



ENG-060 - SOW - STATEMENT OF WORK

SOW for Fabrication of PF-1A & PF-1B Preload Parts

NSTXU_1-1-3-3-11_SOW_100

Work Planning #: **2320**
Effective Date: **12/10/2019**
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**JOB ORDER STATEMENT OF WORK
FOR
FABRICATION OF PF-1A & PF-1B PRELOAD PARTS**

CAT: A1 A2 A3

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RECORD OF CHANGES

Rev #	Date	Description of Changes
0		Initial Release

1. SCOPE OF WORK

1.1. The Subcontractor shall provide all materials, labor, supervision, equipment and expertise required to complete the following Work:

- 1.1.1 Provide documentation per Document Deliverables list
- 2.1.1 Manufacture parts per Components Deliverables list.

2. ATTACHMENTS

- 2.1. Attachment A, Document Deliverables
- 2.2. Attachment B, Component Deliverables

3. REFERENCES

- 3.1. NSTXU_1_SOW_100 - Statement of Work for Fabrication and Machining Shop Services
- 3.2. D-DC11286, PRELOAD PIN PARTS, PF-1A
- 3.3. D-DC11287, PRELOAD PIN PARTS, PF-1B

4. GENERAL REQUIREMENTS

Subcontractor agrees to perform the Work required by this Statement of Work (SOW), maintaining full compliance with the referenced Basic Ordering Agreement (BOA) SOW and any other documents included or referenced therein or elsewhere in this SOW. In the event that requirements in the SOW conflict with those of the BOA SOW, this SOW shall prevail.

5. SPECIAL REQUIREMENTS

5.1. Project Plan and Schedule

Subcontractor shall provide a schedule with key milestones (delivery of raw material, machining, inspection, coating, final inspection, etc.) which support the delivery schedule in the Deliverables tables. This plan/schedule shall be submitted within 2 weeks of award acceptance.

5.2. Weekly Updates

The Subcontractor shall submit weekly updates on the status of fabrication. These updates shall include, at a minimum: a summary of work in progress, a schedule update, and identification and explanation of any potential or actual delays. Photos may be included as required. A mutually agreed upon day shall be scheduled for this regular update.

5.3. Hold/Witness Points

PPPL defines two types of events which require the Subcontractor to halt manufacturing operations pending PPPL approval to continue. The two events are referred to as Hold Points and Witness Points, and are defined as follows:

- Hold Point – A point during the process whereby the Subcontractor shall halt activities and submit documentation, items, or materials to PPPL as defined within the contract documents. PPPL will review the submittals and provide approval to continue.
- Witness Point – A type of Hold Point which requires PPPL personnel to be physically present at the Subcontractor's premises to witness key activities as defined within the contract documents. The Subcontractor shall provide PPPL with notice five working days in advance of Witness Points.

The following Hold/Witness points apply to this contract:

- 5.3.1 Approval of MIT Plan (Hold Point, refer to § 5.5.3 item 9.6)
- 5.3.2 Approval of CMTR's prior to use (Hold Point, refer to § 5.4 & 5.5.3 item 9.20)
- 5.3.3 Approval of FAI report for each unique part (Hold Point, refer to § 5.5.3 item 9.13)

- 5.3.4 Approval of Non-Conformance disposition (Hold Point – as applicable, refer to § 5.5.3 item 9.16)
- 5.3.5 Approval of Process History and Release for Shipment (Hold Point, refer to § 5.5.3 items 9.19 & 9.20)

5.4. Certified Material Test Reports (CMTRs)

The Subcontractor shall provide CMTRs, showing actual relevant chemical, mechanical, and electrical properties for all raw material intended for use in the execution of this contract. The CMTRs shall be submitted prior to the use of material.

5.5. Quality Assurance Requirements

5.5.1 Control of Special Processes

Subcontractor shall use trained and qualified personnel and qualified written procedures in accordance with specified requirements for the performance of certain special processes, including but not limited to welding, plating, heat treatment, and nondestructive examination. Copies of special process procedures and qualifications shall be made available to PPPL for acceptance upon request.

5.5.2 Dimensional Inspection

Tolerances are indicated on the manufacturing drawings. Strict adherence to these dimensions and tolerances is critical to the assembly and performance of the subject equipment. All dimensional measurements shall be performed in a temperature controlled environment, maintained at a temperature of 20°C (±2°C).

For production parts, the parts shall have 100% of dimensions inspected based on the following sampling plan:

Lot Size	Sample Size
2 to 8	2
9 to 15	3
16 to 25	5
26 to 50	8
51 to 90	13
91 to 150	20

Sampling plan based on ANSI/ASQ Z1.4-2003, single sampling plan for normal inspection, general inspection level II.

Samples shall be chosen such that the inspected units are approximately evenly distributed through the manufacturing run. Each sampled lot shall include inspection of the first unit (FAI) and the last unit.

NOTE: For the purposes of executing the above defined sampling plan, a lot shall be defined as a series of components of the same part number manufactured under a continuous process using the same material (same material heat/lot number), fixturing, tooling, and machine. Any change in any of these four characteristics of the machining process shall constitute the end of a lot.

5.5.3 BOA SOW Requirements Flow Down

The following subsections of Section 9.0 of NSTXU_1_SOW_100 shall apply:

§	Description	Applies
9.1	Inspection/Surveillance/Audit by PPPL	✓
9.2	Subcontractor's Responsibility for Conformance	✓
9.3	Changes to PPPL Approved Documents	✓
9.4	Subcontractor Quality Assurance Program	✓
9.5	Submittal of Quality Assurance Plan for this procurement	
9.6	Submittal of Manufacturing/Inspection/Test (MIT) Plan	✓
9.7	Process and Sequence	✓
9.8	Document Traceability and Records	✓
9.9	Inspection and Test Control	✓
9.10	Submittal of Acceptance Test Procedures (ATPs) for PPPL Approval	
9.11	Performance and Documentation of Inspection & Tests	✓
9.12	Equipment/Material Identification and Status	✓
9.13	First Article Inspection Qualification	✓
9.14	Document Review, Approval and Control	✓
9.15	Acceptability of Purchased Items and Services (Procurement Control)	✓
9.16	Non-conformance & Corrective Actions and Notifications	✓
9.17	Measuring Equipment/Calibration	✓
9.18	Welding and Brazing	
9.19	Submittal of Completed Release for Shipment Form	✓
9.20	Submittal of Completed Process History (Documentation Package)	✓
9.21	Age/Shelf Life Storage Control and Records	
9.22	PPPL Receiving/Inspection	✓
9.23	High Strength Fasteners	

The following sections are expanded and/or modified as follows:

9.9 Inspection and Test Control

Inspection/test records shall include, at a minimum:

- PO/Contract number
- Part number and serial number (if applicable) of the item under inspection/test
- Reference identification for each reported attribute/feature traceable to the corresponding requirement definition
- Nominal values
- Tolerances
- Measured values
- Verification of compliance with all drawing notes
- Measurement device(s) and calibration due date(s)
- Inspector/Test Operator's name, signature, and date of inspection/test

9.13 First Article Qualification

Subcontractor shall conduct inspection/test of a first article of each unique part number specified in the contract. FAI review and acceptance is a mandatory Hold Point.

9.16 Non-conformance & Corrective Actions and Notification

Any identified non-conformance shall be communicated to PPPL within 2 working days of detection. A Non-Conformance Report (NCR) shall be submitted to PPPL within 5 working days of detection.

9.17 Measuring Equipment/Calibration

The Subcontractor shall, along with the MIT, submit to PPPL calibration records of all Measurement & Test Equipment designated to be used in the completion of the work defined herein.

9.20 Submittal of Completed Process History

Subcontractor shall provide PPPL, along with the completed Product Quality Certification and Shipping Release Form, a digital copy of the Process History. The Process History is a compilation of documents detailing the objective evidence of the acceptability of the work performed and shall include, at a minimum, the following:

- Subcontractor's Certificate of Conformance (CofC), signed by the Quality Manager (or equally authorized Subcontractor Representative), stating that the work performed conforms in every respect to PPPL requirements. In the event that the Subcontractor has used PPPL furnished material, such certification shall also include a statement certifying that the material furnished by PPPL has been inspected by the Subcontractor and used as specified by PPPL with no unauthorized substitutions.
- The manufacturer's Certified Material Test Reports (CMTRs) showing actual relevant chemical, mechanical, and electrical properties of materials used and providing traceability to the actual material. Submitted CMTRs must be traceable to the delivered items. Where the delivered items are assemblies or subassemblies consisting of multiple components, CMTR traceability must extend to each constituent component as identified in the parts list on the drawing. One copy of each relevant CMTR is to be submitted to PPPL upon Subcontractor acceptance, prior to use. Note: For specialty materials, typically non-metals, where test reports are not readily available from the manufacturer, the manufacturer's Certificate of Analysis or Certificate of Grade may suffice, subject to PPPL concurrence.
- Copies of Heat Treatment temperature run charts.
- Copies of Certificate of Conformance for any required heat treating or plating/coating (including verification of thickness).
- Signed and dated reports for all required inspections and tests (including dimensional inspection).
- Copies of Nonconformance Reports (as applicable).

ATTACHMENT A. DOCUMENT DELIVERABLES

Table A. List of Subcontractor Document Deliverables

#	Document Deliverables Required	Required By	Format	Location	Rcv'd
1	MIT plan (§ 5.5.3 item 9.6)	2 weeks AJOA, N	E	Ops Center	
2	Calibration Records (§ 5.5.3 item 9.17)	With MIT Plan	E	Ops Center	
3	Project Plan and Schedule (§ 5.1)	2 weeks AJOA	E	Ops Center	
4	CMTRs (§ 5.4)	PS, N	E	Ops Center	
5	Non-Conformance Reports (§ 5.5.3 item 9.16)	5 working days of detection, N	E	Ops Center	
6	FAI Reports (§ 5.5.3 item 9.13)	Upon Completion, N	E	Ops Center	
7	Process History (§ 5.5.3 item 9.20)	BD	E	Ops Center	
8	Product Quality Certification and Shipping Release Form (§ 5.5.3 item 9.19)	BD, N	E	Ops Center	

<p>Legend <i>AJOA = After Job Order Award</i> <i>BD = Before Delivery</i> <i>C = Project Completion</i> <i>CMTR = Certified Materials Test Report</i> <i>D = During Manufacturing/As Required</i></p>	<p><i>MIT = Manufacturing / Inspection / Test</i> <i>N = Notice to Proceed Requirement</i> <i>P,E = Paper or Electronic</i> <i>PS = Prior to Start of Manufacturing</i></p>
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ATTACHMENT B. COMPONENT DELIVERABLES

Table B. List of Subcontractor Component Deliverables to PPPL

#	Physical Deliverables	Qty	Required By	Received
1	D-DC11286-1 - Stack Pin, PF-1A	44	10 weeks AJOA	
2	D-DC11286-3 – Transfer Pin, PF-1A	44	10 weeks AJOA	
3	D-DC11286-4 – Soc Setscrew, 7/8-9 UNC, Concave Pt	44	10 weeks AJOA	
4	D-DC11287-1 – Stack Pin, PF-1B	92	10 weeks AJOA	
5	D-DC11287-3 – Transfer Pin, PF-1B	92	10 weeks AJOA	
6	D-DC11287-4 – Soc Setscrew, 5/18-18 UNF, Concave Pt	92	10 weeks AJOA	
7	D-DC11286-1 - Stack Pin, PF-1A [SPARES]	10	10 weeks AJOA	
8	D-DC11286-3 – Transfer Pin, PF-1A [SPARES]	10	10 weeks AJOA	
9	D-DC11286-4 – Soc Setscrew, 7/8-9 UNC, Concave Pt [SPARES]	10	10 weeks AJOA	
10	D-DC11287-1 – Stack Pin, PF-1B [SPARES]	10	10 weeks AJOA	
11	D-DC11287-3 – Transfer Pin, PF-1B [SPARES]	10	10 weeks AJOA	
12	D-DC11287-4 – Soc Setscrew, 5/18-18 UNF, Concave Pt [SPARES]	10	10 weeks AJOA	

Cognizant Engineer: _____
(Sign-off and provide to the Operations Center when job is completed and deliverables are dispositioned and placed/filed in Operations Center (or other Project, Department or Division designated file center).