PROCEDURE: NCSX–PROC–002 Revision 0		Page: 1 of 6
Title **NCSX Configuration Control**	Initiated by: NCSX Systems Engineering Support Manager	Effective Date: **February 24, 2003**
Concurred by: NCSX Quality Assurance Manager	Approved by: NCSX Engineering Manager	Supersedes: New

Applicability

This procedure covers changes to the following controlled documents which define the functional or technical requirements, the design configuration of NCSX, or cost and schedule baselines associated with the technical baseline:

- The General Requirements Document (GRD);
- The NCSX "Design to" and "Build to" Specifications as defined in the Systems Engineering Management Plan (SEMP);
- Statements of Work (SOW) that provides the framework of contracts with suppliers;
- Controlled NCSX drawings and models that physically depict the NCSX configuration;
- Technical installation and assembly procedures;
- The NCSX cost and schedule baselines; and
- Relevant lower level NCSX design documents, e.g., calculations and analyses, ICDs, etc.

Introduction

This procedure describes how the changes to the NCSX Project baselines (technical, cost, and schedule) are processed and controlled. A change request can be initiated by anyone associated with the Project.

As described in the NCSX Configuration Management Plan (NCSX-PLAN-CMP), the physical and functional description of the components, systems, and software/firmware comprise the "configuration" of the NCSX MIE Project. The NCSX project and details of its design configuration is progressively described in greater detail and is placed under configuration control as it proceeds through the design process, fabrication, assembly, and installation. The goal of the NCSX Configuration Management Program is to ensure that the configuration design evolution is controlled and that the documentation of the configuration design shown in electronic drawings and models accurately reflect what is installed in the field to the extent practicable.

All changes to project baselines will be accomplished by the electronic Engineering Change Proposal (ECP). Evolutionary changes to baselines (technical, cost, and schedule), in which the design (and the associated cost and schedule impacts) advances in a level of detail, moving

beyond but not necessarily changing that which is already under formal change control or adjustments due to actual cost and schedule performance against established baselines, will be handled by periodically updating the reference design to incorporate these developments. These "omnibus" ECPs will be processed to capture multiple small changes. Discrete and significant changes in which a change of thinking or understanding causes the project to change something that is already under formal configuration change control will be handled by stand-alone ECPs.

The electronic version of the ECP form can be downloaded from an interactive Configuration Management Web Page that is a subordinate web page to the NCSX Engineering Web Page. The ECP form has three sections:

- **Cover Page** providing ECP numbering and title, suggested reviewers, and the approval signature blocks.
- **Part I** to be filled in by the originator and submitted to the Systems Engineering Support Manager for processing. Amplifying information to the ECP such as design memoranda that provide a rationale/need for the proposed change, sketches, Engineering Change Notices (ECN), and cost and schedule impacts are prepared and attached electronically. Existing drawings or models or Interface Control Documents (ICDs) need only be referenced.   These attachments/referenced drawings/models or ICDs are prepared in accordance with the following plans and procedures:
    - Specifications – PPPL Engineering Procedure ENG-006, "Review and Approval of Specifications and Statements of Work"
    - Drawings and Models – Pro/INTRALINK Users Guide
    - Sketches and ECNs – PPPL Engineering Procedure ENG-010, "Control of Drawings, Software, and Firmware"
    - Cost and Schedule impacts – prepared using the Primavera Project Planner (P3) software.
- **Part II** to be completed by each reviewer.

Referenced Documents

NCSX-PLAN-PEP	NCSX Project Execution Plan
NCTX-PLAN-CMP	NCSX Configuration Management Plan
NCSX-PLAN-DMP	NCSX Data Management Plan
NCSX-PLAN-DOC	NCSX Document and Records Plan
NCSX-PROC-001	NCSX Procedure, Glossary of Acronyms and Definitions
PPPL- ENG-006	PPPL Procedure on the Review and Approval of Specifications and Statements of Work
PPPL-ENG-010	PPPL Procedure on Control of Drawings, Software, and Firmware
PPPL-ENG-033	PPPL Procedure on Design Verification
NCSX-GUIDE-001	NCSX Pro/INTRALINK Users Guide

Procedure
Note: NCSX documents do not all come under configuration control at the same time. Rather, as appropriate for the stage of design, the documents and drawings and models will come under

Controlled Document
THIS IS AN UNCONTROLLED DOCUMENT ONCE PRINTED. Check the NCSX Engineering Web prior to use to assure that this document is current.

NCSX-PROC-002_00

configuration in a phased manner, with the higher-level specifications and drawings coming under configuration control prior to lower-level specification and detailed drawings and models.

Responsibility	**Action**

Initiator (Anyone on the Project)

1. Identifies need for change to the NCSX technical, cost, or schedule baselines.
2. Completes the electronic version of the NCSX ECP form, Part 1. A sample is contained in Attachment 1 of this procedure. Provides as much detail as necessary to adequately describe the proposed change. Continuation sheets may be used as necessary. Electronic versions of the form may be found on the NCSX Configuration Management web page (accessible via the NCSX Engineering Web page).

   Part I of the ECP Form should contain the following information:
   a. Originator: Name of Person Initiating the ECP
   b. Date: Date ECP Prepared
   c. Type of Change: Check all blocks that are applicable => Technical, Cost, or Schedule
   d. Reason for Change: Brief explanation on why the change is necessary
   e. Impacted WBS Elements: Identify impacted WBS element numbers (at least at the two digit WBS level)
   f. Impact of Change: Check off applicable blocks and provide brief impact statement of the expected impact of this proposed change:
      • Design (Including Interfaces)
      • Performance
      • Requirements
      • Vendor Contract Requirements
      • Cost
      • Schedule
      • Maintenance
      • ES&H
      • RAM
   g. Assessment of Other Options: Provide brief discussion of other options considered and why this option selected
   h. Detailed Description of Change: Using the continuation page if needed, provide a reasonably detailed explanation of the change, including identification of any attachments/referenced drawings/models or ICDs and a list of other impacted documents

Controlled Document
THIS IS AN UNCONTROLLED DOCUMENT ONCE PRINTED. Check the NCSX Engineering Web prior to use to assure that this document is current.

NCSX-PROC-002_00

Systems Engineering
Support Manager
Initiator (as necessary)
Systems Engineering
Support Manager

3. Sends completed electronic Part I and any electronic attachments and continuation sheets to the Systems Engineering Support Manger for further processing.

4. Reviews proposed change and, if required, requests additional amplifying information to complete the ECP package.

5. Provides additional information requested.

6. Based on information provided in Part I, identify whether this ECP should be processed as an "expedited" ECP, the Change Level of this proposed change and the final approving official:

Change Level	Approving Official
4	NCSX Project Manager or NCSX Engineering Manager (Expedited ECPs)
3	NCSX Federal Project Manager
2	Associate Director OFES
1	Under Secretary of Energy

7. Once the change package (electronic Part I) is complete, fills out the top portion of the electronic ECP Cover Page:
   a. Identifies initiator of the ECP and Date ECP prepared
   b. Assigns ECP Number in accordance with the scheme outlined in the CMP
   c. Assigns ECP Title that is descriptive of the proposed change
   d. Identifies required reviewers in addition to all WBS Managers by checking yes or no blocks
   e. Provides any amplifying comments to assist in the review and disposition of the proposed change
   f. Posts proposed ECP on the Configuration Management Web Page
   g. Notifies all WBS Managers and other required reviewers via e-mail that the electronic version of the ECP is now posted on the Configuration Management web page

A sample of the ECP Cover Page is contained in Attachment 1 to this procedure.

Reviewers

8. Completes electronic (Word) version of Part II of the ECP Form :
   a. Fill out ECP Number and Title.
   b. Identify reviewer name.
   c. Check block indicating whether or not corrections needed (e.g., additional reviewers, correction to impact statements, etc. and the specific corrections needed. Electronically returns Part II to Systems Engineering Manager for recycling ECP to obtain corrections needed.
   d. If no corrections needed, check block on whether or not the reviewer concurs in the ECP. Provide reason for the rejection recommendation.
   e. Identify if there are other recommendations (e.g., modified ECP to include other impacted documents, etc. and specifically identify those recommendations.
   f. Electronically return completed Part II to the Systems Engineering Support Manager.

   A sample Part II of the ECP form is contained in Attachment 1 to this procedure.

Systems Engineering Support Manager

9. Receives reviewer comments/input and re-reviews ECP for completeness. Once complete, schedules a Change Control Board (CCB) meeting if deemed necessary. Acts as secretary for the CCB meeting.

10. Enters ECP information into the ECP Tracking Log (Attachment 2) – annotates status on the ECP Tracking Log.

CCB Chairperson

11. Determines best method to effect committee review. Options include distributing form to committee members with specified response dates or formal committee meetings.

    Note: If the ECP is a Class 4 ECP, the CCB Chairperson (normally the NCSX Project Manager) is the approving official. If the ECP is a Class 3 or higher level ECP, DOE approval is required.

12. Using information from the committee members, either approves the change/recommends approval if DOE approval required or denies the change. The review process may include discussing concerns about the change with the ECP initiator. Once a decision is made, completes the form and forwards the signed original to the Systems Engineering Support Manager for disposition (i.e., implementation notification, denial notification, or forwarding to DOE.

Controlled Document
THIS IS AN UNCONTROLLED DOCUMENT ONCE PRINTED. Check the NCSX Engineering Web prior to use to assure that this document is current.

NCSX-PROC-002_00

Systems Engineering
Support Manager

13. If the ECP is a Class 3 or higher level ECP, requiring DOE approval, prepare the transmittal letter for NCSX Project Manager signature. Once the ECP is dispositioned by DOE, repeat step 10 above.
14. Updates ECP Tracking Log (Attachment 2).
15. Prepares and transmits notification of approval and implementation authorization or notification of denial to Project.
16. Updates ECP Tracking Log (Attachment 2) indicating final disposition and prepares ECP Implementation Log (Attachment 3) for tracking detailed ECP implementation status.
17. Post approved ECP on the Configuration Management web page.
18. Monthly identify the implementation status of each ECP as part of the monthly status meetings to ensure visibility of the implementation of the ECP.

Notes: **(1)** PPPL Procedure ENG-010, Control of Drawings, Software, and Firmware, addresses the use of Engineering Change Notices (ECNs) for implementing changes to drawings and models released for fabrication. The ECN shall be provided as an attachment to the ECP to ensure that all impacted documents are listed on one ECP.

(2) PPPL ENG-032, Work Planning Procedure, while not specifically applicable to design work, does have good check list of items to consider when proposing a change. The ECP form (Attachment 1 to this procedure) captures the applicable items from the Working Planning (WP) form.

(3) The goal of the NCSX Configuration Management Program is to have the documentation accurately reflect the "as-built" condition in the field. However, cost and schedule considerations may preclude complete "as-built" verification. Rather on a case-by-case basis, the NCSX Engineering Manager may determine that "as-built" verification is required.

Attachments

Attachment 1: Engineering Change Proposal (ECP) Form

Attachment 2: ECP Tracking Log

Attachment 3: ECP Implementation Log

 Note: These forms are typical. The most current version is available on the NCSX Configuration Management Web page that is accessible via the NCSX Engineering Web page < http://www.pppl.gov/me/NCSX_Engineering/ >

NATIONAL COMPACT STELLARATOR PROJECT
Engineering Change Proposal (ECP)

COVER PAGE
(TO BE COMPLETED BY SYSTEMS ENGINEERING SUPPORT MANAGER)

Originator:	Date:
ECP No:	ECP Title:

Required Reviewers

Required Reviewers for ALL ECPs:
- **All WBS Managers**
- **All Project Engineers**
- **NCSX Project Manager**
- **NCSX Engineering Manager**
- **NCSX ES&H Manager**
- **NCSX QA Manager**
- **NCSX Physics Head**

Other reviewers

ECP Approval Level

Expedited ECP? ☐ Yes   ☐ No

Change Level: 1

Approving Official: 4. NCSX Project Manager

Comments

APROVALS
(TO BE COMPLETED BY APPROVING OFFICIALS)

Change Level	Approving Official	Approval?	Signature
4	NCSX Project Manager	☐ Yes ☐ No	
4 (Expedited ECP)	NCSX Engineering Manager	☐ Yes ☐ No	
3	NCSX Federal Project Manager	☐ Yes ☐ No	
2	Associate Director OFES	☐ Yes ☐ No	
1	Under Secretary	☐ Yes ☐ No	

NATIONAL COMPACT STELLARATOR PROJECT
Engineering Change Proposal (ECP)

PART I
(TO BE COMPLETED BY ORIGINATOR)

Originator:	Date:

Overview of Change

Type of Change: ☐ **TECHNICAL**   ☐ **COST**   ☐ **SCHEDULE**
(Check all that Apply)

Reason for Change:

Impacted WBS Elements:

Impacts of Change (Briefly Describe):
   ☐ **Design:**
   ☐ **Interfaces:**
   ☐ **Performance:**
   ☐ **Requirements:**
   ☐ **Vendor Contract Requirements:**
   ☐ **Cost:**
   ☐ **Schedule:**
   ☐ **ES&H:**
   ☐ **Reliability, Availability, and Maintenance (RAM):**

Assessment of Other Options:

NATIONAL COMPACT STELLARATOR PROJECT
Engineering Change Proposal (ECP)

PART I
(TO BE COMPLETED BY ORIGINATOR)

Originator:	Date:

Detailed Description of the Change:
(Use Continuation Sheets and/or Attach Information/Sketches, As Needed)

☐ **Attachments (List):** _____

☐ **List of Impacted Documents:**
    ☐ **Analyses**
        ☐ Seismic Analysis _____.
        ☐ Thermal Analysis _____.
        ☐ Eddy Current Force Analysis _____.
        ☐ Mechanical Analysis _____.
        ☐ FMECA (ENG-008) _____.
        ☐ Radiation/neutron Analysis _____.
        ☐ Other calculations (specify) _____.
    ☐ **Safety-Related Documents**
        ☐ NEPA id (ESH-014): _____.
        ☐ Hazard Controls (e.g. USQD, SAD) (ESHD 5008, sec 11)
        ☐ Job Hazard Analysis: _____.
    ☐ **Interface Control Documents**
        ☐ ICD _____.
        ☐ ICD _____.
        ☐ ICD _____.

Description of Change:

NATIONAL COMPACT STELLARATOR PROJECT
Engineering Change Proposal (ECP)
PART I CONTINUATION SHEET
(TO BE COMPLETED BY ORIGINATOR)

Originator:	Date:

NATIONAL COMPACT STELLARATOR PROJECT
Engineering Change Proposal (ECP)

PART II
(TO BE COMPLETED BY REVIEWERS)

ECP No:	**ECP Title:**

Reviewer:

Corrections Needed? ☐ Yes   ☐ No
- **If yes, identify corrections needed:**

Concur? ☐ Yes   ☐ No
- **Provide reasons for concurrence/rejection:**

Other Recommendations? ☐ Yes   ☐ No
- **Identify Recommendations**

NOTE: Forward completed Part II to Systems Engineering Support Manager via e-mail indicating that your review is completed.

NATIONAL COMPACT STELLARATOR PROJECT Engineering Change Proposal (ECP)
PART II CONTINUATION SHEET *(TO BE COMPLETED BY REVIEWER)*

Originator:	Date:

NOTE: Part II – Review Form will be multiple pages from each reviewer.

NATIONAL COMPACT STELLARATOR PROJECT
Engineering Change Proposal (ECP) Status Log

ECP Number	Version/Date	ECP Title	Status*

Status Notes:
- **Submitted – ECP submitted and impact statements being prepared**
- **Pending – ECP complete and awaiting CCB disposition**
- **Level 4 Approved – Level 4 ECP approved and ready for implementation**
- **DOE Pending – DOE Level 3 ECP or higher approval needed**
- **DOE Approved – Level 3 ECP or higher approved and ready for implementation**
- **Disapproved – Either Project or DOE rejected ECP**
- **Closed – ECP fully implemented**

NCSX

PROCEDURE: NCSX–PROC–002 Revision 0	Page: 1 of 1
ECP Implementation Log Attachment 3 (Typical)	

NATIONAL COMPACT STELLARATOR PROJECT
Engineering Change Proposal (ECP) Implementation Log
Status Date:

ECP No:	ECP Title:		
Document	**Revised?**	**Date Revised**	**Revision Number**
Requirements Documents • GRD • Specifications (List Each) • Spec • Spec • Procurement Documents	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No		
Drawings/Model • ECN #=> Dwg # • ECN #=> Dwg #	☐ Yes ☐ No ☐ Yes ☐ No		
Environmental Documents • EA • SAD	☐ Yes ☐ No ☐ Yes ☐ No		
Cost Baseline	☐ Yes ☐ No		
Schedule Baseline	☐ Yes ☐ No		