Electron Beam Welding Qualification

1. **BACKGROUND:** The Advanced Propulsor Management Office (APMO) (Code 808) in the Naval Architecture and Engineering Department (Code 80) of the Naval Surface Warfare Center, Carderock Division (NSWCCD) is responsible for managing the manufacture and delivery of United States Navy submarine propulsors. The APMO requires NAVSEA qualified Electron Beam (EB) welding capabilities to support propulsor component construction and installation. This request is for unqualified NSWCCD electron welding contractor only, NSWCCD electron welding qualified contractors are not interested parties.

2. **SCOPE:** The contractor shall perform EB welding qualification tasks in accordance with reference 2.4 that includes developing EB weld procedures in accordance with reference 2.5. The contractor shall manufacture a minimum of three Nickel Aluminum Bronze (NAB) "S1L" part configurations defined within the PWS references for welding qualification in order to become approved for production welding. The contractor shall conduct 100% self-inspection, maintain ISO 9001:2015 compliant quality controls, ensure all workmanship meets drawing requirements, and properly store, handle, and ship all unclassified materials and Distribution C drawings. The contractor shall furnish all labor, equipment, and additional materials necessary to perform the tasking in accordance with the references.

   References:

   2.1 (DISTR C)_PR15006 REV B_BODY TUBES.pdf
   2.2 (DISTR C)_PR15007 REV C_TOP CAPS.pdf
   2.3 (DISTR C)_PR15008 REV C_BOTTOM CAPS.pdf
   2.4 (DISTR C)_PR16006 REV C_TYP PLUG WELDING DETAILS.pdf
   2.5 SAE AMS 2680C, Electron-Beam Welding for Fatigue Critical Applications
   2.6 DOD 5220.22-M - National Industrial Security Program

3. **GENERAL REQUIREMENTS:**

   3.1 Management Status Report: The contractor shall submit a monthly Contractor's Progress, Status and Management Report (CDRL A005) to the contracting officer and the Government Technical Representative.

   3.2 Quality System: The contractor's quality system shall meet ISO 9001:2015 or later. The contractor may submit an alternative quality system subject to approval.

   3.3 Material: The contractor shall submit material certifications for all material provided under this contract (CDRL A002). All material certifications shall show use of domestic materials per DFAR Specialty Metal requirements.

   3.4 Facilities: The contractor shall maintain a minimum **Confidential level security clearance** for all personnel performing the work, as well as for the workspace in which the work will be conducted. Although the qualification effort being solicited is **CUI**, the formal work to which the qualification applies will be **Confidential** in nature.

   3.5 Weld Qualifications/Certifications Requirement: Electron Beam Welders shall hold current certification to **AWS D17.1 (2012 or newer)**, Specification for Fusion Welding for Aerospace Applications.

4. **TECHNICAL REQUIREMENTS:**

   4.1 Government Furnished Material (GFM): The Government will provide Nickel Aluminum Bronze (NAB) GFM within thirty calendar days after contract award for

machining of "S1L" piece parts within reference 2.1-2.3. Segments of NAB tube and rod will be of lengths of approximately three to twelve feet. The Government will provide material certifications for all provided GFM to the contractor digitally prior to delivery. Upon receipt of the GFM, the contractor shall conduct an independent dimensional inspection and inventory of all GFM provided and shall confirm with the Government that GFM is sufficient to successfully machine the required quantities of each geometry. All excess GFM raw material and piece parts shall be properly identified, marked, and returned to the Government upon completion of the contract.

4.2 Piece Part Machining: The contractor shall machine a minimum quantity of "S1L" piece parts for three "S1L" assemblies in accordance with references 2.1-2.3 to be used for EB welding qualification. All piece-parts shall be cleaned with acetone, or equivalent cleaning solvent, to remove residual cutting lubricants post-machining. The contractor shall dimensionally inspect all fabricated piece parts to their respective drawing requirements, note 304 and table 1C sampling plan in references 2.1-2.3 shall not apply. The contractor shall complete all individual drawing requirements and submit piece part certification packages in accordance with Note 305 of each drawing (CDRLA001).

4.2.1 Dimensional Inspection: The contractor's measurement equipment shall have proof of calibration and be traceable to a nationally recognized standard with substantiating documentation appended to (CDRL A002). Measurement uncertainty associated with any dimensional inspection device shall be withing +/- 20% of the feature tolerance being measured.

4.2.2 Nondestructive Surface Inspection: The contractor shall perform NDT inspection of each NAB piece part under PWS section 4.2, in accordance with Note 303 of references 2.1 to 2.3 (CDRL A002). The contractor shall notify the Government of any non-compliant piece parts within five business days.

4.2.3 Final Certification Package: The contractor shall complete all individual drawing requirements and submit piece part certification packages in accordance with Note 305 of references 2.1 to 2.3 (CDRL A002).

4.3 Weld Procedure Qualification: The contractor shall possess or develop a qualified welding procedure that is approved by NAVSEA specifically for VIRGINIA Class propulsor hardware in accordance with reference 2.4. Prior to welding, the NAVSEA 05P3 Technical Warrant Holder must approve the contractor's fabrication and welding procedures (CDRL A003). If the contractor requires development of a new weld procedure, the contractor shall perform a weld qualification test prior to welding at no additional cost to the Government. The contractor shall document approval of the Navy Welding Procedure (CDRL A004).

4.3.1 Weld Joint Machining: The contractor shall perform required machining per reference 2.4 to the piece parts manufactured in PWS section 4.2 for EB welding preparation. Machining operations shall be performed without the use of machining fluid to ensure no contamination of any of the internal surfaces occurs during this operation.

4.3.2 EB Welding: The contractor, prior to any welding, shall clean all piece parts manufactured in PWS section 4.2 to remove oxide build-up and machine oil residue. The contractor shall take steps during cleaning and other weld preparation actions to ensure internal surfaces of units are free from contamination post EB welding. The contractor

shall EB weld units with qualified EB weld procedures in accordance with References 2.4 and 2.5.

4.3.3 Production EB Weld Approval: The contractor shall report all requirements of reference 2.4 to the Government for approval of future production EB welding (CDRL A004).

4.4 Disposal and Delivery: The contractor shall dispose of all piece parts produced during the manufacturing qualification effort and shall return to the Government any GFM that was not used, following NAVSEA's final approval of the Contractor's qualification effort.

5. DELIVERABLES: The contractor shall deliver the following Contract Data Requirements Lists (CDRL) for this contract.

CDRL	Title	Data Item Description
A001	Technical Report	**DI-MISC-80508B**
A002	Weld Quality Control Plan	**DI-QCIC-81722**
A003	Welding Procedures	**DI-MISC-80875A**
A004	Weld Qualification Test Report	**DI-MISC-80876**
A005	Contract Management Status Report	**DI-MGMT-80368A**
A006	Government Property Inventory Report	**DI-MGMT-80441D**

The contractor shall prepare a digital copy of the final certification data package/technical report and deliver via email to:

- TBD at Contract Award

The contractor shall deliver completed hardware to:

- Naval Surface Warfare Center, Carderock Division
  9500 MacArthur Boulevard, Bldg 3, Room 308
  West Bethesda, MD 20817-5700
  POC(s): TBD

6. PERIOD OF PERFORMANCE

The Period of Performance for the tasks outlined in Section 4 is six months from the date of contract award.

7. CONTROLLED UNCLASSIFIED INFORMATION (CUI). The contractor shall identify and safeguard written and visual communications accessed, generated or Government-furnished for reference or development in accordance with DFARS 252.204-7012. Only Unclassified data is going to be handled as part of this effort. A DD254 will not be provided.

7.1. CUI shall be marked "For Official Use Only (FOUO)" subject to specified exemptions from the Freedom of Information Act (FOIA), as amended.

7.2. Technical documents are distribution controlled and shall be marked "DISTRIBUTION STATEMENT D" with further specificity contingent upon content at time of generation or development. Reference 2.3 for detailed instructions.

7.3. Utilize the Safe Access File Exchange (SAFE, https://safe.apps.mil.) for encrypted electronic file transmittal of CUI and DISTRIBUTION D-type documents.