Enclosure 1b - Chapters 1 through 13
License Application
for the
Paducah Laser Enrichment Facility

Docket No. 70-7033
Global Laser Enrichment LLC
June 27, 2025

4110 N US Hwy 421
Suite 100
Wilmington, NC 28401

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ACRONYMS

AAC	Augmented Administrative Control
AC	Administrative Control
A/E	Architect / Engineering
AEC	Active Engineered Control
AEGL	Acute Exposure Guideline Levels
AEP	Annual Exceedance Probability
ALARA	As Low As Reasonably Achievable
ALI	Annual Limit on Intake
ANS	American Nuclear Society
ANSI	American National Standards Institute
APF	Assigned Protection Factor
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
BDC	Baseline Design Criteria
BDP	Boundary Definition Package
CAA	Controlled Access Area
CAAS	Criticality Accident Alarm System
CAP	Corrective Action Plan
CAS	Central Alarm Station
CBA	Cost-Benefit Analysis
CDE	Committed Dose Equivalent
CEDE	Committed Effective Dose Equivalent
CEO	Chief Executive Officer
CFR	Code of Federal Regulations
CM	Configuration Management
CRSA	Cylinder Receipt and Shipping Area
CSA	Criticality Safety Analysis
CTPS	Cold Trap Purification System
CY	Calendar Year
DAC	Derived Air Concentration
DFP	Decommissioning Funding Plan
DOE	U.S. Department of Energy
D-N	Depleted to Natural
DP	Decommissioning Plan
EOC	Emergency Operations Center
EHS	Environmental, Health, and Safety
EM	Enrichment Module
EMT	Emergency Medical Technician
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ER	Environmental Report
ERO	Emergency Response Organization

ACRONYMS

FHA	Fire Hazards Analysis
FNMCP	Fundamental Nuclear Material Control Plan
FOCI	Foreign Ownership, Control, Influence
GET	General Employee Training
GHS	Gas Handling System
GLE	Global Laser Enrichment LLC
HAZOP	Hazards and Operability Analysis
HEGA	High-Efficiency Gas Absorption
HEPA	High-Efficiency Particulate Air
HVAC	Heating, Ventilation, and Air Conditioning
IBC	International Building Code
ICRP	International Commission on Radiological Protection
IFC	International Fire Code
IROFS	Items Relied on for Safety
ISA	Integrated Safety Analysis
ISAS	Integrated Safety Analysis Summary
ITM	Inspection, Testing, and Maintenance
JHA	Job Hazards Analysis
KDAQ	Kentucky Department of Air Quality
LA	License Application
LEL	Lower Explosive Limit
LES	Louisiana Energy Services, L.P.
LEU	Low Enriched Uranium
LLRW	Low-Level Radioactive Waste
LSS	Liquid Sampling System
LTTS	Low Temperature Take-off Station
M&TE	Measuring and Test Equipment
MC&A	Material Control and Accounting
MDC	Minimum Detectable Concentration
MCES	Monitored Central Exhaust System
SDS	Safety Data Sheet
MOUs	Memoranda of Understanding
MSW	Municipal Solid Waste
NCS	Nuclear Criticality Safety
NELAC	National Environmental Laboratory Accreditation Conference
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
N-L	Natural to Low Enriched Uranium
NMSS	Nuclear Material Safety and Safeguards
NPDES	National Pollutant Discharge Elimination System

ACRONYMS

NPH	Natural Phenomena Hazard
NRC	U.S. Nuclear Regulatory Commission
NSI	Nuclear Safety Instruction
NSSL	National Severe Storms Laboratory
NUREG	NRC Publication
NVLAP	National Voluntary Laboratory Accreditation Program
OB	Operations Building
OCA	Owner Controlled Area
OJT	On-the-Job Training
OSHA	Occupational Safety and Health Administration
OSTV	Onsite Transfer Vehicle
PGDP	Paducah Gaseous Diffusion Plant
P&ID	Piping and Instrumentation Diagram
PHA	Process Hazards Analysis
PLEF	Paducah Laser Enrichment Facility
PM	Preventive Maintenance
PMT	Post-Maintenance Testing
PPE	Personal Protective Equipment
PSP	Physical Security Plan
QA	Quality Assurance
QAM	Quality Assurance Manual
QL	Quality Level
QRA	Quantitative Risk Assessment
RASCAL	Radiological Assessment System for Consequence Analysis
RCA	Radiological Controlled Area
RCRA	Resource Conservation and Recovery Act
RD	Restricted Data
RLECTS	Radiological Liquid Effluent Collection Treatment System
RM	Records Management
RP	Radiation Protection
RSC	Radiation Safety Committee
RWP	Radiation Work Permit
SB	Support Building
SCA	Sampling Containment Autoclave
SFS	Solid Feed Station
SNM	Special Nuclear Material
SRC	Safety Review Committee
SRD	Secret Restricted Data
SSC	System, Structure, and Component
SSLCB	Single-Sided Lower Confidence Band
SSLTB	Single-Sided Lower Tolerance Band
SSLTL	Single-Sided Lower Tolerance Limit

ACRONYMS

SWU	Separative Work Unit
TEDE	Total Effective Dose Equivalent
TLD	Thermo Luminescent Dosimeters
TSDF	Treatment, Storage, and Disposal Facility
TWS	Tails Withdrawal System
UL	Underwriters Laboratory
UM	Utilities Module
U.S.	United States
USEC	United States Enrichment Corporation, Inc.
USGS	U.S. Geological Survey
USL	Upper Subcritical Limit
WKWMA	West Kentucky Wildlife Management Area

CHEMICALS AND UNITS OF MEASURE

^{40}K	potassium-40
^{99}Tc	technetium-99
^{222}Rn	radon-222
^{226}Ra	radium-226
^{232}Th	thorium-232
^{235}U	uranium-235
^{238}U	uranium-238 (depleted ^{235}U)
ºF	Fahrenheit
ADU	ammonium diuranate
bgs	below ground surface
Bq	Becquerel
cc	cubic centimeters
CFC	chlorofluorocarbon
Ci	curie
cm	centimeter
cm^2	square centimeters
CO	carbon monoxide
CO_2	carbon dioxide
cP	continental polar
dBa	a-weighted decibels
DCE	cis-1,2 dichloroethylene
dpm	disintegrations per minute
ft	foot
ft^2	square foot
g	gram
gal	gallon
gpd	gallons per day
gpm	gallons per minute
GWe	gigawatt electrical
ha	hectare
HF	hydrogen fluoride
hz	hertz
in	inches
kg	kilogram
km	kilometers
kts	knots
lb	pound
L_{DN}	day-night average sound levels
Lpd	liters per day
m	meter
m^2	square meter
Mg	megagram

CHEMICALS AND UNITS OF MEASURE

mg	milligram
mm	millimeter
mph	miles per hour
mrem	millirem
mrem/yr	millirem per year
msl	mean sea level
mSv	millisievert
mSv/yr	millisievert per year
mT	maritime tropical
MWe	megawatt electrical
NO_2	nitrous oxide
O_3	ozone
Pb	lead
pCi	picocurie
PM	particulate matter
PM_{10}	particulate matter with aerodynamic diameter of 10 µm or less
PM_{25}	particulate matter with aerodynamic diameter of 2.5 µm or less
ppm	parts per million
psi	pound per square inch
PU	Plutonium
scfph	standard cubic feet per hour
sL/m	standard liters per minute
SO_2	sulfur dioxide
Sv	sieverts
TCE	trichloroethylene
TSP	total suspended particulates
TSS	total suspended solids
U_3O_8	triuranium octaoxide
UF_4	uranium tetrafluoride
UF_6	uranium hexafluoride
UO_2	uranium dioxide
UO_2F_2	uranyl fluoride
µCi	micocuries
µm	micrometer
VC	vinyl chloride
wt	weight
yd^3	cubic yard
yr	year

GLOSSARY

100-Year Flood – A flood elevation (for a given area) that has a 1 percent chance of being equaled or exceeded each year. Thus, the 100-year flood could occur more than once in a relatively short period of time. The 100-year flood, which is the standard used by most federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance. The term 100-year flood is synonymous with the one percent annual chance flood. [FEMA]

500-Year Flood – Refers to the flood elevation for a given area that has a 0.2 percent chance of being equaled or exceeded each year. This term is synonymous with the 0.2 percent annual chance of flood. [FEMA]

Absorbed Dose – The energy imparted by ionizing radiation per unit mass of irradiated material. [10 CFR 20.1003]

Accident Sequence – An unintended sequence of events that, given the failure of certain items relied on for safety (IROFS) identified in the sequence, would result in environmental contamination, radiation exposure, release of radioactive material, inadvertent nuclear criticality, or exposure to hazardous chemicals (provided that the chemicals are produced from licensed radioactive material). The term "accident" may be used interchangeably with "accident sequence." [NUREG-1520]

Active Engineered Control (AEC) – A physical device that uses active sensors, electrical components, or moving parts to maintain safe process conditions without any required human action. [NUREG-1520]

Airborne Radioactive Material – Radioactive material dispersed in the air in the form of dusts, fumes, particulates, mists, vapors, or gases. [10 CFR 20.1003]

Airborne Radioactivity Area – A room, enclosure, or area in which airborne radioactive materials, composed wholly or partly of licensed material, exist in concentrations in excess of the derived air concentrations (DACs) specified in 10 CFR 20.1001 through 20.2401, Appendix B; or to such a degree that an individual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6 percent of the annual limit on intake (ALI) or 12 DAC-hours. [10 CFR 20.1003]

Annual Limit on Intake (ALI) – The derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year by the reference man that would result in a committed effective dose equivalent of five rems (0.05 Sv) or a committed dose equivalent of 50 rems (0.5 Sv) to any individual organ or tissue. (ALI values for intake by ingestion or inhalation of selected radionuclides are given in 10 CFR 20.1001 through 10 CFR 20-2401, Appendix B, Table 1, Columns 1 and 2. [10 CFR 20.1003]

As Low As Reasonably Achievable (ALARA) – Making every reasonable effort to maintain exposures to radiation as far below the dose limits in 10 CFR 20 as is practical, consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest. [10 CFR 20.1003]

[redacted]

Assigned Protection Factor (APF) – The expected workplace level of respiratory protection that would be provided by a properly functioning respirator or a class of respirators to properly fitted and trained users. Operationally, the inhaled concentration can be estimated by dividing the ambient airborne concentration by the APF. [10 CFR 20.1003]

[redacted]

[redacted]

[redacted]

Background Radiation – Radiation from cosmic sources; naturally occurring radioactive material, including radon (except as a decay product of source or special nuclear material; and global fallout as it exists in the environment from the testing of nuclear explosive devices or from past nuclear accidents such as Chernobyl, that contribute to background radiation and are not under the control of the licensee. “Background Radiation” does not included radiation from source, byproduct, or special nuclear materials regulated by the U.S. Nuclear Regulatory Commission. [10 CFR 20.1003]

Baseline Design Criteria – A set of criteria specifying design features and management measures that are required and acceptable under certain conditions for new processes or facilities specified in 10 CFR 70.64. In general, these criteria are the acceptance criteria that apply to safety design for new facilities and new processes. [NUREG-1520]

[redacted]

[redacted]

[redacted]

Bias – The systematic difference between calculated results and experimentally measured values of keff for a fissile system.

Bias Uncertainty – The integrated uncertainty in experimental data, calculational methods, and models, estimated by a valid statistical analysis of calculated keff values for critical experiments.

Bioassay (Radiobioassay) – The determination of kinds, quantities or concentrations, and in some cases, the locations of radioactive material in the human body, whether by direct measurement (in vivo counting) or by analysis and evaluation of materials excreted or removed from the human body. [10 CFR 20.1003]

[redacted]

[redacted]

Configuration Management (CM) – A management measure that provides oversight and control of design information, safety information, and records of modifications (both temporary and permanent) that might impact the ability of items relied on for safety to perform their functions when needed. [10 CFR 70.4]

Controlled Parameter – A measurable parameter that is maintained within a specified range by one or more specific controls to ensure the safety of an operation. [NUREG-1520]

[redacted]

[redacted]

Derived Air Concentration (DAC) – The concentration of a given radionuclide in air which, if breathed by the reference man for a working year of 2,000 hours under conditions of light work (inhalation Rate 1.2 cubic meters of air per hour), results in an intake of one ALI. DAC values are given in 10 CFR 20.1001 through 20.2401, Appendix B, Table 1, Column 3. [10 CFR 20.1003]

Double Contingency Principle – Process designs should incorporate sufficient factors of safety to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible. [10 CFR 70.4]

Double Contingency Protection – A characteristic or attribute of a process that has incorporated sufficient safety factors to that at least two unlikely, independent, and concurrent changes in process conditions are required before a nuclear criticality accident is possible. [NUREG-1520]

Effective Dose Equivalent – The sum of the products of the dose equivalent to the body organ or tissue and the weighting factors applicable to each of the body organs or tissues that are irradiated. Weighting factors are: 0.25 for gonads; 0.15 for breast; 0.12 for red bone marrow; 0.12 for lungs, 0.03 for thyroid; 0.03 for bone surface, and 0.06 for each of the other five organs receiving the highest dose equivalent. [10 CFR 70.4]

Effective Kilograms of Special Nuclear Material – (1) For plutonium and 233U, their weight in kilograms; (2) For uranium with an enrichment in the isotope 235U of 0.01 (one percent) and above, its element weight in kilograms multiplied by the square of its enrichment expressed as a decimal weight fraction; and (3) For uranium with an enrichment in the isotope 235U below 0.01 (one percent), by its element weight in kilograms multiplied by 0.0001. [10 CFR 70.4]

External Dose – The portion of the dose equivalent received from radiation sources outside the body. [10 CFR 20.1003]

External Event – An event for which the likelihood cannot be altered by changes to the regulated facility or its operation. This would include all natural phenomena events, plus airplane crashes, explosions, toxic releases, fires, etc., occurring near or on the plant site. [NUREG-1520]

[redacted]

High Radiation Area – An area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of 0.1 rem (1 mSv) in one hour at 30 centimeters from the radiation source or 30 centimeters from any surface that the radiation penetrates. [10 CFR 20.1003]

Individual Monitoring – (1) The assessment of dose equivalent by the use of devices designed to be worn by an individual; (2) The assessment of committed effective dose equivalent by bioassay or by determination of the time-weighted air concentrations to which an individual has been exposed; or (3) The assessment of dose equivalent by the use of survey data. [10 CFR 20.1003]

Integrated Safety Analysis (ISA) – A systematic analysis to identify facility and external hazards and their potential for initiating accident sequences, the potential accident sequences, their likelihood and consequences, and the IROFS. As used here, integrated means joint consideration of, and protection from, all relevant hazards, including radiological, nuclear criticality, fire, and chemical. However, with respect to compliance with the regulations of 10 CFR 70, the NRC requirement is limited to consideration of the effects of all relevant hazards on radiological safety, prevention of nuclear criticality accidents, or chemical hazards directly associated with NRC licensed radioactive material. An ISA can be performed process by process, but all processes must be integrated, and process interactions considered. [10 CFR 70.4]

Integrated Safety Analysis (ISA) Summary – A document or documents submitted with the license application, license amendment application, license renewal application, or pursuant to 10 CFR 70.62(c)(3)(ii) that provides a synopsis of the results of the integrated safety analysis and contains the information specified in 10 CFR 70.65(b). The ISA Summary can be submitted as one document for the entire facility, or as multiple documents that cover all portions and processes of the facility. [10 CFR 70.4]

Internal Dose – The portion of the dose equivalent received from radioactive material taken into the body. [10 CFR 20.1003]

Items Relied on for Safety (IROFS) – Structures, systems, equipment, components, and activities of personnel that are relied on to prevent potential accidents at a facility that could exceed the performance requirements in 10 CFR 70.61 or to mitigate their potential consequences. This does not limit the licensee from identifying additional structures, systems, equipment, components, or activities of personnel (i.e., beyond those in the minimum set necessary for compliance with the performance requirements) as items relied on for safety. [10 CFR 70.4]

[redacted]

Licensed Material – Source material, special nuclear material, or byproduct material received, possessed, used, transferred, or disposed of under a general or specific license issued by the U.S. Nuclear Regulatory Commission. [10 CFR 20.1003]

Licensee – Holder of a license from the U.S. Nuclear Regulatory Commission. [10 CFR 20.1003]

Management – Managers who are charged with the administration of a group of people having a common organizational function. Managers are responsible for the assigned organization's output.

Management Measures – The functions performed by the licensee, generally on a continuing basis, that are applied to items relied on for safety, to ensure the items are available and reliable to perform their functions when needed. Management measures include Configuration Management, Maintenance, Training and Qualifications, Procedures, Audits and Assessments, Incident Investigations, Records Management, and other Quality Assurance elements. [10 CFR 70.4]

Mitigative Control – A control intended to reduce the consequence of an accident sequence, not to prevent it. When a mitigative control works as intended, the results of the sequence are called the mitigated consequences. [NUREG-1520]

Nuclear Criticality Safety (NCS) Control – A fixed physical design feature, active device, or procedure that is implemented to maintain safe process conditions. NCS controls are preventive and may be passive engineered, active engineered, or administrative (procedural). The NCS controls that are necessary to maintain the system subcritical under normal and credible abnormal conditions and achieve an overall likelihood of less than or equal to 10-5 per year (per event), are declared as IROFS in the ISA Summary.

New Processes at Existing Facilities – Systems-level or facility-level design changes to processes equipment, process technology, facility layout, or types of licensed material possessed or used. Generally, this definition does not include component-level design changes or equipment replacement. [NUREG-1520]

Occupational Dose – The dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation or to radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee or other person. Occupational dose does not include doses received from background radiation, from any medical administration the individual has received, from exposure to the individuals administered radioactive material and released under 10 CFR 35.75, from voluntary participation in medical research programs, or as a member of the public. [10 CFR 20.1003]

Passive Engineered Control – A device that uses only fixed physical design features to maintain safe process conditions without any required human action. Assurance is maintained through specific periodic inspections or verification measurement(s), as appropriate. [NUREG-1520]

Procedure – A document that specifies or describes how an activity is to be performed.

Radiation (Ionizing Radiation) – Alpha particles, beta particles, gamma rays, x-rays, neutrons, high-speed electron, high-speed protons, and other particles capable of producing ions. Radiation does not include non-ionizing radiation, such as radio-waves or microwaves, or visible, infrared, or ultraviolet light. [10 CFR 20.1003]

Radiation Area – An area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.005 rem (0.05 mSv) in one hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates. [10 CFR 20.1003]

Radiation Monitoring – The measurement of radiation levels, concentrations, surface area concentrations or quantities of radioactive material and the use of the results of these measurements to evaluate potential exposures and doses. [10 CFR 20.1003]

Radiological Controlled Area (RCA) – An area to which access is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. For regulatory purposes, a radiological controlled area is equivalent to a restricted area, as defined in 10 CFR 20.1003.

Residual Radioactivity – Radioactivity in structure, materials, soils, groundwater, and other media at a site resulting from activities under the licensee's control. This includes radioactivity from all licensed and unlicensed sources used by the licensee, but excludes background radiation. It also includes radioactive materials remaining at the site as a result of routine or accident releases of radioactive material at the site and previous burials at the site, even if those burials were made in accordance with the provisions of 10 CFR 20. [10 CFR 20.1003]

Restricted Area – An area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. Restricted area does not include areas used as residential quarters, but separate rooms in a residential building may be set apart as a restricted area. [10 CFR 20.1003]

Restricted Data – All data concerning (1) design, manufacture, or utilization of atomic weapons; (2) the production of special nuclear material; or (3) the use of special nuclear material in the production of energy, but shall not include data declassified or removed from the Restricted Data category pursuant to Section 142 of the Act. [10 CFR 70.4]

Sealed Source – Any special nuclear material that is encased in a capsule designed to prevent leakage or escape of the special nuclear material. [10 CFR 70.4]

Simple Administrative Control – A procedural human action that is prohibited or required to maintain safe process conditions. [NUREG-1520]

Site Area Emergency – Events may occur, are in progress, or have occurred that could lead to a significant release of radioactive material and that could require a response by offsite response organization to protect persons offsite. [10 CFR 70.4]

[redacted]

Source Material – (1) Uranium or thorium or any combination of uranium and thorium in any physical or chemical form; or (2) Ores that contain, by weight, one-twentieth of one percent (0.05 percent), or more, of uranium, thorium, or any combination of uranium and thorium. Source material does not include special nuclear material. [10 CFR 20.1003]

Special Nuclear Material (SNM) – (1) Plutonium, 233U, uranium enriched in the Isotope 233 or in the Isotope 235, and any other material which the Commission, pursuant to the provisions of Section 51 of the Atomic Energy Act, determines to be special nuclear material, but does not include source material; or (2) Any material artificially enriched by any of the foregoing but does not include source material. [10 CFR 70.4]

Special Nuclear Material of Low Strategic Significance – (1) Less than an amount of special nuclear material of moderate strategic significance as defined in Paragraph (1) of the definition of strategic nuclear material of moderate strategic significance, but more than 15 grams of 235U (contained in uranium enriched to 20 percent or more in 235U isotope) or 15 grams of 233U or 15 grams of plutonium or the combination of 15 grams when computed by the equation, grams = (grams contained 235U) + (grams plutonium) + (grams 233U); or (2) Less than 10,000 grams but more than 1,000 grams of 235U (contained in uranium enriched to 10 percent or more but less than 20 percent in the 235U isotope); or (3) 10,000 grams or more of 235U (contained in uranium enriched above natural but less than 10 percent in the 235U isotope). This class of material is sometimes referred to as a Category III quantity of material. [10 CFR 70.4]

Survey (Radiological) – An evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or their sources of radiation, When appropriate, such an evaluation includes a physical survey of the location of radioactive material and measurements or calculations of levels of radiation, or concentrations or quantities of radioactive material present. [10 CFR 20.1003]

Total Effective Dose Equivalent – Means the sum of the effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures). [10 CFR 20.1003]

Unacceptable Performance Deficiencies – Deficiencies in the items relied on for safety or the management measures that need to be corrected to ensure an adequate level of protection as defined in 10 CFR 70.61(b), (c), or (d). [10 CFR 70.4]

Unmitigated Consequence/Likelihood – Unmitigated consequence/likelihood is the consequence/likelihood of the unmitigated event sequence before IROFS are identified and applied.

Unmitigated Risk – Unmitigated risk is the product of the unmitigated likelihood category (a number from 1 to 3) and the unmitigated consequence category (a number from 1 to 3). Unacceptable unmitigated risk carries a value of 6 or 9 (exceeds a value of 4).

Uranium Enrichment Facility – (1) Any facility used for separating the isotopes of uranium or enriching uranium in the Isotope 235, except laboratory scale facilities designed or used for experimental or analytical purposes only; (2) Any equipment or device, or important component part especially designed for such equipment or device, capable of separating the isotopes or uranium or enriching uranium in the Isotope 235. [10 CFR 70.4]

Very High Radiation Area – An area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving an absorbed dose in excess of 500 rads (five grays) in one hour at one meter from a radiation source or one meter from any surface that the radiation penetrates. [10 CFR 20.1003]

Worker – An individual who receives an occupational dose as defined in 10 CFR 20.1003. [10 CFR 70.4]

CHAPTER 1 – GENERAL INFORMATION
REVISION LOG

Rev.	Effective Date	Affected Pages	Revision Description
0	27 June 2025	ALL	Initial Application Submittal.

[redacted]

TABLE OF CONTENTS

TABLES

FIGURES

[redacted]

1. GENERAL INFORMATION

This application requests a license from the U.S. Nuclear Regulatory Commission (NRC) to possess and use source material, special nuclear material (SNM), and byproduct material and construct and operate a commercial uranium enrichment facility. This application is filed by Global Laser Enrichment LLC (GLE). [redacted]

This chapter provides an overview of the GLE Paducah Laser Enrichment Facility (PLEF). The facility enriches uranium for use in the manufacturing of nuclear fuel. This chapter provides a description of the facility and enrichment process, along with a description of the PLEF Site. Institutional information is provided to identify the applicant, describe the applicant's financial qualifications, and describe the proposed licensed activities.

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and general office areas via the main lobby. The building includes the CAS as described in the [redacted]

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CHAPTER 2 – ORGANIZATION AND ADMINISTRATION
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[redacted]

2. ORGANIZATION AND ADMINISTRATION

This chapter of the Paducah Laser Enrichment Facility (PLEF) License Application (LA) presents the organizations responsible for managing the design, construction, operation, and decommissioning of the facility. Key roles and disciplines are described, including personnel qualifications for each key position. This chapter also describes the management system and procedures for effective implementation of Compliance functions at the PLEF.

It is Global Laser Enrichment's (GLE's) policy to maintain a safe workplace for employees and assure operational compliance within the terms and conditions of the license and applicable regulations. [redacted] GLE employs the principle of keeping radiation exposures to employees and the public as low as reasonably achievable (ALARA).

2.1 ORGANIZATIONAL STRUCTURE

2.1.1 Facility Organization

[redacted]

[redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

2.2 FACILITY ORGANIZATION DURING DESIGN, CONSTRUCTION, AND OPERATION

[redacted]

[redacted]
maintenance, modification, and testing of the PLEF. The CEO is responsible for ensuring the [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]

[redacted]

[redacted]

2.2.2 Operations Organizational Structure

The PLEF organizational structure during operations is shown in **Figure 2-2**. GLE has direct responsibility for preoperational testing, initial startup, operation, and maintenance of the PLEF. [redacted]

The responsibilities, authorities, and lines of communication of key management roles within the Operations Organization are discussed in **Section 2.3, *Key Management Roles, Responsibilities, and Qualifications.***

[redacted]

[redacted]

[redacted]

[redacted]

2.3 KEY MANAGEMENT ROLES, RESPONSIBILITIES, AND QUALIFICATIONS

[redacted]

[redacted]

2.3.1 Chief Executive Officer

The CEO is responsible for providing overall direction and management of PLEF activities. [redacted]

2.3.2 Plant Manager

The Plant Manager has overall responsibility for the operation, administration, and regulatory compliance of the PLEF. [redacted]

2.3.3 Quality Assurance Manager

The Quality Assurance Manager reports to the Plant Manager. [redacted]

[redacted]

2.3.4 Security Manager

The Security Manager is responsible for implementing the security program(s) (physical, information, and network security).

The Security Manager shall have, as a minimum, a bachelor's degree (or equivalent), 5 years of security-related experience; or a high school diploma with 8 years of security related experience.

2.3.5 Operations Manager

The Operations Manager has the responsibility of directing the day-to-day operation of the facility. [redacted]

2.3.5.1 Maintenance Manager

The Maintenance Manager reports to the Operations Manager and has the responsibility of directing and scheduling maintenance activities to ensure proper operation of the facility. [redacted]

2.3.6 Engineering Manager

The Engineering Manager performs and/or provides oversight of activities involving design, construction, and/or installation of new and modified facilities and equipment; supplies maintenance and process engineering support; conducts activities associated with product research and development; assures that all equipment and facilities have appropriate safety controls and have been evaluated within the spirit and intent of ALARA; [redacted]

The Engineering Manager shall have, as a minimum, a bachelor's degree (or equivalent) in an engineering or scientific field and a minimum of 5 years of related nuclear experience.

2.3.6.1 [redacted]

[redacted]

[redacted]

[redacted]

2.3.6.2 [redacted]

[redacted]

[redacted] e in [redacted]

2.3.7 Project Director

The Project Director has responsibility for the implementation of facility modifications, and provides project engineering support, as needed, to support operations, maintenance, and performance testing of systems and equipment. The Project Director is also responsible for managing the remaining design and construction activities. The Project Director manages a group of Project Managers and a Project Controls Manager.

The Project Director shall have, as a minimum, a bachelor’s degree (or equivalent), 5 years of nuclear experience, and 3 years of supervisory or management experience.

2.3.8 Compliance Manager

The Compliance Manager reports to the Plant Manager. In addition, the Compliance Manager has the authority and responsibility to contact the GLE CEO with any regulatory compliance concerns. The Compliance Manager provides programs, procedures, and reviews to assure worker health and safety; environmental protection; and compliance with licenses and permits. These activities are conducted with the ALARA principle in mind. Discipline areas include licensing, industrial, chemical, and fire safety, environmental health services, radiation protection, material control and accounting, and emergency preparedness. Emergency preparedness and response programs are supported by each discipline area as needed. Changes to the facility or to activities of personnel that require prior NRC approval are reviewed and approved by the Compliance Manager or designee.

[redacted]

2.3.8.1 Licensing Manager

The Licensing Manager reports to the Compliance Manager. The Licensing Manager has responsibility for coordinating facility activities to ensure compliance with applicable NRC requirements. The Licensing Manager is also responsible for ensuring abnormal events are reported to the NRC in accordance with NRC regulations.

[redacted]

2.3.8.2 [redacted]

[redacted]

[redacted]

2.3.8.3 Environmental Health and Safety Manager

The Environmental Health and Safety (EHS) discipline reports to the Compliance Manager. The EHS discipline works with the other facility disciplines to ensure consistent interpretations of EHS requirements, performs independent reviews, and supports facility and operations change control reviews. The EHS discipline has the authority to issue stop work orders. [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

2.3.8.4 Radiation Protection Manager

The radiation protection discipline has responsibility for establishing and maintaining the radiation safety program necessary to ensure the protection of employees at the PLEF and the community, as defined in **Chapter 4, *Radiation Protection***. Key responsibilities include management of the ALARA, dosimetry, and radiation monitoring and surveillance programs; analysis and approval of operations involving radiological safety and proposed changes to those operations; establishing radiation protection criteria, procedures, and training programs to control contamination and exposure to individuals and the environment; and monitoring plant compliance with the radiological protection criteria through inspections and audits. Radiation monitoring includes measurement of airborne radio nuclide concentration, contamination level, and external radiation levels; evaluation of the operational integrity and reliability of radiation detection instruments; and maintenance of records related to the radiation monitoring program. The radiation protection discipline is administratively independent of Operations and has the authority to shut down potentially unsafe operations.

The individual(s) responsible for the radiation protection discipline administers activities associated with radiological safety. This includes monitoring and control of areas of airborne radioactivity, surface contamination, containment, ventilation, internal and external dosimetry, and bioassay services.

[redacted]

2.3.8.5 Material Control and Accountability Manager

The material control and accountability (MC&A) discipline maintains programs to ensure that SNM is received, processed, stored, and transferred in accordance with federal regulations, and implements these through the areas of SNM safeguards, SNM accountability, shipping, and receiving. This position is separate from, and independent of, the Operations and Engineering organizations to ensure a definite division between the MC&A function and the other organizations.

The minimum qualifications for key MC&A personnel are defined in the Fundamental Nuclear Material Control Plan.

2.3.8.6 Emergency Preparedness Manager

The emergency preparedness discipline is responsible for implementing the emergency management program as defined in **Chapter 8, *Emergency Management*** and the Emergency Plan.

The minimum qualifications for key Emergency Preparedness personnel are defined in the Emergency Plan.

2.3.9 Safety Review Committee

The committee shall consist of the Chairman and five (5) members, at a minimum. The committee shall include competence in the applicable scientific and engineering disciplines and shall be staffed with members outside of the GLE Operations Organization. [redacted]

The chairman, other committee members, and their alternates, are appointed by the plant manager, or the discipline manager authorized to be his alternate. At a minimum, the chairman is required to have the qualifications specified for an individual responsible for a compliance function, and the other committee members are required to have the qualifications specified [redacted].

The committee is responsible to the plant manager, or the discipline manager authorized to be his/her alternate, who retains overall authority for the approval or disapproval of committee actions.

[redacted]

The committee's findings and recommendations are reported in writing to the Plant Manager. Such reports shall be retained in accordance with procedures and retained for at least five years.

Committee review of matters other than the bulleted items above may be conducted by either individual review or collectively at a meeting; however, individual members of the committee have the authority to request a meeting of the entire committee on any given matter.

2.4 ADMINISTRATION

2.4.1 Employee Concerns

GLE is committed to providing a safe and productive work environment that encourages employees to raise issues or concerns related to the design, construction, or operation of the PLEF. Employees who feel that safety or quality is being compromised have the right and responsibility to initiate the "stop work" process in accordance with the applicable procedures to ensure the work environment is placed in a safe condition. Employees also have access to various resources to ensure their safety or quality concerns are addressed.

GLE has established an employee concerns program to provide an avenue for employees to obtain an independent evaluation of concerns.

GLE Management is committed to investigating and resolving employee concerns in an effective manner and providing timely resolutions to issues. The employee concerns program provides methods for establishing a work environment in which employees feel free to raise concerns to their management or the NRC without fear of reprisal.

2.4.2 Management Measures

Management measures [redacted] are established as described in **Chapter 11**.

2.4.3 Off-Site Emergency Response

Written agreements with off-site emergency response organizations are described in **Chapter 8**.

[redacted]

Figure 2-1. GLE Organizational Structure During Design and Construction

[redacted]

Figure 2-2. GLE Organizational Structure During Operations

CHAPTER 3 – INTEGRATED SAFETY ANALYSIS AND ISA SUMMARY
REVISION LOG

Rev.	Effective Date	Affected Pages	Revision Description
0	27 June 2025	ALL	Initial Application Submittal.

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FIGURES

3. INTEGRATED SAFETY ANALYSIS (ISA) AND ISA SUMMARY

This chapter presents the Global Laser Enrichment LLC (GLE) Integrated Safety Analysis (ISA) commitments and outlines the ISA methodology for the Paducah laser Enrichment Facility (PLEF). The approach used for performing the ISA is based on NUREG-1520 Revision 2, *Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility,* Chapter 3, Appendix A, [redacted].

The ISA is a systematic analysis to identify facility and external hazards, [redacted] IROFS implemented to prevent or mitigate each credible accident. The ISA Team reviewed the hazard identified for the credible worst-case consequences.

The primary scope of the ISA included [redacted] that could result in injuries to workers and/or the public, or significant environmental impacts during routine and non-routine (startup, shutdown, emergency shutdown, etc.) operations.

The accident summary resulting from the ISA identifies which engineered or administrative IROFS must fail to allow the occurrence of consequences that exceed the levels identified in 10 CFR 70.61.

[redacted].

3.1 SAFETY PROGRAM AND INTEGRATED SAFETY ANALYSIS COMMITMENTS

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

In compliance with 10 CFR 70.62(a)(2), process safety information and ISA records are maintained up-to-date by the Records Management Program, and in compliance with 10 CFR 70.72 Facility Changes and Change Process, the Configuration Management (CM) Program controls change to Systems, Structures, and Components (SSCs) for the PLEF. [redacted] Changes to the ISA are conducted in accordance with approved written procedures. [redacted] The development and implementation of procedures is described in **Chapter 11.**

[redacted]

3.1.2 Integrated Safety Analysis

In accordance with 10 CFR 70.62(c), the ISA is conducted and maintained of appropriate complexity for each process, such that it identifies:

- Nuclear criticality hazards,
- Radiological hazards,
- Chemical hazards that could increase radiological risk,
- Facility hazards that could increase radiological risk,
- Potential accident sequences,
- Consequences and likelihood of each accident sequence,
- Management measures that are sufficient to ensure IROFS will be available and reliable to perform their intended function in the context of 10 CFR 70.61, "Performance Requirements", and
- IROFS including the assumptions and conditions under which they support compliance with the performance requirements of 10 CFR 70.61.

The ISA methods used are described in the ISAS and in accordance with PLEF ISA procedures. These use guidance provided in NUREG 1520, *Standard Review Plan for the Review of a License*

Application for a Fuel Cycle Facility, Revision 2 and NUREG 1513, *Integrated Safety Analysis Guidance Document.* Written procedures are maintained at the PLEF.

[redacted]

[redacted] Changes to the ISA Summary are submitted to the U.S. Nuclear Regulatory Commission (NRC) [redacted] The ISA update process accounts for changes made to the facility or its processes. This update also verifies that initiating event frequencies and IROFS reliability values assumed in the ISA remain valid. Required ISA changes, as a result of the update process, are included in a revision to the ISA. Evaluation of facility changes, or a change in the process safety information, which may alter the parameters of an accident sequence, is performed using the ISA method(s) described in the ISA Summary.

Proposed changes to the facility or its operations are evaluated using the ISA method(s). New or additional IROFS and appropriate management measures are designated as required. [redacted] to determine if they are impacted by changes to the facility and/or its processes in accordance with criteria in 10 CFR 70.72(c) Unacceptable performance deficiencies in IROFS, does not meet performance requirements of 70.61, identified through updates to the ISA are addressed.

3.1.3 Management Measures

Management measures are utilized to maintain the IROFS so that they are available and reliable to perform their safety functions when needed. Management measures ensure compliance with the performance requirements assumed in the ISA documentation. [redacted]

[redacted]

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[redacted]

[redacted]

3.1.3.1 [redacted]

[redacted]

3.1.4 Design Codes and Standards

GLE commits to follow the industry practice to adhere to all "shall" statements in standards applied. Shown in [redacted]

3.1.5 10 CFR 70.61 performance requirements

3.1.5.1 Consequence Categories

10 CFR 70.61 specifies two consequence categories for a credible accident sequence: "High Consequence" and "Intermediate Consequence." [redacted].

3.1.5.2 Likelihood

10 CFR 70.61 specifies two categories for likelihood of occurrence: "Highly Unlikely" for high-consequence events and "Unlikely" for intermediate consequence events. [redacted]

[redacted]

3.1.5.3 Not Credible

A credible accident for which the consequences could exceed the performance requirements of 10 CFR 70.61 must be controlled to be unlikely or highly unlikely. Thus, for an event that is "Not Credible," meeting the performance requirements of 10 CFR 70.61 is not required. [redacted]

- [redacted]
- [redacted]
- [redacted]

3.1.5.4 Credible

A "Credible" accident is any event that does not meet the definition of "Not Credible" as defined above.

3.1.5.5 [redacted]

[redacted]

[redacted]

3.2 INTEGRATED SAFETY ANALYSIS SUMMARY AND DOCUMENTATION

3.2.1 Site Description

The ISA Summary provides a description of the PLEF Site, [redacted] A summary description of the PLEF Site is contained in [redacted]

[redacted] Description

The ISA Summary provides a description o[redacted]e PLEF. A summary description of the PLEF is provided in **Chapter 1**.

3.2.3 Process, Hazards, and Accident Sequences

The ISA Summary provides a description of the PLEF [redacted]

3.2.4 Compliance with the Performance Requirements of 10 CFR 70.61

The ISA Summary provides information that demonstrates GLE's compliance with the performance requirements of 10 CFR 70.61.

3.2.4.1 [redacted]

[redacted]

3.2.4.2 Management Measures

The ISA Summary provides a description of the management measures to be applied to IROFS for [redacted] For discussion on programmatic management measures, reference **Chapter 11**.

3.2.4.3 Criticality Monitoring

The CAAS is described in **Chapter 5, *Nuclear Criticality Safety*** and exemptions are described in **Chapter 1**.

3.2.4.4 [redacted]

[redacted]

[redacted].

3.2.4.4.1 Quality Standards and Records

SSCs that are determined by the ISA to be IROFS are designed, fabricated, erected, and tested [redacted]

3.2.4.4.2 [redacted]

[redacted]

[redacted]

[redacted]

3.2.4.4.3 Fire Protection

[redacted]

3.2.4.4.4 Environmental and Dynamic Effects

To the extent that they are required to function during or following the event, SSCs that are IROFS are protected [redacted]

[redacted]. SSCs that are determined to be IROFS are designed to withstand the effects of, and be compatible with, the environmental conditions associated with operation, maintenance, startup, shutdown, testing, and accidents for which the IROFS are required to function.

3.2.4.4.5 Chemical Protection

The design provides adequate protection against chemical risks produced from licensed material, facility conditions that affect the safety of licensed material, and hazardous chemicals produced from licensed material.

3.2.4.4.6 Emergency Capability

SSCs that are required to support the GLE Emergency Plan (EP) are designed for emergencies. The design provides accessibility to the equipment of onsite and available offsite emergency facilities and services such as hospitals, fire and police departments, ambulance service, and other emergency agencies.

3.2.4.4.7 Utility Services

Onsite utility service systems required to support IROFS are provided. Each utility service system required to support IROFS are designed to perform their function under normal and abnormal conditions. Utility systems are described in the ISA Summary.

3.2.4.4.8 Inspection, Testing, and Maintenance

SSCs that are determined to be IROFS are designed to permit inspection, maintenance, and testing. Inspection, testing, and maintenance intervals are developed for IROFS based on manufacturers' specifications, and the IROFS risk importance. Inspection, testing, and maintenance help ensure the availability of IROFS assumed in the ISA. Inspection, testing, and maintenance intervals are documented [redacted]

3.2.4.4.9 Criticality Control

[redacted]

3.2.4.4.10 *Instrumentation and Controls*

Instrumentation and control systems are provided to monitor variables and operating systems that are significant to safety over anticipated ranges for [redacted] These systems ensure adequate safety of process and utility service operations in connection with their safety function.

The variables and systems that require monitoring and control include process systems [redacted] Controls shall be provided to maintain these variables and systems within the prescribed operating ranges under normal conditions. [redacted].

3.2.5 [redacted]

[redacted]

- [redacted]
- [redacted]
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- [redacted]
- [redacted]
- [redacted]

[redacted]

[redacted]

3.2.6 Integrated Safety Analysis Methodology

GLE utilizes methodologies identified in NUREG-1520 Revision 2, Chapter 3, Appendix A, *Example Procedure for Accident Sequence Evaluation*, to identify hazards and evaluate accident sequences. [redacted] Descriptions of these general types of high or intermediate consequence accident sequences are reported in the ISAS. The ISA is a systematic analysis to identify facility and external hazards, potential accidents, accident descriptions, the likelihood and consequences of the accidents, and the IROFS.

The ISA uses a [redacted].

[redacted]

[redacted]

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CHAPTER 4 – RADIATION PROTECTION
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4. RADIATION PROTECTION

4.1 RADIATION PROTECTION PROGRAM

The purpose of this chapter is to define the Global Laser Enrichment LLC (GLE) Radiation Protection (RP) Program implemented at the Paducah Laser Enrichment Facility (PLEF). The RP Program protects the radiological health and safety of workers, the public, and the environment and complies with the following:

- Title 10 *Code of Federal Regulations* (10 CFR) Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations",
- 10 CFR 20, "Standards for Protection Against Radiation",
- 10 CFR 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material",
- 10 CFR 70, "Domestic Licensing of Special Nuclear Material", and
- Regulatory Guide 8.2, "Administrative Practices in Radiation Surveys and Monitoring".

[redacted]

4.1.1 Requirements of 10 CFR 20, Subpart B

In accordance with 10 CFR 20.1101, "Radiation Protection Programs", the RP Program uses approved written procedures and engineering controls based on sound RP principles to achieve occupational and public doses below the U.S. Nuclear Regulatory Commission (NRC) established limits. The RP Program is focused on implementing RP principles necessary to achieve compliance with the requirements of 10 CFR 20.1201, *Occupational Dose Limits for Adults*, and to maintain exposure to radiation As Low As Reasonably Achievable (ALARA). [redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]

4.1.2 Responsibilities of Key Program Personnel

The technical qualifications of PLEF staff, to include training and experience, are provided in the License Application (LA) in accordance with 10 CFR 70.22, *Contents of Applications*. Staffing is consistent with guidance provided in NRC-Regulatory Guide (RG)-8.2 and RG 8.10, *Operating Philosophy for Maintaining Occupational and Public Radiation Exposures As Low As Is Reasonably Achievable (NRC Regulatory Guide 8.10 Rev. 2.* Further discussion regarding the qualifications of GLE management and the delineation of safety responsibilities is provided in **Chapter 2**, ***Organization and Administration***.

4.1.2.1 Paducah Laser Enrichment Facility Plant Manager

The PLEF Plant Manager has overall responsibility for safety and activities conducted at the PLEF. [redacted]

4.1.2.2 Paducah Laser Enrichment Facility Compliance Manager

The Compliance Manager reports to the Plant Manager and has responsibility for directing activities to ensure that the PLEF complies with appropriate rules, regulations, and codes. The Compliance Manager directs the following functions: [redacted] The Compliance function provides independent oversight of Operations. The qualifications for this position are described in **Chapter 2**.

4.1.2.3 Radiation Protection Manager

The Radiation Protection (RP) Manager reports to the Compliance Manager and is responsible for the overall implementation of the RP Program. In matters involving RP, the RP Manager has direct access to the Plant Manager. The education and experience qualifications for the RP Manager are discussed in **Chapter 2.** The RP staff, including engineers, technicians, administrative support personnel, and contractors specifically assigned to the RP Program, report to the RP Manager.

[redacted]

[redacted]

4.1.3 Radiation Protection Program Staffing

The RP Manager ensures that the facility is staffed with suitably trained RP personnel to implement an effective program. RP staff qualifications and training are consistent with the guidance in NRC Regulatory Guide 1.8, *Qualification And Training Of Personnel For Nuclear Power Plants* and [redacted]

(ANS)-3.1-2014, *Selection, Qualification, and Training of Personnel for Nuclear Power Plants*. It [redacted]

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- [redacted]
- [redacted]

[redacted]

4.1.4 [redacted]

[redacted].

4.1.5 [redacted]

[redacted]

4.2 AS LOW AS REASONABLY ACHIEVABLE PROGRAM

This section describes PLEF's commitment to an ALARA Program. [redacted]. Approved written policies and procedures document and govern the implementation of the ALARA goals.

4.2.1 ALARA Program

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted].

The design and implementation of the ALARA Program also include the guidance contained in NRC-Regulatory Guide 8.2, NRC RG 8.13, *Instruction Concerning Prenatal Radiation Exposure, Rev. 3,* NRC RG 8.29, *Instruction Concerning Risks from Occupational Radiation Exposure, Rev.1* and NRC RG 8.37, *ALARA Levels for Effluents from Materials Facilities*. Radiation exposures shall be monitored and the annual average release concentration of radioactive material released in gaseous and liquid effluents at the boundary of the unrestricted area in compliance with 10 CFR 20.1302, *Compliance with Dose Limits for Individual Members of the Public* and will not exceed the values in 10 CFR 20, Appendix B, *Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage,* Table 2.

[redacted]

ALARA commitment to minimize the spread of contamination and reduce unnecessary exposure of personnel to radiation.

4.2.2 ALARA Policies and Procedures

[redacted]

[redacted]

[redacted]

4.2.3 ALARA Goals

[redacted]

[redacted]

[redacted]

[redacted]

4.2.4 [redacted]

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[redacted]

[redacted]

4.2.5 [redacted]

[redacted]

4.2.6 [redacted]

[redacted]

4.3 ORGANIZATION AND PERSONNEL QUALIFICATIONS

This section provides information pertaining to the structure of the RP Organization and the staff qualifications.

4.3.1 Radiation Protection Personnel

The technical qualifications include training and experience of PLEF staff, in accordance with 10 CFR 70.22(a)(6). Further discussion regarding the qualifications of PLEF management and the delineation of the safety authority and responsibilities is provided in **Chapter 2**. [redacted]

[redacted]

[redacted]

4.3.2 Organizational Relationships

[redacted].

4.3.3 Radiation Protection Manager

The position of RP Manager was previously described in **Section 4.1.2.3**, *Radiation Protection Manager*. [redacted]

4.3.4 Radiation Protection Staff Responsibilities

RP Technicians, Engineers, and Managers perform the functions of [redacted]

4.3.5 Minimum Training of Radiation Protection Staff

The RP Training Program is designed and implemented [redacted]

4.4 [redacted]

[redacted]

[redacted]

4.5 RADIATION PROTECTION TRAINING

4.5.1 Design and Implementation of Radiation Protection Training Program

The RP Training Program is designed and implemented [redacted]

4.5.2 Training of Personnel and Visitors

Training programs are established for various job functions [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

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4.6.2 Respiratory Protection Program

The Respiratory Protection Program is a subset of the RP Program and is conducted in accordance with 10 CFR 20, Subpart H. In accordance with 10 CFR 20.1703(c)(1-2), *Use of Individual Respiratory Protection Equipment*, [redacted].

4.6.2.1 Respiratory Protection Requirements of 10 CFR 20, Subpart H

In accordance with 10 CFR 20.1701, the PLEF is designed and operated to use, to the maximum extent practical, process and engineering controls to minimize the concentration of radioactive material in air. [redacted].

4.6.2.2 Procedures [redacted]

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4.7 RADIATION SURVEYS AND MONITORING PROGRAMS

[redacted]

4.7.1 Radiation Surveys and Monitoring Programs Meeting Requirements of 10 CFR 20, Subpart F

In accordance with 10 CFR 20.1501(a) and (b), PLEF conducts surveys that are necessary to comply with the applicable regulations and are reasonable [redacted]

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CHAPTER 5 – NUCLEAR CRITICALITY SAFETY
REVISION LOG

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5. NUCLEAR CRITICALITY SAFETY

5.1 MANAGEMENT OF THE NUCLEAR CRITICALITY SAFETY PROGRAM

5.1.1 Nuclear Criticality Safety Design Philosophy

In accordance with Baseline Design Criterion 9 contained in Title 10 *Code of Federal Regulations (*10 CFR) Part 70.64(a), "Requirements for New Facilities or New Processes at Existing Facilities", the design of fissile material processes must "provide for criticality control including adherence to [redacted], is the fundamental technical basis for design and operation of fissile material processes within the Global Laser Enrichment LLC (GLE) Paducah Laser Enrichment Facility (PLEF). [redacted]

The established NCS design criteria and NCS reviews are applicable to: (1) new and existing processes, facilities, or equipment which process, store, transfer, or otherwise handle fissile materials; and (2) any change in existing processes, facilities, or equipment which may have an impact on the established basis for NCS. For fissile material operations, [redacted]

In accordance with the requirements contained in 10 CFR 70.61(d), *Performance Requirements*, "the risk of nuclear criticality accidents must be limited by assuring that under normal and credible abnormal conditions all nuclear processes are subcritical." The NCS Program evaluates each fissile material process to identify the normal and credible abnormal conditions, and establishes the controls required [redacted] design criteria. Use of the [redacted] assures that all nuclear processes remain subcritical under credible conditions. As required in 10 CFR 70.62, *Safety Program and Integrated Safety Analysis*, [redacted]

5.1.2 Nuclear Criticality Safety Program Objectives

The NCS Program establishes and maintains NCS safety limits and operating limits for controlled parameters in nuclear processes. Qualified NCS personnel evaluate operations involving fissile material to determine the basis for safety of operation based on the assessment of both normal and credible abnormal conditions. Functional requirements for criticality safety controls are specified commensurate with the NCS design criteria, and management measures are applied to ensure the availability and reliability of the controls. [redacted]

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GLE personnel initiate proposed changes to the facility (such as, design changes, changes to processes, operating and maintenance procedures, IROFS, and management measures) through [redacted]

5.2 ORGANIZATION AND ADMINISTRATION

5.2.1 General Organization and Administrative Methods

The GLE organizational structure and administrative practices have been established consistent with the guidance in ANSI/ANS 8.1-1998 (R2007) and ANSI/ANS -8.19-2005, *Administrative Practices for Nuclear Criticality Safety*. Organizational positions, experience, and qualification requirements of personnel and functional responsibilities are described in **Chapter 2, *Organization and Administration***, [redacted].

5.2.2 Nuclear Criticality Safety Organization

The NCS function is administratively independent of the Operations Organization and has the authority to shutdown potentially unsafe operations. [redacted]

5.2.3 Operating Procedures

Fissile material operations are performed in accordance with approved written operating procedures. If personnel encounter a condition not covered by the operating procedure, the individual is required to safely stop the operation and report the defective condition to the NCS function, either directly or through Operations management. The operation may not be restarted until the NCS function has evaluated the situation and the necessary procedure instructions are provided. Operations personnel are trained in this procedural compliance policy.

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5.3.7 Nuclear Criticality Safety Records Retention

Records [redacted] are maintained in sufficient detail and form to permit independent review and audit of the calculation method and results. Such records are retained during the conduct of activities and in accordance with approved written procedures following cessation of such activities. [redacted]

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5.4.1.5 Computer Software and Hardware Configuration Control

The software and hardware used within the criticality safety calculational system is configured and controlled in accordance with CM approved written procedures. [redacted]

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5.4.4.1 Mass

Mass control may be used for NCS control alone or in combination with other control methods. [redacted]

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5.4.4.2 Geometry

Geometry may be used for NCS control alone or in combination with other control methods. [redacted]

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5.4.4.7 *Interaction (or Unit Spacing)*

Interaction/spacing control may be used for NCS control alone or in combination with other control methods. Interaction controls are based on either neutronic isolation or spacing of interacting units to control neutron leakage. Physical separation between process operations, vessels, or containers may be provided by either engineered or augmented administrative controls depending on the application. Where engineered spacing controls are required the structural integrity of the engineered feature must be sufficient for normal and credible abnormal conditions. Moveable engineered devices are inspected periodically for deformation.

[redacted]

5.4.4.8 *Neutron Absorbers*

Neutron absorbing materials may be utilized to provide a method for NCS control for a process, vessel, or container. Stable compounds such as boron carbide fixed in a matrix (such as, aluminum or polyester resin, elemental cadmium clad in appropriate material, elemental boron alloyed stainless steel, or other solid neutron absorbing materials) with an established dimensional relationship to the fissionable material are recommended. The use of neutron absorbers in this manner is defined as part of a passive engineered control. When evaluating the absorber effectiveness for an application, the neutron spectrum is considered in the CSA.

Where neutron absorbers are credited as an NCS controlled parameter (whether as engineered additives or as credited materials of construction), fixed neutron absorbers controls are implemented consistent with the guidance in ANSI/ANS 8.21-1995, *Use of Fixed Neutron Absorbers in Nuclear Facilities Outside Reactors*.

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5.4.5 Criticality Safety Analyses

The scope and content of any particular CSA reflects the needs and characteristics of the system being analyzed and typically includes the applicable information requirements listed below.

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5.5 REPORTING REQUIREMENTS

[redacted]

- The reporting criteria of 10 CFR 70, Appendix A and the report content requirements of 10 CFR 70.50, *Reporting Requirements*, are incorporated into approved written procedures.
- [redacted]
- [redacted]
- The required report is issued when the IROFS credited is lost, irrespective of whether the safety limits of the associated parameters are actually exceeded.

CHAPTER 6 – CHEMICAL PROCESS SAFETY
REVISION LOG

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6. CHEMICAL PROCESS SAFETY

This chapter describes the chemical classification process, the hazards of chemicals of concern, process interactions with chemicals affecting licensed materials and/or hazardous chemicals produced from licensed material, the methodology for evaluating hazardous chemical consequences, and the chemical safety assurance features.

The Paducah Laser Enrichment Facility (PLEF) Chemical Safety Program has been developed consistent with the guidance in Chapter 6 of NUREG-1520, Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility , and complies with Title 10 *Code of Federal Regulations* (10 CFR) Part 70.61, “Performance Requirements”, 10 CFR 70.62, “Safety Program and Integrated Safety Analysis”, and 10 CFR 70.64, “Requirements for New Facilities or New Processes at Existing Facilities”.

6.1 PROCESS CHEMICAL RISK AND ACCIDENT SEQUENCES

[redacted]

6.1.1 Process Descriptions

The GLE process descriptions are provided in the ISA Summary. [redacted]

6.1.2 Consequences and Likelihoods of Accident Sequences

An ISA has been performed as required by 10 CFR 70.62. [redacted]

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not create potential conditions that adversely affect the handling of licensed materials. Employees [redacted]

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6.2.1.1.2 *Labeling and Identification*

Hazardous materials [redacted] are labeled or identified to meet applicable regulations. The proper identification of hazardous materials decreases the likelihood of improper use, handling, and disposal, reducing potential negative consequences.

The hazards of chemicals are identified for personnel through the Safety Data Sheet(s) (SDSs). [redacted]

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CHAPTER 7 – FIRE SAFETY
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7. FIRE SAFETY

This chapter describes the features that enable an effective Fire Protection Program at the Global Laser Enrichment LLC (GLE) Paducah Laser Enrichment Facility (PLEF) located in Paducah, Kentucky. See **Chapter 1, *General Information***, for a description of the PLEF Site. [redacted].

The fire protection [redacted] minimizes the risk from potential fires and explosions to protect the health and safety of the workers, the public, and the environment. The Fire Protection Program is developed and implemented in accordance with the following:

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7.1 FIRE SAFETY MANAGEMENT MEASURES

The PLEF Fire Protection Program is based on National Fire Protection Association (NFPA) 801, *Standard for Fire Protection for Facilities Handling Radioactive Materials,* which contains fire safety measures intended to reduce the risk of fires and explosions at facilities that handle radioactive materials. [redacted]

Fire safety measures establish fire protection policies and practices for the PLEF. The objective of the Fire Protection Program is to prevent and mitigate fire incidents through education, prevention, controls, detection, and extinguishment.

7.1.1 [redacted]

[redacted]

7.1.2 Management Policy and Direction

[redacted]

[redacted]

7.1.3 Fire Protection Program

The PLEF Fire Protection program complies with the criteria in NFPA 801 to ensure fire protection requirements are adequately implemented. [redacted]

7.1.3.1 Management Policy and Direction

Approved plans and procedures describe the overall management and implementation of the PLEF Fire Protection program. [redacted]

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7.1.3.2 [redacted]

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7.1.3.4 Inspection, Testing, and Maintenance

Inspection, Testing, and Maintenance (ITM) of fire protection systems is performed using approved written procedures. [redacted]

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7.4 PROCESS FIRE SAFETY

PLEF has addressed process fire safety through the facility design and operations. Fire hazards are identified and addressed through the [redacted]

7.4.1 Principal Hazardous Materials

7.4.1.1 Operations Building

[redacted]

potential failure of UF_6 cylinders due to exposure to fire is evaluated in the FHA.

7.4.2 Principal Fire Hazards

7.4.2.1 Operations Building

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7.5 FIRE PROTECTION SYSTEMS

7.5.1 Firewater Supply System

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CHAPTER 8 – EMERGENCY MANAGEMENT
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8. EMERGENCY MANAGEMENT

8.1 EMERGENCY PLAN

Plans for handling emergencies at the Global Laser Enrichment LLC (GLE) Paducah Laser Enrichment Facility (PLEF) are presented in the Emergency Plan (EP).

The EP was developed in accordance with Title 10 *Code of Federal Regulations* (10 CFR) Part 70.22(i)(3), "Contents of Applications" and 10 CFR 40.31(j), "Applications for Specific Licenses". The EP is consistent with the guidance presented in Regulatory Guide 3.67, *Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities (Rev 1, 2011)*. The EP also addresses the specific acceptance criteria in NUREG 1520, *Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility (Rev. 2, 2015)*, Chapter 8, *Emergency Management*. The EP is maintained under configuration management, and changes to the EP are evaluated to determine if there is a reduction in effectiveness such that prior U.S. Nuclear Regulatory Commission (NRC) approval is required in accordance with the regulations in 10 CFR 70.32(i).

[redacted]

8.2 EMERGENCY PLAN IMPLEMENTING PROCEDURES

The requirements of the EP are implemented through approved procedures and checklists.

8.3 AMENDMENTS OF THE EMERGENCY PLAN

The EP is updated as needed. PLEF may change the approved plan without NRC approval if the changes do not decrease the effectiveness of the plan in accordance with 10 CFR 70.32(i). For changes made to the EP without prior approval, [redacted]

8.4 AGREEMENTS WITH OFFSITE EMERGENCY RESPONSE PARTNER RESOURCES

[redacted]

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CHAPTER 9 – ENVIRONMENTAL PROTECTION
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9. ENVIRONMENTAL PROTECTION

9.1 ENVIRONMENTAL REPORT

Global Laser Enrichment LLC (GLE) personnel have prepared an Environmental Report (ER) which meets the requirements contained in Title 10 *Code of Federal Regulations (*10 CFR) Part 51, Subpart A, "National Environmental Policy Act—Regulations Implementing Section 102(2)". In particular, the ER addresses the requirements in 10 CFR 51.45(a)-(e), "Environmental Reports-General Requirements", and follows the general format of NUREG-1748, *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs.* The ER presents the purpose and the applicable regulatory requirements of the GLE Paducah Laser Enrichment Facility (PLEF) (ER Chapter 1), discusses alternatives (ER Chapter 2), describes the facility and the affected environment (ER Chapter 3), and discusses potential impacts of the proposed action (ER Chapter 4). [redacted] Where applicable, this chapter of the license application (LA) refers to the ER in order to address the acceptance criteria contained in NUREG-1520, *Standard Review Plan for Fuel Cycle Facilities License Applications*.

9.1.1 Date of Application

As required by 10 CFR 70.21(f), *Filing*, the date of the PLEF License Application is at least nine months prior to facility construction.

9.1.2 Environmental Considerations

The PLEF ER addresses the requirements of 10 CFR 51.45(b) as discussed below.

9.1.2.1 Description of Proposed Action

The proposed action is the issuance of a U.S. Nuclear Regulatory Commission (NRC) specific license under 10 CFR 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material", 10 CFR 40, "Domestic Licensing of Source Material", and 10 CFR 70, "Domestic Licensing of Special Nuclear Material", to possess and use byproduct material, source material, and special nuclear material (SNM); as well as to construct and operate an uranium enrichment facility in McCracken County, Kentucky. The enriched uranium produced by the PLEF is intended primarily for use in commercial nuclear power plants.

[redacted]

9.1.2.2 *Purpose and Need for Proposed Action*

The PLEF ER Section 1.2, *Purpose and Need for the Proposed Action*, demonstrates the need for an additional uranium enrichment facility in the United States. The proposed action is intended to satisfy the need for an additional reliable and economical domestic source of enriched uranium supply, particularly as existing aging and less efficient production facilities cease operation. By supplying enrichment services to commercial nuclear power plants, the proposed PLEF will support the continued operation of existing nuclear power plants, and the future operation of proposed new plants.

9.1.2.3 *Description of Affected Environment*

ER Chapter 3 contains a description of the affected environment. The chapter provides a baseline characterization of the PLEF Site and its environs prior to any disturbances associated with construction, operation, or decommissioning of the facility. ER Chapter 3 is arranged as follows:

- Regional, local and vicinity land use,
- Transportation,
- Geology and Soils,
- Water Resources,
- Ecological Resources,
- Meteorology, Climatology, and Air Quality,
- Noise,
- Historic and Cultural Resources,
- Visual/Scenic Resources,
- Socioeconomics,
- Public and Occupational Health, and
- Waste Management.

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GLE has prepared an ISA in accordance with 10 CFR 70.60, *Applicability*, which includes the evaluation of high and intermediate consequence events involving releases of radioactive material to the environment. The ISA process is described in **LA Chapter 3, *Integrated Safety Analysis***.

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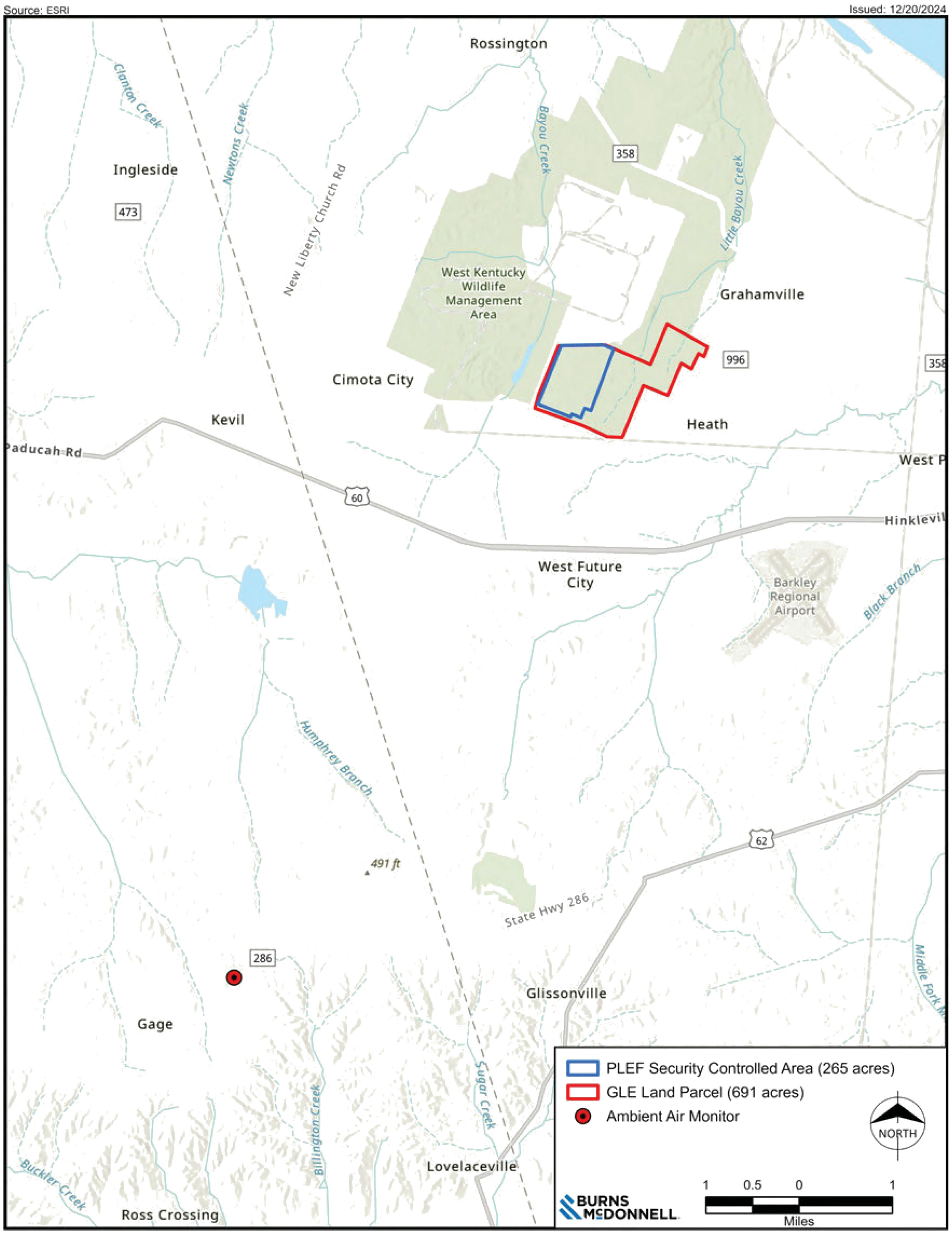

Figure 9-1. Approximate Location of Ambient Air Monitor

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Figure 9-2. Ground and Surface Water Monitoring

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Figure 9-3. Soil and Sediment Monitoring Locations

CHAPTER 10 – DECOMMISSIONING
REVISION LOG

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0	27 June 2025	ALL	Initial Application Submittal.

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10. DECOMMISSIONING

10.1 DECONTAMINATION AND DECOMMISSIONING PLAN

The Global Laser Enrichment LLC (GLE) Paducah Laser Enrichment Facility (PLEF) is designed and operated in accordance with Title 10 *Code of Federal Regulations* (10 CFR) Part 20.1406, "Minimization of Contamination", to minimize contamination, facilitate eventual decommissioning, and minimize to the extent practicable, the generation of radioactive waste. As a result, worker exposure to radiation and radioactive waste volumes during operations and decommissioning are maintained as low as reasonably achievable (ALARA).

In accordance with 10 CFR 70.25, *Financial Assurance and Recordkeeping for Decommissioning*, a Decommissioning Funding Plan (DFP) is being submitted concurrent with the GLE license application that contains a cost estimate for decommissioning and a description of the method of assuring funds for decommissioning. The DFP has been prepared consistent with the guidance in NUREG-1757, *Consolidated NMSS Decommissioning Guidance.*

10.1.1 Decommissioning Strategy

It is the intent of GLE to decommission the PLEF [redacted] to reduce the level of radioactivity remaining in the facility to residual levels acceptable for release of the facility for unrestricted use and for U.S. Nuclear Regulatory Commission (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, an assessment of the radiological status of the PLEF will be made. Decommissioning and closure activities will include the cleaning and removal of radioactive and hazardous waste contamination that may be present on materials, equipment, and structures. [redacted]

Before decommissioning activities begin, a Decommissioning Plan (DP) will be prepared and submitted to the NRC pursuant to 10 CFR 70.38. [redacted]

10.1.1.1 Radioactive Contamination Control

The PLEF is operated in a manner to control and minimize radioactive contamination. [redacted]

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10.1.2.4 *Decontamination*

The decontamination process is addressed separately in **Section 10.1.8, *Decontamination***. The estimated decommissioning costs are based on decontaminating the facility to the radiological criteria for unrestricted use in 10 CFR 20.1402.

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10.1.2.7 *Final Radiation Survey*

A final radiation survey must be performed to verify proper decontamination to allow the site to be released for unrestricted use. [redacted]

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The final survey will systematically measure radioactivity over the entire site. [redacted]

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10.1.7 Recordkeeping

Records important for safe and effective decommissioning of the PLEF are maintained in accordance with [redacted]

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10.1.8 Decontamination

10.1.8.1 Overview

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years consistent with the requirements of 10 CFR 70.25(e). The method for adjusting the cost [redacted]

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CHAPTER 11 – MANAGEMENT MEASURES
REVISION LOG

Rev.	Effective Date	Affected Pages	Revision Description
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FIGURES

11. MANAGEMENT MEASURES

This chapter describes the Management Measures established by Global Laser Enrichment LLC (GLE) that are applied to Items Relied on for Safety (IROFS). [redacted]. Implementation of the Management Measures ensures the Paducah Laser Enrichment Facility (PLEF) can be operated safely, and provides adequate protection of the workers, the public, and the environment from credible hazards presented in the Integrated Safety Analysis (ISA).

The GLE Management Measures provide oversight and assurance that the GLE Safety Program is maintained and functions properly. [redacted]

[redacted]

- Configuration Management
- Maintenance
- Training and Qualification
- Procedures
- Audits and Assessments
- Incident Investigations
- Records Management
- Other QA Elements

11.1 CONFIGURATION MANAGEMENT

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Program establishes consistency in the facility design and operational requirements, the physical [redacted]

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11.2 MAINTENANCE

The purpose of planned and scheduled maintenance of IROFS is to ensure systems are kept in a condition of readiness to perform designed functions when required. Managers are responsible for assuring the operational readiness of safety controls in assigned areas of the PLEF.

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11.3 TRAINING AND QUALIFICATIONS

The training program is designed to ensure personnel who perform activities relied on for safety have the applicable knowledge and skills necessary to design, operate, and maintain the PLEF in a safe manner. Training is performed by personnel trained and qualified for instruction in accordance with training procedures. [redacted]

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11.4 PROCEDURES

GLE utilizes a hierarchy of policies, plans, and procedures to document management expectations and commitments, as well as to provide instructions and guidance to personnel. Activities involving licensed special nuclear material (SNM) or IROFS are conducted in accordance with approved written procedures. [redacted]

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Compliance with PLEF procedures is mandatory. [redacted].

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11.5 AUDITS AND ASSESSMENTS

GLE maintains and implements assessment and audit programs to verify that PLEF license and regulatory requirements are met, [redacted].

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resolved in accordance with applicable procedures, including the corrective action program [redacted]

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11.6 INCIDENT INVESTIGATIONS

[redacted] has overall responsibility for the Corrective Action Program, however all employees are responsible for identifying and documenting abnormal conditions. Incident investigations are performed to ensure [redacted] appropriate corrective actions are identified [redacted] . [redacted] . [redacted].
Condition reports are generated, evaluated, and the associated corrective actions tracked to completion. The objectives of the incident investigation and reporting procedures are to collect data related to the incident, to develop and implement corrective actions when appropriate, to

document an event which was or could become a danger to persons or property, and to ensure that proper levels of management and public agencies are notified.

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11.7 RECORDS MANAGEMENT

11.7.1 Records Management Program

RM shall be performed in a controlled and systematic manner to provide identifiable and retrievable documentation. Applicable design specifications, procurement documents, or other documents specify the records to be generated by, supplied to, or held in accordance with approved written procedures. Records are not considered valid until they are authenticated and dated by authorized personnel.

The RM program requires procedures for protecting, reviewing, approving, handling, identifying, retaining, retrieving, maintaining, selecting, transmitting, and distributing records. Additionally, the RM Program requires procedures to assign responsibilities for records management; specify the authority needed for records retention or disposal; specify which records must have controlled access and provide the controls needed; provide for the protection of records from loss, damage, tampering, theft, or during an emergency; and specify procedures for ensuring that the records management system remains effective. [redacted]

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11.8 OTHER QUALITY ASSURANCE ELEMENTS

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Figure 11-1: Configuration Program Elements

CHAPTER 12 – MATERIAL CONTROL AND ACCOUNTING OF SPECIAL NUCLEAR MATERIAL
REVISION LOG

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12. FUNDAMENTAL NUCLEAR MATERIAL CONTROL PLAN

12.1 FUNDAMENTAL NUCLEAR MATERIAL CONTROL PLAN

Global Laser Enrichment LLC (GLE) maintains a Fundamental Nuclear Material Control Plan (FNMCP) for the Paducah Laser Enrichment Facility (PLEF), which is authorized to possess source material (SM) and special nuclear material (SNM) of low strategic significance, as defined in Title 10 *Code of Federal Regulations (*10 CFR) Part 74.4, "Material Control and Accounting of Special Nuclear Material, Definitions". The PLEF FNMCP was developed using the guidance of NUREG/CR-5734, *Recommendations to the NRC on Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Enrichment Facilities* for a Category III enrichment facility as identified in NUREG-1520, Revision 2, *Standard Review Plan for Fuel Cycle Facilities License Applications*.

[redacted]

12.2 IMPLEMENTATION OF FUNDAMENTAL NUCLEAR MATERIAL CONTROL PLAN

GLE implements the PLEF FNMCP in accordance with 10 CFR 74.[redacted] The FNMCP provides information and addresses commitments regarding the MC&A program. The requirements of the FNMCP are implemented through approved procedures.

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CHAPTER 13 – PROTECTION OF SPECIAL NUCLEAR MATERIAL
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13. PROTECTION OF SPECIAL NUCLEAR MATERIAL

13.1 PHYSICAL SECURITY PLAN

Global Laser Enrichment LLC (GLE) maintains a Physical Security Plan (PSP) for uranium enrichment facilities/licensees authorized to possess Special Nuclear Material (SNM) of low strategic significance, as defined in Title 10 *Code of Federal Regulations* (10 CFR) Part 74.4, "Material Control and Accounting of Special Nuclear Material". [redacted]

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