

# **Performance Work Statement For 13 MT Highly Enriched Uranium Down-blending Services and Low Enriched Uranium Inventory Management (May 29, 2014)**

## **1.0 BACKGROUND**

The Department of Energy executes a program to eliminate surplus Highly Enriched Uranium (HEU) and is currently responsible for disposing of approximately 186 metric tons (MT) of surplus HEU, as follows:

In 1994, the President declared 174 MT of HEU to be excess to national security, and in 1996, issued a Record of Decision announcing the material would be down-blended to low-enriched uranium (LEU) to make it non-weapons-usable, and subsequently used as nuclear reactor fuel to the extent practicable. In 2005, the Department also declared that an additional 200 MT of HEU will never again be used as fissile material in nuclear warheads. Of that amount, 160 MT was designated for use as Naval Reactor fuel, 20 MT was designated for research and space reactor requirements, and 20 MT was designated for down-blending to LEU. In addition to the 20 MT designated for down-blending, Naval Reactors rejected approximately 8 MT of its 160 MT allotment. Smaller quantities of HEU acquired from foreign research reactor facilities as part of the Global Threat Reduction Initiative or other domestic research reactor fuel determined to be excess has also been designated for down-blending to LEU. It is estimated that approximately 186 MT can be down-blended for use as nuclear reactor fuel. The remaining HEU is in spent nuclear fuel and low equity discards that are not planned to be recovered at this time.

The program has substantially reduced holdings of fissile materials throughout the DOE complex and has eliminated over 140 MT of weapons-usable HEU by down-blending it to LEU for use in power and research reactors in the U.S. and abroad. The Department is moving forward with plans for the remaining HEU and has identified a need for commercial services to down-blend at a minimum approximately 13 MT HEU to LEU for use in nuclear reactors.

## **2.0 CONTRACT OVERVIEW**

The overall objectives of the procurement are to meet U.S. nuclear non-proliferation commitments by down-blending at a minimum 13 MT of surplus HEU to LEU below 5% <sup>235</sup>U enrichment, up to a total of 20 MT of HEU or high assay LEU that may become available for down-blending. This contract will also ensure that the timing and quantity of Derived LEU transferred into the market is consistent with DOE excess uranium policy and market impact determinations.

## **3.0 PROGRAM SCOPE**

3.1 The Contractor shall receive at a minimum 13 MT of HEU as oxides, alloyed and unalloyed metals, compounds, sources and standards, and reactor fuel; chemically process the

HEU to prepare it for down-blending; procure necessary diluents; and down-blend the HEU into Derived LEU. The Government may add up to 7 MT HEU or high assay LEU to be down-blended by the Contractor.

3.2 The HEU provided to the Contractor shall be down-blended and made available for shipment to the Government as specified in this PWS. The Contractor shall arrange for storage of the Government's LEU, and shall maximize the amount of LEU to become available for use by the Government during the term of the contract. Prior to the end of the term of the contract, the Contractor shall deliver the Government's LEU to a facility to be designated by DOE in accordance with Section 4.3.

3.3 The Contractor shall manage the Derived LEU transfers into the uranium market to ensure transfers and uses are consistent with DOE excess uranium policy and market impact determinations.

## **4.0 TECHNICAL REQUIREMENTS**

### **4.1 Receipt, Inventory of HEU, and Return of Shipping Containers**

4.1.1 Unless otherwise agreed to by the Government and the Contractor, HEU material delivered to the Contractor will meet the description provided in the Section J, Attachment 4, entitled "HEU Material Summary."

4.1.2 The Government will provide the Contractor an analysis of the isotopic and chemical properties of HEU prior to any HEU shipment to the Contractor. At a minimum, the following information shall be provided in the Government analysis:

- (i) Level of all uranium isotopes ( $\mu\text{g/g}^{235}\text{U}$ );
- (ii)  $^{99}\text{Tc}$  levels ( $\mu\text{g/g}^{235}\text{U}$ );
- (iii) Alpha activity from Neptunium and Plutonium ( $\text{Bq/gU}$ );
- (iv) Gamma activity from fission products for each detectable gamma emitting fission product. The values obtained by multiplying the activity ( $\text{Bq/gU}$ ) of each parent nuclide species by the appropriate mean gamma energy per disintegration ( $\text{MeV/d}$ ) shall be summed ( $\text{MeV Bq/dkgU}$ ). The presence of all identified gamma emitting fission product nuclides will be recorded and each contribution included in the total; and
- (v) Agreed upon elemental impurities including but not limited to Be, Cd, Cr, Pb and Ni.

4.1.3 The Government may perform a statistical sampling approach for oxides and clinkers and screenings to reduce the number of samples required to characterize material solely for Contractor receipt purposes. Normal NMC&A required analysis will continue to be performed. Prior to an HEU shipment, the Contractor and the Government will agree on specific sampling needed for material characterization and/or to be used to determine the suitability of the HEU for down-blending into commercially acceptable LEU.

4.1.4 The Government will provide the opportunity to the Contractor to observe the sampling or loading of HEU, if requested. The Contractor shall only request access for personnel meeting site requirements, including but not limited to security clearances and other training. If

the Contractor requests an opportunity to observe sampling or loading, the Government will notify the Contractor of the date(s) and place(s) for observance of such events.

4.1.5 A detailed HEU shipment schedule shall be defined and agreed upon between the parties on a quarterly basis, and such agreement shall be through quarterly technical review meetings between the parties; however, the detailed schedule shall be consistent with Section J, Attachment 5, entitled, "Planned HEU Delivery Schedule." In the event that the parties cannot reach an agreement as to the quarterly shipping schedule, the Government shall only be bound to Section J, Attachment 5, entitled, "Planned HEU Delivery Schedule." In the event the Contractor is unable to receive and/or process HEU in accordance with such schedules, the Contractor shall immediately notify the CO of any resulting delay, request an alternate delivery or performance date, and identify any impacts to the processing caused by such a delay. Although the Government agrees to make a good faith effort to accommodate such requests, the Government is not bound to make accommodations.

4.1.6 The Contractor shall inventory the HEU shipped by the Government. The Contractor shall physically segregate delivered HEU from other HEU in its possession through the weighing, processing, and accountability sampling steps identified in this contract.

4.1.7 The Contractor shall receive HEU at a facility located in the United States and licensed by the U.S. Nuclear Regulatory Commission (NRC) to possess and process HEU.

4.1.8 The processing facility shall be located in the United States and have the capability of recovery, purification and down-blending of Category I quantities of HEU to Derived LEU.

4.1.9 The Government will deliver HEU to the Contractor in Government-owned, leased, or loaned containers, and Cargo Restraint Tie-downs (CRTs) or Cargo Pallet Assemblies (CPAs). The "delivery" of HEU to the Contractor shall be deemed to occur upon the physical receipt of the HEU at the Contractor's processing facility, located in the United States. A copy of the Form DOE/NRC-741 and analytical data shall accompany the delivery of HEU to the Contractor.

4.1.10 Shipping containers containing HEU will be shipped directly from the Government facility, or its designated site. The primary and secondary shipping containers shipped to the Contractor will not exceed a smearable alpha contamination limit of 220 dpm/100cm<sup>2</sup> on the outside of the containers. Within twenty-one (21) calendar days after receipt of the HEU, or as otherwise agreed between the Government and the Contractor, the Contractor shall return empty shipping containers (including any spacers if used), CRTs and CPAs to the designated Government facility.

4.1.11 Empty shipping containers, CRTs, and CPAs returned to the Government shall be palletized, banded or shrink wrapped and a tamper indicating device applied. Items that are to be returned to the Government shall include the empty shipping containers (including any spacers, if used), CRTs, and CPAs. Convenience containers, wrappings, and other packing material (for example, the aluminum extrusions containing the unclad elements, glass/plastic bottles, slip-top and screw-top cans, bales, etc.) are not to be returned to the Government and shall be disposed of by the Contractor. The Contractor shall palletize empty shipping containers on metal pallets to be provided by the Contractor. The Contractor shall use

customized International Metal pallets (40"x40" wide of 14 gauge hot dipped galvanized steel with six top boards and three runners – Model number: B-4040-1463) or equivalent pallet for the ES-3100 shipping container. The use of equivalent pallets shall be submitted by the Contractor to the COR for approval. Each pallet of empty shipping containers shall be labeled "Empty." CRTs and CPAs shall be banded and a tamper indicating device (TID) applied to each band.

4.1.12 Prior to return of shipping containers, the Contractor shall radiologically survey all of the returned items for loose and fixed activity (alpha and beta-gamma) to meet both the Government and the receiving site's specific requirements [220 dpm/100cm<sup>2</sup>]. Surveys shall include all of the external surfaces of the shipping container drums and any of the internal areas that are accessed/opened during the loading/unloading process. It is noted that these surveys are not intended to be 100 percent surveys for the "free release" of the containers and their contents. The Contractor shall return all of the survey data (along with the items) to the Government for its use in radiologically assessing the receipt, control, and reuse of these items. The Government will return the metal pallets to the Contractor within fourteen (14) calendar days of receipt by the Government.

4.1.13 Title to and/or responsibility for shipping containers, CRTs and CPAs shall remain with the Government. In the event containers are identified by the Government as non-returnable, the Contractor shall take title to and responsibility for the disposal of the containers. The Contractor shall maintain the returnable containers, CRTs, and CPAs in good condition and shall not use them for any materials other than the uranium shipped therein, until returned to the Government. In the event that the containers, CRTs, or CPAs are not returned to Government in the same condition as provided, the Contractor shall reimburse the Government with the market value for the replacement or the actual cost of the repair.

4.1.14 The Contractor shall account for and inventory the HEU shipped by the Government and shall enter into a Shipper/Receiver Agreement (SRA) with the Government and the Government's designated shipping facility Contractor, in accordance with Section H clause entitled "Shipper/Receiver Agreement (SRA)," to document the methods used to establish accountability values for the HEU.

## **4.2 Processing and Down-Blending Requirements of HEU to LEU**

4.2.1 The Contractor shall take delivery of approximately 13 MT of HEU in accordance with the schedule detailed in the Section J, Attachment 5, entitled "Planned HEU Delivery Schedule." The 13 MT consists of predominately HEU oxide, but also includes alloyed and unalloyed metal, compounds, reactor fuel and sources and standards as specified in Section J, Attachment 4, entitled, "HEU Material Summary."

4.2.2 All quantities of HEU provided to the Contractor shall be down-blended within six months of final delivery of HEU to the Contractor.

4.2.3 The Contractor shall procure all diluent necessary to down-blend the HEU to 4.95% Derived LEU.

4.2.4 The Contractor shall down-blend the HEU to LEU at a 4.95% assay. Derived LEU

shall meet the specifications provided in the Section J, Attachment XX, entitled "Specification for LEU Derived from HEU."

4.2.5 Any Contractor requested deviation for LEU not meeting the specifications provided in the Section J, Attachment XX, entitled "Specification for LEU Derived from HEU" shall be submitted by the Contractor to the CO for approval.

4.2.6 The Contractor shall evaluate the HEU to be received, and prior to processing the HEU, shall develop processing plans that include selective batch processing in the uranium recovery, purification and/or down-blending operations to dilute certain impurities, such as transuranics (TRU) and fission products, or high concentration of elemental impurities.

4.2.7 If the HEU material delivered by the Government to the Contractor fails to conform to the specifications set forth in the Section XX, attachment entitled "HEU Material Summary," and the Contractor cannot utilize the material through selective blending with conforming HEU, the Government may elect to replace such non-conforming HEU with conforming HEU or may reduce the quantity of HEU to be delivered under this contract. Such a change will be processed in accordance with FAR clause 52.243-01 "Changes – Fixed Price – Alternate II." The Government will arrange for the removal of any non-conforming HEU. The Contractor shall submit a written notice of non-conformance to the CO no later than forty-five (45) calendar days after receipt of the analytical data. The notice of non-conformance shall include analytical data supporting the Contractor's assessment.

4.2.8 The Contractor shall establish accountability values for the Derived LEU as it is generated, and shall establish an account in the name and for the benefit of the Government which represents the quantities of Government-owned LEU (Government LEU Account) down-blended. All Derived LEU shall be stored in accordance with paragraph 4.3 of the PWS.

4.2.9 The Contractor shall process uranium samples once released by the Government or, as instructed by the Government, shall return the samples to the designated Government facility. Such release or return shall be authorized by the COR.

4.2.10 The Government recognizes that some of the uranium furnished under this contract may be lost in processing or may remain in residues from which it cannot be economically recovered. Unless otherwise agreed to in writing by the Government, the allowable uranium process losses are limited to One and one half (1 ½) percent of the total uranium input at dissolution for processing under this contract. Both that uranium lost in processing and that uranium not economically recoverable shall be considered to be "process losses." The title to authorized uranium process losses shall be deemed abandoned by the Government and shall vest in the Contractor.

4.2.11 The Contractor shall reimburse the Government for the value of the uranium that is not returned and is in excess of the authorized uranium process losses in the performance of the work.

4.2.12 The Contractor shall take title to and dispose of all of the waste streams resulting from activities performed under this contract.

### 4.3 Storage, Delivery, and Use of Derived LEU

4.3.1 The Contractor shall arrange to store, manage and make available for delivery the LEU in the Government's account for up to two years after all HEU has been down-blended (three years after final HEU delivery of Section B, CLIN 0001 – Down-blending 13 MTU).

4.3.2 The Contractor shall secure necessary licenses and facilities, procure equipment, shipping containers, packages required to store and deliver the Government's LEU.

4.3.3 The Contractor providing storage of the Government's LEU under this contract shall have, at all times when it is in possession or custody of the Government-owned LEU, adequate financial assurance to protect the Government's title and interest in the Government's LEU. "Adequate financial assurance" shall be in an amount that is equal to the Full Market Value of the Government's LEU. The financial assurance shall be in a form and amount approved by the Government and evidence of such financial assurance shall be provided to the Government at least thirty (30) days prior to the commencement of the initial down-blending of HEU.

4.3.4 The Contractor shall maintain, at all times when it has possession, custody, or control of Government's LEU or other assets under this contract, insurance adequate to cover the risk of loss of the Government's LEU. All insurance required of the Contractor shall be for the protection of the Government against risk and liabilities in connection with the Government-owned LEU. A certificate of insurance shall be furnished to the Contracting Officer at least thirty (30) days prior to the commencement of delivery of the Government-owned LEU to the storage facility.

4.3.5 Each policy of insurance against loss or damage to the Government's property shall name the United States of America (Department of Energy) as loss payee as its interest may appear and shall contain a loss payable clause reading substantially as follows:

4.3.5.1 "Payments for losses under the Contractor's property insurance related to losses of the Government's LEU, if any, shall be adjusted with the Contractor and the proceeds shall be payable to the Contractor and to the Treasurer of the United States of America, as its interests may appear."

4.3.5.2 Additionally, each property policy of insurance shall contain an endorsement reading substantially as follows: "The insurer waives any right of subrogation against the United States of America which might arise by reason of any payment made under this policy."

4.3.6 The Contractor shall manage its HEU processing and use of LEU transferred to the Contractor as compensation to ensure the total amount of uranium entering the market remain consistent with DOE excess uranium policy and market impact determinations, and shall routinely adjust its uranium processing and/or use plans, as needed, to maximize the uranium return of LEU to the Government's account.

4.3.6.1 If the Contractor uranium processing and/or use plans require an adjustment that changes the Contractor's fixed price in order to comply with the DOE excess uranium policy and market impact determinations, the Government may

elect to reduce the quantity of HEU to be delivered under this contract or agree to adjust the processing and/or use plans. Such a change will be processed in accordance with FAR clause 52.243-01 “Changes – Fixed Price – Alternate II.”

4.3.6.2 The Contractor shall develop and submit to the COR, with a copy to the CO, a quarterly HEU processing plan that estimates the amount of Derived LEU that will be generated and the amount LEU to be invoiced to the Government for transfer to the Contractor as compensation and the amount LEU to be placed into the Government’s LEU account.

4.3.7 Subject to the terms of the Contract, the Contractor may use as a working stock the Government’s LEU. The Government acknowledges that the Government’s LEU is fungible, may exist in various chemical forms at various times, and that the Contractor is not required to maintain, identify, or allocate separate physical inventories of the Government’s LEU. The Government agrees that the Government’s LEU may be commingled with the Contractor’s working stock inventory of LEU; however, the Contractor shall ensure that no other party has title to or any other interest conflicting with the Government’s title to the Government’s LEU.

4.3.7.1 The Contractor agrees to maintain the Government’s LEU within the United States at all times, unless prior written authorization is provided to the Contractor by the Contracting Officer. The Government’s LEU shall continue to meet the specifications of Section J Attachment 5, although the Contractor is not required to continuously re-analyze its working stock inventory of LEU.

4.3.7.2 The Contractor shall not sell, transfer, barter, or otherwise dispose of the Government’s LEU. The Contractor shall not exchange or “book transfer” the Government’s LEU for non-U.S. LEU located outside of the United States, unless prior written authorization is provided to the Contractor by the Contracting Officer; however, the Contractor may routinely perform uranium exchanges or book transfers, so long as the uranium contained in the Government’s LEU Account remains within the United States without prior approval by the Contracting Officer.

4.3.8 The Contractor shall make available the Government’s LEU for delivery to the Government or its designee in the form of UF<sub>6</sub>, unless otherwise agreed to by the CO in writing resulting from the exchange of the Derived LEU produced under the Contract for UF<sub>6</sub> at a 4.95% assay and meeting the ASTM International Specification C996-04<sup>E1</sup>.

4.3.8.1 The Contractor shall deliver the Government’s LEU to a facility to be designated by the COR and in accordance with an agreed upon schedule.

4.3.8.2 Written direction shall be issued to the Contractor by the COR with a copy to the CO for any withdrawals from the Government LEU Account. Within 60 days of receipt of written direction from the COR, the Contractor shall have available for Physical Delivery to the Government or its designee the amount LEU requested (but shall not be more than 40 MTU in one order), and the LEU shall be in the form of UF<sub>6</sub> in Contractor-furnished industry standard cylinders. The COR may give written direction to withdraw no more than 40 MTU in any given order, and shall not issue

written direction for additional LEU (not to exceed 40 MTU) until after a 90 day period following a delivery. Any subsequent delivery shall also occur within 60 days of receipt of written direction from the COR.

4.3.8.3 UF<sub>6</sub> delivered to the Government *or* its designee shall not contain any foreign obligations unless otherwise agreed to by the CO.

4.3.8.4 Pursuant to “Inspection of Supplies—Fixed Price” clause (52.246-2) in Section E of the contract, the UF<sub>6</sub> released hereunder by the Contractor shall conform to the specification included as Attachment 5 entitled, “Specification for LEU Derived from HEU”, and ASTM International Specification C996-04<sup>E1</sup>.

4.3.9 The Contractor shall credit and debit the Government’s LEU Account to record transactions such as, Derived LEU added to the Government’s LEU Account, authorized withdrawals, or other transaction.

4.3.10 The Contractor will certify annually by submitting a report to the CO as described in Attachment X, Reporting Requirements, that Government’s LEU is being stored in compliance with the Contract.

#### **4.4 Reporting Requirements**

4.4.1 The Contractor shall submit all reports in accordance with the Section J, Attachment XX, entitled “Reporting Requirements Checklist.”

#### **5.0 Quality Assurance**

5.4.1 The Contractor shall comply with quality assurance requirements as established by Nuclear Quality Assurance manual (NQA-1), Quality Assurance Program Requirements for Nuclear Facilities or another equivalent nuclear industry standard, unless otherwise specified in this contract.

5.4.2 The Contractor shall maintain its established quality assurance program meeting the requirements of ANSI/ASME NQA-1 or another equivalent nuclear industry standard, unless otherwise specified in this contract. The extent to which NQA-1 applies is dependent upon the nature and scope of work to be performed, and the relative importance of the items or services being produced.

5.4.3 The quality assurance program, including procedures, processes and products shall be documented and subject to review by the CO or Contracting Officer's Representative. The CO may furnish written notice of the acceptability of the Contractor's quality assurance program.

5.4.4 All supplies and services under the contract, whether manufactured or performed within the Contractor's facility or at any other source, shall be controlled at all points necessary to assure conformance with contractual requirements.

5.4.5 The uranium product quality shall be in accordance with the specifications provided

in the Section J, Attachment XX, entitled “Specification for LEU Derived from HEU.”

## 6.0 SERVICE DELIVERY SCHEDULE

<b>Performance Objective</b>	<b>PWS Paragraph</b>	<b>Performance Threshold</b>
Acceptance of HEU	4.1	Accept delivery of HEU in accordance with Section XX, Attachment entitled “Planned HEU Delivery Schedule.”
Down-blend HEU	4.2.1	All quantities of HEU down-blended within six months of final delivery of the HEU to the Contractor.  Government LEU Account established representing the quantities of Government-owned LEU down-blended.  Derived LEU meets specifications in Section J, Attachment XX, entitled “Specification for LEU Derived from HEU.”
Store LEU	4.3.1	Base: Safely store LEU in the Government’s account for 2 and 1/2 years after final HEU delivery of 13 MTU of CLIN 0001.
<b>Performance Objective</b>	<b>PWS Paragraph</b>	<b>Performance Threshold</b>
Manage LEU	4.2.6	Monitor uranium market and ensure amount uranium entering market, including LEU used as compensation for processing services or to be withdrawn from the Government’s account, is consistent with DOE excess uranium policy and market impact determinations.  Make recommendations for needed adjustments to HEU processing and LEU use plans.
Use of Government’s LEU	4.3.7	Use Government’s LEU in accordance with contract.
Deliver LEU	4.3.8	Deliver the Government’s LEU to a DOE designated facility as UF <sub>6</sub> in accordance with delivery request and schedule.
Reports	4.4	100% of reports delivered on time in accordance with Section XX, Attachment entitled “Reporting Requirements Checklist.”