

PPPL	PRINCETON PLASMA PHYSICS LABORATORY	PROCEDURE	No. ENG-010 Rev 3 page 1 of 7
Subject: Control of Drawings, Software, and Firmware	Effective Date: May 30, 2003	Initiated by: Head, Engineering and Technical Infrastructure	
	Supersedes: Rev. 2 dated 4/5/02	Approved: Director	

APPLICABILITY

This procedure applies to all activities at PPPL involving changes to engineering, facilities, and technical infrastructure that require the creation or change of drawings. This procedure defines the process to follow to create, change, check, and use drawings.

This procedure also applies to software or firmware maintained by PPPL that performs operational or process control or that monitors ES&H status.

This procedure does not address changes to requirements specifications. It is PPPL's policy that each Project, using a graded approach, develop and manage their own program for the configuration control of requirements specifications. Such specifications may include project requirements, system requirements, and physics requirements documents.

This procedure also does not address changes to technical procedures which are addressed in ENG-030, PPPL Technical Procedures for Experimental Facilities.

INTRODUCTION

Laboratory activities that introduce change to engineering, facilities, and technical infrastructure and equipment often require the creation, preparation, alteration, and completion of drawings. This procedure uses the Engineering Change Notice (ECN) as the means by which Drafting may add new drawings or receives permission to change approved drawings. New drawings may also be added en masse by projects and numbered in accordance with approved procedures.

Software or firmware modifications or computer system level changes for systems whose failure could adversely impact operations use the Software Change Notice (SCN) to effect changes. The SCN provides a means of communicating, approving, limiting, and documenting change.

Both the ECN and the SCN can be generated as stand alone documents or as adjunct documents to a Work Planning form per procedure ENG-032 per the discretion of the Responsible Line Manager (RLM).

REFERENCES

ENG-032 Work Planning Procedure
ENG-033 Design Verification
PPPL Drafting Manual

DEFINITIONS

Cognizant Individual (Cog) The individual assigned responsibility for making a change (both the equipment configuration and the drawing which documents this configuration.) These individuals are identified by the RLM.

Drafting The group responsible for the drawings at PPPL.

Engineering Change Notice (ECN) Form used to initiate, authorize, and describe changes to drawings.

Responsible Line Manager (RLM) The manager who accepts responsibility for the work and the process leading to the performance of the work. This includes accepting responsibility for the change and the process leading to the change and all associated procedure changes. These individuals are identified by the Department Heads. The list of approved RLMs is available on the Engineering & Technology Department home page.

Software Change Notice (SCN) Form used to authorize and describe changes to software/firmware.

General Requirements for Drawings

Except where a new project has generated new drawings and numbered them in accordance with internal project procedures and CAD systems, the Drafting section issues drawing numbers for all new PPPL drawings, whether drawn by Drafting, the Cog, or other support personnel, and records the numbers in Drafting's records. In the instance of new project drawings, the project bears full responsibility for turning over all drawings and their numbering systems, whether electronic or hardcopy, to the Drafting section per PPPL policy at an appropriate point in the project lifecycle per the project RLM. Official PPPL drawing numbers are required for all drawings required for the manufacture of equipment or hardware incorporated into any experimental device or facility. Prior to issuance of the number, the picture is considered a sketch for presentation or information purposes only. When the picture has been placed on a lab drawing frame format and given a number, it is considered an unapproved drawing, which may be used at design reviews but may not be used for fabrication or installation or external use. A drawing is considered approved when the Cog who has requested the drawing has reviewed, has checked or has had checked, has approved, and has signed the drawing, thereby verifying the drawing for content and correctness, and a Drafting checker has verified that the drawing complies with Drafting standards. It is incumbent on the RLM to assure, whether by discussion, spot checks of drawings, Peer Review of drawing packages, or other means per RLM discretion, that the drawings represent the design as vetted by any review processes that has occurred.

A preliminary drawing may be used for in-house fabrication with the approval of the cognizant engineer by signing the preliminary print. The fabricated part will be quarantined in the shop until the approved drawing is submitted to the shop.

PROCEDURE

This procedure is divided into four parts.

Part A – New Drawings

Part B – Drawing Changes

Part C – Using drawing for installations or fabrications

Part D – Transmitting Electronic Files of PPPL Approved Drawings

Part E – Software changes

A. New Drawings

The Cog is responsible for providing new drawings to Drafting. These drawings may be hand generated, generated via a computerized tool, or provided by a subcontractor or supplier.

Drafting is responsible for issuing new PPPL drawing numbers for all drawings and for logging new drawings into Drafting files and records. Drafting is responsible to assure that all required approvals are provided for the drawing. New drawings may also be added en masse by projects and numbered in accordance with approved procedures.

The steps for new drawings are:

RESPONSIBILITY

ACTION

- | | |
|----------|--|
| Cog | 1. Sketches the drawing, either on paper or via the computer. |
| | 2. Delivers the drawing to Drafting (paper media or computer media or both). |
| Drafting | 3. Assigns a number to the drawing. |
| | 4. Formalizes the drawing to PPPL drafting standards. |
| | 5. Assigns a checker to the drawing. |
| Checker | 6. Verifies that the drawing is consistent and complies with the PPPL Drafting Standards and indicates so by signing the drawing block. |
| Cog | 7. Approves drawing. Note that the Cog or an appropriate designee is responsible for checking and verifying the technical accuracy, dimensions, and tolerances prior to signing the drawing as approved. |
| Drafting | 8. Stamps original drawing - "Release for Fabrication" |

B. Drawing Changes

The Cog is responsible for filling out an ECN form when changes to approved drawings are required. Minor field changes may be red-lined on the drawings and implemented as long as an open ECN exists for the drawing. Such changes are those that do not change the scope of the design; typically they reflect field adjustments that were not anticipated. The Cog is responsible to assure that these changes are submitted to Drafting as soon as possible. The Cog also accepts responsibility that the changes performed under such mechanisms are indeed minor and within the scope and context of all reviews that apply. If there is no open ECN associated with the drawing, an ECN must be opened within a reasonable amount of time as determined by the RLM.

The RLM is responsible for approving the ECN form to permit Drafting to make changes. The RLM is responsible for deciding if a completed Work Planning Form is required or desired prior to the implementation of an ECN per procedure ENG-032.

Changes which the Cog and RLM do not feel should be incorporated into the original drawing shall be documented via a non-conformance report (NCR).

The Drafting supervisor is responsible for issuing ECN numbers to the Cog, logging ECN numbers, assigning the ECN actions to Drafting personnel, performing the ECN changes, obtaining drawing approvals, and closing out the ECN once all changes have been incorporated. Those drawings, which are pending changes via the ECN system, shall have an ECN with the ECN number placed on the original. This identifies to any individual that changes are pending on that drawing and that they should check with the drafting supervisor to see what changes are being planned for that drawing. Once the ECN changes have been completed, the revised drawing shall be entered into the Central CADD Files and drawing with the ECN sticker removed. The Drafting Supervisor is responsible for adding any other drawing numbers to the ECN form which may be entailed as part of the change. These drawings shall have the same approvals as other drawings. Drafting is responsible for assuring that drawings are updated upon the receipt of three (3) ECNs.

RESPONSIBILITY ACTION

- | | |
|-----|---|
| Cog | <ol style="list-style-type: none"> 1. Completes pertinent information on the form. Information to be included on the ECN include: <ul style="list-style-type: none"> - The Cog's name - A title for the ECN appropriate for the technical nature of the work in progress. - The cost center, work package, and job number for the work. This is the charge number to be used by Drafting when incorporating the change. - The description of the change adequately document the change and its location, areas impacted, interfaces, and system impacts. Consult the system engineers if impacts are not known. |
|-----|---|

- RLM
2. Enters the number of the associated Work Planning form. A Work Planning Form is 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 groupsOR changes the scope or intent of the original design.

If a Work Planning form is not required per the decision of the RLM, the RLM must sign the ECN form indicating such.

Note: Even if the above specific triggering requirements do not precipitate the use of a Work Planning Form, the RLM can always use a Work Planning Form at any stage from conceptual design to final stages of project termination to manage work.

- Cog
3. Lists drawing numbers. Details of the drawing changes to be implemented by Drafting should be attached as sketches or marked up prints and the form so annotated.
- Cog/RLM
4. Signs the form prior to submittal to Drafting.
- Cog
5. Consults Drafting to obtain an ECN number.
- Drafting
6. Issues the ECN number. This number opens a log record for the ECN which includes the name of the Cog to whom the ECN is assigned. Place "ECN Sticker" on original copy until changes have been completed.
- Drafting
7. Makes the necessary changes. Drafting shall add drawing numbers to the ECN if it becomes clear that additional drawings are impacted by the change. The Cog must also approve these drawing changes.
 8. Processes the drawing per steps A.5 – A.7.
 9. Closes the ECN number when all changes have been incorporated into the drawings.

C. Using drawings for installations or fabrications

This procedure requires that a) only prints of approved drawings can be stamped “Approved for fabrication” and b) only drawings stamped “Approved for fabrication” can be used for installation or fabrication, whether at PPPL or a supplier’s facility. These requirements apply to all activities at PPPL involving changes to engineering, facilities, and technical infrastructure and all installation and fabrication work including prototypes. The drafting supervisor initials and dates the stamp. There are no PPPL requirements for an expiration date on drawings, therefore "N/A" shall be placed in the expiration date space.

RESPONSIBILITY

ACTION

Responsible
Individual

1. Requests a drawing from Drafting.

Drafting

2. Assures that drawing is approved.
3. Makes copy of drawing and stamps it “Approved for fabrication.”

NOTE: A "Release for Fabrication" stamp must be placed on the floppies, which are sent to the manufacturer. The file size and date shall also be added to the label. This would allow PPPL QC and Engineering to verify the date and revision of the floppies being used by the manufacturer. A print out identifying the drawings with revision will also be provided to the vendor.

Cog

4. Provides updated drawings to the manufacturer or assembler, if changes occur prior to completion of the order. These drawings shall also be stamped "Release for Fabrication".

D. Transmitting Electronic Files of PPPL Approved drawings

The Central CADD Design Group is responsible for transmitting all electronic files of approved PPPL drawings to outside vendors and laboratories for fabrication purposes. This is to ensure that the electronic file is current and that there are no outstanding ECN’s on the drawing.

RESPONSIBILITY

ACTION

Responsible
Individual

1. Makes request to CADD Design Group to transmit an electronic file of a PPPL drawing outside of the laboratory and sends a copy of the request to procurement

Drafting

2. Assures that electronic file is current with no outstanding ECN’s
3. Makes hard copy of file and stamps drawing with ‘Approved for Fabrication’.
4. Transmits electronic file to outside party.

5. Provides copy of stamped drawing to responsible individual for shipment to outside party.

E. Software Changes

The Responsible Line Manager is responsible for determining what specific software modules or packages under his or her control are considered to be critical and operational and providing this information to the Computer Division. Critical refers to software whose failure could adversely impact operations. This individual is also responsible for approving changes to this software.

The Computer Division is responsible for maintaining a list of software or packages that are deemed to be critical and operational for which changes should be controlled via the SCN. The Computer Division will conduct an annual review with RLMs to incorporate additions to this list. The Computer Division is also responsible for tracking open SCNs.

The Cognizant individual responsible for implementing changes in critical and operational software is responsible to generate a Software Change Notice to document the change. This individual is also responsible for the scheduling of the change to assure that the timing of the change is compatible with operations and to assure that backout from the change can be performed, if necessary.

RESPONSIBILITY

ACTION

- | | |
|-------------------------|--|
| Cog | 1. Initiates a Software Change Notice by obtaining an SCN number for the required change. |
| Computer Division | 2. Issues numbers and maintains an SCN log. |
| Cog | 3. Completes the SCN form. |
| | 4. Obtains the requesting Manager's approval signature for the definition of scope and desired results, if the person requesting the change is not the RLM. |
| Responsible
Division | 5. Approves change. |
| Cog | 6. Implements change to software and closes out SCN by completing the date of the change and signing the form. Forwards original, closed SCN to the Computer Division. Notifies the requesting individual that the change has been made. |
| Computer Division | 7. Files closed SCN. |

ATTACHMENTS:

1. Engineering Change Notice Form.
2. Software Change Notice Form.

Engineering Change Notice Form (ECN)

Attachment 1

PPPL ENGINEERING CHANGE NOTICE (ECN) ECN # _____

COGNIZANT INDIVIDUAL:**ECN TITLE:****CC/WP/Job:** **AREA OR PROJECT:**

LIMITATION OF SCOPE - NOTE: A Work Planning Form is NOT required if the total change to be accomplished (ENG-032):

- Is not large or complex or does not represent a new installation into a usable space
- Does not have a significant ES&H impact
- Does not involve tritium or other radioactive contaminated or activated equipment
- Does not impact multiple projects, systems, or groups

OR does not change the scope or intent of the original design.

Responsible Line Manager CONCURRENCE: _____
(Signature indicates that no Work Planning form is required.)

If non-concurrence or associated with a work planning form, enter the WP number: _____

DRAWING(S) AFFECTED NUMBER:	Current Revision	TITLE

Continued on back.

DESCRIPTION OF CHANGE: (state drawing no., zone, group, or list attachments)

REASON FOR CHANGE:

ENGINEERING CHANGE NOTICE APPROVALS :**DATE:**

COGNIZANT INDIVIDUAL MAKING CHANGE:

RESPONSIBLE LINE MANAGER:

Software Change Notice Form (SCN)

Attachment 2

PPPL SOFTWARE CHANGE NOTICE (SCN) FORM SCN # _____

NAME OF COG INDIVIDUAL:	DATE:
PROJECT:	SYSTEM:
COMPUTER:	

LIMITATION OF SCOPE - NOTE: A Work Planning Form (ENG-032) is NOT required if the total change to be accomplished:

- Is not large or complex or does not represent a new installation into a usable space
- Does not have a significant ES&H impact
- Does not involve tritium or other radioactive contaminated or activated equipment
- Does not impact multiple projects, systems, or groups

OR does not change the scope or intent of the original design.

Responsible Line Manager CONCURRENCE: _____
(Signature indicates that no Work Planning form is required.)

If non-concurrence or associated with a work planning form, enter the WP number: ____ .

GENERAL DESCRIPTION OF CHANGE:
REASON FOR CHANGE, DESIRED RESULTS, REQUIRED TESTING:
LIST PROGRAMS AFFECTED OR ATTACH LIST OR DIRECTORY:
INDIVIDUALS TO NOTIFY THAT CHANGE HAS BEEN IMPLEMENTED:

SOFTWARE CHANGE NOTICE APPROVALS
Cognizant individual requesting change:
Requesting Manager:
Responsible Line Manager approving change:

Date change implemented: _____ **By:** _____