NRC FORM 374

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10 of the *Code of Federal Regulations*, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the U.S. Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee

1. Nuclear Fuel Services, Inc.

2. 1205 Banner Hill Road
Erwin, TN 37650-9718

3. License Number: SNM-124, Amendment 8

4. Expiration Date: August 31, 2037

5. Docket Number: 70-143
Reference Number:

6. Byproduct Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum amount that Licensee May Possess at Any One Time Under This License
A. Uranium enriched up to 100 weight percent in the U235 isotope which may contain up to an average of 10^{-6} grams plutonium per gram of uranium, 0.25 millicuries of fission products per gram of uranium, and 1.5×10^{-5} grams transuranic materials (including plutonium) per gram of uranium, as contaminants	A. As described in Appendix 1B to the license application	A. See Sensitive Conditions
B. Uranium enriched up to 100 weight percent in the U233 isotope	B.1 Any form, but limited to residual contamination from previous operations	B.1 See Sensitive Conditions

This license contains **SECURITY - RELATED INFORMATION**. Upon removal/redaction of the Sensitive Conditions on Page 9, this license is **DECONTROLLED**.

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	B.2	Any form, as received for analysis or for input into development studies	B.2 See Sensitive Conditions
C. Plutonium	C.1	As counting and calibration standards	C.1 10 millicuries
	C.2	As residual contamination and holdup from previous operations	C.2 As described in the license application
	C.3	Any form, as received for analysis or for input into development studies	C.3 See Sensitive Conditions
	C.4	Any form, as waste resulting from decontamination and volume reduction of equipment received from other organizations	C.4 See Sensitive Conditions
D. Transuranic Isotopes	D.	As waste resulting from processing enriched uranium	D. See Sensitive Conditions
E. Fission Products	E.	As waste resulting from processing enriched uranium	E. See Sensitive Conditions

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9. Authorized place of use: The licensee's existing facilities in Unicoi County, Tennessee, as described in the referenced application.

10. This license shall be deemed to contain two Sections: Safety Conditions and Safeguards Conditions. These sections are part of the license, and the licensee is subject to compliance with all listed conditions in each section.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date: **August 11, 2017** By: **/RA/**

Robert K. Johnson
Fuel Manufacturing Branch
Division of Fuel Cycle Safety, Safeguards,
and Environmental Review
Office of Nuclear Material Safety
and Safeguards

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SAFETY CONDITIONS

S-1 For use in accordance with the statements, representations, and conditions in the application submitted on the following dates, or as revised pursuant to Condition S-2 below:

June 30, 2009, and supplements dated July 2, August 18, August 28, and September 18, 2009; February 26, August 12, August 16, and September 23, 2010; April 13, May 13, May 27, June 24, July 28, August 1, August 5, September 9, September 27, September 30, November 21, 2011; February 7, March 21, May 14, and October 10, 2012; January 18, 2013; June 20, September 4, September 9, October 24, 2014; October 22, 2015; January 7, March 15, March 22, July 19, and December 15, 2016; June 16, 2017.

S-2 NFS may make changes to the License Application that does not reduce the effectiveness of the License Application, without prior U.S. Nuclear Regulatory Commission (NRC) approval, if the change meets the following provisions:

- The change does not decrease the level of effectiveness of the design basis as described in the License Application.
- The change does not result in a departure from the methods of evaluation described in the License Application used in establishing the design basis.
- The change does not result in a degradation of safety.
- The change does not affect compliance with applicable regulatory requirements.
- The change does not conflict with an existing license condition.
- Within 6 months after each change is made, the licensee shall submit the revised chapters of the License Application to the Director, NMSS, using an appropriate method listed in 10 CFR 70.5(a), and a copy to the appropriate NRC Regional Office.

S-3 NFS shall utilize, for setpoint determinations, conservative engineering analyses that account for safety limits, instrument and system accuracies, response times, instrument drift, manufacturer's data and operating experience. The analysis for each safety setpoint shall be a formal calculation and shall be documented for each IROFS interlock and alarm.

S-4 The vaults will be protected by barriers with an equivalent 2-hour fire resistance rating.

S-5 Active and administrative controls for flammable liquids and gasses must be operable in the fire area where flammable liquids and gases are present during KAST processing.

S-6 The licensee shall maintain and execute the response measures in the Emergency Plan, Revision 22, transmitted by letter dated June 7, 2017, or as further revised by the licensee consistent with 10 CFR 70.32(i).

S-7 NFS shall inform the NRC within 30 days of receipt of a violation notice from the State of Tennessee Division of Air Pollution or Water Pollution Control, or receipt of modified requirements for a State-issued National Pollutant Discharge Elimination System permit.

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SAFEGUARDS CONDITIONS

Section 1.0 – FUNDAMENTAL NUCLEAR MATERIAL CONTROL (FNMC) PLANS

SG-1.1 The licensee shall follow its "Fundamental Nuclear Material Control Plan" with respect to all activities involving strategic special nuclear material. The approved plan consists of the following revisions, or as further revised by the licensee in accordance with 10 CFR 70.32(c):

General Discussion ----------	Rev. 9 (dated September 2009)
Section 1 – Process Monitoring ---------	Rev. 28 (dated October 2015)
Section 2 – Item Monitoring ----------	Rev. 11 (dated July 2013)
Section 3 – Alarm Resolution ----------	Rev. 11 (dated October 2015)
Section 4 – QA & Accounting ----------	Rev. 23 (dated July 2013)

Note: The Plan may include examples in one or more annexes.

SG-1.2 The licensee shall follow its "Fundamental Nuclear Material Control Plan for SNM of Low Enriched Uranium" with respect to all activities involving special nuclear material of low strategic significance. The approved plan consists of the following revisions, or as further revised by the licensee in accordance with 10 CFR 70.32(c):

Section 1 – General Discussion ----------	Rev. 8 (dated September 2012)
Section 2 – SNM Confirmation and Tracking --- ----------	Rev. 5 (dated December 2010)
Section 3 – Management Structure ----------	Rev. 10 (dated December 2010)
Section 4 – MC&A Measurements ----------	Rev. 7 (dated December 2010)
Section 5 – Physical Inventories ----------	Rev. 5 (dated December 2010)
Section 6 – Item Control ----------	Rev. 6 (dated November 2011)
Section 7 – Resolving Shipper/Receiver Differences --------	Rev. 3 (dated December 2010)
Section 8 – Periodic Assessment of the MC&A System ----	Rev. 5 (dated December 2010)
Section 9 – Record Keeping ----------	Rev. 1 (dated February 1993)

Note: The Plan may include examples in one or more annexes.

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Section 2.0 – ADDITIONAL FNMC CONDITIONS

SG-2.1 Notwithstanding the requirements of 10 CFR 74.59(f)(2)(viii) to remeasure, at the time of physical inventory, any in-process SSNM for which the validity of a prior measurement has not been assured by tamper-safing, the licensee may book for high enriched uranium (HEU) physical inventory purposes:

(1) process holdup quantities determined by nondestructive assay measurements in manufacturing facilities performed prior to the start of an inventory, in accordance with the controls described in Section 4.5.2.3.2 of the Plan identified in Condition SG-1.1; and

(2) pre-listed material introduced to process in the manufacturing facilities prior to the start of an inventory, in accordance with the controls described in Section 4.5.2.3.2 of the Plan identified in Condition SG-1.1.

SG-2.2 Notwithstanding, the requirement of 10 CFR 74.53(b)(1) to have a process detection capability for each unit process, the process units listed in Section 1.1.5.2 of the Plan identified in Condition SG-1.1 shall be exempt from such detection capability; and the licensee's process monitoring system shall be comprised of the control units described in Section 1.3 (and all sub-sections therein) of the above-mentioned Plan.

SG-2.3 Notwithstanding, the requirements of 10 CFR 74.31(c)(2) for low-enriched uranium (LEU) and 10 CFR 74.59(d)(1) for SSNM to maintain a system of measurements to substantiate both the element and fissile isotope content of all SNM received, inventoried, shipped or discarded, SNM measured by the licensee for U-233, U-235, or Pu-239 by nondestructive assay techniques need not be measured for total element if the calculated element content is based on the measured isotope content which, in turn, is traceable to an isotopic abundance measurement at the area of generation.

SG-2.4 Notwithstanding, the requirement of 10 CFR 74.59(e)(8) to establish and maintain control limits at the 0.05 and 0.001 levels of significance for all HEU related measurements, the licensee may use one and two scale divisions as being equivalent to the 0.05 and 0.001 control levels, respectively, for mass measurements.

SG-2.5 Notwithstanding, the requirements of 10 CFR 74.59(f)(1) and 74.59(f)(2)(viii) to measure and inventory all SSNM, the licensee may determine process exhaust ventilation system inventory quantities in accordance with Section 4.5.3.5 of the Plan identified in Condition SG-1.1.

SG-2.6 Notwithstanding, the requirements of 10 CFR 74.59(e)(8) relative to actions to be taken when replicate measurement data exceed a 0.001 control limit, the licensee shall comply with Section 4.4.1.7.3.4 of the Plan identified in Condition SG-1.1.

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SG-2.7 Notwithstanding, the requirement of 10 CFR 74.59(e)(4) that allows the pooling of data which has been shown to be not significantly different on the basis of appropriate statistical tests, the licensee may pool data from equivalent scales without testing.

SG-2.8 Notwithstanding, the requirement of 10 CFR 74.31(c)(3) and of 74.59(e)(3)(i) to measure control standards for all measurement systems for the purpose of determining bias, and notwithstanding the requirement of 10 CFR 74.31(c)(4) and of 74.59(e)(8) to maintain a statistical control system to monitor such control standard measurements, the licensee need not measure nor monitor such control standards for point calibrated, bias-free systems. To be regarded as bias-free, a measurement system must be calibrated by one or more measurements of a representative standard(s) each time process unknowns are measured, and the measurement value assigned to a given unknown is based on the associated calibration.

SG-2.9 Notwithstanding, the requirement of 10 CFR 74.15 to include limit of error data on DOE/NRC Form-741 for all SNM shipments, the licensee is exempt from including such data on 741 Forms associated with waste burial shipments.

SG-2.10 Notwithstanding, the requirement of 10 CFR 74.59(f)(1)(i) to calculate the SEID associated with each HEU ID value, the licensee need not determine such SEID for MBA-7 whenever its ID is less than 300 grams U-235.

SG-2.11 Notwithstanding the requirements of 10 CFR 74.31(c)(3) and (c)(4), the licensee is exempted from calculating the SEID and measurement system biases associated with LEU physical inventories provided that the calculated inventory difference does not exceed 1,000 grams U-235.

SG-2.12 Notwithstanding, the requirements of 10 CFR 74.59(d)(1) and Section 4.3 of the facility's FNMC Plan identified in Condition SG-1.1 to measure the uranium element and isotope content of all strategic SNM, the licensee shall provide assigned values for the 2S cylinder heels identified in the December 31, 2009, request letter. This one-time exemption will expire when all of these cylinders are shipped from the site.

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Section 3.0 – PHYSICAL PROTECTION REQUIREMENTS:

SG-3.1 The licensee shall follow the physical protection plan entitled “NFS Physical Protection Plan for Protection of Category 1, High Enriched-Uranium (Strategic Special Nuclear Material),” Revision 16, submitted by letter dated April 12, 2017, and as the plan may be further revised in accordance with the provisions of 10 CFR 70.32(e).

SG-3.2 The licensee shall follow the safeguards contingency plan titled "NFS Safeguards Contingency Response Plan,” Revision 1, and as the plan may be further revised in accordance with the provisions of 10 CFR 70.32(g).

SG-3.3 The licensee shall follow the training and qualification plan titled "NFS Site Security Training and Qualification Plan,” Revision 4, and as the plan may be further revised in accordance with the provisions of 10 CFR 70.32(e).

SG-3.4 The licensee shall comply with the provisions of the plan entitled “Physical Protection Plan for the Protection of Category II Moderate Enriched Uranium (Special Nuclear Material),” Revision 2, submitted by letter dated June 29, 2017, and as the plan may be further revised in accordance with the provisions of 10 CFR 70.32(e), as follows:

a. The licensee may implement the fixed site security provisions (Chapters 1-6) only after notifying the NRC at least 90 days before implementation begins. The notice shall be made in writing to the Director, Division of Fuel Cycle Safety and Safeguards, NRC Headquarters, with a copy to the Director, Division of Fuel Facility Inspection, NRC Region II, and

b. The licensee shall comply with the transportation security provisions (Chapters 7-13).

SG-3.5 The licensee shall comply with the provisions of the plan entitled “Physical Protection Plan for Protection of Category III Low Enriched Uranium (Special Nuclear Material),” Revision 5, submitted by letter dated June 29, 2017, and as the plan may be further revised in accordance with the provisions of 10 CFR 70.32(e).

SG-3.6 See Sensitive Conditions.

SG-3.7 Notwithstanding the requirements of 10 CFR 73.46(b) for security officers to qualify and re-qualify “every 12 months,” the licensee may requalify security officers within a 12 calendar-month period where a calendar-month is considered to include any day of the month. This is in addition to exemption issued in 1999 (ADAMS No. ML11325A131) and renewed in 2012 (ADAMS No. ML102780085), which permits the licensee to extend the requalification period for 30 days due to unforeseen scheduling matters.