U.S. DEPARTMENT OF ENERGY
IDAHO OPERATIONS OFFICE

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GENERAL SPECIFICATIONS

For

SPENT NUCLEAR FUEL DRY STORAGE PROJECT

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GENERAL SPECIFICATIONS

1.0 SCOPE

1.1 Background

The Government is committed to packaging Spent Nuclear Fuel (SNF) for interim dry storage and future shipment from the Idaho National Engineering and Environmental Laboratory (INEEL). The fuel handling and interim storage shall comply with the license conditions pursuant to Nuclear Regulatory Commission (NRC) requirements for dry storage and shipping in accordance with Title 10, Parts 20, 21, 71 & 72, and associated referenced regulations of the Code of Federal Regulations (CFR), effective at time of award.

The Contractor shall:

- Design, license, permit, construct and operate a facility to re-package the SNF for dry storage to be known as the Dry Transfer Facility (DTF)
- Provide packaging of SNF in standardized canisters
- Place the SNF into the storage containers
- Design, license, permit, construct and operate an independent spent fuel storage installation (ISFSI) for the containers
- Monitor and operate its facility in accordance with permitting and licensing requirements
- Transport the SNF storage containers from the packaging facility to the ISFSI
- Provide a conceptual design for a transportation system for unrestricted shipment of the packaged SNF that is fully compatible with the storage and handling system

Ultimately, the packages will be transferred off site, but this operation is not included in the scope of this project.

Spent fuel transfer and placement in dry storage shall be performed at the Idaho Nuclear Technology & Engineering Center (INTEC). The INTEC is located within the INEEL, approximately 50 miles west of Idaho Falls, Idaho.

1.2 Included Work

The Contractor shall provide fuel handling and dry storage capabilities by designing, licensing, permitting, constructing, and operating a Dry Transfer Facility (DTF) and an Independent Spent Fuel Storage Installation (ISFSI) at the INTEC. The submittals and deliverables associated with this work are listed in the Contract Submittals and Deliverables Schedule. The DTF and the ISFSI shall comply with the Nuclear Regulatory Commission (NRC) requirements for dry storage and shipping in accordance with Title 10, Parts 20, 21,71 & 72, and associated referenced regulations of the Code of Federal Regulations. All applicable federal, state, and local permits, and licenses that are required for the construction and operation of these facilities are the responsibility of the Contractor. All activities defined in this General Specification document are the responsibility of the Contractor unless an activity is explicitly designated otherwise.

The DTF shall have capabilities for the following:

- receipt of shipping casks (currently in service within the DOE complex)
- fuel unloading and handling
- removal of fuels from existing storage packages
- visual inspection and inventory of fuels
- treatment of fuels to meet NRC licensing requirements
- re-packaging of fuels into specified canisters
- placement of repackaged fuel into dry storage system units
- transfer of storage units to the ISFSI.

The ISFSI shall provide easily retrievable storage capability for the designated SNF types. The facilities and storage system shall be designed and constructed to be consistent with the appropriate NRC standard review plans and NUREG documents.

The Contractor shall provide NRC-licensed, dry storage to meet specific fuel requirements (See Attachment A). The fuel shall be packaged for dry storage so that it satisfies the requirements defined in this specification, 10 CFR Part 72, and is readily transported between the DTF and the ISFSI. In addition, the Contractor shall provide a conceptual design for a rail-based transportation system for unrestricted shipment of the packaged SNF that is fully compatible with the storage and handling system under 10 CFR Part 71. This transportation system may be provided in a single, dual-purpose system, or the transportation system may be separate from the storage system. The transportation system is not to be fabricated, or licensed under the scope of this procurement. The Contractor shall also design and fabricate, or procure standard

canisters compatible with the specifications provided by DOE for the packaging, storage, and eventual transportation of the SNF.

The Contractor shall provide all design, analysis, shop and field labor, materials, equipment, supplies, and procedures; and perform all work necessary to construct, test and operate the DTF and ISFSI, and shall provide a conceptual design for an offsite transportation system for future use by DOE. The Contractor shall procure all necessary permits and abide by all applicable laws, regulations and ordinances of the United States and of the state, territory, and political subdivision in which the work is performed. The Contractor shall prepare the NRC license application, obtain an NRC license, and remain as the NRC licensee of the DTF and ISFSI until transfer to DOE-ID at the conclusion of the Contract. The Contractor shall operate the DTF and place the fuel packages in the ISFSI. The Contractor shall be the facility owner and operator, unless otherwise transferred in accordance with the provisions of Section H of this contract.

The SNF to be packaged and stored is Peach Bottom Cores 1 and 2, Shippingport LWBR, and TRIGA. The fuel handling requirements, current fuel packaging descriptions, and fuel data are included in Section 4.3.6 of this specification, Attachment C-A-A to this specification, and Section J, Attachment L. These data shall be used to develop safety analysis input and design inputs for safety systems. The Contractor is responsible for performing all necessary evaluation and analyses of the data contained in the reports provided to support design and licensing.

1.3 Utility Tie-ins and Interfaces

DOE can provide available utility connections at the established boundary of the DTF/ISFSI site upon request. DOE will provide these utilities to the west boundary of the project site. A list of the available utilities is provided in Section J, Attachment J-C, Site Service Information of the Contract. The Contractor shall complete all utility tie-ins at this boundary, except for the communications and alarms and security system connections, which are specifically addressed in Sections 4 and 5 of this specification.

2.0 QUALITY ASSURANCE AND QUALIFICATIONS REQUIREMENTS

The Contractor shall have and implement a Quality Assurance Program and Implementing Procedures that are accepted by the Nuclear Regulatory Commission (NRC) for activities associated with spent nuclear fuel transportation casks, fuel handling and fuel storage casks, and licensed storage and packaging facilities. The QA Program shall at least meet the minimum requirements of 10 CFR 20 Standards for Protection Against Radiation, 10 CFR 21 Reporting of Defects and Noncompliance, 10 CFR 71 Packaging and Transportation of Radioactive Materials, Subpart "H", 10 CFR 72 Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High Level Radioactive Waste, Subpart "G", and associated referenced regulations. A Quality Assurance program that complies with ASME NQA-1 including all supplements and addenda, enhanced as necessary to provide NRC approval, satisfies this requirement.

3.0 APPLICABLE CODES, STANDARDS, AND REFERENCES

Compliance with applicable codes and standards used for the design, construction, testing, and operation of the entire system shall be delineated as part of the NRC license application.

The Contractor shall prepare a Requirements Document that describes all applicable codes and standards that will be used as the design, NRC licensing, permitting, and operating basis for the facilities. This document shall be submitted to DOE and shall be revised as necessary during development of the safety analysis report and design to keep it consistent with the permitting and licensing basis. The Contractor shall include the identification of applicable regulatory standards and manuals for the entire project in this document, including items not regulated by the NRC. The Requirements Document shall be the technical basis for development of the NRC License Application. Except for items not covered by 10 CFR Parts 20, 21, 71 and 72, and associated referenced regulations, the Requirements Document shall be superseded by the NRC approved licensing conditions and all design, review, analysis, construction, testing, start-up, and operations shall comply with the license and permit conditions.

4.0 DESIGN

4.1 Design Development

The Contractor shall develop and document all designs necessary to license, permit, construct and operate the required facilities and systems in accordance with the following requirements.

4.1.1 Performance and Design

The Contractor shall use best management practices at all times. The technical and safety requirements outlined in 10 CFR 20, 21, 71 & 72 (and associated referenced regulations), and ANSI/ANS 57.9 are the design, construction, and operating bases for the DTF and ISFSI. As such, the dry fuel storage and transport system(s) shall be based on an existing system(s) with a well-established history of satisfactory (i.e., regulatory compliant) operating experience for dry spent nuclear fuel storage and transport.

4.1.2 Initial Design

The Contractor shall complete the preparation of the facility and storage system designs sufficient for submittal of the license application, and its acceptance for review by the NRC. The design shall include enough necessary detail to adequately describe all safety aspects and conditions of the facilities to meet the specified and approved requirements listed in the Requirements Document (See 3.0 of this Specification). The design shall include, as a minimum, the following items:

- detailed calculation and computer codes
- detailed drawings and descriptions of all major disciplines, systems, and processes
- equipment lists
- Safety Analysis Report
- specifications, and
- draft subcontract documents.

A conceptual design for a rail-based transportation system for unrestricted off-site shipment of the packaged SNF shall be prepared in parallel with preparation of the transfer and storage facility design.

The Contractor agrees to conduct an oral design presentation for DOE at DOE-ID's place of business when the transfer and storage facility design has been completed to approximately the 50% level. The conceptual transportation system design will be presented at this time as well. The design presentation shall demonstrate how the entire design is progressing in order to comply with the Contract requirements.

4.1.3 NRC Licensing

The Contractor shall obtain NRC license(s) for the handling, packaging and storage of the specified SNF in the DTF and ISFSI under 10 CFR Parts 20, 21, 71 and 72, and shall operate the same in accordance with the conditions and commitments of the license. The Contractor shall be the licensee and operator of the DTF and ISFSI. As licensee, the Contractor shall prepare all license applications and documentation in accordance with Parts 71 and 72, and associated referenced regulations as appropriate, perform all supporting calculations, and submit the license applications to the NRC for review and approval. The license shall be for the maximum time period allowed by NRC under the regulations. The Contractor shall use appropriate NRC standard review plans and NUREG guidance in the preparation of the design(s) and license application(s). The license application shall demonstrate that the published standards are applicable to the fuels within the scope of this contract. In the event the acceptance criteria described in the Standard Review Plans (NUREGs 1536 and 1567) are not sufficient for these fuels, the application shall include additional proposed acceptance criteria adequate to satisfy NRC requirements.

[Note: The DOE SNF standard canister shall be designed for use for storage under 10 CFR 72, and unrestricted transportation under 10 CFR 71. The scope of work under the base contract does not, however, include licensing the transportation system.]

During the course of NRC's review of the application, the Contractor shall maintain open and consistent communications with the NRC and shall be present at all NRC requested review meetings to support the licensing process. The Contractor shall respond to NRC concerns with requisite re-submittals.

The Contractor shall prepare and implement a Management Control Plan, which adequately describes and controls all interfaces between the Contractor, DOE, NRC, and other federal, state, and local agencies. The Management Control Plan shall clearly identify how all interfaces with INEEL utilities and site services will be controlled.

The Contractor shall prepare and submit an Environmental Report with its license application(s)in conformity with NRC regulations. The NRC Environmental Impact Statement produced for the INEEL TMI-2 ISFSI (Docket 72-20) and the DOE Programmatic SNFEIS are available to the Contractor and contain useful reference information. The Contractor shall provide any additional information requested by the NRC.

4.1.4 Permit Applications

During Phase I, the Contractor shall prepare and submit applications for all permits necessary for the start of Phase II and III activities. The Contractor shall sign all permits as owner and operator.

4.1.5 Final Design

Upon receipt of the permits and NRC license(s) for the DTF and the storage system, the Contractor shall revise the design to include all the conditions and commitments of the permits and license(s). The final design shall be used for construction, fabrication, and contracting with subcontractors.

4.2 System Requirements

4.2.1 Natural Phenomena

Structures and their elements shall be designed to withstand natural phenomena at INTEC to meet NRC Regulations. The site conditions document from Chapter 2 of the TMI-2 Safety Analysis Report is offered as general information on site characteristics. This information may be used to develop design-input criteria, as applicable, to develop the Safety Analysis Report for the license application.

4.2.2 Design Life

The ISFSI design life shall provide for the interim storage of the SNF for a minimum of 40 years. The DTF shall be designed for a minimum design life of 40

years. Active components shall be maintainable or replaceable throughout the design life of the facilities.

4.2.3.1 Utility Interfaces

During the design phase, the Contractor shall identify all required interfaces such as utilities, roads, and parking areas for the DTF/ISFSI, and submit a utility service request in accordance with Section J, Attachment J-K, Submittal & Deliverables Schedule. See Section J, Attachment J-C, Site Services Information available and/or required services and associated costs. Interface drawings and specifications for existing INTEC systems are provided in Section J, Attachment J-G. DOE will provide these utilities to the west boundary of the project site.

4.3 Functional and Operational Requirements

The functional and operational requirements for the Dry Transfer Facility, Independent Spent Fuel Storage Installation, Transportation System, Fuel Packaging, and supporting equipment are given below. The Contractor is responsible to develop a fuel movement plan as the basis for the facility design and operation that accommodates all the functional and operational requirements of this specification. The fuel movement plan shall include, as a minimum, the activities described in Attachment B, which is a sample fuel movement plan flow sheet.

4.3.1 Dry Transfer Facility

The Contractor shall provide a Dry Transfer Facility (DTF) to meet the following functional *requirements:*

4.3.1.1.1 General

The DTF shall be provided with all equipment and capabilities required for the following activities:

- the safe receipt, handling, and unloading of SNF loaded shipping casks
- the safe handling, characterization, conditioning, and repackaging of SNF into storage systems
- the safe transfer of loaded storage systems from the DTF to the ISFSI
- a shipping cask turnaround time of 48-hours

The DTF shall be designed and constructed to accommodate future cost effective, safe, and environmentally sound decontamination and decommissioning (D&D)

to meet NRC regulations.

The DTF shall be designed to prevent the loss of containment and retrievability during all normal and credible off-normal conditions, including the design basis accidents (DBAs).

The DTF shall be designed to allow recovery from credible drop accidents during all phases of cask and fuel handling.

The DTF shall be designed to support all maintenance and equipment replacement that may be required over the design life of the facility.

4.3.1.2 Fuel Receipts/Cask Handling

The DTF shall provide a means for sampling and analyzing gas and/or liquid from cask internal cavities, and for preparing the cavity atmosphere (draining, venting, purging, etc.) to allow the cask to be opened without exceeding the facility radiological control limits (this includes the handling of effluent wastes from the cask cavity). The control limits for the facility shall be established by the Contractor in accordance with NRC regulations, and the facility design parameters.

The Contractor shall design the DTF to receive, handle and unload the Peach Bottom casks specified in Attachment C of this general specification. Additionally, the facility shall be sized to handle a transportation cask envelope (including trunnions and impact limiters) of 128 inches diameter, 308 inches long, and 300,000 pound weight to accommodate potential future operations. (The fully loaded transport vehicle, with cradle, impact limiters, trunnions and loaded cask is estimated at a maximum of 200 tons.)

The DTF shall provide for the decontamination of shipping casks to meet the limits of the NRC radiation safety requirements and/or requirements for over the road shipments prior to release of the cask to the shipper.

The Contractor shall ensure that the radiological control requirements are met for all interfaces between the DOE facilities and the Contractor's NRC regulated facility. The Contractor shall document in the Project Management Plan an approach satisfactory to DOE to ensure the requirements of both facilities are met.

4.3.1.3 Fuel Unloading and Handling, Conditioning, and Repackaging

The DTF shall provide a shielded hot-cell with remote operational capabilities for shipping cask unloading, and SNF handling, conditioning, and repackaging activities.

The cask and SNF handling equipment within the hot-cell shall have remotely changeable components for the handling of fuel types and fuel baskets as specified in section 4.3.6, and cask and canister shield plugs, and/or hot-cell shield plugs if used.

In-cell equipment shall be designed for recovery from all credible accidents or breakdown conditions.

The DTF shall include features to perform cell and equipment decontamination and to support remote maintenance of contaminated equipment.

The hot-cell shall be capable of being decontaminated and SNF operations suspended during in-cell maintenance.

The DTF shall have the capabilities to characterize, condition and repackage the SNF in accordance with the requirements of sections 4.3.4 through 4.3.6. The facility shall be capable of handling both lengths (10' and 15') and both diameters (18" and 24") of the standard canisters as described in Attachment E to this General Specification.

4.3.1.4 Facility Radiological Control

Optimization methods shall be used to ensure that radiological exposure is maintained As Low As Reasonably Achievable (ALARA) in developing and justifying facility design and physical controls. Radiation protection for occupational workers and interfaces with INTEC shall comply with NRC requirements. The Contractor shall ensure that the radiological control requirements are met for all interfaces between the DOE facilities and the Contractor's NRC regulated facility. The Contractor shall document in the Project Management Plan an approach satisfactory to DOE to ensure the requirements of both facilities are met.

The Contractor shall provide all effluent systems for the DTF/ISFSI as necessary to meet license and permit conditions. An accurate method for measuring the amount of radionuclides in effluents during normal operations, and under accident conditions, shall be provided for these systems. An accurate means of measuring the quantity of the diluting medium, either air or water, shall also be provided. Facility emission limits shall not exceed the limits established for this project in the DOE Programmatic SNFEIS, NRC license and air permits.

4.3.1.5 Shipping Cask Turnaround Time

The total Contractor shipping cask turnaround time (from receipt of a loaded cask into the facility until return of the empty cask) shall be less than 48-hours. Return of the cask shall be at the truck entrance to the DTF.

The DTF shall provide shielded "lag" storage for SNF as required to meet the 48-hour cask turnaround time. The capacity of the "lag" storage shall accommodate the receipt of SNF in accordance with the Shipping Cask and Fuel Receipt Schedule, Attachment D, without disrupting the DTF operations, and shall be based on the storage system design, shipping cask capacities, and the fuel receipt schedule.

4.3.1.6 Future Off-Site Transportation Operations

A conceptual design shall be prepared for a rail-based transportation system, which provides unrestricted off-site shipment of the packaged SNF. This system shall be compatible with the Contractor's DTF and ISFSI designs. While the off-site transportation system and operations are not a part of this contract, the facility design shall consider the following capability necessary to support this future activity:

- A staging area for loading off-site transportation casks onto either a truck or a rail car. This area shall be oriented in a manner which accommodates a cost effective and efficient link to the existing rail east of INTEC, which runs in a north-south direction, as well as truck access from the existing INTEC roads.

- Future placement of rails in an off-site transportation staging area (oriented for east-west travel)

- At a minimum, the staging area shall be sized to handle a transportation cask envelope (including trunnions and impact limiters) of 128 inches diameter, 308 inches long, and 300,000-pound weight. (The fully loaded transport vehicle, with cradle, impact limiters, trunnions and loaded cask is estimated at a maximum of 200 tons.)

4.3.1.7 Characterization Operations

The DTF design and operation shall include the capability for performing all necessary fuel characterization in accordance with the NRC license requirements.

The DTF must also include unused space for future installation of equipment, such as additional fuel characterization and canning capability, which could be required to support processing of optional fuels. This area must be at least 22 feet by 22 feet of floor space, and must be arranged in such a manner to allow for the full range of motion for the cranes, manipulators and other remote devices and not

interfere with other planned activities. The cell ceiling height shall accommodate the cask and fuel requirements defined in Section 4.3.4 and Attachments A and C to this specification. A Motor Control Center (MCC) rated at 277/480-V, 800-A, 3-phase, 4-wire with an 800-A main circuit breaker and ground fault protection shall be installed adjacent to the cell area to supply future power. Eight, two inch diameter wall penetrations must be installed adjacent to the MCC to allow for future routing of power and instrumentation wiring into the cell. A two-inch diameter potable water line must be routed into the cell area and terminated at a common header. A 1.5-inch plant airline must also be routed into the cell area and terminated at a common header.

4.3.2 Independent Spent Fuel Storage Installation

The Contractor shall provide a NRC-licensed, SNF dry storage system that is compatible with the DTF. The storage system, which has distinct units of a standard size that can be constructed on an individual basis for future expansion, shall be located in an Independent Spent Fuel Storage Installation (ISFSI). The ISFSI shall be designed, constructed, and tested to assure safe storage of the fuel in accordance with the conditions of the NRC license and applicable permits. The ISFSI shall be designed to provide easily retrievable storage capability for the designated SNF types.

The Contractor shall provide all equipment, including a storage system that shall allow the fuel to be safely retrieved from the ISFSI.

The design shall provide weather protection as necessary to allow year-round operations, fuel monitoring, and retrieval capabilities for systems associated with the safe operation of the ISFSI in accordance with NRC regulations and applicable permits. The ISFSI shall incorporate security and physical protection systems to protect the fuel (see 5.1 of this specification). The ISFSI shall be designed and constructed to accommodate cost-effective, safe, and environmentally sound decontamination and decommissioning (D&D).

4.3.3 Transportation System

The Contractor shall provide a conceptual design for a rail-based system for transporting the SNF off site to meet the following requirements:

1. Capable of supporting transport of spent fuel by rail. This system shall be compatible with truck transport (heavy haul).

2. Capable of being licensed and/or permitted in accordance with Department of Transportation (DOT) 49 CFR 173 and 10 CFR 71 for unrestricted transport.

3. May be a separate system from the storage system provided to meet Part 72 dry storage requirements.

4. Must be compatible with the standardized canisters (specifications provided by DOE) to be used for handling, interim storage, transportation and disposal in the national repository for DOE SNF.

Except for tractor, locomotive, and/or rail car, the Contractor design must consider all equipment necessary for transportation operations. This equipment includes items such as cask lifting devices, rubber-tire trailer, and impact limiters. For rail transport, the system shall be capable of being placed on a standard "heavy load" railcar. Storage space for this equipment shall also be considered in the design.

4.3.4 SNF Packaging

4.3.4.1 Standardized Spent Nuclear Fuel Canisters

Due to the incomplete knowledge of the condition of the existing fuel storage containers and the fuel cladding, the Contractor shall design and fabricate new fuel storage canisters and load all spent fuel into the new canisters. The new canisters shall provide a known containment boundary suitable for NRC licensure for dry storage under 10 CFR Part 72 regulations.

In addition to meeting the dry storage requirements for 10 CFR Part 72, the canisters shall be designed and fabricated to meet the requirements in Attachment E, *Preliminary Design Specification for Department of Energy Standardized Spent Nuclear Fuel Canisters—Volume 1 - Design Specification.* The standardized canister is patent-pending, and the design shall remain as property of the United States Government (LMITCO Invention Disclosure LIT-PI-444 "Drop-Resistant Toxic Waste/Spent Nuclear Fuel Canister" Case Number S90,596). Attachment E provides preliminary design specifications for standardized canisters that are 10 feet and 15 feet in length, each with diameters of 18" and 24". The Peach Bottom fuels shall be placed in the 15-foot-long 18" canisters; the TRIGA fuel shall be placed in the 10-foot-long 18" canisters; the LWBR fuel may be placed in either the 18" or 24"15-foot-long canisters. Taking into consideration the repository criticality criteria (section 4.3.4.4) and NRC Parts 71 and 72 licensing parameter limits, the canisters shall be loaded to the maximum extent possible.

The final packaged fuel is intended to be repository ready without further processing. Attachment F to this specification includes a list of supplemental requirements based on the current repository criteria, which must be met. Some of the repository requirements are repeated elsewhere in this specification and attachments. The requirements in Attachment F are the responsibility of the Contractor.

A conceptual design for a lifting and handling system has been developed that is compatible with the proposed Standardized DOE SNF canister design. The design for a viable grapple concept is provided in Attachment E. Details of final design features of the grapple will depend on the facility specific lifting and handling criteria. Details of the design presented are purposefully omitted to the extent possible to accentuate that this is a conceptual design. The Contractor shall finalize the design and fabricate the system to NRC requirements.

4.3.4.2 Sealing and Inerting

The standard canister shall be sealed and inerted to meet criteria in Attachment E prior to placement in the ISFSI. The DTF shall provide all necessary equipment to accomplish and verify inerting, drying (to verify moisture content) and sealing of the standard canisters. Provisions for retrieval of individual standard canisters from interim storage within the ISFSI and movement of those canisters within the DTF shall also be provided to allow for future processing of individual standard canisters prior to off-site shipment. All canister components necessary to seal the canisters, such as plugs, shall also be provided.

4.3.4.3 Loading Operations

The loading of the SNF canisters shall be documented in accordance with the Contractor's NRC approved material control and accountability program and 5.2 of this Specification.

The Government, and/or its designated representative, shall have the right to witness and document all aspects of the canister loading operation. The Contractor shall include provisions in the DTF to allow the Government to perform necessary oversight and witness activities during any aspect of the handling or loading operation. The Contractor shall notify DOE sixty (60) days prior to start of canister loading operations so that appropriate notifications can be made.

4.3.4.4 Repository Fissile Loading Limits

The following repository fissile loading limit scoping numbers shall be used to estimate the total number of canisters needed per fuel type. The scoping calculations presented below for the LWBR fuel assumed use of the 18" canister. The Contractor is responsible for estimating the number of canisters required if the 24" canisters are used for LWBR fuel. A report with the preliminary repository loading limits for Peach Bottom fuel in the 18" diameter, 15-foot long canister is included in Section J-L. The calculation of repository fissile loading limits is dependent on the canister dimensions, internals design, geometry, use of poisons, etc. Therefore, the confirmed repository fissile loading limits for the Peach Bottom, Shippingport and TRIGA fuels shall be the responsibility of the Contractor to perform based on the specific design selected.

- Peach Bottom Core 1 and Core 2: Each 15-foot, 18-inch diameter canister can be loaded with up to 13 elements.

- LWBR: 8.27 kg fissile per 15-feet, 18-inch diameter canister.

- TRIGA: 3.75 kg fissile [Beginning Of Life (BOL)] per 10-foot, 18-inch diameter canister.

DOE has only evaluated these three fuel types for the 18" canisters and canister lengths specified here for scoping purposes. The scoping numbers for the LWBR (8.27 kg fissile) and TRIGA (3.75 kg fissile) limits are based on degraded unpoisoned end states for single canisters that may not be most reactive. See Section J-L for the assumptions used in determining the fissile limits for the LWBR and TRIGA fuels.

The Contractor is responsible for all detailed calculations of fuel loading limits and criticality safety (to satisfy both 10 CFR Part 71 and Part 72) for these fuels and the canisters used. The repository methodology defined by the DOE Office of Civilian Radioactive Waste Management shall also be used for any of these additional calculations for repository fissile loading limits. The methodology and guidance are contained in the report titled "Disposal Criticality Analysis Methodology Topical Report," (YMP-TR-004Q), provided in Section J-L. A sample report documenting such an analysis, "Evaluation of Codisposal Viability for Aluminum-Clad DOE-Owned Spent Fuel: Phase II Degraded Codisposal Waste Package Internal Criticality," (BBA000000-01717-5705-00017 Rev 01) is also provided in Section J Attachment J-L document 1-14.

4.3.4.5 External Contamination

In the future, DOE must be able to verify that the 18" and 24" canisters meet certain external contamination limits prior to loading into a transportation cask for off-site shipment. The Contractor shall provide the capabilities, including all necessary equipment, to accomplish this requirement. A demonstration test to prove the capability and that these contamination limits are met shall be performed by the Contractor. Smear tests shall be performed with an absorbent material that has been wiped, using moderate pressure over a representative 300 sq. cm surface area of the container.

4.3.4.4 Labeling

The canisters shall be labeled as specified in 3.2.15 of Attachment E to this Specification. The labeling convention to be used (e.g., bar codes, alphanumeric characters, naming convention, position on the canister, label material) will be provided to the Contractor.

4.3.4.6 Fuel Characterization and Recordkeeping

Records shall be generated which indicate the specific SNF loaded into particular canisters. Photo records of all individual SNF units being loaded into specific canisters shall be provided.

The Contractor shall document the weight of each canister after loading is complete, but prior to sealing, to verify compliance with the canister weight limits listed in Table 3.2 of Attachment E to this General Specification.

Copies of the above documentation shall be provided to DOE in accordance with the deliverables schedule.

4.3.4.7 Canister Drying

The Contractor shall verify that the SNF is dry prior to placing the canister in interim dry storage (see drying criteria below).

4.3.4.8 Criteria

The vendor shall provide the means for subjecting the loaded fuel canister to a vacuum of at least 1 torr. The canister shall be held in vacuum for a period of at least two (2) hours with a pressure rise rate of less than 10 torr per hour.

4.3.5 Fuel and General Handling Equipment

After the DOE or its M&O Contractor delivers SNF to the DTF, the Contractor shall unload the SNF from the transport cask and place it into the Contractor's storage system. All facilities, systems, and equipment shall be designed and operated to meet the NRC nuclear safety requirements.

Provisions shall be made for monitoring the external surfaces of the fuel casks for external radiation levels and radioactive contamination, validation of SNF or canister identification numbers, validation of the inventory, and any other information required by the NRC.

Cranes and lifting fixtures shall be provided, as necessary, to handle casks, canisters, cans, and fuel elements. The lifting fixtures shall interface with the cranes, casks (shipping and transport), and associated equipment such as cask lids, shield plugs and storage canisters. The lifting fixtures shall be designed to facilitate decontamination, nondestructive testing, maintenance, handling, and storage. Cracks or crevices likely to collect contamination shall be eliminated. For a list of the different types of casks to be handled and typical handling hardware, see Attachment C.

The facilities, systems and equipment shall include interlocks, limit switches, redundancy, emergency shutdown and recovery features as necessary to meet the nuclear safety requirements.

Support equipment and procedures required for remote maintenance of failed equipment, off-normal events, and accidents shall be provided for all remote handling equipment.

Handling and process equipment and other support equipment located within the shielded cell shall be designed to function in, or be appropriately shielded from, the high radiation field produced by unshielded fuel units. Safe access to perform necessary testing, inspection, and maintenance shall be provided (e.g., ladders, catwalks, and guardrails).

4.3.6 Fuel Descriptions and Handling Requirements

The Contractor shall receive the specified spent fuel from DOE at the Dry Transfer Facility according to the Shipping Cask and Fuel Receipt Schedule (Attachment D) and place the fuel into the Contractor's NRC approved storage system packages as detailed herein. The Contractor shall prepare and submit a detailed operations schedule indicating receipt of fuels, receipt of storage units, placement of fuels into dry storage, and all other key elements of fuel loading operations. The specific information for each fuel type is contained in Attachment A and Section J Attachment L. The Contractor shall perform fuel loading operations in connection with appropriate material control and accountability requirements (see Sections 5.1 and 5.2 of these specifications). The following provides a summary of the fuel descriptions and handling/packaging requirements.

4.3.6.1 Shippingport LWBR Fuels

The Shippingport LWBR SNF, for the planned campaign within this contract, consists of 16,721 individual rods differentiated into six different fuel module assemblies of varying fissile loadings and outer diameters. The assemblies are packaged into 43 uniform canisters, and stored within the underground vaults in dry storage at CPP-749. The canisters variously contain intact modules, partially filled modules, bare intact rods, sectioned rods, and scrap. The canisters are approximately 158 inches long by 25 ½ inches in diameter. The canisters were dried, sealed, and inerted prior to placement in storage. No inspection of the fuel condition has been made since placement at CPP-749, however, the condition is assumed to be good. Greater fuel description and detail is provided in Attachment A (Fuel and Package Descriptions) of this General Specification.

4.3.6.1.1 Handling Requirements

The Contractor shall receive one fuel canister per shipment according to the attached Shipping Cask and Fuel Receipt Schedule (Attachment D). The

Contractor shall remove individual rods or fuel module assemblies as received from each canister (see Attachment C-A for specific rods per container), and place the material in new canisters in accordance with the requirements of Section 4.3.4. The Contractor may use the 24-in diameter standard canister for the placement of entire assemblies where safety and licensing parameters permit. The new standard canisters shall then be placed in the Contractor's licensed storage system to meet the conditions of the license. Prior to placing the fuel rods into the dry storage system, the Contractor shall inspect, inventory, treat, and/or condition the fuel rods, as necessary, to meet this specification and Contractor's NRC licensing conditions for dry storage and transportation. The Contractor shall dispose the existing fuel canisters and non-fuel materials from the individual fuel module assemblies in accordance with Section 4.3.7, "Waste Management."

4.3.6.2 Peach Bottom Core 1

The Peach Bottom Core 1 fuel, for the planned campaign within this contract, consists of 813 individual elements (assemblies) differentiated into four types of varying enrichment and materials. The elements are packaged into 814 sealed aluminum storage canisters with stainless steel liners. The canisters are contained within 46 aluminum storage baskets, and stored within the underground vaults in dry storage at CPP-749. Failed fuel elements were placed in sealed canisters inerted, and leak tested. Upon positive leak detection, the canister was packaged into a second aluminum storage canister (salvage canister). The canisters usually contain intact fuel with assembly components, instrumentation, and scrap. One element is disrupted and stored in two separate canisters. Canisters for intact fuel are approximately 153 inches long by 4.48 inches in diameter. The salvage canisters are approximately 158 inches long by 4.73 inches in diameter. Some fuel storage positions have been inspected remotely using television cameras. Water infiltration into the vaults was discovered, as was corrosion of both baskets and canisters. Water may have infiltrated the aluminum canisters, but this has not been confirmed. It is assumed that all baskets and their canisters have been corroded to some extent. As a result, all SNF at CPP-749 is scheduled for removal to new second-generation storage vaults within the next two years. During removal of a basket for inspection in 1988, the basket failed. This was due, however, to improper handling and not corrosion. This fuel has since been repackaged and stored in the new second-generation vaults at CPP-749. Greater fuel description and detail is provided in Section C, Attachment C-A (Fuel and Package Descriptions) of this General Specification.

There are an additional 1-1/2 elements stored within the Fuel Examination and Cutting Facility (FECF) located adjacent to the south basin of CPP-603. These elements are in a dry stable condition. They will be sectioned into four pieces, placed into overpack cans, and transferred and stored in the IFSF. From there, they will be shipped to the DTF in two canisters.

4.3.6.2.1 Handling Requirements

The Contractor shall receive a basket assembly containing from 1 to 18 Core 1 fuel elements (canned) per shipment, according to the attached Shipping Cask and Fuel Receipt Schedule (Attachment D). The fuel assemblies shall be contained in the aluminum fuel cans, staged in the basket assembly. The Contractor shall remove the individual fuel elements from the basket assembly and fuel can(s), repackage the fuel in accordance with 4.3.4, and place the fuel in the Contractor's storage system to meet the conditions of the NRC license. The Contractor shall inspect, inventory, treat, and/or condition the individual fuel elements, as necessary, to meet this specification and the Contractor's NRC licensing conditions for dry storage and transportation. The Contractor shall dispose the aluminum fuel cans, tools, and non-fuel waste debris in accordance with 4.3.7, "Waste Management." The fuel basket assembly shall be returned to DOE in the shipping cask.

4.3.6.3 Peach Bottom Core 2

The Peach Bottom Core 2 fuel, for the planned campaign within this contract, consists of 787 individual elements of the same basic type as the Peach Bottom Core 1 fuels – the major difference being the fuel particles are coated with pyrolytic carbon. The elements are packaged dry into 70 unsealed, carbon steel canisters within the dry-side of the CPP-603 fuel storage area, known as the Irradiated Fuel Storage Facility (IFSF). The canisters contain 11 to 12 elements together with their removed reflectors. The canisters are approximately 129 inches in length by 18 inches in diameter. No internal inspections of the canisters or the fuel have been made since placement within the IFSF. External inspection of the canisters in 1997 showed no corrosion. It is assumed the fuel condition is good. Greater fuel description and detail is provided in Attachment A (Fuel and Package Descriptions) of this General Specification.

4.3.6.3.1 Handling Requirements

The Contractor shall receive a shipping cask containing from 1 to 12 Core 2 fuel elements (nominal count is 12) in a carbon steel canister in accordance with the attached Shipping Cask and Fuel Receipt Schedule (Attachment D). The Contractor shall remove the Core 2 fuel elements from the carbon steel canister, package the fuel in accordance with 4.3.4, and place the fuel in the Contractor's storage system to meet the conditions of the NRC license. The Contractor shall inspect, inventory, treat, and/or condition the individual fuel elements, as necessary, to meet this specification and the Contractor's NRC licensing conditions for dry storage and transportation. The Contractor shall dispose the carbon steel canisters in accordance with the 4.3.7, "Waste Management."

4.3.6.4 Training, Research, Isotope production, General Atomics (TRIGA)

TRIGA fuel rods consist of uranium-zirconium hydride, and the cladding is constructed of aluminum, stainless steel, or incoloy. There are currently 1,159 TRIGA fuel rods placed in three storage locations at the INTEC. There are 303 rods in 67 cans in wet storage at the CPP-603 basin. By the time delivery would be required, these fuels will be in dry storage within the IFSF. There are already 576 rods stored in 14 canisters at the IFSF. There are another 280 rods within 19 buckets in wet storage at CPP-666. This fuel continues to be brought to the INEEL from domestic and foreign sources. The scope of this contract includes 1600 TRIGA elements. It is estimated that 320 cans, also referred to as fuel handling units (FHUs), containing 5 rods each (1600 elements) will be delivered to the DTF during the planned campaign within this contract. The fuel assembly is generally 28.94 inches in length by 1.48 inches in diameter depending upon the end fixtures designed for each user. Fuel arriving at the INEEL from off-site sources has likely been stored in water for some time, but will be placed in dry storage within the IFSF upon arrival at the INEEL. The assemblies may have experienced some corrosion, but the fuel itself is expected to be in good condition. Greater fuel description and detail is provided in Attachment A (Fuel and Package Descriptions) of this General Specification.

The TRIGA SNF shall be 747 Standard (stainless steel) elements, and 853 of the 970 Aluminum elements.

4.3.6.4.1 Handling Requirements

The Contractor shall receive from 1 to 5 fuel elements per fuel canister, and up to 18 fuel canisters per shipping cask shipment, in accordance with the attached Shipping Cask and Fuel Receipt Schedule (Attachment D). The Contractor may use the fuel canisters (containing up to 5 fuel elements) for placing the fuel into the storage system provided this meets the requirements of the NRC license and provided the fuel canisters are used in connection with the packaging requirements of 4.3.4. The Contractor shall inspect, inventory, treat, and/or condition the individual fuel elements, as necessary, to meet this specification and the Contractor's NRC licensing conditions for dry storage and transportation. If the Contractor chooses not to use the existing fuel canisters, the Contractor shall dispose of the fuel canisters in accordance with 4.3.7, Waste Management.

4.3.7 Waste Management

4.3.7.1 Waste Streams

There are several wastes that may be generated under this Contract. Primary wastes include original fuel storage canisters, cans, liners, baskets (fabricated from either aluminum, carbon steel or stainless steel), fuel end hardware, and other hardware and non-fuel materials received from DOE with the fuel shall be processed and packaged to meet the requirements of the INEEL Reusable Property, Recyclable Materials, and Waste Acceptance Criteria (RRWAC), Section J Attachment H and returned to DOE for disposal at no charge to the Contractor. All process generated wastes (e.g., tools, lead shielding, laboratory analysis waste, decon/washdown solutions, and miscellaneous radioactive waste items such as used anti-c clothing) resulting from Contractor operations shall be the responsibility of the Contractor to properly treat, store and dispose. Process generated wastes which meet the INEEL RRWAC may be dispositioned through the INEEL at the rates defined in Section J. The Contractor shall handle, treat, and package these and any other wastes in accordance with the applicable regulations and waste acceptance criteria. The facility processes and equipment shall be designed to limit solid waste generation. Liquid and hazardous waste will not be accepted by DOE and shall be the responsibility of the Contractor to properly treat, store and dispose. .

4.3.7.2 Contractor Responsibilities

For those wastes to be returned to the INEEL, the Contractor is responsible for ensuring compliance to the INEEL RRWAC. The Contractor shall contact the assigned INEEL Generator Interface to ensure all requirements for characterization, packaging, and receipt are identified and met. The name, telephone number and location of the INEEL Generator Interface will be made available upon request. The Contractor shall ensure that the material form, package, and documentation adhere to these criteria. The Contractor shall ensure that requirements for transport, and the requirements contained in any applicable transport plan or certificate of compliance, are adhered to before shipment.

The Contractor shall be responsible for maintaining an auditable waste minimization program. Waste will not be received by INEEL receiving organizations from the Contractor without an auditable waste minimization program. The Contractor shall document the program following a Pollution Prevention/Waste Minimization Plan (PP/WMP). This plan shall be transmitted to DOE.

4.3.7.3 Waste Characterization

The Contractor shall characterize and analyze all waste generated prior to requesting shipment to DOE or an offsite facility. The Contractor's

characterization process shall provide verifiable evidence of compliance to the applicable acceptance criteria. Characterization shall be planned and performed in close coordination with DOE or offsite facility waste generator interface personnel. The Contractor shall maintain appropriate records, statements, reports, and data that support characterization. Section J, Attachment J-K identifies deliverable documentation.

4.4 Architectural Requirements

Building and architectural systems shall meet the requirements of ANSI/ANS-57.9 and applicable standards identified by the Contractor in the Requirements Document and approved by the contractor. As a minimum, non-nuclear safety equipment, systems, processes, components, and structures shall comply with the DOE-ID Architectural Engineering Standards, Section J, Attachment J-D.

4.4.1 General Architectural

The Facility shall include the following:

Security Control Point
Office and support areas for facility personnel
Ready Room to be used as a break room and to conduct meetings
Document Control (for storage of documents and drawings)
Men's and women's lavatories, including lockers, and change facilities
A Radiation Control office and change room with decontamination showers
Telecommunications room
General storage room or closet
Janitor room or closet
Office areas shall be provided with lighting, electrical receptacles, local area network and telephone.

4.4.2 Building Features

Where wash-down or decon activities are to be located the floors shall be sloped to drains and have unobstructed draining capabilities for any water. Liquid waste shall be collected in holding tanks and tested prior to being emptied.

The interior wall of areas where potential contamination may be found shall be sealed with a coating that allows for decontamination. Hot Cells shall include shielded and decontaminable walls, floors and ceilings as appropriate for remote handling devices. Shielded operating galleries shall be provided for the conduct, control, and monitoring of remote handling operations. The gallery designs and layouts shall address operator ergonomics and safety principles.

Facilities for donning and doffing Anti-C clothing shall be located adjacent to contamination areas. A buffer area shall be provided for personnel entering and

exiting contamination areas and shall include space for discarded protective clothing and a step-off pad for frisking of contamination by Personnel Contamination Monitor. All surfaces in the buffer area, as well as the floors and walls of the Anti-C room, shall be capable of being decontaminated..

Each entrance or access point into a high radiation area (>100 mr/hr at 30 cm) shall have either a control device that energizes a conspicuous visible/audible alarm signal whenever entry is made, or have entryways that are locked, except during periods when access to the areas is required. Such systems shall comply with egress safety requirements.

The facility HVAC systems shall provide temperature conditioning and filtration of supply air and provide pressure control. The system shall collect exhaust air from contamination control areas and pass the air through HEPA filters before discharging to the atmosphere. Fire detection and suppression for the HEPA filters shall be provided in accordance with NFPA 801. The HVAC-controlled environment shall maintain differential pressures from area to area by containment barriers and sealable entries to prevent the spread of contamination. Air shall flow from areas of least contamination to areas of highest contamination potential. Doors for all occupancies shall meet the requirements for areas having area openings to maintain pressure, shielding, and containment barrier separation. Mechanical operator devices and inflatable seals shall be installed at containment barriers. A method for eliminating truck exhaust fumes shall be provided.

The design of the fire protection system for the facility shall comply with the DOE-ID AE Standards. Firewater can be supplied by DOE as described in Section J Attachment C. The fire alarms for this facility will be connected to a THORN fire alarm control panel, which will be connected to a MINI-100 20 ma fire alarm communication panel. Two fiber optic circuits (4 total) will be connected to the existing fiber optic loop at INTEC. A multiplexing panel (MP 25) is presently located in INTEC Building CPP-665. Programming at the INEEL Central Facilities Area fire alarm dispatch center will be completed by the INEEL Life Safety Systems (LSS) organization. The LSS organization will be responsible for fire alarm certification and all maintenance and configuration control of the system outside of the Contractor's facility. The Contractor is responsible for these same activities within the Contractor's fence. DOE must be notified in advance of any planned work on or testing of the fire protection system or planned use of fire water. DOE will route the cables/wiring (with excess length to reach the Contractor's operations control building) for the connection of the communications and alarms systems to the Contractor's site boundary. The Contractor is responsible for all routing of this cable/wiring, and terminations (except as noted for the security system) within the Contractor's site. DOE will make final terminations at the INTEC facilities.

4.5 Civil Requirements

The following features shall, as a minimum, meet the general requirements of the DOE-ID Architectural Engineering Standards, Section J, Attachment J-D.

4.5.1 Surface Drainage

The Contractor shall coordinate the facility's surface drainage with the INTEC Surface Drainage System. The INTEC Surface Drainage System is shown on drawing 094253. A copy of the drawing is attached to Section J, Attachment J-G. Run-off from the DTF and ISFSI and systems shall be diverted to ditches consistent with INTEC controls.

4.5.2 Slabs, Sidewalks, and Stoops

Reinforced concrete sidewalks, door stoops, and approaches shall be provided to facilitate personnel and vehicle access to the DTF and ISFSI. Building utility and equipment pads shall be of reinforced concrete and sized to accommodate appropriate loading.

4.5.3 Fencing

Perimeter fencing surrounding the DTF and ISFSI to meet security requirements (5.1 of this Specification) shall consist of galvanized, pipe-supported, 11-gauge steel fabric with 2-in. mesh openings. A 20-ft. clear zone shall be maintained on each side of the fence. Three strands of barbed wire on a single 45-degree arm, angled outward, shall top fencing. Top rails shall be continuous along the top edge of the fence fabric. All installed fence hardware shall be peened or spot-welded. The overall fence height, excluding barbed wire shall be 8 ft. The fence shall be grounded.

4.5.4 Paving

Paving shall be provided for the storage area, around the building, for parking areas, and for the access roads. Roadways shall be a minimum of 15 ft wide. The basemat for the storage system, approach slab, and roadways shall be designed to accommodate the maximum loads projected during the loading and operation of the ISFSI.

4.5.5 Sanitary Waste

The Contractor's sanitary waste system may be connected to the existing INTEC system for disposal of raw sewage. The Contractor shall provide all necessary data to obtain necessary permits or permit modifications for this system. This system shall not be used for disposal of any industrial waste streams or other waste streams that potentially may be contaminated with radiological or hazardous constituents.

4.6 Electrical Requirements

The following deliverables shall, as a minimum, meet the general requirements of the DOE-ID Architectural Engineering (AE) Standards, Section J, Attachment J-D.

4.6.1 Power

The electric power system shall provide for the operational electrical supply needs to operate all mechanical, electrical, instrumentation, lighting, communications, and physical security systems. Emergency and standby power shall be provided as required to maintain safety systems as described in the conditions of the NRC license.

An Uninterruptable Power Supply (UPS) shall be provided to furnish emergency power to the Fire Alarm, Voice Paging, HVAC, Radiation Monitoring and Alarm, and security systems. There shall be sufficient battery capacity to carry the rated load in accordance with NFPA 72.

4.6.2 Grounding

An isolated grounding system shall be provided. The following equipment shall be bonded to the ground loop: facility steel, water piping, support equipment, distribution equipment and motor frames.

4.6.3 Cathodic Protection

Any utility piping with the potential for corrosion shall be protected through connection to a cathodic protection system to be provided by the contractor. A testing station shall be included to periodically monitor the cathodic protection system.

4.6.4 Lighting

Lighting shall be designed and included in accordance with current Illuminating Engineering Society (IES) recommendations and to meet NRC security requirements.

4.6.5 Lightning Protection

A lightning protection system shall be provided to meet NRC requirements.

4.6.6 HVAC Controls

A HVAC control system shall be provided. It shall be a smart system that can automatically generate control signals to change HVAC equipment operating parameters based on signals received from various monitors. A computer monitor

shall be provided in the operations control area for reviewing the operating status of the system and making adjustments to control setpoints.

Instrumentation shall be provided to detect and alarm both high and low differential pressures across filters in the HVAC system.

Safety systems shall perform their functions under all design basis accident conditions.

4.6.7 Radiation Monitoring and Alarms

Radiation detection instrumentation shall be provided to warn operating personnel of radiation and airborne radioactivity levels above set limits.

The RAMs shall alarm locally and remotely in the operations control area.

An alpha CAM shall be located in the inlet duct to the HEPA filter for the HVAC system.

A Criticality Alarm System shall be provided.

Continuous stack monitoring shall be provided for the detection of radioactive particulate in the air exhaust stream.

Provision shall be made in the design for leak detection for any water collection or storage tanks.

Area monitoring instruments shall transmit data to a microprocessor-based system for display, recording, alarm, and trending in the operations control area.

4.6.8 Communications and Alarms

Voice and data telecommunications lines shall be provided throughout the occupied areas of the facility.

The existing INTEC Broadband Local Area Network (LAN) shall be made available in the facility. Access ports shall be provided in all normally occupied offices.

Emergency voice paging and alarm systems (fire, radiation, criticality, evacuation, security) shall be tied into existing systems at INTEC and connected to a panel alarm system located in the Contractor's operations control office. The specifications for these systems in the DOE-ID AE Standards shall be used to ensure compatibility with existing INEEL systems. The Contractor must install a FAST-brand Remote Distribution Module (RDM) for their facilities. A parts list for the FAST RDM system presently in use at INTEC is included as Section J-G-G. With the exception of the security system, the Contractor shall be responsible for all

installation and connections of communications and alarms systems within the Contractor's site. Interface drawings are provided in Section J Attachment J-G.

5.0 OTHER GENERAL REQUIREMENTS

5.1 Safeguards and Security

The Contractor shall provide safeguards and security for the DTF and ISFSI in accordance with 10 CFR Part 72. This includes all NRC requirements such as Emergency Planning, Radiation Protection, Fire Protection, Security Program, Environmental Monitoring, Certified Fuel Handler Program, and Quality Assurance Programs. Existing INEEL site systems (emergency brigade, fire department, and security) will be made available for use in these activities except for the physical safeguards and security requirements within the Contractor's facility. If performance testing of the INEEL Protective Forces is required as an NRC License condition, the Contractor may obtain these INEEL personnel services at the rate specified in Section J Attachment J-C of this contract.

The Contractor shall provide all security and safeguard systems within the fenced boundary of their facility, as required to meet licensing conditions, during the contract performance period. These systems shall be compatible with and report to the existing on-site INEEL security system and services. All alarms and access control systems shall be tied into the INEEL security system. The INEEL uses the ARGUS security system; configuration control of the ARGUS system is managed by Lawrence Livermore Laboratory. Specific features of this system are sensitive and are not provided in this document. Tie-ins to the INEEL security system will be made by DOE.

Close coordination with the INEEL Security organization will be required during the Contractor's design phase to ensure security system compatibility. The Contractor shall provide information to DOE concerning security, safeguard systems interfaces, and compatibility during the design phase.

The INTEC site configuration and SNF Contractor facility area is shown on drawings in Section J-G. The Contractor shall provide all necessary fencing and gates for this facility. Security features for any fencing or gates shall be compatible with the INEEL security system.

The Contractor shall establish access control and accountability to their site. This includes any card readers, vehicle barriers, and other measures necessary to meet NRC requirements.

DOE will provide one (1) ARGUS Field Processor with power supply and one (1) Remote Access Panel as Government Furnished Equipment under this contract. The Contractor shall install this equipment. The ARGUS Field Processor is a multiplexor

with a capacity of 48 alarms and 8 card readers. If additional capacity is needed, the Contractor shall notify DOE early in the design process. The Contractor shall locate the ARGUS Field Processor and Remote Access Panel within the Contractor's facility in accordance with the final design. DOE will make the final connections of the multiplexor to the INEEL Central Alarm Station.

The Contractor shall provide all access control devices, alarms, cameras, lighting, sensors, keys, locks, and other security equipment as required to meet NRC requirements. This equipment must be compatible with the ARGUS system. The Contractor is responsible for installation of this equipment and associated cabling to the ARGUS Field Processor. DOE will make final cable terminations at the multiplexor.

The Contractor is responsible for all maintenance of the installed security equipment internal to the contractor's facility except the multiplexor. Preventive and corrective maintenance to the multiplexor will be provided by DOE at no cost.

5.2 Material Control and Accountability

The Contractor shall provide a data management system to keep records showing the receipt, inventory (including location), and transfer of all SNF in the Contractor's possession. This system shall comply with NRC requirements for material control and accountability. The records shall include, as a minimum, the name of the fuel shipper, the quantity of radioactive material per item (including special nuclear material in spent fuel), item identification and serial number (must be the same as or maintain traceability to original DOE numbers), storage location, on-site movements of each fuel assembly and element, and ultimate disposition.

A copy of the DOE/NRC forms 741/741 A (Nuclear Material Transaction Reports) and forms 742 and 742C (Material Balance Report and Physical Inventory Listing) shall be provided to DOE in accordance with the contract deliverables schedule, at the time they are provided to NRC.

Backup records shall be maintained to ensure an off-normal event cannot result in the loss of the sole records of SNF inventories. The backup system shall be located at a location off of the INTEC site (to prevent loss in the case of a single event). These records for spent nuclear fuel shall be retained for as long as the material is stored, and for a period of five years after the material is disposed of or transferred out of the ISFSI.

Equipment shall be provided to enable the conduct of a physical inventory, of all spent fuel and high-level radioactive waste in storage, at intervals not to exceed 12 months, unless otherwise directed by the NRC requirements. A copy of the current inventory at the time the ISFSI is loaded shall be retained as a record until the NRC terminates the license.

Emergency voice paging and alarm systems (fire, radiation, criticality, evacuation, security) shall be connected to existing systems at INTEC and connected to a panel alarm

system located in the Contractor's operations control office. The specifications for these systems in the DOE-ID AE Standards shall be used to ensure compatibility with existing INEEL systems. With the exception of the security system, connections to the INEEL systems shall be the responsibility of the Contractor. Interface drawings are provided in Section J Attachment J-G.

5.3 Environmental, Safety and Health

DOE is the responsible agency with regulatory authority for INEEL operations for on-site worker safety and health. Under this contract, NRC will regulate the nuclear safety and DOE will regulate other workplace hazards at the Contractor's site. The Contractor shall develop and submit to DOE for approval the Environmental Safety and Health Program Operating Plan (ESHPOP), which shall govern activities during construction and operations that are not regulated by NRC. This plan shall be approved by DOE prior to start of on-site construction activities. The ESHPOP shall define the baseline ES&H requirements and shall be incorporated into the contract. Any changes will be negotiated in advance between the Contractor and DOE-ID. ES&H information in other formal permits (such as state air or RCRA permits) and licenses need not be duplicated in the ESHPOP, but shall be presumed to be included in the baseline ES&H requirements. The Contractor shall develop the appropriate safety basis definition, associated safety requirements, and surveillance actions. The Contractor shall obtain all necessary permits and abide by all applicable laws, regulations and ordinances of the United States and of the state, territory and political subdivision in which the work is performed. The Contractor shall design and operate their facilities within the envelope established for this project by the DOE Programmatic SNFEIS, the NRC NEPA documentation, and permits. The contractor shall provide copies of annual facility emissions reports to DOE for information as identified in Section J Attachment K.

5.4 Project Management Plan

The Contractor shall develop, submit, and implement a Project Management Plan that conforms to the Contract requirements. The plan shall demonstrate the Contractor's ability to successfully manage and complete the work and shall define essential personnel. As a minimum, the Project Management Plan shall contain the following information:

Management Organization and Responsibilities
Work Plan
Work Breakdown Structure
Schedule
Logic Diagram
Project Performance Information and Reporting
Configuration Management Control
Internal and External Interfaces, including roles and responsibilities, shall be documented for all phases of the project

5.5 Drawings

Computer-aided design (CAD) incorporating simplified drafting practices shall be used in the preparation of drawings. Drawing methods and standard symbols shall be in accordance with ANSI standards.

Drawing prints shall be black or blue line on white paper of good print quality and durability. Drawings shall be completed on AUTOCAD software version 14 or newer. Drawings and specifications shall be maintained current through the life of this contract. The Contractor shall provide complete designs and updates in accordance with submittals under the Section J, Attachment J-K "Deliverables." Electronic copies of drawings shall be in DWG format and placed on high-density diskettes.

5.5.1 As-Built Drawings

Upon completion of construction, the Contractor shall update the drawings, specifications, and all other vendor data to reflect the "As-Built" conditions of the DTF, ISFSI, utilities, and all support systems and equipment. The original drawings and the title page of each specification shall be stamped or marked (in reproducible quality) with the words "As-Built" at or near the bottom of the sheet. All as-built drawings shall be field verified by the Contractor to be accurate.

Drawings and specifications shall be maintained current through the life of this contract. Updates to the "As-Built" documentation shall be provided as changes are made through the life of the contract. The Contractor shall furnish the "As-Built" design drawings and specifications in accordance with Section J, Attachment J-K.

5.6 Vendor Data

The Contractor shall maintain all essential data to document full compliance with the contract. The data shall confirm the technical and safety bases for the facility. The Contractor shall maintain data needed to establish a history for the DTF and ISFSI, traceable to essential equipment, materials, and processes such as non-destructive examination, inspections during construction and testing to meet NRC QA requirements. The data shall provide all essential information needed to license, update or transfer the license, operate and maintain the DTF and ISFSI safely and in accordance with all applicable laws and regulations.

5.7 Equipment Identification

All buildings, structures, equipment, pipelines, valves, instruments, panels, junction boxes, and vessels at the INTEC shall have unique (INTEC assigned) identification numbers. The equipment numbers shall be shown on the Contractor's drawings. The Contractor shall prepare and submit a general list of the equipment in accordance with the Submittals and Deliverables Schedule section of the Contract. The DOE will assign a block of identification numbers for use by the Contractor.

5.8 Parts

The Contractor shall provide, and have available, spare parts required to maintain safe, continuous operation of the DTF and ISFSI. A list of the types and quantities of spare parts shall be provided to DOE prior to operating the facility. This list shall include the name of the manufacturers and part number for each part.

5.9 Operating Procedures and Technical Specifications

The Contractor shall prescribe and implement operating and maintenance activities by documented procedures, specifications, or drawings of a type appropriate to the circumstances and shall require that these procedures, specifications, and drawings be followed. The procedures, specifications, and drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Existing procedures associated with government furnished equipment will be provided to the Contractor by DOE.

5.10 Pre-Operational, Startup and Performance Testing

5.10.1 Definitions

Startup: The series of activities required to prepare the DTF and ISFSI for the operations phase (Phase III of this Contract). These activities include, but are not necessarily limited to:

- Testing (as a minimum, the activities detailed in 5.10.2)
- Operator Training (to meet NRC requirements)
- Readiness Reviews (to meet NRC requirements)
- Documentation of readiness reviews and assessments reports.

Start of Operations: The beginning of Phase III of this Contract. All startup activities shall be completed prior to "start of operations."

5.10.2 Testing Requirements

The Contractor shall prepare test and startup procedures, perform testing, and provide documentation demonstrating the functional and operational readiness of the systems and components for all fuel types prior to the start of operations. In addition, the Contractor shall satisfy all NRC licensing commitments and conditions prior to the start of operations. All equipment provided, including equipment that will be used by the Contractor for future operations, shall be demonstrated to meet functional requirements prior to start of operations. As a minimum, testing shall include:

- Pre-Operational Tests of individual components
- Pre-Operational test of Systems (System Operational Tests)
- Startup and Performance Demonstration Tests
- A Performance Demonstration Test shall be conducted as part of the Start-up testing. The facility Start-up includes the Contractor's receipt of formal notification of the NRC's approval to begin nuclear operations, and the successful loading of an IFSFI storage unit with a minimum of two standard canisters of Peach Bottom Fuel. DOE will deliver 36 Peach Bottom Fuel Handling Units (FHU) to the facility for processing under Phase II. The Contractor may request additional Peach Bottom fuel deliveries if necessary to support their Phase 2 processing scheme. The Peach Bottom FHUs will be received and processed in the DTF, demonstrating all standard-processing operations. Two standard canisters must be fully loaded with Peach Bottom Fuel and placed in the ISFSI storage unit as part of Phase II. In the event the Contractor has requested more than 36 FHUs delivered to support Start-up, Phase II will be judged complete when the second fully loaded standard canister is in place in the ISFSI. DOE will make fuel available on a schedule to support this performance demonstration test.