

**Statement of Work for
Vehicle Support Post Fabrication
April 10, 2013**

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SOW LOG CHANGE

THIS CHANGE LOG IS FURNISHED IN ORDER TO MAINTAIN A
RECORD OF CHANGES TO THIS STATEMENT OF WORK

CHANGE NO.

DESCRIPTION OF CHANGE

CHANGE DATE

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1 SCOPE AND OBJECTIVE

- A. This project will design and fabricate hardware required to build new Vehicle Support Post (VSP) castings for use on the Mobile Launcher (ML) for the Space Launch System (SLS) vehicle at the Kennedy Space Center (KSC), Florida.
- B. This Statement Of Work (SOW) defines the requirements and specifications for the design for manufacturing, fabrication, testing and delivery of new Vehicle Support Post assemblies.
- C. The contractor shall provide all necessary supervision, labor, tools, facilities, supplies, and equipment necessary to perform the work as directed herein. The contractor shall also provide documentation, processes, and procedures required to perform work. The work shall include the items as set forth in Section 5, Description of Work.
- D. The contractor shall carry out the work as directed in this SOW in accordance with the instructions, drawings, and applicable specifications and codes delineated in the provisions set forth herein.

2 CONTRACT OVERVIEW

- A. Work required by this SOW consists of providing the labor, equipment, and materials to fabricate, test per applicable engineering specifications and deliver Vehicle Support Post castings, to the Launch Equipment Test Facility (LETF), KSC, FL.
- B. The work described herein is to be awarded in serial phases, as follows.
 - a. Phase I work consists of the preparation, submittal and approval of casting and machining drawings, pattern fabrication(s), setup for all fixtures and tooling necessary to begin production. This work includes the performance of the first "test pour" and machining of the first "prototype" Vehicle Support Post. The contractor shall perform layout and inspection of all drawing requirements, and "First Article" destructive analysis of this test pour to verify metallurgical and mechanical compliance. Independently, the contractor shall perform the machining, dimensional and surface finish verification of the first prototype VSP casting. If the test pour and prototype meet the specifications, the contractor should be ready to start production (Phase II) without delay. This initial phase shall be completed within 6 months of the contract award date and is intended to verify that the contractor is ready to produce the first useable article(s). As part of this verification, the contractors shall submit all procedures, processes, certifications, subcontractors, and third party inspectors, as applicable.
 - b. Phase II work consists of producing, testing, and delivering eight (8) VSP castings, with options to provide one (1) and two (2) additional VSP castings. This phase shall be completed within 6 months of the completion of Phase I.

3 APPLICABLE DOCUMENTS AND DEFINITIONS

3.1 Contract Drawings, Documents and Specifications

The following drawings accompany this SOW and are a part thereof:

Drawing No.

719M0600001

Vehicle Support Post

Document(s)

The publications revision level of referenced documents in effect on the date of issuance of the request for proposal form a part of this SOW, and where referred to herein by basic designation only, are applicable to the extent indicated by the references thereto. In the event of difference between this SOW or its accompanying specification, and the referenced document, the order of precedence shall be:

- i. Engineering Drawings
- ii. Statement Of Work
- iii. Referenced Documentation

Other Applicable Documents

Industry Standards, Specifications, and Publications called out in the contract documents listed in paragraph 3.1 are available from commercial sources. It is the responsibility of the contractor to obtain these. Commercial Specifications include, but are not limited to:

- | | |
|---------------------|---|
| - NASA-STD-5008 | Protective Coating of Carbon Steel, Stainless Steel, and Aluminum on Launch Structures, Facilities, and Ground Support Equipment |
| - NASA-STD-5009 | Nondestructive Evaluation Requirements for Fracture Critical Metallic Components |
| - AWS-D1.1 | Structural Welding Code - Steel |
| - NPR 6000.1 | Requirements for Packaging, Handling, and Transportation for Aeronautical and Space Systems, Equipment, and Associated Components |
| - KSC-STD-E-0015 | Standard for Marking of Ground Support Equipment |
| - ASTM E10 | Standard Test Method for Brinell Hardness of Metallic Materials |
| - SAE-AMS-2175 | Classification and Inspections of Casting |
| - SAE-AS9100 | Quality Systems - Aerospace - Model for Quality Assurance in Design, Development, Production, Installation and Servicing |
| - SAE-AS9102 | Aerospace First Article Inspection Requirement |
| - ASTM A370 Rev A | Standard Test Methods and Definitions for Mechanical Testing of Steel Products |
| - ASME Y14.8-2009 | Castings, Forgings, and Molded Parts; Engineering Drawings and Related Documentation Practices |
| - ASME Y14.5M-2004 | Dimensioning and Tolerancing |
| - ASME/BPVC SEC IX | Qualifying Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators |
| - ASTM A 488/A 488M | Standard Practice for Steel Castings, Welding, Qualifications of Procedures and Personnel |
| - ASTM A 781/A 781M | Standard Specification for Castings, Steel and Alloy, Common Requirements, for General Industrial Use |

- ASTM A 802/A802M Standard Practice for Steel Castings, Surface Acceptance Standards, Visual Examination
- ASTM E 94 Standard Guide for Radiographic Examination-Replaces E142
- ASTM E 186 Standard Reference Radiographs for Heavy-Walled (2 to 4 1/2-in. (51 to 114-mm)) Steel Castings
- ASTM E 280 Standard Reference Radiographs for Heavy-Walled (4 1/2 to 12-in. (114 to 305-mm)) Steel Castings
- ASTM E 446 Standard Reference Radiographs for Steel Castings up to 2 in. (51 mm) in Thickness

4 WORK PLANNING

4.1 Schedule

- A. The contractor shall prepare and maintain a schedule of work. This schedule shall include all principal work activities including those of second-tier subcontractors, equipment vendors and suppliers. Two copies (one electronic, one paper) of this initial work schedule, in Gantt format, shall be submitted to the CO within five (5) working days after the award of the contract for approval.
- B. The contractor shall update the schedule on a biweekly basis. The updated schedule shall reflect current work progress and any changes in schedule dates since the previous update. Copy(s) of the updated schedules, in Gantt format, shall be made available to the CO upon request. The contractor agrees that whenever it becomes apparent from updated schedule data that any milestone completion dates and/or contract completion dates will not be met, the contractor shall notify the CO and take whatever action is necessary to recover the schedule.
- C. Any recovery effort undertaken by the contractor shall be at its own expense.
- D. The KSC Contracting Officer's Technical Representative (COTR) and KSC QAR shall be notified for Government Quality Inspection/witness for each of the milestones, as determined by GQA, a minimum of seven working days prior to initiating the task.

4.2 Pre-Work Conference

Within five (5) days after the award of each contract phase, the contractor and its designated project manager shall be required to support a pre-work telephone conference to be scheduled by NASA. If a subcontractor is utilized, they should also be represented at this meeting. Production shall not begin until the NASA and the contractor have clarified all the pre-work conference issues.

4.3 Delays

The contractor shall be fully responsible for monitoring the actual work progress and shall, where delays have occurred due to reasons within the contractor's control, make up any and all lost time at its own expense.

4.4 Audits

The contractor agrees that drawing files and records, quality assurance records and associated documents or such parts as may be engaged in the performance of this contract, shall be subject to inspection and audit to verify conformance to the contract requirements. Copies of all drawings, specifications, engineering or process procedures, and quality assurance records are deliverable to NASA at the completion of the contract or at any time during the performance of the work as may be deemed necessary by the CO or his designated representative.

5 DESCRIPTION OF WORK

The contractor shall provide all labor, tools, materials and equipment for fabrication, testing and shipment of Vehicle Support Post assembly hardware in accordance with contract drawings and specifications that are denoted in Section 3 of this SOW.

5.1 Work Composition

5.1.1 Task Description

The work shall be comprised of the following tasks:

A. Drawing Development and Approval

The contractor shall develop, and submit for approval, casting drawings (per ASME Y14.8-2009) and machining drawings (per ASME Y14.5M-2004) as required by the drawing documents and specifications denoted in Section 3 of this SOW. During the design phase the contractor shall evaluate the NASA drawings and make recommendations (if necessary) that will allow for the successful casting of the VSP. This will be a collaborative effort with NASA so that the design intent of the VSP is maintained. The recommendations shall only pertain to changes that will improve the casting processes and should not affect the form fit or function of the VSP. All recommended changes shall be approved by the CO prior implementation. Additionally, prior to the fabrication of the "First Article" the contractor shall hold a Design Review with NASA to verify all parties are in agreement with the final design. This will be a comprehensive review of the casting and machining drawings.

B. Foundry & Machining Process Setup & Verification

This task consists of pattern fabrication(s), setup for all fixtures and tooling necessary to begin production, the performance of the first "test pour", and machining of the first "prototype" Vehicle Support Post. The contractor shall perform layout and inspection, and dimensional and surface finish verification of the prototype. "First Article" destructive analysis of the test pour shall be completed to verify the hardness and tensile strength are as required by the drawing documents and specifications denoted in Section 3 of this SOW and all technical requirements denoted in Sections 5 and 6 of this SOW. Tensile specimens shall be machined from material sectioned from the First Article at the center of the thickest cross-section. Surface hardness testing should occur at no less than 10 locations such that the average surface hardness of the entire production part can be ascertained. Cross-sectional hardness measurements should be taken at three equally spaced intervals along the vertical load path of the First Article, including along the thickest cross-section. The location for material sections for tensile and hardness testing shall be approved by the NASA COTR prior to testing. First article inspection processes shall be consistent with AS9102.

C. Manufacturing

This task consists of casting, heat treating, tempering, machining and, if necessary, repairing the finished Vehicle Support Post casting assembly to meet all requirements set forth in the drawing documents and specifications denoted in Section 3 and all technical requirements denoted in Sections 5 and 6 of this SOW.

D. Inspection and Testing

This task consists of performing a dimensional inspection of the production post to determine that it meets all dimensions and tolerances specified in the drawing. It also include performing the necessary NDE required to meet all requirements set forth in the drawing documents and specifications denoted in Section 3 and all technical requirements denoted in Sections 5 and 6 of this SOW.

E. Shipping

This task consists of packing and shipping the completed Vehicle Support Post assembly hardware, test specimens and patterns and/or molds to NASA, KSC, FL 32899 per the specification documents in Section 3 and Technical Section 6.1.7.

5.2 Requirements

5.2.1 Drawing Development and Approval

The contractor shall request approval of finished drawings by submitting three full-size hardcopies and one electronic copy (iges, STEP, AutoCAD or Pro-E) of the required drawings and Computer Aided Design Model to the CO for approval.

5.2.2 Foundry & Machining Process Setup & Verification

The contractor shall fabricate pattern(s), setup all fixtures and tooling necessary to begin production.

The contractor shall perform the first “test pour” and verify that it meets the casting materials and process requirements by performing “First Article” inspection of this test pour as required by the drawing documents and specifications denoted in Section 3 of this SOW. Foundry process verification is dependent upon acceptance / witness of test by NASA representatives.

The contractor shall perform the machining of a “prototype” Vehicle Support Post and verify that it meets the dimensional and surface finish requirements as required by the drawing documents and specifications denoted in Section 3 of this SOW. Machining process verification is dependent upon acceptance / witness of inspection and test data by NASA representatives.

5.2.3 Manufacturing

The contractor shall machine the VSP interfaces as required in accordance with the documents set forth in Section 3 and the technical requirements set forth in Section 6 of this SOW.

Except as noted herein, manufacturing shall be performed to produce eight (8) Vehicle Support Post Castings (719M0600001). This batch quantity excludes the Vehicle Support Post assembly that will be destructively tested early in the production of the initial batch.

5.2.4 Miscellaneous Materials

Title to the property described in this paragraph shall vest in the Government. Vestiture shall be immediately upon the date of this contract, for property acquired or produced before that date. Otherwise, vestiture shall occur when the property is or should have been allocable or properly chargeable to this contract.

Property, as used in this clause, includes all of the below-described items acquired or produced by the Contractor that are or should be allocable or properly chargeable to this contract under sound and generally accepted accounting principles and practices.

- A. Parts, materials, inventories, and work in process;
- B. Special tooling and special test equipment to which the Government is to acquire title under any other clause of this contract;
- C. Nondurable (i.e., noncapital) tools, jigs, dies, fixtures, molds, patterns, taps, gauges, test equipment, and other similar manufacturing aids, title to which would not be obtained as special tooling under subparagraph (ii) above; and
- D. Drawings and technical data, to the extent the Contractor or subcontractors are required to deliver them to the Government by other clauses of this contract.

Although title to property is in the Government under this clause, other applicable clauses of this contract; e.g., the termination or special tooling clauses, shall determine the handling and disposition of the property.

The Contractor may sell any scrap resulting from production under this contract without requesting the Contracting Officer's approval, but the proceeds shall be credited against the costs of performance.

To acquire for its own use or dispose of property to which title is vested in the Government under this clause, the Contractor must obtain the Contracting Officer's advance approval of the action and the terms. The Contractor shall (i) exclude the allocable costs of the property from the costs of contract performance, and (ii) repay to the Government any amount of unliquidated progress payments allocable to the property. Repayment may be by cash or credit memorandum.

When the Contractor completes all of the obligations under this contract, including liquidation of all progress payments, title shall vest in the Contractor for all property (or the proceeds thereof) not -

- A. Delivered to, and accepted by, the Government under this contract; or
- B. Incorporated in supplies delivered to, and accepted by, the Government under this contract and to which title is vested in the Government under this clause.

The terms of this contract concerning liability for Government-furnished property shall not apply to property to which the Government acquired title solely under this clause.

5.2.5 Inspection and Testing Requirements

The contractor shall perform all tests and meet all inspection and testing requirements set forth in the drawing documents and specifications denoted in Section 3 and all technical requirements denoted in Section 6 of this SOW.

The contractor shall document all tests result in a pass, fail/repair, or fail disposition that shall be documented and retained with each test article.

The contractor shall notify the CO, or contracting representative, when a test results in failure for approval of a revised test plan that is designed to ensure end item quality. This includes repairable and non-repairable failures.

The contractor shall include all test item specimens, suitable for independent analysis, with the VSP assembly hardware deliveries that follow test performance.

- A. Casting Material and Process Validation: Initial testing of the casting material and process validation consists of "First Article" analysis of the test pour, including hardness and tensile tests as required by the drawing documents and specifications denoted in Section 3 of this SOW and all technical requirements denoted in Sections 5 and 6 of this SOW.
- B. Post Hardness: Every Post produced shall have surface hardness measurements performed with results recorded on individual hardness maps, as specified by ASTM E10.

5.2.6 Shipping Requirements

The contractor shall meet all packing and all shipping requirements of the Vehicle Support Post Casting, test item specimens and molds / patterns per the requirements stated in Section 6 of this SOW. The CO shall be informed of the each shipment no less than ten (10) days prior to arrival at KSC to coordinate the receipt of the shipped items with the NASA receiving, transportation, and management personnel.

The Contractor shall furnish the following written information to the NASA COTR or his authorized designated representative five days prior to each shipment: date of shipment, method of shipment, complete or partial shipment, number of cartons, total weight, dimensions.

5.2.7 Task(s) Explication

The contractor shall complete all work tasks in the engineering drawings and applicable documents in Section 3 and 6 of this Statement of Work.

5.3 Change Process

5.3.1 Requests for Information /Clarification (RFI/C)

The Contractor shall promptly report to the Contracting Officer all issues associated with execution of the contract, this includes questions for clarification of information, problems that could potentially affect cost, or schedule, proposed changes that may affect, form, fit, or function or conflicting technical information. Such issues shall be reported on KSC Form No. 8-268, "Request for Information/Clarification". The Contractor shall provide a copy of each RFIC to the Contracting Officer's Technical Representative (COTR) concurrently with the transmittal to the Contracting Officer when issues are identified. The Contractor shall log and control each Request for Information/Clarification (RFIC), including those generated by their subcontractors, if applicable. The request shall be technically supported by cause or justification, rationale, design and performance impacts, calculations, and any other data that supports conclusive evaluation. Where a requested issue on a particular aspect of the actuators work has a relation to, or affects, other aspects of the work, those other aspects of the work shall be clearly identified and referenced. The CO will provide official written disposition of the RFIC and include supporting information, such as revisions to drawings, specifications and standards to detail the change as required.

5.3.2 Deviations and Waivers

- A. If the contractor proposes to perform work which does not conform to the requirements of the contract drawings and specification, the contractor shall submit to the CO for approval, a written request for deviation or request for waiver on the nonconforming work using KSC Form 869, Deviation/Waiver Request. The request must be technically supported by justification, cost, rationale, design and conclusive evaluation as to acceptability or non-acceptability. Any request not submitted in strict accordance with this provision may not be considered.
- B. Where a requested deviation or waiver on a particular aspect of the work has a relation to, or affects other aspects of the work, those other aspects of the work shall be clearly identified and referenced. Additionally, if the requested deviation or waiver necessitates a deviation or waiver on other aspects, request for all such deviations and waivers must be submitted concurrently.

5.3.3 As-Built Drawings

- A. The contractor shall prepare and keep up to date a complete set of redlined As-Built Documentation which shows all approved changes from the original drawings. Included shall be all RFIs issued during the contract performance. All catalog cuts, diagrams, layouts, literature, illustrations, test data, and similar materials furnished by the contractor to explain specific portions of work required by the contract shall be included.
- B. The contractor shall submit 3 sets hardcopy and one electronic copy of redlined as-built drawings to the CO as part of the turnover package upon completion of the contract
- C. CO shall verify the accuracy of the As-Built Drawings prior to acceptance of the end items.

6 TECHNICAL PROVISIONS

6.1 General

This section covers technical provisions for the work efforts specified in Section 5. Where a difference exists between the specifications and technical provisions, those differences shall be brought to the attention of the CTM or his designated representative using a RFI.

6.1.1 Material

- A. The contractor shall provide to NASA the following: All certification of material compliances, catalog cuts, shop drawings, etc., for all contractor purchased materials and equipment. All material shall be traceable to original vendor via material certification records.
- B. The contractor shall submit a letter of compliance for all special processes (casting, heat treating, tempering, machining, welding, etc.) provided for this contract.
- C. The contractor shall submit catalog cuts for NASA approval for all material the contractor wishes to supply as "equal".
- D. Contractor furnished material considered by NASA to be long lead items and any other long lead material identified by the contractor shall provide status biweekly. Material shall be identified by vendor, part number, nomenclature, quantity and availability versus need date.
- E. The contractor shall not utilize any materials that do not have prior approval of NASA.

6.1.2 Identification

- A. The identification of the VSP shall be in accordance with the drawings referenced in Section 3.1 of this SOW.

6.1.3 Welding

- A. Welding shall be limited to the casting repairs and shall be performed in accordance with the drawings referenced in Section 3.1 of this SOW and the applicable requirements of AWS-D1.1 and ASME, Section IX.
- B. All weld repairs shall be documented and retained with each article. This documentation includes corrective actions taken and the location of repair.
- C. All inspection records for welds shall be made subject to NASA quality review.
- D. All qualifications of welding operators shall be in conformance with the applicable requirements of AWS-D1.1 and ASME, Section IX, Article III. All welding electrodes shall be in conformance with the applicable requirements of ASME Section IX. Certifications and procedures for welding should be submitted to the CO for approval prior to performing welding.

6.1.4 Testing

In addition to the tests required in the engineering drawings listed in Section 3.1 of this SOW the contractor shall be required to:

- A. Submit to NASA for approval ten (10) working days prior to each test performance, a written test plan with complete details on test set-up and procedures.
- B. Notify NASA ten (10) working days prior to each test performance to allow NASA and/or Government representatives time to witness the test(s).
- C. Document and retain all test data and results with each end item for inclusion in individual data packs that will be delivered to KSC.

6.1.5 Cleaning

- A. Cleaning of end items shall be accomplished per basic shop practices.

6.1.6 Delivery and Preparation

- A. Packing, marking, handling and transportation of all hardware shall be in accordance with NPR 6000.1.
- B. Delivery of the finished products shall be accomplished by the contractor with incremental deliveries of VSP castings to the Launch Equipment Test Facility, K6-743 at KSC after final acceptance of the products.

6.2 Quality Assurance Requirements

6.2.1 Purpose

The purpose of this section is to emphasize several requirements considered mandatory for an acceptable quality program. This section will apply to all phases of the contract performance. The contractor shall ensure that their quality plan is on file with NASA prior to start of fabrication.

6.2.2 Governmental Quality Assurance

A. Quality System

The organization shall have a quality program that complies with International Organization for Standardization document SAE, AS9100 - Model for Quality Assurance in Design/Development, Production, Installation, and Servicing, or equivalent.

B. Right of Access

Work under this purchase order/contract is subject to government or customer surveillance/inspection at organization's plant or sub-tier supplier's facility. The organization will be notified if a surveillance/inspection is to be conducted.

C. Flow Down Requirements

This clause mandates that all applicable requirements that are invoked or applied to the customer's purchasing document, including this clause, shall be flowed down to the organization's sub-tier suppliers.

D. Certificate of Compliance Raw Materials

Organization will include with each shipment the raw material manufacturer's test report (e.g., mill test report) that states that the lot of material furnished has been tested, inspected, and found to be in compliance with the applicable material specifications. The test report will list the specifications, including revision numbers or letters, to which the material has been tested and/or inspected and the identification of the material lot to which it applies.

When the material specification requires quantitative limits for chemical, mechanical, or physical properties, the test report will contain the actual test and/or inspection values obtained. For aluminum mill products (except castings), certifications for chemistry may indicate compliance within the allowed range. Certifications for physical properties will show actual values.

E. Certificate of Compliance

Organization shall provide a certification with each shipment to attest that the parts, assemblies, subassemblies, or detail parts conform to the Order requirements. When applicable, the true manufacturers, lot, heat, batch, date code, and/or serial number must appear on the certification. Certification must contain the following:

Customer's Order number, Line number, Part number, Name and address of manufacturing or processing location, Manufacturer's lot, heat, batch, date code, and/or serial number (if applicable), Quantity and unit of measurement (each, box, case, gallons, etc.), Be signed and dated by an official of the company.

The applicable material test results, process certifications and inspection records shall be presented upon Customer's request. Organization shall perform inspection, as necessary, to determine the acceptability of all articles under this Order. All articles

submitted by Organization under this Order are subject to final inspection at Customer's plant."

F. Calibration System

The organization shall have a documented calibration system that meets the requirements of ISO 10012, "Quality assurance requirements for measuring equipment", or the "American National Standard Institute (ANSI)/National Conference of Standards Laboratories (NCSL) Z540-1, General Requirements for Calibration Laboratories and Measuring and Test Equipment.

G. Change Control Authority

The Organization shall provide in writing advance notification to the Customer of any change(s) to tooling, facilities, materials or processes at the Organization or the Organizations sub-tier that could affect the Customers contracted product. This includes, but is not limited to, fabrication, assembly, handling, testing, facility location or introduction of a new sub-tier supplier.

H. Critical Processes

The organization will notify the customer of proposed changes in process definition and, will obtain approval from the customer prior to implementing the change. Changes affecting processes, production equipment, tools and programs shall be documented. Procedures shall be available to control their implementation.

The following shall apply to organization designated "critical processes" that have been sub contracted:

The supplier will notify the organization of proposed changes in process definition and, will obtain approval from the customer prior to implementing the change. Changes affecting processes, production equipment, tools and programs shall be documented. Procedures shall be available to control their implementation.

I. Government Source Inspection

All work on this Purchase Contract is subject to inspection and test by the Government at any time and any place. Government inspection is required on this order prior to shipment from Organization's facility. Government inspections performed will be determined by the delegated Government inspection representative and may be conducted during processing, fabrication, or final inspection. Upon receipt of this Purchase Contract, promptly notify the Government representative who normally services your plant so that appropriate Government inspection planning can be accomplished. If your facility is not serviced by Government inspection and/or the area Government inspection representative or agency cannot be located, immediately notify Customer.

NOTE: Do not proceed with fabrication/manufacture processing until Government mandatory inspection points (GMIPs) are added to Organization's manufacturing

planning. GMIPs shall not be by-passed unless authorized in writing by the Government inspection representative. Organization shall request and include the documents specified in the Government delegation, in the shipment. The Government's request for source inspection shall specify the period and method for the advance notification and the Government representative to whom it shall be furnished. Request shall not require more than 2 workdays of advance notification of the Government representative is in residence in the Contractors plant, nor more than 7 workdays in other instances. Organization, without additional charge to the procurement document, shall provide all reasonably required facilities and assistance (applicable drawings, specifications, change orders, inspection and/or test equipment) for the US Government representative to perform their duties. Organization shall ensure that Government inspection acceptance is evident for every individual GMIP and that completion of Government inspection is evident on Organization's shipping document/packing list. Evidence may be the signature of Government inspection representative with printed name and office, or application of the representative's stamp. The Government shall accept or reject supplies as promptly as practical after delivery, unless otherwise provided in the contract. Government failure to inspect and accept or reject the supplies shall not relieve the Contractor from responsibility, nor impose liability on the Government, for nonconforming supplies. When manufacturing processing affected by GMIPs is subcontracted by Organization, the provisions of this Clause shall be included in the Organization's Purchase Order verbatim."

J. First Article Inspection

Organization is required to perform 100 percent inspection and record the attributes for the first article of this Contract / Purchase Order, and shall be in accordance with AS9100 and AS9102. The inspection records and data shall be per AS9102 and shall identify each characteristic and feature required by design data, the allowable tolerance limits, and the actual dimension measured as objective evidence that each characteristic and feature has been inspected and accepted by the Organization's quality and inspection function. When testing is required, the parameters and results of the test shall be recorded in the same manner. The First Article Inspection Report must show evidence of acceptance by the Organization's quality assurance representative. The First Article(s) shall be produced on production equipment and using processes which will be utilized on production runs. Additionally, the Organization shall perform additional First Article Inspection(s) per the requirements of AS9102 (i.e.: following every major tooling, every design change, and subsequent to any evident quality degradation for a specified part or article). Records of all first article activity will be documented as required in AS9102, treated as quality / acceptance records, and made available to Customer if requested.

K. Nondestructive Inspection(NDI)/Nondestructive Test (NDT) Certification

Organization will include with each shipment a certificate for the NDI/NDT performed. As a minimum, the certification shall contain the following information:

1. Customer's Purchase Order / Contract number
2. Name and address of the Company performing NDI/NDT
3. Date of Inspection
4. Quantity of parts tested by part number

5. Specification or other requirement defining the NDI/NDT acceptance / rejection criteria
6. Inspector/name/stamp and NDI/NDT certification level
7. NDI/NDT specification including revision
8. Material or item identification (part number, heat lot number, Foundry Record (FR) number
9. Material or item traceability (serial number, lot number, batch number, lot/date code)
10. Inspection results (accept/reject)
11. Reference to previous Product Non-Conformance Records, and NDI/NDT reports for repair/rework if applicable
12. Reference to attached recordings i.e., films or photographs if applicable
13. A record of the procedures or techniques used and actual results shall remain on file for at least five years after shipment to Customer and shall be furnished to Customer upon request. These records shall include all information required in the previous paragraph as well as acceptance / rejection criteria, and related test instrument data used in the NDI/NDT process.

L. 100% Attribute Clause

The organization shall submit (1) reproducible copy of all inspection documentation stamped by the responsible quality inspector showing 100% inspection for all attributes noted on the drawings, for all parts submitted under this Contract/Purchase Order

6.2.3 Acceptance Data Package

Throughout the contract, the contractor shall maintain inspection, fabrication, tests, and configuration documentation. One indexed and stapled copy and one electronic copy of the acceptance data package will be provided with each shipment to KSC, traceable to each individual VSP.

The contractor's acceptance data package shall include the following applicable sections.

Title Page

Index Page

- Section I - Shipper/Source Inspection Records
- Section II - Contractor Procedures
- Section III - Waivers/Deviations/RFIs
- Section IV - Shortages, Unplanned/Deferred and Preplanned/Assigned Work
- Section V - Identification-As-Built Configuration
- Appendix - A. Contractor Inspection/Test Data Packs for each VSP included on the delivery:
 - 1) Surface Hardness Test Map
 - 2) Visual Inspection Data
 - 3) Magnetic Particle Inspection Data
 - 4) Pour/Drop/Heat #'s with Dates and Ladle Analysis Results
 - 5) Heat Treatment Lot #'s with Dates and Furnace Run Data (Time and Temperature Charts)

- 6) Tempering Lot #'s with Dates and Furnace Run Data (Time and Temperature Charts)
 - 7) Quench type and temperature/rate of cooling
 - 8) Actual Weight of finished article
 - 9) Material Certifications
 - 10) Radiographic & Ultrasonic Tests, including film and reports, if applicable.
 - 11) Repair Records, if applicable.
- B. Contractor Inspection/Test Data Packs for destructive tests performed on the "test pour" and test blocks will be included in the deliveries that include the test item specimens:
- 1) Radiography Test Data
 - 2) Cross Section Metallography Results
 - 3) Through Thickness Hardness Test Map
 - 4) Tensile Specimen Test Results
 - 5) Pour/Drop/Heat #'s with Dates and Ladle Analysis Results
 - 6) Heat Treatment Lot #'s with Dates and Furnace Run Data (Time and Temperature Charts)
 - 7) Tempering Lot #'s with Dates and Furnace Run Data (Time and Temperature Charts)
 - 8) Quench type and temperature/rate of cooling
 - 9) Actual Weight of finished article
 - 10) Material Certifications
 - 11) Radiographic Tests, including film and reports, if applicable.
 - 12) Repair Records, if applicable.

6.3 Acceptance of Work

When the work has been completed in accordance with the requirements of this contract, the contractor shall give NASA notice thereof in writing. After receipt of such notice, NASA shall determine whether the work has been completed in a manner satisfactory to NASA, and if so, will advise the contractor in writing of final acceptance thereof. If the work, or any portion thereof, is unsatisfactory, NASA shall so notify the contractor in writing and the contractor shall proceed to complete the work in a satisfactory manner, giving notice thereof as set forth in this clause.

7 REQUIRED SUBMITTALS

The contractor shall prepare and submit the following reports or data according to the frequency schedule listed below. Other non-recurring reports and data specified within this SOW shall be made available as required by the CO or his designated representative. The number of copies indicated is for hardcopies, contractor shall provide digital copies along with the hardcopies.

| <i>Report Name</i> | <i>Frequency</i> |
|-------------------------------------|---------------------|
| -Submittal Schedule (1 copies) | 15 days after award |
| -Contractor Quality Plan (1 copies) | 15 days after award |

| | |
|------------------------------------|---|
| -Work Progress Schedule (1 copies) | Initial schedule 5 days after award Updated Schedule as required |
| -Critical Hold Points (1 copies) | Pre-work Conference |
| -Test Plan(s) (1 copy) | 15 days after award |
| -As-Built Drawings (1 copy) | Final |
| -Material Compliance (1 copy) | As Required |
| -Acceptance Data Package (1 copy) | 15 prior to hardware shipment |
| -Deviation and Waivers (1 copy) | As Required |

7.1 Schedule of Submittals

Prior to the start of work, the Contractor shall submit to the Contracting Officer (CO), a schedule with an Inspection Control Point Outline (ICPO) which delineates the work sequence(s) to be employed during the performance of this Contract. The contractor's schedule/ICPO must indicate what types of contractor inspections will be performed and where in the contract's sequence of events they will be accomplished. If applicable, the schedule/ICPO must also indicate the specification(s) (including revisions) and/or other documentation that will be used to perform the indicated inspections. After reviewing the ICPO, the Government will identify which inspections/tests/work steps require Government witness. These inspections/tests and/or work steps will be designated as GMIPS. The contractor shall notify The NASA KSC Contracting Officer and Contracting Officer Technical Representative (COTR) at least 48 hours for KSC on-site work, and five (5) working days for work at contractors or subcontractors facility, prior to the occurrence of a scheduled, designated GMIPS. Designation of GMIPS does not relieve the contractor of the obligation to perform all contractually required inspections.

Within 15 calendar days after notice to proceed, the contractor shall provide the following schedule of submittals:

- A. A Gantt schedule of drawings and technical submittals required by the specifications and drawings. The schedule shall indicate the specification of drawing reference requiring the submittal; the material, item, or process for which the submittal is required; identifying title of the submittal; the contractor's anticipated submission date and the approval need date.
- B. A separate Gantt schedule of other submittals required under the contract but not listed in this SOW. The schedule will indicate the contract requirement reference; the type or title of the submittal; the contractor's anticipated submission date and the approval need date (if approval is required).
- C. Submittals called for by the contract documents will be listed on one of the above schedules. If a submittal is called for but does not pertain to the contract work, the contractor shall include it in the applicable schedule and annotate it "N/A" with a brief explanation. Approval of the schedules by the CO or a designated representative does not relieve the contractor of supplying submittals required by the contract documents but which have been omitted from the schedule or marked "N/A".

7.2 NASA's Review Notations

The CO or a designated representative will review submittals and provide pertinent notation within 14 calendar days after date of submission. Submittals will be returned to the contractor with the following notations:

- A. Submittals marked "Approved" authorize the contractor to proceed with the work covered.
- B. Submittals marked "Approved As Noted" authorize the contractor to proceed with the work covered provided he takes no exception to the corrections. The notes shall be incorporated prior to submission of the final submittal.
- C. Submittals marked "Return For Correction" require the contractor to make the necessary corrections and revisions and to re-submit them for approval in the same routine as before, prior to proceeding with any of the work depicted by the submittal.
- D. Submittals marked "Not Approved" or "Disapproved" indicate noncompliance with the contract requirements and shall be re-submitted with appropriate changes.
- E. The contractor shall make corrections required by the CO or a designated representative. If the contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications notice shall be given to the CO or his designated representative. Approval of the submittals by the CO or a designated representative shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory.
- F. Failure to point out deviations may result in NASA requiring rejection and removal of such work at the contractor's expense.
- G. If changes are necessary to approved submittals, the contractor shall make such revisions and submission of the submittals in accordance with the procedures above. No item of work requiring a submittal change shall be accomplished until the changed submittals are approved.