

<b>PPPL</b>	<b>PRINCETON PLASMA PHYSICS LABORATORY</b>	<b>PROCEDURE</b>	<b>No. ENG-032 Rev 3 page 1 of 6</b>
<b>Subject:</b>  <b>Work Planning Procedure</b>	<b>Effective Date:</b>  December 19, 2003	<b>Initiated by:</b>  Head, Engineering and Technical Infrastructure	
	<b>Supersedes:</b> ENG-032, Rev 2 dated 5/30/02	<b>Approved:</b>  Director	

### Applicability

This procedure applies to all activities at PPPL involving physical changes to engineering, facilities, control computing, and technical infrastructure and equipment or involving collaborations for others. This procedure also applies to work performed during the conceptual or design phases, but, in these cases where additional guidance is warranted, the RLM may develop a more specific procedure as long as the requirements of this procedure are implemented and the Head, Engineering and Technical Infrastructure is one of the approval signatures for the procedure.

The purpose of this procedure includes establishing criteria by which work planning will proceed, integrating safety into all work planning, organizing the avenues by which changes will be planned, prepared, reviewed, implemented, and documented into a systematic whole, and providing key cross references to other lab procedures to expedite the planning process.

The RLM shall be responsible for the use and implementation of this procedure and shall select a graded approach commensurate with the work and hazards per Table I for the appropriate approval level.

As necessary, the Deputy Director shall convene a Work Planning Review Board to review Work Plans in progress and their contents to discover whether the graded approach selected complies with the criteria concerning risk as outlined in Table I of this procedure and to determine if the Work Plans in progress contain the rigor desired to mitigate the risks for the activity. The Deputy Director shall choose the membership of the Work Planning Review Board.

### Introduction

Many Laboratory activities require the preparation and completion of reviews, work planning, hazards analysis, and controls to properly manage the job. This procedure shall be used to plan the anticipated requirements of a job, to define the scope of work, to perform hazards analysis, to provide for all environmental, safety, and health issues as part of the work planning and review process, to establish procedural and testing requirements, to make other determinations as necessary, and to provide clear approvals indicating ownership of the work. It is one of the systems that implement the requirements of P-001, Graded Approach, where a graded approach shall be defined per Table I. Per Table I, risk shall be managed with ascending levels of required approval based on a standard, serious, or major category of risk as it pertains to mission and programmatic impact, ES&H, Cost, and Compliance factors. See Table I for details.

The Work Planning Form and system has been implemented electronically and is available via the PPPL Employee Website.

### **References**

P-001 Graded Approach  
 ENG-033 Design Verification  
 ENG-010 Control of Drawings, Software, and Firmware  
 ENG-030 PPPL Technical Procedures for Experimental Facilities  
 ESH-016 Lockout/Tagout of Energy Sources  
 ESHD 5008 Section 11, Chapter 1– Operations Hazard Controls  
 ESH-014 NEPA Review System  
 Plan: PPPL ISM Document, Integrated Safety Management implementation

### **Definitions/Mnemonics**

Cognizant Individual (COG)	The individual assigned responsibility for performing the work. These individuals are identified by the RLM.
Engineering Change Notice (ECN)	The system used to make changes to drawings. See procedure ENG-010.
Materiel & Environmental Services (M&ES)	The Division responsible for providing services for environmental compliance and remediation.
FMEA	Failure Modes and Effect Analysis (see ENG-008)
Health Physics (HP)	A function within the ES&H Division providing health physics services for the Laboratory.
Industrial Hygiene (IH)	A function within the ES&H Division responsible for providing industrial hygiene and industrial safety support.
Operations Center (Ops Center)	The organization chartered with responsibility for maintaining central files for the Laboratory (except for Drawings, which are the responsibility of Drafting) and for registering project files as satellite files to the Ops Center as appropriate.
Quality Control (QC)	A function within Quality Assurance with the responsibility for performing inspections of components, items, and installations (mechanical, electrical, and welding).
Procurement Quality Assurance (PQA)	A function within Quality Assurance with the responsibility to provide quality services associated with procurements (quality requirements in statements of work/specification, supplier reviews and audits, supplier adherence to quality requirements, etc.)

Responsible Line Manager (RLM)	The manager responsible for the work and the process leading to the performance of the work. These individuals are identified by approved list on the web site. The list of approved RLMs is available on the Engineering & Technology Department home page.
Department Head	(See Org Chart) Where risk scenarios have been identified as Serious, a Department Head shall also approve the Work Plan.
Deputy Director	(See Org Chart) Where risk scenarios have been identified as Major, the Deputy Director shall also approve the Work Plan.
Work Planning Review Board	Review board that the Deputy Director shall convene and chair appropriate for the Work Plans in progress to determine compliance with this procedure and specifically Table I.

### **Responsibilities**

The RLM is responsible for assigning a Cognizant individual (Cog) to the work activity, for approving the Work Planning Form (WP) to initiate the work, for approving the form to indicate permission to install the software or hardware, and for approving the form again at closure indicating that all the documentation is complete. The RLM is responsible for the completeness of the documentation.

For tasks involving potentially Standard risk consequences as defined by Table I, the RLM shall have approval authority for the entire Work Plan. Additionally, for those with Serious risk consequences as defined by Table I, a Department Head shall also approve the Work Plan at the Initial Work approval step. For tasks with potentially Major risk consequences, in addition to the Department Head, the Deputy Director of the Laboratory shall also approve the Work Plan at the Initial Work approval step. See Table I for definitions of standard, serious, and major risk scenarios.

The Cog has overall responsibility to perform the work safely and within the budget and schedule. With respect to this procedure, the Cog is responsible for completing the Work Planning form for RLM approval. Upon approval, the Cog is responsible for following applicable procedures to execute the body of work specified by the form. The Cog is also responsible to obtain RLM approval prior to installation and at closure. The Cog is responsible for the form while it is in progress and shall copy such documents to the Operations Center as may be required.

The Operations Center is responsible for maintaining the Work Planning data files. The Work Plan web site contains a current list of WPs. In the event that a project uses a project specific procedure encompassing work planning, the project shall register its project files as satellite files of the Ops Center as appropriate to maintain the linkage to central files. References to the Ops Center in this procedure shall be understood to include these types of satellite files.

Drafting is responsible for maintaining all drawings.

**Procedure**

This procedure and work planning form requires that the Responsible Line Manager and Cog formally define the steps that will be necessary to perform a work activity. The form offers the RLM the options to select a graded approach in advance to define work scope for the Cog, to balance priorities, identify environmental, safety, and health requirements, insure proper controls, and supply an auditable package on which to base operations authorization.

The Work Planning Form is required for all tasks with Serious or Major risk consequences (see Table I.)

The Work Planning form is also required if the change:

- is large or complex or represents a new installation into a usable space
- has a significant ES&H impact
- involves tritium or other radioactive contaminated or activated equipment
- impacts multiple projects, systems, or groups
- OR changes the scope or intent of the original design.

When a Work Planning Form is not specifically required by the above criteria (as determined by the RLM), a Work Planning form or other approved procedure can and should be used at the discretion of the Cog and RLM to plan work and mitigate hazards. The RLM should consider it the default choice to use the work planning form or approved equivalent and only make a deliberate decision not to use it for tasks with Standard risk consequences and where it is clearly not warranted. In any case a Work Planning form may always be used at the discretion of the RLM.

**Responsibility**

**Action**

- |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cog     | 1. Generates a Work Planning form and completes the description box. The job description must adequately document the work and its location, areas, interfaces, and impacts. Consults system engineers if impacts are not known. The interactive WP is available at <a href="http://workplanning.pppl.gov/">http://workplanning.pppl.gov/</a> .                                                                                                                                                                        |
| Cog/RLM | 2. Defines documentation. The required documentation must be selected and initiated early enough in the job to permit the participation of any other group supporting the change. The documentation must adequately reflect the change, the process, and the controls to make the change such that the RLM may refer to the package if it were to become necessary at a future date. If drawings must be created or changed as a result of the work, an Engineering Change Notice must be used. Use procedure ENG-010. |

- Cog/RLM
3. Determines Engineering Controls. Engineering controls such as reviews, analyses, and calculations should help assure the design, authorization basis, and safety concerns. Implement per procedure ENG-033.
  4. Determines Safety Controls. All work shall be covered by an approved NEPA form per ESH-014. Some projects require added safety documents. Consult ES&HD 5008, Section 11, Chapter 1 for C- and D- Site related activities.
  5. Defines required procedures.
  6. Defines required testing to verify performance. Testing shall be comprehensive and implemented in such a manner as to include verification of the integrity of controls to insure the protection of the environment, the equipment, personnel, and the public.
  7. Evaluates other questions. The questions cover a range of topics and considerations in planning and implementing work. The RLM is responsible for contacting the appropriate group to determine if these categories apply if there are questions.
- RLM
8. If the risk scenario has been deemed Standard per Table I, the RLM approves the plan. The initial approval of the work planning form by the RLM indicates the path forward by which the Cog may proceed.
- Department Head
9. If the risk scenario has been deemed Serious per Table I, the RLM approves the WP and also has the appropriate Department Head approve the WP. In cases where there are separate requesting and performing department Heads, both shall approve the WP. The Initial approval of the work planning form by the RLM and Dept. Head indicates the path forward by which the Cog may proceed.
- Deputy Director
10. If the risk scenario has been deemed Major per Table I, the RLM approves the WP and also has the appropriate Department Head and the Deputy Director approve the Work Plan. The initial approval of the work planning form by the RLM, Dept. Head, and Deputy Director indicates the path forward by which the Cog may proceed.
- Cog
11. Based on the above approval(s), the Cog will confirm that the Work Plan is correct and approved in the database.
  12. Performs all steps identified in the approved plan. The steps defined by the work plan so generated shall be adhered to or revised by the Cog and new approval given by the RLM and previous approvers.

- |                                     |                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cog/RLM                             | 13. Compiles documentation package required by work planning form and associated lab procedures. ( <i>Multiple procedures may be invoked here.</i> )<br>References each document number on the Work Planning form.                                                                                                                                        |
|                                     | 14. Requests approval of RLM when ready for installation.                                                                                                                                                                                                                                                                                                 |
| RLM                                 | 15. Approves installation.                                                                                                                                                                                                                                                                                                                                |
| Cog                                 | 16. Requests approval of RLM to close Work Planning form. All required documentation must be available at this time.                                                                                                                                                                                                                                      |
| RLM                                 | 17. Approves package indicating that all documentation has been generated.<br>Assures that drawings are available in Drafting.                                                                                                                                                                                                                            |
| Work<br>Planning<br>Review<br>Board | 18. The Deputy Director shall convene and chair a review board comprised of constituents appropriate to the task and shall review Work Plans in progress for compliance and appropriate graded approach. The review board shall review the graded approach and shall instruct the RLM to take appropriate measures to improve the Work Plan as necessary. |

**Attachments:**

1. Work Planning Form sample. [The form in the attachment is a sample only. The electronic Work Planning database and form is available at <http://workplanning.pppl.gov/>]

(Sample only. See PPPL web page, forms area, for current version of this form.)

WP #        Revision         
Reference WP #       

**PPPL WORK PLANNING FORM**

**RISK TYPE (select one per Table I.)**    STANDARD     SERIOUS     MAJOR     |

**Description of Work Activity**

Name of Work Activity	Project:
Scope	
Building impacted:	If other, name of building:
Room number or name:	
Anticipated Start Date:	Anticipated Completion Date:
<b>Interfaces/Impacts:</b>	
<input type="checkbox"/> Vacuum Vessel <input type="checkbox"/> RF Systems	<input type="checkbox"/> Diagnostic Systems <input type="checkbox"/> Neutral Beam Sys
<input type="checkbox"/> Tritium Systems <input type="checkbox"/> Water Systems	<input type="checkbox"/> Cryogenic/GN Systems <input type="checkbox"/> Vacuum Systems
<input type="checkbox"/> Facility Power <input type="checkbox"/> Standby Power/UPS	<input type="checkbox"/> Tritium Contaminated Areas <input type="checkbox"/> Radiation Monitoring
<input type="checkbox"/> C-Site MG Sets <input type="checkbox"/> D-Site MG Sets	<input type="checkbox"/> Experimental Power Systems (ECS, etc.)
<input type="checkbox"/> Gas systems <input type="checkbox"/> ER/WM (waste mgmt/min)	<input type="checkbox"/> Other(specify)
<input type="checkbox"/> Facilities (specify which subsystems)	
<input type="checkbox"/> HVAC Systems <input type="checkbox"/> Canal Water	<input type="checkbox"/> Chilled Water <input type="checkbox"/> Steam
<input type="checkbox"/> D-Site LECT <input type="checkbox"/> Lighting UPS	<input type="checkbox"/> Fire Protection <input type="checkbox"/> Compressed Air
<input type="checkbox"/> Potable Water <input type="checkbox"/> Sumps and Drains	<input type="checkbox"/> Electrical <input type="checkbox"/> Other
Special Processes: <input type="checkbox"/> Welding (ES-MECH-002) <input type="checkbox"/> Soldering/Wire Wrapping (ES-ELEC-003)	
<input type="checkbox"/> Leak Checking (23.026) <input type="checkbox"/> Hoisting/Rigging (ENG-021)	

**Required Documentation/Deliverables (Specify identifier of requirements, spec. or SOW when available.)**

<input type="checkbox"/> P&I Drawings	<input type="checkbox"/> Logic/One Line Diagrams
<input type="checkbox"/> Layout Drawings	<input type="checkbox"/> Fabrication/Assembly Drawings
<input type="checkbox"/> Component Lists	<input type="checkbox"/> Source code/Firmware (ENG-010)
<input type="checkbox"/> Requirements	<input type="checkbox"/> Specification or Statement of Work (ENG-006)
<input type="checkbox"/> Work Activity Specific ISM Plan	<input type="checkbox"/> Other – specify

**Work Planning Form sample****Page 2 of 3**

(Sample only. See PPPL web page, forms area, for current version of this form.)

**Engineering Controls**

Required Analyses (ENG-033): (Enter the identifier of the associated report, once finalized.)

- Seismic Analysis -----
- Thermal Analysis -----
- Eddy Current Force Analysis -----
- Mechanical Analysis -----
- FMECA (ENG-008) -----
- Radiation/neutron Analysis -----
- Other calculations (specify) -----

Design Reviews (ENG-033): Interface representatives should be invited to the design reviews.

(For each required review, enter the date(s) of the actual review(s) in the provided space, once held.)

- Peer Review -----
- Cost & Schedule Review -----
- CDR Review -----
- PDR Review -----
- FDR Review -----

Review of materials for vacuum or magnetic impact rqrd?  Yes  No

If yes, enter results of review: -----

# ----- Revision -----

**Safety Controls**

- NEPA id (ESH-014): -----
- Hazard Controls (e.g., SAD) (ESHD 5008, sec 11)
- Job Hazard Analysis: ----- (ESH-004)

**Required Procedures** (Enter identifier of actual procedure when available.)

- Installation Procedure (ENG-030) -----
- Operational Procedure (ENG-030) -----
- Maintenance Procedure (ENG-030) -----
- Lift Procedure (ENG-021) -----
- Hydrostatic/pneumatic test procedure (23.026) -----
- Lockout/Tagout (group – ESH-016) -----
- Work Permit (OP-AD-09, OP-AD-49) -----
- Other – specify -----

**Required Testing** (Enter identifier of actual test procedure and dates test performed.)

- Interlock -----
- Construction -----
- Pre-Operational -----
- Integrated System -----
- Walkthrough (test procedure not required)
- Other-specify -----

(Sample only. See PPPL web page, forms area, for current version of this form.)

**Other**

Davis Bacon Determination Rqrd?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Electrical Safety Support?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
PQA Support Requested?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	IH Support Requested?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
QC Support Requested?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	HP Support Requested?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Special training requirements?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Other ES&H Support?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
ER/WM Support Requested?	<input type="checkbox"/> Yes	<input type="checkbox"/> No			

If yes to special training rqmts or other ES&H support, provide additional information below:

**Approvals (Signature and date)**

	Approval of Initial Work Planning Form	Approval for Installation	Approval for Closure of Work Planning Form
Cognizant Engineer (Select name) -----			
Responsible Line Manager (Select name) -----			
Performing Department Head (Select name)		Not applicable	Not applicable
Requesting Department Head (Select name)		Not applicable	Not applicable
Deputy Director		Not applicable	Not applicable

**Distribution:** All new, revised, and closed forms distributed to: Operations Center – original form

Copies to: \_\_\_\_\_ (Enter names of associated Facility Manager and Department Head.)

- Associated Facility Manager                      Head, Engineering and Technical Infrastructure
- Performing Department Head
- Requesting Department Head                      Head, Training (if training requirements indicated)
- Head, Quality Assurance                                      Head, ES&H
- Head, ER/WM                                                      Head, Maintenance and Operations

**Work Planning Review Board**

Review Board Determination	In Review	Changes Required	Approved
Status			

**TABLE I: Graded Approach to Requirements**

Risk Type	Level 1. Major	Level 2. Serious	Level 3. Standard
<b>Mission / Program Impact</b>	Potential for failure to cause <ol style="list-style-type: none"> <li>(1) Significant adverse impact (≥6 months) to completion of a PPPL Project or/collaboration, or to achieving key performance goals/milestones, or</li> <li>(2) Halt of operations for greater than six months</li> <li>(3) Failure to meet DOE or Presidential milestones.</li> </ol>	Potential for failure to cause <ol style="list-style-type: none"> <li>(1) Moderately adverse impact (3-6 months) to a PPPL Project/collaboration</li> <li>(2) Halting, delaying or significantly limiting operations for 1-6 months, or</li> <li>(3) Failure to meet FWP or PEP approved performance goals.</li> </ol>	Potential for Minimal impact to a PPPL task, system, component or operations due to a failure.
<b>Environment, Safety, and Health</b>	Potential for failure to cause <ol style="list-style-type: none"> <li>(1) Death, total disability or other severe adverse impact on the health or safety of a worker or the public,</li> <li>(2) Exposure/release to/of radiation or radioactive or hazardous material ≥ 50% of PPPL or regulatory limits, or</li> <li>(3) Environmental damage beyond site boundary or requiring cleanup costs greater than \$250k.</li> </ol>	Potential for failure to cause <ol style="list-style-type: none"> <li>(1) Lost time injury or illness,</li> <li>(2) Exposure/release to/of radiation or radioactive or hazardous material &lt;50% of PPPL or regulatory limits but ≥10% of those limits, or</li> <li>(3) On-site environmental damage requiring cleanup costs less than \$250k but ≥\$25k.</li> </ol>	Potential for failure to cause <ol style="list-style-type: none"> <li>(1) Injury or illness not resulting in lost time,</li> <li>(2) Exposure/release to/of radiation or radioactive or hazardous material &lt;10% of PPPL or regulatory limits, or</li> <li>(3) Negligible impact on the environment that can be mitigated completely at costs &lt;\$25k.</li> </ol>
<b>Cost</b> (includes all costs – design, mfr, etc.)	Potential for failure to cause financial loss or damage to a facility or equipment of \$1,000,000 or more.	Potential for failure to cause financial loss or damage to a facility or equipment of \$250,000 - \$1,000,000.	Potential for failure to cause financial loss or damage less than \$250,000.
<b>Compliance</b>	Potential for inadvertent noncompliance with local, state or federal laws, regulations, contract requirements, or DOE requirements that result in fines or disciplinary actions or require emergency notification of a regulatory agency.	Potential for inadvertent noncompliance with regulations or administrative orders resulting in notification of regulatory agency (e.g., Notices of Violation/Deficiency) or requiring non-routine reporting to an agency.	Potential for minor noncompliance with established management practices, policies or procedures.