**Record of Revisions**

|  |  |  |
| --- | --- | --- |
| **Revision** | **Date** | **Description of Changes** |
|  |  |  |
| **0** | **XXX** | **Initial Issue** |
|  |  |  |

**Applicability**

This procedure covers changes to the following controlled documents that define the functional or technical requirements, the design configuration of the NSTX Upgrade Project (NSTXU), or cost and schedule baselines associated with the technical baseline:

* Approved NCSX specifications, including the General Requirements Document (GRD) and System Requirements Documents (SRDs);
* Approved Interface Control Documents (ICDs); and
* NCSX cost and schedule baselines.

***Notes: (1) Approved technical installation and assembly procedures shall be under document control vs. formal configuration control.***

 ***(2) Statements of Work (SOWs) do not normally convey technical information, but may do so in isolated instance s(e.g., for specific and focused R&D efforts that will not become part of the*** NSTXU ***device) where it is determined that a technical specification is not needed. SOWs will be under revision control, but not configuration control.***

**Introduction**

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

Once under configuration control, the “configuration” of the NSTXU Project may only be changed via the Engineering Change Proposal (ECP) process described in this procedure. An ECP may be a “stand-alone” ECP that addresses 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; or an “omnibus” ECP that addresses small and multiple changes, may reflect one or more changes that are of a more evolutionary nature in which the design (and the associated cost and schedule impacts) that have advanced to 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. **Once an ECP is approved, the normal time frame between ECP approval and revision of the impacted documentation shall not exceed 30 days. However, this does not relieve the Project from proper notification of impacted WBS elements and impacted Suppliers – contract amendments/addenda shall be issued in a timely manner with an indication on when the impacted documentation will be updated.**

**Note that Engineering Change Notices (ECNs) are covered under an existing PPPL Engineering Procedure (ENG-010).**

There are two types of ECPs:

* A “standard” ECP that requires a full review and approval cycle via the NSTXU Change Control Board (CCB). .
* An “expedited” ECP that may be approved with only an abbreviated review. Expedited ECPs are reserved for special instances where:
* If a pending critical procurement needs to reflect the proposed change;
* If field activities may be delayed by the normal ECP process involving full reviews and the CCB; or
* If the proposed change is primarily editorial or minor in nature (e.g., clarifications on drawings for dimensions, tolerances, etc.). ***Note: Systems Engineering Manager may make the determination that an ECP is NOT required.***
* If either the Project or the Supplier notes an immediate need to revise the contract documentation on a turn around period shorter than the normal ECP processing process. These changes are usually minor in nature (e.g., correction of omissions, dimensional clarifications, clarification of the Statement of Work, specification, and/or models and drawings) and generally are anticipated to have only minor or negligible technical, cost, and schedule impact if the appropriate changes can be made quickly so as to minimize or eliminate rework or delay. If deemed prudent by the NSTXU Systems Engineering Support the decision can be made to delay revising the impacted documentation beyond the normal 30 day time period.

If an expedited ECP is deemed appropriate, the NSTXU Project Manager, after consultation with the Center Stack Upgrade and NBI Upgrade Managers, will be the approving authority after an abbreviated review cycle defined by the Engineering Manager. Nonetheless, following approval of an expedited ECP, the full CCB will review the ECP “after-the-fact” to ensure that major errors and/or omissions were not made. If the full CCB determines major errors and/or omissions that require a modification to the approved “expedited” ECP, a follow-up modification of the ECP will be made in accordance with the NSTXU procedures and this ECP shall be a “standard” ECP.

***Note: An ECP will likely NOT be required if the change is of a minor editorial nature. The Systems Engineering Support Manager will determine if an ECP is needed on a case-by-case basis.***

**When are ECPS, RFDs, and NCRs Needed?**

The following Table and Flow Chart is intended to summarize in one place when Engineering Change Proposals (ECPs), Requests for Deviation (RFDs), and Non-Conformance Reports (NCRs) are needed and when they are NOT needed:

|  |  |  |
| --- | --- | --- |
| **Type of Document** | **When Needed** | **When NOT Needed** |
|  |  |  |
| ECP | When there is a design change that impacts a Specification (Technical Baseline Requirements) or the Cost or Schedule baselines. Drawing changes (technical baseline) will also impact a Specification since the Specification also contains a table that lists the latest drawing revisions. Additionally, an ECP may be used to request application of contingency in cases where:* There is a directed change from DOE in the annual funding or schedule; or
* There is a change in the GRD impacting scope and schedule; or
* There is a change in the PEP that reflects a change in a Level 1 or Level 2 milestone or redefines PEP deliverables; or
* A planned procurement bid is much higher or reflects a significant schedule change; or
* Experience has shown that certain estimated work is more complex and will require application of contingency to reflect added complexity **(NOT A RETROACTVE CHANGE).**
 | Minor editorial changes will not normally require the processing of an ECP. The Systems Engineering Manager will determine whether an ECP is required on a case-by-case basis. |

|  |  |  |
| --- | --- | --- |
| **Type of Document** | **When Needed** | **When NOT Needed** |
|  |  |  |
| RFD | When either the supplier or PPPL identify a deviation from the established design before the component is fabricated (as indicated in either a Specification or Drawing), a RFD may be submitted to request a deviation either only for this specific component or for all remaining components. In dispositioning a RFD, the determination needs to be made as to whether or not the impacted drawing(s) or Specification need to be revised; if they do, then an ECN and ECP will be required. If the determination is made to not revise either the drawing or Specification, the Systems Engineering Manager will determine if a “stamp” can be placed on the impacted drawing and a note added to the Specification. (See PROC-002) | A RFD should **NEVER** be used to document an after the fact deviation from the requirements – the NCR will be the vehicle to document the change. |
| NCR | NCRs are used to identify items, services, or activities that fail to conform to specified requirements. The purpose of the NCR is provide a controlled method to prevent the inadvertent installation or continued use of the non-conforming items, services, or activities. As part of the NCR process outline in QA-005, the Project must identify, evaluate, and disposition the specific non-conformance(s), including if deemed necessary, provisions to segregate the item or to stop the specific nonconforming activity or condition causing the nonconformance. | A NCR should **NEVER** be used to document a deviation **BEFORE** it occurs – a RFD shall be used in that case. However, a NCR for a specific issue or nonconformance can lead to a follow-on RFD if it is decided that the specific non-conformance will be accepted for follow on components. |

The following flow chart is intended to visually provides and overview of the processing of ECPs, RFDs, and NCRs:

RFD

NCR

(QA-005)

Accept?

**NO**.

**REJECT**

**END**

Yes, approve BUT NO Design Change Needed

Accept?

**NO. REJECT**

**END**

**YES**. Design Change Required.

Prepare & Process ECP & ECN if Drawing Impacted

**YES. USE “AS IS”**

Change Spec or Drawing?

**YES**

**NO**

Change Specification and Drawings

**END**

Annotate Drawing and/or Spec with “Stamp” identifying the ECN and implementing RFD or NCR – use letter (a, b, c) to identify change

**END**

**Referenced Documents**

|  |  |
| --- | --- |
| PMSPD | PPPL Project Management System Program Description (PMSPD) |
| PPPL- ENG-006 | PPPL Procedure on the Review and Approval of Specifications and Statements of Work |
| PPPL-ENG-010 | Control of Drawings, Software, and Firmware |
| PPPL-QA-005 | PPPL Non-Conformance Reports |
| NSTXU-PROC-002 | NSTXU Request for Deviation (RFD) |

1. **Procedure for Processing Engineering Change Proposals (ECPs)**

**Note:** NSTXU 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 configuration control (i.e., are signed and approved) 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.

**Initiator (either Project or Supplier)** identifies a need to update the technical baseline documentation to the Cognizant Engineer and PTR and PPPL Procurement Representative if Supplier initiated.

**Cognizant Engineer/PTR** evaluates proposed change and develops a proposed resolution and method of documenting proposed change in consultation with the Design Integration Manager, Systems Engineering Support Manager, and RLM, including whether this change might warrant special processing to ensure timely notification to a Supplier. The documentation of the proposed change may take the form of Request for Deviation (RFD) or ECP:

* If a RFD, directs the initiator to prepare and process a RFD per PROC-002;
* If a NCR, directs the initiator to process a NCR per QA-005;or
* If a ECP, directs the initiator to prepare a ECP per Attachment 1 of this procedure (or to submit basis of change to the Systems Engineering Support Manager for inclusion in an ECP).

***NOTE: The Cognizant Engineer/PTR may decide to prepare the proposed documentation in lieu of the initiator.***

**A1**

**Initiator or Cognizant Engineer/PTR** submits the ECP (with any continuation sheets deemed necessary to better explain the rationale for the change) and recommendation whether this ECP requires special handling to ensure timely notification to a Supplier to the Systems Engineering Support Manager for further processing.

**A2**

**A1**

**Systems Engineering Manager** reviews proposed change, and:

* If required, iterates until the additional amplifying information needed to complete the ECP package. If the ECP form is not already completed , completes the ECP form per Attachment 1 of this procedure;
* Determines whether this ECP should be processed as a “standard” or “expedited” ECP and whether this ECP warrants a special handling to ensure timely notification to a Supplier;
* The change level/class of this ECP (determined by the approving official);
* Completes the ECP Cover Page to include:
	+ Initiator of the ECP and date ECP prepared;
	+ ECP number in accordance with the following format ECP-XXX, where XXX is a sequential number starting with 001;
	+ Descriptive Title of the ECP;
	+ Required Reviewers;
	+ Action items needed to close out the ECP; and
	+ Any amplifying information that might assist in the review and disposition of the ECP
* Posts the draft ECP on the Configuration Management Web page and notifies all reviewers if and if this will be a standard, or expedited ECP.

***NOTES: (1) An “expedited” ECP process may only be used for change level/class 3 (Project approval) ECPs. If an “expedited” ECP, the NCSX Engineering Manager (or his designee) is the approving official. If not an “expedited” ECP, the NCSX Project Manager (or his designee – usually only the NCSX Engineering Manager) signs for the Project.***

***(2) “Expedited” ECPs will normally only be considered for those items with potential impact on existing supplier contract or critical field activities.***

**A2**

Standard or Expedited ECP?

Expedited ECP

(Only If Class 3 ECP)

Standard ECP

**Reviewers** provide comments and/or concurrence without comment by completing information required in Part II (e-mail okay). Submit comments/concurrence to the systems Engineering Support Manager.

**Systems Engineering Manager** obtains NCSX Project Manager disposition of the ECP without a CCB (or with a a short CCB meeting if desired by the NCSX Engineering Managers ) for an “expedited” ECP.

**A3**

**Systems Engineering Manager** schedules Change Control Board (CCB) with full CCB membership. At end of CCB meeting obtains CCB Chair disposition of the ECP.

**A3**

ECP Approved?

Yes

No

**Systems Engineering Manager** notifies Project personnel that ECP is not approved.

**END**

**Cognizant Engineer/PTR** notifies Supplier if Supplier initiated.

**Systems Engineering Manager:**

* Notifies Project personnel and PPPL Procurement Representative (if impact on an existing contract) that ECP is approved;
* Tracks completion of ECP action items; and
* When the impacted documentation will need to be updated (requests RLM to determine when/if documentation needs to be updated for a “rapid response” ECP ). Options are:
	+ Do not update documentation (usually only reserved for R&D items and items not to be used on the experiment);
	+ Update immediately; or
	+ Update within 30-90 days of ECP approval date of ECP.

**A4**

**A4**

ECP Impacts an Existing Contract?

No

Yes

**Systems Engineering Manager and RLM** notifies the PPPL Procurement Representative the date by which the documentation will be revised and requests that a contact amendment/addendum be issued.

**PPPL Procurement Representative** issue contract amendment/addendum:

* To authorize change to be made; and
* When documents are expected to be updated (Normally within 30 days).

**Project Personnel** update documentation per PROC-006 on schedule identified.

**Design Integration Manager and Systems Engineering Manager** checks revised documentation; obtains approvals, posts (Design Integration Manager for models and drawings and Systems Engineering Support Manager for all other documents) and notifies Project personnel (and Cognizant Engineer/PTR if the updated documentation impact an existing contract) that the updated documentation has been posted.

**Systems Engineering Manager** notifies Project personnel the date by which the documentation needs to be revised.

**A5**

**A5**

**PPPL Procurement Representative** notifies Supplier the contractual documents have been updated and requests that they notify PPPL of any cost/schedule impacts within 30 days.

**END**

If not impacting an existing contract.

**Supplier** notifies PPPL Procurement Representative of any cost/schedule impacts within 30 days.

**PPPL Procurement Representative** notifies PTR and Systems Engineering Support Manager whether or not there is a cost/schedule impact.

If a cost/schedule impact, Project personnel evaluate identified impact and provide direction to the PPPL Procurement Representative on proposed negotiation strategy or whether or not change should be made.

**END**

If no cost/schedule impact.

**END**

* PPPL Procurement Representative negotiates and finalizes change; and
* Systems Engineering Support Manager processes change to ECP

## Attachments

**1 - ECP Forms (Cover Page and Part I) 2 – Reviewer Comment Form (Part II)**

|  |
| --- |
| **NATIONAL SPHERICAL TORUS EXPERIMENT UPGRADE PROJECT (NSTXU)****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 this ECP:**       |
| **ECP Approval Level****Expedited ECP? [ ]  Yes [ ]  No****Change Level:** Approving Official:  |
| **Actions**      |
| ***APPROVALS*** ***(TO BE COMPLETED BY APPROVING OFFICIALS)*** |
| **Change Level** | **Approving Official** | **Approval?** | **Signature** |
| **3** | **NSTXU Project Manager** | **[ ]  Yes [ ]  No** |  |
| **3a** **(Expedited ECP)** | **NSTXU Engineering Manager** | **[ ] Yes [ ]  No** |  |
| **2** | **NSTXU Federal Project Director** | **[ ] Yes [ ]  No** |  |
| **1** | **Associate Director OFES** | **[ ] Yes [ ]  No** |  |
| **0** | **Deputy Secretary of Energy** | **[ ] Yes [ ]  No** |  |

|  |
| --- |
| **NATIONAL SPHERICAL TORUS EXPEREIMENT UPGRADE PROJECT (NSTXU)****Engineering Change Proposal (ECP)** |
| ***PART I*** ***(TO BE COMPLETED BY ORIGINATOR)*****ECP-** |
| **Originator:**  | **Date:**  |
| **Overview of Change****Type of ECP: [ ]  EXPEDITED [ ]  STANDARD** **Type of Change: [ ]  TECHNICAL [ ]  COST [ ]  SCHEDULE [ ]  EDITORIAL****(Check all that Apply**)**Reason for Change:**      **Impacted WBS Elements:**      **Impacts of Change (Briefly Describe):**      **Does this Change Impact Material Already Procured or Parts/Assemblies Already Assembled/Manufactured using this Material: [ ]  Yes [ ]  No****If “Yes”, what is the recommended disposition of this material/part/assembly?**      **Assessment of Other Options:**       |

|  |
| --- |
| **NATIONAL SPHERICAL TORUS UPGRADE PROJECT (NSTXU)****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)****List Attachments, Impacted Documents, etc.**      **Description of Change:** |

|  |
| --- |
| **NATIONAL SPHERICAL TORUS UPGRADE PROJECT (NSTXU)****Engineering Change Proposal (ECP)** |
| ***PART I CONTINUATION SHEET******(TO BE COMPLETED BY ORIGINATOR)*** |
| **Originator:**       | **Date:**       |
|       |

**Reviewer Comment Guidelines**

Reviewers will complete a reviewer comment sheet (either using the Part II form included in this procedure or in any other acceptable format such as e-mail, word, etc.). The reviewer comment sheet shall contain at a minimum the following information:

* ECP Number and Title;
* Reviewer Name;
* Indications on whether or not corrections needed and the specific modifications/corrections needed (e.g., additional reviewers, correction to impact statements, modifications to the ECP to include other impacted documents, etc.);
* Whether or not the reviewer concurs in the ECP without comment or concurrence if recommended modifications/corrections are made.

This information should be submitted to the Systems Engineering Support Manager who will tally all the comments and attempt to reach a resolution with the ECP initiator.

A sample Part II of the ECP form is follows in this attachment if the reviewer opts to utilize it.

|  |
| --- |
| **NATIONAL SPHERICAL TORUS UPGRADE PROJECT (NSTXU)****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 Manager via e-mail indicating that your review is completed.** |

|  |
| --- |
| **NATIONAL SPHERICAL TORUS UPGRADE PROJECT (NSTXU)****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.***