

Advanced Photon Source User Policies and Procedures

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Development of New Beamline or New Beamline Capability

Changes made in this revision:

- New title. Previous title: [Development of New Beamline of Significant New Capability/Instrument on an APS-Operated Beamline](#)
- Extensive revision. Previous available through hyperlinked in first bullet.

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POLICY

1 Introduction

This policy defines the process for taking a beamline from a concept through approved design and ready to start construction (see Appendix flowchart).

2 Scope

This policy defines:

- How to initiate a proposal to develop a new beamline, new experiment station, or the reconstruction of a beamline to support a new research program;
- The proposal review and approval process; and
- Framework requirements for beamline design reviews – Conceptual (CDR), Preliminary (PDR), and Final (FDR) Design Report.

This policy does not:

Define the detailed requirements for each level of beamline design reviews. The overarching APS standard is the [APS Design Review Policy \(APS_000031\)](#).

When does a beamline proposal need to be submitted?

A proposal needs to be submitted and approved to:

- Construct a new beamline.
- Add a new experiment station.
- Reconstruct a beamline to support new program.

Modifications to a beamline do not require a new proposal if the changes: do not significantly change a beamline's programmatic scope and the new optical configuration is consistent with the approved ray traces. However,, design reviews may be required

3 Before the Proposal ...

Before the effort is invested to develop a detailed proposal for a new beamline, ideas for new beamlines/research programs are screened to ensure they align with the strategic goals of the APS and availability of resources. These pre-proposal reviews are conducted by the APS Director in consultation with the APS Scientific Advisory Committee (SAC).

Pre-proposal screening can be initiated either through an APS-sponsored multi-beamline facility development (e.g., the APS Upgrade Project) or a letter of intent (LOI).

Facility Upgrade Projects

The APS Director can empanel a group to develop a plan for developing or redeveloping multiple beamlines (e.g., the APS Upgrade Project). The scientific objectives and organizational plans of each of the beamlines will define strategic objectives of the APS. The APS Director is responsible for overseeing the reviews of the plans. Reviews will be performed in consultation with the SAC and DOE stakeholders, as appropriate. If the plans are favorably reviewed, the APS Director will contact the Project Director and invite the submission of a proposal for each of the individual beamlines.

New CAT or CDT Beamline

Traditionally, Collaborative Access Teams (CAT, a group outside of the APS) or Collaborative Development Teams (CDT, a collaboration of APS and external developers) were formed to build beamlines at the APS. With the APS substantially built-out or committed, while not excluded, opportunities to form a new CAT or CDT and build a beamline will be limited. Should a group seek to establish a CAT or CDT, the initial step is the submission of a Letter of Intent (LOI). Contact the Deputy Associate Laboratory Director –X-ray Science (DALD – Science) for details. The APS Director, in consultation of the SAC will organize peer reviews of the LOI. If a LOI is favorably reviewed, the APS Director will invite the submission of a full proposal.

Adding a Station or Reconstructing a Beamline

If an existing beamline seeks to add a new experiment station or reconstruct the beamline to support a new program, the beamline management can start with a proposal (see next section).

4 Proposal

A full proposal includes five sections: scientific justification, Conceptual Design Report (CDR), management plan, ESH plan, and funding commitments. The scientific case and the design report are required for all proposals; the other sections are required on an as-needed basis.

The review of a beamline conceptual design is to identify and resolve issues of overall layout and feasibility before significant design effort is expended. For example, the review can address: if a beamline requires facility utility, network, or controls infrastructure beyond what is standardly available to the sector; if the beamline seeks to expand beyond the standard sector space; or if the project includes conventional construction.

Chart 1: Proposal Requirements

	New CAT/CDT Beamline	New XSD Beamline	Add a Station or Reconstruct a Beamline to Add a Program
Scientific Justification	Required	Required	Required
Conceptual Design Report	Required	Required	Required
Management Plan	Required	Required	Required if new CAT/CDT member institutions or new partner user institutions added
ESH Plan	Required	Update required if new program hazards not covered by current XSD ESH plan and WCDs	Update required if new program hazards not covered by current beamline or XSD ESH plan and Work Control Documents (WCDs)
Funding Commitments	Required	Required for non-APS funding	Required for non-APS funding
See APS Beamline Proposal Guide (APS 2013648) for more information on specific content.			

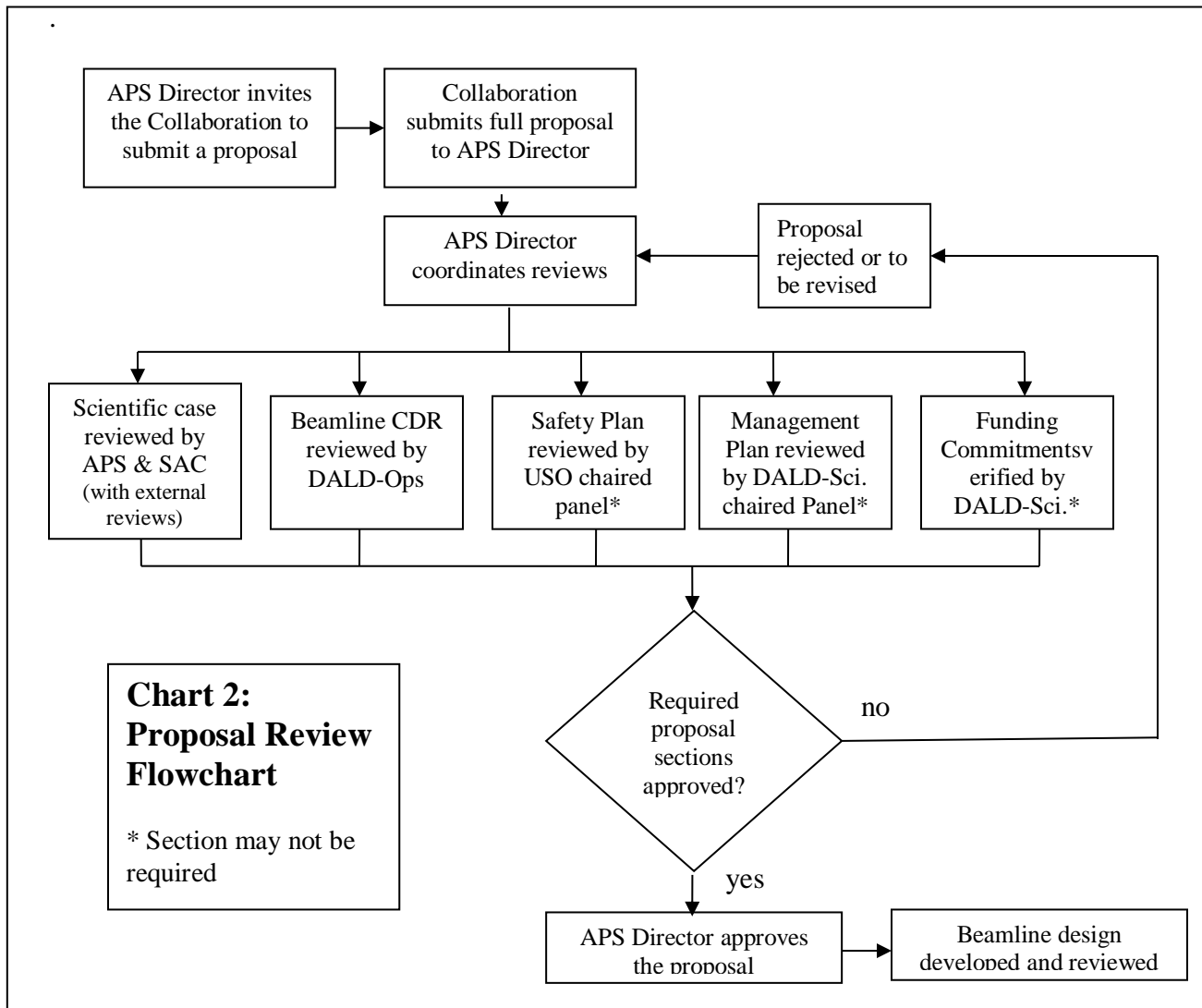
Each section of a proposal can be submitted separately - typically, the scientific justification is developed first. A conceptual design report and management plan are prepared early in the process and may be submitted concurrently with the scientific case. Chart 2 describes the full proposal development process.

A beamline or sector may be allocated to a CAT or CDT only after each of the required parts has been reviewed and approved. The assignment is formalized through a Memorandum of Understanding (MOU) between the CAT/CDT member institutions and the APS.

The CDR describes the proposed new beamline facilities. The content of a CDR is described in the [APS Beamline Conceptual Design Report Guide \(APS 2013649\)](#). The CDR is submitted to the Deputy ALD – Operations (DALD-Ops) to assess facility impacts and instrumentation and construction feasibility. Along with the scientific case, the CDR defines the scope of facilities that may be constructed at the APS and will be used as a baseline in subsequent design reviews.

Proposals are submitted to the APS Director via the APS User Program Office. The APS Director: coordinates proposal reviews, notifies the proposal spokesperson of the status of the reviews, and advises the spokesperson of proposal approval, need for resubmission, or rejection.

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Proposal Section	Reviewer	Notes
1. Scientific Justification	Peer review and APS-Science Advisory Committee (SAC)	External reviews invited by the APS and available to the SAC
2. Beamline Conceptual Design Report (CDR)	DALD-Ops organized review	Review considers instrumentation feasibility and baseline and schedule
3. Management Plan	Panel chaired by DALD-Science	Plan includes resources sought from the APS
4. Safety Plan	Panel Chaired by the User Safety Officer (USO)	Template available from the APS User Safety Officer
5. Funding Commitment	DALD-Science	Commitment letters from funding agencies

5 Beamline Design Reviews

Beamline designs are reviewed to help ensure conformance to APS/ANL/DOE safety standards and compatibility with facility operational standards.

- After the approval of the CDR, subsequent beamline designs are reviewed by the standing APS beamline design review committee (see the [APS Design Review Policy and Procedure](#)).
- Beamlines are reviewed at two stages
 - Preliminary Design Report (PDR)
 - [Preliminary Design Report Guide \(APS 2013650\)](#)
 - Prepared at ~30% completion of design engineering effort.
 - Establishes beamline layout and allows individual components to be detailed.
 - If the preliminary design is significantly different from the conceptual design, DALD-Ops approval is required for the change
 - PDRs can be approved by the DALD -Ops
 - Final Design Report (FDR)
 - [Final Design Report Guide \(APS 2013651\)](#)
 - Prepared at ~90% completion of design engineering effort.
 - Establishes component final designs.
 - FDRs can be approved by the DALD -Ops
 - For limited scope developments, at the discretion of the APS Engineering Support Division Director, the PDR review can be waived and only a FDR is required.

An approved FDR is needed to start installations on the experiment hall floor. Exceptions may be granted for limited scope, long-lead time, low-risk installations with the written approval of the DALD-Ops.

DOCUMENTS/RECORDS CREATED BY THIS PROCEDURE

The documents/records listed below will be created in the execution of this procedure and must be retained as indicated.

Document/Record	Custodian	Storage Location and Medium	Retention Period
Letter of intent	User Program Manager	ICMS	indefinite
LOI review comments (peer review and SAC)	User Program Manager	ICMS	indefinite
Scientific proposal including the scientific case, CDR, safety plan, management plan, and funding commitments	DALD-Science	ICMS	indefinite
Design report reviews	DALD-Ops	ICMS	indefinite
Proposals reviews including SAC reviews	User Program Manager	ICMS	indefinite

6 FEEDBACK AND IMPROVEMENT

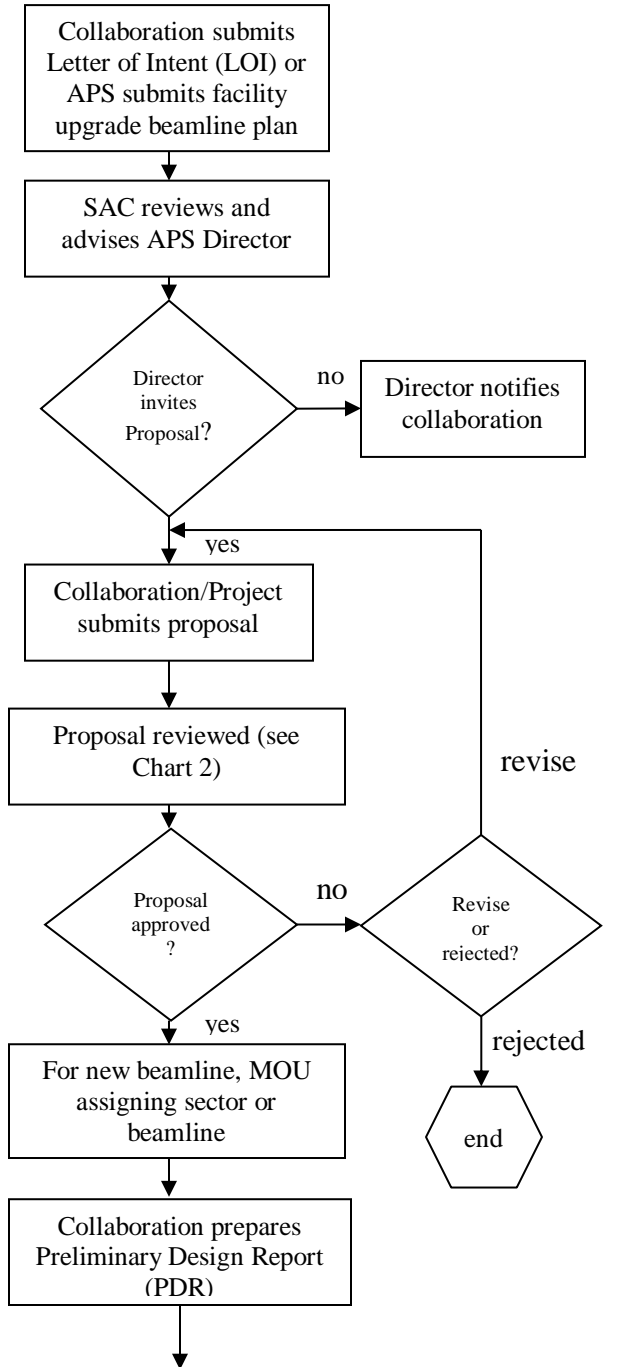
If you are using this procedure and have comments or suggested improvements for it, please go to the [APS Policies and Procedures Comment Form](#)* to submit your input to a Procedure Administrator. If you are reviewing this procedure in workflow, your input must be entered in the comment box when you approve or reject the procedure.

Instructions for execution-time modifications to a policy/procedure can be found in the following document: Field Modification of APS Policy/Procedure ([APS 1408152](#)).

* <https://www.aps.anl.gov/Document-Central/APS-Policies-and-Procedures-Comment-Form>

Appendix - Beamline Development Concept to Operations

Assigning a Sector or Beamline



Beamline Design Review

