in that year. Units are tons except for CO_2, which is in metric tons. The underlying data are from the ER (Orano 2026d,f) and AECOM (2025).

[b] This emission category includes four 2,500-kW standby diesel generators for the main facility and two 850-kW diesel generators designated for security and fire pump use. For aggregate emissions calculations, Orano (2026d) assumed that each generator operates for testing purposes 1.6 hours per week, 52 weeks per year. Consistent with EPA guidance, a conservative default of 500 hours per year was applied for emissions estimation. For CO_2 emissions, a conservative heat rate of 10,000 Btu/kW is assumed for diesel generators.

[c] Conservatively assumes no carpooling; 980 light-duty gasoline commuter vehicles (reflecting 590 construction workers and 390 operation workers) travel 50 miles per day (round trip); and 14 heavy-duty diesel trucks (2 site preparation-related and 12 operation-related) travel 500 miles per day.

[d] $PM_{2.5}$ is conservatively assumed to be equal to PM_{10}.

[e] A dash indicates not applicable or not available.

[f] While estimates tabulated for the ER Orano (2026d,f) report an annual emission for CO_2 only, the combined contributions of CH_4 and N_2O from diesel generators and offsite vehicles typically account for less than 1 percent each of the total CO_2 emissions.

Onsite miscellaneous sources. Miscellaneous air emission sources during IKE facility operation would be associated with UF_6 cylinder handling and routine equipment maintenance. Diesel-powered vehicles would be used as needed to transfer UF_6 cylinders between the IKE facility operations buildings and cylinder storage pads. These vehicles would be refueled and maintained onsite, either at designated fueling areas located away from the main operation buildings 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. Worker automobiles and delivery and shipment trucks traveling to and from the IKE site would cause air emissions along roadways. The estimated volume of operation-related passenger vehicle and truck traffic in 2035 (390 commuting vehicles for operation workers and 12 heavy-duty diesel trucks for operational shipments and deliveries) would be lower than the

estimated construction-related traffic during the peak construction year, 2028. As described in the ER (Orano 2026d, Table 4-2; Orano 2026f), facility construction would overlap with operation in the estimated peak traffic year of 2035, with an estimated 590 construction personnel also onsite during their respective workdays per week (Orano 2026d,f; Tables 4-22 and 4-23). Because the facility is expected to operate 365 days per year while site preparation and construction are assumed to occur 250 days per year, the emissions associated with operational traffic would be comparable to (about 3 percent lower than) those associated with peak traffic during site preparation, which are presented in Table 3-5.

Over the planned 40-year operating life of the IKE facility, 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 IKE facility are expected to decrease over time relative to emissions estimated using current emission factors as shown in Table 3-5.

Air quality impacts. Table 3-6 presents estimated air emissions from diesel generators and offsite vehicles (both commuter vehicles and delivery/shipment trucks) during the operational year 2035, including site preparation and construction-related emissions occurring in the same year. Overall emissions of criteria air pollutants and VOCs are relatively small, even under the conservative assumption of extended diesel generator operating hours. As described above, emissions from offsite operational traffic (390 commuter vehicles and 12 heavy-duty trucks per day, 365 days per year) are bounded by the emissions estimated for construction-related vehicles presented in Table 3-5 (590 commuter vehicles and 18 heavy-duty trucks per day, 250 days per year).

The emissions presented in Table 3-6 including operation and construction conservatively represent the estimated air emissions for the peak year during the operational phase. In general, mobile and temporary sources are not subject to permit-related air regulations such as PSD or CAA 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 3-6, 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 the EPA.

As also shown in Table 3-6, operational emissions from the proposed IKE facility would not exceed the PSD threshold of 250 tons/yr for any criteria air pollutant and therefore do not trigger air dispersion modeling. Furthermore, regulatory GHG reporting would not be required (note that direct GHG emissions would remain well below the EPA Greenhouse Gas Reporting Program threshold of 25,000 MT of CO_2e per year previously identified in 40 CFR Part 98).

In summary, the facility's air emissions 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 air emissions are expected to be minimal, IKE facility operation would not significantly alter the existing ambient air quality in the surrounding area. The IKE facility air emissions would be below regulatory thresholds and managed in accordance with permitting requirements. Therefore, the NRC staff concludes that air quality impacts resulting from IKE facility operation would be SMALL.

Decommissioning. Decommissioning, dismantlement, and site restoration activities would involve heavy equipment operations similar to those during site preparation and construction, but on a more limited scale and over a shorter period. Consequently, potential impacts on ambient air quality during decommissioning would be correspondingly lower than those projected for the site preparation and construction phase. Section 4.6.2 of the ER (Orano 2026d) provides further details about air emission sources, types of air pollutants, assumptions used for emission estimates, and resulting emissions inventories. Activities would be conducted using standard industry practices and administrative controls.

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 the site preparation and construction phase, and emissions from mobile equipment are expected to be lower due to anticipated lower-emitting vehicles in the future.

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. Dust suppression and administrative controls would ensure that air quality impacts remain minor. Therefore, with mitigation measures, the NRC staff concludes that air quality impacts during decommissioning would be SMALL.

Reasonably Foreseeable Effects. The construction and operation of nearby facilities, such as the TRISO-X facility, would be conducted in accordance with the same TDEC air quality requirements as for the proposed IKE facility, which would serve to limit emissions from each. Considering the air emissions estimated for the proposed IKE facility together with those from the TRISO-X facility (and other facilities located across the Oak Ridge Turnpike from the IKE site), given their separation distances, the distances to nearby receptor locations (more than a mile from each facility), local topographic features that would influence the potential for overlapping air quality effects, and emission controls that would assure compliance with protective air quality standards, the effect on air quality would be minor.

The DOE remediation of nearby legacy sites, including the White Wing Scrap Yard (DOE 2026e, UCOR 2026a), would be conducted concurrently with site preparation and construction activities for the proposed IKE facility and could extend into facility operation. The remediation activities would contribute minor increases in fugitive dust and vehicle exhaust emissions that would be temporary and localized to the immediate vicinity. The DOE would continue to implement BMPs to minimize air quality impacts and would comply with emission control requirements and air quality standards such that the overall effect on ambient air quality would be minor.

Potential effects associated with GHG emissions could incrementally contribute to climate alterations over the term of the IKE facility license, if issued. Regional climate projections for Tennessee indicate increasing average temperatures, potential changes in precipitation patterns, and increasing drought intensity under warming conditions (NCICS 2025); such alterations might occur during the license period. As described above, potential CO_2 emissions were conservatively estimated for the proposed IKE facility for the peak construction year (2028) and the peak operational year (2035), with the 2035 estimate accounting for concurrent

construction activities during the later phase of construction. Estimated CO_2 emissions during both periods would be minor compared with regional and global GHG emissions.

3.2.3 Mitigation Measures

The measures Orano proposes to mitigate impacts on air quality are set out in Sections 4.6.5 and 5.6 of the ER (Orano 2026d), which are incorporated by reference here. 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. During construction, water and water-extender solutions would be sprayed at least twice daily when needed, and other construction BMPs would be applied to minimize fugitive dust emissions.

During operation, the IKE facility would employ the GEVS, a specially designed ventilation system in which exhaust air passes through HEPA filters to remove PM, followed by activated carbon beds for gas adsorption. Continuous monitoring and alarms would detect off-normal radionuclides or HF in the exhaust system, automatically tripping it to a safe state if operational limits were exceeded. The HVAC system would capture and treat all potentially hazardous gases from room ventilation prior to atmospheric release.

As described in Sections 4.6.5 and 5.6 of the ER (Orano 2026d), Orano is considering a number of mitigation measures to minimize air quality impacts. Orano has committed to the following mitigation measures in the ER (Orano 2026d):

- Post and enforce reduced onsite speed limits (e.g., 15 mph) and apply gravel to unpaved roads to reduce airborne fugitive dust.
- Limit the height and disturbance of stockpiles and apply water to their surfaces.

The NRC staff recommends additional mitigation measures to minimize potential impacts on air quality, supplementary to those to which Orano has committed. Orano is considering several of these additional mitigation measures. The NRC-staff recommended mitigation measures are described below and presented in Table 4-4:

- Use construction and mobile equipment that meets applicable State regulatory emission standards and EPA engine standards, including Tier 4 engines whenever practicable; Tier 3 engines may be used on a case-by-case basis where Tier 4 engines are infeasible.
- Conduct routine maintenance of automobiles, trucks, construction equipment, onsite generators, and portable power units that are routinely present at the site to ensure efficient combustion and minimize emissions in accordance with the State Code of Regulations.
- Cover stockpiled materials with tarpaulins or geotextiles when they are potential sources of windborne fugitive dust.
- Install wind fencing around disturbed areas where fugitive dust could affect areas beyond the IKE site boundary (e.g., nearby residences to the south).
- Stage construction activities, where practicable, to minimize the amount of exposed land at any given time.

- Suspend soil-disturbing activities and travel on unpaved roads during periods of high winds.
- 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.

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. The information is summarized and incorporated by reference from Section 3.3 of the ER (Orano 2026d), which summarizes and incorporates by reference information from the TRISO-X EIS (NRC 2026e, Section 3.4), the environmental assessment for ORETTC, and the early site permit documentation for the Clinch River reactor. The ORETTC facility is about 0.85 mile from the proposed IKE facility location (DOE 2020b), and the Clinch River reactor is about 4.5 miles from the proposed IKE facility location (TVA 2019). Additional information is summarized from recent geotechnical studies (Kiewit 2025a,b).

3.3.1 Affected Environment

3.3.1.1 Regional Geology and Physiography

The IKE site is located within the Valley and Ridge Physiographic Province of East Tennessee. This region is characterized by a series of parallel, narrow, elongated ridges and valleys formed by highly folded and faulted sedimentary rocks that follow a northeast-to-southwest trend. The Valley and Ridge Physiographic Province developed on thick, folded beds of sedimentary rock deposited during the Paleozoic era. The long axes of the folded beds control the shapes and orientations of a series of long, narrow parallel ridges and intervening valleys (ORNL 2006).

3.3.1.2 Stratigraphy

The IKE site lies approximately 1 mile from the TRISO-X fuel fabrication facility site, within the same geologic setting as the ORR. The regional stratigraphy and hydrostratigraphy are described in Section 3.4.1 of the TRISO-X EIS (NRC 2026e), which is incorporated by reference and briefly summarized here. The NRC staff compared that description against the site-specific boring logs for the IKE site and found the regional stratigraphic framework applicable.

Most underlying geologic units in the aquifer are carbonate in composition and are described as limestones or dolomites. Geologic formations include the Knox Group (Kingsport Formation, Mascot Dolomite) and the Chickamauga Supergroup (Pond Springs, Murfreesboro, Ridley, and Lebanon formations), with units progressing from oldest to youngest across the site from northwest to southeast. The upper aquitard comprises the Mississippian/Devonian formations plus the Sequatchie Formation and Reedsville Shale; the lower aquitard comprises Conasauga Group formations, bounded by the Nolichucky Shale above and the Rome Formation below. The aquifer comprises the Chickamauga Supergroup, the Knox Group, and the Maynardsville Limestone; these units are predominantly carbonate.

Based on geotechnical borings conducted at the site (Kiewit 2025a, 2025b) as summarized in the ER (Orano 2026d, Section 3.3.3), the subsurface consists of:

- Residuum/overburden: Stiff to very stiff “fat clay” and “lean clay” resulting from in-situ weathering of the underlying carbonate bedrock. The thickness of this soil layer varies across the site, ranging from approximately 10 to 50 ft. Additional information regarding IKE site soils can be found in the ER Sections 3.3.3.4 and 3.3.3.5 (Orano 2026d), incorporated here by reference.
- Bedrock: The Chickamauga Group and Rome Formation underlie the site. The Chickamauga Group consists primarily of limestone and siltstone, while the Rome Formation contains sandstone, siltstone, and shale.

3.3.1.3 Structure and Seismicity

Structural geology and seismicity overviews for this part of the Valley and Ridge province are described in Section 3.3.1 of the ER (Orano 2026d), which is incorporated by reference and summarized here. The NRC staff reviewed the underlying information from Hatcher et al. (2012) and other sources cited in that ER section and confirmed that they remain applicable.

Numerous major thrust faults are present in the vicinity of the IKE site; these are associated with mountain-building episodes that ended more than 200 million years ago. The Whiteoak Mountain Fault along the north side of Pine Ridge, southeast of the site, is the predominant structure in the vicinity. No thrust fault in the province is known to be active; the last movement was in the Pennsylvanian or Permian period. However, stress stored up at depth in these rocks is periodically released as minor earthquakes.

The IKE site lies in the Eastern Tennessee Seismic Zone, which is the second-most active zone in the eastern United States for small-magnitude ($M < 5$) seismicity (the New Madrid Seismic Zone is the most active). Few recorded events have been as large as magnitude 4.6. Since 1973, 139 earthquakes have been recorded within 62 miles of the IKE site; the highest magnitude (4.7) occurred in 1973 at a location nearly 25 miles southeast of the site.

Information regarding regional and local karst conditions is included in Sections 3.4.1.1.3 and 3.4.1.2.4, respectively, of the TRISO-X EIS (NRC 2026e) and in Section 3.3.2 of the ER (Orano 2026d), which are incorporated by reference and briefly summarized here. In summary, carbonate rocks of the Valley and Ridge province are subject to dissolution that can produce solution voids, cover-collapse sinkholes, and caves, a phenomenon known as karstification.

The TRISO-X EIS documents several surficial evidences of karst conditions at the site and on adjacent sites, including springs, sinkholes, swales, depressions, and intermittent and disappearing streams. The Orano ER, however, notes that IKE site topography does not indicate the presence of karst features. During recent surveys, karst outcrops and a small, unplugged sinkhole were identified near the southeast corner of the planned parking area for the nearby Oak Ridge Emergency Response Training Facility.

Based on existing data, no conclusive evidence of a cave system at the overall SSP-2 parcel (of which the IKE site is a part) has been reported (Orano 2026d, Section 3.3.2). Boring logs produced during geotechnical investigations of the IKE site area identified subgrade features (voids and soil-filled seams) consistent with karst geology. Site-specific information from these investigations concluded that the IKE site has a low risk of sinkhole development (Kiewit 2025a,b).

3.3.1.4 Local Soil Contamination

Adjacent to the IKE facility footprint is the White Wing Scrap Yard, just north of Bear Creek Valley in the north-central area of the ORR. The scrap yard contains residual debris from past operations by DOE's predecessor agencies. From 1949 to 1963, it received out-of-use equipment, scrap, and industrial waste from three nearby ORR facilities: ORNL, Y-12, and K-25 (EPA 1992). The DOE maintains ownership of the scrap yard, and remediation is ongoing.

Past soil sampling at the White Wing Scrap Yard indicated the presence of cesium, radium, and uranium isotopes (DOE 2025b). Larger pieces of scrap were removed from the surface in 1966 and buried at an ORNL waste storage area. The scrap yard was fenced in 1970 and about 6,000 yd^3 of radioactively contaminated soil were removed and dispositioned in another waste management facility on the ORNL site. Miscellaneous small pieces of scrap and debris remained, and further cleanup was conducted in 1992 to remove surface debris (DOE 1992).

Following renewed interest in transferring the property for beneficial use (UCOR 2024, 2025), by late summer 2026, DOE had completed site preparation and field characterization and had deforested 39 acres (the main footprint of the scrap yard) to facilitate subsurface remediation (DOE 2026d,e). DOE also removed additional contaminated soil and debris, including asbestos-containing material, and transported nearly 400 bags of soil to nearby ORR landfills (DOE 2026e, UCOR 2026a). Through completion of the remediation activities at the White Wing Scrap Yard, DOE will continue to implement BMPs to control releases and maintain a rigorous monitoring program to assure health and environmental protection.

The areas of the ORR surrounding the scrap yard, including the IKE site to its west, are unrelated to operation of the scrap yard or to operation of the three facilities from which it received equipment and debris (UCOR 2024, DOE 2025b). These areas were determined to be uncontaminated, as described in the clean parcel determination for SSP-2 (DOE 2025b).

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 3 ft, including topsoil. Soil disturbance could result in both soil loss and impacts on surface water quality. The ER notes erosion control plans and permits would be in place to manage activities resulting in soil disturbance (Orano 2026d, Section 4.3.1.2).

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 project phase is presented below, followed by a summary of mitigation measures. Facility performance related to seismicity is addressed in the parallel safety review being conducted by the NRC staff to inform the licensing decision for the proposed IKE facility.

Site Preparation and Construction. Site preparation would involve excavating, scraping, grading, and compacting soil for purposes including stormwater detention and retention basins, foundations for ancillary buildings, parking areas, the access road, and storage pads. Because there are ridges and steep slopes in some areas of the IKE site, much of the facility footprint would also require cut and fill operations to achieve the final grade. Orano would implement BMPs to control soil erosion, and excavated soil would be used as fill to limit the need for borrowed soil. Orano would conduct geotechnical oversight, implement erosion and sediment controls, and use tailored engineering designs and construction

techniques to account for potential subsurface karst features. Therefore, the NRC staff concludes that impacts of site preparation and construction 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 impacts of facility operation on geology and soils would be SMALL.

Decommissioning. Decommissioning would involve removing building structures and foundations and establishing vegetative cover. BMPs similar to those implemented during site preparation and construction would be followed during this phase. The NRC staff concludes that impacts of facility decommissioning on geology and soils would be SMALL.

3.3.3 Mitigation Measures

Radiological and nonradiological consequences from potential seismic hazards would be evaluated in accordance with 10 CFR Part 70 requirements to ensure that credible high-consequence events would be classified as highly unlikely, or the consequences mitigated; and that credible intermediate consequence events would be classified as unlikely, or the consequences mitigated. Orano has committed to the following BMPs to minimize impacts on soils (Orano 2026d):

- Following completion of facility construction, grade and stabilize the temporary construction laydown/parking area as needed.
- Test soil prior to disturbance.
- Suppress dust, as discussed in Section 3.2.3.
- Develop a worker health and safety plan.
- Stabilize disturbed soil within 14 days.
- Use lined stormwater systems.

The NRC staff recommends the following mitigation measures to minimize potential impacts on soils, supplementary to those to which Orano has already committed:

- Inspect outgoing trucks and remove any loose soils from truck bed edges.
- Install a truck washing station onsite to remove soils from truck tires.
- Place gravel construction pads at the entrances/exits of construction areas.
- Decontaminate vehicles prior to demobilization.

3.4 WATER RESOURCES

This section provides an overview of existing water resource conditions at the IKE site, including groundwater, surface water, and water use. It also describes potential impacts on water resources from the proposed action. Wetlands are discussed in Section 3.5.

3.4.1 Affected Environment

3.4.1.1 Groundwater

The information in this section is incorporated by reference and summarized here from Section 3.4.1 of the ER (Orano 2026d). The IKE site is located in the Ridge and Valley Physiographic Province of East Tennessee. Unlike the thick unconsolidated sediments of the Mississippi Embayment, this region's hydrogeology is characterized by fractured bedrock and thin overlying residuum. The principal hydrogeologic units at the site consist of the Chickamauga Group and the Rome Formation. Groundwater occurs primarily within a fractured "water-bearing zone" in the upper portion of the bedrock and within the lower portions of the clay-rich residuum. In this region, groundwater generally follows the topography, flowing from the ridges toward the valley floors.

The site lies at the southwestern terminus of the East Fork Ridge and east of McKinney Ridge. An unnamed ridge runs through the southeast corner of the IKE site and serves as a groundwater divide between SSP-2 and the White Wing Scrap Yard. It also serves as the watershed boundary between the Bear Creek and Poplar Creek watersheds (Orano 2026d, Section 3.4.1.2).

As described in Section 3.4.1 of the ER (Orano 2026d), groundwater at the site is near the surface in low-lying areas, while the water table is 49 to 164 ft below the ground surface near topographic highs, including along ridgetops. Modeling suggests that 95 percent of the groundwater flow at the site occurs in the upper 49 to 98 ft of the saturated zone in the ORR aquitards, resulting in relatively short flow paths in the active-flow zones. Nearly all groundwater in the site area discharges to surface water drainages in the ORR; groundwater in the site area is likely expressed at the surface through seeps and springs.

The water table beneath the ORR generally mimics the topography; the primary flow direction of groundwater in the bedrock is along the geological strike (DOE 2020b). Available data indicate that shallow groundwater generally flows west-southwest (DOE 2020b), away from the East Fork Ridge to the northwest and southwest, as well as northwest down the unnamed ridge toward drainage swales, and then west toward East Fork Poplar Creek. Further details regarding hydrogeology at the IKE site are provided in the ER (Orano 2026d).

Kiewit (2025b) presents information from a site investigation that included 27 soil borings, of which only one encountered groundwater, at a depth of 20 ft. Because the boreholes were made during the wet winter season, groundwater levels would generally be expected to be lower at other times of year. These boreholes were nearly 15 to 90 ft deep, with bottom elevations ranging from 735 to 793 ft above mean sea level and therefore well below the planned building grade of 825 ft above mean sea level (Orano 2026d). In early 2026, 13 monitoring wells were installed at the site (Orano 2026d). No long-term data on groundwater level fluctuations are available because the monitoring network is new.

Groundwater at the ORR is extensively monitored by the DOE (Orano 2026d, Section 3.4.1.1) as described in annual site environmental reports, the most recent of which contains the results of 2024 sampling (DOE 2025c). An environmental baseline survey report was prepared as part of the clean parcel determination for SSP-2. The report concluded that the parcel was uncontaminated and would not pose a threat to human health or the environment; EPA and TDEC concurred with this conclusion (DOE 2025a,b). The potential impacts of the White Wing Scrap Yard and its two southward-draining tributaries (ET3 and ET4) were considered in

making the clean parcel determination for SSP-2. The interpretation of generalized groundwater flow maps indicates that groundwater flows away from the scrap yard toward the southwest, with part of the flow paths intersecting with seeps and springs in the two tributaries.

Baseline monitoring of the SSP-2 indicates that groundwater quality beneath the broad parcel is generally good (DOE 2025b). No groundwater would be withdrawn for the IKE project; only municipal water would be used (see Section 3.4.2 of this EIS). The most recent annual site environmental report for the ORR (DOE 2025c) provides an overview of remediation activities and groundwater monitoring at DOE legacy waste sites on the ORR, including at the Y-12 complex, ETTP (formerly K-25 plant), Bear Creek Burial Grounds, and White Wing Scrap Yard. The IKE site is topographically and hydraulically upgradient of DOE legacy contamination plumes associated with the former K-25 plant and Bear Creek Burial Grounds. Groundwater from the Y-12 complex is in a separate hydrogeological regime from the IKE site (Elvado 2020). Therefore, contaminant migration from those three legacy sites would not impact the IKE facility.

Earlier studies of groundwater at the White Wing Scrap Yard reported elevated levels of chromium, cadmium, and some VOCs (Osborne and Kuhaida 1996, DOE 2025b). Although the scrap yard and its buffer area lie just east of the facility footprint, the groundwater flow paths are strongly controlled by localized ridge and valley topography. The scrap yard sits on the west edge of East Fork Ridge, which separates its local hydraulic gradient from the IKE facility footprint. Groundwater beneath the ORR moves via shallow stormflow and fractured bedrock zones. In the vicinity of the IKE site, it follows local flow paths that move laterally and discharge into local streams (two tributaries) rather than moving across the gradient into adjacent parcels (Osborne and Kuhaida 1996, DOE 2025b).

3.4.1.2 Surface Water

The IKE site area lies within the Hydrologic Unit Code (HUC) 12 sub-watershed (HUC 060102070302) of the Tennessee Region drainage basin (NRC 2026e). The drainage basin for the East Fork Poplar Creek is nearly 20 square miles and includes a large portion of the City of Oak Ridge (NRC 2026e). Several intermittent streams in the vicinity join an artificial waterway, the East Fork Poplar Creek, to the northwest (Orano 2026d). East Fork Poplar Creek flows to Poplar Creek west of the IKE site, which joins the Clinch River and ultimately the Tennessee River to the southwest (USGS 2026b).

The proposed IKE site is situated on a local drainage divide. Surface water runoff from the southern portion of the site drains toward Bear Creek and that from the northern and eastern portions drains toward East Fork Poplar Creek. Both creeks are tributaries of the Clinch River.

Sections of Bear Creek and East Fork Poplar Creek are listed as “impaired” on the Tennessee 303(d) list as a result of past operations by DOE’s predecessor agencies. Bear Creek is impaired due to legacy releases of nitrates and radionuclides, while East Fork Poplar Creek is impaired primarily due to mercury and polychlorinated biphenyl compounds from historical operations at the Y-12 Complex. However, the SSP-2 parcel itself was determined to be uncontaminated (DOE 2025b). The DOE maintains ownership of the impacted segments and regularly monitors the surface water as part of its environmental management program, summarized in annual site environmental reports (DOE 2025c).

Like the groundwater flow, surface water flow around the IKE site follows the local topography. Because of their geographical and topographical settings, surface water contamination at DOE

legacy sites, including the White Wing Scrap Yard, would not impact the IKE facility footprint. During a 2013 environmental baseline survey, low concentrations of uranium-233/234 and uranium-238 (less than 5 picocuries per liter [pCi/L]) were detected in surface water at East Fork Ridge and attributed to the White Wing Scrap Yard. According to DOE (2025b), the presence of these isotopes (with uranium-234 and uranium-238 at levels above natural background) was most likely associated with groundwater originating from the scrap yard and surfacing in an adjacent seep. However, no seepage was detected in 2024 at that location, even after rain events. Like groundwater, surface water from the scrap yard to the IKE site follows localized ridge and valley topography; it flows to ET3 and ET4 drainages and then into Bear Creek. Therefore, the potential for migration of contaminants from the scrap yard to the IKE facility footprint is low (DOE 2025b).

The DOE is actively remediating the White Wing Scrap Yard and recently completed a removal action that involved excavating soil and debris from the northern portion of that site. Further information is provided in the annual site environmental report (DOE 2025c), DOE's letter to EPA and TDEC regarding the removal action (DOE 2025f), and web articles describing the remediation and summarizing 2026 cleanup progress (DOE 2026d,e; UCOR 2026a), each of which is incorporated here by reference. No surface water discharges are associated with that removal activity (DOE 2026f).

The IKE site is not located within a 100- or 500-year flood hazard area, and its topography ensures that the facility footprint is well-drained and protected from regional flooding events. Wetlands, including jurisdictional and non-jurisdictional intermittent and ephemeral streams, are discussed in Sections 1.6 and 3.5 of this EIS, including coordination with the USACE.

3.4.2 Potential Impacts

This section describes potential environmental impacts on water resources associated with each of the project phases. Impacts on streams, wetlands, wet-weather conveyances, and drainage areas are covered in Section 3.5.2 of this EIS. The NRC staff identified four NR GEIS Category 1 issues related to water resources during construction and operation that are relevant to the review of the Orano license application (see Tables 3-1 and C-1 of this EIS).

The NRC staff incorporates the technical analyses in the NR GEIS to conclude that during both construction and operation phases, there would be SMALL impacts from water use conflicts from plant municipal water demand and from degradation of water quality from plant effluent discharges to municipal systems. 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. Water used during site preparation and construction would be supplied by the City of Oak Ridge. As described in Section 4.4.3.2 of the ER (Orano 2026d), this system has an excess water supply of 6 million gallons per day (gpd), which corresponds to 4,167 gallons per minute (gpm). Site preparation and construction activities would require an estimated 12.2 million gallons per year, which is a small fraction of the available capacity.

Sanitary wastewater and uncontaminated effluent generated during the site preparation and construction phase would be sent to the City of Oak Ridge Rarity Ridge treatment plant, which has an excess sewer capacity of 300,000 gpd (nearly 110 million gallons per year). Orano estimates that the proposed IKE facility would discharge about 13,700 gpd (5 million gallons

per year) of sanitary wastewater and 43 gpd (less than 0.016 million gallons per year) of uncontaminated effluent to the municipal system. The capacity of the treatment plant far exceeds these amounts.

Orano is developing, but has not yet submitted, a Tennessee National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit from TDEC's Water Division. It would comply with the permit conditions and requirements during site preparation and construction.

The City of Oak Ridge (2019) has established guidelines for stormwater management that include a requirement for a stormwater management plan to minimize soil erosion and protect downgradient areas from the effects of increased stormwater runoff, including from disturbed land. (The city requires a land disturbance permit prior to construction, grading, filling, and similar activities.) The stormwater management plan would include a stormwater pollution prevention plan (SWPPP), an erosion prevention and sediment control plan, and ultimately a permanent stormwater management plan. The SWPPP identifies activities that might cause pollutants in stormwater and describes practices to control them. The erosion prevention and sediment control plan is a plan for minimizing erosion during construction activities. The permanent plan describes the methods for ongoing management of stormwater, including drainage structures, conduits, ponds, ditches, storm sewers, and any other features that collect, transport, pump, treat, or dispose of stormwater. Orano would implement BMPs such as silt fences, sediment traps, and temporary seeding to minimize turbidity in Bear Creek and East Fork Poplar Creek. Therefore, the NRC staff concludes that impacts of site preparation and construction on water resources would be SMALL.

Operation. Water used for facility operation would be supplied by the City of Oak Ridge. Because gas centrifuge enrichment is mainly a dry, mechanical process, most of the water would be used for building cooling systems and office functions such as restrooms and drinking water (Orano 2026i). As described in Section 4.4.3.2 of the ER (Orano 2026d), facility operation would use about 440,000 gallons per month (nearly 5.3 million gallons a year). This amount is well within the capacity of the city's municipal water system.

Like for site preparation and construction, sanitary wastewater and uncontaminated effluent generated during facility operation would be sent to the city's Rarity Ridge wastewater treatment plant (Orano 2026d, Section 4.5.1.2.2). As described in Section 4.4.3.2 of the ER, the municipal wastewater treatment plant has an excess capacity of 300,000 gpd (nearly 110 million gallons per year). The proposed IKE facility would discharge about 13,700 gpd (5 million gallons per year) of sanitary wastewater and 43 gpd (less than 0.016 million gallons per year) of uncontaminated effluent to the municipal system. These amounts are well within the capacity of the treatment plant. Consequently, the impact on municipal water resources would be SMALL.

Groundwater quality is not expected to be affected by facility operation. The use of double-lined basins for potentially contaminated stormwater and the low permeability of the site's clayey soils act as a natural barrier to infiltration. Orano would implement an operational groundwater monitoring program to ensure early detection of any leaks.

Stormwater from the cylinder storage pads would be collected in lined retention basins, sampled for uranium and fluorides, and treated if necessary to meet discharge limits before release. All process effluents containing radiological materials would be treated, evaporated, or

recycled onsite. Based on this information, the NRC staff concludes that impacts on water resources during facility operation would be SMALL.

Decommissioning. During decommissioning, all structures and roads would be removed, and the site would be regraded. Stormwater would continue to flow into retention basins. Erosion-control BMPs and SPCC and SWPPP measures similar to those applied during site preparation and construction would be followed during this phase. Vegetative cover would be established. Water use during decommissioning is expected to be similar to or less than during the operational phase. Therefore, the NRC staff concludes that impacts on water resources during decommissioning would be SMALL.

3.4.3 Mitigation Measures

Mitigation measures generally apply to both soil erosion control and to maintaining surface water quality. The NRC staff anticipates that BMPs would include the use of grass swales in addition to retention basins to reduce peak flow of stormwater and to trap sediments and reduce surface water turbidity. Landscape management relying on herbicides and pesticides would also follow BMPs to reduce the potential impact on surface water quality.

Mitigation measures to which Orano has committed consist of following BMPs, including those in the SWPPP and SPCC plans (Orano 2026d). In addition, radiological monitoring would be conducted to evaluate stormwater runoff from UF_6 storage pads and process wastewater to inform decision making regarding the storage, treatment, or release of effluent.

Groundwater quality impacts are expected to be minimal because of lined retention ponds and general BMPs. Orano has committed to the following mitigation measures to further minimize impacts on groundwater (Orano 2026d):

- Establish proper engineering and design controls.
- Develop a SPCC plan under the NPDES permits for both the construction and operational phases.
- Contain concrete washout.
- Implement a groundwater monitoring program.

Impacts on surface water would be minimized by the following measures (Orano 2026d):

- Adherence to stormwater discharge permits for construction obtained from TDEC and the City of Oak Ridge, including implementation of any special requirements.
- Implementation of stormwater controls comprehensively described in a SWPPP that are modified and updated throughout the changing conditions of construction.

Groundwater monitoring and release-response measures of the type applicable to a licensed facility on the ORR are described in Section 3.4.3 of the TRISO-X EIS (NRC 2026e), which is incorporated by reference here. The NRC staff evaluated the applicability of these measures to the proposed IKE facility and determined that equivalent measures would be appropriate.

Independent of suggested mitigation measures, the NRC would require an emergency plan setting out protocols for handling an emergency at the facility. If a release were identified, groundwater wells would be sampled and results compared against ambient data, and the

process facility would incorporate internal containment measures limiting the potential for stored chemicals to reach soils, surface water, groundwater, and wetlands.

The NRC staff recommends additional mitigation measures (see Table 4-4) to further minimize potential impacts on water resources, supplementary to those to which Orano has already committed. These measures are summarized below:

- Limit cut/fill slopes to a horizontal-to-vertical ratio of 3:1 or less.
- Suspend general construction activities during storms and impending precipitation.
- As indicated, construct any stream crossings (i.e., install culverts) following at least 48 hours of dry weather, and divert stream flow during stream-crossing construction to minimize excavation in flowing water.
- Use low-water-consumption landscaping.
- Install low-flow toilets, sinks, and showers, and perform localized floor washing using mops and self-contained cleaning machines to reduce water usage compared to conventional washing techniques.

3.5 ECOLOGICAL RESOURCES

This section summarizes the ecological resources at the proposed IKE site and in the surrounding area, including terrestrial and aquatic resources and threatened and endangered species. It also summarizes the potential environmental impacts on these resources from the proposed action. This overview is incorporated by reference from Sections 3.5, 4.5, and 5.5 of the ER (Orano 2026d) and summarized here.

3.5.1 Affected Environment

Historically, the region was dominated by oak–hickory and mixed-mesophytic forests. The project area is situated within the ORR, a large contiguous block of forested land managed by the DOE, which has served as a de facto wildlife refuge since the 1940s.

To characterize the habitat and biota at the IKE site and surrounding areas, wildlife and habitat surveys were conducted between 2020 and 2025 at the ORR, including at the 624-acre SSP-2 parcel, the 81-acre ORETTC site, and the 110-acre TRISO-X site, approximately 1 mile from the IKE site (Orano 2026d).

3.5.1.1 Biotic Communities

Information presented in the ER (Orano 2026d, Section 3.5.2.1) is incorporated by reference and summarized here. The ORR is mostly contiguous native eastern deciduous oak-hickory (Quercus-Carya spp.) hardwood forest. Other forest cover types include hemlock (*Tsuga canadensis*), white pine (*Pinus strobus*), and bottomland hardwood forests. The proposed IKE facility itself would occupy about 188 acres on the western side of the approximately 624-acre SSP-2 land parcel. Most of the site is comprised of a dense forest of hardwood trees mixed with dense underbrush, with gravel access roads that were constructed by DOE during past ORR activities.

Field surveys conducted of the 624-acre parcel in 2025 identified several major biotic communities, mostly upland deciduous forest, mixed coniferous-deciduous forest, and localized

successional scrub shrub. Typical trees within the forest and upland ridges included oaks (*Quercus* spp.), maples (*Acer* spp.), loblolly pine (*Pinus taeda*), hickories (*Carya* spp.), American beech (*Fagus grandifolia*), sweetgum (*Liquidambar styraciflua*), eastern red cedar (*Juniperus virginiana*), black cherry (*Prunus serotina*), dogwood (*Cornus* spp.), and elms (*Ulmus* spp.). Trees along the drainages and lowlands include sycamore (*Platanus occidentalis*) and black willow (*Salix nigra*). Understory shrubs include tree saplings of the previously mentioned species, privet (*Ligustrum* spp.), honeysuckle (*Lonicera* spp.), spicebush (*Lindera benzoin*), coralberry (*Symphoricarpos orbiculatus*), and silky dogwood (*Cornus amomum*).

3.5.1.2 Terrestrial Wildlife

The ORR provides wildlife habitat in the form of forested land, areas of undisturbed wetlands, open waterways, and riparian vegetation, and several hundred acres of grassland communities and fallow fields. Wildlife surveys of the ORR, including at the 110-acre TRISO-X site, provide information on wildlife that may occur at the SSP-2 property; surveys are described in the ER (Orano 2026d). Mammals such as white-tailed deer (*Odocoileus virginianus*), bobcat (*Lynx rufus*), coyotes (*Canis latrans*), gray foxes (*Urocyon cinereoargenteus*), raccoons (*Procyon lotor*), and several bat species have been documented in the vicinity and may occur in forested areas of the IKE site.

Abundant and common bird species observed at the TRISO-X site and that are potentially present at the SSP-2 property include the American crow (*Corvus brachyrhynchos*), blue jay (*Cyanocitta cristata*), white-eyed vireo (*Vireo griseus*), downy woodpecker (*Dryobates pubescens*), tufted titmouse (*Baeolophus bicolor*), northern cardinal (*Cardinalis cardinalis*), Carolina chickadee (*Poecile carolinensis*), American goldfinch (*Spinus tristis*), Carolina wren (*Thryothorus ludovicianus*), common yellowthroat (*Geothlypis trichas*), yellow-breasted chat (*Icteria virens*), and field sparrow (*Spizella pusilla*). Wild turkey (*Meleagris gallopavo*) and mourning dove (*Zenaida macroura*) are recreationally valuable bird species likely to occur in the study area. Migratory birds protected by the Migratory Bird Treaty Act are described in the ER (Orano 2026d, Section 3.5). While the bald eagle (*Haliaeetus leucocephalus*) is known to forage and nest along the nearby Clinch River, no nests are currently recorded within the project area footprint.

Several reptile and amphibian species observed in the area around the SSP-2 property could potentially be found in the proposed IKE project area including multiple frog species, red-spotted newt (*Notophthalmus viridescens*), and northern dusky salamander (*Desmognathus fuscus*). Herpetofauna expected to occur within the herbaceous and forested upland areas of the study area include eastern box turtle (*Terrapene carolina carolina*), eastern American toad (*Anaxyrus americanus*), northern fence lizard (*Sceloporus undulatus*), common five-lined skink (*Plestiodon fasciatus*), and several species of snakes.

Travel corridors are passageways used by species to access various foraging, nesting, and breeding habitats. The animals likely take advantage of connected forested parcels and human-induced corridors, such as wet weather conveyances and other riparian areas, fence lines, edge habitat, road corridors, and utility corridors. Mobile animals use travel corridors across various biotic communities located on the ORR and adjacent areas.

3.5.1.3 Aquatic Communities

Aquatic habitat at the IKE site consists primarily of headwater and first-order tributaries that drain toward Bear Creek and East Fork Poplar Creek. Field surveys from February 2025 identified 28 streams/relatively permanent waters at the site. These 28 streams totaled 15,243 linear ft or 2.88 miles in length. They range from approximately 1 to 5 ft wide, and have depths up to 1 ft and silt/cobble bottoms. The riparian zones are generally wooded with a diversity of trees and shrubs.

Forty-two wet-weather conveyances/non-relatively permanent waters were identified and are typically headwater ephemeral channels located within the forested valleys throughout the site. These 42 features totaled 16,042 linear ft (or 3.04 miles in length), range from 1 to 5 ft wide, and generally have silt/gravel substrates with a few instances of cobble. The riparian zones are generally wooded. USACE and TDEC jurisdictional streams and wet weather conveyances with relative reach are listed in Table 3-6 of the ER (Orano 2026d).

Several fish species are known to inhabit streams in and around the ORR. One fish species, the spotfin chub (*Erimonax monachus*), which is listed as threatened by both the State and the Federal government, has been sighted and collected in the City of Oak Ridge and may be present on the ORR.

3.5.1.4 Wetlands

Surveys from September 2025 on the SSP-2 parcel identified 17 wetlands on the site totaling 3.86 acres (Orano 2026d, Section 3.5.3). These are primarily palustrine forested and palustrine emergent wetlands associated with seepages and low-lying areas along stream segments (Orano 2026d). Vegetation is comprised of obligate, facultative, and facultative wetland tree and shrub species, including sycamore, sweetgum, hackberry (*Celtis occidentalis*), red maple, spicebush, and alder (*Alnus serrulata*). Herbaceous species consist primarily of soft rush (*Juncus effusus*), Japanese stiltgrass (*Microstegium vimineum*), sedges (*Carex* spp.), giant cane (*Arundinaria gigantea*), and Japanese honeysuckle (*Lonicera japonica*).

All wetlands but three are connected to relatively permanent waters downstream and are considered jurisdictional waters of the United States under Section 404 of the CWA and jurisdictional waters of the State under Section 401 for the State of Tennessee. Three are isolated features that lack a connection to a relatively permanent water; therefore, they would likely not be considered waters of the United States. However, isolated wetlands are typically regulated by TDEC and considered waters of the State. Wetland areas, both onsite and adjacent to the site (in the larger SSP-2 parcel), have the potential to be a habitat for both Federally listed (endangered) and State-listed (threatened) species of orchids. Further discussion of endangered plant species is presented in Section 3.5.1.6.

3.5.1.5 Important Ecological Systems

Important ecological systems are areas that are especially vulnerable to change or that contain important species habitats, such as breeding areas (e.g., nesting areas), nursery areas, feeding areas, resting areas, wintering areas, or other areas of seasonally high concentrations of individuals of important species. Important ecological areas may include national or State forests, wilderness areas, scenic areas, nature preserves, wildlife management areas, Nationwide Rivers Inventory streams, and wild and scenic rivers.

The ORNL Natural Resources Management program maintains a list of special habitats within the ORR that are collectively termed Sensitive Areas. Sensitive Areas are those containing State or Federally listed species, ecologically significant habitat, and/or particular management requirements. Sensitive Areas on the ORR and other ecologically important areas in the vicinity of SSP-2 sites are shown in Figure 3-38 of the ER (Orano 2026d).

The ORR was designated as an Important Bird Area by the National Audubon Society in 2022. In addition, DOE and the State designated almost 3,000 acres of ORR land as the Black Oak Ridge Conservation Easement, which contains the largest block of unfragmented forest on the ORR. The Poplar Creek Cliffs (NA20) Natural Area (NA), the East Fork Limestone Quarry/Blackoak Ridge Limestone Quarry/Blackoak Ridge Forest (NA46), the East Fork (Poplar Creek) Floodplain (NA47), and Habitat Area (HA) HA4 are four designated areas on the ORR within 0.5 mile of SSP-2. Habitats for protected species of bats, fish, and plants are also found in the ORR and are discussed in Section 3.5.1.6 of this EIS.

3.5.1.6 Federally Protected Ecological Resources

Action area. The implementing regulations for Section 7(a)(2) of the ESA define "action area" as all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area effectively bounds the analysis of Federally listed species and critical habitats because only species and habitats that occur within the action area may be affected by the Federal action. Section 4 of the biological assessment prepared to support formal ESA consultation with the FWS for the proposed IKE facility describes the ESA action area in detail (Orano 2026h). That discussion is incorporated by reference here. The action area encompasses approximately 624 acres of the SSP-2 property within the ORR in Roane County, Tennessee, including Tracts 1A and 1B, and the immediately surrounding lands that could be affected by the proposed action. The proposed facility would occupy only part of SSP-2, specifically 188 acres in the southwestern portion of the property. Surrounding land uses are predominantly forested, with industrial, residential, and previously disturbed areas occurring in the vicinity. The action area includes locations where construction, site development, access, and associated changes to terrestrial and aquatic habitats could potentially result in direct or indirect effects on Federally listed species and designated critical habitat.

Federally listed and proposed species and critical habitats. Sections 5, 6, and 7 of the biological assessment (Orano 2026h) discuss Federally listed and proposed species and critical habitats that may occur in the action area. That discussion is incorporated herein by reference; Table 3-7 summarizes occurrences of Federally listed and proposed species. No critical habitats occur in the action area.

3.5.2 Potential Impacts

This section describes potential impacts on ecological resources for each project phase. The NRC staff identified NR GEIS issues related to terrestrial and aquatic ecology during the construction and operation phases that are relevant to the review of the Orano license application (see Tables 3-1 and C-1 of this EIS). The NRC staff incorporates the technical analyses in the NR GEIS to conclude that construction and operation impacts would be SMALL for 14 issues identified in the NR GEIS — 7 for terrestrial ecology and 7 for aquatic ecology:

- Terrestrial ecology during the construction phase: important species and habitats — other important species and habitats.

- Terrestrial ecology during the operation phase: permanent and temporary loss or disturbance of habitats, exposure of terrestrial organisms to radionuclides, water use conflicts with terrestrial resources, effects of transmission line ROW management on terrestrial resources, effects of electromagnetic fields on flora and fauna, and important species and habitats — other important species and habitats.
- Aquatic ecology during the construction phase: runoff and sedimentation from construction areas; building transmission lines, pipelines, and access roads across surface waterbodies; and important species and habitats — other important species and habitats.
- Aquatic ecology during the operation phase: stormwater runoff, exposure of aquatic organisms to radionuclides, impacts of transmission line ROW management on aquatic resources, and important species and habitats — other important species and habitats.

Justification for these SMALL conclusions is shown in Table C-1. 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.

Table 3-7 Occurrences of Federally Listed and Proposed Species in the Action Area for the Proposed IKE Facility

Species	Federal Status[a]	Potential to Occur in Action Area	General Habitat Description and Range
Mammals			
Gray bat (*Myotis grisescens*)	FE	Yes	Inhabits caves year-round, but may sometimes use man-made tunnels as summer quarters. Forages within 12 miles from summer roost, generally over water or in adjacent riparian areas.
Indiana bat (*Myotis sodalis*)	FE	Yes	Females deliver their young in hollow trees or beneath tree bark of both live and dead trees. Forages in a wide variety of habitats, especially near water. Overwinters in limestone caves.
Northern long-eared bat (*Myotis septentrionalis*)	FE	Yes	Roosts primarily under tree bark of both live and dead trees. Small maternity colonies also form in trees. Forages in the forest. Overwinters in caves and mines.
Tricolored bat (*Perimyotis subflavus*)	FPE	Yes	During winter, hibernates in caves, abandoned mines, and small to large abandoned tunnels. In the southern United States, may hibernate in road-associated culverts. During spring, summer, and fall, roosts primarily among leaf clusters of live or recently dead deciduous hardwood trees.
Birds			
Whooping crane (*Grus americana*)	EXPN	Yes, but outside known distributional range of the species and no habitat present in action area	Breeds in freshwater marshes and prairies. Uses grain fields, shallow lakes and lagoons, and saltwater marshes on migration and in winter.

Species	Federal Status[a]	Potential to Occur in Action Area	General Habitat Description and Range
Fish			
Spotfin chub (*Erimonax monachus*)	FT	Yes, but no habitat present in action area	Adults are found in relatively low-silt substrates in good flows. Subadults appear more commonly on sand and small gravel.
Insects			
Monarch butterfly (*Danaus plexippus*)	FPT	Yes, but no habitat present in action area	Ranges over large areas of various habitat types. Proximity to surface water, elevation, and vegetative cover are the most important criteria for roost site selection. Overwinters in Mexico, then disperses across eastern North America during March to August. During September to December, returns south using two flyways: one that spans the central United States and another that follows the Atlantic coast.
Plants			
Virginia spiraea (*Spiraea virginiana*)	FT	Yes, but outside known distributional range of the species	Found along scoured banks of high gradient streams or on meander scrolls, point bars, natural levees, and braided features of lower stream reaches.
White fringeless orchid (*Platanthera integrilabia*)	FT	Yes	Found in wet, boggy areas near stream heads and sloping areas kept moist by groundwater seeps. Often associated with Sphagnum in partial shade.

[a] Indicates protection status under the ESA. EXPN = experimental population, non-essential; FE = Federally endangered; FPE = proposed for Federal listing as endangered; FPT = proposed for Federal listing as threatened; FT = Federally threatened.

Potential impacts associated with each of the project phases are incorporated by reference from the ER (Orano 2026d, Section 4.5) and subsequent documentation (pursuant to ESA consultation). The NRC does not have regulatory authority over impacts that are not within the definition of construction in 10 CFR 70.4. NRC-authorized construction is defined 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 that are related to radiological safety or security. Therefore, impacts from site preparation, including erection of fences and other access control measures not related to radiological materials, excavation, building of an access road, erection of support buildings, and building of service facilities are separated from impacts related to NRC- authorized construction activities. For impacts that are greater than SMALL (adverse), the EIS breaks out the impact contribution from the construction that would be authorized by the NRC license, if issued.

Site Preparation and Construction. The primary ecological impacts would be from site preparation activities, including the construction of access roads, parking areas, and landscaping (Orano 2026d). The total area of land to be directly disturbed by site preparation and construction is conservatively assumed to be 188 of the 624 acres at the site. The total area of impact represents approximately 30 percent of the overall site and 0.9 percent of the broader ORR:

- *Impacts on biotic communities:* Activities would entail vegetation removal (including forested habitat), excavation, placement of fill soil, grading, and other land disturbing activities in the development footprint. Clearing 188 acres as part of site preparation would result in MODERATE impacts on biotic communities. While the ORR has vast forested tracts, the loss of this specific interior forest block would fragment existing forested habitat and create an "edge effect" that alters habitat conditions, such as moisture regime and light penetration, and might potentially increase the establishment of invasive species like privet or honeysuckle. The MODERATE impacts are attributable to site preparation activities that are not within the NRC definition of "construction." The NRC staff concludes that impacts of NRC-authorized construction activities on biotic communities would be SMALL.
- *Impacts on wildlife:* Wildlife impacts would result from loss of habitat due to site preparation and construction activities, as well as noise, vehicle collisions with wildlife, and artificial lighting when after-sunset work is necessary. For some species, these stressors could result in physiological stress, behavioral impacts, and reduced use of nearby onsite and offsite habitat. Most of the IKE site would remain suitable for use by wildlife (Orano 2026d). During site preparation and construction activities, most mobile wildlife would avoid the facility area and move to other locations within the 33,000-acre ORR. Fencing of the facility area is not expected to cause significant disruption to wildlife travel corridors, because those would be available on most of the IKE site and across the much larger ORR. Vehicle collisions might primarily affect deer, but impacts are expected to be minor. Activity durations would vary, noise levels would decrease with distance from the equipment, and noise impacts would be variable and temporary. For these reasons, the NRC staff concludes that impacts of lighting, noise, and vehicle collision on wildlife would be SMALL. Impacts on wildlife due to the loss of nesting and foraging habitat, and habitat fragmentation (i.e., loss of contiguous habitat) due to up to 188 acres of tree clearing and surface grading would be MODERATE. The MODERATE impact would be due to site preparation activities that are not within the NRC definition of construction. The NRC staff concludes that impacts of NRC-authorized construction activities on wildlife would be SMALL.
- *Impacts on aquatic habitat and biota:* Aquatic habitat and communities could be affected by vegetation removal, excavation, placement of fill soil, grading, and other land-disturbing activities in the development footprint during site preparation. These activities could result in the alteration of drainage areas and wetlands present on the site, including placement of fill on one wet-weather conveyance and three streams. The wet-weather conveyance, two streams (numbers 11 and 12), and portions of the eastern section of the third stream (number 9) located in the proposed excavation area would be eliminated as part of site preparation activities. Per the development plan for the IKE site, Orano proposes to capture the flow of the eastern section of stream 9, including flow from three other streams to the east, and allow it to continue to flow toward East Fork Poplar Creek along the northern side of the facility footprint. The footprint avoids major perennial streams, and erosion control measures and other BMPs would be used to minimize impacts on aquatic habitat and biota. These impacts would result from site preparation activities that are not within the NRC definition of construction. Furthermore, site surveys determined that no fish were present in streams 9 and 12 (Orano 2026d), and the ESA consultation determined that the spotfin chub was not present in the action area, nor does suitable habitat exist (FWS 2026a). Therefore, the NRC staff concludes that the impacts of site preparation and construction on aquatic habitat and biota would be SMALL.

- *Wetlands:* Site preparation activities would include the placement of fill on four small wetlands totaling 0.48 acre (Orano 2026d). Two wetlands, WTL-I (0.12 acre) and WTL-K (0.03 acres), are jurisdictional. The other two impacted wetlands, WTL-G (0.01 acre) and WTL-J (0.32 acre), are non-jurisdictional. The loss of these small wetlands would result from site preparation activities that are not within the NRC definition of construction. Less than 0.5 acre of wetlands would be impacted, and indirect impacts would be minimized with implementation of sediment and erosion control measures and other BMPs. Furthermore, Orano has implemented the USACE recommendation to purchase licensed stream bank credits to mitigate wetlands impacts (Orano 2026i). Therefore, the NRC staff concludes that the impacts of site preparation and construction on wetlands would be SMALL.

  The NRC staff concludes that overall impacts of site preparation and construction on ecological resources would range from SMALL to MODERATE, and the impacts of NRC-authorized construction would be SMALL.

Operation. Potential impacts on biotic communities, wildlife, and aquatic communities during facility operation are summarized below based on information in the ER (Orano 2026d):

- *Impacts on biotic communities.* Operation would not directly impact additional biotic communities beyond those affected during the site preparation and construction phase. Vegetation maintenance activities on the site (including transmission line maintenance by TVA) would be performed periodically, and herbicides would be applied in a manner consistent with their labeling and safety precautions. Therefore, the NRC staff concludes that impacts of facility operation on biotic communities would be SMALL.
- *Impacts on wildlife.* Impacts of facility operation on wildlife within and outside the site could result from night lighting and vehicle collisions. Artificial lighting at the facility would be similar to that existing at nearby facilities and adjacent highways. Lights would be directed downward to minimize impacts. Vehicle collisions might primarily affect deer, but impacts are expected to be minor. Impacts from operational noise would be minor because the primary mechanical equipment that would generate noise would be housed within enclosed buildings. Therefore, the NRC staff concludes that impacts of facility operation on wildlife would be SMALL.
- *Impacts on aquatic habitat and biota.* The facility would not withdraw from any surface water body, nor would there be any direct discharges into surface water features. Potential impacts on aquatic habitat and biota from sediment or radiological contaminants would be minimized using mitigation measures described in Section 3.4.3, such that impacts on the Bear Creek and East Fork Poplar Creek drainages would be minor. Therefore, the NRC staff concludes that impacts of facility operation on aquatic resources would be SMALL.
- *Impacts on wetlands*. Operation would not directly impact additional wetlands beyond those impacted during site preparation. There would be no surface water or groundwater withdrawals, nor would there be any discharges to wetlands. Therefore, the NRC staff concludes that impacts of facility operation on wetlands would be SMALL.

Decommissioning. During decommissioning, no further impacts would be expected beyond those associated with site preparation and construction. Disturbed areas would be replanted in accordance with best practices and regulations. Potential radiological exposures of biota would be well below existing standards and guidelines. The NRC staff concludes that overall impacts of facility decommissioning on ecological resources would be SMALL.

Potential impacts of the proposed IKE facility on protected species across all three project phases (site preparation and construction, operation, and decommissioning) are described below. This overview is followed by highlights of the ESA consultation process with the FWS.

Protected species. Sections 8 and 9 of the biological assessment (Orano 2026h) discuss potential effects of the proposed IKE facility on Federally listed and proposed species that may occur in the action area. Table 3-8 summarizes the NRC staff's ESA effect determination for the proposed IKE facility for each species, including a brief justification for the staff's finding, and the outcome of the consultation.

The NRC staff concluded ESA consultation with the FWS, which it conducted jointly with the DOE and USACE, on October 27, 2026 (FWS 2026a). During consultation, Orano committed to implementing conservation measures and BMPs consistent with the FWS's programmatic biological opinion, *Conservation Strategy for Indiana and Northern Long-eared Bats in Tennessee* (FWS 2026). Orano also requested to make a voluntary contribution to the Imperiled Bat Conservation Fund to address adverse effects to the Indiana and northern long-eared bats through the framework established in the programmatic biological opinion. Under the opinion's Conservation Strategy, Imperiled Bat Conservation Fund contributions are an accepted recovery-focused conservation option for small or time-sensitive projects. Following execution of this contribution, the FWS determined that Orano's participation in the Conservation Strategy and use of Imperiled Bat Conservation Fund as the recovery-focused conservation option satisfies ESA Section 7(a)(2) by ensuring effects are minimized and mitigated consistent with the programmatic biological opinion and its Incidental Take Statement.

ESA consultation with the FWS. The NRC has fulfilled its ESA Section 7 responsibilities for the proposed IKE facility in conjunction with DOE and USACE. On April 9, 2025, the NRC designated Orano as its non-Federal representative to prepare a biological assessment and conduct informal consultation with the FWS (NRC 2025b). The DOE designated Orano as its non-Federal representative on February 5, 2026 (DOE 2026g). In support of consultation on July 30, 2025, and as updated on March 18, 2026, the NRC obtained an official species list from the FWS Information for Planning and Consultation online tool (FWS 2026b).

While preparing the biological assessment, the agencies determined that formal consultation was likely needed due to potential impacts on Federally listed species and proposed bat species from tree clearing on the Orano site. On February 26, 2026, DOE, NRC, and USACE held a virtual meeting with the FWS to discuss this determination, as well as receive input and approval for the three agencies to conduct joint consultation. The three agencies also held a meeting with FWS on March 26, 2026, to share information on final tree clearing plans and acreage presented by Orano. During that meeting, the FWS confirmed that formal consultation is appropriate for the proposed actions. Accordingly, DOE and the NRC requested that Orano complete the biological assessment and submit it to the three agencies to support the consultation. This submission on May 7, 2026, fulfilled Orano's role as the non-Federal representative of DOE and NRC (Orano 2026h).

On May 26, 2026, the DOE, NRC, and USACE submitted the biological assessment prepared by Orano to the FWS and requested to initiate formal ESA Section 7 consultation (DOE et al. 2026). The FWS completed formal consultation on October 27, 2026, with issuance of a letter to DOE, with copies to NRC and USACE. Appendix D of this EIS identifies this letter in the list of related correspondence.

Table 3-8 Effect Determinations for Federally Listed and Proposed Species

Species	Federal Status[a]	Summary of Effects	ESA Effect Determination[b]	FWS Concurrence Date[c]
Mammals				
Gray bat (*Myotis grisescens*)	FE	In the biological assessment, impacts on this species were evaluated as they relate to loss of habitat; mortality or injury; noise and vibration; lighting; and human presence primarily during site preparation and construction. Considerable additional habitat and roosting resources are available on the rest of the undisturbed SSP-2 and immediately adjacent ORR lands. There would be loss of foraging habitat for all bats onsite, which may have incidental impacts. Noise or vibrations from facility operation would be negligible. Increased traffic, associated noise from traffic, and lighting at night would be longer-term impacts from facility operation. Orano would employ bat conservation practices and BMPs to minimize those impacts. No bat species are expected to be jeopardized by the proposed project. During consultation, the FWS determined that suitable foraging habitat is present within the action area; however, the absence of caves or karst features, the absence of known hibernacula or roost sites within a 5-mile radius, and Orano's proposed conservation measures and BMPs would reduce the potential level of impacts to "may affect, not likely to adversely affect."	May affect, not likely to adversely affect (NLAA)	Oct. 27, 2026
Indiana bat (*Myotis sodalis*)	FE	In the biological assessment, the following impacts on this species were evaluated: loss of habitat; mortality or injury; noise and vibration; lighting; and human presence primarily during site preparation and construction. DOE, NRC, and USACE made a "may affect and is likely to adversely affect" determination for the Indiana bat because suitable roosting and foraging habitat is present, this species has consistently been detected within the action area during multiple survey efforts since 2013, and tree removal may result in adverse effects.	LAA	Oct. 27, 2026

Species	Federal Status[a]	Summary of Effects	ESA Effect Determination[b]	FWS Concurrence Date[c]
Indiana bat (*Myotis sodalis*) (cont.)	FE	During consultation, Orano committed to implementing conservation measures and best management practices consistent with the FWS's 2026 programmatic biological opinion, *Conservation Strategy for Indiana and Northern Long-eared Bats in Tennessee*. Orano also requested to make a voluntary contribution to the Imperiled Bat Conservation Fund to address adverse effects to the Indiana and northern long-eared bats through the framework established in the programmatic biological opinion. Under the opinion's Conservation Strategy, Imperiled Bat Conservation Fund contributions are an accepted recovery-focused conservation option for small or time-sensitive projects. Following execution of this contribution, the FWS determined that Orano's participation in the Conservation Strategy and use of the Imperiled Bat Conservation Fund as the recovery-focused conservation option satisfies ESA Section 7(a)(2) by ensuring effects are minimized and mitigated consistent with the programmatic biological opinion and its Incidental Take Statement.	LAA	Oct. 27, 2026
Northern long-eared bat (*Myotis septentrionalis*)	FE	See impacts described above for Indiana bat.	LAA	Oct. 27, 2026
Tricolored bat (*Perimyotis subflavus*)	FPE	See impacts described above for Indiana bat. Due to Orano's commitment to clearing trees during the non-breeding season, the small size of the action area in relation to the species' range, and the small number of individuals that could potentially be affected by the actions relative to the overall species population, potential effects on the tricolored bat from removal of suitable forested habitat are anticipated to be minimal. Based on the minimal effects resulting from the proposed action, the FWS determined that the proposed actions are not likely to jeopardize the continued existence of this species.	LAA/ NLJ	Oct. 27, 2026[d]
Birds				
Whooping crane (*Grus americana*)	EXPN	This species does not occur in the action area, and suitable habitat is not present.	NE	Oct. 27, 2026
Fish				
Spotfin chub (*Erimonax monachus*)	FT	This species does not occur in the action area, and suitable habitat is not present.	NE	Oct. 27, 2026

Species	Federal Status[a]	Summary of Effects	ESA Effect Determination[b]	FWS Concurrence Date[c]
Insects				
Monarch butterfly (*Danaus plexippus*)	FPT	The species is unlikely to occur in the action area due to lack of milkweed plants. Any impacts from transitory occurrences of the species would be insignificant.	NLAA/ NLJ	Oct. 27, 2026[e]
Plants				
Virginia spiraea (*Spiraea virginiana*)	FT	This species does not occur in the action area, and suitable habitat is not present.	NE	Oct. 27, 2026
White fringeless orchid (*Platanthera integrilabia*)	FT	Several seeps and springs within the action area are suitable for white fringeless orchid. Impacts on this species during construction and operation would be minimized through protocol-level presence and absence surveys and sediment-control BMPs.	NLAA	Oct. 27, 2026

[a] Indicates protection status under the ESA. EXPN = experimental population; FE = Federally endangered; FPE = proposed for Federal listing as endangered; FPT = proposed for Federal listing as threatened; FT = Federally threatened.

[b] The NRC staff makes its effect determinations for Federally listed species in accordance with the language and definitions specified in the FWS and National Marine Fisheries Service *Endangered Species Consultation Handbook* (FWS and NMFS 1998). LAA = may affect, likely to adversely affect; NE = no effect; NLAA = may affect, but not likely to adversely affect; NLJ = not likely to jeopardize the continued existence.

[c] Source: FWS (2026b). The FWS completed its formal ESA consultation on October 27, 2026. The ESA does not require Federal agencies to seek FWS concurrence for “not likely to adversely affect” determinations for proposed species or for “no effect” determinations. Nevertheless, the Service acknowledged the “no effect” determinations for the whooping crane, spotfin chub, and Virginia spiraea.

[d] The NRC, DOE, and USACE determined that the proposed actions may affect and are likely to adversely affect the tricolored bat. The FWS, which is the agency responsible for determining jeopardy to species protected under the ESA, determined that the proposed actions are not likely to jeopardize the continued existence of the tricolored bat.

[e] The NRC, DOE, and USACE determined that the proposed actions are not likely to adversely affect the monarch butterfly. The FWS, which is the agency responsible for determining jeopardy to species protected under the ESA, determined that the proposed actions are not likely to jeopardize the continued existence of the monarch butterfly.

Reasonably Foreseeable Effects. During Orano's site preparation, the TVA plans to move its transmission line from the central area of the site to along its western boundary. The TVA has addressed this action under a separate NEPA review (TVA 2026a), which stated that with proper implementation of BMPs, no impacts on endangered, threatened, or special status species would occur as a result of the proposed ROW maintenance activities. As further described in that review, any potential ground disturbance would be minimized, and all work would be conducted in accordance with TVA's BMPs that are designed in part to minimize erosion and subsequent sedimentation and would prevent construction stormwater runoff from reaching nearby tributary streams. With an onsite length of less than 3,000 ft and a ROW width of 100 ft for the transmission line (Orano 2026d, Section 4.9.1.2), the overall area affected would represent a small fraction of the 188 acres that would be cleared and graded for the IKE facility. Considering the small scale of this action and the TVA determination, the overall effect would be minor. Throughout IKE facility operation and decommissioning, the TVA would continue to maintain the ROW in accordance with an integrated management plan, which would include its BMPs to minimize impacts (TVA 2026b). Considering the small ROW footprint, the overall effect would be minor.

3.5.3 Mitigation Measures

Several practices and procedures have been designed to minimize adverse impacts on ecological resources. These practices and procedures include the use of BMPs recommended by various State and Federal management agencies, minimizing the construction footprint to the extent possible, avoiding all direct discharge (including stormwater) to any waters of the United States (i.e., the use of temporary detention ponds), and site stabilization practices to reduce the potential for erosion and sedimentation. In addition, Orano has identified the following additional mitigations that may be used to reduce impacts on ecological resources (Orano 2026d, Sections 5.4.5 and 5.5):

- Use dust suppression methods to minimize dust emissions.
- Fence stormwater discharge retention and detention basins to limit wildlife access.
- Continue seasonal monitoring of habitat to confirm habitat use by sensitive species.
- Protect migratory birds during the construction and decommissioning of the IKE facility, including avoiding areas containing active nests of migratory birds.
- Use low-maintenance landscaping in and around the stormwater detention basin.
- Manage unused open areas (i.e., leave undisturbed), including areas of native plant species and vegetation, for the benefit of wildlife.
- In consultation with TDEC, USFWS, and the USACE, use BMPs to reduce impacts on ecological resources.
- Mitigate unavoidable wetland impacts in accordance with Section 404 of the CWA and State regulatory requirements, by purchasing mitigation credits through an approved mitigation bank. Orano has already purchased licensed stream bank credits (Orano 2026i) to fund restoration efforts elsewhere and offset the project's net effects.
- Avoid tree and vegetation clearing during bat roosting season and bird nesting season.
- Use downward-facing, low-impact lighting during construction.
- Use native seed mixes to revegetate impacted areas.

3.6 SOCIOECONOMICS

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

3.6.1 Affected Environment

The IKE facility would be located in Roane County within the city limits of Oak Ridge. The region of influence (ROI) for this analysis includes Roane, Anderson, Knox, Loudon, and Morgan counties (see Figure 1-2); Anderson County contains most of the City of Oak Ridge. The socioeconomics of the region are heavily influenced by the presence of the ORR and associated research and industrial activities. The following overview incorporates by reference information from Section 3.1 of the ER (Orano 2026d) and Section 3.12.1 of the TRISO-X EIS (NRC 2026e, including Tables 3.12-1 through 3.12-4).

3.6.1.1 Population and Projected Growth

The IKE facility and the TRISO-X fuel fabrication facility share the same five-county ROI. The demographic and economic baseline described for this ROI in Section 3.12.1 of the TRISO-X EIS (NRC 2026e) served as an information source for Section 3.10 of the ER (Orano 2026d), which is incorporated by reference and summarized here.

The ROI has seen steady population growth, largely driven by the expansion of the Knoxville metropolitan area and the scientific workforce in Oak Ridge. The population growth rate of 8.4 percent in the ROI between 2010 and 2020 was similar to that of Tennessee as a whole (8.9 percent), with the population projected to grow at a slightly lower rate than the State through 2065. Historical and projected population growth varies across the ROI. Roane County has experienced materially lower growth than other counties in the ROI and was the only county in the ROI projected to lose population in future years (Orano 2026d). The ROI has a lower proportion of minority residents than Tennessee as a whole, about 18 percent compared to 29 percent (Orano 2026d).

According to 2025 data, nearly 737,000 people live in the ROI (about 10 percent of the State's population), and Knox County accounts for nearly 70 percent of this total. An estimated 511,453 people live in Knox County; 82,066 in Anderson County; 63,764 in Loudon County 57,395 in Roane County; and 22,160 in Morgan County (USCB 2026a). The estimated population of the City of Oak Ridge (located in Anderson and Roane counties) is 35,395 (USCB 2026b).

3.6.1.2 Economic Characteristics

The regional economy is anchored by the DOE, which is the largest employer in the area, through contractors at ORNL, Y-12, and ETTP. Median household incomes vary by county, reflecting a mix of urban and rural counties in the region. Based on recent American Community Survey census data (USCB 2026c, representing 2024 data, 5-year estimates, median household income in the past 12 months in 2025 inflation-adjusted dollars), the population-weighted average estimate for the median household income in the ROI is about $73,500; this is 5 percent higher than the State-wide level (about $70,000). This average is dominated by Knox County (per its larger population), which has a median household income of about $74,200. Anderson and Morgan counties have a median household income of about $66,000, while that for Roane County is nearly $72,000; Loudon County has the highest, at

slightly more than $84,000. The median household income in the City of Oak Ridge is similar to that for Roane County, about $72,300 (USCB 2026b).

Unemployment rates in the ROI reflect trends that have been observed across the United States since 2000 (Orano 2026d, Table 3.12-3). Unemployment was relatively low in the ROI in 2000 and then increased in 2010, during the recession of 2008 through 2010. By 2019, unemployment had dropped again to relatively low levels, with elevated levels of unemployment during the COVID-19 public health emergency. Based on 2023 data (USDA 2025), unemployment rates across the five counties in the ROI ranged from 2.9 percent (Knox) to 3.3 percent (Anderson and Loudon), 3.7 percent (Roane), and 3.8 percent (Morgan). As of September 2026, the unemployment rate had dropped in Knox, Anderson, and Loudon counties (to 2.8, 2.9, and 3.1 percent, respectively [BLS 2026a]) and in Roane County (3.3 percent [FRED 2026a]), while it is again 3.8 percent in Morgan County (FRED 2026b). For context, the Statewide rate as of September 2026 was 3.4 percent (BLS 2026b).

As summarized from the ER (Orano 2026d, Section 3.10), employment across the economic sectors in the ROI (in order) are: (1) educational services and health care and social assistance; (2) professional, scientific, and management, and administrative and waste management services; and (3) retail trade. The top five employers in the ROI (in order) are the Knox County Schools in Knox County, University of Tennessee—Knoxville, Y-12 National Security Complex in Roane County, ORNL in Roane County, and University of Tennessee Medical Center in Knox County (Orano 2026d, Table 3-46). These and other top employers in the area coincide with the overall employment by industry patterns described above, with concentrations in education, health care, and professional/scientific services.

The overall size of the economy of the ROI as measured by gross domestic product in 2024 (adjusted for inflation) totaled nearly $46.13 billion for the five counties combined: about $34.55 billion for Knox County, $6.01 billion for Anderson County, $2.85 billion for Roane County, $2.35 billion for Loudon County, and $0.365 billion for Morgan County (BEA 2026).

3.6.1.3 Social Infrastructure and Community Characteristics

The City of Oak Ridge provides public services that include a professional police force and fire department and a highly rated school system. The following information is incorporated by reference from the ER (Orano 2026d, Section 3.10.3.2) and summarized here. There are 200 schools within the five-county ROI, of which roughly 20 percent are private. With nearly 100,000 students and more than 7,000 teachers, the student:teacher ratio across the ROI is 14.1. Most students (more than 91 percent) attend public schools; there, the student:teacher ratio is slightly higher at 14.2 across the ROI, compared with 13.2 in private schools. The number of students attending private schools is highest in Roane County, about 1,500 (roughly 19 percent of the total). More than 105,500 students in the ROI attend kindergarten through 12th grade. In Title 49 of the Tennessee code (Section 49-1-04, “Education”), the State established average student:teacher ratios for these grades. These ratios are 20:1 for kindergarten through grade 3, 25:1 for grades 4–6, and 30:1 for grades 7–12. Current student:teacher ratios in the ROI are substantially lower than these levels.

Based on recent American Community Survey data (USCB 2026d), the local housing market has about 27,000 vacant housing units available across the ROI, including single-family homes, mobile homes, and multi-family buildings. Nearly two-thirds of the vacant units are in Knox County (more than 17,500), while each of the other four counties has at least 1,300 vacant units, ranging from nearly 1,380 in Morgan County to nearly 2,900 in Roane

County and more than 3,100 in Anderson County (USCB 2026d). Across the ROI, vacant housing units categorized as “for rent” totaled 4,710; those categorized as “for sale only” totaled more than 1,700; and those categorized as “other vacant” totaled nearly 14,100 (USCB 2026d,e,f,g).

Local water and sewer services are managed by the City of Oak Ridge. The city has significant excess capacity in both to support new industrial development — 6 million gpd and 300,000 gpd, respectively (Orano 2026d, Section 4.4.3.2).

3.6.2 Potential Impacts

Potential impacts of the proposed IKE facility on local and regional socioeconomic conditions are briefly summarized by project phase below.

Site Preparation and Construction. During this phase, Orano would create more than 1,000 jobs annually on average, including direct workers at the project site and workers employed indirectly throughout the regional economy (Orano 2026f, Table 7-1). It is anticipated that some of the housing units for rent could be occupied by workers who would move to the area from outside the ROI for site preparation and construction work. Because most are anticipated to come from within the ROI, there would not be a significant influx of new residents, and the estimated reduction in available housing units would be less than 5 percent. The NRC staff concludes that the impact on housing during construction would be SMALL.

Similarly, the project is not expected to significantly strain existing health care or emergency services because most workers are anticipated to come from within the ROI. Because the number of workers who might move to the area would be small compared to the population in the ROI (nearly 737,000), the potential impact would be minor. The impact on public schools would likewise be minor, with the potential increase in the student-to-teacher ratio estimated to be less than 5 percent and the ratio remaining below 15:1. Therefore, the NRC staff concludes that potential adverse impacts on housing, health and emergency services, and public schools would be SMALL.

With regard to regional employment, most of the direct labor is expected to be sourced from the existing regional pool of skilled trades. The NRC staff concludes that this would result in a SMALL to MODERATE beneficial impact on regional employment.

Orano estimates the total cost to construct the IKE facility (including site preparation) would be $5 billion (Orano 2026d, Section 4.10.1.1). The total payroll for direct workers during the site preparation and construction period is estimated to approach $600 million (Orano 2026d, Table 4-31). Orano estimates that the average annual wage for workers involved in site preparation and construction would exceed $70,000 (Orano 2026d, Table 4-30). Orano estimates that the total salary and wage earnings (direct and indirect) during the site preparation and construction period could approach $824 million, with an estimated total output approaching $3.3 billion (Orano 2026f, Table 7-1). From this information, the NRC staff concludes that there would be a MODERATE beneficial impact on the local and regional economy.

Operation. During operation, the facility could create more than 1,400 direct and indirect annual full-time jobs (Orano 2026f, Table 7-1). Orano anticipates that most operation workers would commute to the site from within the region. Some of the housing units for sale would be expected to be occupied by workers who would move to the area for the longer-term operational period. The operational workforce would be small enough to be absorbed by the

existing housing market without causing price destabilization, and the impact on housing would be minor (less than 5 percent reduction in available housing units). Because the number of workers who might move to the area would be small compared to the population in the ROI, the impact on health care and emergency services and on public schools would likewise be minor. Therefore, the NRC staff concludes that potential impacts on housing, public schools, and health care and emergency services would be SMALL.

Annual payroll would total $29 million for direct workers, on average, which would correspond to nearly $94,600 per worker per year in constant 2025 dollars (Orano 2026d). Such a salary would surpass the median household income in Roane County by more than 30 percent (note that the latter represents the combined earnings and income sources of all people living in a single housing unit). In earlier input to the economic impact plan for the project, by the fifth year of operation, Orano anticipated paying an average annual salary for operation workers that would at least initially be 150 percent of the median annual salary in Roane County (ORIDB 2025).

The total socioeconomic benefit of the proposed IKE facility is estimated to be nearly $1.4 billion, with $190 million in total salary and wage earnings for direct and indirect workers combined (Orano 2026f, Table 7-1). The facility would contribute to the local tax base through various mechanisms, including potential Payments in Lieu of Taxes agreements with the City of Oak Ridge and Roane County. Orano estimates annual property tax payments would total $40 million through 2079 (Orano 2026d, Section 7.1.2). From this information, the NRC staff concludes that facility operation would result in a SMALL to MODERATE long-term beneficial impact on the regional economy and employment.

Decommissioning. During this phase, there would be a gradual reduction in employment at the site, estimated at 265 direct and indirect workers per year (Orano 2026f, Table 7-1), with corresponding reductions in both minor adverse impacts and beneficial impacts (including related to reduced regional employment and wages). However, the 40-year project life allows for long-term regional planning to mitigate the impacts of eventual closure. During decommissioning, the total salary and wage earnings for direct and indirect workers are estimated to be about $142 million, with a total output approaching $714 million (Orano 2026f, Table 7-1). From this information, the NRC staff concludes that socioeconomic impacts during decommissioning would be SMALL.

In summary, the NRC staff concludes socioeconomic impacts associated with the proposed IKE facility would be SMALL to MODERATE, with the latter being beneficial impacts on employment and the local and regional economy. (See also the cost-benefit analysis in Section 4.4 of this EIS.)

Reasonably Foreseeable Effects. Construction and operation of the TRISO-X facility would overlap with site preparation and construction and operation of the proposed IKE facility. The TRISO-X facility would involve a smaller average direct construction workforce of 166 (332 at the peak), of which 70 percent (116 workers on average) are assumed to come from outside the ROI (NRC 2026e). Most of the direct construction workforce for the IKE facility (864 at the peak) is anticipated to come from within the ROI (Orano 2026d, Section 4.10.1.1 and Table 4-30). (For both projects, the operation workers and the indirect workers during each phase are anticipated to be local to the ROI.) Given that recent census data identified more than 27,000 vacant housing units available across the ROI, some of these could be occupied by workers and their families who would move to the area from outside the ROI, such that the overall effect on housing in the ROI would be minor (USCB 2026d,e,f,g). Similarly, given the

small influx of workers and their families relative to the current ROI population of about 737,000, effects on local health care and emergency services and on public schools would be minor. Meanwhile, both projects would have a beneficial impact on employment and the economy in the ROI (USCB 2026a).

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 in the ER (Orano 2026d). Most socioeconomic impacts are beneficial, and Orano has undertaken measures to mitigate potential adverse impacts, as described in recent communications (Peebles 2026; Orano 2026e). These include partnering with regional community colleges for workforce development and seeking to hire locally.

3.7 HISTORIC AND CULTURAL RESOURCES

NEPA requires Federal agencies to consider the potential effects of their actions on the affected human environment, which includes aesthetic, historic, and cultural resources as these terms are commonly understood, including such resources as sacred sites. Section 106 of the NHPA requires Federal agencies to consider the effects of their undertakings on historic properties. While NHPA emphasizes impacts on historic properties, for NEPA compliance, impacts on cultural resources that are not eligible for or listed in the *National Register of Historic Places* (NRHP) also need to be considered.

Historic and cultural resources are the remains of past human activities and include precontact (i.e., prehistoric) and historic era archaeological sites, districts, buildings, structures, and objects. Historic properties are defined as resources listed on or eligible for listing in the NRHP. The NRHP is the Nation's official list of recognized buildings, structures, objects, sites, and districts of national, State, or local historical significance that merit preservation. The criteria for eligibility are listed in 36 CFR 60.4 and include (a) association with significant events in history; (b) association with the lives of persons significant in the past; (c) embodiment of distinctive characteristics of type, period, or construction; and (d) sites or places that have yielded, or are likely to yield, important information.

In the context of NEPA, the proposed action (i.e., undertaking) is Orano's application to possess and use special nuclear material, source material, and byproduct material for the purposes of constructing, and then operating for up to 40 years, a facility that uses gas centrifuge enrichment technology to enrich uranium. The direct area of potential effects (APEs), where historic and cultural resources may be directly impacted by ground disturbing activity, consists of the 188-acre facility location. The indirect APE, where historic and cultural resources may be affected further in distance or later time (primarily visually), is a 1-mile radius based on the center point of the facility site (see Figure 3-3).

This section describes the cultural background and the historic and cultural resources found within the APE and surrounding area. The applicable cultural history background information described in the ER, Section 3.8.2 (Orano 2026d), the Phase I archaeological survey (Jenkins 2025), and Section 3.5.1.1 of the Hermes I EIS (NRC 2023). TRISO-X EIS (NRC 2026e) remains accurate and is incorporated here by reference. The chronology of the area is divided into the following periods: Paleoindian (prior to 8000 B.C.), Archaic (8000–1000 B.C.), Woodland (1000 B.C.–A.D. 900), Mississippian (A.D. 900–1540), Contact / Protohistoric (A.D. 1520–1672), and Historic (A.D. 1672–present). As discussed below, several

historic homesteads were identified within the direct APE, which pre-date development of the ORR and Manhattan Project. Development of the ORR and activities conducted in support of the Manhattan Project are important in the development of Roane County.

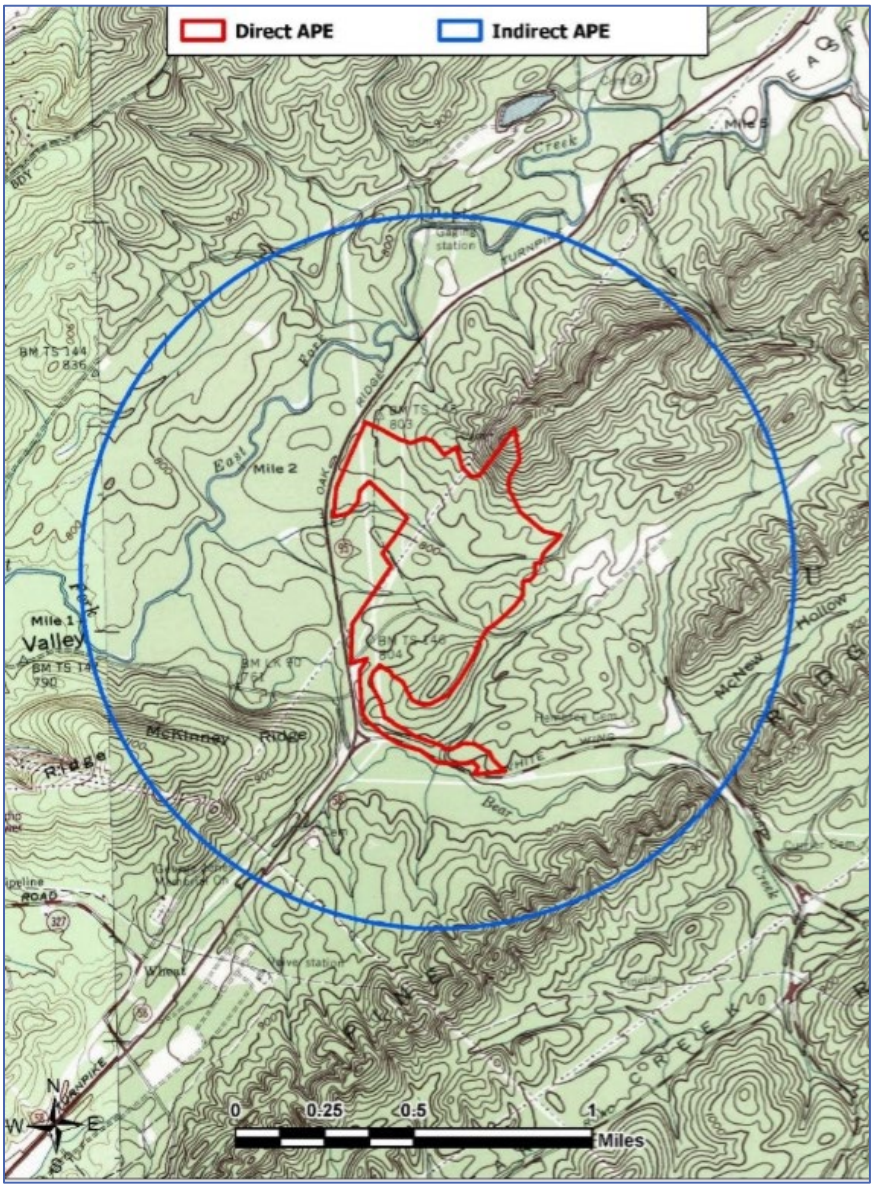


Figure 3-3 Direct and Indirect APEs for Project IKE (Source: NRC 2026g)

3.7.1 Affected Environment

Sections 3.8.2.1, 3.8.3, and 3.8.4 of the ER (Orano 2026d) describe historic and cultural resources in the direct and indirect effects APEs, based on a site file search of Tennessee Division of Archaeology records and Phase I (Jenkins 2025) and Phase II (Jenkins 2026) archaeological investigations, and review of historic maps. In addition to its independent and confirmatory review, the NRC staff used this information to support its NHPA Section 106 obligations and the referenced documents are incorporated here by reference.

As described in the ER (Orano 2026d, Section 4.8), a records review was conducted to determine the presence of previously conducted surveys, previously recorded archaeological sites, and previously identified historic buildings/structures within the direct and indirect APEs. As a result of this review, neither previously conducted surveys nor previously recorded historic or cultural resources (archaeological sites and historic buildings/structures) were identified within the direct APE.

Within the indirect APE, 20 previously recorded historic and cultural resources were identified, which include five precontact archaeological sites, one multi-component site (historic house and precontact archaeological site), and 14 historic sites (two grist mills, five farmsteads, six houses, and one town with multiple features), none of which were assessed for NRHP eligibility. In addition, seven previously conducted archaeological surveys were identified within the indirect APE. These surveys were conducted between 1974 and 2022 and included identification efforts prior to development; the surveys are discussed in Section 4.8 of the ER (Orano 2026d) and Section 3.7.3 of the TRISO-X EIS (NRC 2026e).

Three cemeteries were identified within the indirect APE during the records review, two of which are generally surrounded by the direct APE: the Smith-Gallaher Cemetery and the Hembree Cemetery. Neither was included in the direct APE subject to archaeological survey because DOE will retain ownership of the Smith-Gallaher and Hembree cemeteries, and public access to them will be maintained (Orano 2026d). The third cemetery is associated with the former town of Wheat and is located within the southwestern edge of the indirect APE.

From May 27 to June 30, 2025, Cultural Resource Analysts, Inc., conducted a Phase I archaeological survey which included the direct APE for NRC's undertaking (Jenkins 2025). The survey was conducted for a DOE land transfer undertaking for the SSP-2, and employed pedestrian transects, shovel testing, and metal detecting to determine the presence of historic and cultural resources. Except for a few precontact lithic flake artifacts, the remainder of the identified assemblage reflected historic use of the area. Table 3-9 summarizes the seven sites that were identified.

Table 3-9 Sites Identified Within the Direct APE[a]

Site	Description	NRHP Recommendation
40RE649/Robinette Site	Farmstead with multiple features	Not eligible
40RE650/Gallaher Site	Farmstead with multiple features	Potentially eligible
40RE651/Gallaher Tenant Site	House	Potentially eligible
40RE652/Hembree Site	House	Not eligible
40RE653/Moneymaker Tenant Site	House	Not eligible
40RE654/Proaps Site	Farmstead with multiple features	Not eligible
40RE655/Moneymaker Site	Farmstead with multiple features	Potentially eligible

[a] Source: Jenkins 2025.

To further determine the NRHP eligibility of the Gallaher Site, Gallaher Tenant Site, and Moneymaker Site, DOE and the Tennessee SHPO agreed that Phase II archaeological testing of these three sites should be conducted. Cultural Resource Analysts, Inc., completed these investigations between March 9 and May 8, 2026. The Phase II investigation focused on areas of the sites with the highest potential for archaeological research value. Areas selected for investigation were cleared of vegetation, inspected through pedestrian transects, and subjected to LIDAR, preliminary shovel testing, metal detecting, and 1x1-meter test units.

Subsequently, mechanical excavation was employed to remove overburden and to excavate trenches to identify and expose features prior to hand excavation. Results of excavation from across the three sites demonstrate farmstead occupation from at least the mid-19th century until 1942, when occupants were removed from the land. Phase II investigations exhausted the research potential of the three sites. By email to DOE dated June 16, 2026, the Tennessee SHPO accepted the Phase II archaeological testing report, agreed with its recommendations, and concurred with a determination of no historic properties affected (DOE and THC 2026).

In Section 4.8.1.4 of the ER, Orano proposed procedures applicable to the Smith-Gallaher and Hembree cemeteries, archaeological discoveries, and discoveries of human remains (Orano 2026d). Buffers would be established around the cemeteries to ensure avoidance. Measures in the case of discoveries of archaeological materials or human remains are also described, which include stop-work and protection procedures; Federal, State, and Tribal notifications; and planning for removal or preservation in place. The NRC staff reviewed these procedures as part of the confirmatory review.

By correspondence dated May 5, 2026, the DOE designated the NRC as lead agency for NHPA Section 106 compliance pursuant to 36 CFR 800.2(a)(2) (DOE 2026h). Although the DOE previously completed consultations for their undertaking related to land transfer, the DOE had another undertaking, a property deed amendment, that was coincident with NRC's undertaking. By correspondence dated May 27, 2026, the NRC staff and Tennessee SHPO agreed to expedite NHPA Section 106 consultation pursuant to 36 CFR 800.3(g) based on previous studies, findings, and consultations conducted previously by DOE (NRC and THC 2026). Based on the decision and agreement to expedite consultation, the NRC prepared correspondence to consulting parties that included information to initiate NHPA Section 106 consultation, identify historic properties, and assess any potential effects. The letters included the NRC staff's finding of no historic properties affected for the undertaking. Letters dated July 7, 2026, were sent to 18 Federally recognized Tribes (NRC 2026h) and the Tennessee SHPO (NRC 2026i).

Responses were received from the Tennessee SHPO (THC 2026), Shawnee Tribe (Shawnee Tribe 2026), Delaware Nation (Delaware Nation 2026), Chickasaw Nation (Chickasaw Nation 2026a,b), non-public Tribe (no impact on cultural resources important to the Tribe), and Absentee Shawnee Tribe (AST 2026). Subsequently, the NRC staff sent correspondence dated August 13, 2026, to 16 Tribes (NRC 2026j) and dated August 11, 2026, to the Tennessee SHPO (NRC 2026k) to conclude Section 106 consultation. Correspondence is also described in Table D-1.

3.7.2 Potential Impacts

The proposed IKE facility 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. No historic properties are located within the APE. Historic and cultural resources include the remains of historic homesteads, three of which have been subject to archaeological excavation, and several isolated finds of pre-contact lithic flake artifacts. Due to the nature of the landscape, topography, and vegetation, no historic or cultural resources would be visually affected. Environmental procedures (Orano 2026d) would be followed to address any discovery of historic and cultural resources and to avoid cemeteries. Therefore, the NRC staff concludes that the impacts of construction would be SMALL.

Operation. Operational activities are not expected to affect historic and cultural resources. No new construction or modifications are anticipated once construction is complete. Any facility operation activity, and maintenance activities necessary to support operation, would be limited to areas disturbed by construction. In addition, Orano's environmental procedures would be followed (Orano 2026d). Therefore, the NRC staff concludes that impacts on historic and cultural resources during operation would be SMALL.

Decommissioning. Decommissioning activities, if limited to areas of previous ground disturbance associated with construction and operation, are unlikely to cause impacts. However, an updated historic and cultural resources analysis and NHPA Section 106 evaluation would be necessary to determine if the facility itself had gained significance and to consider any new historic and cultural resources impact information at the time of decommissioning. Based on that future analysis and Orano's environmental procedures (Orano 2026d), the NRC staff concludes that impacts from decommissioning would likely be SMALL.

3.7.3 Mitigation Measures

Because the proposed action is not anticipated to lead to any significant adverse effects, no specific mitigation measures are necessary. Nevertheless, Orano would limit the facility footprint to avoid unnecessary soil disturbance and unintentional impact on resources that might be present.

3.8 VISUAL AND SCENIC RESOURCES

This section provides an overview of the existing visual character of the IKE site and surrounding areas, including sensitive viewpoints and the potential for the proposed facility to alter the landscape's aesthetic quality.

3.8.1 Affected Environment

This section incorporates information from Section 3.9 of the ER (Orano 2026d) by reference and summarizes it here. The IKE site consists primarily of dense, second-growth forest on rolling to steep terrain; the proposed facility itself would be on rolling and gently sloping terrain, which is bordered by steeper slopes and prominent ridgelines that are typical of the area (Orano 2026g). The visual character is largely natural, although the site is within 1 mile of established industrial and research facilities located in the 2,200-acre ETTP (formerly DOE's K-25 site). The ETTP contains the 1,200-acre Heritage Center and the 1,000-acre Horizon Center Industrial Park, within which lies the 110-acre Horizon Center Site (location of the TRISO-X facility) (ORIDB/OREDI 2026).

The NRC staff applied the Bureau of Land Management (BLM) Visual Resource Management methodology to their review, as applied to the ORR setting in Section 3.8 of the TRISO-X EIS (NRC 2026e), which is incorporated by reference here. This information includes the scenic quality, sensitivity level, and distance zones, and the resulting Class I through IV inventory classes (BLM 1986). The staff independently applied the methodology to the IKE site and reached its own ratings, presented below.

The scenic quality classification is the rating of the visual appeal of the land designated for the proposed IKE facility. This rating is based on an evaluation of seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. Scenic quality is classified as one of three ratings — A, B, or C — with A as the highest quality visual rating.

Due to the homogeneity of the landscape features across the IKE site (i.e., similar physiographic characteristics, visual patterns, colors, and impacts from man-made modifications such as vegetation clearing) it was not necessary to subdivide the site into multiple scenic quality rating units. Thus, for the purposes of the scenic quality evaluation, the IKE site was rated as a single unit. The IKE site was assigned a total scenic quality score of 10, which places it within the lowest BLM scenic quality rating of C (Orano 2026d).

The sensitivity level is a measurement of public concern for scenic quality, using six different indicators: types of users, amount of use, public interest, adjacent land uses, special areas, and other factors. The sensitivity level of public concern for scenic quality is assigned as high, moderate, or low. The most frequent users of the site and surrounding area would be IKE facility employees and visitors (e.g., contractors or delivery personnel), employees and visitors to future industrial developments in the vicinity, and recreators. Industrial employees and visitors are likely to have low sensitivity to changes in the visual quality of the site, given that their interaction with the site would primarily begin after construction of the facility is completed (NRC 2026e). The IKE site would, however, be visible to members of the public from the North Boundary Greenway and Wheat Trails, whose trailheads are located across the highway from the western border of the IKE site. Thus, the public would have interest in the value of the lands near the trail as a visual resource (Orano 2026d). Based on these considerations, the IKE site is assigned a medium sensitivity rating overall.

The BLM methodology also subdivides landscapes into three distance zones based on relative visibility of the area from travel routes and key observation points: foreground-middle ground, background, and seldom seen. The foreground-middle ground zone typically includes areas visible from highways, rivers, or other viewing locations that are less than 3 to 5 miles away; the background zone includes areas visible from 6 to 15 miles away; and the seldom-seen zone includes areas not visible from travel routes or other frequently occupied places such as residences and public areas. Due to the scale of the IKE facility and the regional topography, the site would not be readily distinguishable from the surrounding landscape at background distances.

Following the BLM Visual Resource Management classification system, which is often used in Federal EIS documents, the site is situated in an area generally consistent with Class IV. The BLM management objectives for Class IV areas allow for high levels of change, with the understanding that an attempt would be made to minimize the effects of the planned disturbance.

3.8.2 Potential Impacts

Potential impacts of activities within each of the three project phases are incorporated by reference and summarized here from descriptive information in the ER (Orano 2026d, Section 4.5.1.3.1).

Site Preparation and Construction. Activities undertaken during this phase would alter the existing visual character of the site through deforestation and other vegetation removal, grading, and earthwork that would result in exposed soils; as well as laydown and staging areas, stockpiled materials, construction equipment, and increased construction-related vehicle activity on the newly created access road. The principal visual effects associated with site preparation and construction would result from the scale of vegetation clearing and land disturbance, changes in the forest edge and landscape pattern, visibility of cranes and other tall equipment, exposed grading and soils, fugitive dust, increased vehicle activity, and

temporary construction lighting. The degree of visual effect would vary spatially and over the duration of construction depending on viewing distance, topography, remaining vegetation, season, and the sensitivity of affected viewpoints.

Remaining forest buffers and local topography are expected to screen many ground-level activities from surrounding public viewpoints. However, the land clearing activities could create localized areas of increased visibility and visual contrast, particularly where clearing creates new openings in the forest canopy or alters existing ridgelines and forest edges. Tall cranes might also create temporary vertical contrasts above the tree canopy.

Some trees would be removed at the edges of the site to develop a perimeter security path and fencing. Heavily forested areas on the site away from the IKE facility would remain. These would include a visual buffer between the IKE facility construction area and the Oak Ridge Turnpike to the south along Bear Creek and extending across the southern border along SR 95 as it heads east. On the western boundary of the site along SR 95 heading north/south, tree clearing would make the facility visible from a portion of the highway (Orano 2026d).

With regard to construction, the IKE facility would include several large industrial buildings and associated infrastructure encompassing about 750,000 ft^2. Visual effects would result from the overall height, scale, and massing of the facility's structures, as well as building color and reflectivity; the stack and other vertical elements; security infrastructure and fencing; roads and parking areas; utility corridors; exterior and security lighting; and permanent changes to vegetation and landscape character. The degree of visual effect would be influenced by the site's valley setting, surrounding forested hills and ridges, and retention of a substantial forested perimeter. The tallest building (the process building) is anticipated to be about 60 ft high, with two 10-ft-high exhaust housings on the roof. A centrally located stack would rise about 60 ft above the roof, for a maximum height of 120 ft above the ground surface (Orano 2026d, Section 4.9.1.2). Because the tallest buildings would be lower than the surrounding ridgelines, visibility of the IKE facility would be limited by the natural terrain and vegetation. Parts of the taller features may be visible from some points of nearby roads and properties, including from part of the Wheat Trail. However, the topography and surrounding areas of dense forest would generally obstruct views of the IKE facility, including for recreators as they move westward along the trail. Because of the stack's narrow profile, it would not obstruct views of the broader natural landscape.

Development of the site is consistent with the planned use of the ORR and compatible with current zoning designations and nearby facilities located within a mile, west of the Oak Ridge Turnpike. During the site preparation period, the TVA would relocate its transmission line that currently bisects the site along East Poplar Ridge to along the road on the western boundary of the IKE site. The transmission line would have an onsite length of nearly 3,000 ft along Oak Ridge Turnpike with a ROW width of 100 ft and height of 25 ft. The TVA has addressed that action under a separate NEPA review (TVA 2026a).

Operation. No significant changes to the IKE facility or landscape beyond those associated with site preparation and construction would be anticipated during the operational period. The visual impacts of the facility during this phase would be similar to those associated with site preparation and construction. As described in the ER (Orano 2026d, Section 4.9.1.2) and Orano's online overview of the project (Orano 2026i), the tree line and natural topography would limit visibility. Portions of the taller structures could be visible from nearby roads and other locations, including parts of the nearby hiking trail. Because of its narrow profile, the stack would not obstruct the broader natural landscape views.

With regard to night lighting, security and operational requirements would introduce permanent exterior lighting and could increase localized nighttime brightness and sky glow. If implemented by Orano, shielded, downward-directed fixtures and other lighting controls could reduce direct glare, light spill, and visibility of individual light sources from surrounding areas. Given the existing industrial context and the screening provided by vegetation and topography, nighttime visual effects would generally be expected to be low, with localized effects possible where operational lighting is directly visible from nearby sensitive viewpoints.

Overall, visual effects during operation would be expected to range from low to modest, depending on viewing distance, degree of screening, viewer sensitivity, and the visibility and visual contrast of facility structures, infrastructure, and nighttime lighting.

Decommissioning. Decommissioning of the IKE facility would involve removing all structures, roads, and utilities except for 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 would be expected. Temporary visual effects could result from demolition activities; cranes and other tall equipment; exposed soils and foundations; debris, material stockpiles, waste containers, and temporary staging areas; dust generated by demolition, grading, and material handling; increased truck and equipment traffic; temporary access routes; and temporary construction, security, or nighttime lighting.

Decommissioning could also involve additional vegetation removal or disturbance to accommodate demolition equipment, material handling, and haul routes, potentially reducing existing visual screening. Visibility of decommissioning activities could vary seasonally, particularly where deciduous vegetation currently contributes to screening. Temporary erosion, unvegetated slopes, altered drainage features, or contrasts between disturbed and undisturbed vegetation could also increase visual contrast during site restoration. These effects would generally be similar in character to those experienced during site preparation and construction, although they would occur within an already developed site and would progressively decrease as buildings and infrastructure were removed. Visual effects could be most noticeable during periods of intensive demolition and material removal when tall equipment, exposed structural elements, debris stockpiles, dust, and nighttime lighting are present.

As decommissioning proceeds and disturbed areas are graded, stabilized, and revegetated, the visual contrast associated with the facility would be expected to diminish. Some residual visual effects could potentially remain where switchyards or other infrastructure are retained, where original landform or vegetation patterns cannot be fully restored, or where revegetation requires multiple growing seasons to become established. Depending on visibility from surrounding viewpoints, the effectiveness of retained vegetation and topographic screening, the duration and intensity of demolition activities, and the success of site restoration, visual effects during decommissioning would generally be expected to range from low to modest.

In terms of overall impact, when evaluated in relation to baseline visual conditions, regional visual ecology, and EPA Level IV Ecoregion characteristics, and considering mitigation measures described in Section 3.8.3 of this EIS, the IKE facility 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 recently been altered by the development of other industrial and research facilities and has a demonstrated capacity to accommodate visual modification without fundamentally altering overall visual character or scenic value. Thus, the NRC staff concludes that impacts from the proposed IKE facility on visual and scenic resources would be SMALL for all phases.

3.8.3 Mitigation Measures

Given the anticipated SMALL impacts on visual resources due to the relatively limited visibility of the IKE facility to the public, the adherence to City of Oak Ridge zoning designations, and the facility being consistent with the planned use of the IKE site, Orano has proposed two mitigation measures that would avoid or minimize impacts on visual resources (Orano 2026d). Orano would maintain as much forested land as possible surrounding the IKE facility during construction and operation and would use downward-facing low-impact lighting during construction.

Although the IKE facility is expected to have relatively limited visibility from most surrounding public viewpoints because of existing topography, forest cover, and the industrial context of the ORR, visual effects might occur where facility structures, vegetation clearing, lighting, security infrastructure, or construction activities are visible from nearby roads, trails, developed areas, or other sensitive viewpoints. Visual mitigation could therefore focus on maintaining existing screening, minimizing visual contrast, reducing unnecessary disturbance, and integrating visual considerations into site planning, facility design, construction, and long-term operation. The NRC staff recommends the following mitigation measures to minimize potential impacts on visual resources, supplementary to those to which Orano has committed:

- *Forest buffers*: Maintain a substantial no-cut timber buffer around the perimeter of the SSP-2 parcel to provide natural visual screening from SR 58 and SR 95.
- *Building aesthetics*: Use non-reflective materials and neutral exterior colors (e.g., earth tones) that blend with the surrounding forest and sky.
- *Lighting design*: Implement an outdoor lighting plan that follows “dark sky” principles, using full-cutoff fixtures to prevent light trespass into adjacent habitats and sensitive viewpoints.

3.9 NOISE

This section presents an overview of existing acoustic conditions in the area surrounding the IKE site 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).

As described in the ER, neither Roane County nor the State of Tennessee has established community noise limits (Orano 2026d). Scoping input indicated that Roane County references general guidelines limiting residential noise to 55–60 dBA daytime and 45–50 dBA nighttime (equivalent to 55–60 dBA L_{dn}), with stricter quiet hours from 10:00 p.m. to 7:00 a.m. These values align with EPA and U.S. Department of Housing and Urban Development/NRC benchmark criteria. Potential noise impacts from facility construction and operation are evaluated in this EIS against these Federal benchmark levels.

3.9.1 Affected Environment

The proposed IKE site is located within a relatively quiet, forested portion of the ORR, but it is adjacent to active industrial and transportation corridors:

- Current noise sources: The primary contributors to the existing noise environment include traffic from SR 95 (Oak Ridge Turnpike) and SR 58, as well as activities from the nearby Heritage Center (former K-25) and Horizon Center Industrial Park.
- Typical background levels: Day-night average noise levels (L_{dn}) typical of a suburban area range from 45 to 58 dBA (EPA 1974). Around the IKE site, surrounding dense forest acts as a natural sound attenuator, dampening noise from distant sources.
- Measured background levels: A baseline noise survey was conducted in February 2026 at four onsite locations along the western boundary near SR 95. After excluding data affected by unfavorable meteorological conditions (e.g., high winds, precipitation) and atypical activities (e.g., tree cutting, construction, geotechnical boring), daytime averages ranged from 50 to 63 dBA, nighttime averages from 48 to 53 dBA, and L_{dn} from 55 to 63 dBA. Three monitoring points were located 400 to 500 ft from the turnpike, and one was located 1,200 ft away. Due to their proximity to the highway, traffic from SR 95 was the dominant noise source, resulting in measured levels somewhat higher than those typical of a suburban-industrial area (Kiewit 2026).
- Sensitive receptors: The nearest sensitive noise receptors are residential properties located approximately 1.25 miles from the primary facility footprint. No schools, churches, hospitals, or nursing homes are located within this distance.

Noise-sensitive land uses in the vicinity of the ORR are identified in Section 3.9.1 of the TRISO-X EIS (NRC 2026e), which is incorporated by reference and briefly summarized here. The Wheat Trail and North Boundary Greenway Trail are low-density recreational hiking and biking trails in the vicinity that represent potential noise-sensitive land use near the IKE site. The Wheat Trail is south and west of the IKE site across the highway, while the North Boundary Greenway Trail is north and west of the IKE site along the western site boundary of the TRISO-X site. A combination of factors is expected to minimize exposure to facility-

related noise including the existing highway, noise attenuation of at least 35 dBA between the IKE site boundary and the trail, and the relatively short amount of time the average trail or recreational user is expected to spend in the area. There are no other recreational facilities, schools, churches, or other noise-sensitive receptors adjacent to the site that could potentially be impacted by noise from the proposed IKE facility. Other land uses in the vicinity include industrial and commercial businesses, as well as undeveloped, forested land.

3.9.2 Potential Impacts

This section discusses the potential noise impacts of the proposed IKE facility on the surrounding environment during each phase of the proposed project. Potential mitigation measures to minimize noise impacts are also presented.

The NRC staff identified two NR GEIS Category 1 issues related to noise during construction and operation that are relevant to the review of the Orano license application (see Tables 3-1 and C-1 of this EIS). The NRC staff incorporates the technical analyses in the NR GEIS to conclude there would be SMALL impacts from construction-related and operation-related noise. Therefore, these issues are not discussed in detail in this section; however, information about them may be included for additional context as it relates to other aspects of this resource area.

Site Preparation and Construction. Heavy equipment operation (bulldozers, excavators, and cranes) and increased truck traffic would generate peak noise levels between 80 and 90 dBA at the source. In this EIS, noise levels at receptor locations are conservatively calculated using geometrical spreading, with a 6-dB decrease per doubling of distance from a point source (FHWA 2011). Factoring in ground absorption, atmospheric attenuation, and meteorological effects would further reduce the estimated sound levels. Due to the distance to the nearest residents, significant topographic relief, and forest cover, noise levels at the property boundary would be well below local ordinances. Site preparation and construction activities would 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 minor incremental noise impact on the community.

Site preparation and construction activities would occur during daytime hours, when atmospheric sound attenuation is more favorable[9] and background noise levels are relatively higher.[10] Noise impacts of these activities would be localized and temporary, and mitigation measures would be implemented to reduce noise levels. Overall, site preparation and construction would increase ambient levels by no more than 1 dBA over the baseline conditions. Potential impacts of noise from the site on people who might be hiking nearby are

[9] 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.

[10] 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. Construction activities commonly begin at 7 a.m., in the early-morning hours, which are more likely to be affected by inversion conditions — especially during colder months. Avoiding noisy activities during inversion periods would minimize community noise impacts.

considered as follows. During site preparation and construction along the western boundary of the IKE facility, noise levels at the eastern end of the Wheat Trail are projected to be attenuated by 30 dBA. Due to high ambient traffic noise from SR 95, project-related noise at this eastern terminus might be perceptible but would largely be masked by traffic. Conversely, as hikers move westward along the trail, noise levels would become inaudible. Thus, noise during site preparation and construction would be noticeable only to hikers near the eastern end of the Wheat Trail, resulting in an overall minor noise impact on trail users. These impacts would primarily be due to site preparation activities that are not within the definition of "construction" under NRC regulations. The noise emissions during NRC-authorized construction activities would be lower. From this information, the NRC staff concludes that noise impacts on nearby communities and recreators would be SMALL.

Operation. Primary noise sources include the separations building modules, coolers, rooftop fans, evaporators, air conditioners, transformers, and ancillary support equipment such as forklifts and wheeled loaders. Additional contributors are onsite traffic from employee vehicles, site service vehicles, and delivery trucks, as well as diesel generators used for mandatory monthly testing. Unlike gaseous diffusion plants, gas centrifuge technology is relatively quiet. Most mechanical equipment would be housed within reinforced concrete separations building module structures, which would provide significant acoustic shielding. Operational noise would be constant but low-frequency. At the site boundary, based on comparable facility operational noise survey results, the noise level is expected to be less than 65 dBA and would be indistinguishable from the existing background traffic noise (Orano 2026d). During the operational phase, facility noise is expected to be imperceptible or barely noticeable at the east end of the Wheat Trail due to lower noise emissions during this period (compared to site preparation and construction). Therefore, the NRC staff concludes that operational noise impacts on nearby communities and recreators would be SMALL.

Decommissioning. During decommissioning, the activities and types of equipment would generally be similar to those during site preparation and construction but would be implemented on a more limited scale and over a shorter duration. Accordingly, potential noise impacts would be correspondingly lower than those projected for the site preparation and construction phase. Any noise impacts during the decommissioning phase would be temporary, and mitigation measures comparable to those implemented during site preparation and construction would be applied, as appropriate. Therefore, the NRC staff concludes that potential noise impacts on nearby communities and recreators from decommissioning activities at the IKE site are expected to 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 IKE facility-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.

Reasonably Foreseeable Effects. Noise from the IKE facility during site preparation and construction and decommissioning could temporally overlap with that from the TRISO-X facility and other facilities located across the Oak Ridge Turnpike (SR 95) from the IKE site. During operation of the respective facilities, noise levels at offsite receptor locations would be

minimal because the primary mechanical equipment that would generate noise would be housed within enclosed buildings. The heavy equipment and heavy-duty trucks used during site preparation and construction and facility decommissioning would be the main contributors to noise impacts, but that noise would be temporary and intermittent and would primarily occur during daytime hours when elevated ambient background noise levels would have a masking effect on facility-related noise. Considering the separation distance between the proposed IKE facility and TRISO-X and other facilities, together with the contribution of existing traffic noise along Oak Ridge Turnpike (SR 95) to the ambient noise environment and the attenuation of sound propagation by the intervening forest and topographic features, the effects of noise at nearby receptor locations would be minor.

3.9.3 Mitigation Measures

As described above, noise impacts on neighboring communities and wildlife during site preparation and construction — which would be localized and temporary in nature — are anticipated to be SMALL. Orano has committed to implementing a number of mitigation measures to minimize potential noise impacts, which are incorporated by reference from Sections 4.7.5 and 5.7 of the ER (Orano 2026d) and summarized here:

- Restrict vehicle use of SR 95 to daytime hours.
- Restrict use of heavy trucks and earth-moving equipment during construction to daytime hours.
- Sequence construction or decommissioning activities to minimize the overall noise and vibration impact (e.g., establish the activities that can occur simultaneously or in succession).
- Equip construction equipment with manufacturer-recommended noise-control devices and maintain the equipment in proper working condition. Such engineering controls would include the use of equipment and vehicle mufflers, acoustic baffles, shrouding, barriers and noise blankets.
- Post appropriate State highway signs warning of blasting, and use blast mats as necessary.
- Establish procedures to notify State and local agencies, residents, and businesses in advance of construction or decommissioning activities that could generate high noise or vibration, particularly during off-hours.

The NRC staff recommends the following mitigation measures to minimize potential noise-related impacts, supplementary to those to which Orano has committed:

- Operate equipment with internal combustion engines at the lowest practical speed.
- Keep engine enclosures and housing doors closed during operation.
- Avoid unnecessary equipment engine idling.
- Use quieter equipment or construction methods whenever practical; this could include using quieter white-noise or broadband back-up alarms on construction equipment.

Although no adverse noise impacts are anticipated during the operational phase, additional measures could be considered if necessary. The NRC staff suggests that such measures might

include installing low-noise equipment, erecting temporary noise barriers, or increasing equipment setback distances from sensitive receptors.

3.10 TRANSPORTATION

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

3.10.1 Affected Environment

The IKE facility is located within the ORR, which is served by a robust network of State and Federal highways designed for industrial and commercial use:

- *Primary roadways*: The site is primarily accessed via SR 95 and SR 58. These are multi-lane highways that connect the site to Interstate 40, approximately 8 miles to the west, providing a direct route for regional and national shipping. Directly west-southwest of the proposed site location, SR 58 terminates in an interchange with SR 95, and the roadway is referred to as the Oak Ridge Turnpike (sometimes as Oak Ridge Turnpike/ SR 95/58). Nearby roads are shown in Figure 3-1.
- *Existing traffic*: Current traffic volumes are influenced by DOE operations at the Heritage Center, Horizon Center Industrial Park, and ORNL, as well as construction activities for new projects such as the TRISO-X facility. The general level of service (LOS) on these roadways is high (traffic flows smoothly with low congestion), although peak-hour congestion occurs during shift changes at neighboring facilities (AECOM 2025; Orano 2026d).
- *Rail infrastructure*: While the ORR has historical rail spurs, the IKE facility is designed to use trucks as the primary mode of transport, ranging from construction materials and natural uranium feedstock to the enriched uranium product and byproducts/wastes.

3.10.2 Potential Impacts

This section presents potential transportation impacts associated with the proposed action to construct, operate, and decommission the IKE facility. Information from Section 3.11.2 of the ER (Orano 2026d) and from AECOM (2025) is incorporated by reference. Vehicles traveling to and from the IKE site would use the existing public roadways described in Section 3.10.1. Materials, supplies, and equipment used for IKE facility construction, operation, and decommissioning would be delivered by truck. Likewise, products and solid waste materials would be shipped from the IKE site by truck (Orano 2026d).

The volume of estimated traffic from supply shipments, waste shipments, and workers commuting is estimated from information provided in the ER (Orano 2026d) and AECOM (2025). The mode of transportation during IKE facility 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 IKE site would be by car, van, or light truck (Orano 2026d).

As framing context for the transport of radioactive feedstock, product, and solid waste, the potential environmental impacts of transporting nuclear materials including feed material and

finished products are described in an earlier EIS for transportation, NUREG-0170 (NRC 1977a). In that EIS, NRC staff 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. From that evaluation, the NRC staff concluded that even with conservative assumptions, the transportation of radioactive materials provides adequate public protection.

Subsequently, the NRC staff evaluated potential impacts of transporting spent nuclear fuel (NUREG-2125, NRC 2014). This study reconfirmed that radiological impacts from transporting spent fuel 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 presented in NUREG-0170. In the 2014 report (NUREG-2125), the NRC staff concluded that regulations for the transportation of radioactive material are adequate to protect the public against unreasonable risk. (For project IKE, the potential health impacts on workers and the public under normal and accident conditions from transportation to and from the IKE site are described in the last part of this Section 3.10.2.)

Site Preparation and Construction. As part of site preparation activities, Orano would construct a new access road from SR 95 to the facility, with an intersection at Novus Drive, as indicated by the white cross-arrows in Figure 2-2 (modified from Orano 2026d). 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 IKE site to deliver construction materials, supplies, and equipment. The number of truck deliveries and mix of truck types would depend on the stage of site preparation and construction and the types of construction activities. It is estimated that during peak site preparation (in 2028), 590 workers would commute daily, and a maximum of 4,500 heavy truck deliveries are expected over the site preparation and construction period (Orano 2026f, Table 4-22). While this would increase traffic, the highway infrastructure is designed to accommodate these loads.

Transportation impacts associated with building the IKE facility would be temporary and variable over the construction period. On a day-to-day basis, total vehicle trips to the site would be expected to vary significantly depending on the type of site preparation or 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 impacts from project-related traffic during construction are presented in Table 3-10.

It is anticipated that all intersections would operate at an acceptable LOS during site preparation and construction (i.e., traffic delay would be less than 25 seconds), except the intersection of SR 58 and the Interstate 40 eastbound off-ramp (AECOM 2025). That intersection is expected to operate with a morning traffic delay of between 35 and 50 seconds for part of the construction period, notably during the period when construction and operation overlap (peak year 2035), in part due to the combined traffic to the IKE facility. Three other nearby intersections would experience slight increases in expected delays but would still maintain an acceptable LOS (AECOM 2025). Due to the temporary and variable nature and the low percentage increase in traffic projected for nearby roadways, the NRC staff concludes that local and regional transportation impacts during the site preparation and construction phase would be SMALL.

Table 3-10 Estimated Impacts from Project-Related Traffic During Site Preparation and Construction, 2028[a]

Traffic Count Location	TDOT Identifier	5-Year Average Daily Traffic Count (2020–2024)	Projected Daily Traffic Volume (2028)	Daily Round Trip Increase	Impact on Local Traffic, Percent Increase
Oak Ridge Turnpike (SR 95)	73000059	12,379	15,334	608	4.0
White Wing Road (SR 95)	73000058	6,877	8,036	304	3.8
Oak Ridge Turnpike (SR 58)	73000060	13,559	17,188	304	1.8
Gallagher Road East of Kingston (SR 58)	73000061	12,301	13,903	304	2.2

[a] Source: Orano 2026d, Table 4-1.

Operation. The NRC staff evaluated traffic impacts from workers commuting to the IKE facility, shipments of equipment and supplies to the IKE, and shipments of fabricated fuel and wastes produced at the IKE facility during operation. Employee trips during facility operation are included in Table 3-12. The operational workforce of 390 workers would have a minor impact on regional traffic. Nonradiological shipments (such as office supplies and chemicals) would average 5 to 10 trucks per week. Routes used by these workers would depend on where they live and could be similar to those used by the construction workers.

Because the IKE facility would operate on multiple shift schedules 24 hours per day, 7 days per week, not all of these workers would be onsite each day or during the same time periods. Peak traffic volumes entering and exiting the IKE site would occur during a shift change. Because the roadway design and traffic flow would accommodate this temporary increase, the impact on traffic would be minor. As described for the site preparation and construction period, some visitors would make occasional vehicle trips to and from the site. The number of these trips would be limited because site access would be restricted to authorized personnel, and the temporary and variable changes are not expected to substantially alter transportation conditions. For example, the change in congestion during peak times (shift changes) is estimated to result in an incremental 25 seconds in traffic (AECOM 2025).

Table 3-11 Annual Radioactive Material Quantities and Shipments[a]

Material	Container Type	Container per Year	Containers per Truck Shipment	Shipments per Year
Feed	48-inch cylinder	1,350	1	1,350
Empty feed	48-inch cylinder	1,350	2	675
Product	30-inch cylinder	880	2	440
Empty product	30-inch cylinder	880	2	440
DUF_6[b]	48-inch cylinder	—	—	—
Empty DUF_6	48-inch cylinder	1,200	2	600
Radioactive waste	55-gallon drum	900	60	15
Other waste	B-25 package	240	2	120
Total shipments				***3,640***

[a] Source: Orano 2026d, Table 4-4. A dash indicates not applicable or not available.

[b] The DUF_6 would be stored onsite until decommissioning.

The enriched UF_6 produced at the IKE facility would be shipped offsite to various nuclear fuel fabricators for ultimate use in U.S. nuclear reactors. An estimated 3,640 heavy-duty truck shipments per year (average six per day) are projected when the IKE facility is operating at full production capacity, as shown in Table 3-11. Table 3-12 presents estimates of project-related impacts on traffic during facility operation. The NRC staff concludes that transportation impacts would be SMALL due to the low percentage increase in traffic on local roadways and the minor congestion delay.

Table 3-12 Estimated Impacts from Project-Related Traffic During Operation, 2035[a]

Location of traffic count	TDOT Identifier	5-Year Average Daily Traffic Count (2020–2024)	Projected Daily Traffic Volume (2035)	Operation-Related Daily Round Trip Increase	Project-Related Impact on Local Traffic, Percent Increase
Oak Ridge Turnpike (SR 95)	73000059	12,379	18,859	982	5.2
White Wing Road (SR 95)	73000058	6,877	9,883	491	5.0
Oak Ridge Turnpike (SR 58)	73000060	13,559	21,139	491	2.3
Gallagher Road East of Kingston (SR 58)	73000061	12,301	17,099	491	2.9

[a] Source: Orano 2026d, Table 4-2.

Radiological impacts on workers from incident-free transportation to and from the IKE 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 IKE facility 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 71 (Packaging and Transportation of Radioactive Material) and 49 CFR 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 a diameter of about 30 and 48 inches, 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 hypothetical members of the public and workers from incident-free transport of radioactive materials generated during IKE facility operation were calculated using the NRC-RADTRAN (RADioactiveTRANsport) computer model. The IKE facility 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. For the DUF_6 tails, the assessment considers transport from the IKE facility to multiple candidate conversion facilities, including the DOE facilities in Portsmouth, Ohio, and Paducah, Kentucky. All scenarios assume the materials are shipped by truck with a two-person crew (Orano 2026d, Section 4.2.2).

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/year (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. The estimated dose for a member of the public with a non-incident encounter with a shipment (e.g., at a rest stop or in traffic) is 2.5 mrem, which is approximately the average individual dose within a day (Orano 2026d). The risk from this dose is minimal. Estimated impacts associated with vehicle incidents during shipments are 0.12 fatalities/yr, <3 accidents/yr, and <2 injuries/yr. Hypothetical impacts of vehicle emissions were estimated using conservative (protective) assumptions for the emission unit risk factors for transportation, as described in the ER (Orano 2026d, Section 4.2.3.1), combined with estimated round-trip distances, annual number of shipments, vehicle emission rates, and population density. From these inputs, the estimated risk from vehicle (diesel) emissions over the extensive population through which vehicles would travel for the project, in vehicle miles, translates to an illustrative risk estimate of about 3 fatalities/yr. The transportation of project wastes during facility operation would comply with applicable DOT and NRC regulations. From this evaluation, the NRC staff concludes that the impacts from transportation of radioactive waste produced during operation of the proposed facility would be SMALL.

Decommissioning. The estimated number of onsite workers during decommissioning is projected to be fewer than the number estimated for the operation phase. Decommissioning would include decontaminating and removing equipment and other materials for shipment offsite. The number of truck shipments would 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 3 years of construction. (DUF_6 tails would be transported offsite for conversion during decommissioning; the associated impacts are discussed above together with the transport of other materials generated during operation.) 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 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 IKE 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 that time. Transportation impacts associated with decommissioning the IKE facility would be temporary and variable over the decommissioning period. Given the significant reduction in the number of onsite workers, the level of anticipated truck traffic, and the relatively short duration for many of the expected decommissioning activities, the NRC staff concludes that transportation impacts during decommissioning would be SMALL.

Transportation Accidents. The NRC has previously evaluated potential environmental impacts of transporting radioactive materials on public roads and by air. Radioactive material 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 would 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 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 packagings 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 1977a). 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 173) and for which the NRC has issued design approvals meeting the performance standards of 10 CFR 71, are SMALL (49 FR 9375). For the IKE project, The NRC staff concludes that the potential impacts from transporting inbound fuel feedstock material and outbound fuel product (including transporting associated radioactive materials during operation) would be SMALL.

Reasonably Foreseeable Effects. The AECOM traffic study assessed trip generation, distribution, and traffic analyses, considering LOS and queuing. Resources on the TDOT website were referenced to determine trends from 2014 to 2024 in the AADT of the roadways studied. AECOM then estimated hypothetical traffic conditions in the year 2035 for scenarios with and without construction and operation of the IKE facility. That analysis included consideration of impacts associated with the TRISO-X facility located 1 mile northwest of the proposed IKE site (AECOM 2025). The study found that effects from the IKE and TRISO-X facilities would not unduly burden the traveling public in the area, such that overall effects would be minor.

The DOE remediation of nearby legacy sites, including the White Wing Scrap Yard, would be conducted concurrently with Orano's site preparation and construction activities for the proposed IKE facility and could extend into facility operation. The remediation activities involve removing contaminated materials such as soil and debris, packaging them for shipment, and transporting them to a disposal facility, as illustrated for the recent soil cleanup in which packaged soil was transported by truck to the ORR Landfills. Because the staging area and disposal location are within the ORR, shipments would often operate within this closed-loop system, thus reducing impacts on local roadways. Furthermore, the DOE remediation contractor recently implemented a mitigation measure to reduce overall traffic impacts, which was to close access from SR 58 by the DOE cleanup crew at White Wing Scrap Yard to reduce congestion impacts on this highway (UCOR 2026b). This information indicates that overall effects on traffic would be minor.

3.10.3 Mitigation Measures

To mitigate potential impacts of transportation activities on traffic, Orano has committed to implementing any recommendations identified by the City of Oak Ridge from project-related traffic studies (Orano 2026d). In addition, Orano has recommended to TDOT that the State implement measures on its roadways that would mitigate traffic impacts (Orano 2026d). These include installing a traffic control signal, a northbound right turn lane and a southbound left-turn

lane with 300 ft of storage on SR 95, restriping the existing eastbound approach to an exclusive left-turn lane, a through lane, and a right-turn lane on Novus Drive, and providing an exclusive left-turn lane and a shared through/right-turn lane for the westbound approach on the site access road to reduce the traffic impact of the new site access road at SR 95 and Novus Drive.

3.11 PUBLIC AND OCCUPATIONAL HEALTH

This section describes existing conditions and potential impacts of the proposed IKE facility, 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 IKE facility 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 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 IKE facility 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). 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 25 mrem/yr. These regulations also limit the maximum dose to any organ of the body to 25 mrem/yr for an actual person.

To limit radiological and chemical exposures associated with the IKE facility, Orano 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 IKE facility include natural background sources and man-made sources, notably the work associated with the production of highly enriched uranium and plutonium during World War II in the adjacent Oak Ridge facilities.

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 ppm 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 are 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 2024). In the State of Tennessee, the average annual doses from cosmic radiation, terrestrial radiation, and indoor radon, respectively, are 27.6, 25.1, and 511 mrem/yr (Mauro and Briggs 2005). The average total annual doses in the site vicinity from cosmic radiation, terrestrial radiation that includes radon, and ingested radioactivity, respectively, are 31, 536, and 31 mrem/yr (Orano 2026d, Table 3-57).

With regard to radiation exposures from man-made facilities in the vicinity of the proposed IKE facility, all DOE Oak Ridge facilities potentially contribute via direct exposure, atmospheric releases, and liquid effluent releases. DOE actively monitors radiological contaminants in air and effluents as part of their radiation monitoring program. Using data from 2024, DOE calculated potential radiological exposures associated with the ORNL via air and water pathways and from consumption of wildlife harvested at ORR. DOE estimated that the dose to the maximally exposed individual of 0.6 mrem from air pathways, 0.3 mrem from water pathways, and 3 mrem from consumption of wildlife (Orano 2026d, Section 3.11.1.2).

3.11.2 Potential Impacts

This section summarizes potential health impacts on the nearby public and on workers at the proposed IKE facility 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 nonradiological environment during construction that is relevant to the review of the Orano license application for the proposed IKE facility (see Tables 3-1 and C-1 of this EIS). The NRC staff incorporates the technical analyses in the NR GEIS to conclude there would be SMALL impacts of chemical, biological, and physical nonradiological hazards. In addition, the NRC staff identified one NR GEIS Category 1 issue related to the radiological environment and one related to the nonradiological environment during operation that are relevant to the review of the Orano license application. The NRC staff incorporated the technical analyses in the NR GEIS to conclude there would be SMALL impacts of the radiological dose to nonhuman biota, 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 site preparation and construction activities. It also evaluates the potential public and occupational health impacts from nonradiological and radiological releases during this phase.

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. Orano would develop a worker health and safety plan for the proposed IKE facility (Orano 2026d). 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 workers (as full-time equivalents), were obtained from BLS (BLS 2026c, Table 1, Incident rates of nonfatal occupational injuries and illnesses industry and case types). Using the estimated maximum of 864 construction workers at the proposed IKE facility (Orano 2026d, Table 4-30) together with the injuries and illness rate of 1.8 per 100 full-time equivalent workers for the heavy and civil engineering construction (BLS 2026c), about 16 injuries per year represents a bounding estimate for the site preparation and construction phase. The impact from site preparation and construction activities would be minor due to the use of personal protective devices and adherence to the construction health and safety plan.

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 activities. 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 IKE facility during the overlap period of its construction and early operation are discussed in the Operation subsection below; as noted, such exposures would be minor.

As described in the ER (Orano 2026d, Section 4.12.2.1), fugitive dust 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 (Orano 2026d, Section 4.12.2.1).

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 by 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 construction workers. Exposures to the offsite public would not be expected due to their distance from site preparation and 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 3-13 for the general public (i.e., 100 mrem/yr). Site preparation and construction activities would not generate any radiological contamination, but these activities could disturb areas previously contaminated due to deposition of contaminated particulates on soil due to air emissions from the DOE Oak Ridge facilities (Orano 2026d, Section 3.11.2). Construction workers would also be exposed to emissions from the proposed IKE facility during the overlap period of site preparation and construction and initial operation.

The main exposure pathways for construction personnel would be the direct dose from cylinder storage at the IKE facility. Calculations performed by Orano estimated the dose to be less than 0.01 mrem/hr in the plant's general area from the cylinder storage pads; if the workers were present in the general area for 2,000 hr/yr, the worker dose would be less than 20 mrem/yr (Orano 2026d, Table 4-55). The total maximum possible dose to construction workers from all pathways combined is estimated to be less than 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 IKE facility and (2) impacts on worker safety, notably estimated occupational injuries and illnesses. As framing context for this assessment, the NRC has statutory responsibility, pursuant to the AEA (42 U.S.C. 2011 et seq.) to protect the health and safety of workers and the public. The NRC regulations in 10 CFR Part 20 specify annual dose limits for workers, including 5 rem TEDE.

The NRC regulations also identify limits for members of the public, including (1) an annual dose of 100 mrem TEDE, with no more than 2 mrem in any 1-hour period from any external sources, and (2) an annual dose limit of 50 mrem for external sources. In addition, NRC regulations limit radiation doses to the public from airborne emissions to 10 mrem. These dose limits for individual members of the public from NRC-licensed activities are provided in Table 3-13. For context, these limits are a fraction of the estimated total individual radiation dose in the United States of 620 mrem/yr from natural and artificial sources combined (the latter includes medical imaging) (NRC 2024).

Table 3-13 Dose Limits for Individual Members of the Public from Licensed Operations[a]

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

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

In addition to meeting the NRC dose limits for individual members of the public, Orano 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 2012), to reduce exposures to the public from airborne radioactivity below the limits in 10 CFR 20.1301. Orano 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.

Orano would also implement a radiological effluent monitoring program to meet the regulatory requirements in 10 CFR 70.59, "Effluent monitoring reporting requirements." Orano 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 (Orano 2026d).

In its General Industry Standards (29 CFR Part 1910), OSHA establishes 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 1910 Subpart I ("Personal protective equipment"). Orano 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.

Orano 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 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. Orano would also be required to mitigate risk to workers from accident conditions in accordance with 10 CFR 70.61, "Performance requirements." Orano would comply with all applicable health and safety regulations.

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

Based on the anticipated chemical release, the IKE facility would be classified as a minor-source operator (Orano 2026d), and air permits would require Orano to monitor and evaluate nonradiological pollutant emissions. Chemical emissions would also be monitored under Orano's environmental monitoring plan. Orano 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. Operation of the IKE facility 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 IKE facility are those considered typical for similar industrial facilities and include exposure to chemicals and accidents ranging from minor cuts to harm from industrial machinery (Orano 2026d).

Orano would store bulk chemicals in the form of solids, liquids, compressed gases, and cryogenic liquids to support facility operation. 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.

Orano would be required to maintain an NRC-approved emergency plan, which would provide resources, training, and procedures to mitigate the impact and severity of radiological or nonradiological accidents. This plan would define the coordination of Orano's actions with the NRC, DOE, Federal Emergency Management Agency, and State of Tennessee regarding emergency response and facility security. Orano's NPDES permit would require an SPCC plan during construction and operation to prevent and control accidental chemical releases.

Public Health. The main emissions of concern for nonradiological health effects are HF and uranium (due to 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 and uranyl fluoride (UO_2F_2). 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 levels established as health protective, including the Tennessee State Department of Environmental Quality permit limits (Orano 2026d, Section 6.2.1). The use of air emission control systems and implementation of mitigation measures would reduce the levels of pollutant emissions to the atmosphere. Therefore, the NRC staff concludes that potential public health impacts from nonradiological air emissions during normal facility operation would be minimal.

Liquid releases would be managed as described in the ER (Orano 2026d) and summarized in Section 3.12 of this EIS. Potential nonradiological releases to the sanitary sewage system during the operational period would be minor and would not degrade existing water quality offsite (see Section 3.4 of this EIS). Therefore, the NRC staff concludes that potential impacts on public health associated with liquid releases would be minimal.

With regard to potential routine radiological impacts, operation of the proposed IKE facility 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 main pathway of concern potentially leading to public intake of uranium would be airborne emissions. With respect to releases to air, any UF_6 gas released

inside the buildings during plant operations and repair activities would be sent through the ventilation system employing a high-efficiency, multi-stage, emissions control system that incorporates HEPA filters to remove PM and activated carbon filters to remove HF, thereby minimizing outside releases. Liquid releases could result from decontamination, cleaning, and maintenance of failed equipment or equipment being serviced. However, these liquids would be collected in tanks, sampled, treated (if necessary), before being released into the atmosphere by evaporation. Exposure of members of the public to direct external radiation could 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 buildings would be substantially attenuated by the walls of the storage cylinder, and building walls, process lines and equipment in the proposed IKE facility:

- *Public dose from direct* gamma *radiation*. The presence of radioactive materials at the proposed IKE facility, 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 three 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 16.5 mrem/yr spending 2,000 hours at that location in 1 year), another assumed to be present at the closest business (who could possibly receive a dose of about 0.1 mrem/yr spending 2,000 hours at that location), and a third assumed to be continuously present at the closest residential location (who could potentially receive a dose of about 0.0001 mrem/yr) (Orano 2026d, Table 4-36).
- *Public dose from airborne releases of radioactive materials*. The proposed IKE facility would release small amounts of uranium to the atmosphere through rooftop stacks. Air emission estimates from Georges Besse 2 enrichment facility at Tricastin site in France were used as context for emission estimates from the IKE facility. The NRCDose3 computer code was used to calculate the potential radiological dose from IKE facility operations. The effective dose equivalent calculated for a hypothetical resident at the site boundary assumed to have the highest (maximum) exposure to facility releases is 2.62 mrem/yr. This includes the estimated dose from inhalation, air submersion, direct external dose from deposited contamination, and ingestion of contaminated food grown at that location (Orano 2026d, Table 4-54). The main contributor to dose would be direct external radiation from the cylinder storage pads. All estimated doses are far below the protective limits established by the NRC (summarized in Table 3-13 of this EIS) and by EPA (40 CFR Part 190).

As described in the ER (Orano 2026d), Orano 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 meet the public dose limits defined in 10 CFR 20.1301 (see Table 3-13 of this EIS). These data would also be used to assess compliance with technical specifications of the license regarding emission concentrations. The dose assessment presented in the ER and summarized here shows that hypothetical public doses from IKE facility emissions would be far below the protective level of 100 mrem/yr.

Environmental effluent releases would be monitored at release points or at 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 (Orano 2026d), Orano has committed to complying with NRC's Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors" (NRC 1977b). If necessary, the NRC staff would stipulate license conditions to ensure that IKE facility operations comply with the guidance in NUREG-1520 (NRC 2015a). 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 hypothetical maximally exposed member of the public would be insignificant, the potential health impact on members of the public who receive lower radiation exposures would also be insignificant (such as recreators on offsite trails whose potential exposures would be much lower than those assumed for the hypothetical maximally exposed individual). 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 IKE facility, the NRC staff concludes that the public health impact of operating the facility would be minimal.

Occupational Health and Safety. Operation of the IKE facility would result in potential direct and indirect worker exposures to radiological and nonradiological hazardous materials. During normal operation, worker exposures would be controlled to comply 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 IKE facility 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 Orano's estimate of the maximum IKE facility workforce of 1,167 full-time employees (Orano 2026d, Table 4-30), it is estimated that 19 worker injuries could potentially occur per year. This estimate is based on data from BLS (2026d), which identifies an injury rate of 1.6 total recordable cases per 100 workers (as full-time equivalents) for Tennessee in calendar year 2024, representing the chemical manufacturing industry (North American Industry Classification System Code 325). For context, this is lower than the most recent national average of 2.3 for all private industries (NSC 2026).

Orano 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 (Brock et al. 2025). The average worker doses at fuel cycle facilities are much less than the occupational dose limits for workers of 5 rem in 10 CFR 20.1201. This level of radiation exposure represents a fraction of the annual average background radiation dose received by the U.S. public (620 mrem). The IKE facility 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. The impact on occupational workers from radiation exposure would be minimal.

Therefore, the NRC staff concludes that the potential public and occupational health impacts from the proposed IKE facility during operation would be SMALL.

Decommissioning. The potential public and occupational health 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 site preparation and 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 impacts related to demolition are controlled analogously to construction safety practices, with radiological and chemical safety programs as appropriate. Therefore, the NRC staff considers potential public and occupational health impacts during decommissioning to be SMALL.

3.11.3 Mitigation Measures

The proposed action is not anticipated to result in significant public or occupational health or safety impacts. In addition to the mitigation measures listed for air emissions (Section 3.2.3), soil disturbance (Section 3.3.3), groundwater use and surface water quality (Section 3.4.3) that would also reduce impacts on public health, Orano would develop an emergency plan, inspect, test, and maintain outdoor major chemical and gas storage tanks and cylinders storing feed, tail, and product materials of the enrichment process as recommended by applicable industry codes and standards, adhere to OSHA standards, implement ventilation and effluent controls. Further measures for radiological hazards include implementing confinement barriers around radiation sources and access controls to radiological areas (Orano 2026d). No additional mitigation measures would be indicated beyond those that would be implemented under NRC, OSHA, and EPA regulations and those addressed in the NRC staff's separate safety review.

3.12 WASTE MANAGEMENT

This section describes waste management under current site conditions and potential waste management impacts of the proposed IKE facility.

3.12.1 Affected Environment

The proposed IKE facility is on undeveloped land (see Section 1.2), and no waste is currently 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 waste that would be

generated during the construction, operation, and decommissioning of the IKE facility; waste materials include the DUF_6 tails that would be generated during IKE facility operation. As described in Section 3.12 of the ER, waste produced at the IKE facility would be managed in accordance with Orano's solid, hazardous, and radioactive waste management program (Orano 2026d).

Construction waste would be typical of that from an industrial facility. During IKE facility 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, as amended (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 incorporates by reference and summarizes descriptive information presented in the ER (Orano 2026d, Sections 3.12 and 4.13).

The NRC staff identified two issues related to nonradiological waste management during construction and operation that are relevant to the IKE facility (see Tables 3-1 and C-1 of this EIS). The NRC staff incorporates the technical analyses in the NR GEIS to conclude there would be SMALL impacts from nonradiological waste generated 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. Site preparation and construction activities would generate solid waste materials that would be collected and transported offsite for recycling or disposal, and capacity in the area is sufficient to manage these materials. It is expected that construction debris would be typical of industrial construction projects, such as concrete, wood, metal, and soil. The specific compositions and quantities for these construction waste types would depend on the final facility design. No radioactive waste would be generated from construction.

Any hazardous waste generated throughout the construction phase would be temporarily stored onsite and then shipped to an offsite facility appropriate for handling the waste composition, in accordance with established recycling and hazardous waste management programs. Sanitary wastewater would be sent to the existing City of Oak Ridge sanitary sewer system, and stormwater would be discharged in accordance with the NPDES permit (see Section 4.4.3.3.1 of Orano 2026d and the summary in Table 1-2 of this EIS). Therefore, the NRC staff concludes that the waste and wastewater management impacts resulting from construction of the IKE facility would be SMALL.

Operation. During operation, the IKE facility would generate sanitary wastewater, uncontaminated liquid effluent, stormwater runoff, and radioactive liquid effluent as described in Table 3-14. Radioactive liquid effluent generated during facility operation would be treated onsite before discharge; this treatment would generate solid waste that would be treated onsite or offsite and shipped offsite for disposal. Table 3-14 summarizes the types and estimated amounts of wastes to be generated, together with their proposed disposition.

Table 3-14 Projected Waste Generation and Management During Normal Operation[a]

Waste Type	Estimated Quantity Generated	Management
Sanitary wastewater	5 million gal/yr	Send to the City of Oak Ridge sanitary sewer system.
Uncontaminated liquid effluent	15,625 gal/yr	Send to an evaporator for vaporization and discharge to the atmosphere.
Stormwater runoff	165 million gal/yr	Route to onsite stormwater management basin.
Radioactive liquid effluent	15,623 gal/yr	Collect in tanks in the liquid effluent collection and treatment room, then treat with filtration and precipitation processes to remove uranium and fluorine.
Construction debris	Not applicable	Total 1,625 truck shipments to the waste landfill during 7 years of construction period (maximum 275 shipments/yr).
Nonhazardous wastes	70 tons/yr	Industrial waste would be sent offsite to a waste management facility for waste minimization (treatment and/or processing), then transferred to a licensed, permitted waste landfill for disposal. Municipal waste: collected by municipal waste services and disposed of at a permitted municipal landfill.
RCRA hazardous waste	50 lb/yr; 1,000 gal/yr	Send offsite to RCRA hazardous waste disposal facility in the region.
Mixed waste	220 lb/yr	Send to offsite facility: Energy Solutions facility in Utah; Oak Ridge facility in Tennessee.
LLRW	163 tons/yr	As described for mixed waste.
Depleted UF_6 (UF_6 tails)	17,290 tons/yr	Transport cylinders with UF_6 tails by truck to a DOE facility for conversion.

[a] Source: Orano 2026d.

Regarding wastewaters, the plans for managing sanitary wastewater, uncontaminated liquid effluent, stormwater, and radioactive liquid effluent are summarized below from the ER (Orano 2026d). 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 the IKE facility would generate approximately 5 million gal/yr of sanitary wastewater. It would be collected onsite and monitored for NPDES permit requirements and would be discharged to local sewer system.
- *Uncontaminated Effluent*. Facility operation would generate an estimated 15,625 gal/yr of non-contaminated liquid effluent. It would be sent to an evaporator for vaporization and discharged to the atmosphere.
- *Stormwater*. Runoff from the IKE facility would be routed to stormwater detention basins and would be monitored for compliance with SWPPP permit requirements before being discharged to local sewer system. Runoff from the UF_6 cylinder storage pads would be routed to a stormwater retention basin, where it would be monitored to ensure radionuclides are below the acceptable levels before being released in accordance with applicable requirements.

- *Radioactive Wastewater*. IKE facility operation is expected to generate an estimated 15,623 gal/yr of radioactive wastewater from laboratory effluent, degreaser water, citric acid, laundry effluent, floor washings, miscellaneous condensates, and radiation areas emergency hand washing and shower water (Orano 2026d). The liquid effluent would be sampled for uranium contamination and then sent to effluent collection tank in the liquid effluent collection and treatment room; it would be treated to remove uranium. The treated effluent would be filtered, and precipitation would generate a sludge solid waste stream; the clean liquid stream would be sent to an evaporator for vaporization.

Regarding solid wastes, IKE facility operations would generate (1) construction debris and other nonhazardous solid waste, (2) wastes designated as RCRA hazardous wastes, (3) mixed waste, and (4) LLRW. In addition, depleted uranium would be produced by the uranium-enrichment process. No high-level radioactive waste, transuranic waste, or greater than class C waste would be generated by facility operation. Potential impacts of solid waste disposition are summarized below. Potential impacts of transporting solid wastes from the IKE facility are discussed in Section 3.10 of this EIS:

- *Nonhazardous/Nonradioactive Waste*. IKE facility operation would generate an estimated 70 tons/yr of nonhazardous (industrial and municipal) solid wastes. Industrial waste would be sent offsite to waste management facility for waste minimization (treatment and/or processing), then transferred to a licensed and permitted waste landfill for disposal. Municipal waste would be collected by municipal waste services and disposed of at a permitted municipal landfill. The NRC staff concludes that potential impacts would be SMALL because 70 tons/yr is a small fraction of the nonhazardous waste disposal capacity in the region.
- *Hazardous Waste*. IKE facility operation would generate approximately 50 lb/yr of solid waste and 1,000 gal/yr of liquid RCRA hazardous waste. The nonradioactive portion would be temporarily stored onsite. The waste would be shipped to a RCRA-permitted Subtitle C facility, or an equivalent facility for treatment, storage, and disposal. The waste would be transported in DOT approved shipping containers. The NRC staff concludes that potential impacts are expected to be SMALL because regional facilities have enough capacity for the disposal of hazardous waste.
- *LLRW and Mixed Waste*. A variety of uranium-contaminated wastes would be expected to be generated from operating the proposed IKE facility. Except for the DUF_6 tails (discussed below), the majority of the LLRW (163 tons per year) would be the combustible and non-combustible portions of contaminated used items, including 4,599 lb/yr of sludge from the treatment of liquid wastewater (Orano 2026d). This LLRW[11] could be shipped in LLRW Type A containers to any of the three facilities discussed in the ER (Orano 2026d, Table 4-5), the Waste Control Specialists facility in Texas, the Energy Solutions Clive facility in Utah, or the Energy Solutions Oak Ridge facility in Tennessee. These facilities are respectively about 1,123 miles, 1,733 miles, and 1 mile from the IKE site. All three accept Class A radioactive and mixed waste. (The

[11] With regard to volume, during operation, the LLRW would be shipped in 55-gal drums (one drum corresponds to less than 0.25 m^3), and 900 containers would be shipped per year (Orano 2026d, Table 4-4). Thus, the volume generated would be less than 225 m^3. With regard to activity, using the specific activities from IAEA (2026), if it were conservatively assumed that these waste streams (about 150 MT/yr, or 150,000 kg/yr) were natural uranium (specific activity 25.4 Bq/milligram), the total activity would be 103 Ci. Note: the specific activity of DU, at 14.8 Bq/milligram, is less than 60 percent of that for natural uranium.)

IKE facility would not generate any greater-than-Class A waste.) The NRC concludes that the impact of this transportation would be SMALL because approximately 163 tons/yr of waste is a small fraction of the amount being disposed of in domestic facilities (which in 2023 exceeded 3 million cubic ft, see NRC 2026l). IKE facility operation would generate 220 lb/yr of mixed waste. Mixed waste would also be disposed of in an NRC-licensed disposal facility, as discussed for LLRW.

- *DUF_6 Tails*. Operation of the IKE facility to enrich natural uranium would generate an estimated 17,290 tons/yr of DUF_6 tails as a byproduct, on average. Orano (2026d) estimates that 640,000 tons of DUF_6 tails could be generated over the IKE facility's 40-year operating period, assuming a 7.4 million SWUs/yr plant that averages up to 10 percent uranium-235 enrichment by weight. These tails would be temporarily stored onsite on an outdoor pad in standard steel cylinders used for storing UF_6. At 2.5 million square ft, the current storage pad design is large enough to accommodate the total inventory expected from 40 years of IKE facility operation. The enriched uranium product would be shipped offsite to conversion facilities for further processing. (The disposition of the DUF_6 cylinders would occur as part of decommissioning activities.) There would be no onsite processing or disposal of the UF_6 tails during facility operation.

As described above, solid, hazardous, and radioactive wastes generated during facility operation would be managed in accordance with best practices and regulatory requirements. Further, the impact on disposal facilities of waste generated during operation would be minor. Thus, the NRC staff concludes that potential impacts from waste management during facility operation would be SMALL.

Decommissioning. During decommissioning, the separations building modules would be sequentially shut down, which would reduce the generation of radioactive waste compared to the operational phase. Because fewer workers would be onsite, the amount of sanitary wastewater would decrease. Stormwater would be managed in the same manner as during the operational phase. Because these impacts would be similar to those during facility operation, the NRC staff concludes that impacts of wastewater management during decommissioning would be SMALL.

Regarding solid wastes, nonradioactive wastes including demolition debris generated onsite would be shipped offsite to salvage or disposal facilities, as appropriate. 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. Radioactively contaminated equipment and materials removed during decommissioning would be shipped to a licensed treatment or disposal facility authorized by the NRC.

The DUF_6 produced by the enrichment process and temporarily stored onsite during facility operation would be dispositioned during the decommissioning phase. As context for this disposition, as described in the August 12, 2026, *Federal Register* notice (NRC 2026m):

> *"unless Orano demonstrates a use for uranium in the depleted tails as a potential resource, the depleted tails would be considered waste. The Commission has previously concluded that depleted uranium from an enrichment facility is appropriately classified as low-level radioactive waste* […]*. An approach for disposition of tails that is consistent with the USEC Privatization Act, such as transfer to the Department of Energy (DOE) for disposal, constitutes a "plausible strategy" for disposition of the Orano depleted tails."*

If not already sold or otherwise dispositioned, Orano plans to transport the DUF_6 tails to the DOE Portsmouth facility in Ohio or the DOE Paducah facility in Kentucky for further processing (conversion) and ultimate disposal (Orano 2026b, Section 10.1.1). The potential impacts of transporting the tails from the IKE facility to offsite facilities are discussed in Section 3.10.2. The potential impacts of DOE's subsequent shipment of converted DU oxide from these facilities to potential disposal sites (such as the commercial facility in Clive, Utah, or the DOE facility at the Nevada Test Site) have been previously evaluated for the DU stored at DOE's Portsmouth and Paducah sites (DOE 2004a,b).

Consistent with the recent *Federal Register* notice (NRC 2026m), the NRC staff also considered DOE's *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride* (DOE 1999) in preparing this EIS, including the alternatives DOE evaluated in that review. Those alternatives were no action, long-term storage as UF_6 or the oxide, conversion to uranium oxide or uranium metal for commercial or institutional use, and disposal. The DOE's preferred alternative was to initiate conversion of the tails as soon as possible, to the oxide, metal, or a combination of both (DOE 1999). The NRC staff found that Orano's proposed approach for the DUF_6 tails from the IKE facility is consistent with the conversion alternatives described in the DOE (1999) programmatic EIS. In that EIS, the DOE found that the waste management impacts of ultimate disposal as DU oxide would be negligible to low with respect to both existing and projected nationwide waste generation.

Therefore, the NRC staff concludes that solid waste management impacts resulting from decommissioning the IKE facility 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 Orano has outlined waste minimization and pollution-prevention practices encompassing waste generation, collection, removal, and disposal. Orano's waste management program intends to minimize the generation of waste through reduction, reuse, or recycling (Orano 2026d). With an emphasis on pollution prevention and waste minimization, Orano'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.

3.13 ACCIDENTS

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

3.13.1 Affected Environment

The proposed IKE facility 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 IKE facility. The NRC staff performed an independent verification and evaluation of Orano's technical report on potential accident scenarios and associated consequences at the IKE facility. Results of the evaluation are presented in a safety

evaluation report, which 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 IKE facility. As used in this section, the term "accident" 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 IKE facility.

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. Orano's license application for the IKE facility (Orano 2026b) uses the hazard and operability analysis method to identify the hazards for the UF_6 process systems and the technical support building. This method is consistent with the guidance provided in NUREG-1513, *Integrated Safety Analysis Guidance Document* (NRC 2001) to conduct integrated safety analysis for each process and node to identify hazards. The hazard identification process identifies radiological, nuclear criticality, chemical, and fire hazards with potential for causing harm to site workers, the public, or extreme damage to the environment. Hazards are identified through a systematic review process that entails the use of system descriptions, piping and instrumentation diagrams, process flow diagrams, plot plans, topographic maps, utility system drawings, and specifications of major process equipment. In addition, criticality hazard identification is performed for the areas of the facility where fissile material is expected to be present, with information about the location and geometry of the fissile and other in-process material that could affect a criticality accident, for both normal and credibly abnormal conditions. Most hazards are assessed individually for the potential impact on the discrete components of the process systems. However, for hazards initiated by fires external to the process system and from external events (such as a seismic event or severe weather), the impacts were assessed on a facility-wide basis.

The consequences of concern associated with the hazards identified for the proposed IKE facility would be related to either the release of UF_6 due to loss of confinement or a nuclear criticality[12] 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. HF would be in a gaseous form and could be transported in air through the facility and potentially beyond the site boundary. This gas[13] is considered a toxic chemical with the potential to injure facility workers and the public.

The consequences analyzed by Orano included chemical exposures to UF_6, HF, and UO_2F_2 and radiological doses from UF_6 and UO_2F_2 for workers and/or members of the public from loss of confinement accidents. The consequences analyzed from nuclear criticality accidents included prompt effective external doses and subsequent radiation doses from air submersion, inhalation, and groundshine associated with the atmospheric releases of noble gases and

[12] 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.

[13] 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.

halogens, as well as the particulates and uranium isotopes in the evaporated solution that are produced by the criticality events.

A comprehensive list of hypothetical accident sequences was developed for the IKE facility (Orano 2026b, Section 9.2.3). A risk assessment was conducted for each accident sequence using methods described in NUREG/CR-6410, *Nuclear Fuel Cycle Facility Accident Analysis Handbook* (NRC 1998) that involve assigning a likelihood index (3: not unlikely; 2: unlikely; 1: highly unlikely) and a consequence index (3: high consequence; 2: intermediate consequence; 1: low consequence) to an accident sequence and then determining the risk index of the accident sequence as the product of the likelihood index and consequence index. A risk index value less than or equal to 4 defines the accident sequence as being controlled within an acceptable level. Table 3-15 identifies the radiological and chemical dose limits for the high- and intermediate-consequence categories based on 10 CFR 70.61. For an accident sequence to be in the low-consequence category, the dose to workers or receptors outside the control area should be lower than the limits of the intermediate-consequence category.

Table 3-15 Radiological and Chemical Limits for Consequence Severity Categories[a]

Limit Type	Receptor	High Consequence	Intermediate Consequence
Acute radiological dose	Worker	>100 rem TEDE	>25 rem TEDE
	Outside controlled area	>25 rem TEDE	>5 rem TEDE
Acute chemical exposure	Worker (10-minute exposure)	>2,816 mg UF_6/m^3 (>147 mg uranium/m^3) >139 mg HF/m^3	>28 mg UF_6/m^3 (>19 mg uranium/m^3) >78 mg HF/m^3
	Outside controlled area (30-minute exposure)	>21 mg uranium intake >28 mg HF/m^3	>4.06 mg uranium intake >0.8 mg HF/m^3
Radiological release	Outside restricted area (environment)	Not a 10 CFR 70.61 performance requirement	>1.7 mg uranium/m^3 (24-hr average)

[a] Source: Orano (2026b, Table 6-12). mg = milligram. TEDE = total effective dose equivalent; values are from NRC (2015a, Table A-1). Values for HF and UF_6 are acute exposure guideline levels (National Research Council 2004); the latter are for soluble uranium. Values for uranium are based on health effects of soluble uranium (NRC 1991).

For the safety analysis for the proposed IKE facility, Orano evaluated the uncontrolled/ unmitigated consequences of each accident sequence (for short, “accident” is used in the remaining section) at the proposed IKE facility and the controls (“items relied on for safety”) it would use to prevent or mitigate the consequences against NRC’s performance requirements for accidents set forth in 10 CFR 70.61 (Performance Requirements). To comply, the IKE facility must have controls that achieve the following:

- 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);
- 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 accidents 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).

The proposed IKE facility accident mitigations would be designed and built to withstand any internal (e.g., caused by a component failure) or external (e.g., caused by weather or natural phenomena events) accident without loss of capability needed to mitigate consequences. The industrial codes and standards Orano would follow to design and construct the IKE facility as well as various preventive controls that would be incorporated into different steps of the enrichment process are discussed in the safety portion of the license application (Orano 2026b).

To evaluate the unmitigated consequences associated with each accident scenario, Orano applied the method prescribed in NUREG/CR-6410 (NRC 1998) for source term, which is the fraction of the uranium inventory that would be released in an accident, and the dispersion modeling code, RASCAL (NRC 2015b), which is based on NRC Regulatory Guide 1.145, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants" (NRC 1982). Consistent and conservative approaches were followed to determine the release fraction, dispersion factors, and meteorological conditions to estimate the exposure concentrations and durations. As such, the unmitigated consequences would be overestimated for the accidents analyzed. The accidents that could impact the public and the environment, as identified in the safety portion of the application include UF_6 releases and nuclear criticality (Orano 2026d, Section 4.12.4.2).

Fire safety controls for the IKE facility would involve the following: (1) eliminate the hazards with proper process configuration and system design, in building construction, electrical installation and distribution, signage and symbols for emergency egress, ventilation, drainage, and lightning protection; (2) passive engineered controls such as fire-rated barriers, doors, windows, coatings, and containers, in designated areas; (3) automatic engineered controls including fire alarms for evacuation, hydrants or hose and reel stations, and suppression systems; and (4) administrative controls for transient combustibles, fuel volumes, confined space, or hot work permitting (Orano 2026b). Fire protection systems and equipment would be inspected periodically following guidance of NFPA 25 for water-based fire systems (NFPA 2023) and NFPA 70B for maintaining related electrical systems (NFPA 2026).

To reduce the release of hazardous materials, physical barriers including double-walled piping and tanks, liquid confinement dikes, enclosures for exhaust decontamination, splash shields for bulk liquid hazardous chemicals handling, backflow preventers and siphon breaks, overflow vessels, and chemical traps and filters would be used (Orano 2026b). The chemical process safety functions and areas would be audited at least triennially (Orano 2026b).

As described in the license application (Orano 2026b), Orano would adhere to the double contingency principle and incorporate into process designs sufficient factors of safety to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible. Preventive controls for the criticality scenario would include preventing accidental uranium enrichment excesses (no greater than 10 percent by weight enrichment); maintaining safe geometry; and incorporating moderation controls within UF_6 processes. Mitigative controls include criticality monitoring and alarm systems and emergency planning and response training. Furthermore, periodic audits and assessments, including observation of operations and verification of equipment configuration, would be conducted to ensure the adequacy of criticality controls.

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 accidents at the IKE facility would be reduced such that the facility would be in compliance with the performance requirements outlined in 10 CFR 70.61. Based on the analyses briefly summarized in this review, the NRC staff concludes that the impacts from potential material release or criticality accidents at the proposed IKE facility would be SMALL because the likelihoods of such accidents are very low.

Decommissioning. No assessment of radiological or hazardous chemical accidents is associated with this phase; as described for site preparation and construction, the evaluation of accident impacts 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 impacts. Current processes, programs, and regulations would be in place to reduce the potential for adverse health effects. No additional mitigation measures would be indicated beyond those that would be implemented under NRC, OSHA, and EPA regulations and those addressed in the NRC staff's separate safety review.

4 CONCLUSIONS AND RECOMMENDATIONS

This EIS describes the environmental review conducted by the NRC staff of Orano's application for a license, pursuant to 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," 10 CFR Part 40, "Domestic Licensing of Source Material," 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 authorize Orano to construct and operate its uranium enrichment facility on a 188-acre portion of the 624-acre IKE site in Roane County, Tennessee. 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 Orano's application. Section 4.1 summarizes the environmental impacts from construction, operation, and decommissioning of the IKE facility 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 Orano 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 Orano to possess and use special nuclear material at the IKE facility would have SMALL environmental impacts, and in one case SMALL to MODERATE environmental impacts (the MODERATE impacts would be beneficial). Table 4-1 summarizes the potential environmental impacts of the proposed IKE facility, which highlights information from Chapter 3 and from the cost-benefit analysis in Section 4.4. Anticipated impacts from the proposed action 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 socioeconomics (largely beneficial) — and SMALL for all the others. The NRC staff also considered the reasonably foreseeable effects of actions with a close causal relationship to the proposed Federal action regardless of which agency (Federal or non-Federal) or person undertakes them.

4.1.2 No Action

No alternative locations for the IKE facility 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 Orano for the construction and operation of its uranium enrichment facility. 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 IKE facility 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 IKE Facility

Resource Area	Summary of Impact	Impact Level
Land use	The proposed IKE site is on land zoned for FIR, and its use would be consistent with that zoning, as well as with other industrial development nearby. Approximately 188 acres of forested and former agricultural land could be cleared for the IKE facility, but access to much larger tracts of nearby land for recreation and other uses would continue. Operation would be confined to the IKE site. Decommissioning is expected to result in release of the land 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 site preparation and 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. IKE 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 soil resources	Site preparation would involve cut and fill activities to achieve the final grade, and soil would also be disturbed during excavation of stormwater retention basins and emplacement of building footings. Construction of the access road and parking facilities would involve excavating, scraping, grading, and paving. No further soil disturbance would occur during facility operation. Potential seismic hazards would be mitigated through design to ensure that the IKE 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. Decommissioning would involve removing building structures and foundations and establishing vegetative cover.	SMALL
Surface water resources	The potential for surface water quality to be impacted by soil erosion or incidental release of chemicals used during site preparation and construction would be minimized by implementing BMPs and adhering to conditions of the NPDES stormwater construction permit. During operation, potential impacts on surface water quality from stormwater runoff would be minimized by collecting stormwater in retention and detention basins and discharging it from the latter to East Fork Poplar Creek after ensuring adherence to the NPDES permit conditions. The NPDES permit would include a SWPPP and SPCC, and adherence to those conditions would likewise minimize impacts. Sanitary wastewater would be sent to the City of Oak Ridge treatment plant, which has substantial excess capacity.	SMALL
Groundwater resources	No groundwater would be withdrawn for the IKE facility because Oak Ridge would supply municipal water. Groundwater quality is not expected to be affected by site preparation and construction, operation, or decommissioning activities. The likelihood of contaminated surface water infiltrating to groundwater is low. The IKE facility would use lined basins for potentially contaminated stormwater, the unsaturated zone thickness greatly limits surface water–groundwater interaction, and Orano would monitor groundwater as part of its integrated monitoring program.	SMALL

Resource Area	Summary of Impact	Impact Level
Ecological resources	Biotic communities and wildlife would be impacted by habitat disturbance and vegetation loss during site preparation and construction; most of the IKE site would not be disturbed. Temporary, indirect impacts in the vicinity could result from noise, traffic, human presence, and lighting, but such impacts on biotic communities and wildlife populations would be localized and would not eliminate travel corridors or destabilize the existence of these communities and species in the surrounding area. The facility footprint avoids major perennial streams, and applicable BMPs would be used to minimize impacts on aquatic habitat and biota. Site preparation and construction activities would result in direct impacts on wetlands and alteration of drainage areas in the facility footprint. Less than 0.5 acre of wetlands would be impacted, but the impact has already been mitigated through Orano's purchase of licensed stream bank credits. Operation would not impact ecological resources beyond those affected during site preparation and construction. Vehicular collisions with wildlife could occur during all phases of the project, but the impact would not be significant. Lighting could potentially affect wildlife use of habitat at or near the facility, and impacts would be mitigated with downward-facing lights. There would be no water withdrawals or direct discharges to aquatic habitat. No further impacts would be expected during operation or decommissioning beyond those associated with site preparation and construction. With regard to protected species, there is no ESA-designated critical habitat on the IKE site. Protected bat species could potentially be impacted by tree-clearing activities, but alternative roosting habitat is available around the site and mitigation measures would be taken to reduce impacts. The NRC staff recently concluded ESA consultation with the FWS, which it conducted jointly with the DOE and USACE. During consultation, Orano committed to implementing conservation measures and BMPs consistent with the FWS's programmatic biological opinion, *Conservation Strategy for Indiana and Northern Long-eared Bats in Tennessee* (FWS 2026).	SMALL
Socioeconomics	Employment during site preparation and construction would create more than 1,000 jobs annually on average, including direct workers at the facility and workers employed throughout the regional economy as a result of project-related business and household spending. Direct and indirect workers could exceed 1,400 annually during the operational period (including the overlap with site preparation and construction activities), and decommissioning would result in a gradual reduction in the number of direct and indirect workers, to 265 per year, on average. Direct and indirect total income during site preparation and construction could approach $824 million, and the respective salary and wage earnings during operation are estimated to total $190 million. The decommissioning phase is estimated to produce $142 million in direct and indirect total income. With most direct workers expected to commute to the site from within the region, the impact on the number of vacant rental housing units during site preparation and construction, and on the number of vacant owner-occupied housing units during operation, is expected to be small. The project is not anticipated to significantly strain existing public schools, health care services, or emergency services during construction, operation or decommissioning.	SMALL to MODERATE (beneficial)
Historic and cultural resources	No historic properties would be impacted by the IKE project, and there would be no impacts on historic or cultural resources.	SMALL

Resource Area	Summary of Impact	Impact Level
Visual and scenic resources	During site preparation and construction, temporary visual intrusions into the landscape could result from clearing and the use of cranes, and the large industrial buildings would alter the landscape at the site itself. The natural topography and dense trees would be expected to block views of the facility from travelers and neighbors, except for the stack. However, the stack would have a narrow profile that would not obstruct views of the broader natural landscape. The IKE facility would result in some impacts on visual and scenic resources, but would not significantly alter the viewshed or the character of the landscape. While the project would introduce new visual elements and localized contrast, such changes would occur within a landscape that has a demonstrated capacity to accommodate visual modification without fundamentally altering overall visual character or scenic value.	SMALL
Noise	Noise levels during site preparation and construction would increase ambient levels by no more than 1 dBA. Ambient noise levels combined with project IKE contributions might temporarily exceed the EPA guideline, primarily due to high baseline levels resulting from traffic on adjacent highways, but levels would remain below the acceptable limit. Noise levels during facility operation would be lower than during site preparation and construction because mechanical equipment would be housed in enclosed structures. Noise levels during decommissioning would be similar to those during site preparation and construction because similar equipment would be used.	SMALL
Transportation	Transportation impacts during site preparation and construction would be temporary and variable. Activities would require heavy-duty tractor-trailer trucks, heavy-haul trucks, and light-duty delivery trucks to deliver construction materials, supplies, and equipment, as well as vehicles for workers commuting to the site. During operation, traffic impacts would be from workers commuting to the site, shipments of equipment and supplies to the site, and shipments of fabricated fuel and wastes produced at the site. During both site preparation and construction and operation, traffic congestion would increase during peak commuting hours, resulting in an estimated incremental delay of 50 seconds or less, and the LOS would remain acceptable. During decommissioning, the average number of truck shipments would be similar to those during the initial three years of construction, which would be less than those during operation. The estimated radiological doses for incident-free transportation would be 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 all applicable NRC and DOT requirements.	SMALL
Public and occupational health	Radiological impacts during the construction period that overlaps with operation would primarily be incurred by workers proximal to cylinders stored at the IKE site; estimated doses are expected to be below the NRC limit established in 10 CFR 20.1301(a)(1). During facility operation, Orano 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	Wastes generated at the IKE facility would be managed in accordance with Orano's solid, hazardous, and radioactive waste management program. Construction wastes would be typical of those for an industrial facility. Hazardous waste would be temporarily stored onsite before being shipped offsite to a licensed facility. Wastewater discharges would be managed under the NPDES permit. DUF_6 tails would be temporarily stored on an outdoor pad onsite before being shipped offsite to a conversion facility (or facilities) for further processing at the time of decommissioning. 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 would be shipped to a RCRA-permitted Subtitle C facility; radioactively contaminated equipment and materials would be shipped to a licensed treatment or disposal facility.	SMALL
Accidents	The analysis presented by Orano in the safety portion of the application indicates that sufficient mitigation and prevention controls are designed for the IKE facility to reduce the consequences and likelihoods of potential high- and intermediate-category accidents to satisfy 10 CFR 70.61 requirements. Orano 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
Land use	SMALL	SMALL
Air quality	SMALL	SMALL
Geology and soils	SMALL	SMALL
Water resources	SMALL	SMALL
Ecological resources	SMALL	SMALL
Socioeconomics	SMALL to MODERATE	SMALL
Historic and cultural resources	SMALL	SMALL
Visual and scenic resources	SMALL	SMALL
Noise	SMALL	SMALL
Transportation	SMALL	SMALL
Public and occupational health	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 resources that would be associated with constructing, operating, and decommissioning the proposed IKE facility. 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, 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 IKE facility. Two such resources would be irreversibly and irretrievably committed: (1) waters of the United States that would be altered during site preparation and construction; and (2) Federal resources in terms of labor time and cost, including oversight activities by NRC staff during IKE operation. The limited portions of streams and wetlands that would be irreversibly and irretrievably committed, as waters of the United States, would be minimized through BMPs and mitigated through licensed stream bank credits, which Orano has already purchased. 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 IKE facility 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 Orano 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 IKE 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.

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

The construction, operation, and decommissioning of the IKE facility 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 uses 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 188 acres of land to industrial use. This change would align with the current zoning and intended use of this land. The IKE facility would change the viewshed of the existing landscape for users of a small portion of an adjacent trail and roadway. 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 IKE facility, as described in Section 3.4.2 of this EIS.

Air emissions from construction, operation, and decommissioning would introduce small amounts of radiological and nonradiological constituents at the IKE 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 (notably during construction and decommissioning) 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 IKE site. Furthermore, existing roadway traffic would have a masking effect during daytime hours. Noise levels would return to background levels once construction and decommissioning activities were complete.

The additional demands on community services resulting from construction, operation, and decommissioning of the IKE facility 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 IKE operation. Worker and delivery vehicle-related traffic would be short term during peak construction and decommissioning activities and work shifts; therefore, the associated impacts 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. As indicated, the incremental use of land to meet waste disposal needs would reduce the long-term productivity of that land. The extension or installation of service lines (e.g., water, wastewater) during site preparation for construction of the IKE facility 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 IKE facility 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: (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 and maintenance operations 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.

Orano 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 Orano, many of which are related to compliance, are discussed in Chapter 5 of the ER (Orano 2026d) and discussed in Section 4.3.1 below. 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

Orano identified a suite of mitigation measures in the ER (Orano 2026d) 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 Orano and found that these measures are sufficiently protective of human health and the environment. The NRC staff identified additional mitigation measures as recommendations (Table 4-4). While the NRC cannot impose mitigation outside its regulatory authority under the AEA, these additional mitigation measures in Table 4-4 could potentially reduce the impact of the proposed action. No additional mitigation measures were identified for land use, socioeconomics, transportation, public and occupational health, waste management, or accidents.

Table 4-3 Summary of Mitigation Measures Proposed by Orano (Source: Orano 2026d)

Resource Area	Impact Type	Proposed Mitigation Measure
Land use	Land disturbance	Orano would minimize the footprint to limit the impacts of ground disturbance.
Air quality	Emissions and fugitive dust	Orano would implement a comprehensive program that incorporates multiple air emission-control components to minimize impacts on air quality. Instrumentation would be provided to detect and signal via alarm all non-routine process conditions, including the presence of radionuclides or HF in the exhaust system that would trip the system to a safe condition in the event of effluent detection beyond routine operational limits. BMPs would be applied to minimize fugitive dust during construction, including providing gravel to and imposing speed limits on the unpaved surface of haul roads, and limiting the height and disturbances of stockpiles.
Soil resources	Soil disturbance	Orano would implement BMPs to minimize soil impacts. Soil would be tested prior to disturbance; stormwater retention basins would be lined; temporary construction laydown/parking areas would be graded following facility construction, as needed; and disturbed soil would be stabilized within 14 days.
Water resources	Groundwater use and surface water quality	Orano would implement BMPs to mitigate soil impacts in the Orano SWPPP and SPCC plan and would operate in compliance with permits from the USACE, the State (including TDEC), and the City of Oak Ridge. Orano would establish appropriate engineering and design controls and implement a groundwater monitoring program and ensure containment of concrete washout.
Ecological resources	Habitat disturbance, alteration of wetland	Orano has purchased licensed stream bank credits to mitigate wetland impacts. Orano would use dust suppression methods to minimize dust emissions, fence the stormwater retention and detention basin to limit access by wildlife, continue seasonal monitoring of habitat to confirm habitat use by sensitive species, protect migratory birds during the construction and decommissioning of the facility, including avoiding areas containing active nests of migratory birds, use low maintenance landscaping in and around the stormwater detention basin, and manage unused open areas (i.e., leave undisturbed), including areas of native plant species and vegetation for the benefit of wildlife. Orano would avoid tree and vegetation clearing during bat roosting season and bird nesting season. Orano would use downward-facing, low-impact lighting during construction, and use native seed mixes to revegetate impacted areas.
Historic and cultural resources	Disturbance of resources	Orano would limit the facility footprint to avoid unnecessary soil disturbance and unintentional impact on resources that might be present.
Visual and scenic resources	Visibility from offsite locations	Orano would use downward-facing, low-impact lighting during construction and would maintain as much forested land as possible surrounding the IKE facility during construction and operation to limit visibility from offsite locations.

Resource Area	Impact Type	Proposed Mitigation Measure
Noise	Noise emissions	Orano would limit construction or decommissioning activities with potential of noise or vibration that could result in a negative impact on nearby residents in daytime hours. Orano would sequence construction or decommissioning activities to minimize the overall impact. Orano would keep noise-suppression systems on construction vehicles in proper operation. Orano would post appropriate State highway signs warning of blasting and would use blasting mats, if necessary.
Transportation	Traffic volume	Orano has recommended to TDOT that the Department install a traffic control signal, a northbound right turn and a southbound left turn lane with 300 ft of storage on SR 95, restripe the existing eastbound approach to an exclusive left turn lane, a through lane, and a right turn lane on Novus Drive, and provide an exclusive left turn lane and a shared through/right lane for the westbound approach on the site access road to reduce the traffic impact of a new site access road at SR 95 and Novus Drive.
Public and occupational health	Nonradiological and radiological hazards	In addition to the mitigation measures listed for air emissions, soil disturbance, groundwater use and surface water quality that would also reduce impacts on public health from nonradiological hazards, Orano would develop an emergency plan, inspect, test, and maintain outdoor major chemical and gas storage tanks and cylinders storing feed, tail, and product materials of the enrichment process as recommended by applicable industry codes and standards, adhere to OSHA standards, and implement ventilation and effluent controls. Further measures for radiological hazards include confinement barriers around radiation sources and access control to radiological areas.
Waste management	Volume of wastes to be managed	Orano would implement a waste-minimization plan to reduce the quantities of waste generated at the IKE site that require onsite management and disposal. Orano would incorporate a design that minimizes the release of chemicals or other nonradioactive materials into the environment. Orano would group solid waste for efficient packaging prior to transport and disposal at an offsite licensed waste facility. Orano would implement employee training and education on general environmental activities and hazards regarding the facility, its operation, and the pollution prevention program. Orano would implement recycling plans for the construction and operation project phases.

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

Resource Area	Activity	Proposed Mitigation Measure
Air quality	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 site 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, and 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 ppm 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 soils	Soil disturbance and erosion, inadvertent contamination	Limit cut/fill slopes to a horizontal-vertical ratio of 3:1 or less. Inspect outgoing trucks and remove any loose soils from truck-bed edges. Install a truck washing station onsite to remove soils from truck tires. Place gravel construction pads at the entrances/exits of construction areas. Decontaminate vehicles prior to demobilization.
Water resources	Runoff and conservation	Limit cut/fill slopes to a horizontal-vertical ratio of 3:1 or less. Suspend general construction activities during storms and impending precipitation. As indicated, construct stream crossings (i.e., install culverts) following at least 48 hours of dry weather. Divert stream flow during stream-crossing construction to minimize excavation in flowing water. 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 alteration	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. In addition, 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 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). Restrict site preparation 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. Install animal-friendly fencing around the IKE 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 Tennessee Wildlife Resources Agency or TDEC to reseed at an appropriate location. 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. Develop an integrated vegetation management plan for the control of noxious weeds and invasive species, and prevent their establishment and spread 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, use fully shielded or full cut-off fixtures to limit light spill and glare beyond the site boundary, and select lighting intensity and color temperature to minimize contrast with the surrounding nighttime environment. Use non-reflective materials and neutral exterior colors (e.g., earth tones) that blend with the surrounding forest and sky. Post signs to prevent unauthorized excavation and maintain a substantial no-cut timber buffer around the perimeter of the SSP-2 parcel to sustain natural visual screening from SR 58 and SR 95.
Noise	Noise reduction	Operate equipment with internal combustion engines at the lowest operating speed to minimize noise emissions. Close engine housing doors during equipment operation to reduce noise emissions from the engine. Avoid unnecessary equipment engine idling. Whenever practical, use quiet equipment or construction methods, such as quieter, white-noise or broadband back-up alarms on construction equipment.

Resource Area	Activity	Proposed Mitigation Measure
Transportation	Traffic reduction	Schedule truck deliveries and shipments as well as worker shift changes for off-peak traffic periods to reduce potential congestion on local roadways during peak worker commuting periods. Implement voluntary programs to encourage worker carpooling 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(2)(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.C. 4332).

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 potential positive and negative internal and external benefits and costs of the proposed Federal action, 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 IKE facility are described in Chapter 7 of the ER (Orano 2026d).

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 IKE facility, these impacts are described in the ER (Orano 2026d). 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 IKE facility would be located would not be developed as an enrichment facility, and no facility-related impacts on the environment and surrounding communities would be expected. However, not constructing the IKE facility would result in forgoing the benefits it 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, and energy efficiency, and economic and fiscal impacts. External costs include the cost of constructing and operating the IKE facility, 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.

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.	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
Employment, payroll and purchase income	The IKE facility would employ more than 1,000 direct and indirect workers on average during site preparation, construction, and start-up, overlapping with operation; more than 1,400 direct and indirect jobs could be generated annually during operation until the final year; regional income would increase due to employee payroll and local purchases of goods and services.	MODERATE
Tax revenue	Sales and tax income would increase due to Orano and employee spending; income from corporate taxes would increase due to tax on Orano profits.	SMALL
Costs		
Construction and operating costs	Proprietary information.	MODERATE
Land use	The IKE facility would be built on previously undeveloped land zoned for heavy industrial use, approximately 1 mile from the TRISO-X fuel fabrication facility; no impact on surrounding land use is expected.	SMALL
Transportation	Temporary highway congestion could occur in the immediate area of site entrances during hours of peak traffic.	SMALL
Soils	No significant adverse impacts on soils are anticipated. Soils in the facility footprint would be impacted by site preparation activities, and excavated soil would be used as fill. Impacts of construction (and decommissioning) would be much lower, and operational impacts would be minimal.	SMALL

Cost-Benefit Category	Description	Scale of Impacts
Water resources	No significant adverse impact on nearby wells is anticipated because there would be no withdrawals, and no impacts are expected on 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 are anticipated.	SMALL
	An 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, and potential temporary impacts on floodwaters during flood events would be minor.	SMALL
Air quality	Impacts from air emissions would not substantially change the ambient air quality at the site or in the vicinity.	SMALL
Ecological resources	Protected bat species could potentially be impacted by tree clearing activities. One Federally listed endangered bat species may be affected, but is not likely to be adversely affected. Three Federally listed or proposed bat species are likely to be adversely affected. One Federally proposed insect species and one Federally threatened plant are not likely to be adversely affected. Less than 0.5 acre of wetland would be altered, and impacts would be mitigated (including through stream bank credits that have already been purchased).	SMALL
Social services	Small increases in the regional population would not burden housing, schools, police or fire services, or health care services.	SMALL
Noise	Noise modeling indicates impacts from site preparation and construction, operation, and decommissioning would be minor.	SMALL
Public and occupational health	Some work-related injuries are estimated during site preparation and construction; no adverse health impacts are projected for either employees or the public due to radiological or nonradiological releases.	SMALL
Wastewater	Process wastewater would be treated to remove uranium, which would generate a sludge that would be managed as solid waste. A clean liquid stream would be evaporated. The nonradioactive and nonhazardous liquid effluents (sanitary and stormwater discharges) would be collected, monitored, and discharged to the local sewer system or via TDEC-permitted discharge pathways.	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 stored at the IKE facility and subsequently shipped to a licensed conversion facility.	SMALL

Anticipated benefits include socioeconomic and environmental benefits. Employment and income generated by IKE facility construction and operation, and the 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 IKE facility 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 IKE facility are generally SMALL, and many of the potential external costs could be offset by mitigation measures. These costs include temporary increases in traffic associated with the facility; limited increases in air emissions; limited alteration of wetlands; and potential impacts on some ecological species of interest.

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

4.5 PRELIMINARY RECOMMENDATION

After weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering the alternatives, the NRC staff's recommendation, unless safety issues mandate otherwise, is the issuance of a license to authorize Orano to construct and operate the proposed uranium enrichment facility. The NRC staff based its recommendation on the following factors:

- The NRC staff's review of Orano's ER and responses to clarification requests;
- The NRC staff's consultation with Federal, State, and local agencies, and Tribal officials;
- The NRC staff's independent environmental review; and
- The NRC staff's consideration of public comments.

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

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APPENDIX A:

SUMMARY OF COMMENTS RECEIVED DURING THE SCOPING PERIOD

On June 11, 2026, the U.S. Nuclear Regulatory Commission (NRC) staff published its notice of intent (NOI) to prepare an environmental impact statement (EIS) and conduct the scoping process in the *Federal Register* (91 FR 35584). The purpose of the scoping process is to gather information necessary to prepare an EIS to evaluate the environmental impacts of issuing a license to Orano Enrichment USA, LLC (Orano, the applicant) to construct and operate the Project IKE uranium enrichment facility in Roane County, Tennessee.

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). NRC staff invited potentially affected Federal, State, local, and Tribal government agencies; members of the public; and any other interested and concerned people and organizations to identify issues and provide recommendations to the agency on the scope of the EIS by July 13, 2026. For this scoping process, the NRC staff posted information to the NRC website and issued an email (GovDelivery) to approximately 200 stakeholders with potential interest in NRC's environmental review process. The NRC staff also made Orano's environmental report (ER) available at the Oak Ridge Public Library.

This appendix summarizes substantive comments and information gathered during the scoping period. Table A-1 contains an alphabetized 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. The NRC staff received seven individual comment letters that were submitted at www.regulations.gov.

The submission from the U.S. Environmental Protection Agency (EPA) Region 4 (ML26195A040) stated the following (91 FR 35584): "Based on our review of the NOI, the EPA has no comments."

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

Commenter	Affiliation	ADAMS Accession Number
Anonymous	Not stated	ML26195A063
Creswell, Wade	Roane County Government	ML26195A054
Gibson, Luther	Not stated	ML26195A046
Hermann, Randall	City of Oak Ridge	ML26195A057
Kajumba, Ntale	U.S. Environmental Protection Agency, Region 4	ML26195A040
McManus, Mark	United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the U.S. and Canada, AFL-CIO	ML26195A049
Porterfield, Donivan	Not stated	ML26195A060

Along with summarizing substantive topics from the comment correspondence, this appendix indicates the sections of the EIS in which they are addressed. Comments that are not substantive (e.g., comments of 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 NRC staff. These comments include general concerns about the safety and feasibility of nuclear power and alternatives to nuclear power, energy policy considerations, influences of energy demand, fuel technologies not evaluated in this EIS, and remediation of past contamination in the region.

Health and safety issues will be considered in detail as part of the NRC staff's safety evaluation report, which is being prepared in parallel to this EIS. The EIS and the safety evaluation report are related in that they may cover the same topics and may contain similar information, but the analysis in the EIS is focused on an assessment of potential environmental impacts. In contrast, the safety evaluation report deals primarily with safety analyses 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 roles of certain agencies. Information about the proposed action, the environmental review process; permits and consultations, and interactions; and alternative to the proposed action (no-action alternative) are discussed in Chapters 1 and 2 of the EIS. The NRC considers and evaluates the potential environmental impacts of the construction, operation, and decommissioning of the proposed IKE facility in Chapter 3. Further comments within the scope of the EIS were received for the topics summarized below:

- Regulatory roles and engagement
    - Clarify NRC/DOE roles per the memorandum of understanding and how Tennessee (agreement state) and Tennessee Valley Authority (TVA), Roane County, and City of Oak Ridge roles will be addressed in permitting/NEPA documentation.
    - Continue outreach and education with local officials and the public; implement periodic briefings and comment opportunities.

  Chapter 1 of this draft EIS addresses regulatory roles, permitting, engagement, and outreach, notably Sections 1.5 and 1.6. Appendix B provides further information on laws and regulations, permits, and consultations. Appendix D lists the environmental review correspondence to date for the project.
- Land use and ecological resources
    - Describe local land use and potential impacts, including quantifying the acreage that would be cleared or deforested.
    - Address potential impacts on threatened and endangered species.

  Section 3.1.1 describes local land use, and Section 3.1.2 provides an estimate of acreage that would be cleared or deforested. Section 3.5.2 addresses potential impacts on threatened and endangered species.
- Air and water resources
    - Assess air emissions, process gaseous streams, UF_6, HF, and UO_2F_2 release potential, and monitoring of emissions/effluent to air and stormwater runoff.

  - Address groundwater elevation, water levels, and drought sensitivity (using updated drought data); assess proximity to the water table and potential impacts.

  Section 2.1.4 describes monitoring and mitigation programs, and mitigation measures are further discussed in Section 4.3. Section 3.2.1 describes existing air resources, and Section 3.2.2 addresses potential impacts of air emissions. Section 3.11.2 discusses impacts from UF_6, HF, and UO_2F_2 at the facility to workers and the general public. Section 3.4.1 describes baseline conditions for water resources, including groundwater elevation and levels related to drought conditions. Section 3.4.2 discusses potential impacts on water resources, including impacts related to stormwater runoff.

- Socioeconomic effects, labor and the workforce, and social services
  - Quantify construction and operation employment, local economic benefits and burdens, housing and community impacts, and workforce development aspects (apprenticeships, training programs, socioeconomic benefits of developing and maintaining the skilled workforce). Consider benefits of potential hiring practices (labor unions), workforce qualifications, and quality assurance. Evaluate effects of labor management strategies (including project-labor agreements) on workforce stability, labor availability, schedule reliability, and associated socioeconomic effects. Evaluate long-term workforce benefits associated with expanding domestic nuclear fuel production.
  - Assess social services, emergency services capacity, and any required public investments.

  Section 3.6.2 addresses social services, labor and the workforce, and associated socioeconomic effects of the proposed IKE facility. Section 4.4.2 identifies social service and labor/workforce-related aspects of the cost-benefit analysis.

- Historic and cultural resources
  - Include results of the Phase II historical and cultural survey to determine eligibility of seven new archaeological sites and one isolated find for the *National Register of Historic Places* (NRHP).

  Section 3.7.2 discusses results of the Phase II survey and potential NRHP eligibility of the seven sites and the isolated find.

- Noise
  - Assess noise impacts of both construction and operation. Roane County follows Tennessee's general noise guidelines (55–60 decibels [dB] during the day and 45–50 dB at night, with stricter levels during quiet hours from 10 p.m. to 7 a.m.).

  Section 3.9.2 addresses noise impacts during construction and operation, including context regarding the Tennessee general noise guidelines.

- Transportation, infrastructure, and emergency response
  - Address construction and operational traffic and workforce estimates; infrastructure upgrades and costs to local jurisdictions.
  - Address modes and routing of UF_6 transport (truck/rail), accident probabilities, routing impacts, and local emergency response capacity/needs (Oak Ridge, Roane County, TVA coordination).

- Address power supply siting: include environmental impacts of required transmission lines, switchyards, and siting/construction of external power infrastructure.

Section 3.10.2 presents estimates of traffic and numbers of workers during construction and operation phases. This section also addresses transportation of UF_6. Costs are considered in Sections 3.6.2 and 4.4. Section 2.1.2 discusses power infrastructure. The description and assessment of the applicant's emergency response plan is part of the NRC's safety review, documented in the safety evaluation report, and is outside the scope of the EIS.

- Public and occupational health, accidents, and radiological releases
  - Address offsite dose and public health consequences from routine operations and bounding accidents, notably doses from transportation accidents.
  - Clearly address engineering and procedural controls to avoid criticality accidents, as well as the potential hazard exposures to the public.
  - Consider at least the accident scenarios for the Eagle Rock enrichment facility (including inadvertent nuclear criticality, hydraulic rupture of a heated feed vessel, earthquake, facility-wide fire, sampling manifold release, sampling cylinder release). All hazardous chemicals in the facility should be screened for other potential accidents to analyze in the EIS.

Section 3.11.2 discusses radiological exposures of the public and workers under both routine and accident conditions, as well as criticality controls. The NRC staff's safety evaluation report that will be issued as part of the licensing review will address the potential for credible accidents and associated mitigations. Potential transportation impacts are discussed in Section 3.10.2, including risks associated with a vehicular accident. Section 3.13.2 addresses accidents and potential effects of releases under multiple accident scenarios. It considers bounding doses from the accidents described in the comment, as well as applicable bounding dose results from other accidents that would result in consequences similar to such accidents.

- Feedstock and waste management
  - Address whether only obligated uranium would be enriched and would only be used for civilian reactor fuel purposes.
  - Address inventory and material controls, including related to incoming/outgoing UF_6 quantity and storage (onsite/outside), enrichment levels (up to 10 percent uranium-235 by weight), whether feedstock is virgin or reprocessed (with potential fission/activation product impurities), management of cascade impurity, and disposition of cylinder heels and other byproducts of the enrichment process.
  - Address how wastes will be managed to minimize exposure to the environment, workers, and the general public, both during construction and operation.
  - Address gaseous waste streams, process wastewater, sanitary wastewater, municipal solid wastes, nonhazardous industrial wastes, hazardous wastes, low-level radioactive wastes, and high-level radioactive wastes. Characterize waste streams and disposition paths.

Section 2.1.2.1 describes the feed material (including that it is natural rather than reprocessed uranium), enrichment levels, and cylinder storage. Section 2.1.2.2 describes anticipated use of the enriched uranium that would be produced by the IKE facility, notably as feedstock for fuel to be used in commercial U.S. nuclear reactors.

Section 2.1.2.3 describes the shipment and transportation of incoming feed material and outgoing UF_6.

Section 3.12.2 addresses the planned management of process wastes and radiologically and chemically contaminated material from the IKE facility; this section includes estimated amounts of different waste streams that would be generated and their planned disposition. This section also clarifies that no high-level radioactive waste or transuranic waste would be generated at the proposed IKE facility.

- Alternatives and combined effects
  - Consider a no-action alternative and alternative sites nearby, including those that would require less development.
  - Address potential interactions and combined risks with nearby nuclear and nuclear-related facilities and DOE remediation (e.g., White Wing Scrap Yard).

  The no-action alternative is discussed in Section 2.2.1. Potential impacts of this alternative are further discussed in Sections 4.1.2 and 4.4.1. Site alternatives assessed in the ER are summarized in Section 2.2.3 of this EIS. DOE remediation of the White Wing Scrap Yard is briefly discussed in Sections 3.1.1, 3.3.1, and 3.4.1.

  Reasonably foreseeable effects related to nearby facilities and activities with a nexus to the proposed action are discussed in Sections 3.2.2, 3.5.2, 3.6.2, 3.9.2, and 3.10.2.

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 of 1954, as amended (AEA) 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 Nuclear Regulatory Commission (NRC) the licensing and regulatory authority for nuclear energy uses within the commercial sector. If the license application for the proposed IKE is approved, the NRC would license and regulate the possession, use, storage, and transfer of special nuclear, source, and byproduct materials to protect public health and safety as stipulated in the following regulations:

- *Title 10, Section 20 of the Code of Federal 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 30, Rules of General Applicability to Domestic Licensing of Byproduct Material.* This regulation establishes the procedures and criteria for the issuance of licenses for byproduct material.

- *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 in 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:

- The 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 Tennessee Department of Environment and Conservation (TDEC) implements the CAA in the State of Tennessee.

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 waters of the United States.

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 TDEC Division of Solid Waste Management is responsible for managing the hazardous waste generator registrations and annual reports for the State of Tennessee.

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 AEA to specify that the Federal Government is responsible for disposal of low-level radioactive waste (LLRW) generated by its activities and that States are responsible for disposal of other LLRW.

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 Tennessee, the TDEC Division of Water Resources 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.

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.

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(a)(2) of the Act requires Federal agencies to consult with the U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service for Federal actions that may affect listed species or designated critical habitats.

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 IKE would be required to comply with these regulations.

B.1.14 U.S. 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 LLRW. The Act allows any person licensed by the NRC to operate a uranium enrichment facility to request that the U.S. Department of Energy (DOE) accept for disposal as LLRW 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 (FPPA) 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 FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance.

B.2 PERMITS AND APPROVALS

B.2.1 Federal Permits and Approvals

Table B-1 Federal Permits or Approvals

Permit or Approval	Agency	Regulatory Authority	Activity Covered	Status
Source Material License	U.S. Nuclear Regulatory Commission (NRC)	10 CFR Part 40	License to receive, possess, use, transfer, or deliver source material.	Orano submitted its license application to the NRC in March 2026.
Special Nuclear Material License	NRC	10 CFR Part 70	License to receive title to, own, acquire, deliver, receive, possess, use, or transfer special nuclear material.	
Byproduct Material License	NRC	10 CFR Part 30	License to possess and use byproduct material.	
Environmental Impact Statement (EIS)	NRC	10 CFR Part 51	Analysis of potential impacts associated with site preparation and construction (in particular, construction of structures that would be authorized by the NRC license), operation, and decommissioning of the IKE facility to inform the licensing decision.	In process (this EIS).
Spill Prevention, Control, and Counter-measure Plan	EPA	40 CFR Part 112	Storage of oils during construction and operation.	Orano has not yet prepared SPCC plans.
Section 404 Permit	USACE	40 CFR Part 230, authorized by the CWA; 33 CFR Parts 320-331	Permit allowing the discharge of dredged or fill material into waters of the United States, including wetlands.	USACE public comment period was resolved with no public comment. Per the USACE mitigation suggestion, Orano has purchased licensed stream bank credits.
Certificate of Registration	Department of Transportation	49 CFR Part 107	Transportation of hazardous materials.	Application not yet submitted.

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
Specific and General Radioactive Material Licenses	TDEC Division of Radiological Health	Rules of TDEC, Chapter 0400-20-10; TCA Sections 4-5-201, 68-202-101, and 68-202-201 (et seq.)	Manufacture, production, receipt, possession, use, transfer, ownership, or acquisition of radioactive material; and packaging and transportation of radioactive material.	Application not yet submitted.
			Use of X-ray apparatus, including analytical X-ray equipment.	Application not yet submitted.
		10 CFR Part 20; Tennessee Division of Radiological Health Rules Chapter 0400-20-05, TCA Sections 4-5-201 et seq. and 68-202-203 and 206	Occupational and public dose limits; effluent limits; general survey and monitoring; security of stored material; general disposal requirements.	Application not yet submitted.
Consultation regarding State-listed species	Tennessee Wildlife Resources Agency	ESA, Section 7; TCA Sections 70-8-101 to 70-8-112; Rules of the Tennessee Wildlife Resources Agency, Chapter 1660-01-32	Potential for adverse effects on species listed by the State as endangered, threatened, or in need of management.	Orano has informally discussed State-listed species with the agency.
Air Quality Permits (Construction and Operating)	TDEC Division of Air Pollution Control	Rules of TDEC Division of Air Pollution Control, Chapter 1200-03-09; CAA	Facility construction and operation, new air pollutant source.	Application not yet submitted.
401 Water Quality Certification	TDEC Division of Water Resources	TCA Section 69-3-101; CWA	Verification by the State of Tennessee that the IKE facility would not degrade State Waters or violate water quality standards.	Final ARAP/401 Permit NRS26.099 was submitted on September 30, 2026; the 30-day public notice process began on October 16, 2026; proof of publication will follow the public notification period.

Permit or Approval	Agency	Regulatory Authority	Activity Covered	Status
NPDES General Permit for Construction Stormwater Management	TDEC Division of Water Resources	Tennessee Water Quality Control Act (codified at Tennessee Compilation of Rules & Regulations, Chapter 0400-40-05); Rules of the TDEC Division of Water Resources, Individual NPDES Permits	Required for all stormwater discharges from construction activities. Requires the development of a Stormwater Pollution Prevention Plan.	Application not yet submitted.
Aquatic Resource Alteration Permit	TDEC Division of Water Resources	Rules of TDEC, Chapter 0400-40-07 (Aquatic Resource Alteration); CWA	Required for any activity that alters a stream, river, lake, or wetland, including dredging, channel widening, bank sloping, or road crossings.	ARAP application was submitted on September 30, 2026; see Section 401 permit status.
Hazardous Waste Generator Identification Number for Transport	TDEC Division of Solid Waste Management	Tennessee Rules, Chapter 0400-12-01; RCRA	Requirement to obtain an EPA identification number from TDEC (as authorized by the State) for transporting hazardous waste originating in the State.	Pending applicability, the application for EPA ID per EPA Form 8700-12 is in process.
Hazardous Waste Management Treatment, Storage, and Disposal Facility Permit	TDEC Division of Land Protection, Waste Management Branch	Tennessee Rules, Chapter 0400-12-01; RCRA	Required for operation of a facility that generates and manages (stores) hazardous waste. (No hazardous waste would be treated or disposed of onsite at the IKE facility.)	Pending applicability, the application for EPA ID per EPA Form 8700-12 is in process.
Commercial Entrance Permit	TDOT	Rules of TDOT, Chapter 1680-10-01	Construction of access road and/or heavy haul road.	To be obtained.
Land Disturbance Permit	City of Oak Ridge Planning & Development	Oak Ridge, Tennessee, City Code, Title 14 (Zoning and Land Use Control)	Application for commercial land disturbance permit, to include as attachment a notice of coverage under general NPDES permit for stormwater discharges associated with construction activity.	To be obtained.
Building Permit	City of Oak Ridge Planning & Development	Oak Ridge, Tennessee, City Code, Title 12 (Building, Utility Etc. Codes)	Permit to construct new commercial building (non- residential); could require a Commercial Plan Review.	To be obtained.

Permit or Approval	Agency	Regulatory Authority	Activity Covered	Status
Electrical, Mechanical, and Plumbing Permits	City of Oak Ridge Planning & Development	Oak Ridge, Tennessee, City Code, Title 12 (Building, Utility Etc. Codes)	Trade permits must be submitted to City of Oak Ridge and would be needed for new build non-residential; electrical, mechanical, and plumbing permits are available from the Code Enforcement Division.	To be obtained.
Zoning Approval	City of Oak Ridge Planning & Development	Oak Ridge, Tennessee, City Code, Title 14 (Zoning and Land Use Control), Chapter 3 (Zoning)	Required for construction of a uranium enrichment facility.	Application in process; required public meetings are anticipated in January 2027.
Fire Safety Permit	City of Oak Ridge Fire Department, Fire Prevention Office	Oak Ridge City Code, Title 7 (Fire Protection and Fireworks), Chapter 1 (Fire Code)	Compliance with fire safety regulations; initial and regular inspections required for fire suppression systems.	To be obtained; per ongoing discussions with the City of Oak Ridge Fire Marshal, a permit would be needed at vertical construction/final design phase.

B.3 CONSULTATIONS

B.3.1 National Historic Preservation Act Section 106 Consultation

As described in Section B.1.10, above, 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 proceed through the Section 106 process, which includes consultation with the appropriate State Historic Preservation Officer, Federally recognized Tribes, other parties, and the public.

Section 106 consultation is also discussed in Section 1.5.2.2, Section 3.7, Appendix B (Section B.1.10), Appendix D (Table D-1), and Appendix E (Table E-1) of this EIS.

B.3.2 Endangered Species Act Section 7 Consultation

Section 7(a)(2) of the ESA requires Federal agencies to consult with the FWS or the National Marine Fisheries Service for Federal actions that may affect listed species or designated critical habitats. The NRC has fulfilled its ESA Section 7 responsibilities for the proposed IKE facility in conjunction with the DOE and USACE. Sections 1.5.1.1 and 3.5.1.5 of this EIS summarize the ESA consultation.

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 a cumulative effects analysis 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 ESA and the NHPA.

APPENDIX C:

ASSESSMENT OF PARAMETER ENVELOPES FROM THE NEW REACTOR GEIS

This appendix summarizes information for the plant and site parameter envelopes presented in NUREG-2249, the U.S. Nuclear Regulatory Commission (NRC) *Generic Environmental Impact Statement for Licensing of New Nuclear Reactors* (NR GEIS, NRC 2026) that are relevant and appropriate to the consideration of potential environmental impacts of the proposed Orano Enrichment USA, LLC (Orano) Project IKE uranium enrichment facility. The NR GEIS is discussed in Section 1.4.3 of this EIS.

C.1 EVALUATION OF NRC GEIS ENVELOPES AND IKE FACILITY CONTEXT

The NR GEIS presents plant parameter envelopes (PPEs) and site parameter envelopes (SPEs) corresponding to a SMALL potential for adverse environmental effects during facility construction, operation, and decommissioning. Table C-1 highlights values and assumptions for PPE and SPE from the NR GEIS that are relevant and appropriate to the proposed IKE, together with supporting information from Orano's environmental report (Orano 2026) and Chapter 3 of this EIS. This evaluation provides context for the analysis of potential impacts of the proposed IKE facility on the human environment during construction, operation, and decommissioning.

C.2 REFERENCES

10 CFR Part 20. *Code of Federal Regulations*. Title 10, Energy, Part 20 "Standards for Protection Against Radiation." Nuclear Regulatory Commission, Washington, D.C.

10 CFR Part 61. *Code of Federal Regulations*. Title 10, Energy, Part 61 "Licensing Requirements for Land Disposal of Radioactive Waste." Nuclear Regulatory Commission, Washington, D.C.

10 CFR Part 71. *Code of Federal Regulations*. Title 10, Energy, Part 71 "Packaging and Transportation of Radioactive Material." Nuclear Regulatory Commission, Washington, D.C.

10 CFR Part 72. *Code of Federal Regulations*. Title 10, Energy, Part 72 "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste." Nuclear Regulatory Commission, Washington, D.C.

33 CFR Part 330. *Code of Federal Regulations*. Title 33, Navigation and Navigable Waters, Part 330 "Nationwide Permit Program." Army Corps of Engineers, Department of Defense, Washington, D.C.

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.

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). 2026. *Generic Environmental Impact Statement for Licensing of New Nuclear Reactors*, NUREG-2249 (Feb.). ADAMS Accession No. ML24176A220.

Orano. 2026. *Orano Enrichment Facility Environmental Report*, Revision 2 (Oct.). ADAMS Accession No. ML26282B051.

TVA (Tennessee Valley Authority). 2026. *Right of Way Safety & Use*. Available at https://www.tva.com/energy/transmission/right-of-way-maintenance. Last accessed Nov. 2, 2026.

Table C-1 Plant Parameter and Site Parameter Envelopes from the New Reactor GEIS Relevant to Project IKE

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 IKE Facility
Water Resources		
Construction		
Water use conflict due to 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).	As described in the ER (Section 4.4.3.2), the City of Oak Ridge has an excess water supply of 6 million gpd, which is 4,167 gpm. The IKE facility is estimated to need about 23 gpm during construction (12.2 million gallons per year). The amount available from the municipal water system far exceeds the amount required by the IKE facility.
	Municipal water availability accounts for all existing and planned future uses.	As described in the ER (Section 4.4.3.2), the City of Oak Ridge public water distribution system has a substantial excess capacity of 6 million gpd, which accounts for all existing and planned future uses.
	An agreement or permit for the usage amount can be obtained from the municipality.	Orano has coordinated with the City of Oak Ridge regarding municipal water use (ER Section 4.4.3.2), and no permit is required.
Degradation of water quality from plant effluent discharges to municipal systems	Municipal system's available capacity to receive and treat plant effluent accounts for all existing and reasonably foreseeable future discharges.	As described in the ER (Section 4.4.3.2), the Oak Ridge City Engineer confirmed an excess sewer capacity of 300,000 gpd (nearly 110 million gallons per year) at the municipal Rarity Ridge Treatment Plant, which accounts for all existing and reasonably foreseeable future discharges. The proposed IKE facility would discharge about 13,700 gpd (5 million gallons per year) of sanitary wastewater and 43 gpd (less than 0.016 million gallons per year) of uncontaminated effluent to the municipal system.
	Agreement to discharge to a municipal treatment system is obtainable.	As described in the ER (Section 4.4.3.2), Orano has coordinated with the City of Oak Ridge regarding the agreement to discharge wastewater to the municipal treatment plant (Rarity Ridge).

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 IKE Facility
Operation		
Water use conflict from plant municipal water demand	Usage amount is within the existing capacity of the system(s), accounting for all existing and planned future uses.	As described in the ER (Section 4.4.3.2), facility operation would require about 440,000 gallons per month (10 gpm), and the City of Oak Ridge municipal water system has an excess capacity of 6 million gpd, which is 4,167 gpm; this capacity accounts for all existing and planned future uses.
	An agreement or permit for the usage amount can be obtained from the municipality.	Orano has coordinated with the City of Oak Ridge regarding municipal water use, and no permit is required.
Degradation of water quality from plant effluent discharges to municipal systems	Municipal system's available capacity to receive and treat plant effluent accounts for all existing and reasonably foreseeable future discharges.	As described in the ER (Section 4.4.3.2), the Oak Ridge City Engineer confirmed an excess sewer capacity of 300,000 gpd (nearly 110 million gallons per year) at the municipal Rarity Ridge Treatment plant, which accounts for all existing and reasonably foreseeable future discharges. The proposed IKE facility would discharge about 13,700 gpd (5 million gallons per year) of sanitary wastewater and 43 gpd (less than 0.016 million gallons per year) of uncontaminated effluent to the municipal system.
	Agreement to discharge to a municipal treatment system is obtainable.	As described in the ER (Section 4.4.3.2), Orano has coordinated with the City of Oak Ridge regarding the agreement to discharge wastewater to the municipal treatment plant (Rarity Ridge).
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 Section 3.5.4 contains a description of Tennessee-listed species for Roane County, and ER Section 5.5 describes mitigation measures for ecological resources, and confirms that Orano, in consultation with the Tennessee Department of Environment and Conservation (TDEC), U.S. Fish and Wildlife Service (FWS), and USACE, would implement State and Federal agency recommendations to reduce impacts on important species.

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 IKE Facility
Operation		
Permanent and temporary loss or disturbance of habitats	Temporarily disturbed lands would be revegetated using regionally indigenous vegetation once the lands are no longer needed to support building activities.	Orano would use native seed mixes to revegetate impacted areas as stated in ER Section 5.5.
	The total wetland loss from site disturbance over the operational life of the plant would be no more than 0.5 acre.	Orano estimates the total wetland loss to be less than 0.5 acre, as described in ER Section 4.4.5.
	Any State or local permits for wetland impacts would be obtained.	Orano would obtain any required State or local permits for wetland impacts as described in ER Section 4.4.5.
	Any mitigation measures indicated in the NWPs or other wetland permits would be implemented.	ER Sections 4.4.3.1 and 4.4.3.3 describe that wetland impacts would be minimized with the implementation of required sediment and erosion control measures and other BMPs developed in accordance with standards and practices determined by the U.S. Army Corps of Engineers (USACE) and TDEC and required by permits. Construction impacts would be mitigated in accordance with Section 404 of the Clean Water Act and State regulatory requirements.
	Best management practices (BMPs) would be used for erosion, sediment control, and stormwater management.	ER Section 4.4.3.3 describes erosion and sediment controls and BMPs would be implemented to mitigate impacts on water quality. Stormwater would be managed through a SWPPP, and stormwater discharge permits would be obtained from TDEC and the City of Oak Ridge.
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) (1992) and National Council on Radiation Protection and Measurements (NCRP) (1991) guidelines.	ER (Section 4.5.1.1.2, Table 4-16) presents estimated radiological nonhuman biota doses, which are two orders of magnitude below the IAEA and NCRP guidelines.

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 IKE Facility
Water use conflicts with terrestrial resources	Total plant water demand would be less than or equal to a daily average of 6,000 gpm.	ER Section 4.4.3.2 (Water Use) describes proposed water uses that are far below 6,000 gpm, at 1 million gallons per month (23 gpm) during construction and decommissioning and 440,000 gallons per month (10 gpm) during operation.
	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.	The IKE facility would not withdraw water; it would be supplied with municipal water.
	Applicants would be able to demonstrate that hydroperiod changes are within historic or seasonal fluctuations.	No groundwater would be used so there would be no changes in water levels or reduction of hydroperiod.
Effects of transmission line right-of-way (ROW) management on terrestrial resources	Vegetation in transmission line ROWs would be managed following a plan consisting of integrated vegetation management practices.	The Tennessee Valley Authority (TVA) is responsible for the transmission line ROW onsite; the TVA manages ROW vegetation in accordance with an integrated vegetation management plan (TVA 2026).
	All ROW maintenance work would be performed in compliance with all applicable laws and regulations.	The TVA maintains its ROW in accordance with applicable laws and regulations (TVA 2026).
	Herbicides would be applied by licensed applicators, and only if in compliance with applicable manufacturer label instructions.	The TVA maintains its ROW in accordance with applicable laws and regulations (TVA 2026).

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 IKE Facility
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.	No effects of electromagnetic fields on flora or fauna are associated with the proposed action. (TVA is responsible for the operation of the transmission line; it is not part of the proposed action.)
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 Section 3.5.4 contains a description of Tennessee-listed species for Roane County, and ER Section 5.5 describes mitigation measures for ecological resources and affirms that Orano, in consultation with TDEC, FWS, and USACE, would implement State and Federal agency recommendations to reduce impacts on important species.
Aquatic Ecology		
Construction		
Runoff and sedimentation from construction areas	BMPs would be used for erosion and sediment control.	ER Section 4.4.3.3 states that erosion and sediment controls, and other construction-phase stormwater BMPs would be implemented, as appropriate, to mitigate construction impacts.
	Temporarily disturbed lands would be revegetated using regionally indigenous vegetation once the lands are no longer needed to support building activities.	ER Section 5.5 states that native seed mixes would be used to revegetate impacted areas.

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 IKE Facility
Building transmission lines, pipelines, and access roads across surface waterbodies	If activities regulated under the Clean Water Act are performed, they would receive approval under one or more NWPs (33 CFR Part 330) or other general permits recognized by the USACE.	Orano applied for a Clean Water Act Section 404 permit through the USACE.
	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 Orano IKE site 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 are planned to be extended 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.	Orano would obtain and comply with required permits.
	BMPs would be used for erosion and sediment control.	ER Section 4.4.3.3 states that erosion and sediment controls and other construction-phase stormwater BMPs would be implemented, as appropriate, to mitigate construction impacts.
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.	ER Section 3.5.4 contains a description of Tennessee-listed species for Roane County, and ER Section 5.5 describes mitigation measures for protected species, and affirms that Orano, in consultation with TDEC, would use BMPs to reduce impacts on protected species. Orano is coordinating with the TDEC Water Division 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 IKE Facility
Operation		
Stormwater runoff	Preparation, approval by applicable regulatory agencies, and implementation of a stormwater management plan.	Orano is coordinating with the TDEC regarding the NPDES General Permit for Construction Stormwater Management.
	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).	Orano would obtain a RCRA permit from the Tennessee Division of Waste Management, as required.
	BMPs would be used for stormwater management.	ER Section 4.4.3.3 describes BMPs that would be implemented to mitigate impacts on water quality.
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 4.5.1.1.2 (Operation) states doses will be below IAEA and NCRP guidelines.
Impacts of transmission line ROW management on aquatic resources	Vegetation in transmission line ROWs would be managed following a plan consisting of integrated vegetation management practices.	The TVA is responsible for the transmission line ROW onsite; TVA manages ROW vegetation in accordance with an integrated vegetation management plan (TVA 2026).
	All ROW maintenance work would be performed in compliance with all applicable laws and regulations.	The TVA maintains ROW in accordance with applicable laws and regulations (TVA 2026).
	Herbicides would be applied by licensed applicators, and only if in compliance with applicable manufacturer label instructions.	The TVA maintains ROW in accordance with applicable laws and regulations (TVA 2026).
	BMPs would be used for erosion and sediment control.	Orano would obtain an NPDES General Permit for Construction Stormwater Management and comply with BMPs outlined in those permits.
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.	Orano is coordinating with the State of Tennessee regarding aquatic fish, wildlife, and plants and would implement agency mitigation recommendations.

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 IKE Facility
Environmental Hazards — Radiological Environment		
Operation		
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 4.5.1.1.2 (Operation) states doses will be below IAEA and NCRP guidelines.
Environmental Hazards — 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.	Orano 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.	Orano will follow nonradiological public and occupational health BMPs and mitigation measures, as appropriate, as documented in the environmental and safety reviews.
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.	Orano 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.	Orano 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 IKE Facility
Noise		
Construction		
Construction-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 personal protective equipment purposes.	Construction of the IKE facility would involve the same types of noise sources as construction of a reactor (including equipment and vehicular traffic sources); thus, the noise level limit is likewise relevant to the proposed IKE facility (and other industrial facilities). As described in the ER (Section 4.7.4) and Section 3.9.2 of this EIS, the noise level during construction would be less than 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 modeling, foliage planting, construction of noise buffers, and the timing of construction and/or operation activities.	Orano would implement BMPs such as (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.
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 personal protective equipment purposes.	IKE operation would involve many of the same types of noise sources as a reactor (including HVAC system, emergency generator, and vehicular traffic sources); thus, the noise level limit is likewise relevant to the proposed IKE facility (and other industrial facilities). As described in Section 3.9.2 of this EIS, the noise level during operation would be less than 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 modeling, foliage planting, construction of noise buffers, and the timing of construction and/or operation activities.	Orano would implement BMPs such as (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 IKE Facility
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.	Orano would comply with permit conditions, regulations, and BMPs related to solid, liquid, and gaseous waste management.
	For hazardous waste generation, applicants must meet conformity with hazardous waste quantity generation levels in accordance with RCRA.	Orano would comply with the RCRA requirements.
	For sanitary waste, applicants must dispose of sanitary waste in a permitted process.	Per ER Section 4.13.2.2, Table 4-61, sanitary wastewater would be collected and treated onsite before being discharged to the local sewer system or other permitted discharge pathways.
	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.	Orano would implement a waste minimization plan, which includes recycling, as described in ER Section 4.13.4.
Operation		
Operation nonradiological waste	The applicant must meet all the applicable permit conditions, regulations, and BMPs related to solid, liquid, and gaseous waste management.	Orano would comply with all applicable permit conditions, regulations, and BMPs related to solid, liquid, and gaseous waste management.
	For hazardous waste generation, applicants must meet conformity with hazardous waste quantity generation levels in accordance with RCRA.	Orano would comply with the 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.	Per ER Section 4.13.2.2, Table 4-61, sanitary wastewater would be collected and treated onsite before being discharged to the local sewer system or other permitted discharge pathways. Orano would implement a waste minimization plan, which includes recycling, as described in ER Section 4.13.4.

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 IKE Facility
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.	As discussed in ER Section 4.10.1.2, the majority of construction workers are expected to commute from within Roane County and other locations within the region of influence (ROI). In the unlikely event that all new workers and their families came from outside the ROI and settled in Roane County, this would represent, at most, 39 percent of all available housing units in the year 2023 during the peak; thus, at least 60 percent of the vacant housing stock would remain available in the peak year of construction.
	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.	As described in Section 3.8 of this EIS, because most construction workers are expected to commute from within Roane County and other locations in the ROI, the impact on school enrollment would be minor. The change in the student:teacher ratio is estimated to be less than 5 percent, with the ratio remaining below 15:1 across the ROI. This ratio is well below those ratios established by the State (20:1 for grades K–3, 25:1 for grades 4–6, and 30:1 for grades 7–12).
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, as discussed in Section 3.6.2 of this EIS.
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, as discussed in Section 3.6.2 of this EIS.

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 IKE Facility
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.	Because most of the operation workers are anticipated to commute from within Roane County and other locations in the ROI, they would require less than 5 percent of the estimated more than 2,000 owner-occupied housing units for sale, as discussed in Section 3.6.2 of this EIS.
	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.	As described in Section 3.8 of this EIS, because most facility operation workers are expected to commute from within Roane County and other locations in the ROI, the impact on school enrollment would be minor. The change in the student:teacher ratio is estimated to be less than 5 percent, with the ratio remaining below 15:1 across the ROI. This ratio is well below those ratios established by the State (20:1 for grades K–3, 25:1 for grades 4–6, and 30:1 for grades 7–12).
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, as discussed in Section 3.6.2 of this EIS.
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, as discussed in Section 3.6.2 of this EIS.

APPENDIX D:

ENVIRONMENTAL REVIEW CORRESPONDENCE

This appendix provides a chronological listing of key correspondence between the U.S. Nuclear Regulatory Commission (NRC) and Orano Enrichment USA, LLC (Orano, or applicant), and other correspondence related to the NRC staff's environmental review. All documents, except 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. For the ADAMS search, the docket number for Orano's Project IKE is 07007038.

Table D-1 Environmental Review Correspondence and Consultation for Licensing, Construction, Operation, and Decommissioning of Orano's IKE Facility[a]

Date	Correspondence	Type of Document	ADAMS Accession Number
2/5/2025	Environmental Report exemption request for Orano Enrichment USA LLC, IKE enrichment facility	Letter	ML25036A341
4/4/2025	NRC acceptance of Orano request for exemption from the 10 CFR 51.60(a) requirements	Letter	ML25092A040
4/8/2025	Summary of February 27, 2025, partially closed meeting with Orano Enrichment USA, LLC	Meeting Summary Memo	ML25084A216
4/9/2025	Designation of Orano as non-Federal representative for NRC for ESA Section 7 consultation	Letter	ML25083A179
4/14/2025	Summary of March 18, 2025, teleconference with Orano regarding non-Federal representative designation for ESA Section 7 consultation	Meeting Summary Memo	ML25098A195
5/2/2025	NRC approval of exemption request from 10 CFR 51.60(a)	Letter	ML25085A095
8/16/2025	Summary of June 25, 2025, conference call with Orano to discuss schedule for ESA Section 7 non-Federal representative consultation	Meeting Summary Memo	ML25199A203
1/30/2026	Orano submittal of the ER to NRC	Letter, Report	ML26030A236
2/25/2026	Orano IKE Pre-Application Audit Summary memo	Memo	ML26042A316
3/2/2026	NRC letter to Oak Ridge Public Library providing ER	Letter	ML26054A041
3/11/2026	Orano submittal of the BA to NRC	Letter	ML26070A336
4/17/2026	NRC letter inviting DOE to be a cooperating agency on the EIS	Letter	ML26099A039
4/23/2026	Signed Memorandum of Understanding (MOU) between NRC and DOE	MOU	ML26099A038
5/7/2026	Orano submittal of revised BA to NRC, DOE, USACE	Letter, Report	ML26127A246

Date	Correspondence	Type of Document	ADAMS Accession Number
5/19/2026	NRC summary of trip report on site visit and local government meeting for the proposed Orano enrichment facility	Memo	ML26134A271
5/21/2026	NRC letter to Orano issuing acceptance of the Orano Enrichment USA, LLC, Special Nuclear Material License Application for review	Letter	ML26134A324
5/26/2026	Request from DOE, NRC, and USACE to FWS, to initiate formal ESA consultation for the Orano enrichment facility	Letter and BA	ML26146A129
6/16/2026	DOE request to the SHPO for concurrence on DOE's NHPA Section 106 finding	Letter	ML26168A486
6/17/2026	SHPO concurrence on the DOE Section 106 finding	Letter	ML26168A477
7/7/2026	NRC letter to the SHPO initiating Section 106 consultation	Letter	ML26176A278
7/7/2026	NRC letters to Tribes initiating Section 106 consultation	Letter (package)	ML26176A062
7/9/2026	Orano letter to NRC submitting the ER Revision 1, with enclosure	Letter, Report	ML26191A482, ML26191A483
7/10/2026	Letter from the SHPO to NRC concurring with the NRC finding of no historic properties affected	Letter	ML26195A339
7/15/2026	Letter from the Chickasaw Nation to NRC indicating no government-to-government consultation required	Letter	ML26198A233
7/28/2026	Letter from the Delaware Nation to NRC indicating no government-to-government consultation required	Letter	ML26209A318
7/30/2026	Letter from the Shawnee Tribe to NRC agreeing with no historic properties affected	Letter	ML26212A413
8/11/2026	NRC letter to the SHPO concluding Section 106 consultation	Letter	ML26218A030
8/11/2026	NRC letters to the Tribes concluding Section 106 consultation	Letter (package)	ML26218A119
8/12/2026	Notice of Receipt of Application for License; Notice of Consideration of Issuance of License; Notice of Hearing and Commission Order; Opportunity To Request a Contested Hearing; and Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards Information and Safeguards Information for Contention Preparation	Notice (91 FR 52088)	ML26218A174
9/17/2026	DOE email to NRC declining the need to be a cooperating agency on the EIS	Email	ML26267A123
9/30/2026	Orano response to ER Table 1-2 clarification questions	Email	ML26279A265
10/9/2026	Orano letter to NRC submitting ER Revision 2, with enclosure	Letter, Report	ML26282B051
10/22/2026	Orano email to NRC submitting updated ER tables	Email	ML26300A058

Date	Correspondence	Type of Document	ADAMS Accession Number
10/27/2026	Letter from FWS to DOE, NRC, and USACE regarding completion of ESA consultation for the Orano enrichment facility	Letter	ML26300A190

[a] ADAMS = Agencywide Documents Access and Management System; BA = Biological Assessment; CFR = *Code of Federal Regulations*; DOE = U.S Department of Energy; EIS = environmental impact statement; ER = Environmental Report; ESA = Endangered Species Act; FR = *Federal Register*; FWS = U.S. Fish and Wildlife Service; LLC = Limited Liability Company; NHPA = National Historic Preservation Act; SHPO = State Historic Preservation Officer (Tennessee); USACE = U.S. Army Corps of Engineers.

APPENDIX E:

AGENCIES, ORGANIZATIONS, AND PERSONS CONTACTED DURING THE PROJECT IKE 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 Orano Enrichment USA, LLC (Orano) Project IKE.

Table E-1 Agencies, Organizations, and Persons Contacted During the Project IKE Environmental Review

Name	Affiliation	Contact Information
John Raymond Johnson Governor	Absentee Shawnee Tribe	Absentee Shawnee Tribe 2025 S. Gordon Cooper Drive Shawnee, OK 74801
Ben Barnes Chief	Shawnee Tribe	Shawnee Tribe P.O. Box 189 Miami, OK 74354
Bill Anoatubby Governor	Chickasaw Nation	Chickasaw Nation P.O. Box 1548 Ada, OK 74820
Chuck Hoskin, Jr. Chief	Cherokee Nation	Cherokee Nation P.O. Box 984 Tahlequah, OK 74465-0948
David Hill Principal Chief	Muscogee (Creek) Nation	Muscogee (Creek) Nation P.O. Box 580 Okmulgee, OK 74447
Glenna J. Wallace Chief	Eastern Shawnee Tribe of Oklahoma	Eastern Shawnee Tribe of Oklahoma 12705 South 705 Road Wyandotte, OK 74370
Jeff Wacoche Chief	United Keetoowah Band of Cherokee Indians	United Keetoowah Band of Cherokee Indians P.O. Box 746 Tahlequah, OK 74465
Rick Sylestine Tribal Council Chairman	Alabama-Coushatta Tribe of Texas	Alabama-Coushatta Tribe of Texas 571 State Park Road 56 Livingston, TX 77351
Wilson Yargee Chief	Alabama-Quassarte Tribal Town	Alabama-Quassarte Tribal Town P.O. Box 187 Wetumka, OK 74883
Libby Rogers Principal Chief	Jena Band of Choctaw Indians	Jena Band of Choctaw Indians P.O. Box 14 Jena, LA 71342-0014

Name	Affiliation	Contact Information
Marcellus W. Osceola, Jr. Chairman	Seminole Tribe of Florida	Seminole Tribe of Florida 6300 Stirling Road Hollywood, FL 33024
Michael McLane President	Delaware Nation	Delaware Nation P.O. Box 825 Anadarko, OK 73005
Michell Hicks Principal Chief	Eastern Band of Cherokee Indians	Eastern Band of Cherokee Indians Qualla Boundary P.O. Box 1927 Cherokee, NC 28719
Ryan K. Morrow Town King	Thlopthlocco Tribal Town	Thlopthlocco Tribal Town P.O. Box 188 Okemah, OK 74859
Sena M. Yesslith Principal Chief	Seminole Nation of Oklahoma	Seminole Nation of Oklahoma P.O. Box 1498 Wewoka, OK 74884
Stephanie A. Bryan Chairwoman	Poarch Band of Creek Indians	Poarch Band of Creek Indians 5811 Jack Springs Road Atmore, AL 36502
Stephanie Yahola Town King	Kialegee Tribal Town	Kialegee Tribal Town P.O. Box 332 Wetumka, OK 74883
David Sickey Chairman	Coushatta Tribe of Louisiana	Coushatta Tribe of Louisiana P.O. Box 818 Elton, LA 70532
Mr. Daniel Elbert Field Supervisor	Tennessee Ecological Services Field Office, U.S. Fish and Wildlife Service	U.S. Fish and Wildlife Service 446 Neal Street Cookeville, TN 38501
Miranda Montgomery State Historic Preservation Officer	Tennessee Historical Commission	Tennessee Historical Commission 2941 Lebanon Pike Nashville, TN 37214
Leah Alexander	U.S. Department of Energy	U.S. DOE-OREM P.O. Box 4067, Oak Ridge, TN 37831
Cara Beverly Biologist	Nashville District, U.S. Army Corps of Engineers	U.S. Army Corps of Engineers 110 9th Avenue South, Suite A415, Nashville, TN 37203
Jordan Sikkema Program Manager	Tennessee Valley Authority	Tennessee Valley Authority 1101 Market St BR 2C Chattanooga, TN 37402
James Tinch Regional Director	Knoxville Field Office, Tennessee Department of Environmental Protection	Tennessee Department of Environmental Protection 3711 Middlebrook Pike, Suite 101, Knoxville, TN 37921

Name	Affiliation	Contact Information
Local officials	City of Oak Ridge	Municipal Building 200 South Tulane Avenue Oak Ridge, TN 37830
Roane County Commission	Roane County	Roane County Courthouse 200 E. Race Street Kingston, TN 37763

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	Deputy EIS document manager
Young-Soo Chang	Ph.D., M.S., and B.S., 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	Accidents; monitoring and mitigation
Laura Fox	B.S., Biology; 14 years of experience in environmental impact assessments	EIS document manager
Mark Grippo	Ph.D., M.S., and B.S., Ecology; 17 years of experience in ecological and environmental impact analyses and biological assessments	Ecological resources, wetlands
Jacob Houseman	B.S., Geography and Geographic Information Systems; 3 years of experience in GIS and geospatial analyses	GIS mapping and analysis
Chris Howell	B.S., Business; 23 years of experience in cultural and historic resource analyses and consultations, in particular Tribal consultations	Cultural resources
Kevin Hickey	Ph.D. and B.S., Environmental Engineering; 5 years of experience with chemical exposure modeling and health risk analyses	Water resources; technical review and quality assurance
Sunita Kamboj	Ph.D. and M.S., Health Physics/Radiological Engineering; M.S. and B.S., Physics; Certified Health Physicist; 32 years of experience in radiological impact analyses, including RESRAD modeling	Co-project manager; waste management; public and occupational health

Name	Education/Expertise	Contribution
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	Transportation
Margaret Lobbig	Master of Landscape Architecture; B.A., Geography and Urban Studies; 3 years of experience in landscape evaluation and visual impact analyses	Land use and demography
Margaret MacDonell	Ph.D. and M.S., Civil/Environmental Health Engineering; B.S., Biology; 40 years of experience in environmental technology and health risk analyses	Argonne project manager
Daniel O'Rourke	M.S., Industrial Archaeology; B.A., History and Anthropology; 33 years of experience in cultural, historic, and other environmental impact analyses	Historic and cultural resources
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 Secter	Master and Bachelor of Landscape Architecture; Project Management Professional; B.A., Community Development; B.S., Applied Ecology; more than 25 years of experience in scenic and visual impact analyses	Visual and scenic resources
Ellen White	Master of 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, GIS mapping
U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards		
Briana Arlene	B.S., Conservation Biology; Master's Certification in Environmental Policy; 20 years of experience in ecological impact analyses and biological assessments	Endangered Species Act consultation
Patrick Donohue	B.S., Earth Science; 12 years of experience in environmental geology, remediation, and Federal and local government environmental reviews	Back-up Environmental Project Manager

Name	Education/Expertise	Contribution
Beau Goldstein	M.A. and B.A., Anthropology; Registered Professional Archaeologist; 27 years of experience in historic and cultural resource analyses, and Tribal and State consultations	Historic and cultural resources
Stacey Imboden	M.S., Environmental Engineering; B.S., Meteorology; 25 years of experience in environmental impact analyses, agency coordination, and nuclear facilities	Lead Environmental Project Manager
Amy Minor	B.A., Environmental Studies; more than 25 years of experience in environmental impact analyses, agency coordination, and industrial and nuclear facilities	EIS reviewer
Ashley Waldron	B.S., Biology; 18 years of experience in environmental impact analysis; agency consultation and nuclear facilities	Co-lead Environmental Project Manager