

<b>Princeton Plasma Physics Laboratory Procedure</b>		
<b>Procedure Title: EXPERIMENTAL PROPOSALS FOR NSTX-U</b>		
<b>Number OP-ADX-03</b>	<b>Revision: 1</b>	Effective Date:  Expiration Date: <i>(2 yr. unless otherwise stipulated)</i>
<b>Procedure Approvals</b>		
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<b>Procedure Requirements</b> designated by RLM		
LABWIDE:		
	Work Planning Form # _____ (ENG-032)	Lockout/Tagout (ESH-016)
	Confined Space Permit (5008, Sec. 8, Chap 5)	Lift Procedure (ENG-021)
	Master Equip. List Mod (GEN-005)	ES&H Review (NEPA, IH, etc.)
	RWP (HP-OP-20)	Independent Review
	ATI Walkdown	Pre-job Brief (ENG-030)
	Post-job Brief	Hazard Analysis
	Run Copy Required (performance of procedure must be documented and archived per ENG-030 page 10)	Special archiving requested for completed Run Copies: _____
D-SITE SPECIFIC:		
	D-Site Work Permit (OP-AD-09)	Door Permit (OP-G-93)
	Work on Tritium Contaminated Sys. (OP-AD-77)	Activity Certification Committee Review
	Pre-job brief (ENG-030)	T-MOD (ENG-036)

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No training required <input type="checkbox"/> Instructor			
Personnel (group, job title or individual name)	Read Only	Instruction	Hands-On
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Training Rep. _____			
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NSTX-U PROJECT

EXPERIMENTAL PROPOSALS FOR NSTX-U

REVISION 1

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1.0 PURPOSE

The purpose of this procedure is to specify requirements and delegate responsibilities for Experimental Proposals for NSTX-U plasma operation.

This procedure establishes the means to document machine conditions required for an Experimental Proposal and to disseminate this information to the appropriate personnel and the rules for carrying out an experimental proposal with plasma operation.

## 2.0 SCOPE

This procedure describes the administrative controls required for approval of Experimental Proposals (XP) on NSTX-U and provides a formalized method for the NSTX-U Physics Analysis and NSTX-U Experimental Research Divisions to communicate machine conditions, diagnostics, and heating systems required for an Experimental Proposal. Experimental proposals are carried out by the Physics Operators for the NSTX-U facility in collaboration with the Session Leader and with the support of the Chief Operations Engineer (COE) and Research Operations Branch Heads who coordinate operations of engineering systems. An Experimental Proposal in itself is not a procedure, but it guides the execution of approved procedures for the achievement of a scientific goal within the established operational limits of the facility.

This procedure does not cover the early development, discussions and reviews of the Experimental Proposals which occur elsewhere before the Experimental Proposals are deemed ready for submission for approval. (See the flow chart in Appendix IV)

## 3.0 REFERENCES

- 3.1 NSTX-U Conduct of Operations OP-AD-39
- 3.2 Chain of Command, OP-AD-56
- 3.3 NSTX-U Operations Training, OP-NSTX-12

## 4.0 DEFINITIONS

### 4.1 Experimental Proposal (XP)

A written document describing the experiment to be carried out, defining the required machine and plasma conditions, listing the required diagnostic measurements and analysis tools, and describing the expected publications. The approval process for an XP is covered in section 6.

### 4.2. Machine Proposal (XMP)

A written document describing the activities to be carried out to support desired machine operations in preparation for experimental plasma operations and defining the required machine conditions, listing any required diagnostics. Machine Proposals may cover preparations for operations, such as conditioning, bakeout, and diagnostic calibrations that do not require high power plasma operation. However, XMPs may also cover such plasma operational activities as discharge development, control development, or diagnostic development that are required to make possible XPs that may be performed later. Generally, they are not expected to lead to publications in and of themselves, but they are activities that are required for successful operation. Approval of XMP's is the responsibility of the Experimental Research Operations Division.

### 4.2. Science Groups (SGs), Topical Sub-Groups (TSGs), and Tasks Forces

Science Groups, Topical Sub-Groups, and Task Forces, as well as the leaders and deputies for these groups, will be named by the NSTX-U Project and Program Directors. For the purpose of this document, a Task Force and a Science Group will be treated in a similar fashion.

#### 4.3. Experimental Proposal Review Meeting and its attendees

The Experimental Proposal Review Meeting, also known as the “Team Review” is the forum at which the final versions of Experimental Proposals are presented for review prior to approval.

Everyone, both internal and external to PPPL, is welcome to attend the Experimental Proposal Review Meetings, which will be held at a scheduled time and place. **Members of the CHIT Review Board, as designated by the Run Coordinator (see 4.11) shall attend.**

#### 4.4. Session Leader

During the running of the experiment, the Session Leader specifies to the Physics Operator the plasma conditions necessary to meet the requirements of the approved XP. The Session Leader will normally be a proposer of the XP; however, the Run Coordinator can assign the job of Session Leader to any NSTX-U team member.

#### 4.5 Chief Operation Engineering (COE)

The Chief Operating Engineer is directly responsible for the proper operation of the NSTX-U machine and support systems on a shift basis.

#### 4.6 Physics Operator (PO)

The Physics Operator sets up the plasma conditions necessary to meet the requirements of each Experimental Proposal, with concurrence of the COE and in consultation with the Session Leader.

#### 4.7 Experimental Proposals Log Book

A loose-leaf binder maintained by the Research Operations Division and located in the NSTX-U control room. It contains controlled copies of XPs.

Experimental proposals will be submitted to the Operations Center which will provide a single controlled copy for the Experimental Proposals Logbook at the Physics Operator station in the NSTX-U control room. The Approval Form of the controlled copies of the Experimental Proposal shall be copied to the Operations Center file after any change or comments on the Approval Form.

#### 4.8 NSTX-U Run Scheduling Meeting

Meeting held to schedule the activities for the following run, including execution of experimental proposals, and to address operational considerations. Sometimes referred to as the “Program/Ops Meeting”.

#### 4.9 ATI

Accountable Technical Individual

#### 4.10 RLM

Responsible Line Manager

#### 4.11 Experimental Proposal CHIT Review Board

Board that reviews CHITs generated during the Experimental Proposal Review Meeting (Team Review). The board is designated by the Run Coordinator, and would typically consist of the Run Coordinator (or his/her deputy or designee), SG & TSG leaders for the group from which the XP originated, and any additional members designated by the Run Coordinator. The designated CHIT Review Board must attend the Experimental Proposal Review Meeting

### 5.0 BACKGROUND

The needs and requirements of NSTX-U project staff necessitate that a program be implemented to disseminate information to personnel in a timely manner. To insure that this information remains current, a weekly and daily run schedule shall be maintained in the control room and on the Web.

Information such as which Experimental Proposals (XPs) or machine proposals (XMPs) are being run on a particular day, special machine requirements, and other similar short term matters will be included in the daily run schedule. Also, the names and phone numbers of the COE, NBOE, Test Cell Manager, RFO, PO, Session Leader, etc. as applicable will be included on the daily run schedule board. The run schedule is the responsibility of the Run Coordinator in consultation with others. The COE is responsible for ensuring that daily run schedule board is kept up to date.

### 6.0 PROCEDURE

6.1 Experimental Proposals: The genesis the XP can come either from the proponent or the topic can be assigned to someone by a SG or TSG leader.

6.1.1 XP early stage of preparation: It is advisable to discuss the XP with the appropriate Science Group and Topical Sub-Group leaders who will likely request an initial review within the TSG. It is also advisable to discuss the XP with the following people (as applicable) to uncover potential problems early in the process:

- The Experimental Operations Division Head
- The Physics Operations Branch Head
- The Physics Analysis Division Head
- The RF Branch Head
- The Diagnostics Operations Branch Head
- Any of the COEs

- 6.1.2 Draft XP preparation: A draft of the XP shall be written, including all required elements. It is then given to the Run Coordinator by the SG or TSG leader or the XP proposer.

The Run Coordinator will determine whether the Experimental Proposal addresses issues relevant to the experiment based on the general format of XP's as outlined in Appendix II. If adequate, the Run Coordinator will:

- Assign an XP number
- Schedule formal reviews
- Appoint formal reviewers as they feel is necessary
- Appoint the XP CHIT Review Board

It is expected that in most cases the XP will be developed, reviewed and prioritized within the scope of activities of the SGs and TSGs. On some occasions, it is possible that an XP is proposed that does not fall within the purview of any particular TSG. In this circumstance, the XP proposer may give the XP to the Run Coordinator directly. The Run Coordinator will make sure that the XP does not fall within the scope of any of the SGs before assigning an XP number and scheduling a review. If the XP is determined to be within the scope of any of the SGs and/or TSGs, it will be turned over to that group for the normal development and review process. The ability for a proposer to give an XP to the Run Coordinator directly is to ensure that all ideas are considered, and is not meant as a convenient way to circumvent the usual SG/TSG process.

- 6.1.3 Notification of formal review meeting: The Run Coordinator will notify the CHIT Review Board and the NSTX-U team of the Experimental Proposals to be reviewed at the next Experimental Proposal Review meeting. Where possible, this notification shall be given at least 3 days before the meeting is to be held.
- 6.1.4 Distribution of draft copies: The XP proposer will then distribute review copies to any formal reviewers designated by the Run Coordinator, post a copy of the XP on the web and provide notification of the XP's URL to the NSTX-U team via e-mail. Copies of the draft XP shall also be given to all SG and TSG leaders, so that they can look for any potential overlap with experiments in their areas of responsibility. This shall be done at least 2 days in advance of the formal review if at all possible
- 6.1.5 Presentation at meeting: The XP proposer, or a designee, presents the XP at the formal Review Meeting; this meeting is sometimes known as the "Team Review". The Run Coordinator will determine whether there are the appropriate people at the meeting to adequately review the XP. Blank CHIT forms (example attached at the end of this procedure) will be distributed at the beginning of the meeting to allow documentation of concerns raised during or after the presentation. During the Experimental Proposal Review Meeting, modifications to the Experimental Proposal, and/or comments on operational limits and availability of different heating and diagnostics systems may be discussed. If deemed significant, issues will be documented on the CHIT

forms by any attendee. Reviewers must submit their CHITs by the end of the meeting. People linked into the meeting electronically offsite will be able to submit their CHITs electronically. At the end of the meeting, the Run Coordinator will make sure all CHITs are collected. Run Coordinator will document on a CHIT any questions, concerns, and recommendations raised during the review that were not adequately resolved and for which a CHIT was not already generated.

#### 6.1.6 CHIT response recommendations:

Soon after the conclusion of the Experimental Proposal Review Meeting (Team Meeting), a session of the Experimental Proposal CHIT Review Board chaired by the Run Coordinator will convene. In most cases, these two meetings will be completely contiguous.

The CHIT Review Board will review the CHITs and decide what needs to be done to address each CHIT (i.e., make comments on and/or recommendations (on the CHITs) as to the disposition of the issues raised in each CHIT). Recommendations can be made on the CHITs as to references to consult in order to resolve issues raised in the CHITs. (A CHIT can be deemed "not applicable.") A copy of the CHITs will then be returned to the proposer.

The Experimental Proposal CHIT Review Board will decide whether the review of the XP was successful or not. If the review of the XP is deemed successful, then any CHITs generated still will have to be satisfactorily resolved before the XP is officially approved. If not successful and if the proposer and his/her Task Force decide that the XP is still worth pursuing, the proposer must present the XP again (go back to step 6.1.2), after addressing the CHITs and/or other concerns. The Run Coordinator will inform the proposer as to the disposition of the XP.

If there are no unresolved CHITs, then the Experimental Proposal can proceed directly to sign-off (step 6.1.9). Otherwise, a decision based on the resolution of the CHITs will be made after the CHITs are returned (steps 6.1.7 and 6.1.8).

#### 6.1.7 CHIT resolution and XP modifications:

The Proposer will respond to the CHITs (on the CHIT forms themselves in the space provided if the response is short). The proposer shall modify their XP to include the results of the Experimental Proposal Review Meeting discussions and of the CHITs, and can comment on these changes in the "Response" space on the CHIT forms.

#### 6.1.8 Final XP draft review:

After responding to all the CHITs, the proposer will redistribute the amended XP to those designated to sign-off the XP as indicated on the Approval Form for Experimental Proposals (Appendix I) and will sign the approval form.

If there is a difference in opinion, preventing the XP from proceeding through the approval process, then the procedure described in Section 6.3 should be performed before proceeding to the next step below.

#### 6.1.9 XP sign-off:



Those designated to review the XP will inform the Run Coordinator they concur with the responses to the CHITs and to the modified XP by signing the Approval Form for the Experimental Proposal (Appendix I). If they do not concur see section 6.3. The official approval of the Experimental Proposal is then made by the Run Coordinator.

#### 6.1.10 XP documentation:

Once approved, the Run Coordinator will stamp, date and send the approved XP to the Operations Center and post the final XP text to the Web. The Operations Center will provide a controlled copy to the Experimental Proposals Logbooks in the NSTX-U control room. Uncontrolled copies will be supplied by the Operations Center for informational purposes for the NSTX-U staff.

#### 6.1.11 XP execution:

The XP shall be approved for operation by the Head of Experimental Research Operations on a particular run day, by notifying the PO and COE for that day that the XP is approved.

6.1.11.1 The Experimental Proposals shall be reviewed by the Physics Operator and be ready to be run at the beginning of the designated scheduled day.

6.1.11.2 The Session Leader, or the author of the Experimental Proposal, will make sure that the Physics Operator has a copy of the entire Experimental Proposal well in advance of the scheduled performance of the proposal and is informed of any unusual operating conditions.

In the event that the XP is rescheduled, the Session Leader, or the author of the Experimental Proposal, will ensure that the Physics Operator for the "new" shift will be similarly informed.

#### 6.1.12 Distribution of XP copies:

Uncontrolled copies of the approved XP may be made for use by the NSTX-U Staff by the Operations Center. In addition, copies of uncontrolled XP's can be made by the staff for informational purposes.

### 6.2 Minor Modifications

6.2.1 Minor modifications can be made to the approved and controlled version of XPs by either the Run Coordinator (or designee) or the Head of Experimental Research Operations Division (or designee), in consultation with the SG/TSG Leader and XP proposer or Session Leader. These changes will be entered on the XP Approval Form. A copy of the Approval Form will be sent to the Operations Center file to document the changes.

### 6.3 Resolution of Conflicts

If there are differences in opinion among the author of the XP and the reviewers, then the following procedure is to be followed to resolve the conflict:

- 6.3.1 The SG or TSG Leader for the XP (whoever is designated by the Run Coordinator) will collect the written comments on the issue at hand from the one author representing the XP and the reviewers. The designated SG/TSG leader for the XP will then review these comments and attach his/her own comments to the collection of comments. The entire collection of comments will then be forwarded for approval to the Run Coordinator, according to the normal procedure for approval (Section 6.1.9). The Run Coordinator can then make a decision on the approval of, or required modifications to, the XP.
- 6.3.2 If the decision by the Run Coordinator remains in dispute, then the Run Coordinator shall forward the full set of comments to the NSTX-U Program or Project Director (or their designee). That person will resolve the differences and require changes so that the revised XP can be approved (or clearly not approved as being untenable).

## 7.0 RESPONSIBILITIES (See section 6 as well.)

### 7.1. The Topical Sub Group (TSG) Leaders

- A. Shall assist the Physicist writing the Experimental Proposal to ensure that the Experimental Proposal is consistent with the overall goals of the NSTX-U program.
- B. Shall conduct reviews as appropriate to determine that the XP is ready for the Experimental Proposal Review Meeting (Team Review).
- C. Notify the Science Group leader when the XP is ready for the Experimental Proposal Review Meeting. They shall then attend that meeting.
- D. Helps schedule the XP with the Run Coordinator, so that it fits well into the overall NSTX-U programmatic goals and run schedule.

### 7.2. The Science Group (SG) Leaders

- A. Shall assist the Physicist writing the Experimental Proposal to ensure that the Experimental Proposal is consistent with the overall goals of the NSTX-U program.
- B. Requests time for presentation at an Experimental Proposal Review Meeting (Team Review) for an XP in their groups from Run Coordinator and ensure copies of the XP have been sent out to the Experimental Proposal CHIT Review Board and the list of attendees of the Experimental Proposal Review Meeting. They or their deputy/designee shall attend that meeting.
- C. Helps schedule the XP with the Run Coordinator, so that it fits well into the overall NSTX-U programmatic goals and run schedule.

### 7.3. Session Leader

- A. Any special conditions for the XP must be requested at the scheduling and rollover meetings and reconfirmed the day before the experiment is scheduled.
  - B. The Session Leader should monitor conditions with the Physics Operator and ensure that the conditions continue to be satisfactory for the purposes of the experiment.
- 7.4. Run Coordinator, Deputy Run Coordinator or designee approved by the NSTX-U Project Head.
- A. Develops a draft schedule to conduct the Experimental Program on NSTX-U with help from the SG and TSG leaders, the Heads of Experimental Research Operations, Engineering Operations, and Physics Analysis and the Project and Program Directors and present this schedule at the Run Scheduling meeting.
  - B. Maintains a rolling experimental schedule on the Web that covers several run weeks in order to provide adequate notice with weekly updates.
  - C. Maintains the weekly schedule of the proposed Experimental Proposals to be run in the NSTX-U control room and on the Web.
  - D. Ensures that the overall scientific objectives of an Experimental Proposal are met in the final version of the document.
  - E. Assigns whether the SG, TSG, or TF leader shall sign the XP Approvals page.
- 7.5. Head of Experimental Research Operations Division or his/her designee
- A. Ensures that Experimental Proposals meet ES&H requirements and OPR requirements.
  - B. Ensures that the Experimental Proposal will not exceed any machine limits.
  - C. Authorizes the execution of the Experimental Proposals on a weekly and daily basis via verbal communication with the COE and PO.
  - D. Ensures that the Approval Form of a controlled copy of the Experimental Proposal shall be copied to the Operations Center file after any changes or comments are made on the form.
- 7.6. Head of Physics Analysis or his/her designee
- A. Chairs NSTX-U Physics Meetings during which time XP results will be presented to the NSTX research staff.
  - B. Coordinates the ultimate analysis and dissemination of results of the XPs through publications and conferences.
- 7.7. Operations Center
- A. Uncontrolled copies will be supplied by the Operations Center for informational purposes for the NSTX-U staff.

## 8.0 RECORD KEEPING

- 8.1 Experimental Proposals Logbook:  
The Experimental Proposals Logbook shall be a loose-leaf binder kept in the NSTX-U control room. Experimental Proposals shall be ordered and numbered so that the highest number is at the end of the section.
- 8.2 Approved Experimental Proposals from past years will be kept in the Operations Center and a controlled copy LOB 260.
- 8.3 The Experimental Proposals Logbook shall be kept in the Physics Operator area in the NSTX-U Control Room.

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## APPENDICES

- I. Approval form for 2015 Experimental Proposals
- II. CHIT form