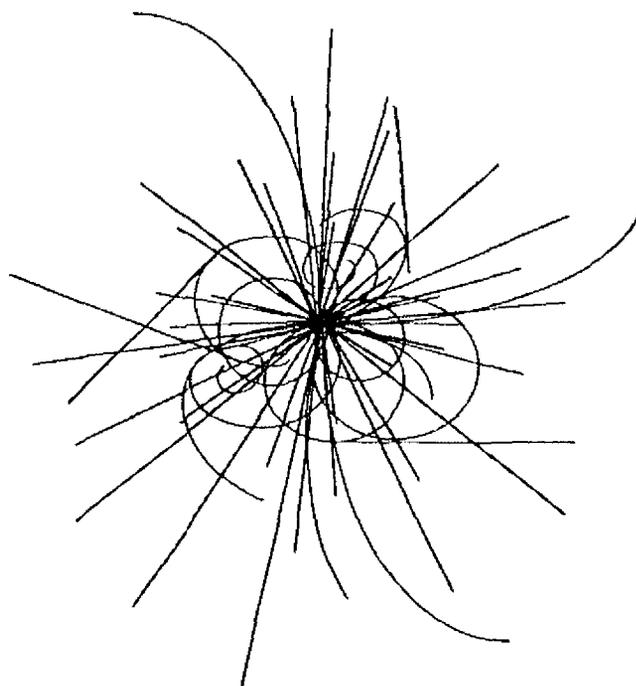


SSC PROJECT
MONTHLY PROGRESS
REPORT
MAY 1990



SSC

LABORATORY

SSC PROJECT

MONTHLY PROGRESS REPORT

Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
I.	EXECUTIVE SUMMARY.....	1
II.	TECHNICAL SYSTEMS.....	2
III.	CONVENTIONAL CONSTRUCTION.....	11
IV.	PROJECT MANAGEMENT and SUPPORT.....	14
V.	R&D, PRE-OPERATIONS, and ADMINISTRATION and SUPPORT	19
VI.	EXPERIMENTAL SYSTEMS.....	47
VII.	LAB OPERATIONS SUPPORT.....	48
VIII.	COST/SCHEDULE DATA	
	1. CPR, Format 1.....	51
	2. CPR, Format 2.....	62
	3. Major Subcontractor List.....	63
IX.	MILESTONE STATUS REPORTS.....	64
X.	MEETINGS AND EVENTS.....	70

EXECUTIVE SUMMARY

Cold testing of magnet DD0027 continued at Fermilab. Upon completion of the first set of tests, the magnet was warmed up to room temperature and then re-cooled. As part of a continuing study of quench training behavior, the magnet was then quench tested at 4.35K without conditioning during this second thermal cycle. The results of the second cold magnet showed more re-training than other recent magnets. The first quench in this cycle was at 6223A and four additional quenches were recorded before the magnet returned to its nominal short sample current of about 6850A. Analysis of the quench origins and mechanical sensor data is continuing in a effort to further understand the observed re-training behavior.

Work continues to refine the requirements for both surface and underground structures for the Accelerator System String Test facility and the Prototype Installation Facility tunnel segment.

Major efforts in all divisions were devoted to preparations for the June baseline validation review, including work on the conceptual design, technical requirements, cost estimate, master schedule and funding profiles, project management plan, magnet acquisition plan, etc. More than 75 sets of documentation were mailed to review committee members.

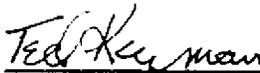
The Machine Advisory Committee met on May 4-5 at the SSC Laboratory. They suggested that the HEB should operate with alternate polarity on each accelerating cycle and use 50mm aperture magnets, and argued that a dipole magnet life test was crucial to the demonstration of an accelerator quality magnet.

The Directorate approved two new educational programs. The Summer Intern program offers high school and undergraduate students employment at the SSCL for specified terms such as summer or a school semester. Twenty-nine interns have been selected for the summer of 1990. The Co-op program will offer undergraduates alternating periods of study at their college or university and work at the SSCL. Ten students are expected to be participating in this program during the fall 1990 semester.

Fourteen expressions of interest in research at the SSC were received by the May 25 deadline, representing some 1,900 scientists from many countries.

The laboratory's first large scale theoretical physics conference, "New Topics in Electroweak Physics", was held on May 30 - June 1. Among the new ideas discussed was the possibility that the weak interactions might become strong at SSC energies, yielding spectacular events with dozens of W, Z and Higgs bosons.

As of May 31, the laboratory had a total of 625 employees.



Ted Kozman
Deputy Project Manager
SSC Laboratory

TECHNICAL SYSTEMS (WBS 1.0)

ACCELERATOR SYSTEMS (WBS 1.1)

(SEE SECTION 4.0 - R&D, PRE-OPERATIONS, AND ADMINISTRATION AND SUPPORT)

MAGNET SYSTEMS (WBS 1.2)

• MANAGEMENT AND SUPPORT (WBS 1.2.1)

The Magnet Research and Development Plan has been reviewed in depth with the Accelerator Division. An Executive Summary of the R&D Plan is in final review and will be released in early June.

Additional effort has been devoted to finalizing cost estimates in support of the DOE cost review scheduled for June 26 - 29 . Dry runs of the formal presentation will be presented to management in early June.

Engineering supported the Magnet Systems Integration Meeting held at SSCL and action items generated during the meeting are presently in work.

The MSD Administrative Assistant visited FNAL for the purpose of evaluating the administrative needs of our office staff there. Considerable time was spent with Nancy Theis, the Project Secretary, to establish procedures for procurement, materials management, office set-up, equipment, communications and more. Some problems associated with start-up have been experienced, i.e., the lack of equipment, phones, supplies, facilities and basic operational procedures relative to SSCL. The SSC staff moved into their trailer on May 24, and phones were installed a few days later. Restrooms will not be installed until approval is obtained from the DOE for installation of above ground septic tanks. The basis for approval centers on environmental issues.

We have established procedures to assist the SSC staff at FNAL in obtaining the equipment they need to get started. Good communications channels have been established between our office and the Fermi Project Office with key contact persons being designated. This should enable us to keep abreast of problems that arise and to assist our SSC staff in performing the administrative tasks necessary to make this project run smoothly.

A Collider Dipole Magnet (CDM) RFP Review Team of 6 DOE personnel was at MSD on May 21 - 22 for review and approval of the draft prior to release to industry on May 25. Requests were received from 44 industry firms for this draft RFP. Industry, DOE, MSD, and SSCL "Red Team" comments to this draft RFP were requested by June 6. Industry bidder's briefing is scheduled for June 8.

The Magnet Division Master Schedule initial draft was prepared and distributed to Group Leaders for review and comments. Upon approval by Magnet Division's Associate Director, the Master Schedule will go under formal change control. Work continues on development of detail schedules to support the Master Schedule. Effort is being concentrated initially on the Collider Dipole Magnets. Detailed schedules will be developed for each of the superconducting magnets.

• HEB MAGNETS (WBS 1.2.2)

HEB Dipole Program

The 50mm collider dipole was analyzed for its suitability as an HEB dipole. The magnet design was changed to reflect 2.5 micron filament conductor to minimize the AC loss problems associated with pulsed operation. Preliminary indications show that, with a modified beam tube and 2.5 micron conductor, the heating due to AC loss can be removed with one phase helium flow. The issue of field quality requirements based on slow extraction is now under study in conjunction with the Accelerator group.

The SCDR was rewritten based on the 50mm design and the problems associated with pulsed operation. The requirement of a 27.6mm sagitta was pointed out and a program to understand its effect on the magnet has been started. Presentations were made to the Machine Advisory Committee and the Board of Overseers on the present status of the design and the problems still requiring resolution.

• COLLIDER MAGNETS (WBS 1.2.3)

TEST

Cold testing of magnet DD0027 continued in May. In its initial cold test in April, the magnet was 'conditioned' at 3.5K (run to ~6800A several times without quenching) prior to its quench tests at 4.35K. Upon completion of the first set of tests, the magnet was warmed up to room temperature and then re-cooled: a 'thermal cycle'. As part of a continuing study of quench training behavior, the magnet was then quench tested at 4.35K without conditioning during this second thermal cycle.

The results of the second cold test period were somewhat surprising in that the magnet showed more re-training than other recent magnets. The first quench in this cycle was at 6223A and four additional quenches were recorded before the magnet had returned to its nominal short sample current of about 6850A. Analysis of the quench origins and mechanical sensor data is continuing in a effort to further understand the observed re-training behavior.

The magnet measurements program continued during this test period with both warm and cold field quality data being acquired. Several axial scans of the field were completed as well as continued studies of time dependence of magnetization currents and other systematic studies of field quality. The planning and development of the SSCL Magnet Test Laboratory (MTL) has continued at a high level. The Concurrent 6450 VME computer was delivered and installed. Associated VME and CAMAC crates and modules have also been delivered so that development of data acquisition software can begin. MTL measurement and control subsystem costing is now complete. Total costs are in line with earlier estimates, and can now be justified in some detail. With the decision to site the MTL at E1 (in conjunction with the ASST facility) facilities design is now proceeding apace.

Development of magnetic measurement systems, including integration into the overall MTL control software scheme, has been given a high priority. To accelerate systems development, BNL has agreed to give SSC a rotating coil magnet survey system immediately and provide a measuring device of its most recent design ('mole' D3) within about 6 months.

A 'Measurements and Acceptance' workshop, jointly hosted by the Magnet Systems and Accelerator Systems Divisions, was held on May 17 - 18. Attendees heard reports from the HERA project at DESY, reviews of the Tevatron magnet experience at FNAL, as well as discussions of plans for measurement of SSC magnets. The progress observed in production and measurement techniques from the early FNAL work to the recent DESY effort was impressive. The SSCL program should follow as a third generation of superconducting accelerator magnet production with further improvements in techniques and quality control.

The Data Management section continues work on the MagCom database. A new table has been created which describes features of individual magnets and work is underway to enter and verify data for recent and upcoming magnets. Improvements have been made in the cable data summary report system to make the report generation more stable against changes in the database during this development period. The table generation has now been separated into a Unix shell script and the report is created by the Sybase report generator.

QA

Only two Quality Technicians and one Quality Engineer accepted positions for the Fermilab Industrialization effort reported last month. An offer for a Project Engineer - Quality is being prepared. Eight additional candidates for Quality Technician (QT) have been scheduled for interviews at Fermilab early next month. There are three QT slots remaining to be filled. In addition, Magnet Systems received a request for Quality Engineering support for the Lawrence Berkeley Laboratory quadrupole program. We anticipate that the position will be filled by someone from the San Francisco area and that person will continue later in a quality role for the SSCL at the quadrupole contractor's facility.

We have requested comments by June 29 from industry on draft superconducting wire specifications. Most comments are expected to be on data reporting requirements, testing frequency, process control, non-conforming material control and safeguarding of proprietary information. Proposed language was provided to production for inclusion in the Statement of Work for a Superconductor Supplier Qualification Program.

In addition to the cable data base status reported last month, there have been some macro programs developed for SYSTAT to analyze CMM data for Inner and Outer cable. The programs provide user-friendly menus and prompts to isolate the user from the internal syntax and command level requirements of the system. Work started on a measurements verification plan to be implemented for all superconductor suppliers. Accomplishment of the plan will provide confidence in data base information provided by the suppliers.

Two requests for waivers on superconducting cable were processed. One request pertained to cable produced from a 14 inch R&D billet that did not meet flatness requirements due to excessive strand springback; the request was not granted. The other request, from the same manufacturer but a different billet of material, also pertained to springback. The second request was granted on the first increment of cable presented for acceptance. Follow-on deliveries will be evaluated on a case-by-case basis. The company involved was asked to provide a report on the cause and the proposed corrective action.

A representative attended the American Supplier Institute presentation on Total Quality Management in Washington, D.C. and two QA personnel attended the American Society for Quality Control (ASQC) course on Quality Engineering and the ASQC course on Managing for Quality.

Work continued on development of fundamental quality assurance procedures such as: purchase requisitioning; guidelines for sole source justification; audit of subcontractors; and receipt inspection of incoming material. Identification of the basic metrology requirements for the Magnet Evaluation Lab (MEL) and supplier sources of metrology equipment have been completed. Requisitions will be issued for the equipment as soon as lease arrangements for the MEL are finalized. A gaging systems company demonstrated a non-contact video measurement machine, the IQ-2000, which is capable of performing the duties of a coordinate measurement machine and an optical comparator. The IQ-2000 is faster and more accurate. This machine will likely be selected as the workhorse for measurements in receipt inspection for the Magnet Division.

ENGINEERING

Magnetic Cold Mass Design and Analysis

Several new dipole design options with high field quality and different number of wedges have been generated and a report is being prepared.

A 5 cm wedgeless quadrupole design with no turn overhang has been generated. The design has a high transfer function corresponding to 25% more turns.

TOSCA runs for coil end turn field calculations are being carried out and preliminary results on magnetic length, forces and field quality are expected to be available by the end of June.

Eddy current calculations have been performed for the beam tube. The results indicate that slots in the copper plating do not have significant effect on quench forces. Calculations including the heating of the copper plating are being carried out to calculate the total quench impulse on the beam tube.

Eddy current calculations are being carried out for the coller end assembly and will be completed soon.

A persistent current code is being written and initial results show a reasonable agreement with LBL calculations and measurements. However, significant aspects of the magnetization still require to be coded in to model the complete magnetization loop.

Mechanical Design and Analysis

The ANSYS analysis of the DSX201 horizontally split yoke configuration has been completed and the antiovalization of the collar is shown to cause all around collar-yoke gap until 4800A. Analysis is being carried out for High Manganese steel and for horizontally ovalized collars.

ANSYS analysis has been completed for the Al Bar design and the results confirms the expected favorable behavior of the configuration. A collaring prestress of 35Mpa is adequate and after cooldown the prestress rises to the required value of 65Mpa.

3D ANSYS analysis on the skin stress at the edge of the yoke has been carried out and two methods to reduce the bending stress due to differential shrinkage are being evaluated: a) an overhang of yoke material supporting the skin; and b) a cushioning layer of aluminum. Initial results indicate that improvements do not give adequate stress relief. Further analysis will continue.

ANSYS analysis of the collaring tooling has been carried out and the total compression of 0.5mm and a flange bending of 0.1mm is calculated for the I-beam applying the collaring load at nominal loading condition. This is a large deflection and therefore the effect of misalignments could have deleterious effect on the performance of the tooling. Effect of non-straightness of the flanges and I-beam alignment will be analyzed.

ANSYS stress analysis has been carried out for curing tooling and the analysis is being extended to thermal distribution and stress.

Some end parts for the FNAL magnets have been received and evaluation of the coil winding has exposed some machining programming flaw. While winding with these parts is proceeding, corrections are being carried out. The vendor development for machining of these parts is being continued intensively, including obtaining budgetary quotes.

Minco prefabricated quench heaters have been received and will be tested for mechanical loading in BNL. Optimally patterned heaters have been ordered and will be tested in a short magnet.

The Field Quality Study to assess the sensitivity of the field quality to manufacturing tolerances and material variables is continuing. The Monte Carlo model to assess variations in magnet assembly tolerances has been exercised and results are being analyzed.

The SSCL SI Units of Measure Standard has been completed and is scheduled for release in early June. All SSC drawings will be converted to SI units of measure.

Interconnect Region and Bus Assembly Design

Efforts in support of the interconnect region and bus assembly is continuing on schedule. An in-house interconnect program status/design review was held and presentations were made to the Accelerator Division staff to apprise them of the IR status. FNAL participated in some of these meetings to ensure continuity between the labs.

A contract has been signed with MIT for support of conceptual design and requirements definition of stabilization and lead soldering. Other tasks are being negotiated in the area of cryostability and main leads.

A test and manufacturing capability has been established with LTV with the placement of a Task Ordering Agreement. This contract is open to all SSCL organizations with quick turn-around tasks in the area of small fabrication needs and test.

Materials Engineering

Materials Engineering was visited by representatives of Composite Technology Development, a small company in Boulder, CO that specializes in performing R&D in the area of composite organic materials. They have in-house capability for formulating epoxy and other polymeric materials, making test specimens (including reinforcement), and doing cryogenic mechanical tests. They also have been doing a lot of work for the fusion people, so they also have experience and contacts in radiation testing. We are in the process of placing a contract with this firm to help us validate the present cable insulation as our baseline approach as well as develop a backup scheme in case the baseline proves to be inadequate.

We envision that this company will also be of assistance in developing candidate materials from which to make molded end parts, as well as cryostat support posts.

Discussions are being held with ARMCO, later to include other companies, to determine a suitable experimental program that will help us write the specification for the yoke iron. ARMCO apparently is planning to set up a pilot plant to determine if they want to produce magnetic steel up to 6.35mm thick.

Materials Engineering is working with FNAL to specify the cold mass shell material. For the vertically split dipole, in order to keep the shell thickness at 4.75mm, one would like a little more yield stress than conventional 304 SS would provide. Several options are under consideration, such as tightening the composition specification for the 304, or trying other materials.

Conceptual design of a fixture that will be used in the cable insulation tests has started. The tests will be performed on curved stacks of the DSX201 cross section.

ENGINEERING LABORATORY

Work has progressed on the acquisition of equipment needed to set up the development laboratory. This includes a basic set of test equipment and workstations. Most of the equipment has been received and is in storage because the Magnet Evaluation Lab (MEL) facility is not yet ready.

Work on a conceptual design of the data acquisition system and the power supply node has begun in earnest. The specification and design of the dewars for the cable test facility and the magnet test facility are well under way and should be ready for release within the next month. Development of the cable sample holder at LBL is also continuing but has had a setback; the last group of prototypes exhibited excessive quenching. The holders were disassembled and some problems were found that will be corrected. The samples will be redone and sent to BNL for testing and results should be available in July.

The program is being hindered by the difficulty in hiring qualified engineers. Further delay can seriously jeopardize the development schedule. In addition, the delay in occupying the MEL is beginning to add delays to the program. These two sources of delay have caused a slip from Spring '91 to Fall '91 before the facility will be ready to test short magnets.

CRYOSTAT DESIGN

Cooling studies (single and two-phase flow) were performed in support of the HEB activities and feasibility study of using the 50mm SSC dipole as the HEB magnet system.

Design of the cryostat for the collider quadrupole magnet was initiated during the month.

Conceptual design of the thermal bridges and MLI associated with the interconnects continues.

Cryostat engineering staff visited DESY to observe activities relating to their cryostat design and build efforts and to accomplish a transfer of technology.

The contract with EQE has been reinstated to permit completion of their work on a structural dynamic model of the 40mm aperture long dipole magnet.

Design for fabrication of prototype magnet stands continues.

QUENCH PROGRAM

The area of quench detection, modelling, and protection has been included in the development plan. Work continues on development of a quench modeling program that will bring together more factors in the model than previously has been used.

COMPUTER AIDED DESIGN SYSTEM (CADS)

A preliminary MSD Drawing Release Procedure has been completed and is in review.

936 magnet drawings have been received from BNL and logged into Document Control. A listing of all drawings is available in the MSD Document Control Room.

3D layouts of the re-entrant support post and CDM have been initiated in support of FNAL.

Drawings of the outer return end pieces have been started. Revisions to the roller bearing alignment support have also been input to the CAD database.

A preliminary set of drawings of the 27" pipe end seal has been completed and is in review by engineering. Drawings of the new interconnect design have been initiated.

CAD drawings have been completed on the following tooling: SSC NC17M, Magnet Coil Transport Fixtures, and Magnet Production-Spooler Device.

Evaluations of electronic imaging, the implementation process, industry standards and legal issues continued through attendance of the Optek Conference in Washington, D.C.

CAD Support to FNAL

Six CAD workstations have been installed and configured at FNAL. MSD CAD designers are on board and supporting FNAL needs. Work is continuing in support of FNAL on revisions to the vertical split 50mm SSC dipole.

SYSTEMS ENGINEERING

Systems Engineering began updating the collider dipole magnet prime item development specification (PIDS) to fill-in areas identified in the prior version as TBDs. All TBDs are planned to be completed prior to formal RFP release to industry.

The Magnet Division Requirements Notebook was completed and released for publication.

A comparison of the new SCDR Superconducting Magnet Section and the CDM PIDS has been completed to identify revisions to collider magnet system requirements and to maintain traceability.

An interface control working group (ICWG) has been established to assist in the development of interface control documents (ICD) for magnet to external subsystems interfaces.

A strawman interface control drawing has been developed to define the interface between the collider dipole magnet and the spoolpiece.

Development of the CDM interconnect region critical item development specification has been initiated.

Development of the preliminary collider quadrupole PIDS has also been initiated.

Updates to the superconducting magnets parameters matrix were prepared based on revised program requirements for both performance and deliverables.

Reliability

A preliminary functional analysis of the CDM was completed and distributed to the MSD staff for review and comment.

A briefing has been prepared for in-house presentation to address the design and system performance issues relating to magnet reliability and availability.

Configuration Management

The MSD Systems Engineering section has been identified as the focal point for coordination of all MSD drawings. A trial run of the first drawing to be released was initiated using the newly developed drawing release procedure.

MAGNET FACILITIES EQUIPMENT AND TOOLING (WBS 1.2.4)

Efforts leading to the development of a cable and short magnet test facility continues. The development plan and schedule includes a discussion of the efforts leading to the prototyping and operation of a short sample cable test facility and a short magnet test facility. Assessment of the approach for procurement of a cabling machine and its location continues.

MAGNET EVALUATION LAB (MEL)

The contract for facility improvements including installation of a 15-ton overhead crane, HVAC, etc, has been approved and the work is scheduled to be completed by the end of July.

A safety review of the MEL is scheduled for June 8.

DD0018 electrical tests, including impulse testing, have been completed and a formal report documenting the results has been published. All BNL results were replicated.

Formal DD0018 disassembly instructions were prepared, reviewed and approved and disassembly of DD0018 cold mass was started May 22. To date, the interconnect region has been disassembled and skin removal has started.

MAGNET DEVELOPMENT LAB (MDL)

Two large deliveries of skinning press structural members have been received. The parts are temporarily being stored in Building 2 adjacent to the MEL.

The long coil winder RFQ was issued April 27. Bids are due June 10.

Detailed design of the collaring press is in process.

An RFP for a Beam Tube Wrapper was prepared and approved. The RFQ is in process.

Hardware and software for use in development of equipment control and data acquisition has been ordered.

Miscellaneous

A "bottoms up" cost estimate for tooling and labor associated with production of SSC and HEB superconducting magnets was prepared.

A private consultant, well versed in estimation methods using learning curves, was utilized at the lab during the month. He reviewed the dipole material cost estimates and his assessment was that the learning factors we used were conservative as compared to the results he would anticipate over the life of the project.

Two working groups were established during the month; the Interface Control Working Group and the Shop Steering Committee. Mike Caracciolo will represent Production Engineering on these groups.

Specifications have been completed on a TV weld monitoring system for the cold mass autowelder at FNAL. The RFQ should be released within the next month.

CONVENTIONAL CONSTRUCTION (WBS 2.0)

DIVISION MANAGEMENT & ADMINISTRATION (2.5.2.1)

Input to the updated SCDR was reviewed and revised. Planning and cost estimating activity concentrated on preparation for the DOE review on June 25-28. Schedules are being developed and revised in close coordination with Accelerator Division and the Technical Director. Direction continued of the pre-design activities for the Accelerator Systems String Test (ASST) and Prototype Installation Facility (PIF). Joint infrastructure planning with TNRLC continued. Pre-negotiations were held with the PB/MK team in preparation for award of the architect engineer/construction manager (A-E/CM) contract.

Work continued on plans for interfacing CCD with the future SSC A-E/CM. Meetings were held with TNRLC staff to discuss the exact nature of the "inducements" set forth in the Texas proposal regarding the design and construction of infrastructure serving the SSC. At the end of the month, these issues were still to be clarified.

MAJOR STUDIES (2.5.2.2)

Surface Transportation Study

Coordination meetings have been scheduled with DOE, TNRLC and ANL.

Building Space Requirements

Studies continued on space requirements. Since the January, 1990 presentation the population estimate has been reduced by 500 personnel. This has drastically altered space needs, which are being reanalyzed.

Utility Requirements

RTK continues to study SSC electrical and water supply requirements. Coordination meetings have been scheduled with DOE and TNRLC and reports are being prepared.

Overall Site Development Plan

Work with TNRLC continued regarding acceptance of improvements on real estate to be acquired and conveyed to DOE.

Vegetative Stabilization Program

This site-specific study and design of revegetation/stabilization of SSC spoils disposal sites at service area and east and west campuses will be primarily accomplished by a subcontractor who has not yet been selected.

• DESIGN CRITERIA (2.5.2.3)

Work continued in May to refine programming requirements for both surface and underground structures for the prototype installation facility (PIF) tunnel segment and the Accelerator Systems String Test (ASST) facility. Sketches and CADD drawings continue to be developed which define the relationship of these structures with the collider ring alcoves, niches, shafts, and shaft connections. Magnet transport and delivery considerations required a 55-ft F shaft at E-7. Space requirements were defined well enough to allow for preliminary design of the PIF facilities. Preliminary design is being done by RTK with CCD providing the laboratory interface with RTK.

Work continued on updating the SCDR to represent the basis for the recommended cost estimates, and to finalize coordination with technical division requirements. The conceptual designs for the EMPACT and BCD detector halls were further developed. Alternative collision hall concepts were studied in an effort to reduce costs. Revised shaft sizes and configurations were included, as well as reduced square footage in numerous building footprints.

Programming for the Linear Accelerator (LINAC) continued. Incorporated into this study was the relationship of the depth of LINAC to LEB, MEB, and HEB relative to radiation shielding needs. This analysis was completed and presented to Accelerator Division for their analysis and final determination.

Study continued on the design and construction of the ASST facility. Programming requirements were clarified in greater detail for the structure's associated cryogenic systems, technical systems, and surface facilities. The ASST structure, as currently envisioned, will consist of a surface structure approximately one-half kilometer in length, in which strings of magnets can be assembled and tested. It will share surface facilities for the PIF which will subsequently be utilized for the E-1 site to support the collider ring. Based upon cost modeling and personal safety issues, the envelope of the string was determined to match the 12-ft inside diameter of the tunnel with exterior insulation and expansion joints at appropriate intervals expressed as concrete "boxes" which incorporate HVAC on top and egress on the sides. Site configuration of surface facilities was analyzed and returned to RTK with SSC input for final schematic configuration.

Input was provided to the new baseline scheduling effort and to the Engineering Standards Committee. Scheduling input took the form of estimating contract packaging for the collider tunnel construction contracts.

Architectural space programming of nontechnical campus administrative and support facilities was initiated based upon the January, 1990 population baseline. Management of the consultant primarily takes the form of setting interviews in advance for SSC personnel and attending interviews to verify baseline data utilized. A first draft of this data was submitted.

- **CONFIGURATION MGMT & INTERFACE CONTROL (2.5.2.6)**

Interface Control

The Conventional Construction Procedural Guidelines (Advance Draft) was submitted to DOE, in response to their request, on May 18.

- **GEOTECHNICAL PROGRAM (2.5.2.8)**

Program Oversight

Planning continued in May for geotechnical drilling in the vicinity of the PIF program. This drilling will include closely spaced borings to more clearly define the location and nature of the geologic contact between the Eagle Ford Shale and the Austin Chalk along the first tunnel segment alignment.

- **A-E/CM SELECTION & CONTRACT ADMINISTRATION SUPPORT (2.5.2.10)**

The PB/MK team was issued the SSC Lab's Request for Cost Proposal on March 16, and the SSC Lab negotiating team was organized and began preparations for pre-negotiation and contract negotiation meetings scheduled for June.

- **SEIS SUPPORT (2.5.2.12)**

SIES Support Management

CCD has attended meetings and provided responses to data requests from EAO for SEIS preparation.

SIES Spoils Management

CCD continues response to questions through the EAO.

PROJECT MANAGEMENT AND SUPPORT

(WBS 3.0)

- **PROJECT MANAGEMENT (WBS 3.1)**

- **PROJECT MANAGEMENT OFFICE (3.1.1)**

The major effort for May centered around preparing and completing the documentation for the June baseline validation review. All cost and schedule data was nearing closeout as the month was completed. Presentations to DOE were made with the working group reviewing the preliminary details of the presentations and data that will be made available. Because some of the cost details (including the roll-ups) are business sensitive, it was decided that any documentation with cost details would be covered in red and assigned a control number. Since the cost details include the estimates for contracts currently being negotiated, or soon to be negotiated (AE/CM and Collider Dipole Magnet), it was decided not to send the cost details with the package but to have copies available in each subcommittee room. Additionally, because of the sensitive nature of the funding profile, it was decided to send only the technical baseline and present all three cases (technical baseline, option 1, and option 2) at the June review.

Additionally, during May we decided to locate the Magnet Development Laboratory (MDL), Magnet Test Laboratory, and the Magnet Acceptance and Storage Facility at the E1 site next to the proposed accelerator facilities and String Test Facility and Prototype Installation Facility. This would have the benefit of fostering better communications and allowing sharing of the two cryoplants between the Accelerator and Magnet Divisions. A memorandum was sent to DOE requesting this change. It is also our current plan to ask the State of Texas to assist with the funding of MDL.

- **PROJECT PLANNING (3.1.2)**

The major activities for this group also centered around preparation for the June Baseline validation review. The overall project schedule has been updated to include all systems and contains over 3,000 activities. The current baseline schedule includes attaching all activities to need dates for installation into the tunnel. The baseline case has been completed, reviewed, and refined to incorporate escalation rates and contingency so that as activities are moved the schedule details reflect the changed funding requirements. Additionally, the two option cases requested by DOE have been changed to incorporate the latest cost and escalation factors. However, these still need to be reviewed prior to release. We feel these will not be reviewed until after the June 11, 1990 ship date but will be available for the June 25, 1990 review.

Also, since the data pertaining to WBS 6.0 will only be discussed in Subcommittee 6, this data will be added after the funding profile is distributed for the June review. The elements in WBS 6.0 pertain to the High Energy Physics Program and Laboratory Operations and are not part of the Total Project Cost by our definition.

Additionally, after the June validation review, it is our intent to incorporate this group into the PMRS group and form one cost and schedule reporting group. Once the baseline schedule is completed, and costs and WBS added, it is our intention to use this data base as the backbone for the cost, schedule, and budgeting process for the project construction. Greater detail will be required for the current operating period for the defined work packages.

- **PROJECT MANAGEMENT AND REPORTING SYSTEMS**
(3.1.3)

The major effort was the collection of data via the current WBS for the budget replanning completed in May. Additionally, a C/SCSC workshop was held on May 30, 1990. This was a basic workshop and there were continuing requests for an advanced workshop on the Laboratory specific procedures and policies. The plans for advanced workshops will be developed later this summer.

- **ENGINEERING STANDARDS (3.1.4)**

A hierarchical structure code which is a top down breakdown of the collider is being developed. It will be utilized to relate documents to equipment and ensure that all documentation for the collider is prepared. The section which relates to the technical components has been completed to WBS level six. The infrastructure section has been initiated. The SSCL part numbering procedure is under development, with the first draft scheduled to be released for review in early June.

The first set of engineering standards and guidelines (a total of 13) has been placed on the project management server. These guidelines are now accessible and have been tested. A "read-me first" file has been added to these server notebooks, expanding the method of access. Included in these procedures is a method for attaching notes in case there is difficulty understanding the procedure or requesting revisions. Additionally, the engineering document management database is about 50% designed. This system will use "4th Dimension" database running on the project management server. A running prototype of this system should be completed by the end of June.

A final draft of the Project Quality Assurance Plan has been completed and will be available for the June validation review. This plan has now been coordinated with the engineering standards working group and will be consistent with the engineering standards documents. Work continues with both the Accelerator and Magnet Divisions to ensure their quality practices are consistent with the overall project quality assurance procedures. The Accelerator Division has started the interview process for their QA group leader and the Magnet Division has started a set of quality control procedures for receiving inspection and source inspections. These procedures are being reviewed and should be adoptable to the Project Quality Assurance Manual.

• **ENVIRONMENTAL AFFAIRS (3.1.5)**

DOE-CH requested us to put on a short training session for personnel from DOE-HQ, DOE-CH, SSCL, and TNRLC on requirements and step-by-step procedures for mitigation and management of cultural resource impacts. This session was held the last day of the month and covered compliance with the Texas Antiquities Act and other relevant legislation, including the priority system for identifying historic structures. Additional work on the draft SEIS included reviewing chapter 2 and processing the additional data requested by Argonne from Chapter 6 of the SCDR.

DOE-OPO requested a draft Memorandum to File for the construction of and operation of the Magnet Development Laboratory in Ellis County, Texas. This was developed by Laboratory personnel, the TNRLC Compliance Officer, DOE-CH Legal Counsel, and the DOE-CH SSC-SEIS Project Officer and was transmitted to DOE-OPO on June 1, 1990.

- **SYSTEMS ENG. & INTEG. (WBS 3.2)**

- **SYSTEMS ENGINEERING MANAGEMENT (3.2.1)**

The major effort this month included completion of the documentation for the June baseline validation review. This work was coordinated by the project management staff and included the systems requirements notebooks and the WBS dictionary. Additionally, work was started on a technical systems safety model which was presented to the safety working group. The draft Collider Dipole Magnet RFP was also reviewed.

Work on the engineering standards included a coordination meeting with the Conventional Construction Division to establish points of contact and discuss philosophy and implementation strategy associated with getting guidelines, standards, and practices in place for the construction project. We have taken the approach that if the AE/CM would supply their standards and practices manuals, those documents could be used as the starting point for the architectural, civil, and structural engineering standards. Other engineering standards revisions included: parts control and standardization, technical reviews and audits, and internal reviews; and updated guidelines on use of the metric system at the SSCL, to include a description of the process of justifying and obtaining a deviation from the use of metric units in new design and development.

- **SE SUPPORT TO ASD (3.2.2)**

We worked with the planning group to develop the overall project baseline schedule and the two options requested by DOE. The first option (not yet reviewed) calls for the delay of underground construction (excluding the Prototype Installation Facility) until after the successful completion of the string test in October, 1992. This appears to delay the overall completion (beam to experiments) by seven months. The second option (not yet reviewed) calls for the delay of all facility construction (excluding the Prototype Installation Facility) until after the successful completion of the string test. This appears to delay the overall completion (beam to experiments) by 12 1/2 - 13 months.

Additional work included development of the draft specification for superconducting wire for use in the correction coils and other Accelerator Division magnets, and the first draft of the Accelerator Division Organization Plan.

- **SE SUPPORT TO MSD (3.2.3)**

Work this month included developing of the first draft of the collider dipole magnet -- spool piece interface control document, and working with visiting Russian scientists and the Accelerator Division on the amount of radiation expected to be produced in the collider. This work will lead to a specification for neutron and ionizing radiation to be included in the collider dipole prime item development specification document.

• **SE SUPPORT TO PHYSICS (3.2.4)**

We finalized the resource requirements for the requirements document which was to be mailed in early June. The utility requirements were reported on a standard spreadsheet for five detector collaborations which was presented to Physics Research personnel to highlight missing data and inconsistencies in data content between the collaborations submitted thus far. Eventually all of the Expressions of Interest will be reviewed and be listed in the resource requirements report. This work is expected to be complete by the end of June.

R&D, PRE-OPERATIONS, AND ADMINISTRATION AND SUPPORT (WBS 4.0)

Research and Development (4.2)

Accelerator R&D (4.2.1)

• Management Services (4.2.1.1)

The cost estimate for Accelerator Technical Systems has been refined and improved during the past month in preparation for the June baseline validation review.

The final draft of the Conceptual Design Report is under review.

Three large RFQs have been sent out for design of the injector Linacs, an RF lab, and a data acquisition system for the Cryogenic Lab.

Schedules have been updated to include commitment profile logic for conventional construction, technical systems, and manpower. Cost data from the latest cost scrub has been entered into the system, enabling the production of commitment profiles for the baseline schedule as well as two alternate construction schedules requested by DOE. Presentations were made to the DOE, providing our current status as well as detailing our method of developing the schedule and commitment information.

• LINAC (4.2.1.2)

The mechanical designs of the HESQ and einzel lens LEBTs are now underway. Electroforming appears to be the best production technique for the HESQ electrodes. All 66 cavity shapes for the side-coupled linac have been designed using SUPERFISH. Each tank contains 20 identical cavities. The peak surface field was kept below 32 MV/m for a constant axial field (E_0T) of 6.3 MV/m. The low peak surface fields (1 Kilpatrick) were achieved with only small loss in shunt impedance by adopting a two-radius nose shape. The RF requirements of the side-coupled linac modules are now firmly established. A contract has been awarded to LBL to develop a cesium-free, RF-excited volume H- source for the SSC. Preliminary indications are that this will be an operationally convenient source if it can achieve adequate reliability. A new turbopump has now been installed on the TAC source and characterization tests are resuming.

• LEB (4.2.1.3)

Several new voltage excitation curves have been studied. The presently favored one has a final voltage of 80 leV and a synchrotron frequency of 215 Hz. The longitudinal emittance needs to be diluted by a factor of three in order that the spacecharge tune spread in the MEB at injection remains at 0.07. Simulations studies are being carried out to determine whether and how the dilution can be achieved.

- **MEB (4.2.1.4)**

A considerable amount of work has been underway concerning the design of the MEB. The primary areas of work have involved lattice changes affecting the MEB's transition energy. A conceptual design of a transition-jumping system was developed. This design involves powering two systems of 16 air-core pulsed quadrupoles in such a way as to lower the transition gamma by 0.5 to 1 unit in a 100 Hz pulse, and thus avoid slowly crossing transition. This design leaves the machine beta functions and tunes unchanged. Quadrupoles and power supplies were specified and a preliminary cost estimate for the system was made.

Another lattice design studied was one based on a 90° cell. An initial 90° lattice was developed, and work is continuing on straight-section functions and space utilization.

Tracking studies were begun on the current 60° lattice. These are similar in nature to those recently done for the HEB. The studies used the dipole design values supplied by Fermilab. The studies are to determine the dynamic aperture at injection, and to determine the efficiency of slow extraction at 200 GeV/c. While the magnet under study has ample good-field aperture at injection, the high-energy slow extraction may have difficulties due to the magnet saturation at 1.7T.

Studies have been made using the FNAL main injector dipole design as a basis for the MEB ring magnets. This has aided the development of good cost data for those components that will permit the early procurement of these items next fiscal year.

- **HEB (4.2.1.5)**

The main effort on the HEB for May was on the SCDR and the associated cost estimates in preparation for the June review.

Efforts were started on a program to get bipolar dipole multipole measurements for a superconducting magnet. Since the standard HEB operating cycle will follow a bipolar ramp, magnet measurements need to be taken to determine the magnet's performance during such a cycle. In particular, measurements of the differences during the two halves of the cycle need to be determined as well as the general magnet characteristics.

The HEB cycle is fairly short, approximately 8 minutes, and so relatively fast measurements are required. One requirement for the measurements is the ability to reverse the current of the measurement power supply. Fermilab is presently building a high-current reversing switch which is expected to be completed in December. This switch will be used in the colliding-beam run which is scheduled to begin in Spring, 1991. It may be possible to use this switch for bipolar tests prior to its installation in the Tevatron.

The scheduling of bipolar magnet tests will continue with the goal of beginning the tests as soon as feasible.

Work continued on the determination of the required aperture in the dipoles.

• **COLLIDER (4.2.1.6)**

Considerable work was performed on the cost estimate in preparation for the June DOE review. A workshop was held at SSCL to discuss issues related to magnetic measurements of collider magnets. Visitors from Fermilab and DESY related the experience from the Tevatron and HERA projects. Discussion then centered on suggestions for the SSCL magnetic measurement scenario. Particle tracking studies concentrated on linear coupling and the effects of splitting the horizontal and vertical tunes. Magnetic field modeling continued for the corrector element design. Comparative studies of 4cm versus 5cm i.d. correctors were initiated. Designs and studies of synchrotron radiation intercepts, and their implications, for the 5cm dipole magnets were initiated. Improvements to layouts for the first shaft and service buildings at the N15 site continued to be developed. Members of the Collider Group visited the DESY laboratory in Hamburg, West Germany, to witness the progress of the HERA project. Very useful discussions were conducted concerning magnet performance and testing/measurement procedures, installation procedures, and results of the very successful cooldown and testing of the first octant of the ring.

MAGNET R&D (WBS 4.2.2)

FERMILAB (WBS 4.2.2.1)

The second thermal cycle of DD0027 revealed unexpectedly low quenches. DD0027 is being held warm on test stand #5 while low-beta insertion components are tested. DD0026 has been removed from test stand #4, which is available for DD0028 when it is completed. Design work on the 50mm collider dipole cryostat and the interconnect is continuing on schedule. Development of an alternate support structure is proceeding using purchased prototype assemblies. Software to support the curing press hydraulic function is being debugged and will be operational by mid-June. The attempt to collar practice cold mass #2 resulted in concern for the beam strength. This is being reanalyzed and strengthened. Practice winding with 50mm inner cable took place in May. Results indicate no major problems in winding 50mm ends. DS0308 performed quite well on tests despite its low preload. DS0309 is being readied for test on the second cooldown.

Magnetic Measurements

Testing of DD0027 continued. The test program was structured to facilitate studying possible changes in the harmonic structure of the field as a consequence of magnet cooldown, warmup, quenching, and ramping. Preliminary analysis of warm harmonics measurements made before and after the first cold testing period indicates a small change in sextupole similar to that observed in DD0019.

The second cold testing period commenced on May 9 after a standard cooldown. After harmonics measurements at 2000A, a series of quench tests at a nominal magnet temperature of 4.3K were conducted. The currents were 6224A, 6532A, 6449A, 6386A, 6834A, 6868, 6789A, 6868A, 6890A, 6526A, and 6901A. This series indicates slow retraining (essentially no training was observed during the first cold testing period after conditioning at 3.5K) and some unexpectedly low quenches. During subsequent magnetic field measurements - both harmonics and a longitudinal scan with a NWR/Hall probe - additional unexpectedly low quenches were observed. The magnet was warmed and another warm harmonics measurement made.

DD0027 is being held warm on test stand #5 while the Fermilab MTF is devoted to testing low-beta insertion components. It is expected that DD0027 will have a third cold testing period devoted to further studies of quench performance. Analysis of the magnetic measurements is underway.

Long Magnet Fabrication

Cryostat Area

Assembly DD0028 is ready for insertion into the vacuum vessel; the estimated completion is June 13.

Miscellaneous

DD0001 vacuum vessel was modified to fit onto the stretch wire alignment stands.

Cold Mass Area

Curing Press

Pressure bleed valves were installed on all three hydraulic systems. This completes the hydraulic system and allows for complete computer control of the press hydraulic function. Software to support this system is being debugged and should be operational by mid-June.

Collaring Press

The upper press beam showed signs of yielding at 4.2KSI. Operation of the press was halted and an analysis of the beam was done. The conclusion is that the beam strength is marginal. Additional structural members are being installed to alleviate the situation. This fix should be in place by the first week of June.

Winding Table

Rework of the spool height adjuster is still in process. The parts required will be available by mid-June.

Coil Assembly Station

The coil assembly station is now completely operational.

Coil Winding

RCM#2 Inner #2 (17M1008) was wound on 5/11. Coil 17M1008 was backwound because of interference in the curing mold due to a misplaced spacer. The conductor is scheduled to be reinsulated and rewound.

RCM#2 Outer #2 (17M2008) was wound on 5/22 and cured on 5/25.

RCM#3 Inner #1 (17M1009) was wound 5/30. Curing on coil 17M1009 will occur on 6/1.

Coil Assembly and Collaring

PCM#1: the assembly, collaring, and keying of this magnet is complete.

PCM#2: the assembly of ground insulation and collars is complete. This assembly is installed in the collaring tooling. Collar keying will occur upon completion of the press beam modifications on approximately 6/6.

RCM#1 coils have been assembled with beam tube, ground insulation, and heater strips. Pole shimming requirements are being decided.

RCM#2 voltage taps are being applied to inner coil #1. The measuring of coil #2 is in process.

Yoke and Skinning

PCM#1 skins are being prepared for assembly. The iron packs are assembled and on hand.

SSC Short Model Program

DS0307 is being potted and sectioned.

DS0308 testing has been completed; results are available.

DS0309 has been tested; results are available. It will be cooled down a second time on May 30 for further testing, including a "mini-life" test consisting of 500 excitation cycles between 2000A and 6500A at about 100A/sec. This is being done to verify that magnets without collaring shims will not fail after many excitations.

DS0310 was collared on May 29. It will be yoked and tested in early June. It has teflon applied to the coils as a slip plane.

DS0311 coils are wound. It will be completed in June. Experiments with DS0311 will duplicate the teflon vs. no teflon experiments done with magnet DS0307.

Grouped, developable surface end parts have been received for 40mm outer coils. Winding with these parts will begin with magnet DS0312.

Practice winding with 50mm inner cable took place in May. Results indicate that there will be no major problems in winding 50mm ends.

Magnet Development

DS0308 has been tested and tests of DS0309 are under way. DS0308, despite its low preload, performed quite well. It had one training quench 40A below the plateau at 6980A at 4.2K (this is about 200A above the calculated critical current for this magnet). The training quench was in the pole turn straight section on the side adjacent to the ramp-splice and the plateau quenches were in the pole turn on the opposite side. Quenches at 50 and 75 A/sec were in the lead end between the pole turn and the second turn from the pole. The quench current decreased for ramp rates above 100 A/sec and these quenches were in the ramp-splice. Strain gage data were taken up to a maximum current of 6870A. Inner coil strain gages showed the coil unloading from the collars at about 4000A. The "bullets" showed very little change with excitation indicating that the ends were unloaded at 4K (each of the four bullets were set to 200 lbs. at room temperature). Field harmonics were measured as a function of axial position at 5000A and as a function of current at the magnet center. The harmonic data are currently being analyzed.

DS0309 has been tested through one cooldown and is currently being readied for test on the second cooldown. Tests on the first cooldown included quench training at 4.3K and 3.8K, ramp rate dependence of quench current at 4.3K, tests ramping down from 6500A at rates up to 400A/sec, strain gage runs to 6740A at 4.3K and 7350A at 3.8K, and harmonics measurements as a function of z at 5000A and as a function of current at the center of the magnet. There was one training quench (6316A) at 4.3K, located in lower inner turn 10 on the right side near the return end. All plateau quenches originated in the straight section of the upper inner pole turn on the side opposite the ramp-splice; this behavior is the same as in DS0308. DS0309 was ramped from 6500A to 4000A at -100, -200, -300, and -400A/sec without quenching. There were three training quenches at 3.75K before a plateau at an average current of 7430A was established. The first two training quenches were at 7390A in the upper outer coil most likely in the pole turn towards the return end. The third training quench was at 7275A, about 100A lower current than the first two, and in the upper inner coil 11 at the

lead end. The plateau quenches were at the same location as those at 4.3K. To check that the temperature dependence matched that expected for conductor limited quenches, one quench was taken at 3.71K. On the second cooldown the 4.3K tests will be repeated and a "mini-life test" will be performed in which the magnet will be ramped 500 times between 2000A and 6500A.

Drawings for vertically split yoke laminations and the associated horizontally ovalized collars for the 40mm dipole have been released. Final design calculations are being done for the 50mm yoke and collar.

• **BERKELEY LAB (WBS 4.2.2.2)**

Superconductor and Cable

The possible causes for the time-dependent decay of multipole components in accelerator dipole magnets were discussed recently at a DOE-sponsored workshop. Several effects, which have not yet been investigated, were suggested as possible sources of this decay. Among these are long time constant current transfer effects due to (1) the field gradient across the wide face of the cable, or (2) the presence of joints in the magnets. These effects were investigated in a series of collaborative experiments at NIST. A significant decay rate was observed and a series of follow-up experiments are in progress. Complete results will be reported next month.

Coil winding experiments were performed at BNL and FNAL with several versions of the LBL fabricated 30-strand inner layer cable. These tests indicate that the cable with a short pitch possessed better winding characteristics. In order to achieve the short pitch, it was necessary to increase the width of the cable by 0.15mm. This new cable width has been adopted by the SSCL. Additional cable will be made next month in order to provide more practice cable for coil winding experiments.

Over 20,000 ft. of 36-strand cable was made during May on the LBL cabling machine by a combined crew of FNAL and LBL personnel. This is the last scheduled run of FNAL cable, so we should have no scheduling problems in providing the SSC with 36-strand cable.

QUADRUPOLE MAGNETS

5m Quadrupole Models

Three practice coils have been wound and cured. One inner and one outer coil have been measured. General appearance of these coils is good. Azimuthal size uniformity is plus/minus .0015 inch over the whole coil for each coil.

Detail drawings for the coil assembly table and tooling are complete and components are being fabricated. The layout design of the collaring press is complete; detail drawings have been started, and some components are in work.

Purchase orders for the yoke laminations and the skinning die laminations have been placed.

1m OC Quadrupole Model

The magnet QC1 is complete, it is being installed in the cryostat and should be ready for cooldown during the first week of June. The cryostat testing was delayed so the magnet could be cooled in liquid

nitrogen to measure the effects of shell stress during cooldown. This was done by reading strain gages applied to the shell, and was done in liquid nitrogen to simplify the cold zeroing of the shell strain gages. This data is now being evaluated. The coils for our second 1 meter magnet (QSC-401) are in production with about 50% of the coils complete. This magnet will be very similar to QC1 with assembly starting as soon as the coils are completed. Preliminary work was done on an improved end design for the 40mm AC quadrupole.

50mm Quadrupole Design

A magnetic design study was made on a quadrupole using the same 36-strand cable chosen for the outer coil of the 50mm dipole. An extensive study of the mechanical behavior was made for several yoke support schemes, including 4-piece iron yoke with gaps at assembly (gaps close during cooldown with no prestress loss); and a 2-piece yoke with no gaps at assembly (large loss of prestress during cooldown).

Dipole Design

Additional magnetic analysis was made on 5cm dipole magnets including the effect of an elliptical inner surface of the iron yoke and the effect of yoke gaps on harmonics.

A magnetic design for the end of the 50mm SSC dipole to be built at FNAL was completed.

• **SUPERCONDUCTING CABLE R&D (WBS 4.2.2.3)**

Routine visits have been initiated to the wire manufacturers to maintain schedules as well as detect process difficulties at an early stage in the program. Our goal is to develop a partnership with the wire vendors so that we can be perceived as part of the solution when problems arise. Continuous updates of the cable delivery schedules are now being supplied to all of the magnet fabrication programs at the national laboratories. This program now allows for a more accurate early warning of potential problems with conductor supply. As a result we have been able to project conductor supply schedules out through the pre-production magnet fabrication. This planning should facilitate the removal of the conductor supply from the critical path.

During May we delivered Cable SSC-I-O-00011 to BNL for use in magnets DSO204,205, and 206. Cables SSC-O-O-00013 and -00014 were delivered to FNAL for use in magnet DLO304. Cable SSC-O-S-00015 was also shipped to FNAL for use in magnet DLO305. We fabricated practice cable for use at FNAL and LBL. Approximately 11,000 ft. of Outer cable was produced, with 3200 ft. going to LBL for the quadrupole program and the remainder to FNAL for check out of the long tooling. Finally Inner strand for DLO306 at FNAL is being prepared for cabling at this time.

The RFQ for the SEM/EDAX system has been sent to the contracts group for processing. An RFP for a new 36-strand cabling machine is in preparation and will be in procurement next month. Finally we have completed the statement of work for the vendor qualification program which will qualify four wire vendors for full scale production of collider magnet conductor. In addition, this program will continue the development of 2.5 μ m conductor. This RFP should be ready to send to the vendors in draft form early next month.

• **BROOKHAVEN LAB (WBS 4.2.2.4)**

Long Magnets

Testing of DD0020, begun last month with excellent results, was curtailed when problems with a quench propagation heater were discovered. Following an evaluation of the problem, testing of correction coils and cooling scheme proceeded with reduced current and continued through most of this month.

Final electrical tests and cryostat assembly occupied DC0201 most of the month.

DC0202 saw yoke assembly, shell welding, leak checking, and start of interconnect electrical assembly.

Coil assembly for DC0203 began in mid-May.

A second set of coils for DC0204 was assembled, and voltage taps were installed, after which the magnet awaited midplane caps.

DC0205 awaited coil assembly, which is expected to start during the first week of June.

DC0206 awaited outer cable.

Short Magnets

Testing of DSS020, begun in April, continued.

DSS021 was installed in the vertical test facility, awaiting completion of tests on DSS020. DS0201 underwent end gauging, received a second set of voltage taps, was collared, measured warm, and yoke assembly started.

DS0202 saw cable insulation and awaited further insulation from Dupont.

Magnet Tooling and Equipment

Coils

Engineering continues on 50mm aperture coil tooling for both short and long magnets.

Collars

Design work continues on the 50mm short magnet collaring press.

Superconductor

Cable Procurement

SSC inner cable has been promised for early June delivery. This cable should allow the completion of the short DS0200 series magnet program for this fiscal year.

Cable Tooling

As reported last month, a designer has been assigned to the wrapping line project; he is presently well into that layout, with 80% completed.

The floating roller for the new wrapping machines is now 74% complete in the central shops.

Although an investigation is underway on a precision stage for addition to the microscope/camera cable monitoring device, little progress has been made due to more urgent work.

The keystone angle measuring blocks and standards have been released for fabrication.

Miscellaneous

A review of the wrapping line's lump detector has been completed; detailing of the required changes and parts awaits assignment of a designer.

Tests and Measurements

Tests continued with DD0020 on the 17m test stand. A successful measurement of the effectiveness of the cross-flow cooling scheme was carried out, using a special bore tube with heaters attached to it. Also, it was verified that both the dipole and sextupole correction coils could be powered to allow magnetic measurements.

Tests continued on DSS020 in the vertical test facility. Multipole measurements were made of both the dipole and sextupole trim coil.

PROJECT ADMINISTRATION AND SUPPORT (WBS 4.3)

• ADMINISTRATION SYSTEMS & SUPPORT (WBS 4.3.1)

We held the first three-phase Management/Supervisory Training Program for the laboratory. A total of 71 supervisors attended the sessions. Completion of this program is a significant step in our Affirmative Action and Equal Employment Opportunity programs.

The URA/SSC Laboratory Employee Handbook was distributed this month. This handbook is an interim document during the startup period of the Laboratory as we continue to establish personnel policies and procedures. Certain sections are still in the development process.

• FINANCE (4.3.2)

The Budget Office spent the month working with the Divisions to refine the FY90 reforecasted budgets. The resulting changes, expected to be input during June, should permit more diligent cost control through year-end. Meetings were held with procurement and technical personnel which addressed funding and cost control issues for the AE/CM, dipole magnets, RTK and Sverdrup subcontracts. The first monthly Budget Review was held on May 24 and the Budget Office was tasked to draft a Forward Financing policy.

The Accounting and Financial Control Section completed the following significant tasks:

1. Completed implementation of data download from the TRAC System to Deltek; and
2. Implemented the use of an invoice tracking system to identify and expedite problem invoices.

The Financial Informations Systems Section accomplished three key goals in May:

- Analyzed an on-line method of accessing data from the central computer or running from down-loaded information.
- Met with essential departments to discuss efforts to ensure accuracy in SSCL's hard commitment reports and devised a method to automate the conversion of purchase requisitions to purchase orders.
- Signed off on the TRACS system linking the Diner's Club travel information with the Deltek A/P package.

• **PROCUREMENT (4.3.3)**

During May, the Procurement Department made awards totalling \$5,730,803, of which \$689,031 was to Small Business and \$265,798 was to Small Disadvantaged Business as defined in PL 101-101, Section 301(a).

Procurement participation in outreach programs aimed toward the development of Small and Small Disadvantaged Business firms continued throughout the month of May with seminars presented in Dallas, Texas, and Monroe, Louisiana.

May was considered to be a very progressive month, with major procurements reaching significant milestones in their status. On May 25, after release by the DOE, the draft RFP for the collider dipole magnets was released to private industry. This draft RFP is an initial step leading toward the ultimate production of approximately 8700 magnets. Another significant May milestone was the signing of a Cost Incurrence Letter with the selected Architectural Engineering/Construction Manager, Parsons Brinckerhoff/Morrison Knudsen (PB/M-K). This arrangement enables PB/M-K to perform certain up-front and necessary tasks pending final negotiations of the definitive subcontract.

Progress was also made on leasing Building No. 3 at Stoneridge Business Park. After intensive negotiations, tentative agreements were concluded on May 31.

The search for a new Director of Procurement continues, as well as the continuation of the formulation of Procurement Standard Practices. Also, during the month of May, pre-screening of interested candidates for the Manager of Project Procurement was conducted. This position is being created to provide a more dedicated atmosphere with respect to Procurement support of Magnets, Accelerators, the A-E/CM, and others.

DOE is continuing its close monitoring of the SSCL's awards to Small Disadvantaged Business firms. Two high level meetings were held in May with government officials, one in Dallas, Texas, and the other in Washington, D.C.

• **PERSONNEL (4.3.5)**

We coordinated 119 interviews with hiring managers this month. Fifty-seven new employees joined the Laboratory for a total employee population of 625. As of May 31, 1990 we have 337 open positions at the Laboratory.

May was marked by major activity in all sections of the Personnel Department covering a wide variety of issues. Specifically, some highlights include:

- We received DOE approval for our revised retirement plan document. This allowed us to immediately institute the reduced waiting period for the URA Retirement System for 150 employees.
- Our compensation analysts met with representatives of several other DOE Laboratories as part of the survey work and information-gathering in preparation of the new SSCL Classification System.

- In close cooperation with EG&G Human Resources, the Operations Section launched the SSCL Management/Supervisory training program. Six sessions of the Performance Appraisal Training module were conducted, and we will begin the EEO/Affirmative Action training in June.

The Recruiting Section sent a representative to the G.E.M. organizational meeting in Indiana. This begins the Laboratory's involvement in this excellent engineering program for minorities.

A major organizational change occurred in mid-May when it was announced that the SSCL Travel Department was to become part of the Personnel Department. This resulted from an in-depth study of Travel Department operations by the Personnel Director and the Employee Relations Manager. A group will be formed in June to evaluate the current level of service and recommend any procedural changes to ensure that the SSCL Travel Department continues to provide full and responsive service to the Laboratory.

• **MINORITY AFFAIRS (4.3.7)**

During the month the Office of Minority Affairs participated as presenters and guest spokesmen in several SSC Lab external affairs outreach meetings. The Minority Affairs Director:

- Advised the Dallas/Fort Worth Minority Business Council Construction Assistance Center and Associated General Contractors on matters related to the SSC Lab's development.
- Was a guest speaker at the monthly meeting of the Central Texas Purchasing Management Association Inc., Waco, TX, and the Amarillo Hispanic Chamber of Commerce.
- Participated as a presenter at a vendor seminar in Corsicana, TX, Navarro College, hosted by the four county area Chambers of Commerce through Congressman Joe Barton's Office.
- Appeared and presented testimony before the Presidential Commission on Minority Business Development at their Commission hearings in Dallas, TX.
- Participated in the U.S. Senate Hispanic Task Force meeting on May 21. Issues of interest were the Civil Rights Act of 1990 and related topics. Senator Hatch (R-Utah) made the presentation along with Senator Dominici, Senator Chaffee, and Senator Gramm.
- Participated with DOE SADBUs officials from Washington, D.C. and Chicago operations on May 22-23. SSC Lab's Procurement representative also attended the first day session.
- Participated at the Monroe, LA vendor seminar sponsored by Washita Enterprise Group and Economic Development Group. Remarks were given by Senator J. Bennett Johnson.
- Attended the SSC Lab's Management and Supervisory Training Session and also met with SSC Procurement officials to review the SSC travel contract reporting procedures to assure a more accurate Small Disadvantaged Business contract dollar accountability.

The Manager of EEO/Affirmative Action:

- Completed outreach effort with Department of Labor (DOL).
- Met with the Director of Personnel to discuss waiver requests and declined signing because the requests did not follow SSC personnel procedures.
- Participated in an EEO/Pre-Recruiting seminar at Stanford University to familiarize minority and women physics/engineering staff and students with employment opportunities.
- Visited with the President of the Dallas Urban League to discuss their role in assisting the SSC in its outreach efforts. The Dallas Urban League began their recruitment efforts early. Met with representatives of the Dallas Urban League to monitor the contractual arrangement between the SSC Lab recruiting office and the Urban League.
- A meeting was held with EEO personnel representative to discuss AA/EEO training and its scheduling for SSC Associate Directors and other managers.
- Attended a meeting with the Manager of Education Programs to discuss her involvement with the G.E.M. program. This office referred her to the Personnel and Recruiting Managers.
- Attended a meeting with the Labor Compliance Action Committee to review items that DOL/DOE will hold the Lab responsible for when the AE/CM comes on board. An area of concern will be the AE/CM affirmative action plan and how the plan will be monitored and implemented. The Deputy Regional Director of OFCCP was in attendance.
- Attended the Society of Hispanic Professional Engineers Conference in Los Angeles. The conference was well attended by both students and local Hispanic engineers.
- Met with the Manager of Recruiting to discuss changing recruiting/outreach methods so that they may be more responsive in trying to attract minorities and women applicants. The upcoming visit to the G.E.M. program also was discussed. This will be an orientation for the SSC and how the SSC can benefit the most from G.E.M.
- Attended the G.E.M. program's annual meeting and visited Fermilab, Argonne Lab's AA/EEO representatives and DOE office. Several meetings were held with the URA and EG&G personnel representatives to familiarize them with forth coming EEO awareness training. Additional efforts were made in developing the handout materials for the managers.
- Attended a meeting at the Associated General Contractors office to acquaint vendors with agencies that have contracting opportunities.
- Attended a meeting at the Bill Priest Center hosted by the TNRLC. The purpose of the meeting was to give the minority business communities an overview of TNRLC and SSC Lab's procurement and employment activities.

The Manager of SADBUs:

- Met with Cryogenics Division personnel to review status of input from interested parties relating to Small Business Innovation Research (SBIR) program. Follow-up with applicants is now in progress in order to comply with the DOE's May 18, 1990 application deadline.
- Coordinated with the Presidential Commission on Minority Business Development and DOE staff in preparation for the Director of Minority Affairs' testimony regarding SSC minority business development presented before the Commission in Dallas on May 18.
- Attended the Dallas/Fort Worth Minority Business Council Construction Assistance meeting in conjunction with the Associated General Contractors and other prominent leading organizations and corporations to discuss minority contractors' involvement in projected construction work. This office has been invited to become a member of the Advisory Council.
- Met with managers of Administration and Procurement and other procurement personnel to discuss problem areas and to develop techniques to prevent any repetition.
- Met with Procurement personnel to review the requirements of the metric system and its relationship to minority vendors.
- Attended a meeting with the Labor Compliance Action Committee to review aspects of the SSC Lab/Davis-Bacon Act and OFCCP DOE Pre-Award Review.
- Attended the Society of Hispanic Professional Engineers conference in Los Angeles.
- Contacted DOE Chicago and Washington, D.C., staff to discuss the DOE Small Business Innovation Research (SBIR) Program Solicitation for FY91. With the cooperation of Cryogenics Division personnel, we have been able to comply with the rules and regulations and have met DOE submission deadlines.
- Attended a meeting of the Central Texas Purchasing Council in Waco, TX. A presentation was made on the SSC Lab, how its procurement process relates to minority vendors, and how we can cooperate in developing a network of qualified minority vendors.
- Met with Manager of Education Programs to discuss how we can cooperate in the administering of several SSC education.
- Attended a meeting with the Deputy Director of Procurement to review the projected SSCL Procurement and Contracting Standard Practices relating to socioeconomic programs and requirements. This activity is being done in coordination with the Director of Minority Affairs and Deputy Director of Procurement. It is very important that the Office of Minority Affairs be actively involved in the procurement process. The SADBUs Manager and the Director of Minority Affairs met with other Procurement personnel to discuss and review pending SDB procurement awards and discussed and reviewed the SDB Tramex Travel contract on concerns of their progress in providing services to SSCL personnel.
- Met with the Minority Business Director of the Oklahoma Department of Commerce to discuss their involvement in the SSC Lab's small disadvantaged business procurement process.

- Attended a meeting sponsored by the Dallas/Fort Worth Minority Business Development Council, Construction Assistance Center and Associated General Contractors-Dallas Chapter.

- **INTERNAL AUDIT (4.3.8)**

Fieldwork for the reviews of Petty Cash and Travel were completed, and areas where improvements could be made were identified. Improvements to the handling of petty cash have been made and others are being implemented. Corrective actions relative to travel are being discussed with management. Fieldwork for a review of Relocation has been initiated.

PROJECT TECH SUPPORT (WBS 4.4)

• TECHNICAL SUPPORT MANAGEMENT (4.4.1)

Baseline cost estimating and schedules were correlated carefully to coincide with overall project milestones, objectives, and detailed requirements. Costs for operating commissioned facilities, those for which construction or project effort would be fully completed, were developed.

Activities to find suitable locations and interested developers continued for interim leased space that might be needed in advance of permanent campus space. Thirty-one local developers have expressed interest; at least 5 have previously developed plans for office parks and related developments in the vicinity of Waxahachie and the project campus location.

Human Resources

- A Letter of Commitment was issued by the OFCCP to conclude their compliance audit and effort is now underway to satisfy the requirements of that letter.
- LTS Human Resources continued to work with URA Personnel to develop the compensation strategy and structure for the upcoming fiscal year.
- A draft of the Personnel Appendix (Appendix C) to EG&G InterTech's subcontract was presented to our Contract Administrator on May 31.
- We established licensing and implemented administrative procedures for the Magnet Division support that is being done at Fermilab. A representative from our office visited Fermilab to do an "in-person" orientation of new employees.
- We are working with the Relocation office and Procurement to review the proposals for temporary housing. All property has been assessed and vendor selection should be made in June.

Staff Services

Central Files

Preparations are proceeding for occupancy of the Central Files area. A full-time head clerk is on board, and a data entry card has been designed and accepted. Research into an optical disk system and software integration is underway, as well as an SSCL needs study.

GSA and Lease Vehicles

An inventory of all Lab-assigned vehicles has been completed. A complete overhaul of files and administrative databases is nearly complete, based on input/guidance from GSA management.

The SSCL budget code process for payment of D&M Leasing invoices has been updated and refined to effect timely payment and eliminate late charges. All D&M vehicles have been audited. A vehicle maintenance schedule has been designed, and the key control system has been improved. A purchase

requisition for payment of D&M leases was submitted, and work was begun on a purchase requisition for bids for the SSCL lease/rental vehicle needs.

Mail Room

The Mail Room procedures manual is in its final draft stage. A second Mail Room volume study was completed, showing an average of 3,023 pieces/day, an increase of 536 pieces/day over the study done three months ago.

Facility Support

Two truckloads of furniture were transported from the Hereford inventory and distributed throughout the Lab. Purchase of furniture and equipment for the DOE expansion at the Provident Bank Building has gone out to bid; award is to be made within the next week.

A special three-hour demonstration of the Oce 2500 very-high-volume copier was attended by the Facility Support Section Head and the Technical Publications Manager as part of the research being done prior to putting a second high-volume copier in the Technical Publications area.

Research is being conducted to determine the most economical and expeditious way to furnish office set-ups to Magnet employees on temporary assignment at Fermi Lab. One possibility is to ship required inventory directly from Hereford to Batavia, Illinois.

Security

A Lab-wide Crime Prevention seminar was coordinated and successfully presented and coordination of procedures for lock-down of equipment was resolved with Property Management.

A meeting was held with Procurement regarding placing travel information on SSCL ID cards.

The draft Security Operating Procedures manual is being prepared.

Food Services

The monthly Cafeteria Review has been rescheduled for June 13, at which time there will be an evaluation of an upgraded cash register that will also handle inventory control, and a review of the cost to install security gates for the area.

Special catering for Governor Clement's visit has been finalized.

Medical Office

The interview process has begun for the position of SSCL Medical Director. Two physicians have been screened initially, and will be brought to the lab in June for a second interview. The medical office is in the process of being set up and will be operational in June.

FACILITIES ENGINEERING SERVICES (4.4.2)

Efforts continued this month on the acquisition of additional interim campus space. The following is the status of the additional space planned for FY90:

- 8,440 SF, Provident Bank Building - Additional space for DOE. Lease approval from DOE was received late in the month. A lease agreement should be signed and finish-out construction begun the first week of June. Construction should be completed by the end of June, with the installation of the systems furniture to immediately follow.
- Parking Lot - A new lease package was forwarded to DOE for approval.
- 7,800 SF, Stoneridge Building #1 - We received lease approval from DOE the last week of May and a lease agreement should be signed the first week of June. The space was cleaned up, minor modifications made, and the space was occupied on May 14th. It houses primarily the Support Services functions.
- 12,700 SF, Stoneridge Building #2 - Awaiting DOE approval.
- Warehouse space - We received DOE approval the same day the landlord informed us he had signed a lease for the space with another entity. A query of the next responsive bidder also revealed a lease for that space had been consummated. A sole source justification for the leasing of a 40,000 SF warehouse in south DeSoto was accomplished and forwarded to DOE for approval. We expect approval and the ability to consummate a lease for this space by the middle of June.

The status of additional interim space planned for FY91 includes:

- 47,120 SF, Stoneridge Building #3 - Negotiations should be finalized and a lease package forwarded to DOE for approval during the first week in June. This space will house offices and much needed laboratories for the Physics Research Division.
- 180,000 SF, Ellis County - The scope of this proposal was increased significantly to include not only office space, but warehouse and major laboratory space as well. A revised Solicitation for Offers will be sent to potential vendors early in June.

Action continues or was initiated on several projects. Included are:

- Construction of new steps and handrail at the main entrance of Stoneridge Building #4 to alleviate a safety hazard.
- Work began on the finish-out of the high bay area of Stoneridge Building #4 for Accelerator Division laboratories.
- Finalizing the procurement process for the finish-out of 5,600 SF in Stoneridge Building #2 for a laboratory for the Magnet Division.
- Plans were initiated to install the excess DOE systems furniture presently at Hereford, TX in Stoneridge Buildings #2 and #3.

• **PROPERTY MANAGEMENT (4.4.3)**

Warehousing is scheduled to relocate to the Parkerville Road area, which is approximately 3 1/2 miles from the SSCL Campus, to gain additional storage space at the expense of some convenience. A total of 40,000 square feet of space is available at this location to take care to immediate and near term warehouse needs.

The first annual inventory of property will start in early July to account for the 5,000 items and \$10M in equipment currently at the SSCL Interim Campus.

The second block of ten Materiel Management Standards was completed, routed for internal review, and submitted to DOE for review and approval.

• **FABRICATION SHOPS (4.4.4)**

We contacted a series of vendor sources to reverify and obtain more accurate equipment cost estimates, and continued developing preliminary designs for the different shop configurations.

In late May the SSC Technical Director, SSC Project Manager and representatives from the Accelerator, Magnet, Physics Division, and Technical Service Group met to discuss the status of Fabrication Shops and the operational plan. Based on the results of the meeting, a shop steering committee was appointed with representatives from the different divisions and groups. The committee is chartered to present a white paper study of fabrication shops on July 6.

• **GENERAL COMPUTING (4.4.5)**

Technical Support

The RFP for the Relational Database, along with a valid requisition, was sent to Purchasing for preparation and release of a formal bid proposal package.

The Long Range MIS Project Plan was initiated on a proceed as planned basis. There are formal and up-to-date project plans and schedules available for this project and monthly progress reports will amount to schedule variance justifications. There are currently three major areas of activity:

1. The procurement of the relational database is about two weeks behind schedule. The RFP for the RDBMS was completed on time (April 19), but a delay was encountered while obtaining approvals;
2. Project planning continues on schedule. The project plans have been distributed to the SSCL organizations most directly affected by the project in the near term. The project plans are intended to receive a broader publication soon;
3. Preparation for the procurement of a services contract to aid SSCL personnel in an evaluation of long range plans continues on schedule.

MIS SOFTWARE SUPPORT

An Action Item Database (AID) was written for Project Management in Foxbase. This database will be used to track action items in a multi-user environment. An Appleshare file server and QuickMail were both ordered to implement the AID.

A dBase application was written for the Cost Estimating group which will link together the main Work Breakdown Structure (WBS) database with an activity database on a common field (which happens to be the WBS number).

USER SERVICES

Primary installation of the Magnet Division QuickMail is complete and the immediate result was a tripling in the problem reports from Magnet personnel in the wake of the installation. This was expected and will be handled as expeditiously as possible. Better news concerns the fact that Mac virus findings have decreased, but have not been totally eliminated. A new project called for meeting with the DOE SSC Project Office to configure e-mail requirements.

User Support Services representatives attended the Apple Worldwide Developers' Conference to become familiar with the potential impact of the pending release in December of System 7.0 for the Apple Macintosh. The symposium provided useful information regarding possible problems and probable fixes. It also proved to be a productive exercise in making contacts with other Mac User Services support personnel. Meanwhile, in the Software/Hardware support area, the ongoing evaluation of Mac IIfx personal computers has been completed, the result being the purchase of several machines for use by Laboratory personnel.

Microsoft Windows 3.0 is currently being evaluated for use on IBM-PCs and clones. This package could prove useful as it is a very "Mac-like" icon-based DOS operating system shell which is designed to make these personal computers more user friendly. Our repair response capability has improved since a User Services technician underwent Macintosh certification training and a class on the Apple Laserwriter. Final installation of the Project Management file server and mail capability is complete pending the outcome of burn-in tests on selected users. Ethernet capabilities have been extended from the Laboratory to the Provident Bank building for access by the DOE office and the Procurement organization.

The Training coordinator collaborated with the SSC Computer Protection Program Manager to write the first draft of the "Security Guidelines for Unclassified Microcomputer and Terminal Users". A training management plan was developed for integration into the overall Laboratory plan to support staffing and budget recommendations through 1998.

In other support projects, the following accomplishments have been reported:

- The CERN Library V.198 has been installed on a DECstation 3100
- Bugs in the RISC System/6000 C Shell have been identified and corrected by IBM
- The CMZ code management software has been upgraded from V.1.29 to V.1.32
- The REDUCE algebraic computation software has been installed
- Several new pieces of equipment including the NEC PostScript-compatible color printer, the AMT DAP massively parallel SIMD computer and the Allaint FX/2800 multi-processor for 28 64-bit RISC CPUs were evaluated

ADP PLANNING, STANDARDS AND PROCEDURES

Approval was received from DOE for the following acquisition proposals:

Doc. No. 6235-L90-004: CAD/CAE Workstations and Software for the Magnet Systems Division
Doc. No. 6235-L90-008: Use of Argonne National Laboratory Computer Services (handled as a Memorandum to a Purchase Order).

The following documents have been transmitted in final form to DOE for review:

Doc. No. 6235-L90-005: CAD/CAE Workstations and Software for the Accelerator Division
Doc. No. 6235-L90-007: Software Development Tool for the SSCL, Laboratory Technical Services
Doc. No. 6235-L90-013: CAD/CAE Workstations and Software for Conventional Construction

Acquisition plans have been prepared in draft form for submission to Procurement:

Doc. No. 6235-L90-014: Implementation Plan for 500 MIP Major Item of Equipment (>\$1 Million)
Doc. No. 6235-L90-015: Relational Database Management System to Support MIS for the SSCL
Doc. No. 6235-L90-017: CAD/CAE Development Workstation for Accelerator Division

• DESIGN SUPPORT (4.4.6)

ADMINISTRATION

The staff supporting Magnet Systems Division increased as three new designers joined; some will go to Fermilab to support accelerated tooling and design requirements for the 50mm magnet. They will use six new H-P workstations running Unigraphics II software. Four to six additional designers will be hired and temporarily relocated to Fermilab for a one year (or more) rotational assignment as well. Six designer positions are now open to support the Accelerator Systems Division, with one offer pending. Several designer candidates are being interviewed for the Physics Research Division.

Our organization's Management Plan, which is currently under development, will be updated to reflect current management direction and plans.

The SSC Laboratory standard drawing format, which was revised slightly to reflect the metrication of the project, is being used as the lab's standard until final approval by the standards committee.

CAE/CAD OPERATIONS AND SUPPORT

The CAD manager's support to the Bldg. 4 CAD effort included loading new software on all Intergraph workstations and improving related plotting utilities. Currently, three plotters are online and a fourth unit aimed at providing low-cost, high-resolution color output is under evaluation. Daily and weekly backup service is provided for data stored on the Intergraph server.

Interviews for a CADS database manager, who will be set up and operate a data filing system for database translation to and from dissimilar CAD systems, will conclude this month. A plan describing the SSCL CAD environment and resource needs for the foreseeable future is being developed. This plan details the planned method of operation, the staff required to support the function, and the equipment and software necessary to perform the required design effort. The plan

will also include information on the CAD interface to the Document Management System. Acquisition plans for additional CADS equipment and software for Physics Research, Accelerator Systems, and Conventional Construction are currently being processed.

Evaluation of EE CAE/CAD systems continues, include the following: Cadence, Hewlett-Packard, Prime/Computervision, Harris/Scicards, Dasix, Mentor Graphics, Racal-Redac, Intergraph and Valid Logic. One more vendor will complete the first round before final evaluations are complete.

DESIGN DRAFTING SUPPORT

Staff support continued for Accelerator Systems and Physics Research Divisions and the Facilities Engineering Group including engineering on collider corrector and spool piece design (AS); detector configuration (PR); and facilities layout and documentation (FE) as well as ongoing support for the Administrative Personnel organization.

TECHNICAL DATA MANAGEMENT AND REPRODUCTION

Efforts to setup a data management system continues to be supported by Project Management personnel. Data management software and mass-storage devices are being considered to hold the technical data generated by the project. The database size, which is expected to exceed 2,200 GBytes by 1998, will require considerable storage resources which have been budgeted.

Requests for engineering drawing reproduction continue to increase as more design work flows out of the technical divisions. Initial storage of drawings was implemented this month as more than 300 were logged into the document management tracking system and filed. High-speed drawing reproduction systems are being evaluated for integration into the operation.

• COMMUNICATIONS (4.4.7)

Communications and network support have been combined into one office in the LTS Division.

The Stoneridge campus CATV system was extended to include the Strategy and Training rooms. This system was also tested to allow origination of video teleconferences from any conference room via CATV (with reduced features).

Installation of the Emergency Paging System, which was modified to include the trailers as a separate zone, has been completed.

The role of the "HELP DESK" has been expanded to include more support requirements. The lab's telephone operators are learning the computer system and procedures to cover the position.

The Laboratory Public Branch Exchange (PBX) system has been updated to permit four digit dialing of 12 digit pager numbers by instituting a list of abbreviated paging alias numbers.

The networking group attended a DOE-organized Government Open Systems Integration Plan (GOSIP) meeting, an ESnet Site Coordinators meeting, an OSI migration planning meeting, and training classes for Cisco equipment. The group hosted an ESnet Steering Committee meeting. Plans for communications services to Bldg. 2 and 3 in the Stoneridge campus have been initiated.

A representative from Computer Operations attended the ESnet DECNET Working Group meeting of which the last three days were meetings with Digital's DECnet managers and developers. The topics covered included the DECnet/OSI Phase-V transition on the ESNET backbone, the resulting impact on the backbone and tail circuit sites.

• **ENGINEERING SUPPORT/STANDARDS (4.4.8)**

Drawing Formats

A visit to Engineering Design Support from the Magnets Group revealed disagreement on the format relative to the tolerance block. This was discussed with Project Management and the Support Groups. The differences have been resolved and the revised format is in use.

Engineering Documents and Equipment Part Numbers

The part number problems were discussed with Project Management and have been resolved in the new procedure titled "Part Numbering Procedure". The new method is a 3 digit-6 digit-3 digit system; the last three digits are the dash number. The dash number provides the capability to create similar parts without creating multiple drawings--one drawing for each part.

Procedures Completed and Submitted to Program Management for Review

The Drawing Review Process Procedure has been completed. The procedure defines the engineering document review process, who should review the documents, and the flow of drawings being reviewed for release to Documentation Control.

Procedures in Process

Work has started on a Software Libraries and Repositories Procedure to establish the requirements and responsibilities for the formal release, storage, distribution, change authorization, and change(s) to software for the accelerator. This includes the software for programming firmware (programmable devices) and operational software used in the operation of the accelerator and the monitoring equipment.

Drafting Manual

The Drafting Manual will be divided into two sections. The first section will consist of different types of drawings with complete preparation instructions. The second section will be an appendix consisting of detailed subject instructions. Drafts of four sections of the appendix were completed in May and placed in a notebook for Project Management review. The four sections include:

- (1) Surface Texture - detailing the features which form a part of roughness and the method for defining the required minimum acceptable texture (roughness) on drawings by means of symbols.
- (2) Metric Conversion - defining the metric units of measurements and how they are applied to drawings, how to use the grades of fit for mating parts, and the general use of tolerances.
- (3) Reference Designations - covering the selection, formation, and application of reference designations pertaining to electrical and electronic parts and equipment. A uniform method of

assigning reference designations to identify and locate discrete items on equipment, parts lists, and other documents is also described.

(4) Line Conventions - defining the different line conventions used in engineering drawings preparation. The application of these lines is also covered in this section.

• **METROLOGY LABS (4.4.9)**

The following tasks were accomplished in May:

- Completed cost reviews for the Metrology and Calibration and Repair Labs on capital equipment, materials and supplies, office equipment, and personnel, for an eight-year period.
- Ordered FY90 materials and supplies and capital equipment for both the Metrology and Calibration and Repair Labs.
- Developed a Metrology Quality Assurance Program outline.
- Designed initial layouts for both the Metrology and Calibration and Repair Labs.
- Initiated process to hire the two technicians who will be required to check incoming equipment when FY90 working standards arrive.
- Contacted the National Conference of Standards Laboratories (NCSL) about the SSC Metrology Laboratory participation in this professional organization.
- Contacted the National Institute of Standards and Technology and obtained information on calibration services and various other services provided.
- Wrote the first draft of the Calibration and Repair Lab Standard Operating Procedures.
- Ordered several ANSI, OSHA, and MIL-STD publications that pertain to Metrology and Calibration Labs.
- Made contact with several other EG&G Calibration Labs to obtain any reference materials available on Metrology.
- Set up a temporary Test Equipment Data Base to track all incoming, as well as in place, test equipment.
- Began limited operational checks on incoming test equipment.
- Implemented a procedure with the warehouse receiving section to have all test equipment routed to the Calibration and Repair Laboratory before acceptance by the owner/user.
- Began working on the plans for a temporary building to house the Calibration and Repair Lab.

SSC LAB DIRECTORS OFFICE (WBS 4.5)

The Machine Advisory Committee met on May 4-5 at the SSC Laboratory. Among their recommendations: the HEB should operate with alternate polarity on each accelerating cycle. This idea should first be tested at Fermilab. The HEB should probably use 50mm aperture magnets, matching the collider aperture. A manager should be appointed as soon as possible for the injector complex. A dipole magnet life test is crucial to the demonstration of an accelerator quality magnet. A string test is also needed to verify system integrity, but is less important to the present critical path than the life test.

The SSC Board of Overseers met at the SSCL on May 7-8 and were briefed by Directorate and other staff on the status of the project.

The Users Office supported a Solenoidal Detector Collaboration meeting on May 10-12 to discuss an Expression of Interest in research at the SSC.

Preparations continued for the "Symposium on Detector Research and Development for the Superconducting Super Collider" to be held in Fort Worth on October 15-18. Approximately 500 people from the high energy physics community and industry are expected to attend.

Final plans have been completed to begin issuing User ID cards on August 1.

Fourteen Expressions of Interest in research at the SSC were received by the May 25 deadline, representing some 1,900 scientists from many countries. The Program Advisory Committee will guide the laboratory in evaluating these ideas in the next few months, leading to a call for formal proposals to be due about one year later.

The Directorate approved two new educational programs. The Summer Intern program seeks to encourage careers in science for junior and senior high school students and college undergraduates by offering employment at the SSCL for specified terms such as summer or a school semester. Twenty-nine interns have been selected for the summer of 1990 from a very strong set of applicants. The Co-op program will offer undergraduates an integrated program of classroom and supervised work, alternating periods of study at the college or university with work at the SSCL. Ten students are expected to be participating in the Co-op program during the fall 1990 semester.

PHYSICS RESEARCH (4.6)

• LIBRARY SERVICES (4.6.1)

Two presentations helped the library staff gain a better understanding of High-Energy Particle Physics and the history of the SSC. Many thanks to George Yost for his presentation on High-Energy Particle Physics and to Doug Kreitz from the Personnel Department for his presentation on the History of the SSC From Its Beginnings To The Present.

The Laboratory's Records Manager/Archivist began to analyze and plan strategies for the Records Management and Archival needs of the Laboratory.

• TECHNICAL INFORMATION AND PUBLICATIONS (4.6.2)

The SSCL Manager of Technical Information and Publications and Rick Troxell, Print Group Manager for the Federal Prison Industries toured printing facilities at three Federal Prisons located at Fort Worth, TX, Leavenworth, KS, and Sandstone, MN. The Fort Worth facility is capable of black and white printing, the Leavenworth facility primarily designs and prints forms, and the facility at Sandstone is a general print shop, capable of producing black and white and multiple color documents. The Federal Prison Industries is very competitive with commercial print shops.

The Graphic Services Department is requesting additional equipment which will enable the group to produce high quality photographic stats, viewgraphs, continuous tone prints and color reproductions. The draft of the Request For Purchase has been submitted to DOE for review.

The SSCL Manager of Technical Information and Publications attended a meeting/workshop for DOE contractors, hosted by DOE and GPO concerning outside printing requirements and methods.

• EXPERIMENTAL FACILITIES (WBS 4.6.3)

We continue to collect data for the Resource Requirements Report. For the most part, the detectors do not differ appreciably from the baseline designs described in the SCDR. Small differences do exist, however, and work is in progress to document the requirements that would be reflected as changes to the baseline.

A comparative cost and schedule study of liquid argon and spaghetti calorimetry has been carried out with Martin Marrietta. The results will be published as an SSC Note. In brief, the results indicate that there is little schedule difference in the two techniques, but that spaghetti will cost somewhat more to build.

A detector Safety panel met in May to consider safety issues related to detectors. The panel provided the lab with manuals and information that reflects experience at their home institutions. Some observations on safety issues associated with SSC Lab detectors were also made. A report of the panel will be available shortly.

Work continues on various aspects of the design of a detector model for the SDC collaboration. The present work is centered on an investigation of maintenance procedures for one of the detector configurations. Work is also in progress on the design of the muon steel. This work is being done with the help of RTK in California.

The Bottom Collider Detector concentrated on consolidating results of previous work and preparing the Expression of Interest. Computer simulation work will become a major effort for the near future.

Some members of the L* detector group are concentrating this month on developing a list of resource requirements for the SSC Lab. Although a great deal of information is already on hand, the group is filling in the remaining blanks - especially with regard to the assembly sequence for the detector. Much of this work will be done with help from Oak Ridge National Lab.

The TeXAS detector has unique structural problems which affect the assembly and construction procedures for the detector. A structural design was carried out at Draper Labs for TeXAS, and a report is available. The work on developing an assembly sequence for the detector can now begin.

EXPERIMENTAL SYSTEMS (WBS 5.0)

• EXPERIMENTAL SYSTEMS R&D (WBS 5.1)

The Memoranda of Understanding (MOU) between the SSC Laboratory and the collaborations that will receive funding in FY90 to perform R&D on major detector subsystems were completed. The final MOUs dealt with data acquisition and triggering topics, as well as engineering studies for straw-tube tracking. The Laboratory authorized the DOE to recall funds and distribute them to the appropriate institutions to cover these expenditures.

Planning continues for the Symposium on Detector R&D for the SSC to be held October 15-18, 1990 in Fort Worth, Texas. The first mailing announcing the meeting was sent out to the international high energy physics community and to various industrial concerns. Abstracts for talks were requested to be submitted by June 22. A request for bids for publishing the proceedings has gone out.

On May 25, F. Gilman and T. Dombeck attended a meeting of the Detector R&D Review Committee formed by the Texas National Research Laboratory Commission (TNRLC) to review proposals to the State of Texas on detector topics. Reviews were presented of the fourteen proposals submitted by the Laboratory for consideration by the TNRLC to augment the subsystems detector R&D funding already provided by the DOE. Of the \$2.013M requested, the Review Committee recommended twelve projects for funding (\$1.813M), one be deferred until more information was obtained (\$100K), and one be rejected (\$100K). The Commission subsequently voted and accepted these recommendations. Discussions have begun with Laboratory personnel to begin timely distribution of these funds.

A number of other meetings were attended and talks presented by Laboratory personnel during the month of May. T. Dombeck presented talks on the SSC Laboratory program at the Seven Points, Texas, Chamber of Commerce on May 9, and at Lawrence Livermore National Laboratory on May 11. An information meeting on SSC detector R&D was held on May 23 with Timothy Day, Legislative Assistant for Representative Joe Barton.

• DETECTORS (WBS 5.2)

Fourteen Expressions of Interest were received, logged and filed with copies distributed to readers and members of the Program Advisory Committee. Letters acknowledging receipt and invitations to the public presentations June 7-8 were sent to the proponents.

• EXPERIMENTAL SYSTEMS COMPUTERS (WBS 5.3)

See Physics Support under WBS 6.1.4.

LAB OPERATIONS SUPPORT (WBS 6.0)

PHYSICS PROGRAM SUPPORT (WBS 6.1)

• DIVISION OFFICE (6.1.1)

The WBS elements for the Physics Research Division were changed to conform to the latest revision and long range planning will be performed in accordance with this version of the Work Breakdown Structure.

Some preliminary budget reallocations were accomplished and further analysis will be performed following distribution of the May actuals.

The Division Office coordinated the following meetings in May:

Computing Policy Committee - May 1 - 2, 1990

Detector Safety Review Panel - May 30 - 31, 1990

New Topics in Electroweak Physics - May 30 - June 1, 1990

Six guest scientists arrived and will be visiting the Division through June. Work was begun on a Division Office Support Staff procedural guideline handbook. Various safety documents were sorted and organized and delivered to the Environmental Safety and Health Library.

• THEORY (6.1.2)

Six theorists arrived to be in residence for approximately one month, including the period of the conference on New Topics in Electroweak Physics. This was the first large scale theoretical physics activity at the SSC Laboratory. The conference itself was held on May 30 - June 1, with 40 attendees from outside the SSCL. The meeting was a very interesting one, with new developments presented, especially on technicolor theories and on the possibility that weak interactions become strong at SSC energies, thereby yielding spectacular events with dozens of Z, W, and Higgs bosons. The likelihood of such events, which was proposed last year, was still unsettled at the end of the meeting.

• EXPERIMENTAL PHYSICS AND FACILITIES (6.1.3)

Planning for formation, staffing, and activities of an experimental physics group led by Jim Siegrist was begun.

• COMPUTING AND DATA ANALYSIS (6.1.4)

Computation and Analyses

Computer Operations added one new employee who has extensive operator experience in VMS systems and is currently familiarizing himself with SSC's multi-vendor environment for future support work. Representatives from this organization attended Powerhouse programming and DELTEK System Management classes.

A four-member working group was established for the purpose of studying domain name service. The goal of the group is to produce internal documentation on local nameservers (e.g., differences, strengths) to understand and more effectively troubleshoot local nameserver problems. Reference materials are specific RFCs recommended by the resident nameserver expert from LLNL. Members representing User Services, Networks, and Operations provide input to the group. In a related activity, the laboratory domain nameserver (SUNOVA) was moved to the Administrative computer room to provide for stability of the hardware/software configurations.

Requisitons for an IMAGEN printserver (6320) for SSCAD1, two additional exabyte 8mm tape drives for SSCAD1 and SSCVX1, and maintenance on the S-G server and the AlisaTalk software have been submitted. A means to expedite an important, delayed SPARCstation order is being investigated by the vendor, SUN Microsystems.

VAX Systems

The Administrative VAX 6310 computer system (SSCAD1) has been upgraded to a VAX 6420 with 64 MB memory, for an increase from 3.5 MIPS to 13 MIPS. The installation of four RA90 disk drives added 7 gigabytes of online disk storage. A dual-drive read/write optical subsystem has been installed on the Microvax 3400 for evaluation. Test procedures were developed and executed from both systems in the Administrative VAXcluster. Along with the optical subsystem, an 8 mm tape drive has been ordered to support backup and archival requirements. The following software activities were accomplished on both SSCAD1 and the scientific VAX (SSCVX1):

Administrative System:

- TRACS software was implemented
- Index file 'cleanup' routines on DELTEK data files reduced disk space requirements by 40%
- Document Tracking System was rewritten using Powerhouse Quick screens (rather than Datatrieve)
- Security enhancements for DELTEK system were developed and tested
- Redesigned software layout on disks

Scientific System:

- ANSYS was installed with an expected increase in resource utilization
- TELE utility enhanced to print name, phone, bldg., cubicle, division, M/S and VAX username
- A menu-driven laserwriter selection program for VAX users has been written
- Development of a menu-driven program for operators to perform the SUN backups from the VAX and place the resulting logfiles in a directory structure on the VAX was begun

UNIX System Management

Some short term goals for common user interfaces have been met with the installation of the VMS shell (VCL) and EDT editor for UNIX systems. The shell and the editor have been installed and tested on the Silicon Graphics computer and some SUN systems. There are some platform-specific differences between UNIX systems running VCL which will require further investigation. In addition, a demonstration of the TPU editor has been installed on the Silicon Graphics server.

Other UNIX systems activities included installing three new SPARCstations for Physics Research and installing an evaluation copy of WINGZ on a SPARCstation. Routine functions included rebuilding the system disk on SNAPPY, reporting a Yellow Pages problem (it cannot use a SUN as a YP slave) diagnosed on the S-G machine and updating HOSTS and NETWORK files on CAD workstations adding SSCRT1 to the routing tables.

The Berkeley 4.3 print spooling system has been ported to the Silicon Graphics fileserver which will allow the use of a common print spooling system for the existing UNIX systems.

Physics Support

The Systems Development Group is continuing to support the 500 MIP acquisition project. The Cooperative Processes Software has been chosen for use as the process-level distributed computing software. A meeting at Fermilab involved discussions regarding porting, software internals (and produced a tape of the code). A new hire will work with the software, possibly in a joint effort with Fermilab.

The Systems Development Group has also initiated the process of obtaining a UNIX source license for the 500 MIP project to be used as system documentation. The system specification document for the project has been reviewed by three independent sources. Their comments and suggestions have been debated by the Computer Acquisition Working Group (CAWG) for incorporation into the system specification, which has been updated and finalized. A systems integration plan supporting the analysis, design, simulation, development and operations of the project has been outlined.

In the effort to integrate the Macintosh personal computers with the Silicon Graphics file server, the Systems Development Group has developed an X window-based calendar tool. This tool will allow each user to share their calendar with other users for such tasks as coordinating the schedules of volunteers members to the CAWG. A representative of this organization attended the X window system seminar to evaluate more potential uses for this tool.

Networks

Networking and communications support have been combined into one Work Breakdown Structure number under Laboratory Technical Services. Since they have been consolidated under that division, there will not be a separate report under this heading.

SSC LABORATORY - CONTRACT #DEACO289ER40486 - FORMAT I (BY WBS)

COST PERFORMANCE REPORT - BY WBS														
REPORT PERIOD										FROM: 04-29-90			\$ IN 000'S	
										TO: 05-27-90				
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90				
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE	BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE			
				SCHEDULE COST				SCHEDULE COST						
1.0 TECHNICAL SYSTEMS	1,248	1,248	1,248	0	0	7,434	7,434	7,434	0	0	30,516	30,516	0	
2.0 CONVENTIONAL CONSTRUCTION	2,052	2,052	2,052	0	0	11,114	11,114	11,114	0	0	18,794	18,794	0	
3.0 PROJECT MGMT. & SUPPORT	454	454	454	0	0	4,352	4,352	4,352	0	0	8,746	8,746	0	
4.0 R&D, PRE-OPS, ADMIN& SUPPT	7,346	7,346	7,346	0	0	56,135	56,135	56,135	0	0	102,123	102,123	0	
5.0 EXPERIMENTAL SYSTEMS	23	23	23	0	0	251	251	251	0	0	330	330	0	
6.0 LAB OPERATIONS SUPPORT	585	585	585	0	0	3,626	3,626	3,626	0	0	7,642	7,642	0	
TOTAL DIRECT COSTS	11,708	11,708	11,708	0	0	82,912	82,912	82,912	0	0	168,151	168,151	0	
MANAGEMENT RESERVE											3,196	3,196	0	
TOTAL	11,708	11,708	11,708	0	0	82,912	82,912	82,912	0	0	171,347	171,347	0	

**BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL

SSC LABORATORY - CONTRACT #DEACO289ER40486 - FORMAT I (BY WBS)

COST PERFORMANCE REPORT - BY WBS													
REPORT PERIOD											FROM: 04-29-90		\$ IN 000'S
											TO: 05-27-90		
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90			
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE	BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE		
				SCHEDULE COST				SCHEDULE COST					
2.1.1 SUPPORT FUNCTION	0	0	0	0	0	0	0	0	0	0	0	0	
2.1.2 LINAC	0	0	0	0	0	0	0	0	0	0	0	0	
2.1.3 LEB	0	0	0	0	0	0	0	0	0	0	0	0	
2.1.4 MEB	0	0	0	0	0	0	0	0	0	0	0	0	
2.1.5 HEB	0	0	0	0	0	0	0	0	0	0	0	0	
2.1.6 COLLIDER	0	0	0	0	0	0	0	0	0	0	0	0	
2.1.7 TEST BEAMS	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL 2.1 CONV. CONSTR. ACCEL.	0	0	0	0	0	0	0	0	0	0	0	0	
2.2.1 WN REGION	0	0	0	0	0	0	0	0	0	0	0	0	
2.2.2 WS REGION	0	0	0	0	0	0	0	0	0	0	0	0	
2.2.3 EN REGION	0	0	0	0	0	0	0	0	0	0	0	0	
2.2.4 ES REGION	0	0	0	0	0	0	0	0	0	0	0	0	
2.2.5 SUPPORT FUNCTIONS	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL 2.2 CONV. SYS. EXPERIMENT	0	0	0	0	0	0	0	0	0	0	0	0	

**BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL

SSC LABORATORY - CONTRACT #DEACO289ER40486 - FORMAT I (BY WBS)

COST PERFORMANCE REPORT - BY WBS													
REPORT PERIOD										FROM: 04-29-90			
										TO: 05-27-90			
CURRENT PERIOD										CUMULATIVE TO DATE			
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE
				SCHEDULE	COST				SCHEDULE	COST			
2.3.1 PRIMARY, OFFSITE	0	0	0	0	0	0	0	0	0	0	0	0	0
2.3.2 PRIMARY, ONSITE	0	0	0	0	0	0	0	0	0	0	0	0	0
2.3.3 SECONDARY	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 2.3 SITE&INFRASTRUCTURE	0	0	0	0	0	0	0	0	0	0	0	0	0
2.4.1 CENTRAL LAB/OFFICE AREA	0	0	0	0	0	0	0	0	0	0	0	0	0
2.4.2 MAGNET LABORATORY	0	0	0	0	0	0	0	0	0	0	0	0	0
2.4.3 ACCELERATOR FACILITIES	0	0	0	0	0	0	0	0	0	0	0	0	0
2.4.4 ENVIRONMENT HEALTH FACIL.	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 2.4 CAMPUS	0	0	0	0	0	0	0	0	0	0	0	0	0
2.5.1 AE/ICM	0	0	0	0	0	0	0	0	0	0	0	0	0
2.5.2 CCD MANAGEMENT	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 2.5 CONV. CONST. MGMT.	2,052	2,052	2,052	0	0	11,114	11,114	11,114	0	0	18,794	18,794	0
TOTAL 2.0 CONVENTIONAL CONST.	2,052	2,052	2,052	0	0	11,114	11,114	11,114	0	0	18,794	18,794	0

**BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL

SSC LABORATORY - CONTRACT #DEACO289ER40486 - FORMAT I (BY WBS)

COST PERFORMANCE REPORT - BY WBS													
REPORT PERIOD										FROM: 04-29-90		\$ IN 000'S	
										TO: 05-27-90			
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90			
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE
				SCHEDULE	COST				SCHEDULE	COST			
3.1.1 PROJECT MGMT. OFFICE	-530	-530	-530	0	0	933	933	933	0	0	1,500	1,500	0
3.1.2 PLANNING	92	92	92	0	0	833	833	833	0	0	1,783	1,783	0
3.1.3 PMRS	62	62	62	0	0	639	639	639	0	0	1,072	1,072	0
3.1.4 ENGINEERING STANDARDS	21	21	21	0	0	59	59	59	0	0	641	641	0
3.1.5 ENVIRONMENTAL AFFAIRS	683	683	683	0	0	721	721	721	0	0	1,250	1,250	0
3.1.6 OFFICE OF TECH. DIRECTOR	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 3.1 PROJECT MANAGEMENT	328	328	328	0	0	3,185	3,185	3,185	0	0	6,246	6,246	0
3.2 SYSTEMS ENGINEERING	126	126	126	0	0	1,167	1,167	1,167	0	0	2,500	2,500	0
TOTAL 3.0 PROJ. MGMT. & SUPPORT	454	454	454	0	0	4,352	4,352	4,352	0	0	8,746	8,746	0

**BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL.

SSC LABORATORY - CONTRACT #DEACO289ER40486 - FORMAT I (BY WBS)

COST PERFORMANCE REPORT - BY WBS														
REPORT PERIOD										\$ IN 000'S				
FROM: 04-29-90														
TO: 05-27-90														
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90				
BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE		
			SCHEDULE	COST				SCHEDULE	COST					
WBS ITEM														
4.1	ACCELERATOR PRE-OPS	0	0	0	0	0	0	0	0	0	0	0		
4.2.1	ACCELERATOR R&D	1,848	1,848	1,848	0	0	11,522	11,522	11,522	0	0	26,130	26,130	0
4.2.2	MAGNET R&D	3,068	3,068	3,068	0	0	24,358	24,358	24,358	0	0	41,800	41,800	0
TOTAL 4.1&2 PRE-OPS/RES. & DEV		4,916	4,916	4,916	0	0	35,880	35,880	35,880	0	0	67,930	67,930	0

*BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL

SSC LABORATORY - CONTRACT #DEACO289ER40486 - FORMAT 1 (BY WBS)

COST PERFORMANCE REPORT - BY WBS																
REPORT PERIOD											FROM: 04-29-90		\$ IN 000'S			
											TO: 05-27-90					
CURRENT PERIOD											CUMULATIVE TO DATE				**FY90	
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE				
				SCHEDULE	COST				SCHEDULE	COST						
4.3.1 ADMIN SERVICES MGMT.	47	47	47	0	0	1,524	1,524	1,524	0	0	2,858	2,858	0			
4.3.2 ACCTG. & FINANCE	170	170	170	0	0	1,423	1,423	1,423	0	0	2,016	2,016	0			
4.3.3 PROCUREMENT & CONT.	170	170	170	0	0	1,822	1,822	1,822	0	0	2,681	2,681	0			
4.3.4 TRAVEL SERVICES	11	11	11	0	0	122	122	122	0	0	215	215	0			
4.3.5 HUMAN SERVICES	278	278	278	0	0	1,715	1,715	1,715	0	0	2,120	2,120	0			
4.3.6 STAFF SUPPORT SERVICES	87	87	87	0	0	816	816	816	0	0	1,303	1,303	0			
4.3.7 MINORITY AFFAIRS	44	44	44	0	0	220	220	220	0	0	465	465	0			
4.3.8 INTERNAL AUDIT	0	0	0	0	0	0	0	0	0	0	0	0	0			
TOTAL 4.3 LAB ADMIN & SUPPORT	800	800	800	0	0	7,596	7,596	7,596	0	0	11,612	11,612	0			
* adjustment due to surcharge offset from warehouse stores																

**BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL

SSC LABORATORY - CONTRACT #DEACO289ER40486 - FORMAT I (BY WBS)

COST PERFORMANCE REPORT - BY WBS														
REPORT PERIOD										FROM: 04-29-90			\$ IN 000'S	
										TO: 05-27-90				
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90				
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE	BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE			
				SCHEDULE COST				SCHEDULE COST						
4.4.1 TECH SUPPORT MANAGEMENT	118	118	118	0 0	831	831	831	0 0	1,827	1,827	0			
4.4.2 FAC. ENG. SERVICES	105	105	105	0 0	3,235	3,235	3,235	0 0	4,231	4,231	0			
4.4.3 MTL. & LOGISTIC SERVICES	68	68	68	0 0	538	538	538	0 0	964	964	0			
4.4.4 FABRICATION SHOPS	10	10	10	0 0	61	61	61	0 0	132	132	0			
4.4.5 GENERAL COMPUTING	580	580	580	0 0	1,799	1,799	1,799	0 0	3,239	3,239	0			
4.4.6 DESIGN SUPPORT	70	70	70	0 0	343	343	343	0 0	1,294	1,294	0			
4.4.7 COMMUNICATIONS	75	75	75	0 0	810	810	810	0 0	2,351	2,351	0			
4.4.8 ENG. SUPPORT/STDS	30	30	30	0 0	174	174	174	0 0	504	504	0			
4.4.9 METROLOGY LABS	6	6	6	0 0	13	13	13	0 0	146	146	0			
4.4.10 PROTECTIVE SERVICES	0	0	0	0 0	0	0	0	0 0	0	0	0			
TOTAL 4.4 LAB TECH SUPPORT	1,062	1,062	1,062	0 0	7,804	7,804	7,804	0 0	14,688	14,688	0			

Page 58

**BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL

SSC LABORATORY - CONTRACT #DEACO289ER40486 - FORMAT I (BY WBS)

COST PERFORMANCE REPORT - BY WBS													
REPORT PERIOD											\$ IN 000'S		
FROM: 04-29-90													
TO: 05-27-90													
CURRENT PERIOD						CUMULATIVE TO DATE						**FY90	
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE	SCHEDULE COST	BCWS	BCWP	ACWP	VARIANCE	SCHEDULE COST	BAC	LRE	VARIANCE
4.5.1 DIRECTORATE	282	282	282	0	0	2,273	2,273	2,273	0	0	3,470	3,470	0
4.5.2 EXTERNAL AFFAIRS	40	40	40	0	0	405	405	405	0	0	575	575	0
4.5.3 LEGAL SERVICES	36	36	36	0	0	230	230	230	0	0	305	305	0
4.5.4 RESEARCH & TECH. ASSMT.	0	0	0	0	0	1	1	1	0	0	65	65	0
4.5.5 USERS OFFICE	8	8	8	0	0	175	175	175	0	0	239	239	0
4.5.6 ENVIRON. HEALTH & SAFETY	36	36	36	0	0	335	335	335	0	0	516	516	0
4.5.7 PLANNING	27	27	27	0	0	226	226	226	0	0	323	323	0
4.5.8 INTERNAT'L. COORDINATION	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 4.5 LAB DIRECTORATE	429	429	429	0	0	3,645	3,645	3,645	0	0	5,493	5,493	0
4.6.1 LIBRARY SERVICES	87	87	87	0	0	580	580	580	0	0	1,365	1,365	0
4.6.2 TECH. INFO. & PUBLICATIONS	52	52	52	0	0	630	630	630	0	0	1,035	1,035	0
4.6.3 EXPER. FACILITIES ADMIN.	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 4.6 PHYSICS RESEARCH	139	139	139	0	0	1,210	1,210	1,210	0	0	2,400	2,400	0
4.7 PRIME CONTRACTORS FEES	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 4.0 R&D, PRE-OPS, ADMIN SUP	7,346	7,346	7,346	0	0	56,135	56,135	56,135	0	0	102,123	102,123	0

Page 59

**BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL

SSC LABORATORY - CONTRACT #DEACO289ER40486 - FORMAT I (BY WBS)

COST PERFORMANCE REPORT - BY WBS												
REPORT PERIOD											\$ IN 000'S	
FROM: 04-29-90												
TO: 05-27-90												
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90		
BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE
			SCHEDULE	COST				SCHEDULE	COST			
WBS ITEM												
5.1.1	GENERIC R&D	0	0	0	0	0	0	0	0	0	0	0
5.1.2	MAJOR DETECT. & SUBSYST.	0	0	0	0	0	0	0	0	0	0	0
5.1.3	APPROVED EXPER. R&D	0	0	0	0	0	0	0	0	0	0	0
TOTAL 5.1 EXPER. SYST. R&D		0	0	0	0	0	0	0	0	0	0	0
5.2	DETECTORS	0	0	0	0	0	0	0	0	0	0	0
5.3	EXPER. SYS. COMPUTERS	0	0	0	0	0	0	0	0	0	0	0
TOTAL 5.0 EXPERIMENTAL SYSTEMS		23	23	23	0	0	251	251	251	0	0	330

Page 60

**BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL.

SSC LABORATORY - CONTRACT #DEACO289ER40486 - FORMAT I (BY WBS)

COST PERFORMANCE REPORT - BY WBS													
REPORT PERIOD											\$ IN 000'S		
FROM: 04-29-90													
TO: 05-27-90													
WBS ITEM	CURRENT PERIOD					CUMULATIVE TO DATE					**FY90		
	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE
				SCHEDULE	COST				SCHEDULE	COST			
6.1.1 PHYSICS ADMIN/SUPPORT	57	57	57	0	0	459	459	459	0	0	871	871	0
6.1.2 PHYSICS THEORY	0	0	0	0	0	1	1	1	0	0	356	356	0
6.1.3 EXPER. PHYSICS	223	223	223	0	0	1,490	1,490	1,490	0	0	2,748	2,748	0
6.1.4 COMPUTING & DATA ANALYSIS	305	305	305	0	0	1,676	1,676	1,676	0	0	3,667	3,667	0
6.1.5 ACCELERATOR PHYSICS	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 6.1 PHYSICS PROG SUPPORT	585	585	585	0	0	3,626	3,626	3,626	0	0	7,642	7,642	0
6.2 LAB OPERATIONS OVERHEAD	0	0	0	0	0	0	0	0	0	0	0	0	0
6.3 ACCELERATOR OPERATIONS	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 6.0 LAB OPS. SUPPORT	585	585	585	0	0	3,626	3,626	3,626	0	0	7,642	7,642	0

**BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL

SSC LABORATORY - CONTRACT #DEACO289ER40486 - FORMAT 2 (BY OBS)

COST PERFORMANCE REPORT - BY OBS												
REPORT PERIOD										FROM: 04-29-90		\$ IN 000'S
										TO: 05-27-90		
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90		
OBS ITEM	BCWS	BCWP	ACWP	VARIANCE	BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE	
				SCHEDULE COST				SCHEDULE COST				
D - DIRECTORATE	429	429	429	0	0	3,645	3,645	3,645	0	0	5,493	
B - PROJECT MANAGEMENT	454	454	454	0	0	4,352	4,352	4,352	0	0	8,746	
A - ACCELERATOR SYSTEMS	1,854	1,854	1,854	0	0	11,724	11,724	11,724	0	0	28,530	
C - CONVENTIONAL CONSTRUCTION	2,052	2,052	2,052	0	0	11,114	11,114	11,114	0	0	18,794	
T - TECHNICAL SERVICES	1,062	1,062	1,062	0	0	7,804	7,804	7,804	0	0	14,688	
G - ADMINISTRATIVE SERVICES	800	800	800	0	0	7,596	7,596	7,596	0	0	11,612	
P - PHYSICS RESEARCH	747	747	747	0	0	5,087	5,087	5,087	0	0	10,372	
M - MAGNET SYSTEMS	4,310	4,310	4,310	0	0	31,590	31,590	31,590	0	0	69,916	
TOTAL SSC LABORATORY	11,708	11,708	11,708	0	0	82,912	82,912	82,912	0	0	168,151	

****BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL.**

SSC LABORATORY - CONTRACT #DEACO289ER40486 - MAJOR SUBCONTRACTORS

MAJOR SUBCONTRACTORS												
REPORT PERIOD										\$ IN 000'S		
FROM: 04-29-90												
TO: 05-27-90												
CURRENT PERIOD					CUMULATIVE TO DATE					FY 90		
BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE	
			SCHEDULE	COST				SCHEDULE	COST			
CONTRACT												
BROOKHAVEN LAB - MAGNETS	1,038	1,038	1,038	0	0	10,975	10,975	10,975	0	0	18,722	
FERMILAB - MAGNETS	1,868	1,868	1,868	0	0	10,114	10,114	10,114	0	0	16,000	
LBL - MAGNETS	161	161	161	0	0	3,269	3,269	3,269	0	0	4,500	
LOCKHEED	116	116	116	0	0	1,025	1,025	1,025	0	0	2,530	
RTK	1,870	1,870	1,870	0	0	9,651	9,651	9,651	0	0	11,917	
HARC/TAC	48	48	48	0	0	1,809	1,809	1,809	0	0	2,772	
SUBTOTAL	5,101	5,101	5,101	0	0	36,843	36,843	36,843	0	0	56,441	
SSCL/OTHER	6,607	6,607	6,607	0	0	46,069	46,069	46,069	0	0	111,710	
TOTAL	11,708	11,708	11,708	0	0	82,912	82,912	82,912	0	0	168,151	

*BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL

SSC PROJECT

STARTUP (NEAR TERM) MILESTONES

MIL NO.	WBS NO.	MILESTONE DESCRIPTION	COMPLETION DATE			COMMENTS
			ORIGINAL PLAN	CURRENT PLAN	ACTUAL	
1	2.0	AE/CM Criteria	3/89		4/89	
2	2.0	Start Geotech	5/89		6/89	First Phase Complete
3	3.0	SE/I RFP Issued	6/89		6/89	
4	2.0	Footprint Fixed	8/89		8/89	
5	3.0	SE/I Contract Award	8/89		10/89	
6	3.0	First Draft PMP Issued To DOE	8/89		8/89	Subject of Semi Annual Review
7	4.0	DOE Approval To Proceed With In-House Design For Early Critical A-E/CM Activities	8/89		8/89	Official 10/2
8	2.0	Land Acquisition Footprint Specification Documentation Complete	8/89		9/89	
9	1.0	MIP RFP	9/89		5/90	Draft
10	3.3	Key Finance Staff Hired	9/89		9/89	
11	2.0	First Tunnel Section Location Set	9/89		9/89	
12	1.0	Tunnel Cross Section Defined	9/89		10/89	
13	3.0	First DOE Semi Annual Review	9/89		9/89	

SSC PROJECT

STARTUP (NEAR TERM) MILESTONES

MIL NO.	WBS NO.	MILESTONE DESCRIPTION	COMPLETION DATE			COMMENTS
			ORIGINAL PLAN	CURRENT PLAN	ACTUAL	
14	3.3	SSCL Accounting System In WBS Format Shown in August Monthly Report	9/89		11/89	In October Report
15	3.3	Deltek Accounting System Operational	9/89		9/89	October 1 Initialization
16	3.3	Key Procurement Staff Hired	9/89		9/89	All Key Positions Filled
17	3.3	Procurement Policies Procedures Manual Complete and Issued	9/89		9/89	Submitted To DOE-CH For Review And
Approval						
18	3.3	Deltek Purchasing Module Operational	9/89		9/89	
19	3.4	SSCL Vax Delivered	9/89		10/89	
20	3.1	PMRS Software Installed and Tested	9/89		9/89	
21	3.1	Eng. Mgmt. System Plan - Final Draft Issued	9/89		4/90	
22	2.0	First SEIS Draft Issued	10/89		10/89	
23	2.0	AE/CM Contract	10/89		5/90	
24	3.1	PMRS Implementation Complete	10/89		10/89	Software Implementation
25	3.4	MIS Hardware Operational	10/89		10/89	
26	3.1	Config. Mgmt. Plan Complete	10/89		1/90	
27	3.4	Draft Document Control Plan Issued	10/89		10/89	

SSC PROJECT

STARTUP (NEAR TERM) MILESTONES

MIL NO.	WBS NO.	MILESTONE DESCRIPTION	COMPLETION DATE			COMMENTS
			ORIGINAL PLAN	CURRENT PLAN	ACTUAL	
28	2.6	AE/CM-SSC Performance Objectives & Syst. Requirements Revisions Complete	10/89		5/90	Draft
29	3.0	Issue First Funding Directive	10/89		10/89	
30	3.0	First C/SCS Report Test	10/89		11/89	October Data
31	1.0	Collider Dipole Criteria Established	10/89		4/90	
32	3.0	Initial Baseline Issued	11/89		5/90	
33	3.1	First Monthly Report With Automated PMRS	11/89		11/89	Test CPR
34	3.1	Baseline Cost Estimate Complete	11/89		1/90	
35	3.2	SEMP Approved and Issued	11/89		2/90	
36	3.1	PMP - Final Draft Issued	11/89	7/90		
37	3.1	Key QA Staff Hired	11/89		1/90	
38	3.5	ES&H Management Plan	11/89	6/90		
39	3.5	ES&H Final Draft Issued	11/89	6/90		
40	3.1	SSC WBS/WBS Dictionary Complete and Issued	11/89		5/90	
41	1.0	Prototype Dipole Specification Complete	11/89		3/90	
42	1.0	Magnet Criteria Complete	11/89		3/90	

SSC PROJECT

STARTUP (NEAR TERM) MILESTONES

MIL NO.	WBS NO.	MILESTONE DESCRIPTION	COMPLETION DATE			COMMENTS
			ORIGINAL PLAN	CURRENT PLAN	ACTUAL	
43	3.3	Deltek Procurement Interface Pgrm Imp	12/89		2/90	
44	3.1	Configuration Mgmt Policy Statement Issued	12/89		2/90	
45	3.4	Document Control Policy Statement Issued	12/89		1/90	
46	2.6	CCD-Procedures Manual Second Draft Issued	12/89		3/90	
47	3.0	Supplemental Site Specific CDR Issued	12/89		12/89	
48	3.0	Start Baseline Validation	1/90		1/90	
49	3.1	QA Policies and Procedures Complete	1/90		5/90	Draft
50	3.1	QA Data Base Requirements Document Issued	1/90		5/90	
51	2.1	AE/CM-Complete Near Term Work Auth Packages	1/90		5/90	
52	4.0	First Land Tract Available	1/90	7/90		Footprint Approval Req.
53	1.0	Award Magnet Prototype Contract	1/90	9/90		
54	2.0	Award MTL/MDL Fac Cold Test Fabrication Contract	1/90	8/90		
55	3.3	Final AAAP Approved and Issued	2/90	8/90		
56	3.1	DOE/CSCSC Readiness Review	2/90	2/91		Determined by DOE

SSC PROJECT

STARTUP (NEAR TERM) MILESTONES

MIL NO.	WBS NO.	MILESTONE DESCRIPTION	COMPLETION DATE			COMMENTS
			ORIGINAL PLAN	CURRENT PLAN	ACTUAL	
57	3.1	PMP Approved and Issued	2/90	7/90		
58	2.6	CCD-Procedures Manual Issued	2/90		5/90	Preliminary
59	3.0	Baseline Validation Complete	2/90	7/90		
60	4.0	Supplemental Environmental Impact Statement Issued	2/90	11/90		
61	2.0	A-E/CM On Board	2/90	6/90		

SSCL - MASTER MILESTONE STATUS REPORT

As Of: June 18, 1990

NO.	MIL LEVEL	WBS NO.	TITLE		* BASELINE	CURRENT	ACTUAL
					PLAN	PLAN	
M1-1	1	3.1.1	PM	First DOE Semiannual Review	Sep-89		Sep-89
M1-2	1	1.1.6	Collider System	Start Design	Feb-90		Feb-90
M1-3	1	3.1.1	PM	Start Construction Project	Oct-89		Oct-89
M1-4	1	1.1	Injection System	Start Design	Mar-90	Jun-90	
M1-5	1	3.1.1	PM	SCDR Issued	Dec-89		Dec-89
M1-6	1	3.0	Footprint	DOE Approval	Feb-90		Mar-90
M1-7	1	3.1.1	PM	Baseline Validation Complete	May-90	Jul-90	
M1-8	1	3.1.1	PM	PMP Approved By DOE	Apr-90	Jul-90	
M1-9	1	3.0	AE/CM	Award of Contract	Jun-90		May-90
M1-10	1	3.0	SEIS	Record of Decision	Sep-90	Nov-90	
M1-11	1	2.4	Collider Ring	Start First Tunnel Construction	Oct-90	Dec-90	
M1-12	1	2.2	Campus Structures	Complete	May-94		
M1-14	1	1.1.6	Collider System	Complete Design	Oct-96		
M1-15	1	2.4	Collider Ring	Complete Conventional Construction	Oct-96		
M1-16	1	1.1	Injection Systems Operational		Sep-97		
M1-17	1	1.0	Collider System	Complete Acceptance Tests	Sep-98		
M1-18	1	1.0	SSC Operational		Sep-98		

* BASELINE VALIDATION SCHEDULED FOR COMPLETION JULY, 1990.

MEETINGS/CRITICAL EVENTS

<u>Date</u>	<u>Meeting Subject</u>	<u>Participants</u>	<u>Location</u>
July 14-20	Program Advisory Committee	30	Snowmass, CO
Oct 16-18	R&D Symposium	350	Fort Worth, TX
Oct 19-20	R&D Committee	30	SSCL
Nov 1-3	Program Advisory Committee	30	SSCL
Nov 30 - Dec 1	Machine Advisory Committee	25-30	SSCL
Dec 14-15	Scientific Policy Committee	25	SSCL