STATEMENT OF WORK

FLARE

FABRICATION OF EQUILIBRIUM FIELD VACUUM VESSEL

FLARE-SOW-04

WP1995

REVISION 0

April 20, 2015

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1.0 INTRODUCTION AND SCOPE

This Statement of Work (SOW) is for the manufacture of one vacuum vessel weldment and two vacuum vessel endcap weldments for FLARE (Facility for LAboratory Reconnection Experiment).

2.0 APPLICABLE DOCUMENTS

2.1 FLARE SPEC 04 – FLARE Vacuum Vessel Manufacturing Specification

3.0 APPLICABLE DRAWINGS

3.1 E-FL600-001 FLARE TOP ASSY vacuum vessel Assembly
3.2 E-FL300-002 FLARE VACUUM VESSEL WELDMENT
3.3 E-FL300-005 FLARE VACUUM VESSEL ENDCAP WELDMENT

4.0 RESPONSIBILITIES

4.1 Princeton University (PU)

Michael Kalish will be the contact for managing the Vacuum Vessel procurement

4.2 Subcontractor

The subcontractor shall provide a single point contact to interface with P.U.

5.0 REQUIREMENTS

5.1 FABRICATION OF THE VACUUM VESSEL

The Vacuum Vessel and Endcaps shall be designed per the requirements of the manufacturing specification FLARE-SPEC-04

5.2 BI-WEELKY REPORTS

The selected subcontractor shall provide brief bi-weekly status reports covering technical, administrative, and quality activities and notable problems/issues and. The report may be short in bullet format as long as all important issues are noted. The report may be submitted as e-mail and should include photographs when appropriate.

5.3 MONTHLY STATUS REPORTS

Subcontractor shall submit via e-mail, to be received by PU by the last working day of each month, a report that includes a schedule of major tasks to be performed under the Subcontract, and actual/projected completion dates. Include a narrative explanation of significant schedule delays. Photos are recommended to support the narrative. The

report can be short (less than a page) with concise bullet statements but must as a minimum include summary of critical events and issues.

5.4 CAD/CAM Files

The supplier shall provide PU any electronic copies of CAD/CAM files generated by the vendor in the manufacturing of the Vacuum Vessel.

5.5 MANUFACTURING PACKAGE

Subcontractor shall provide to PU the Manufacturing Package in pdf format- consisting of the Process Procedures and the Process History.

6.0 TEST AND INSPECTION REQUIREMENTS

6.1 ACCEPTANCE TESTS

Refer to the requirements in the manufacturing specification FLARE-SPEC-01

6.2 QUALITY CONTROL RECEIPT INSPECTIONS

Inspection shall be performed to determine compliance with drawings, SOW's and specifications.

7.0 QUALIFICATIONS

Welders must be qualified per ASME Section 9

8.0 ENVIRONMENT, SAFETY, AND HEALTH

N/A

9.0 QUALITY ASSURANCE REQUIREMENTS

9.1 INSPECTION/SURVEILLANCE and AUDIT

It is the responsibility of the selected subcontractor to perform daily inspections and surveillances throughout the manufacturing of the vacuum vessel. Authorized representatives of PU will periodically visit the selected subcontractor to perform inspection and surveillances as well.

All measurements and tests will be witnessed and signed-off by the subcontractor's QC representative. PU may designate specific measurements or tests as mandatory witness points for PU.

Subcontractor's Quality Assurance representatives shall observe the work area regularly to ensure that approved manufacturing processes are followed.

9.2 SUBCONTRACTOR QUALITY ASSURANCE PROGRAM:

The subcontractor shall establish and maintain an effective Quality Assurance Program to assure that the Subcontractor's work meets the required level of quality and is performed in accordance with contractual requirements. Subcontractor's quality assurance function shall be organized to have sufficient authority and independence to identify quality problems, verify conformance of supplied items or services to specified requirements and obtain satisfactory resolution of conflicts involving quality.

9.3 INSPECTION and TEST PROCEDURES:

Inspections and tests shall be performed in accordance with approved procedures referencing criteria for acceptance or rejection. Adequate records documenting the specific item tested or inspected, the results (actual measurement, where applicable), any instruments used with calibration date, and the inspector/test operator shall be maintained and available for PU reviews.

9.4 PROCESS PROCEDURES:

Process procedures will be used as a signoff/approval document noting that critical manufacturing steps have been completed. Authorized personnel associated with the manufacturing, inspection and test processes shall initial and date the procedure records for this purpose. In addition, the process procedures are to provide witness points as well as references for test results, and measurements.

NOTE: The procedures shall be filled out in a timely fashion once a particular activity has been completed.

9.5 NON-CONFORMANCE & CORRECTIVE ACTIONS:

Nonconforming items shall be positively identified, and, where possible, segregated to prevent use. The selected subcontractor shall document each non-conformance. PU's written approval is required prior to the use of the nonconforming item. The Subcontractor's system shall provide not only for timely resolution of non-conformances but also for analysis of non-conformances to determine root causes and to implement appropriate and effective corrective actions.

9.6 CALIBRATION of TEST and MEASURING EQUIPMENT:

Inspections and tests shall be performed using properly calibrated measuring and test equipment. Calibration standards shall be traceable to the National Institute for Standards and Technology (NIST) or equivalent. Where such standards do not exist, the basis used for calibration shall be documented. Calibration standards shall not be used for shop inspections, but instead be protected against damage or degradation.

9.7 SUBMITTAL of MANUFACTURING/INSPECTION/TEST (MIT) PLAN

The Supplier shall provide their MIT/QA plan and all associated procedures to PU for approval at least 5 workdays prior to beginning fabrication. Procurement of materials may start prior to plan approval, but vacuum vessel fabrication shall not.

The Manufacturing, Inspection, Test and Quality Assurance Plan (MIT/QA Plan) is required for PU review and approval prior to start of fabrication. All inspections and tests referenced in FLARE-SPEC-04 must be addressed in the MIT/QA Plan. From the plan, PU may designate selected operations as mandatory "witness" points. Subcontractor shall provide PU with a minimum of five (5) working days' notice in advance of these witness points. Such witness points shall be mutually planned to minimize delays. The MIT/QA shall include as a minimum the following:

1. Outline of the sequence of operations
2. Identify critical manufacturing operations
3. Identify inspections, examinations, and tests (Receipt, In-process, and Final)
4. Include procedures for special processes, inspections, and tests.
5. Identify the documentation to be provided.
6. Approvals for each critical area must be included as these areas are completed.
7. Areas to record the required tests, inspections, etc. must be included.

Deviations from the MIT/QA Plan, other than simple, minor sequence changes, require written PU approval prior to implementation. All deviations shall be identified in the subsequent progress report.

9.8 PROCESS HISTORY:

The subcontractor shall provide a Process History for the Vacuum Vessel that includes a compilation of documents (digital preferred, in pdf format, Microsoft Word, or Microsoft Excel format), detailing the objective evidence of the acceptability of the work performed. One copy of the Process History for be provided to PU with the Shipping Release Request (See Attachment 1). Another copy shall be provided as part of the Manufacturing package.

9.9 WITNESS/HOLD POINTS and NOTIFICATION OF PRICETON IN ADVANCE

Princeton reserves the right to designate selected manufacturing, inspection and/or test operations as mandatory Witness or Hold points. Subcontractor shall provide Princeton with five (5) working days' notice in advance of such points.

9.10 SUBMITTAL of MATERIAL CERTIFICATIONS

Subcontractor's Certified Material Test Reports (CMTRs) showing relevant chemical, mechanical and electrical properties of materials used, where applicable, shall be submitted to PU. A copy of the material certifications shall be submitted to PU as soon as the sub-contractor has determined that the material is acceptable for use.

9.11 INSPECTION and TEST REPORTS

Reports from all required inspections and tests shall provide the test or inspection parameters, actual results measured, and identification of the inspector/tester. Reports shall be reviewed by appropriate subcontractor's personnel prior to submittal. Please refer to the MIT Plan for details.

9.12 NONCONFORMANCES & CORRECTIVE ACTIONS and NOTIFICATION OF PU

Nonconforming items or services shall be positively identified, and, where possible, segregated to prevent use. The Subcontractor shall document each nonconformance. The written approval of Princeton is required prior to the use of the nonconforming item or service. The Subcontractor's system shall provide not only for timely resolution of nonconformances but also for analysis of nonconformances to determine root causes and to implement appropriate and effective corrective actions.

9.13 SUBMITTAL of COMPLETED RELEASE for SHIPMENT FORM

Subcontractor shall not ship (full or partial) without a "Product Quality Certification and Shipping Release" Form (Attachment 1) signed by Princeton's Representative. Manufacturer shall complete and sign the certification section, deliver the form to Princeton's Quality Assurance (QA) Representative, and hold shipment until Princeton signs and returns the form, authorizing shipment. A copy of the fully executed form shall accompany each full or partial shipment.

10.0 SHIPPING STORAGE AND HANDLING

10.4 Packing and shipping details shall be approved by PU. The crate shall protect vacuum vessel assembly from shock, damage from load shift, and weather conditions, including precipitation.

1. Vendor name, shipper, purchase order number, and gross weight shall be marked on the shipping container.
2. The Vacuum Vessel manufacturer is responsible for arranging shipment, and for the safe arrival of the Vacuum Vessel at it's final destination site

11.0 WARRANTY

N/A

12.0 ATTACHMENTS

12.1 Princeton University – PU Product Quality Certification & Shipping Release Form

13.0 DOCUMENTATION AND DELIVERABLES

#	Physical Deliverables Required	When Deliverable Is Required	Deliverable Received (✓)
1	Vacuum Vessel Assembly	Completion	
2	Vendor handling fixtures if requested by PPPL	Completion	
Exceptions (Add justification for any missing physical deliverables that will not be received):			

#	Document Deliverables Required	When Deliverable Is Required	Deliverable format (paper, electronic etc.)	Storage Location for Deliverable	Deliverable Received (✓)
1	Manufacturing Inspection Test Plan (Section 9.7)	5 days before Manufacturing Begins	Electronic	Ops Center	
2	Bi-Weekly Reports (Section 5.2)	Bi-weekly after award	Email		
3	Monthly Status Reports (Section 5.3)	Monthly after award	Email		
4	Material Certifications (Section 9.10)	Prior to start of fabrication	PDF		
6	CAD / CAM Files (Section 5.4)	Prior to shipment	Electronic	Ops Center	
7	Completed & Signed Manufacturing Inspection Test Plan which includes test results (Section 9.7)	Prior to shipment	Electronic		
8	Signed Shipping Release (Section 9.13)	Prior to shipment	Electronic	Ops Center	
Exceptions (Add justification for any missing document deliverables that will not be received):					

Princeton Technical Representative/COG:_____

(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).

ATTACHMENT 1
PRINCETON UNIVERSITY—PU
PRODUCT QUALITY CERTIFICATION & SHIPPING RELEASE

To be completed by supplier and submitted to PU with the Documentation package.
Shipment (full or partial) is not authorized until PU returns this form signed.

Completed by Supplier

PU SUBCONTRACT/ ORDER #	ITEM #(s)	QUANTITY SHIPPED

ITEM DESCRIPTION	SUPPLIER REFERENCE #	SHIPMENT #

SUPPLIER'S CERTIFICATION

This is to certify that the products and services identified herein have been produced under a controlled quality assurance program and are in conformance with the procurement requirements including applicable codes, standards and specifications as identified in the above-referenced documents unless noted below. Any supporting documentation will be retained in accordance with the procurement requirements.

SIGNED: _____ DATE: _____

TITLE: _____ COMPANY: _____

Completed, signed, and returned by PU before shipment

PU (AUTHORIZED REPRESENTATIVE) SHIPPING RELEASE

This is to certify that evidence supporting the above Supplier's Certification statement has been reviewed and no product/service nonconformances from procurement requirements have been identified unless noted below. This product/service is hereby released for shipment.

This section serves as the Quality Assurance release for the above described product for shipment. It does not constitute an acceptance thereof and does not relieve the Supplier, Manufacturer or Contractor of any and all responsibility or obligation imposed by the purchase contract. It does not waive any rights the Purchaser may have under the purchase contract, including the Purchaser's right to reject the above described material upon discovery of any deviations from requirements of the purchase contract, drawings and specifications.

NONCONFORMANCES FROM PROCUREMENT QUALITY REQUIREMENTS:

REMARKS/PRODUCT SERIAL NUMBERS:

BY PU QA REPRESENTATIVE (OR DESIGNEE)	DATE

Rev. 1 November 15, 2010