March 4th, 2019

REQUEST FOR EXPRESSION OF INTEREST (EOI) – LOW-ACTIVITY WASTE MELTER FABRICATION

Prospective Offerors:

The U.S. Department of Energy (DOE) Office of River Protection (ORP) has adopted the Direct-Feed Low-Activity Waste (DFLAW) Program, which will operate the Low-Activity Waste (LAW) Vitrification Facility to immobilize LAW years earlier than the rest of the Waste Treatment and Immobilization Plant (WTP) processing facilities. Heat up and start of joule-heated operation of the two LAW melters to support cold commissioning is scheduled for mid-fiscal year 2021. LAW melters have a design life and expected operating life of 5 years, after which replacement is anticipated.

To support continued operation of the LAW Vitrification Facility, the existing melters will need to be replaced. The WTP Engineering, Procurement, Construction, and Commissioning (EPCC) contractor is responsible for procuring and storing the components necessary for the first replacement melter. Providing replacement melters is required to sustain LAW Vitrification facility operations.

Washington River Protection Solutions (WRPS) is seeking prospective contractors who are interested in providing LAW Melter fabrication, as required for the DFLAW Program and LAW Facility operations.

Background

The LAW Melters are comprised of the melter enclosure, melter lid, castable and brick refractory, and additional equipment and parts. Fabrication of the LAW Melter components is estimated to require approximately 4 years. Following LAW Melter fabrication, the melter assembly, provided by others, is required which is estimated to require approximately 2-3 years. Therefore, based on the current DFLAW Program Schedule, melter component fabrication should be complete with melter components ready to ship by July 2023.

Melter Physical Properties: The size and weight of a fully assembled melter (Table 1) is a key challenge for melter handling. The refractory is placed (by others) in the melter in a specific pattern, with prescribed spacing between refractory brick as part of the assembly process.

![Table 1]( replacement_low-activity_waste_melter_physical_parameters)

<table>
<thead>
<tr>
<th>Melter type</th>
<th>Height</th>
<th>Length</th>
<th>Width</th>
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</thead>
<tbody>
<tr>
<td>LAW</td>
<td>15 ft-10 in. (190 in.)</td>
<td>30 ft-7 in. (367 in.)</td>
<td>21 ft-10 in. (262 in.)</td>
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LAW = low-activity waste.

Figure 1 shows the assembled LAW melter as it is being maneuvered via the rail system into the LAW facility.
Figure 1. LAW Melter being placed inside the LAW facility

Figure 2 shows the interior of the melter shield box without the lid installed. The photo shows three of the six electrodes, the plenum refractory above the glass melt pool (by others), the glass-contacting refractory (by others), the two discharge chambers and the exterior melter shield box.

Figure 2. Interior Photo of a Low-Activity Waste Melter with Refractory Blocks Shown
Figure 3 is a photo showing the cast refractory on the underside of a gas barrier lid plate.

![Figure 3. Portion of Low-Activity Waste Melter Gas Barrier Lid Inverted](image)

**Definitions**

**Assembled melter** – A melter that has been completely constructed to the point that it can be installed within the LAW Vitrification Facility.

**Melter** – All components inside of the melter enclosure, including the melter enclosure.

**Melter assembly** – The task of assembling all melter parts (e.g., melter shell, melter lid, refractory) acquired via melter procurement into a melter that is ready for installation.

**Melter assembly facility** – A location where melter assembly is performed.

**Melter enclosure** – The metal shield lid and the metal walls that separate the annulus from the melter gallery. This assembly is also referred to as the melter shield box.

**Melter lid** – The assembly of the shield lid (part of the melter enclosure), melter lid cooling cavity (part of the gas barrier), and gas barrier lid plates (part of the melter shell and gas barrier).

**Melter fabrication** – The process of obtaining materials for and fabrication of parts, equipment, or assemblies comprising the melter shell, lid and enclosure panels from the time the requisition is submitted to the time ready to delivery to a Hanford receipt location. Melter fabrication does not include procurement or installation of glass contact or plenum refractories.

**Melter shell** – The inner confinement boundary comprising the gas barrier lid plates, gas barrier walls and support structures, and gas barrier base plate on top of the melter base. These are all welded together. The melter shell has the credited safety function of confining offgases to the plenum and routing offgases to the LAW primary offgas process system.

**Melter storage** – The task of storing an assembled melter awaiting installation. This is preferably climate controlled so the refractory is not negatively impacted by atmospheric conditions such as humidity.

**Melter storage facility** – A location where assembled melter storage is performed.
**Plenum** – The area of the melter that makes up the gas space directly above the melt pool.

**Shield lid** – The lid section of the melter enclosure. The shield lid covers the melter lid cooling cavity. The shield lid supports all components mounted on and through it.

**Summary of Scope**

Work associated with this EOI includes the following functions:

- *Fabrication of melter components*: includes procurement of all materials, labor, and special tools needed to fabricate and partially assemble (finish weld the gas barrier walls and their support structures) the melter enclosure, the melter Gas Barrier and Shielded Lids, and melter instrumentation and appurtenances. The components identified in this summary of scope will be delivered (by others) to WRPS’s facility in Richland, WA for final assembly and installation. An inspection of the melter ‘partial assembly,’ its appurtenances, and associated documentation, will be completed by WRPS at the potential bidders facility prior to shipment. WRPS will perform a final receipt inspection of all equipment and documentation upon receipt at the WRPS facility upon receipt of the equipment.

**Minimum Qualification Criteria**

Primary/lead potential offerors that do not meet the following minimum technical qualifications listed below will not be considered for further evaluation (subcontracted experience will not be considered an adequate substitute for direct experience by the primary protential offeror):

1. *NQA-1 Compliant Program*: The potential offeror must submit an uncontrolled copy of an established Quality Assurance Program Plan meeting ASME NQA-1 2008/2009 Parts I and II requirements and three (3) examples that demonstrate successful implementation of the QA program for similar scope of work (fabrication).

2. Potential offeror must agree to sign Non-Disclosure Agreements associated with the proprietary aspects of the melter fabrication in order to receive a copy of the design drawings and specifications.

3. Potential offeror shall confirm that all measurements contained in engineering Drawings Specifications and Calculations as well as all instrumentation used to measure physical dimensions and tolerances shall use US customary units as the main designator.

4. Potential offeror must demonstrate experience and capabilities associated with large scale casting and inspecting refractories per IAW API STD-936, ASTM A-380 cleaning stainless and nickel alloys, ASNT SNT-TC-1a NDE certifications, and SSPC-SP no. 10 NACE no.2 surface preparation.

5. Potential offeror must identify means, experience, and extent of existing capability to perform positive material identification of metallic alloys and technical capabilities to resolve discrepancies in material compositions.

6. Potential offeror must demonstrate experience and existing capabilities associated with fabricating, code welding and precision machining of the following:
a. Inconel, Platinum, Stainless Steel, and Carbon Steel metals. Equipment including Lathes/Mills capable of machining 20" Sch. 140 C.S. pipe, gun-drilling/boring a 0.6" ID into Inconel MA758 1.5" dia x 40" long round bar milling small diameter ovals, bosses, counter sinks, etc., **gas tungsten arc welding (GTAW) capability appropriate for Carbon Steel, INCONEL 690 & MA758 metals, casting castable refractories and drying 18" dia refractory cylindrical plugs with penetrations, NDE equipment, Pneumatic high pressure (4500 psig) and low pressure (5psig) leak check testing equipment, meg-ohm testing equipment, white metal blasting and bead cleaning equipment, spray booth and spray painting equipment.

7. Potential offeror must demonstrate capability / experience with welding INCONEL base materials using INCONEL filler metal 52 or equivalent.

8. Potential offeror must demonstrate extent of experience and capabilities associated with fabricating metals to AWS QCI, D1.1, D1.6, ASME B31.3, & ASME B&PVc.

**Other LAW Melter Fabrication Evaluation Criteria**

The following criteria / questions will be used to further evaluate potential offerors for the Fabrication of the Joule Heated Glass Melter described above. Potential offerors shall provide responses to all requests for information and questions listed below. Each potential offeror will be evaluated based on their responses to determine overall capability to complete the scope of work. Potential offerors that do not provide a response to each of the requests for information and questions may not be considered to be suitably qualified.

1) Organization / Technical Experience

   a) Provide Organizational Chart for the complete organization as well as that for the proposed Melter project team.

   b) Provide resumes of members of the proposed project team, highlighting management of fabrication projects of similar size and complexity.

   c) Provide brief description of Manufacturing / Production Capacity of facility / organization.

   d) Provide Current and planned available production capacity through July of 2023 compared to total facility / organization capacity.

   e) Provide a brief description of the Project Management System employed by your organization i.e., scheduling program, cost / performance system (Project Control and Reporting system).

   f) Provide brief description of Non Destructive Examination (NDE) Capabilities.

   g) Provide brief description and breakdown of how much of the total project will be performed directly by the potential bidder and how much will be performed by teaming partners and subcontractors. If teaming partners and subcontractors are to be utilized, the
potential offeror must demonstrate the ability and extent of experience associated with selecting and integrating the work of multiple subcontractors to consistently deliver high quality complex, large scale products on schedule and within budget requirements for multiple projects.

h) Demonstrate record and capability of accurate schedule progress and financial reporting.

i) Demonstrate record and capability of configuration management of large volumes of engineering drawings, data and other engineering and technical records.

2) Knowledge of and Experience with Fabrication of Large Complex Engineered Equipment for Use in the Nuclear or other Highly Regulated Industry

a) Provide detailed information on three projects in the past five years where the potential bidder has fabricated, assembled, and transported equipment / structures of similar size and complexity to the LAW Melter described above. Highlight modular manufacturing projects and machining / welding projects.

b) Describe the Equipment / Structure materials and fabrication methods used

c) Describe the potential bidder’s history regarding success rate with managing to a pre-established Fabrication schedule.

d) Provide a brief description of the proposed project execution methodology, including development of manufacturing (shop) drawings, material procurement, material management, fabrication sequencing, testing and inspection management, and client interaction.

e) Provide customer references for the projects submitted for review as part of this EOI.

f) Describe experience with machining and welding of high-chromium nickel alloys such as UNS N06690 & UNS N10276 fabrication and welding, including experience with welding dissimilar metals.

g) Describe experience with maintaining cleanliness requirements for high temperature equipment and high alloy and non-ferrous metals

3) ENGINEERING CAPABILITIES AND CAPACITIES

The prospective bidders shall provide information regarding their engineering capabilities, including:

a) Manufacturing Engineering Support, Experience Level and Number of Personnel

b) Welding Engineering Support, Experience Level and Number of Personnel

c) Design Engineering Support, Experience Level and Number of Personnel
i) CAD Support


d) Information on existing CAD System
e) Experience with ASME Section VIII Design Requirements

4) MANUFACTURING PROCESS CAPABILITIES AND CAPACITIES

The prospective bidders shall provide a list of available machining and welding equipment, including:

a) Machining
   i) Large CNC / Conventional Milling and Boring Capacity
      (1) Minimum Bed Size (in inches)
      (2) Minimum Bed Capacity (in lbs. / tons)
   ii) Large Turning Capacity
      (1) Maximum Swing (in Inches)
   iii) Plasma Arc or Abrasive Jet Cutting Capabilities
      (1) Minimum Bed Size (in inches)
   iv) Number and Size of Machines
   v) Number and Availability of Qualified Machinists
   vi) Overall Condition of Equipment

b) Welding Equipment
   i) Number and Size of Gas Tungsten Arc Welding (GTAW) Machines
   ii) Pre-Heat and Interpass Temperature Control Equipment
   iii) Controls for managing Welding Rod materials
   iv) Condition of Equipment
   v) Number and Availability of Qualified Welders / Certified Weld Inspectors

c) In-Plant Transportation Systems
i) Crane Capacity and Availability

ii) Forklift Capacity and Availability

iii) Lifting & Rigging Capability

d) Assembly

   i) Assembly Space (Equipment, Jigs and Fixtures)

   ii) Assembly Equipment

   iii) Testing equipment

5) MANUFACTURING PROCESS CONTROLS

   All bidders shall submit a description of their Manufacturing Process Control System, as currently implemented to control shop operations.

   The In-Process Manufacturing Control System should focus on prevention versus appraisal. Manufacturing Process Control Procedures should address:

   a) Manufacturing Planning and Scheduling

   b) The management of documented Manufacturing procedures

   c) Specification of approved equipment

   d) Specification of inspection and measurement techniques

   e) Use of calibrated measuring equipment

   f) Formal instruction and training of all personnel

   g) Management of raw material compliance

   h) In-Process Inspection

   i) Machining

   j) Welding

   k) Machine Calibration and Capability Assessment

   l) Welder Qualification / Certification

   m) Welding Equipment Calibration
n) Calibration program for company and personal measuring equipment used during machining and calibration.

6) MATERIAL & INVENTORY CONTROL SYSTEM

The prospective bidders shall submit a description of their Material & Inventory System, which shall describe how all raw, in-process materials and finished goods inventories are stored, handled and controlled.

The description shall address the following:

a) Documentation control & accuracy
b) Material Identification by project
c) Shelf life issues (where applicable)
d) Contamination Issues
e) Materials and components Inventory, order planning, processing, and release procedures
f) Receiving Inspection and Storage of all raw and in-process materials and finished goods inventories
g) Government Furnished Material Management

7) FACILITIES MANAGEMENT AND CONDITION

The prospective bidders shall demonstrate that their production facilities and equipment are properly maintained to ensure continuous, uninterrupted services to our organization. They shall demonstrate, through the submittal of records / discussion that:

a) Sound Manufacturing Operations Practices and Processes are implemented and followed
b) Maintenance procedures incorporate both preventive and predictive maintenance practices and methodologies
c) Facility and equipment maintenance schedules are followed, and that the results of those maintenance activities are used to implement corrective action processes to ensure that process controls are maintained
d) Equipment and facilities management processes contain provisions for safety-related monitoring programs to ensure a safe workplace for all employees.
e) In addition, the prospective bidders shall describe the current status of any union labor contracts established for the proposed fabrication shops

8) TRANSPORTATION CAPABILITY AND EXPERIENCE
The bidders shall describe their transport capabilities and experience in shipping oversized, over weight equipment.

9) NQA-1 QUALITY PROGRAM

All Prospective bidders shall provide their Quality Program Manual for review by WRPS.

**Offeror Responses**

Please send all correspondence regarding this EOI to christopher_j_franz@rl.gov. Please use EOI 2DB00-CJF-19-006 in the e-mail subject line. Responses are due by 3:00PM PST on April 3rd, 2019. Response to this EOI is required to be considered in forthcoming procurements related to this EOI.

WRPS will then evaluate the expression of interests received, and make presentations and recommendations to the Department of Energy (DOE). Selected firms will be pursued with related solicitation(s).

**Closing Remarks**

Please be aware, this is not a Request for Proposal, but a request for an expression of interest. WRPS will not award a contract(s) based on this expression of interest, nor pay for information solicited. WRPS anticipates using responses to this EOI to determine if issuing an RFP is appropriate, and to adjust the scope of work as needed.

We look forward to hearing from you regarding our request and seeing you in the near future.

Sincerely,

Chris Franz
Procurement Specialist