

<b>PPPL</b>	<b>PRINCETON PLASMA PHYSICS LABORATORY</b>	<b>PROCEDURE</b>	<b>No. ENG-032 Rev 5 page 1 of 7</b>
	<b>Subject:</b>  <b>Work Planning Procedure</b>	<b>Effective Date:</b>  <b>Feb. 13, 2009</b>	<b>Initiated by:</b>  Associate Laboratory Director for Engineering and Infrastructure
	<b>Supersedes:</b> Rev 4 dated April 24, 2006	<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. 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 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.

The Associate Director for Engineering and Infrastructure shall convene a Work Planning Review Board (WPRB) to monitor the use of the main Engineering procedures governing work planning, drawing changes, procedures, and design verification and definitions. The Associate Director shall choose the Chair and membership of the WPRB. The WPRB Chair will schedule and hold WPRB meetings regularly to monitor the use of the Work Planning system. The WPRB Chair will [provide feedback to RLMs on all work planning for continuous improvement. With regard to Work Planning forms in progress, the WPRB will evaluate the usage and risk criteria selection as delineated in this procedure and will monitor WPs for timely completion and closure. |

The WPRB Chair will also monitor the use of the other main Engineering procedures as constituent parts of the work planning process for compliance and usage by Cogs and RLMs, including drawings and ECNs, procedures, and the design verification process and Design Reviews. The WPRB Chair will implement RLM and Cognizant training as may be necessary for consistent usage of these Engineering instruments. The WPRB Chair purview includes the associated functions and records management that are required by Cogs and RLMs and the Operations Center. As part of the design verification process, the Head of Engineering and Infrastructure shall select a roster of Design Review Chairpersons. In conjunction with RLMs and Design Review Chairpersons, the WPRB Chair will monitor the results of Design Reviews for consistency and compliance with laboratory procedures and provide feedback to RLMs and Design Review Chairpersons for continuous improvement of Engineering work planning systems. |

**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, health and security 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 at <http://workplanning.pppl.gov/> or the Engineering Department home page.

**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
GEN-023	Records Management
Plan	PPPL Integrated Safety Management System Description
ENG-029	Technical Definitions and Acronyms

**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 remediation, waste management, pollution prevention, and environmental stewardship.
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.
Engineering and Infrastructure Department Head	Department Head responsible for the operation, configuration and content of the on-line Work Planning System and Form.
Department Head	(See Org Chart) Where risk scenarios have been identified as Serious, a requesting and a performing Department Head shall also approve the Work Plan.
Associate Director	(See Org Chart) Where risk scenarios have been identified as Major, the Associate Director shall also approve the Work Plan.
Work Planning Review Board	Review board that the Associate Director for Engineering and Infrastructure shall appoint to review and monitor the Work Plans in progress to determine compliance with this and other Engineering procedures and specifically Table I. The Associate Director shall chair or designate a chair for the WPRB.

**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 WP revisions, 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 and compliance with the applicable PPPL policies and procedures for safety, security, engineering, quality, environmental compliance, and property management.

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 requesting and a performing 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 Associate Director of Engineering and Infrastructure 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 for obtaining RLM approval on revisions as work proceeds, 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.

The Engineering and Infrastructure Department Head is responsible for the configurations and content of the web-based Work Planning System and Form.

The electronic Work Planning System will automatically make one-time e-mail notifications to the Heads of Engineering and Infrastructure, Quality Assurance, Training, ES&H and Infrastructure, and Maintenance & Operations upon the initial approval of a Work Planning Form (and assignment of a form identifying number).

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, health and security 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 (energy/water use, new or increased emissions, waste generation, personnel hazard, etc.)
- 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**

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| 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 and Security Controls. All work shall be covered by an approved NEPA form per ESH-014. Some projects require added safety documents. Consult with ES&H and M&ES personnel for work activities that may impact personnel safety, security, waste management, and environmental impacts. 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. Approves the work plan. The initial approval of the Work Planning Form by the RLM indicates the path forward by which the Cog may proceed. For Risk scenarios Serious and Major, see steps 9 and 10.  |

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| Department Head                                      | 9. Approves the WP 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.  |
| Associate Director of Engineering and Infrastructure | 10. Approves the WP 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 Associate Director of Engineering and Infrastructure approve the Work Plan. The initial approval of the Work Planning Form by the RLM, Dept. Head, and Associate Director indicates the path forward by which the Cog may proceed.   |
| Cog  | 11. Confirms that the Work Plan is correct and approved in the database and proceeds with work.   |
| Cog  | 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. (Multiple procedures may be invoked here.) 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 once all work is completed. All drawings must be available in Drafting. All other required documentation must be available at this time and, unless specified differently by a project specific procedure encompassing work planning, must be stored in a file location agreed upon with the RLM. Examples of such locations include the Operations Center or other central file locations, file cabinets in the responsible engineer's office, or electronic files on a specified computer or server. |
| RLM  | 17. Approves package indicating that all documentation has been generated. Assures that drawings are available in Drafting.   |
| Work Planning Review Board                           | 18. The Associate Director of Engineering and Infrastructure shall convene a Work Planning Review Board comprised of constituents appropriate to the task and designate a Chairperson. The WPRB shall review Work Plans in progress for compliance and appropriate graded approach. The WPRB shall review the graded approach and shall instruct the RLM to take appropriate measures to improve the Work Plan as necessary. The review board shall also monitor WPs for timely completion and closure .  |

**Attachments:**

1. TABLE 1 – Graded Approach to Requirements

**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, Health and Security</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> <li>(4) Threat to nuclear material (tritium); threat to sensitive equipment, parts and technology</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.