

Heavy Rare Earth Element (HREE) Supply Chain Resiliency Statement of Objectives (SOO)

1.0 Scope

There is a critical need in support of the Office of the Secretary of Defense (OSD), Industrial Base Analysis and Sustainment Program (IBAS) to onshore Heavy Rare Earth Element (HREE)¹ separation and processing capability and then strategically integrate HREE based materials and products into the Defense Industrial Base (DIB) and essential civilian economy. There is particular interest in domestic suppliers and producers in the HREE supply chain that provides secure percentage of HREE materials and products. This initiative will leverage existing industrial and Governmental partners and process to deliver HREE based products and assure critical component availability and continuity across the material lifecycle.

This effort seeks to further develop the domestic HREE industrial base through the development of manufacturing processes for HREE materials in support of Department of Defense (DoD) and essential civilian products, with specific priority given to dysprosium and terbium used in Neodymium-Iron-Boron (NdFeB) permanent magnets and samarium and gadolinium used in Samarium Cobalt (SmCo) permanent magnets. In order to develop these manufacturing processes, specialized equipment may be required for operations such as separation of heavy rare earth concentrates such as "samarium europium gadolinium plus (SEG+)"² concentrate into individual, saleable rare earth products. The objective deliverable sought is a validated manufacturing process (or processes) for the aforementioned HREEs.

NdFeB permanent magnets and actuators are used in almost countless defense applications including precision guided munitions, flight control systems, pumps, sensors, and other systems. Essential civilian requirements for NdFeB include electric motors used in automotive, and commercial aerospace applications. SmCo permanent magnets are used in place of NdFeB and other magnets when high temperature performance is critical. For instance, SmCo magnets can be found in advanced naval radar systems and ship cooling systems.

2.0 Applicable Documents

1. Executive Order No 13806, (2017) "Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency

¹ For the purposes of this document, the HREEs are categorized as the elements europium (Eu), gadolinium (Gd), terbium (Tb), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb), and lutetium (Lu).

² SEG+ contains Sm, Eu, Gd, as well as smaller amounts of the HREEs.

of the United States.”

2. Memorandum DARS 2019-O0006, “Class Deviation – Restriction on Acquisition of Certain Magnets and Tungsten”
3. Defense Logistics Agency Strategic Materials. “2019 Report on Stockpile Requirements.”
4. Strategic Materials Protection Board. 10 U.S.C. 187 et seq.

3.0 Objectives

This effort will follow a multi-stage process to identify, assess, challenge and improve the industrial base for HREE for defense applications.

Phase 1 (Base Agreement): Assess Key Providers, Materials, Facilities, Processes and Applications in the HREE Material Supply Chain

Task 1.1: Supply Chain and Market Strategy Report

Task 1.2: Facility, Process, and Equipment Assessment

Task 1.1 is expected to result in the contractor’s assessment(s) of their business strategy for HREE supply chain. This effort will begin from baseline characteristics of the worldwide HREEs market including current and potential customers. This will require the identification of key performers in the HREE market including current manufacturers and end users. Specific attention should be given to projected forms and volumes required by the market, realistic volumes of HREE that a domestic facility could produce and sell, and projected revenues from a domestic facility. The contractor shall include a plan for long-term sustainment of any domestic HREE facility.

Task 1.2 is expected to be the engineering plans for a domestic HREE facility that would meet the market gaps identified in Task 1.1. The report shall include plans for both pilot and full scale operations. This may include capital investments and/or facilitation to improve their current capability and capacity. Potential environmental considerations as well as other operating expenses shall be presented in this report.

Phase 2 (Option): Pilot Scale HREE facility

Task 2.1: Acquisition and installation of capital equipment for pilot scale facility

Task 2.2: Commissioning and validation of pilot scale facilities including

separation of SEG+ from a non-Chinese source

The requirements of Phase 2 may be modified based on the results of Phase 1. The execution of requirements in this phase requires a notice to proceed from the contracting office, prior to the contractor proceeding with any of these requirements.

As part of applicable milestones, the contractor will execute the development of pilot processes that address key government product needs and the proliferation of that increased capability across the industrial base and supply chains. At the conclusion of Phase 2 milestones, the contractor will show that current production can be expanded to meet critical defense and essential civilian requirements. This may be accomplished, for example, by capability and skill improvements with traditional and nontraditional suppliers through innovative financial investments and technology infusion. Deliverables will include materials relevant to DoD applications and demonstrate the effectiveness of the current capability prototype process.

Phase 3 (Option): Full Scale HREE facility

Task 3.1: Acquisition and installation of capital equipment for full scale facility.

Task 3.2: Commissioning and validation of full scale facilities including separation of SEG+ from a non-Chinese source.

The execution of requirements in this phase requires a notice to proceed from the contracting office, prior to the contractor proceeding with any of these requirements.

Phase 4 (Option): Qualification into DIB and Essential Civilian Supply Chains

Task 4.1: Integration and qualification of HREE into DoD supply chains.

The execution of requirements in this phase requires a notice to proceed from the contracting office, prior to the contractor proceeding with any of these requirements.

4.0 Milestones and Deliverables

The offeror shall include a schedule of milestones and deliverables in its proposal, in accordance with the list of required deliverables below.

Task	Milestone	Deliverable	Date (months after award)	Data Rights
N/A	Award Date	N/A	TBD	N/A
N/A	Kickoff	Meeting Report	TBD	Government Purpose Rights (GPR)
1.1	Initial Report	Market and Business Strategy Report	TBD	GPR
1.2	Initial Report	Facility, Process, and Equipment Assessment	TBD	GPR
2.1	Acquisition and installation of pilot scale capital equipment	Summary of Capital Equipment and related expenses and Invoices	TBD	GPR
2.2	Commissioning and validation of pilot scale facilities including separation	Production Assessment and Material Quality Report	TBD	GPR
3.1	Acquisition and installation of capital equipment for full scale facility	Summary of Capital Equipment and related expenses and Invoices	TBD	GPR
3.2	Commissioning and validation of full scale facilities	Improved Prototype Process and Samples	TBD	GPR
4.1	Qualification	Materials test data	TBD	GPR

5.0 Security: The security classification level for this effort is unclassified.

6.0 Government-Furnished Property: No Government-furnished property will be provided in support of this requirement.

7.0 Patents, Data Rights and Copyrights: The Government will establish Government Purpose rights in all technical data for the manufacturing processes for HREE including the processes and procedures necessary to maintain those capabilities as determined by the Government. Technical data includes, but is not limited to, all process records, descriptions of manufacture, operating and inspection procedures, quality performance and test procedures, maintenance procedures and records, material and component purchase descriptions, software, and software applications. Irrespective of the source of funds, the contractor grants nothing less than Government Purpose rights in all technical data used in the execution of this agreement, except as otherwise specifically negotiated. Government Purpose rights involve the right to use, modify, release, reproduce, perform, display or disclose the data within the Government without restriction but may release or disclose the data outside the Government only for government purposes. Technical data will be provided to the Government at the end of the contract performance period in its most current form; i.e., current as of the last date of its use. Technical data delivered with Government Purpose rights will automatically revert to Unlimited rights five years after the end of the contract performance period. The offeror may identify and assert restrictions on the Government's use, release, or disclosure of technical data or computer software under the procedure identified at DFARS 252.227-7017.