

Procedure #:	X.3.1.1
Revision:	1
Issue Date:	23 Aug. 2005
Review Period:	1 year
Supersedes:	Rev 0 (9/14/04)

APS Design Review Procedure

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8-23-2005

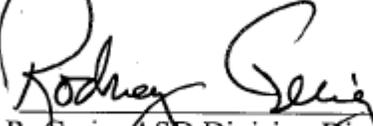
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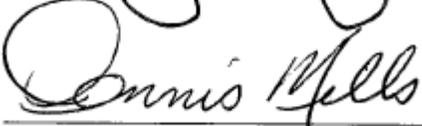
8/23/05


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APS Design Review Procedure

1 Introduction

1.1 Purpose

The purpose of APS design reviews is to assess the adequacy of new designs or modified facility components in terms of the potential impact they may have on the APS and its operations.

This procedure defines a uniform approach for the APS to review new designs and changes before beginning project construction. It requires APS management to appoint a 'steering committee', to oversee the review process. Secondly, it requires APS management to have two levels of review conducted; safety and technical quality. Finally, it identifies the standing APS safety committees and technical panels that are available to the steering committee to perform the reviews, thus encouraging uniformity and consistency throughout the APS. The same procedure will be used to review designs brought to the APS from external parties, (e.g., beamlines). In this latter case the review action items will be focused on safety, although recommendations regarding technical issues may be included in the report.

1.2 Scope

The philosophy of the APS design review process is that Division Directors are responsible for the designs developed in their divisions¹. This review process has been established to support that objective.

In addition, the AOD Division Director has the following oversight responsibilities:

- Safety and facility operational issues associated with beamline designs done by non-APS designers/engineers and
- Safety issues in critical components for beamlines and front ends.

The Division Director will assess the significance and the potential impact of the new design or engineering change on the APS facility and convene a steering committee to facilitate and coordinate the review process. Depending on the potential impact of the

¹ The AOD Division Director has the oversight responsibilities for conventional construction and plant facilities operations.

change, Division Directors may choose to include individuals from outside of the APS in the steering committee.

If the design uses conventional technology and has a moderate or low potential consequence to APS operations, an internal review panel consisting of scientists and engineers from within the division or APS should be adequate. When additional technical expertise is needed, technical experts from outside of APS should be considered to augment their review panels.

1.3 Applicability

This procedure applies to new projects or design revisions to existing APS systems. This will include mechanical, pressure, cryogenic, electrical, electronic, software, safety and shielding systems.

1.4 References

- DOE Order 414.1A Quality Assurance
- ANL-E Quality Assurance Manual
- APS Quality Assurance Plan (June 2004)
- ANL ES&H Manual

1.5 DEFINITIONS

1.5.1 Critical Component

For the purpose of this procedure a component/system used to provide radiation protection for personnel is considered a *critical component*.

1.5.2 Division Director Review

A Division Director design review is conducted to assess any new or modifications to existing APS technical components that have impact on the APS facility. Division Director reviews will cover the safety aspects of the design, and the technical (e.g., reliability, applicability, alternatives considered) aspects.

Appendix A of the APS QAPP, *The APS Grading Matrix*, can be used for guidance on risk assessment.

1.5.3 Beamline – Front End Safety Review

Safety aspects of designs for beamlines and for front end critical components are the responsibility of the AOD Division Director. In this case the review is for safety and not for technical quality. For APS designed components that fall into this category, it will be normal for a Division Director Review to have taken place before the design is brought to a Beamline – Front End Safety Review. The steering committee is a pre-selected standing committee as noted in section 1.5.4.

1.5.4 Steering Committee

A committee tasked by a Division Director is responsible for overseeing a review process. This committee will be charged by a Division Director to organize the reviews, resolve discrepancies and provide a report to the Division Director on completion of the review with their determination on the adequacy of the design. Responsibilities are defined in Section 2.

In the case of Beamline – Front End Safety Review, APS management has agreed to a standing Beamline Safety Design Review Steering Committee. The committee membership will consist of:

- User Technical Interface Officer
- AOD Technical Operations Specialist
- APS Radiation Safety Shielding Committee Chair
- Critical Components System manager
- AOD Electrical Engineer
- Mechanical Technical Panel Chair
- Conventional Construction Technical Panel Chair
- XOR Representative
- System Interlocks Representative

The names of committee members are available online at

<http://www.aps.anl.gov/About/Committees/index.html>

1.5.5 APS Safety Committee for Design Reviews

A committee made up of the ES&H representative from all APS divisions, the Technical Operations Specialist and the Group Leader of the User ES&H Support Group. The committee will be chaired by the ES&H representative from the requesting division except when the review involves beamlines or critical components. In this case the Technical Operations Specialist will chair the committee. The chair will serve on the steering committee.

1.5.6 Technical Design Review Panel (TDRP)

The role of a TDRP is to evaluate the design quality and engineering value. APS has a number of technical design review panels (chaired by APS experts) that are based on technical specialties, such as mechanical engineering and electrical engineering. Additional panel members (including experts external to the APS) can be recruited for specific design reviews where appropriate.

1.5.7 Project Coordinator

Typically the project coordinator is the individual responsible for executing the project. This may be an engineer, physicist, group leader or associate division director. In the case of a beamline safety review, it is possible that the project coordinator may not be a member of the APS staff.

2 RESPONSIBILITIES

Responsibilities concerning implementation of design review procedures as defined and outlined in this procedure are as follows:

2.1 Associate Lab Director

- Approves the design review procedure;
- Provides the final approval of the design review process as described in the APS Quality Assurance Program Plan and the Conduct of Operations;
- Provides final decisions for cross-divisional projects.

2.2 Division Director

- Identifies a Project Coordinator for every project;
- Assures that the design review process is properly conducted and documented in accord with the APS QAPP and the Conduct of Operations;
- Appoints and defines the charge to the design review Steering Committee;
- Ensures that the review is appropriate for the project risk, (e.g., the Division Director is responsible for recommending external participation.);
- Provides the final approval of the design reviews;
- Provides oversight evaluations for the design review process.

Note: The AOD Division Director is responsible for the safety oversight of beamlines and front end critical components. APS designed components that fall into this category,

will normally have been the subject of a Division Director Review before the design is presented to the Beamline Safety Design Review Steering Committee.

2.3 Steering Committee

The steering committee will:

- For critical components, require that a safety/shielding report be prepared by the APS Radiation Safety Shielding Committee;
- Assure that all safety aspects of the project are reviewed;
- For limited scope reviews the steering committee may carry out the review. Participation can be limited to only those members required for an adequate review;
- For Division Director reviews, assure that technical designs meet project objectives;
- For Beamline - Front End Safety reviews, make a request to the technical panels to review the design if additional technical input is needed to assess a safety issue that was not reviewed during a previous Division Director design review;
- Assure that the depth of review is commensurate with the complexity of the design;
- Combine the outcome of each panel and committee and reconcile any differences;
- Provide advisory report to APS ALD, Division Directors and Group Leaders (as appropriate);
- Ensure that committee reports are made available in the APS document management system.

2.4 APS Safety Committee for Design Reviews

This committee will evaluate all aspects of design safety. Where possible it will review the design, and in other cases it will solicit input from APS standing safety committees. (See [APS Standing Safety Committees](#) on the APS Safety information web page). If this committee believes technical input is needed to assess a safety issue, it will make a request to the Steering Committee to provide a review of the safety issue they have identified. A written report will be provided in a timely manner.

Specifically the committee will:

- Ensure that design adheres to ANL ES&H policies;
 - Ensure that the design meet design standards set by national mechanical, electrical, and radiological protection standards such as the ASME pressure vessel standard, National Electric Code, and 10CFR 835 on Radiological Protection, etc.;
 - Request reviews by APS safety committees when appropriate;
 - Ensure proper identification of radiation safety systems;
 - Ensure that any design for a shutter, beam stop, or any other device in which it is critical to know its status, includes a means to unambiguously identify the status by observation.
-

2.5 APS Radiation Safety Shielding Committee

As part of its responsibilities to provide APS management and APS User community with technically competent advice on the safety of radiation shielding systems at the APS, the committee will:

- Evaluate all new, or changes to existing, critical components designs (including specialized radiation enclosures) and validate that they are within the existing safety envelope;
- Submit written reports of these evaluations, with any recommendations, to Review Steering Committees.

Based upon its design evaluations, as appropriate, the committee shall advise the Division Directors of recommended changes to existing safety envelopes

2.6 Technical Design Review Panels (TDRP)

These panels will meet when requested by the steering committee. It is the responsibility of these panels to ensure the highest technical standards of new designs; promote best engineering values; ensure technological feasibility of the fabrication; ensure the customer input in the design and provide a written report in a timely manner.

2.7 Project Coordinator

The Project Coordinator will:

- Ensure that ES&H and QA/QC requirements are addressed by the designs;
- Assure that adequate documentation has been developed for the design review;
- Submit the design review documents;
- Coordinate the presentations to the APS design review panels and committees;
- Prepare response to findings and recommendations from the design review panels;
- Document all responses.

2.8 Design Staff

The Design Staff will:

- Perform detailed design effort, including design modifications when required;
 - Provide all back-up material required to substantiate design and satisfy all design review scrutiny, as well as ESH and QA/QC requirements;
 - Participate in design reviews as determined by group leaders.
-

2.9 Division Quality Assurance Representative (QAR)

QARs participate in design reviews as follows:

- Assure that acceptance criteria for quality verification are adequately specified in drawings and specifications;
- Recommend improvements/corrections in quality verification criteria;
- Verify completion of agreed upon QA recommendations.

3 DESIGN REVIEW PROCEDURE

3.1 Overview

The design review procedure consists of a series of evaluations to determine the adequacy of a design in meeting its specified performance and operation.

3.2 Prerequisite Action

For APS design/engineering efforts covered by this procedure the responsible Division Director will assign a Project Coordinator. For non-APS managed beamline design/engineering efforts the beamline management will assign a Project Coordinator.

3.3 Design Review Procedure Flow

The design review procedure flow is shown in Figure 1. The Project Coordinator will submit the necessary design documentation commensurate with the level of review as defined by the steering committee. Figure 1 depicts the review process as a hierarchically organized information flow from the Project Coordinator, through the Division Director to the review steering committee. The committee is responsible to see that the appropriate reviews take place. Review process steps:

1. Project Coordinator submits request to the appropriate Division Director for review
2. The Division Director:
 - a. evaluates the submission,
 - b. forms a steering committee, and
 - c. provides a charge to the committee requesting a review.
3. The Steering Committee
 - a. Evaluates the submission,

- b. Arranges for Project Coordinator presentations as required, and
 - c. Requests reviews by the appropriate safety committees and technical panels.
 4. The safety committees and technical review designs and report to the steering committee.
 5. The Steering Committee:
 - a. integrates the input from the panels and safety committees,
 - b. if clarifications of designs or additional information, is required, or if prompt corrective actions is sought, the steering committee chair notifies the project coordinator, and
 - c. provides a report to the requesting Division Director.
 6. The Division Director notifies the Project Coordinator if the project is approved.
 7. If the project crosses APS Divisions, the review is forwarded to the ALD for approval.
 8. The Project Coordinator is advised if the designs have been approved.

3.4 Division Director and Beamline – Front End Safety Reviews

3.4.1 Division Director Design Review

The Division Director design reviews ensure that the design will achieve project goals and meet all safety requirements and guidelines. The steering committee, chosen by the Division Director will utilize the APS Safety Committee for Design Reviews to assess all safety issues. All standing APS safety committees are available to this committee for more detailed analysis. Technical reviews will be conducted by technical panels. The technical content of this review is supported by the design package of drawings, specifications, and calculations/analyses. The steering committee will resolve discrepancies and redirect questions that arise.

3.4.2 Beamline – Front End Safety Review

The external beamline Project Coordinator or APS Project Coordinator for a critical component design submits their design package to the AOD Division Director. The AOD Division Director will utilize the APS Beamline Safety Design Review Steering Committee to coordinate these reviews. This committee will organize the review using standing APS safety committees including the ‘APS Safety Committee for Design

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Reviews' and the APS Radiation Safety Shielding Committee. The technical panels may be enlisted to answer question related to safety as brought forth by the safety committees reviews.

APS designed front end and beamline critical components will normally have been the subject of a Division Director Review before they are presented to the Beamline Safety Design Review Steering Committee. The report from the first review will be made available to the APS Beamline Safety Design Review Steering Committee.

Critical component designs that are different from existing approved designs or that will be used in a different context will be submitted at the conceptual level to the AOD Division Director. The AOD Division Director may choose to have the committee review the concept before further design work is done. In any case a final design review of critical components will also take place prior to construction/installation.

3.5 Records

Design review documents, recommendations, and design changes resulting from the design review process will be the kept in the APS document management system.

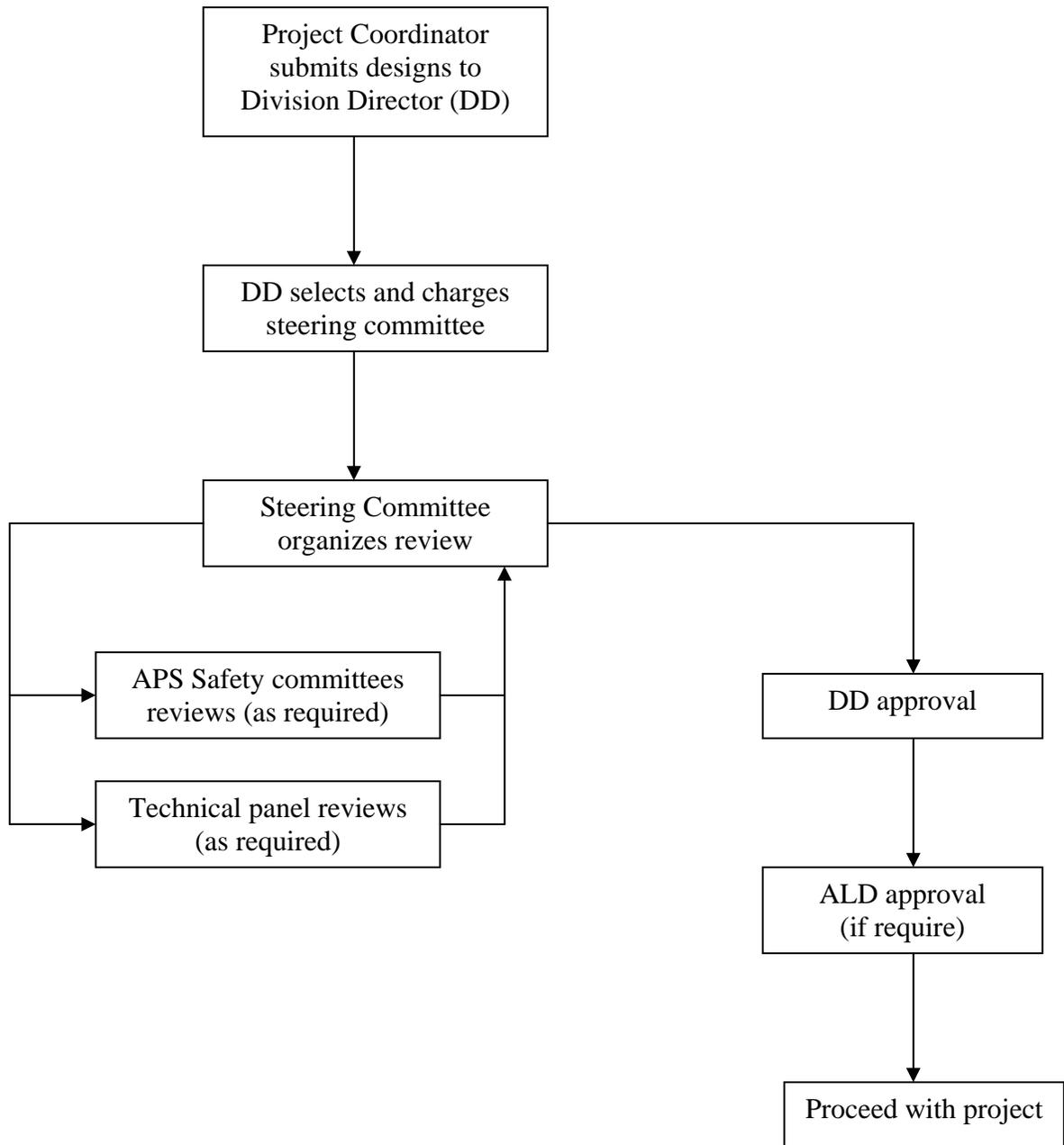


Figure 1. Design Review Procedure Flow