



Review of Major SSC Experiments

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Abstract:

The requirements for the review process of a major SSC experiment are stated. In addition, the schedule for the GEM Detector review is given.

REVIEW OF MAJOR SSC EXPERIMENTS

PURPOSE OF REVIEW:

The Technical Design Report (TDR) and associated documents will be the basis for a detailed evaluation of the proposed experiment by the SSC Laboratory, in consultation with the Program Advisory Committee (PAC), and by the DOE in accordance with their respective responsibilities in defining and overseeing the scientific program. The purpose of this evaluation is to ascertain that the scientific goals stated in the Letter of Intent can be accomplished, that the proposed detector is technically feasible, and that the collaboration has the resources and organization to build the detector according to specifications, on schedule and within the available budget.

The evaluation of a major SSC experiment will proceed in two stages:

STAGE I

The first stage will be primarily the responsibility of the Laboratory which will call on the advice of the PAC, augmented by a number of advisors with expertise in specific technical systems, engineering, fabrication, costing, and project management. It is the purpose of this first round to evaluate the scientific merit, the technical feasibility, the collaboration resources and management, as well as the proposed cost and schedule. The review will be based on the TDR and drafts of the associated documents. A satisfactory review will result in approval of the scientific, technical, cost and schedule goals for the project baseline and a recommendation that the collaboration proceed to draft agreements among the collaborating institutions.

STAGE II

The second stage follows agreement between the SSCL and the collaboration on the baseline and a credible funding plan, and will involve primarily representatives of the Department of Energy. It will consist of a detailed analysis of the proposed technical, cost, schedule, and management baseline of the project. The review will examine the TDR, the detector-specific Project Management Plan (including plans for quality implementation and advanced acquisition), the status of plans and agreements for institutional assignments, the Cost and Schedule (by WBS), and the Conceptual Safety Analysis Report. A satisfactory review of the project will result in the acceptance of the baseline of the project by the DOE and will permit the Laboratory to initiate the construction of the detector.

CONTENT OF TECHNICAL DESIGN REPORT

The Technical Design Report (TDR) for a major detector should define its scientific goals and technical design and thus represents a very important document for an experimental program that is projected to extend over many years. The total length (including figures, tables, etc.) should not exceed 750 pages. The TDR should include:

- A list of individual members of the collaboration by institution, indicating the contact persons at each institution.
- A description of the physics goals of the proposed experiment and a demonstration of the capabilities of the proposed detector to address those physics goals.
- A description of the proposed detector, including the overall layout and choice of technologies. Major SSC detector projects can be divided into the following subsystems:
 - a) superconducting magnet;
 - b) tracking systems;
 - c) calorimeters
 - d) muon system;
 - e) electronics, trigger, data acquisition and on-line computing .

For each of these subsystems, the TDR or accompanying Cost and Schedule (including WBS dictionary) and detector-specific Project Management Plan (including plans for quality implementation, advanced acquisition, and configuration management) should contain details on:

- design requirements and performance goals,
- selection of technology and potential risks,
- performance and cost optimization,
- performance of similar systems and R&D results,
- future R&D and prototyping,
- conceptual design of electronics and readout,
- calibration/alignment schemes, and monitoring,
- fabrication methods,
- assembly and installation,
- procedures for maintenance and repairs,
- test beam needs at SSCL and elsewhere,
- costs, schedule, and funding profile
- options for staging and upgrades,
- potential environmental and safety issues, and
- subsystem management and responsibilities of individual institutions for this subsystem.

- A description of the requirements for the interaction hall and surface facilities, and a list of other resources required from the SSCL.
- An overall plan for assembly, installation, and commissioning of the detector.
- A list of the Environment, Safety, and Health (ES&H) considerations.

In addition, the documents should include:

- A description of the organization and management of the collaboration, as well as interactions with the SSCL.
- A description of the resources of the collaboration in terms of equipment, engineering and fabrication facilities, personnel (engineers, technicians, research scientists), and financial support. The distribution of responsibilities among the members of the collaboration.
- The projected total project cost, including a WBS dictionary, a funding profile, and the project schedule with major milestones. The cost should be expressed in FY1992 dollars, using "U.S. accounting methods," and should include all detector-specific R&D/engineering costs.
- A summary of the financial resources of the collaboration, broken out by WBS in FY1992 dollars, for each fiscal year.
- A list of associated technical notes and publications.

SCHEDULE AND ORGANIZATION OF GEM REVIEW

TDR REVIEW: May 24-29, 1993

During the week-long review of its TDR, the Gamma-Electron-Muon (GEM) Collaboration will be given ample time to present the project and to interact with the committee members.

The first day will be reserved for an overview of the project presented by the collaboration in a plenary (and public) session. This will be followed by several days of work in parallel sessions during which the committee members will be given more detailed presentations and have a chance to clarify issues not addressed in the summary. The remaining time will be reserved for preparation of the summary reports and lists of issues that need further attention or clarification. Following oral reports by the subcommittees, written reports to the SSCL will be formulated and discussed.

The members of the review committee (PAC plus experts) will be grouped into two sets of subcommittees with overlapping membership. The first set of subcommittees will meet on days two and three and will focus on the subsystems listed above. The second set of subcommittees will meet on days four and five to address more global issues:

- a) IR facilities, detector integration and installation, safety analysis;
- b) physics performance, trigger, optimization and integration;
- c) cost and schedule; and
- d) collaboration management and resources.

With the overlap in membership of the two sets of subcommittees, detailed information concerning specific subsystems can be transferred to the sessions addressing global project issues; in particular, cost, schedule, and resources as well as detector installation and ES&H issues. The evaluation of the cost and schedule is a very important step towards the preparation of a credible baseline plan for the project.

PAC SUMMER MEETING: July 31 - August 6, 1993

During the week-long meeting in July, the PAC will review the status of the GEM TDR evaluation and address any issues left unresolved from the earlier meeting. The GEM spokespersons and key personnel are expected to be available for brief presentations and interactions with PAC members. It is hoped that at this meeting, the PAC, after reviewing the GEM TDR and the overall initial experimental program, will be able to recommend that GEM proceed with the Laboratory to formulate the baseline to be presented to DOE and to draft agreements with the collaborating institutions.

Following a positive recommendation by the PAC and the approval by the SSCL director to proceed towards the establishment of the project baseline in detail, the Laboratory and collaboration will prepare and submit the following documents:

- Technical Design Report, including updates and addenda;
- Cost and Schedule (including WBS dictionary) identifying separately procurements by the SSC Laboratory as opposed to other funding agencies in the US and abroad, and matched to the projected funding profile for the major SSC detectors;
- GEM Project Management Plan, including plans for quality implementation and advanced acquisitions;
- Safety Analysis Report; and
- Funding Plan, including the status of agreements.

The DOE will organize a thorough review of these documents. An evaluation of resources realistically available to the U.S. and foreign institutions combined with assessment of the management, cost, schedule, and technical risks will form the basis of the review. It is anticipated that the process of arriving at an approved GEM baseline will take several months.

A summary of the proposed schedule and the projected results for the evaluation of the GEM project is appended below.

SUMMARY SCHEDULE FOR REVIEW OF GEM

- April 1, 1993 Deadline for drafts of Project Cost and Schedule, Project Management Plan, and Conceptual Safety Analysis Report
- April 30, 1993 Deadline for TDR
- May 24 - 29, 1993 Review of TDR and draft plans (at SSCL)
Focus: - Scientific merit
 - Technical feasibility
 - Collaboration resources, organization, management
 - Cost and schedule
- Projected Results: - Detailed evaluation of the GEM project
 - Action items for further study and clarification
 - Cost and schedule goals for GEM baseline
- July 15, 1993 Deadline for written response to TDR Review
- July 31 - Aug. 6, 1993 PAC Meeting at Santa Fe, NM (tentative)
Focus: - Closure on action items from May review
 - GEM in context of total SSC program
- Projected Results: - Recommendation to formulate the GEM baseline and to draft agreements with participating institutions.

If the July review results in a recommendation to proceed with the formulation of the GEM baseline, the tentative schedule is:

- October, 1993
(tentative date) Deadline for proposed baseline Cost and Schedule, and Funding Plan and final versions of GEM Project Management Plan and Conceptual Safety Analysis Report
- October, 1993 DOE Project Review (at SSCL)
Focus: - Detailed review of GEM the baseline
 - Management plan (in-depth review)
 - Status of agreements & plan for institutional assignments (US and foreign)
 - Operations (plans for QA, safety, acquisitions, detector operating procedures, etc.)
- Projected Results: - Report to DOE/ER Management
 - GEM baseline presented by Laboratory approved by DOE.