

<b>PPPL</b>	<b>PRINCETON PLASMA PHYSICS LABORATORY</b>	<b>PROCEDURE</b>	<b>No. ENG-006 Rev 2 page 1 of 2</b>
<b>Subject:</b>  <b>Preparation, Review &amp; Approval of Specifications &amp; Statements of Work</b>	<b>Effective Date:</b>  <b>July 8, 2004</b>	<b>Initiated by:</b>  Head, Engineering and Technical Infrastructure	
	<b>Supersedes:</b>  Revision 1, dated Dec 20, 2001 and TCR-ENG- 006,R1-001	<b>Approved:</b>  Director	

### Applicability

This procedure applies to activities and projects at PPPL C and D Sites and to off-site work, such as collaborations and work for others, unless superseded by external agreement or other procedures.

### Introduction

This procedure provides requirements and guidance for the development, review and approval of specifications and statements of work (SOW). These documents may be part of a procurement package or standalone documents. A specification is typically developed when a drawing does not completely describe the item and its required functionality. An SOW is typically developed when subcontracted services involve more than a single governing standard, or involve testing, inspection, or onsite work other than small, routine work scopes. Applicable environment, safety and health (ES&H) requirements, must be included in SOW's for subcontracted work that is to be performed at PPPL. The exception is for small, routine work scopes where a less detailed description of work may be prepared, provided it is accompanied by a Job Hazard Analysis (see procedure ESH-004).

### References

ESH-004 Job Hazard Analysis

### Procedure

#### Responsibility

#### Action

Cognizant Individual /  
Accountable Technical  
Individual (ATI)

1. Determines if a specification and/or Statement of Work (SOW) is required or appropriate for items and services.

**NOTE:** Procurements of services to be performed at PPPL generally require a statement of work or specification. The exception is for small, routine work scopes where a less detailed description of work may be prepared as part of a requisition, provided that it is accompanied by a Job Hazard Analysis (see procedure ESH-004).

2. Obtains concurrence from Supervisor/Responsible Line Manager (RLM) and develops specification / SOW in accordance with the guidelines provided in Attachments 1 and 2 and Project / Department requirements.
3. Issues specification / SOW to reviewers and resolves comments with concurrence of the Supervisor / RLM.

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|---|--|
|   | 4. Obtains necessary approval signatures, as specified by the Supervisor / RLM.  |
| Supervisor /<br>Responsible Line<br>Manager (RLM)                   | 5. Reviews and approves the specification / SOW.   |
| Cognizant Individual /<br>Accountable Technical<br>Individual (ATI) | 6. Forwards the specification / SOW to the appropriate PPPL Department that will carry out the requirements, or forwards to the Procurement Division, together with a requisition and other necessary documentation. |
|   | 7. Provides copies of specifications/SOW to Project/Department designated files.   |
| Project / Department<br>Administration                              | 8. Ensures that copies of project related specifications/SOWs are maintained in accordance with Project/Department requirements.   |

**Attachments**

1. Guidelines for Specification Format and Content
2. Guidelines for Statement of Work Format and Content

**SPECIFICATION****FOR****GLOBE VALVES ☆***☆ Enter the name of the item/service being specified in this document***REVISION 0****DATED October 15, 2001**

PREPARED BY: \_\_\_\_\_ \*

Cognizant Individual / ATI

REVIEWED BY: \_\_\_\_\_ \*

ES&amp;H

REVIEWED BY: \_\_\_\_\_ \*

Quality Assurance

APPROVED BY: \_\_\_\_\_ \*

Supervisor / RLM

**PRINCETON UNIVERSITY  
PLASMA PHYSICS LABORATORY  
P.O. BOX 451  
PRINCETON, N.J. 08543  
609-243-2000**

\*NOTE: COG/ATI and SUPERVISOR/RLM signatures are required. Other signatures may vary based on project/department requirements and the determination of the ATI and RLM.

## **GUIDELINE FOR SPECIFICATION FORMAT**

Note: A specification is a concise set of requirements to be satisfied by a product, a material, or a process. Whenever appropriate, the specification indicates criteria and/or steps that will determine whether the requirements are satisfied.

### **1.0 SCOPE**

Describe the intended use of the item/system being procured, fabricated or installed in a summary type statement.

### **2.0 APPLICABLE DOCUMENTS**

Provide a listing of those documents that are referenced in the specification. These may include industry standards issued by nationally recognized organizations (e.g., ASME, IEEE, ANSI, OSHA, etc.), bulletins, manuals, drawings, and DOE Orders.

The listing should include the edition/revision level of each listed document or have a statement that the applicable edition/revision level is the latest in effect at the time of fabrication, installation or subcontract award. If only part of a particular document is in effect or applicable, it should be so noted. The source location of the referenced documents should be specified. Industry standards may be presumed to be available to all industry participants. Government and PPPL documents should be made available in hard copy form, or at a public Internet web site. Internet addresses should be included in the specification.

### **3.0 REQUIREMENTS**

This section contains performance and design requirements. Indicate "not applicable" for those subsections that are not applicable to the item being procured, fabricated or installed.

#### **3.1 PERFORMANCE REQUIREMENTS**

##### **3.1.1 PERFORMANCE CHARACTERISTICS**

Identify the functional characteristics which have been established by analysis or design including those which are not necessarily mission critical, but which must be specified to properly constrain a complete design. State requirements in quantitative terms.

##### **3.1.2 OPERATING ENVIRONMENT**

State the environment that the component is to withstand such as maximum/minimum temperature, humidity, pressure, magnetic fields, radiation, etc. Specify any constraints to eliminate an environmental impact (e.g., no PCB's, CFC's, etc.).

##### **3.1.3 DESIGN LIFE**

Identify the required life cycle of the product in terms of cycles or hours of operation required. Include requirements for shelf-life and storage prior to usage.

**3.1.4 RELIABILITY**

Identify reliability requirements by stating in quantitative terms such as mean time to failure, duration of down time, etc.

**3.1.5 MAINTAINABILITY**

Include schedule of intended maintenance per storage or operating hour. Describe requirements for service such as access doors; built in tools; self test capability; test jacks; and other appropriate requirements.

**3.1.6 HUMAN FACTORS**

Specify requirements related to user operation, such as color recognition, foolproof assembly, interlocks, etc.

**3.1.7 SAFETY**

Identify requirements to preclude or limit hazards to personnel, the environment and /or equipment. Refer to hazards in assembly, disassembly, test, transport, storage, operations, and/or maintenance. Specify all applicable safety requirements unique to PPPL. If on-site work at PPPL is to be performed by a supplier, include appropriate provisions (see the SOW guidance in subsection 3.3 of Attachment 2 for guidance). The ES&H Division and Industrial Hygiene will provide assistance in developing this section.

**3.1.8 SPECIFICATIONS AND STANDARDS**

Identify and explain requirements, criteria, and constraints, pertinent to the component. Include requirements that apply from nationally recognized codes and standards as well as federal/military specifications and standards. Any referenced documents should also be listed in Section 2.0.

**3.2 EQUIPMENT DEFINITION****3.2.1 GENERAL DESIGN FEATURES**

Specify physical characteristics such as size, weight, shape, and individual critical dimensions. Requirements may be descriptive or expressed in quantitative terms. All requirements should be verifiable by inspection and should include appropriate tolerances.

**3.2.2 MATERIALS**

List specific materials that are required and any materials that are prohibited for the various parts of the hardware. For subcontracts, identify any material/equipment that is being provided by PPPL.

**3.2.3 ELECTROMAGNETIC INTERFERENCE AND SUSCEPTIBILITY**

Identify the electromagnetic radiation of fields the hardware may be subjected to (the susceptibility specification) and the maximum electromagnetic radiation permitted from the hardware (the interference specification).

**3.2.4 IDENTIFICATION AND MARKING**

Include requirements for marking and coding the parts of the hardware such as wiring, plumbing, nameplates, etc. (see procedure ENG-012)

**3.2.5 WORKMANSHIP**

List requirements for acceptable workmanship such as: IPC 610, Electronic Workmanship Standards; ASME and AWS codes for qualified welders and procedure; PPPL specific requirements for workmanship; or generally accepted industry practice, if appropriate. Also include requirements for cleaning and painting of hardware. Standards should be listed in Section 2.0.

**4.0 TEST AND INSPECTION REQUIREMENTS****4.1 PERFORMANCE TESTS**

Identify each of the performance tests that the vendor is to perform on the hardware before shipping and the acceptance criteria that must be met. These may include destructive and nondestructive tests. The tests should verify that the specified performance values have been met.

**4.2 ACCEPTANCE TESTS**

Identify each of the acceptance tests and inspections that PPPL is to perform. If these tests and inspections require participation by vendor personnel, their participation should be specified. Also state where and when they must be performed. Acceptance criteria must be clearly identified.

**5.0 QUALITY ASSURANCE REQUIREMENTS****5.1 QUALITY CATEGORIES**

Identify the quality level of the work activity – explain if the work is considered critical to the project for schedule, complexity, mission, risk or other reasons. If the project uses Quality Categories such as "critical, major or minor" indicate the level designated for this work.

**5.2 QUALITY ASSURANCE PROGRAM AND PROCEDURES**

Specify the requirement for a quality system and procedures for all critical and major components. The extent of the program will depend on the component.

**5.3 RIGHT OF ACCESS**

Specify that PPPL or its agent has the right of access to the vendor's facility as well as subcontractors of the vendor (obtain latest text from Quality Assurance).

**6.0 DOCUMENTATION REQUIREMENTS**

Identify all of the design data, drawings, calculations, reports, test results, user manuals, repair and maintenance manuals and any code documentation required to be forwarded to PPPL. Specify that it should be sent to the Procurement Division for subcontracts and to

the ATI/cognizant individual for internal work. Specify when it is required as well as how many copies are required. Include deliverable documentation in Section 8.0, Deliverables.

### **7.0 SHIPPING STORAGE AND HANDLING**

Specify the requirements for packing (e.g., crating, pallets, accelerometers, nitrogen purge, desiccant, etc), shipping and handling of the component. Identify temperature and humidity storage requirements. Specify labeling to be placed on shipping container. Also identify requirement for receipt inspection, if necessary.

### **8.0 DELIVERABLES**

Identify each deliverable (hardware, documentation and software) and the delivery date for the item. As part of the deliverables, a milestone schedule for PPPL/vendor interaction items should be specified (e.g., design reviews, tests, witness points, etc.). Specify format or medium of deliverables, as appropriate.

### **9.0 WARRANTY**

Identify if a warranty is required or desired and describe in detail.

### **10.0 ATTACHMENTS**

Provide a list of attachments, including each attachment referred to in the text of the specification.

**STATEMENT OF WORK****FOR****Hardware Maintenance Contract ☆**☆ *Enter a title for the work being described by this document***REVISION 0****DATED October 17, 2001**

PREPARED BY: \_\_\_\_\_ \*

Cognizant Individual / ATI

REVIEWED BY: \_\_\_\_\_ \*

ES&amp;H

REVIEWED BY: \_\_\_\_\_ \*

Quality Assurance

APPROVED BY: \_\_\_\_\_ \*

Supervisor / RLM

**PRINCETON UNIVERSITY  
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P.O. BOX 451  
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609-243-2000**

\*NOTE: COG/ATI and SUPERVISOR/RLM signatures are required. Other signatures may vary based on project/department requirements and the determination of the ATI and RLM.

## **GUIDELINE FOR STATEMENT OF WORK FORMAT**

Note: A statement of work (SOW) is a detailed description of the work to be performed and the codes, standards, procedures, etc., to be followed during the performance of proposed services such as fabrication and installation. Whenever appropriate, the SOW indicates criteria and/or steps that will determine whether the requirements are satisfied.

### **1.0 SCOPE**

Describe the intended services or work activity being procured, fabricated or installed in a summary type statement.

### **2.0 APPLICABLE DOCUMENTS**

Provide a listing of those documents that are referred to in the SOW. These may include industry standards issued by nationally recognized organizations (e.g., ASME, IEEE, ANSI, OSHA, etc.), bulletins, manuals, drawings, and DOE Orders.

The listing should include the edition/revision level of the document listed or have a statement that the applicable edition/revision level is the latest in effect at the time of fabrication, installation or subcontract award. If only part of a particular document is in effect or applicable, it should be noted as such. The source location of the referenced documents should be specified. Industry standards may be presumed to be available to all industry participants. Government and PPPL documents should be made available in hard copy form, or at a public Internet web site. Internet addresses should be included in the specification.

### **3.0 REQUIREMENTS**

This section contains design, performance, and construction requirements. Indicate "not applicable" for those subsections that are not applicable to the work activity being procured, fabricated or installed.

#### **3.1 STATEMENT OF WORK ACTIVITY**

Describe the specific work activity that the subcontractor or PPPL Department must perform. When appropriate, refer to fabrication or construction drawings or procedures that identify the specific functions to be performed.

Note: If it is desirable that only subcontractors with extensive experience in performing the required work will be considered for award of the Subcontract and that bidders must submit references, discuss this with Procurement. These and other award criteria will be documented appropriately by Procurement in documents other than the SOW.

#### **3.2. MATERIALS**

List specific materials that are required. Also list any materials that are prohibited for the various work activities. For subcontracts, identify any material/equipment that is being provided by PPPL.

### 3.3 ENVIRONMENT, SAFETY, & HEALTH (ES&H)

Identify hazards to personnel, the environment and /or equipment, and identify the requirements and controls to preclude or limit those hazards. Specify all applicable safety requirements unique to PPPL. The PPPL Job Hazard Analysis (JHA) form (see procedure ESH-004) can be used as a tool to help identify ES&H hazards, controls, and related PPPL requirements that potentially apply to a subcontract. Those items identified using the JHA should then be incorporated into the SOW or subcontract documents. The ES&H Division and Industrial Hygiene will provide assistance in developing this section. The JHA form can be found at the following web site:

[http://www-local.pppl.gov/eshis/JHA\\_Form.doc](http://www-local.pppl.gov/eshis/JHA_Form.doc)

The following are ES&H controls that must be considered and included in the SOW if they are applicable to the work:

- Include a list of specific PPPL procedures, policies and ESH Directives that are applicable to the subcontractor's work scope. Those documents should be provided to potential subcontractors, either via Web access or as hard-copies. The list should choose from PPPL policy, procedure and ES&H documents, as applicable:

<http://www.pppl.gov/eshis/procedures.html>

<http://www.pppl.gov/eshis/policy.html>

[http://www.pppl.gov/eshis/ESHD\\_MANUAL/sm.html](http://www.pppl.gov/eshis/ESHD_MANUAL/sm.html)

- Cite specific OSHA regulations that are applicable to the subcontractor's work scope if they warrant additional focus or attention by the subcontractor (note that subcontractors are required to comply with OSHA regulations by law).
- Include a list of PPPL permits that are applicable to the subcontractor's work scope. The list should choose from the following permits, as applicable:
  - Confined Space Permit,
  - Radiological Work Permit,
  - Hot Work Permit,
  - Flame Permit,
  - Digging Permit,
  - Penetration Permit

**Typical Cover Page for Statement of Work**

**Attachment 2**

- Include a list of PPPL ES&H training courses that are applicable to the subcontractor's work scope. State if the training must be provided by PPPL or if equivalent subcontractor training may be substituted with prior PPPL approval. State if a written or practical Test is required. The list should choose from the following courses, as applicable:

Safety Courses at PPPL	Written Test*
Advanced Electrical Safety (see EUT)	
Aerial Lift Boom (Classroom)	YES
Aerial Boom Lift (OJT)	
Asbestos Awareness	No
Basic Electrical Safety	YES
Bloodborne Pathogens	No
Bubblesuit Training	YES
Capacitor Bank Access	YES
Capacitor Bank Access OJT	
Compressed Gases & Cryogenic Liquids	YES
Confined Space Entry	YES
CPR	No
Crane Operator (Classroom)	YES
Crane Operator (OJT)	
D-site Access Training	
Disposable Respirators	No
Electric Utilization Training (EUT)	YES
ES&H Issues in the Workplace (Grad Students)	No
Fall Protection	YES
Fire Extinguisher Training	YES
Fire Watch Training (For D-site Fire Watch Qualification)	No, lecture only (Prereq. Fire extinguisher Training)
Forklift Training (Classroom)	YES
Forklift Training (OJT)	
Forklift Rigging (Classroom)	
Forklift Rigging (OJT)	
General Employee Training	YES
General Employee Training for Subcontractors	YES
Hazard Communication (Formerly Right-to-Know)	YES
Hazardous Waste Generator's Training	Read Only
Hazmat Handling/On-site Transportation	
Hearing Conservation	YES
Hoisting & Rigging (Classroom)	YES
Hoisting & Rigging (OJT)	
Integrated Safety Management	No
Ladder Safety	YES
Laser Safety	YES
Lead Safety	YES
Lockout/Tagout	YES
Machine Guarding	YES
NSTX Access	
Personal Protective Equipment	YES
Radiation Safety	YES
Respiratory Protection	YES
Scissor Lift (Classroom)	YES
Scissor Lift (OJT)	
Tritium Work Practices (donning & doffing)	No
Working Under the Vacuum Vessel During D&D	Read Only

\* Challenge testing only allowed in extreme emergency cases.

A general ES&H Compliance Statement should be included with subcontracts. An example of such a statement follows:

The subcontractor shall comply with:

- the specific PPPL documents, requirements, permits and courses listed in this Statement of Work;
- the completed subcontractor ISM Plan, and
- all applicable Federal, State, and local laws, regulations and requirements whether or not they are specifically listed in the Statement of Work or subcontract.

PPPL has safety programs that include the following areas Confined Space Permits, Digging Permits, Penetration and Fire Seal permits, Flame permits, Radiation Work permits, Lock-out/Tagout of energy sources, and restrictions on working alone. The subcontractor must confirm with their PPPL contact person that all prerequisites have been met before initiating any activity that involves these areas.

The following are additional ES&H controls that should be considered for inclusion in the Statement of Work:

- State that the subcontractor's safety record will be considered in the proposal/bid evaluations. Request supporting information.
- State that the subcontractor's number of reportable injury/illness cases, in the last year or even longer, will be included in the proposal/bid evaluation requirements. Request supporting information.
- Work subcontracted by PPPL is frequently subcontracted to sub-tier contractors and, at times, sub-tier contracts are not known at the time of the initial subcontract award. The Statement of Work should address the method by which PPPL ES&H Requirements (imposed on the subcontractor) are subsequently applied to work performed by their sub-tier contractors.
- If the work is to be performed at D-Site, or some other restrictive area, state that a briefing by PPPL personnel on the unique safety requirements will be included in the Pre-Proposal/Pre-Bid Conference.
- Consider including a requirement for the Subcontractors to submit an Integrated Safety Management (ISM) Plan (examples of when this is appropriate include: subcontractor replacement of underground water pipes in the vicinity of electrical and gas utilities, and subcontractor inspection and repair of on-site cranes). Submittal of the ISM Plan should be required within a certain number of days of subcontract award. State that receipt of the Plan will be a condition of letting the Subcontractor begin on-site work. [PPPL review of the ISM Plan should be by the Cog/ATI/requisitioner and an individual with an ES&H background. PPPL should review and approve the ISM Plan.
- A statement that the subcontractor must inform its employees of the contents of their ISM Plan, including hazards and controls should also be included in subcontracts. This would essentially be a requirement for any subcontractor to hold a pre-job briefing before starting on-site work. [Relying on "paper" alone is not the most effective way to convey requirements. The one-on-one conversations of an on-site pre-job brief are invaluable. A Pre-Job Briefing form should be attached to the subcontract that must be signed prior to starting the job. A Job

Hazard Analysis form signed by affected workers can be used as documentation of a pre-job brief. The JHA form can be found at the following web site:

[http://www-local.pppl.gov/eshis/JHA\\_Form.doc](http://www-local.pppl.gov/eshis/JHA_Form.doc)

- Consider including a sample ISM Plan with the RFP/RFB.
- State that PPPL will monitor execution of the ISM Plan and subcontract compliance.

### **3.4 CODES AND STANDARDS**

Identify the applicable industry codes and standards, or portions thereof, that the work must comply with, such as ASME, IEEE, ANSI, etc.

### **3.5 IDENTIFICATION AND MARKING**

Include requirements for marking and coding the work such as wiring, plumbing, nameplates, etc. (see procedure ENG-012)

### **3.6 WORKMANSHIP**

List requirements for acceptable workmanship such as: IPC 610, Electronic Workmanship Standards; ASME and AWS codes for qualified welders and procedure; PPPL specific requirements for workmanship; or generally accepted industry practice, if appropriate. Also specify the requirements for cleaning and painting hardware.

## **4.0 TEST AND INSPECTION REQUIREMENTS**

### **4.1 PERFORMANCE TESTS**

Identify each of the performance tests that the subcontractor or PPPL is to perform on the work and the acceptance criteria that must be met. These may include destructive and nondestructive tests. The tests should verify that the work has been satisfactorily accomplished.

### **4.2 ACCEPTANCE TESTS**

Identify each of the acceptance tests and inspections that PPPL is to perform. If these tests and inspections require participation by Subcontractor personnel, their participation should be specified. Also state where and when they must be performed. Acceptance criteria must be clearly identified.

## **5.0 QUALITY ASSURANCE REQUIREMENTS**

### **5.1 QUALITY LEVEL**

Identify the quality level of the work activity – explain if the work is considered critical to the project for schedule, complexity, mission, risk or other reasons. If the project uses Quality Categories such as "critical, major or minor" indicate the level designated for this work.

### **5.2 QUALITY ASSURANCE PROGRAM AND PROCEDURES**

Specify the requirement for a quality system and procedures for all critical and major SOWs. The extent of the program will depend on the work activity.

**5.3 RIGHT OF ACCESS**

Specify that PPPL or its agent has the right of access to the work activity as well as access to subcontractors facilities (obtain latest text from Quality Assurance).

**6.0 DOCUMENTATION REQUIREMENTS**

Identify all of the reports, test results, manuals and any code documentation required to be forwarded to PPPL. Specify that it should be sent to the Procurement Division for subcontractors and to the ATI/cognizant individual for internal work. Specify when it is required as well as how many copies are required. Include deliverable documentation in Section 8.0, Deliverables.

**7.0 SHIPPING STORAGE AND HANDLING**

Specify the requirements for packing (e.g., crating, pallets, accelerometers, nitrogen purge, desiccant, etc), shipping and handling of the work. Identify temperature and humidity storage requirements. Specify labeling to be placed on shipping container. Also identify requirement for receipt inspection, if necessary.

**8.0 DELIVERABLES**

Identify each deliverable (hardware, documentation and software) and the delivery date for the item. As part of the deliverables, a milestone schedule for PPPL/vendor interaction items should be specified (e.g., design reviews, tests, witness points, etc.). Specify format or medium of deliverables, as appropriate.

**9.0 WARRANTY**

Identify if a warranty is required or desired and describe in detail.

**10.0 ATTACHMENTS**

Provide a list of attachments, including each attachment referred to in the text of the SOW.