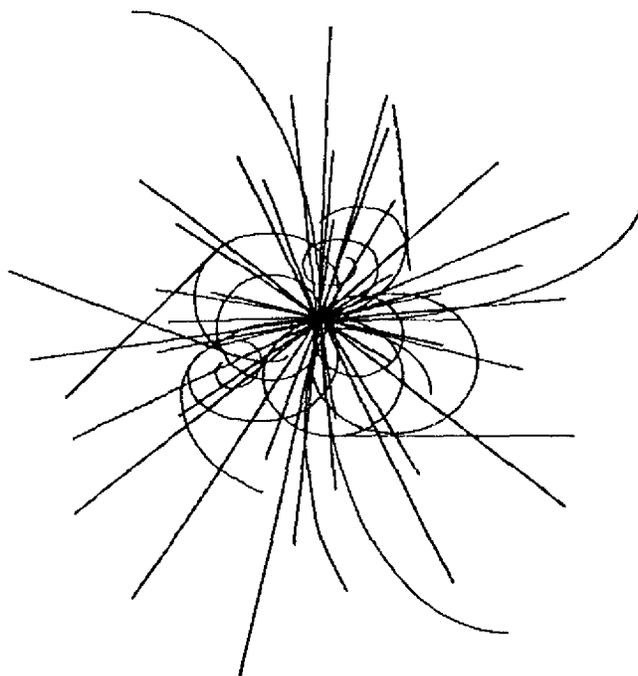


SSC PROJECT
MONTHLY PROGRESS
REPORT

APRIL 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	7
IV.	PROJECT MANAGEMENT AND SUPPORT	10
V.	R&D AND PRE-OPERATIONS	27
VI.	EXPERIMENTAL SYSTEMS	37
VII.	LAB OPERATIONS SUPPORT	38
VIII.	COST/SCHEDULE DATA	
	1. CPR, Format 1	42
	2. CPR, Format 2	54
	3. Major Subcontractor List	55
IX.	MILESTONE STATUS REPORTS	56
X.	MEETINGS AND EVENTS	62

EXECUTIVE SUMMARY

Two baseline 40mm long dipole magnets were cold tested: DD0020 at BNL and DD0027 at Fermilab. Both were conditioned successfully before quench testing. Conditioning means powering the magnet at high current (6,800 amperes) and low temperature (3.5K) in order to "pretrain" it without quenching. After conditioning, DD0020 reached short sample (6,840A) on the first quench at 4.35K and DD0027 reached 6,890A after very slight training. Thus conditioning appears helpful; further studies are planned.

A design study at LBL of a 50mm aperture dipole with thin (5mm) collars suggests that the 6.6T design field might be achieved with only 5.8 kiloamps, allowing a 15% operating field margin.

Planning and programming were underway for many conventional facilities, including campus surface buildings, the accelerator systems string test (ASST, above ground), the prototype installation facility (PIF, underground) structures and the LINAC.

Major effort focused on preparation 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.

The FY91/92 Field Task Proposal Agreement (FTP/A) was completed and sent to DOE on April 13.

The HEB dipole magnet length was changed from 7.5m to 15m to match the Collider dipole length. The HEB quadrupole was shortened and its gradient was changed to 206T/m to match the Collider quadrupole gradient.

As of April 30, the laboratory had a total of 568 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)

MAGNET SYSTEMS (WBS 1.2)

• MANAGEMENT AND SUPPORT (WBS 1.2.1)

The Magnet Research and Development Plan defining the R&D efforts has been expanded into a bubble flow chart.

Considerable effort was devoted to preparation for the DOE cost review scheduled for June.

Inputs were provided to the Field Technical Plan which summarized the Magnet Research and Development Program.

• HEB MAGNETS (WBS 1.2.2)

HEB Dipole Program

The HEB dipole development continued at a reduced level due to concentration on the development of cost projections in support of the DOE review.

Development of preliminary layouts for the test facility is continuing. We have ordered test equipment and work stations, and the start up of the development laboratory is scheduled for mid-May.

• COLLIDER MAGNETS (WBS 1.2.3)

TEST

The magnet test program saw the initial cold tests of two new long magnets in April: DD0020 at the BNL test facility and DD0027 at Fermilab's MTF. The two magnets are largely the same in design, fabrication and instrumentation - both being representative of the 'baseline design' series of 40mm long dipole model magnets. DD0020 has its bore tube instrumented with a string of thermometers so that detailed studies of magnet cooling can be made during tests that simulate the synchrotron radiation heat load along the length of the bore tube.

The test plans called for both magnets to be 'conditioned' at 3.5K. Plans called for the magnets to be run to a current (6800A) above the nominal operating value while at a temperature significantly lower than the nominal 4.35K operating point, which provides greater accommodation for small disturbances and thus allows the magnet to experience these force levels without quenching. Both magnets were very successful in these efforts: DD0020, following its conditioning cycles, had its first 4.3K quench at 6840A and subsequent quenches were in the range from 6823A to 6862A. These were consistent with short sample expectations and temperature variation. DD0027, also conditioned at 3.5K with

three ramps to ~6800A, initially quenched at 6817A and showed only very slight training to a plateau at 6890A, which was consistent with short sample expectations.

Both magnets appear to have been successfully conditioned in that no quenches at 4.35K were below the nominal 6800A current of the conditioning cycles. Conditioning studies will continue with future magnets to determine if these apparent successes will be maintained over a larger data sample.

A detailed program of magnetic measurements was planned for both magnets to begin systematic studies of field quality issues. Important among these were development of a methodology for cold measurements to allow comparison with warm measurements which handled time dependent effects in a systematic manner. As part of the program, we want to have a detailed magnetic history - before and after thermal cycles, before and after initial quenching, etc. - to determine the limits of small variations that might be anticipated under the rigors of operation.

Due to instrumentation difficulties, measurements of magnet DD0020 were initially limited to warm conditions. At the end of the first thermal cycle, it was discovered that the one of its quench protection heaters had developed a resistive path to ground. This situation compromises both the quench protection and electrical integrity of the magnet and a reduced test program is now being followed which will concentrate on cooling measurements and a limited set of magnetic measurements.

Magnet DD0027 has finished its first thermal cycle, which included a series of magnet measurements described above. These measurements included several axial scans of the magnetic field (28 steps at 24 inch intervals corresponding to the length of the measuring coil), time dependence measurements at two positions along the magnet length, and measurements during current ramps from zero to 4000A and back down. The measurement currents were limited to a maximum of 4000A to avoid quenching prior to the initial conditioning and quench cycles of the magnet. Typically, measurements were made at currents of 2000A.

The Test Group has been very active in the planning and development of the SSCL Magnet Test Laboratory (MTL). Development and lab support equipment is being ordered and evaluated in support of the MTL data acquisition and control software development program. A Concurrent 6450 computer which supports VME Buss data acquisition and control has been ordered, along with MUX, A/D, and CAMAC interface cards. A CAMAC crate and a data logger have also been ordered. This equipment will form the test bed for software development as well as allowing for evaluation and development of new instrumentation and techniques for the MTL. Detailed costing of facilities, fixtures, and sensors for the MTL is in progress.

A 'Measurements and Acceptance' workshop has been planned for May 17/18, 1990 to bring together experts from superconducting accelerator magnet programs, including the HERA project at DESY and the Tevatron project at Fermilab. The workshop is being jointly run by the Magnet Division Test Group and the Accelerator Systems Division. Its primary purpose is to review the experience in the accelerator community and determine how to apply it to a project of the scope and complexity of the SSC.

The Data Management section has continued its effort on the MagCom database. The cable production data that is collected by the SSCL engineers at cabling time, using the QA group's portable PC and dBase program, has been incorporated into the MagCom database, and menu-accessed procedures for data display and editing have been implemented.

A prototype quench summary table and report were set up, and data for one recent magnet was abstracted from the VAX summary file. Work is underway on refining the contents of this table as well as automating the data transfer so that all magnets can be easily added to the table.

Development continues on automated forms and reports generation. Data transfer issues are being pursued to allow more expedient transfer of new data from remote sites as well as exporting data from MagCom to others.

QA

Draft copies of revised superconducting wire and cable specifications have been distributed internationally for comment by suppliers. Development continues on expansion of statistical processing (SYSTAT) capability of database information on wire and cable. Analysis includes the available performance (Ic, Cu/SC, RRR, piece length, cable map and CMM data) for strand and cable run data. The data collection is intermittent but reporting has improved during the last quarter. The new wire and cable specifications include additional data reporting requirements for process and raw material data. Several of the existing data tables have been successfully transferred electronically from the QA Group's IBM to the Test Group's SUN using the Telnet network. Verification of the ability to do the file transfer was important to the future flow of information collected in the field, through QA processing and on into final accumulation in the master database. The SYSTAT application has the capability to automate routine data analysis and graphing tasks. Non-programmer users, with access to the cable database, can apply a large set of quantitative statistical routines.

Two representatives of the QA Group visited domestic wire suppliers in April to receive tours of production facilities and open informal talks on quality matters. The QA Group submitted language to the Engineering Group for a supplier qualification program that could be used in a future procurement of wire. It is our opinion that a formal means of qualification and monitoring will be required.

Support of the Fermilab industrialization effort began in April, with offers being extended to four QC technicians for permanent assignment at Fermilab. One QA engineer has been identified but has not yet cleared the SSCL hiring system. One additional QA engineer and one QC technician have yet to be identified. Two SSCL QC engineers were temporarily assigned to Fermilab until the new permanent hires have reported for work. The QA/QC support team will report to Fermilab staff and provide assistance with quality-related activities and development of inspection instructions, procedures and other documentation.

In-house development of receipt inspection, supplier survey and purchasing plans has begun. Plans and budgets were developed in support of the June validation review. Seminars and workshops were attended by various members of the QA Group on reliability, the ASQC government/industry quality forum and magnet technology. A shopcheck was made on the supplier of tooling with some concerns relayed back to the cognizant production engineer.

A QC engineer from the superconducting industry reported to the QA Group for work in April and a strong candidate for Inspection, Test and Safety Section has been identified. The search continues for a qualified Safety Coordinator for Magnet Systems Division.

ENGINEERING

Efforts in support of the interconnect region and bus assembly is continuing on schedule. Discussions were held with Handy and Harmon, Inc. relative to their efforts in developing improved means for production of the beam tube.

Analysis on the baseline DSX201 cross section (including Lorentz force) and the vertically split yoke design (the Fermilab 50mm dipole design) is continuing.

Work on coil end design continues in conjunction with work being performed at Fermilab. A trial order for G-10 coil ends parts is being prepared for release. Efforts for the end part design and fabrication for 50mm magnets have been initiated.

The ANSYS stress analysis of the effect of antiovalization in collars was completed and a report of the results will be prepared.

The field quality study to assess the sensitivity of the field quality to manufacturing tolerances and material variables is continuing. The field quality team traveled to BNL to gather additional data as input to the field quality study. A Monte Carlo model is in preparation to assess variations in magnet assembly tolerances.

BNL revisions to the SSC 50mm CDM design (DSX 201) were incorporated in the latest CAD drawings. These included changes to collar laminations, collar transducers, tapered keys, cable, insulation, etc. All BNL drawings are being converted to metric.

CRYOSTAT DESIGN

Engineering staff visited FNAL to observe the assembly of magnet DD0028 into its cryostat. Effort associated with design of the cryostat for the 50mm inner coil diameter long dipole magnet continues. Concerted effort is being made to maintain a 669.4mm outer diameter for the cryostat.

Design for fabrication of prototype magnet stands continues.

QUENCH PROGRAM

Engineering staff participated in the quench workshop. 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. The program has been structured to add various quench acceleration phenomena as well as expected pressure rises within the cold mass.

COMPUTER AIDED DESIGN SYSTEM (CADS)

CADS personnel are continuing to attend training classes in preparation for the intensive demands anticipated in support of the CDM procurement, short magnet test program, and FNAL/BNL magnet build efforts.

Offers have been extended to four additional CAD designers to fill vacancies in the SSCL/MSD organization and for assignment in support of the FNAL program. Personnel are presently on site at FNAL.

SYSTEMS ENGINEERING

Development of the Quadrupole Magnet Specification continues.

- **MAGNET FACILITIES EQUIPMENT AND TOOLING (WBS 1.2.4)**

MAGNET EVALUATION LAB (MEL)

Finish out of the facility has been delayed until bonding issues concerning the building are resolved. DD0018 will be moved into the warehouse portion of the building so that disassembly may begin on May 21st as scheduled.

The bridge crane has been received and will be installed as soon as the building is ready.

MAGNET DEVELOPMENT LAB (MDL)

The RFQ for a 17m automated coil winder was issued April 27th. Bids are due within 30 days. Structural members for the skinning press, and the 60 ton hydraulic cylinders are due to arrive August 1st.

Production and testing schedules and criteria for the cable wrapping line were obtained from Dour of Belgium. Staff members will travel to Belgium some time between May 21st and June 8th to inspect the performance of the wrapping heads.

Miscellaneous

Work continues on the development of detailed tooling, labor and material cost estimates for the June DOE validation.

The staffing effort continues at FNAL with candidates identified for twenty-seven out of approximately thirty positions.

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 is under way.

CONVENTIONAL CONSTRUCTION (WBS 2.0)

DIVISION MANAGEMENT & ADMINISTRATION (2.6.1.1)

The FY91/92 FTP/A and input to the updated SCDR were completed. Reorganization and consolidation of the CCD staff, integrating the Sverdrup and URA personnel, was accomplished. Planning and management continued in preparation for the Independent Cost Estimate (ICE), the DOE baseline validation visit, and direction of the pre-design activities for the Accelerator Systems String Test (ASST) and Prototype Installation Facility (PIF). Joint infrastructure planning with TNRLC continued.

PROJECT CONTROLS GROUP MGMT & ADMINISTRATION (2.6.1.2)

Documentation of the supporting detail for the January Baseline Cost Estimate in preparation for the ICE continues. Schedules are being developed and revised in close coordination with the Accelerator Division.

DESIGN OVERSIGHT GROUP MGMT & ADMINISTRATION (2.6.1.3)

Work continued on plans for interfacing CCD with the future SSC architect engineer/construction manager (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 (2.6.2)

Surface Transportation Study

The completed report was submitted to DOE, TNRLC and ANL.

Building Space Requirements

The SSC Surface Facilities Programming Report is being utilized as a reference document for ongoing campus surface facilities programming by consultants. Since the January, 1990 baseline presentation the population has been reconfigured with a loss of 500 personnel. This drastically altered space needs, which are being reanalyzed.

Utility Requirements

Studies addressing SSC electrical supply requirements continued. The utility requirements report was transmitted to DOE, TNRLC and ANL.

Overall Site Development Plan

Activity continued to be delayed pending management/DOE direction on the desired scope.

Vegetative Stabilization Program

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

• DESIGN CRITERIA (2.6.3)

Work continued in April to refine programming requirements for both surface and underground structures for the PIF tunnel segment and the 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 in April.

Study continued in April 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 personnel safety issues, the envelope of the string was determined to be on-grade concrete pipe 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 is expected by the end of May.

• CONFIGURATION MGMT & INTERFACE CONTROL (2.6.6)

Interface Control

Initiation of work on interface requirements of CCD with the A-E/CM awaited receipt and review of the draft SSC configuration management plan.

- **GEOTECHNICAL PROGRAM (2.6.8)**

Program Oversight

Geotechnical field activity ended in April, however, laboratory testing and report writing continues. The characterization phase of the boring program concluded with approximately 117 borings being completed. The thickness of alluvial cover over bedrock was investigated in the vicinity of E9-F9 using seismic refraction methods.

Planning began in April 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 (2.6.10)**

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 to prepare for pre-negotiation and contract negotiation meetings scheduled for June.

PROJECT MANAGEMENT AND SUPPORT

(WBS 3.0)

• PROJECT MANAGEMENT (WBS 3.1)

• PROJECT MANAGEMENT OFFICE (3.1.1)

The major effort for the SSCL Project Management Office this month was preparation for the June baseline validation review. Work concentrated on detailed technical, cost, and schedule reviews of the major subsystems. A second, detailed internal review is scheduled for the month of May. All work on the documentation continues and the currently planned mailing date is June 11, 1990. The following is a partial list of documentation in work for the June 25-29, 1990 baseline validation review:

- Site Specific Conceptual Design Report,
- Technical Requirements Document,
- Work Breakdown Structure (WBS) and Dictionary,
- Cost Estimate and Backup Details,
- Contingency Analysis,
- Master Schedule and Funding Profiles,
- Draft Project Management Plan,
- Magnet Request for Proposals (Draft) for Collider Dipole Magnets,
- Magnet Acquisition Plan,
- Decapitalization Analysis,
- Systems Engineering Management Plan,
- Configuration Management Plan, and
- Project Management Quality Assurance Plan (Draft)

Revision 6 of the Project Management Plan has been completed and is being reviewed internally prior to the final printing for the June validation review. There are very few changes from revision 5, except for milestones and cost data. Other revisions as discussed by DOE and SSCL are on hold until permanent project managers are working in both organizations.

• PROJECT PLANNING (3.1.2)

A high resolution graphics projection display system has been installed in the Strategy Room primarily for presenting and reviewing schedule details and networks. In order to provide the best possible projection, a high resolution VGA video display card was installed in a project office AST computer. Microsoft Windows (for displaying data and graphics) is currently running with 800 x 600 and 1,024 x 768 pixel resolution projected with good visible details. From the projections obtained so far, we feel a 1,280 x 1,024 pixel resolution would be ideal for the presenting schedule details. Our current plan is to refine this and other graphics capabilities during the month of May so that the Strategy Room can be used to present project schedule data for the June review.

In the schedule networking, all major subsystems have been detailed and the accelerator need dates have been developed. Current plans call for the linking of all these data and adding the cost data via the WBS to obtain the various funding profiles requested during the first two weeks of May. Because of the large number of elements (approximately 3,000), processing time for the cases and review of the data will require these two weeks.

The cost estimating group continued working with the various divisions to insure that details and labor rates are consistent throughout the laboratory. Several models for the materials and services for internal personnel have been developed. A consistent model and appropriate labor rates is being entered into the details. Refinements should continue for the first two weeks in May. At that time, printing and internal distribution of the detailed sheets for incorporation into the June presentation materials will start.

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

Work this month centered around three major efforts: First, several internal discussions were held regarding the C/S controls for the A-E/CM. A draft proposal was presented to the Conventional Construction Division (CCD) and subsequent discussions were held with the A-E/CM; Second, a team with members from the project office as well as representatives from the divisions was formed to review and complete the C/SCS documentation and cost account manager's requirements; Third, the reprogramming effort for the FY90 budget was completed.

Some of the essential programming changes for the EASYTRAK software to accept Open Plan data have been completed and are currently being tested. These changes are necessary since Open Plan is the software currently being used for the baseline validation scheduling effort and we want to use EASYTRAK and Open Plan for the funding roll-up and use only EASYTRAK for the C/SCS reporting.

- **ENGINEERING STANDARDS (3.1.4)**

An engineering drawing standard format, which incorporated recommended changes, was released to the Engineering Standards Committee for final review. A draft of the Document Control Center Operating Procedures has been also distributed to the Engineering Standards Committee for comment. A draft of the overall system description for the Engineering Document Management System continues to be worked; current effort includes the following sections:

- Document workflow,
- User service requests,
- Documentation creation/update control, and
- Document acquisition for control.

The third draft of the Project Management Quality Assurance Plan is nearing completion and will be sent to the Deputy Project Manager for review the first week in May. The format has changed from a Total Quality Management document to a plan for compliance with DOE Order 5700.6B and the basic requirements of ANSI/ASME NQA-1. This is the reference which most of the laboratory and potential vendor personnel are familiar. This draft has been discussed with the Engineering Standards Committee to identify those QA requirements that are already satisfied by an engineering standard or practice. Work also continues on quality procedures for the first draft of the Project Management Quality Assurance Manual. It currently looks like we will be writing about 20 laboratory-wide quality assurance procedures. Most of these may be adopted from the Magnet Division's quality procedures being used with the Collider Dipole Magnet Program. Additionally, we are in the process of developing a short 10-15 minute videotape for quality training to laboratory employees. We have a QA tape from Fermilab that will serve as an excellent model for ours.

• **ENVIRONMENTAL AFFAIRS (3.1.5)**

The office received comments from CCD and ES&H on the preliminary draft SEIS. These were integrated into one note and sent to Tom Baillieul (DOLE-CH). We prepared an aggressive schedule, which received Project Management's approval, for the SEIS that leads to a Record of Decision Date of November 4, 1990. Finally, the SSCL Surface Transportation Requirements, Water and Sewer Requirements, and Construction Power Requirements were revised by CCD and sent to TNRLC, with copies to ANL and DOE-CH. These are the final data requirements requested by ANL. Additionally, a SEIS meeting between ANL and the SSCL was held on April 19, 1990, in response to a letter from Ed Pentecost to Roy Schwitters. As a result of this meeting, the SSCL sent copies of the April 16, 1990 draft of the SCDR to DOE-CH for forwarding to ANL. Also, the environmental walkovers were scheduled April 30 to May 3 (weather permitting). We anticipate there will be representation from ANL, DOE, COE, USFWS, USDA, SCS, TPWD, and TNRLC.

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

- **SYSTEMS ENGINEERING MANAGEMENT (3.2.1)**

Work was centered on schedule planning and functional baseline preparation. Most of the detailed networks have now been generated for the Accelerator Division and the Conventional Construction Division. Accelerator magnet requirements have started to be incorporated into the Magnet Division schedule with the anticipated overall schedule completion by early May and the funding roll up completed by the middle of May.

Previously drafted engineering guidelines (e.g., Systems Engineering Management Plan and the Configuration Management Plan) were revised to reflect the new project organization as part of the documentation for the June review. Also, Systems Engineering assisted the Conventional Construction Division with updating their WBS so to be consistent with the Accelerator System WBS. Work also continues with the new updated WBS on the requirements notebooks and funding profiles so that every division will be consistent.

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

Schedules were developed for the String Test, first collider section and injection systems. The other collider section schedules and requirement dates for the other components were completed by the end of the month. The first stage of development of the requirements notebook included the development of the format, guidelines, and list of figures and tables. Later in the month this was set to the new WBS and rough drafts of the existing known requirements were incorporated. Also, during April the Linac specifications were completed and a review is scheduled for early May.

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

The major effort this month included finalizing the quantities and requirements of all the superconducting magnets. This data has been distributed and is being reviewed. Once completed this information will be included in the latest revision of the SCDR. Additional work for the period was started on characterizing and optimizing the collider dipole magnet ends to assure high reliability. This work is continuing with both SSCL and FNAL personnel.

- **SE SUPPORT TO PHYSICS (3.2.4)**

Work continued this month on support of the Physics Research section of the working requirements notebook and organization of the WBS. The first draft of the Physics Experiments section of the System Specification was completed.

PROJECT ADMINISTRATION AND SUPPORT

(WBS 3.3)

• ADMINISTRATION SYSTEMS & SUPPORT (WBS 3.3.1)

The reorganization of the procurement function was started during April. The principal change was the separation and relocation of the prime contract compliance and administration function from the procurement function. It is anticipated that review of the grade structure and position analysis will require a realignment of responsibilities. We are directing the organization toward increased responsiveness to Laboratory needs.

We are proceeding with the three-phase Management/Supervisory Training Program for the Laboratory. Completion of this program is a significant step in our Affirmative Action and Equal Employment Opportunity programs.

The Personnel Policy Manual has been completed and an advanced copy has been circulated to the Associate Directors.

• FINANCE (3.3.2)

The Budget Office completed the FY91/92 Field Task Proposal Agreement (FTP/A) and shipped the necessary copies to the appropriate DOE offices on April 13th. On April 20th, the Director approved the FY90 re-forecasted budgets and on April 21st, allocated the undistributed funds between Divisions. The Budget Office aligned the dollars by fund type, discussed the alignment with the Divisions and has begun entering these budgets into the financial system.

The Accounting and Financial Control Section accomplished the following tasks:

- Initiated bi-weekly closing of books of records enabling the laboratory to more closely monitor its costs and commitments against available funding as we approach the end of the first year.
- Implemented an automated accrual system which will enable the laboratory to record costs at the time materials and/or services are received.

The Financial Information Systems Section continued to assist the MIS Support Team in scheduling and staffing all financial interim programming tasks which include:

- (a) Pre-printed time sheet system
- (b) Field Task Proposal system
- (c) Automatic purchase requisition reduction system
- (d) Upgrade to Deltek Advanced Payroll
- (e) Transfer asset accounting system to the VAX
- (f) Transfer of subcontract tracking to the VAX

- (g) On-line, drill down costs reporting and
- (h) Electronic Funds Transfer from Deltek Accounts Payable.

- **PROCUREMENT (3.3.3)**

During April, the Procurement Department made awards totaling \$2,982,156. Of this amount, \$1,276,622 was to Small Business and \$622,087 was to Small Disadvantaged Business.

We participated in outreach programs aimed toward the development of Small and Small Disadvantaged Business firms and also structured toward education of the business community in general relative to "how to do business with SSCL". These outreach seminars, which are sponsored by various civic and business organizations, continue to be beneficial in enhancing our overall procurement data base.

Work continues with SSCL technical personnel toward award of the Cryogenics package. Proposals were received in late March and our technical and cost evaluations continue.

During the first week of April, the SSCL A-E/CM selection team met with PB/M-K representatives in a two day fact-finding session. Although PB/M-K's cost proposal was scheduled for submittal by May 1, this was not possible due to changes within the statement of work, schedules and the WBS. Other meetings are scheduled with PB/M-K the first part of May.

The Dipole Magnet RFP was completed in draft form and submitted to DOE for review. Although informal approval of the April 15 draft was granted by DOE, this approval was subsequently withdrawn pending resolution of various outstanding issues (such as an acquisition strategy plan, review by DOE-CH, etc.). These issues are being worked by the respective groups within the SSCL.

On April 20, organizational changes were made within the SSCL Procurement Department. These changes included the naming of a new Acting (Interim) Director, Mr. J. F. Marmo, and the transferring of the contract administration (Prime and Major Support Subcontracts) function to the office of the Associate Director of Administration. Plans are being formulated by the Interim Director, which include preparation of procedures, instituting a search for a permanent director, and other tasks.

On the RTK Subcontract, approval was received from DOE on April 11 to definitize RTK's performance for November, 1989, through April, 1990. URA on April 25 provided advance notification to DOE that would take us beyond April 30, 1990, for some limited period of time.

- **TRAVEL DEPARTMENT (3.3.4)**

Tramex Travel, the new SSCL travel agency, began providing travel services for the SSCL in April. Reservationists were hired and airline automation equipment and ticket printers were installed. The Travel Services Department now has the capability of furnishing passport and visa applications and photos.

- **PERSONNEL (3.3.5)**

Recruiting activity continued at a fast pace in April. We coordinated 126 interviews with hiring managers. Forty-two new employees joined the Laboratory this month for a total employee population of 568. As of April 30, 1990 we have 211 open positions at the Laboratory.

The Department of Labor, Office of Federal Contract Compliance Programs (OFCCP) conducted an on-site compliance review at SSCL this month. We expect to receive the written report of the review in May. Based upon the exit interview with the OFCCP reviewer, the Laboratory is making excellent progress in its Affirmative Action and Equal Employment Opportunity programs.

The SSCL Performance Appraisal system was presented to the Associate Directors in April. All policy matters, forms and training materials have been completed and we will begin training supervisors in performance appraisals in May.

The Training and Development Office, working closely with the EG&G Human Resources Department, completed preparations for a three-phase management/supervisory training program for presentation May-July. In addition to the performance appraisal training in May, all SSCL managers will attend EEO/Affirmative Action training in June and training in Employee Relations and Employment Law in July.

The Personnel Department conducted a meeting with Dallas Area Rapid Transit (DART), SSCL staff, and representatives of other businesses in the Stoneridge Office Park. The goal of this effort is to provide DART bus service to the SSC Laboratory and begin planning possible shuttle service to the Ellis County site once activity begins there.

• **STAFF SUPPORT SERVICES (3.3.6)**

In the medical area, a six month contract was signed with a physician to act as the interim staff physician for the Lab. The scope of work will include development of the medical policies and procedures, establishing a wellness program, and responsibility for employee health. Plans have been made to open the medical facility during May.

In the area of records management, progress is being made in setting up central files. The office space has been designated and the Central File Office will be set up during May.

GSA motor vehicle request forms have been issued labwide to ascertain vehicle needs for 1991.

Emergency notification procedures have been written for tornadoes, and work continues on emergency preparedness.

• **MINORITY AFFAIRS (3.3.7)**

The Office of Minority Affairs continues its active role as participant, presenter and guest spokesman in performing the SSC Lab's outreach program to the business, civic and other members of the national community. The Director was the guest speaker at the 23rd Annual Chicago Business Opportunity Fair where 4,000 people participated in the two-day business fair. In conjunction with this trip, he was also asked to speak at the Department of Energy's National Semi-Annual Small Business Conference. The Director also participated in the following meetings and conferences:

- Guest speaker, annual business development meeting sponsored by the State of Arizona Economic Development Department and Phoenix Minority Business Development Center;
- Keynote Speaker, Texas Conference on Small business sponsored by Southwestern Bell and NCNB Texas;
- Keynote Speaker at COMA Hispanic Chamber of Commerce, Lubbock, TX;

- Participated at the National Minority Expo for Career Job Opportunities sponsored by Southwest Texas State University in San Marcos, TX;
- Participated in several vendor seminars sponsored by the Collin County Community College, the local chamber of commerce and the city of Plano; and
- Participated in meetings held at Cedar Valley Community College which were sponsored by Best Southwest Chambers of Commerce.

The Manager of EEO/Affirmative Action conducted a career fair at Southwest Texas State University in San Marcos, TX along with the SSC recruiting staff. The career fair was well attended, with participants coming from across the United States. The manager of EEO/AA also:

- Attended the American Association for Affirmative Action Training Conference held in Boston, MA;
- Participated in the SER Jobs for Progress job fair in Dallas, TX. There were approximately 7,000 attendees and the SSC Lab's recruiters were able to acquire 150 resumes of candidates for possible employment consideration;
- Chaired a SSC presentation to the National Business League vendor seminar in Austin, TX;
- Participated with SSC staff at the monthly meeting of the Minority Design Professionals held at the Associated Dallas General Contractors Office, Dallas, TX; and
- Conducted several meetings with the Dallas Urban League. The purpose of these meetings were to develop a procedure so the Dallas Urban League can assist the SSC Laboratory with its outreach recruiting efforts.

The Small and Disadvantaged Business Utilization (SADBU) Manager met with the Manager of P&C Data Systems to review and finalize the "Electronic Bid Board" system and how our office will participate as part of the system. The SADBU Manager attended the following meetings and conferences:

- Chicago Business Opportunity Conference to meet with vendors and to make presentations regarding the SSC Lab project and business development opportunities;
- Texas Conference on Small Business;
- Association of Minority Design Engineers, to discuss how PL 101-101, Section 304(a) relates to their business development;
- National Business League symposium, Austin, TX;
- SER Jobs for Progress job fair, Dallas, TX;
- Senator John McCain (AZ) and other national leaders to request their support in promoting the SSC Lab's project.

Based on the SSC Director's commitment that all technical components and detectors will be metric procurements, we responded to a request from the Office of Energy Research which was preparing testimony for a congressional hearing before the House Subcommittee on Science, Research, and Technology on how the SSC Lab proposes to aid small and minority businesses in the conversion to metric. We submitted the names and topics of small businesses that were interested in participating in

the Small Business Innovation Research program. The deadline for submittals was April 27, 1990. We telephoned and solicited proposals from several small cryogenic businesses and three of them responded by the next day.

- **INTERNAL AUDIT (3.3.8)**

A review of the Personnel Policy Manual was completed and the results were discussed with Personnel Management. Some minor revisions and areas for future inclusion into the manual were suggested.

Policies and procedures for the Internal Audit Department were developed and sent to upper level SSC Management for review.

A review of Special Events was completed and improvements for better control were implemented. A review of Travel Services is in process. This review will concentrate on compliance to the SSC Travel Policy by Laboratory personnel and compliance to the contract by Tramex Travel.

PROJECT TECH SUPPORT (WBS 3.4)

TECHNICAL SUPPORT MANAGEMENT (3.4.1)

The main focus for this month was thorough planning for activities and costs that would impact on the Baseline Cost Estimate through 1998 for the Total Project Cost. Several activities that would fall under Technical Services, such as shop support and telephone service, were determined to be best handled by user divisions. These items are now budgeted by the user divisions. It was also determined that site security and custodial services would be targeted for minority set aside.

Interim space planning continued for accommodation of office/laboratory/warehouse needs prior to the availability of the main campus buildings. Plans are being made to handle additional space needs beyond those accommodated by the Stoneridge Business Park by new leased facilities in Ellis County located close to future PIF and ASST operations. Also, because of the large amount of equipment and materials that will be received during construction, temporary warehousing will be used as much as possible to reduce permanent structures on the campus.

FACILITIES ENGINEERING SERVICES (3.4.2)

The Laboratory currently has 185,830 square feet of interim office, laboratory, shop, and warehouse space. The status of additional interim space planned for FY90 is as follows:

- 8,440 SF, Provident Bank Building- additional space for DOE. A lease package was prepared and forwarded to DOE for approval.
- Parking Lot- received DOE approval but the vendor withdrew their offer. A new package is being negotiated and will be forwarded to DOE early next month for approval.
- 7,800 SF, Stoneridge Building #1- awaiting DOE approval.
- 12,700 SF, Stoneridge Building #2- a lease package is being negotiated and will be forwarded to DOE early next month for approval.
- 10,000 SF, warehouse- awaiting DOE approval.

The status of additional interim space planned for FY91 includes:

- 50,000 SF, Stoneridge Building #3- a vendor was selected and negotiations initiated. Negotiations should be finalized and a lease package forwarded to DOE for approval by mid-May.
- 180,000 SF, Waxahachie- the process of leasing an additional 180,000 SF of primarily interim office space in Ellis County near the permanent site was initiated. Interest responses are due May 11th.

Several projects are in process to assist the Divisions in meeting their requirements and to improve the efficiency and effectiveness of various operational functions. Included are:

- installation of an uninterruptable power supply (UPS) for the major computer systems.
- installation of voltage suppression to prevent damage from lightning strikes and power surges

- development of various small laboratories and shops for various Divisions
- reconfiguration of systems furniture

- **PROPERTY MANAGEMENT (3.4.3)**

Warehousing is scheduled to relocate to the Eagle Park area, which is approximately 1 1/2 miles from the SSCL Campus, to gain additional storage space at the expense of some convenience. A total of 3,400 square feet of space is available at this location to take care of immediate and near term warehouse needs.

The Inventory Manger has prepared, coordinated, and submitted thru Property Accounting, the Semi-Annual Summary Report of DOE-owned plant and capital equipment for the six month period ending February, 1990.

A physical inventory of stores was completed on April 30, 1990 with \$105,000 current value.

The second block of fourteen Materiel Management Standards has been completed and routed for internal review. They will be submitted to DOE for review and approval late next month.

- **FABRICATION SHOPS (3.4.4)**

The major effort for April centered on the preliminary design of the Fabrication Shops and their related area sub shops. We developed an estimate for the cost of equipment, staffing, and M&S requirements from 1990 through 1998 by comparing our scope of work to similar facilities at FNAL and BNAL.

An evaluation of the applicability of Mobil Shops for use at SSC was performed. This concept has been incorporated in our recommendation and cost analysis.

- **GENERAL COMPUTING (3.4.5)**

MIS SOFTWARE SUPPORT

MIS applications development and software support were the most active areas in the General Computing group during April. The following are some of the objectives achieved last month:

Verbal approval was received from DOE regarding the Powerhouse acquisition proposal. The Powerhouse applications are being tested against the Standard Data Dictionary prior to full production. The Invoice Tracking System is being configured to run with the new Powerhouse Data Dictionary before moving the application to the new production environment.

The DELTEK/VMS Security System menu screens are in the last phases of testing. Users from the URA and EG&G Personnel, Finance and Procurement groups received training from DELTEK. The DELTEK custom enhancements for the WBS Summary Report were completed for Finance. The DELTEK receipt accrual modifications were implemented despite some problems with the code which were identified after month-end posting occurred. An action plan was implemented to restore backups and reprocess the close successfully with a revised program from DELTEK.

A two day off-site data mapping process was conducted for coordinating the implementation of Advanced Payroll between the URA and EG&G Personnel and Finance groups. The Finance Payroll

portion of TIAA-CREF (Teachers Insurance and Annuity Association College Retirement Equities Fund) project is complete. The EG&G/URA Field Task Proposal submission for URA Finance and DOE was accomplished.

Using Powerline, an attempt was made to back up and reload all the transactions from Provident Bank since October. The reload process was about 36 hours into updating when the user aborted the program. It may take as long as one week to fully reprocess the entire transaction. A meeting is scheduled to discuss the Powerline System problems with software and bank representatives.

A high priority service request from URA to produce Sub-Contractor Tracking reports had two of three reports complete by month-end, with the third is targeted for a May completion date. Also scheduled for next month is the Travel Profile/TRAKS project for Finance which has been delayed due to bugs in the program mode from DELTEK.

An interim solution for the Master Employee Directory has been developed using the TELE function on the VAX while the long term solution is planned to be developed in Powerhouse.

The user design review for the Action Item database for Project Management is complete and modifications are in process.

A technical publications log system is being developed for the VAX to enable visiting scientists to reference available publications.

The Requisition Status Log system is in production, though Procurement is working on correcting some recently identified errors in the data. Minor programming changes will be made before the system becomes available laboratory-wide. A similar effort is under way to resolve the problems in the Small & Disadvantaged Business Report. The Vendor Contract Report for April shows some inconsistencies regarding the entry of addresses and state codes. A sub-system designed to provide edit checks and field validations to promote self-sufficiency is being developed.

USER SERVICES

AppleShare file service and network backup services are being organized--and will be implemented soon--for Magnet Systems Division, which is the largest group of QuickMail users (130 users) in the laboratory. User Services personnel have been doing most of the installation work in this area.

New QuickMail services included a QuickMail name server installed to provide laboratory-wide addressing for QuickMail 2.2 and an automatic link set up to exchange information with Apple employees, developers and resellers via the AppleLink information system. Select Directorate personnel are testing automatic forwarding of Email to their QuickMail accounts from the VAX.

Attendees at the AppleSEED corporate and university user's group meeting held at Baylor University observed several Mac-to-Host (VAX, IBM, etc) connectivity presentations. Three different methods of accessing mainframe data from a Macintosh (Hypercard, Mac Workstation and CL/1) suggested several interesting possibilities for data access via the Macintosh interface. Membership by the SSCL in the not-for-profit AppleSEED organization is recommended based on new contacts made for Email and network solutions at the recent meeting

Representatives to the MacWorld trade show in San Francisco evaluated several aids for the Macintosh including multi-media products, computer security products and productivity products.

Implementation of a QuickMail capability, as well as AppleShare and In/Out, for Magnet Division has begun and training regarding their use has been initiated for group leader secretaries.

A representative from User Services has joined the advisory committee at Cedar Valley College (a Dallas community college) to assist in development of Computer Information Systems curriculum.

Evaluation of the new Mac IIfx architecture has been initiated to determine if this faster (40mh) machine provides the flexibility and high-performance interaction desired by AUX and CAD/CAM users. Potential use as a file server is being investigated as part of this evaluation. In addition, testing of a color version of eXodus (X server for Macintosh operating system) is also underway.

The CERN Library (V.198) has become the default on the Scientific VAX (SSCVX1) and is currently being installed on the Apollo system (SSCAP01), with only the graphics routines requiring GKS remaining to be tested. The source code has been put on the IBM/AIX and converted to PAM files. In addition, a guide for accessing the CERN libraries in the VAX/VMS and Unix operating system environments has been written.

A random number generator, which uses a linear congruential sequence, has been acquired from the public domain to replace the one which came with the benchmark (and only went to 4096).

A DEC-sponsored seminar was held to clarify interconnectivity between DEC, SUN, IBM and Macintosh machines running VMS, Ultrix, Unix, MAC/OS and MS-DOS.

Documentation has been prepared to support an eight year forecast for training. The revised schedule includes several new classes: Wingz (April), QuickMail (June) and Powerhouse and VMS (July). To meet the education needs of management, a special class was arranged to introduce the desktop and Word environments.

ADP PLANNING, STANDARDS AND PROCEDURES

A representative from this group participated in the required training session related to the release of V.2.0 of the Los Alamos Vulnerability Assessment (LAVA). This package will be used to conduct a thorough risk assessment of the ADP resources at the Laboratory in anticipation of preparing a contingency plan for the identifiable threats. This representative also attended the 13th DOE Computer Security Group Conference to familiarize the Laboratory with the latest tools available to promote effective system security.

This group has also received training from DOE Headquarters in Germantown, MD to initiate reporting procedures for the Automated Data Processing Equipment/Data System (ADPE/DS). A preliminary ADPE/DS report will be submitted once a thorough inventory of ADP equipment on hand is prepared for the Laboratory.

The following documents were prepared for transmittal to DOE for review:

- Doc. No. 6235-L90-003: Silicon Graphics HEP Software Development System
- Doc. No. 6235-L90-009: Code Management Software for HEP Libraries
- Doc. No. 6235-L90-010: Silicon Graphics File Server for Physics Research Division
- Doc. No. 6235-L90-011: Major Item of Equipment Justification (>\$1 Million) 500 MIP System

Approval was received from DOE for the following acquisition proposals:

- Doc. No. 6235-L90-001: Statement of Strategy for Personal Computers and Workstations
- Doc. No. 6235-L90-002: Video Teleconferencing for the SSC Laboratory
- Doc. No. 6235-L90-006: Apollo Computer System for HEP Software Development

The initial telephone system call detail list has been distributed to every division for informational purposes. Updated listings will now be sent out every month.

• **DESIGN SUPPORT (3.4.6)**

ADMINISTRATION

The Design Support Group expects to add six new designers who will be temporarily relocated to Fermilab in a rotational assignment lasting for one year or more. These positions are being filled to work on magnet and magnet tooling design in support of the accelerated design requirements for the 50mm magnet. Six designer positions are open to provide design support to the Accelerator Division. Physics Research Division has five requisitions for designers outstanding.

CAE/CAD OPERATIONS AND SUPPORT

A CAD Database specialist is being recruited to be responsible for setting up a data filing system and for database translation to/from dissimilar CAD systems.

The CAD manager revamped the Intergraph system and wrote several plot spooling utilities which are being used to interface every workstation with a plotter in support of the CAD effort in Bldg. 4. Three plotters are on-line, including a Hewlett-Packard electrostatic plotter, and daily/weekly backups of data on all systems are being made.

An SSCL CAD plan detailing future resource needs is being developed. This plan describes the current environment, the planned method of operation, the staff required to support the function, the equipment and software necessary to perform the required design effort and the CAD interface to the Document Management System.

Additional FY90/91 CAD acquisition plans for Physics Research and Conventional Construction have been submitted for approval.

A new model for the SSC Laboratory standard drawing format was submitted this month and is currently being evaluated by standards committee personnel. This format is being used as an interim standard until approval or changes are received.

Electrical Engineering CAE/CAD systems evaluated to date include Prime/Computervision, Dasix, Intergraph; Racal-Redac, Mentor Graphics, Hewlett-Packard and Valid Logic. Others under initial evaluations, including Harris Scicards and Cadence are expected to be complete by mid-May.

DESIGN DRAFTING SUPPORT

The Design Drafting Support staff continued to provide support to the Accelerator and Physics Research divisions and the Facilities Engineering group. The principal work is in the area of engineering on collider corrector design, Physics Research detector configuration, and facilities layout and documentation.

TECHNICAL DATA MANAGEMENT AND REPRODUCTION

The effort to set up a data management system by Project Management personnel continues. Requirements for mass-storage devices to hold the technical data generated by the project are being investigated. The database size is expected to exceed 2,200 Gigabytes by FY98. This is a massive amount of data and will require significant budgeting for considerable storage resources.

• COMMUNICATIONS (3.4.7)

The pilot project to evaluate video teleconferencing at the laboratory has become fully operational. The system is now capable of three-way operation between the SSC, Fermilab and LBL. A project proposal regarding the long-term use of the video teleconferencing capability was submitted to DOE for review and approval.

A public address system, which will be used for emergency warnings and notification for building evacuations, has been installed in the Stoneridge complex.

• ENGINEERING SUPPORT/STANDARDS (3.4.8)

During April, the following tasks were completed:

- (1) Engineering Design Support completed re-loading the formats into the CAD system. Engineering Design Support had started using the formats prior to final review by the Standards Committee. Any further changes should be minimal.
- (2) The *Engineering Release Procedure* was submitted to Project Management for review. This procedure defines the responsibilities for the preparation and release of engineering documentation packages to Documentation Control and the distribution to the users.
- (3) The *Engineering Release Package Contents* was submitted to Project Management for review. As its name implies, the engineering release package defines the documents which make up a release package.

The following procedures are in process.

A. Drawing Review Process

The *Drawing Review Process* will define the engineering document review process and who will review the documents.

B. Drafting Manual

The first section of the *Drafting Manual* will consist of different types of drawings with complete instructions for their preparation. Engineering Design Support will supply examples of preferred drawing techniques to Engineering Standards.

The second section will be an appendix consisting of detailed subject instruction. Drafts of three sections of the appendix have been prepared and placed in a notebook for Project Management review. The three sections include:

- (1) Drawing Forms (This was completed first because of the work done on the formats.)
- (2) Weld Symbols - detailed instructions on the symbology and its applications.
- (3) Nondestructive Examination Symbols (Welds) - detailed instructions on the symbology and the applications for examining welded joints for defects and possible failure.

Two appendices to the Drafting Manual are in process: (Rough drafts were written in April.)

- (1) Surface texture details the features which form a part of roughness and the method for for defining the required minimum acceptable texture (roughness) on drawings by means of symbols.
- (2) Metric conversion defines the metric units of measurements and how they are applied to drawings. Metric conversion also details how to use the grades of fit for mating parts and the general use of tolerances.

- **METROLOGY LABS (3.4.9)**

A manager for the Metrology Lab and Calibration and Repair Lab joined the SSC Laboratory on April 23, 1990. For the next 30 days, operational planning and equipment ordering for the Calibration and Repair Lab will take place. Calibration of incoming test measurement equipment will begin as the lab equipment becomes operational.

The Metrology Laboratory will begin operation in 1991 when equipment and facilities become available.

SSC LAB DIRECTORS OFFICE (WBS 3.5)

The Citizen's Advisory Committee members met in Midlothian, TX on April 5 and were briefed on environmental and safety aspects of the SSC.

The Director testified on the status of the SSC on April 24 before the Senate Subcommittee on Energy, Research and Development of the Committee on Energy and Natural Resources. He then joined Deputy Secretary Henson Moore in speaking to Congressmen and staffers on international aspects of the project.

R&D AND PRE-OPERATIONS (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 considerably during the last month, based on the response of the estimators to our request for corrections, backup comments and references to the appropriate sections of the Site-specific Conceptual Design Report (SCDR).

The Field Task Proposals/Agreements have been submitted to DOE.

Small corrections have been made to the SCDR, but the document cannot be completed until certain technical issues have been settled.

During April the Accelerator Division Staff-on-Board increased to 114.

Schedules have been developed which detail conventional construction for the Injector, Collider, Test Beams, Infrastructure, Experiment Halls and Campus. In developing the logic for construction, emphasis was placed on supporting proposed project-level milestones, with the intention of overlaying cost and varying delivery dates to meet funding profile constraints. The logic for technical installation of Collider half-sectors has been incorporated and the logic for technical installation for the Injector is in progress. Construction cost data is now being entered into the Collider schedule logic for a first cut at a commitments profile.

• LINAC (4.2.1.2)

Preliminary designs of both a Helical Electrostatic Quadrupole (HESQ) and an einzel lens Low Energy Beam Transport (LEBT) have been completed satisfactorily. Both appear to perform well from the simulations and both will be fabricated and studied on the linac test stand at SSCL. The HESQ may be operationally more reliable since it requires high voltages of only 7 kV -- much less than the 35 kV of the einzel lenses. A 70 MeV DTL has been designed and has shown good performance in simulations including alignment errors using PARTRACE at LANL. Similar simulations are underway for the sidecoupled linac using CCLTRACE acquired at LANL from ACCSYS, Inc. Source characterization tests at Texas Accelerator Center (TAC) have been slowed by another failure of the source turbopump.

• LEB (4.2.1.3)

A workshop on LEB/MEB design issues was held at the SSC Lab on April 26-27. As a result of the discussions, the excitation curves are being re-examined in order to ease the LEB-MEB beam transfer synchronization. Other issues may be studied in the near future, such as the value of transition gamma in both LEB and MEB.

- **MEB (4.2.1.4)**

MEB design issues were discussed during the April 26-27 LEB/MEB Issues Meeting held at SSCL. Two main concerns were the transition energy and the dipole magnet design. In the present design, the transition energy is very near the injection energy and therefore the time the protons spend near transition could be reduced by increasing the transition energy. In addition, the LEB/MEB RF systems could be more efficiently matched if the transition energy were increased. The recommendation was made to raise the tune from 16.6 to about 24.6 (60 degree cells go to 90 degrees). The straight sections would then need to be redesigned to better accommodate extraction with the new phase advance. The other major item discussed was the choice of MEB dipole magnet. The present MEB design calls for the same dipole magnet as used in the FNAL Main Injector proposal. It was pointed out that the sextupole field may be a problem for slow spill. (The MI at Fermilab conducts slow spill at 120 GeV at a field of 1.4 T.) It was recommended that a more detailed study of the MEB aperture requirements be conducted.

- **HEB (4.2.1.5)**

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

Work was also done on the basic design of the HEB. In order to maximize commonality with the collider magnets, the HEB dipole length was changed from 7.5 m to the collider length of 15 m. The HEB design is now 2 dipoles per half cell and the total number of dipoles required is 432. In addition, the cell quadrupole length and gradient was changed from 1.75 m @ 140 T/m to 1.2 m @ 206 T/m. Thus the HEB arc quadrupoles will run at the same gradient as the collider quadrupoles and their gradient is consistent with being run in series with the present dipole design.

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

- **COLLIDER (4.2.1.6)**

Particle tracking studies continue on the 5cm magnet model. Tune shift studies were performed to evaluate the effects of plausible multipole errors on the location of tunes in tune space and their nearness to resonance lines. Work has commenced to evaluate correction schemes for reducing the x-y betatron oscillation coupling. Considerable progress was made in cost estimation for the June DOE cost review. We are continuing to develop in-house expertise in magnetic field modeling to assist in the corrector element design evaluation. Quench simulation analysis is continuing on the dipole magnet design and experimental data is being compared with the simulation results.

MAGNET R&D (WBS 4.2.2)

FERMI LAB (WBS 4.2.2.1)

Dipole DD0027 has undergone tests including magnetic measurements both warm and cold. Future tests include a thermal cycle and more magnetic measurements. Following warm magnetic measurements the cold mass for DD0028 was moved to the cryostat area for assembly. One meter magnet DS0308 was tested and performed well in spite of low indicated preload and DS0309 will be tested within two weeks. The first long coil is being collared. Coil winding practice will be curtailed due to lack of conductor.

Dipole Cryostat

Work is continuing on the Heat Leak Test Facility in preparation for 80K to 4.5K MLI measurements.

We are beginning a development program with one of our composite tube vendors, Structural Composites Industries (SCI), to study the feasibility of redesigning the support posts with wound-in ends as opposed to shrink fit joints. We are also working with SCI to develop a composite material with increased shear modulus as a means of increasing the lateral support stiffness. A purchase order has been issued to SCI for fabrication of seven prototype assemblies with wound-in ends. As of April 30, SCI has fabricated and tested prototype assemblies, but were not satisfied with the measured structural performance. Development is continuing.

We have issued a purchase order to ACPT for six composite tubes built to the current support post drawings, but with a modified fiber layout which will increase the shear modulus and thus the lateral stiffness of support post assemblies. These tubes will be assembled into support assemblies and tested for structural comparison with the current design.

We are taking another look at the bore tube shuttle previously developed at FNAL. The current device tends to corkscrew down the pipe. The work is aimed at eliminating this effect and at reducing the size for use with the warm bore. The present thinking is to float the probe on an air bearing to eliminate the twisting problem.

We are actively working on the redesign of the SSC dipole cryostat to accommodate the 50mm aperture cold mass. Nearly all of the engineering, design, and drafting resources involved in SSC activities are related to this redesign effort. As of April 30, the two-dimensional cryostat cross section was nearly complete. The interconnect region is under development.

We have opened communication with several bellows manufacturers to develop new bellows for the 50mm cryostat interconnect area. We have received a response to our original set of specifications from Flexonics and are awaiting a response from Calflex.

Magnetic Measurements

Dipole DD0027 was measured magnetically on the test stand at room temperature, then cooled down to 4.35K. Quench protection was verified by inducing quenches at currents up to 4000A and the magnet was measured magnetically with the Mole at 2000A to establish values for the magnetic field harmonics before ramping to high currents. The magnet was then cooled to 3.5K and three "conditioning" ramps to 6800A were made without quenching, during which a set of strain gauge readings were recorded. The magnet was then warmed to 4.35K and quench testing begun. Quenches occurred at 6817A, 6812A, 6862A, 6856A, 6890A, and 6890A. Quench origins for the first four "training" quenches varied, including an upper inner coil turn 16 straight section, the lower inner coil

near the ramp splice, and the lower outer coil. The last two quenches, which appear to be at the conductor limit, occur in the lower inner coil at the ramp splice region. Magnetic measurements were performed at 2000A with the Mole along the length of the magnet and at fixed positions along the magnet at varying magnet currents using a simulated accelerator ramp cycle. The magnet was then warmed to room temperature for another set of warm magnetic measurements before cooldown on the next thermal cycle.

Long Magnet Fabrication

Cryostat Area

DD0017 and DD0019

Magnets DD0017 and DD0019 are presently being stored in the Industrial Center Building and will be used eventually in the string test at ER.

DD0026 and DD0027

Magnets DD0026 and DD0027 are being tested at MTF.

DD0028

Mole measurements of the Cold Mass for DD0028 were completed by MTF personnel and the Cold Mass was then moved to the cryostat assembly area on 4/16/90. Assembly was started and all of the single phase welding is now complete. The Cold Mass has also been installed on posts and is presently being vacuum leak checked. This is the first Cold Mass from BNL which was not pressurized with helium to check for leaks. Since it was not contaminated with helium, it was decided to vacuum leak check it, which will allow for better sensitivity during the test. An estimated completion date is 5/31/90.

Miscellaneous

The installation of a new vacuum vessel survey station has begun. This involves anchoring and aligning new stands that will permanently store a dummy cold mass used for loading the vessel. The estimated completion date is 5/18/90.

Cold Mass Area

Curing Press

The electrically operated valves for the heat exchanger were installed on 4/3/90. An oil sight glass was installed on the 100 ton hydraulic system reservoir on 4/17/90. Six hydraulic hoses were rerouted on 4/6/90 to avoid the heat of the "dow therm" piping. In the event we change to a 500 π cure temperature, the heat exchanger was also converted from an open atmosphere to a closed system. A nitrogen head can now be applied to the suction side of the pump to prevent moisture from entering the system. This is also necessary for higher temperature operation if needed. This work was completed on 4/13/90.

Precision valves for controlling the hydraulic pressures via the computer were received and installed on the curing press on 4/21/90. The computer program to control these valves still has to be written.

Installation and testing of the limit switches for the mold positions on the curing press and insertion table was completed on 4/23/90.

A thermocouple was installed on the "dow therm" supply line at the mold to provide temperature readings at this point to the computer.

Collaring Press

Installation of the pusher bars in the collaring mold was completed on 4/2/90. The mold and press are now ready for operation.

Winding Table

Work has begun to correct a binding problem of the spool height adjuster. Parts are being reworked but the operation of the adjuster is still not correct; there is no estimated completion date.

Coil Winding and Curing

RCM #1 Inner #1 (18M-1005) was measured on 4/2/90.

RCM #1 Outer #1 (17M-2005) was measured on 4/4/90.

RCM #1 Inner #2 (17M-1006) was measured on 4/5/90.

RCM #1 Outer #2 (17M-2006) was measured on 4/9/90.

RCM #2 Inner #1 (17M-1007) was wound on 4/21/90, cured on 4/24/90, and measured on 4/27/90.

Coil Assembly and Collaring

PCM #1 coils have been assembled with ground wrap insulation and precollared; this work was completed on 4/19/90.

PCM #2 coils have been assembled with beam tube ground wrap heater strips and pole shims. Precollaring of this coil is now 90% complete. PCM #2 coil has two strain gauge packs installed.

The final compression and keying collaring of PCM #1 and PCM #2 coils will begin on about 4/30/90, when the balance of the collaring lifting/insertion fixtures are received.

Miscellaneous

The final assembly of the coil "stripping station" is now complete.

Sixty-two extra spring-loaded wheels were added to the outer curing mold to prevent sagging between wheels. Another sixty-two wheels are being installed on the inner curing mold for the same reason.

Magnet Development

The warm finger for use with 40mm aperture SSC dipoles in the 144 inch dewar at Lab 2 is complete and a second warm finger for use in the 96 inch dewar is being assembled. The new 24 inch harmonic probe has been completed, checked and used to measure the field of DS0308 at room temperature. A second header with 10kA leads and many instrumentation leads is nearing completion. This will allow a magnet to be fully prepared for testing before the previous magnet test is complete.

The 1m model DS0308 is the first complete C358D cross section magnet built at Fermilab. For reasons that are not completely understood, it has very low preload of about 2-3 kpsi. It is instrumented with 55 voltage taps, collar pack, "bullet," and skin strain gauges, capacitor coil stress

gauges, and bending beam "deflectometers" to measure horizontal radial deflections of the return end can. Its field harmonics have been measured at room temperature both with the mole and the Lab 2 magnetometer. It has been cooled to 4.2K and is currently being prepared for cold testing.

SSC Short Model Program

The F5 ends have been sectioned and inspected in the Materials Development Lab.

DS0307 has been collared two ways: with the normal ground insulation system and with brass replacing the layers of ground insulation nearest the collars. This was done to determine whether preload losses result from Kapton extruding into the die break areas between collar laminations. Preliminary results indicate no preload differences between the two systems.

DS0308 has been shipped to Lab 2 for testing.

DS0309 has been collared. Yoking will take place on 4/30/90 and it will be shipped to Lab 2 for testing on 5/2/90.

DS0310 is ready for collaring, which is scheduled for 5/8/90. The magnet will be ready to test by 5/19/90.

DS0311 coil winding has begun.

• BERKELEY LAB (WBS 4.2.2.2)

Superconductor and Cable

Work is continuing on the development of the tooling and cabling parameters for the 50mm bore dipole cable. A preliminary set of cable dimensions has been furnished to SSC Laboratory personnel so that magnet tooling can proceed. During April, two experimental runs were performed on 30-strand inner cable. Several short lengths of 30-strand inner cable were made in order to optimize the conductor for the final 5cm bore dipole.

Adjustable parameters are:

- width of cable 0.472" to 0.490"
- compaction on minor edge 95% to 99%
- lay pitch length 3.50 to 4.50

However, for the production of acceptable cable, these parameters are not independent; for example compaction depends on lay pitch, and width and lay pitch are interdependent. The goal is a cable with low degradation and good mechanical stability that is easy to wind. First, we shortened the cable lay pitch from 3.7" to 3.0" in three increments. The cable produced at 3.0" and 3.35" pitch was not of high quality, so the pitch was set at 3.6" and a 250' length was produced for practice winding at BNL. In the second experiment, now in progress, the cable width is increased from .480" to .486", and the cable pitch experiment is repeated. A length of between 250 and 350 ft. will be sent to FNAL for winding tests. We expect to reduce the choice to no more than 2 designs which will be further evaluated for a final selection.

Dipole Magnets

Sample Holder for Cable Test Facility

The first series of drawn A1-tube sample holders have been tested at BNL. The critical current values obtained were the same as measured previously in standard holders. However, the samples showed more training than expected, so the samples will be redrawn with thicker shims (more prestress) and sent back to BNL for testing.

Wedges

We started manufacturing the copper wedges needed for two of the five-meter QC quadrupoles. These are 50% complete.

Magnet Test Facility

The refrigerator compressor motor that was damaged on March 23 was repaired and returned to service on March 29. Re-testing of dipole magnet D16B1 in He II at 1.85K was resumed on April 2, 1990. Quench current in the He II ranged from 8548A to 9340A. Cyclic heating in He II was measured at ramp rates from 50A/S to 400A/S. Extensive magnetic measurements were made in both He I and He II, including field decay rates under various set up cycles. Tests were completed on April 16.

QUADRUPOLE MAGNETS

5m Quadrupole Models

Assembly of the coil winding table, cable tensioner, winding mandrels, curing cavities, main curing press, press loading table, hot oil transfer system, and all tooling for inserting and extracting coils for curing is complete.

A practice outer coil has been wound and prepared for curing which will begin in early May, followed by the winding and curing of a practice inner coil.

Layout design of the coil assembly table and tooling is 50% complete. Some detail drawings are complete and some components are being fabricated. The layout design of the collaring press is complete.

Design of the magnet yoke alignment system is continuing. This includes design of the yoke, skin, fiducials, and tooling to be used in the main press for clamping the assembly during welding. Yoke lamination drawings are out for quotation.

1m OC Quadrupole Model

All assembly has been completed with voltage taps on the pole turns in each quadrant of each layer. The magnet has been collared with the load cells indicating a prestress of 5800 psi. The ends have been clamped and the magnet is waiting for installation in the iron yoke. Electrically the magnet is sound with no shorts or other problems. It is expected that the shell will be welded by May 4, and the magnet ready for testing on May 11.

5cm Dipole

A magnetic design study of a 5cm SSC dipole with 5mm collars and elliptical ID iron has been completed. The study shows that a 6.6 T field can be achieved with 5790A, good harmonic quality and about 15% field margin.

• SUPERCONDUCTING CABLE R&D (WBS 4.2.2.3)

Activity in R&D for the superconducting wire and cable has concentrated on expediting wire orders to fill the need of the prototype magnets.

Production is nearing completion in support of the requirements for INNER conductor for the 40mm magnet program. Processing difficulties are continuing with the 14" diameter OUTER billets. Cabling of the long pieces was initiated this month and should yield enough cable for one magnet.

To accommodate the shortfall of OUTER conductor, an existing IGC order has been modified to divert three INNER billets into three OUTER billets. This conductor will arrive in late July and be used to complete the requirements of the 40mm program and meet the early requirements for the 50mm program. In order to improve our understanding of OUTER conductor processing, a contract change order is being prepared for OST to produce 5 billets in a single batch which will support a controlled experiment to help in understanding vendor variability. OST is the only vendor, at present, with sufficient production capacity to accomplish this task.

Insulation Development Program

The insulation development program continues to investigate prime materials characterization; insulation system characterization; and insulation breakdown and short detection.

• BROOKHAVEN LAB (WBS 4.2.2.4)

Long Magnets

Testing of DD0020 took place this month. The initial performance of the magnet was excellent, with the first quench at the limit of the conductor, 6.84kA at 4.35K.

Leak checking was performed on DC0201. End plate "bullets" were installed, voltage taps dressed, and the magnet's electrical interconnection system was completed by the end of the month.

DC0202 saw end gauging and installation of voltage taps early in the month, followed by collaring, warm measurements and start of yoke assembly.

DC0203 awaited coil assembly, expected to start in early May.

Coils were wound and cured for DC0204, end gauging was performed, and voltage tap installation started.

By the end of April all inner coils for magnets through DC0206 had been wound and cured.

Short Magnets

DSS020 was checked out electrically, wired into the top hat and installed in the vertical dewar. Tests began in the third week of April, (see Test and Measurement section for details).

Electrical assembly of DSS021 was finished and final checks performed; subsequently it was wired into DSV016's top hat.

All coils for DS0201 (all-Kapton) have been wound and cured. Coil assembly got under way in the last week of April.

Magnet Tooling and Equipment

Coils

Engineering continues on coil tooling, short and long, for 50mm aperture coils, including formblocks, liners and mandrels. Heating tests were completed on the new 1.8m (40mm) outer coil formblock.

Collars

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

Yokes

The fineblanking die for producing 1/4-in. yoke laminations has been approved; production of laminations will commence shortly.

The yoke block stacking fixture and end block bonding fixture for 50mm magnets were designed.

Superconductor

Cable Procurement

The only cable received in April was short lengths of wide inner cable for winding tests for the 50mm program.

Cable Tooling

The cost estimate and schedule for the modified wrapping line was completed, and a designer was assigned to the project.

The microscope/camera device for monitoring the cable quality is now fully operational and in service. A precision stage is being investigated for addition to the system.

Tooling for the incoming inspection of wide cable for the 50mm program has been released to the shops for fabrication. The keystone angle measuring blocks and standards are being designed.

Miscellaneous

A review of the wrapping line's lump detector is near completion. Once revised, the lump detector will be able to handle the anticipated higher wrapping speeds and also accommodate the wider cable to be used in the 50mm magnet.

Test and Measurements

Three SSC dipoles were tested this month. Two were 1.8m long (DSV016, DSS020) and one was full length (DD0020). The testing of DSV016 started in March; the testing of the other two magnets will continue into May.

DSV016

Magnet DSV016 used the coils originally assembled in DSS016 and later reassembled (as DSV016) with standard prestress but with antiovalizing collars. For this DSV016 retest, the thickness of the pole shims was reduced so that the assembly, again with antiovalizing collars, would result in a coil prestress which was much lower than the initial DSV015 assembly. The quench performance of the magnet was excellent, even though the strain gauges indicated that inner coil prestress had gone to zero at fields above 4.5T. As expected, the allowed multipoles changed when the shim size was changed. Much of this change was accounted for by a first-order estimate which assumed that the shim change was evenly distributed among the turns of the coils.

DSS020

The initial testing of 1.8m dipole DSS020 took place at the end of the month. This is the third magnet in series designed to check the effect of varying the epoxy content of the fiberglass insulation in the outer coil. The initial quench performance was measured at 4.35K, and there were two training quenches before reaching plateau at 6.9kA. The harmonics of the field were good.

DD0020

The initial testing of 17m dipole DD0020 also took place this month. The magnet was of standard construction, with the addition of numerous thermometers along the cold bore tube (to measure the effectiveness of the cross flow cooling scheme) and a 10m sextupole Multiwire trim coil (the conclusion of a R&D program in this area). The initial performance of the magnet was excellent -- the first quench was at the limit of the conductor, 6.84kA at 4.35K, well above the operating current of 6.5kA (6.6T).

Following the final quench, an upset electrical condition was detected by the monitoring equipment of the test stand. Subsequent tests revealed that damage to the magnet insulation had occurred. Preliminary investigation has indicated that the damage was caused by the overheating of safety heaters that are fired to protect the magnet when a quench occurs. The capacitor discharge used to fire the heaters was not properly matched to the resistance of the heaters. The cause of this mismatch is still under study.

This damage will curtail the test program but not terminate it completely. It is anticipated that the magnet may be ramped slowly to an intermediate field so that the field angle and multipoles of both the dipole and the sextupole corrector can be measured. The tests of cross flow cooling can be carried out, since they do not require that the magnet be powered. The main loss will be magnet quench data at low temperatures and following a thermal cycle.

EXPERIMENTAL SYSTEMS (WBS 5.0)

- **EXPERIMENTAL SYSTEMS R&D (WBS 5.1)**

Final drafts have been prepared and circulated of the four Memoranda of Understanding (MOU) between the Laboratory and the collaborations in data acquisition and triggering R&D subsystems topics for FY90. An addendum to the Central and Forward Tracking MOU dealing with engineering has also been prepared for signatures.

Planning continues for the Symposium on Detector R&D for the SSC to be held October 15-18, 1990, at the Worthington Hotel in Fort Worth, Texas. An International Advisory Committee has been formed and has been asked to make recommendations on the program.

A number of meetings were attended and talks presented by Laboratory personnel during the month of April. Six people from the Research Division visited the UT-Arlington (UTA) campus on April 12 to view the Engineering School facilities and discuss possible collaboration with the Laboratory in regard to detectors and physics research. T. Dombeck presented the keynote talk on April 24 at the College of Sciences Awards Banquet at UTA. T. Dombeck and R. Stefanski attended the L* Detector Collaboration meeting at ORNL at the end of April.

LAB OPERATIONS SUPPORT (WBS 6.0)

PHYSICS PROGRAM SUPPORT (WBS 6.1)

• DIVISION OFFICE (6.1.1)

Preliminary FY90 budget reallocations for the Physics Research Division were coordinated with the Project Office. The SSCL Budget Office then issued a divisional breakout of the budget which showed the fund types and amounts. An analysis of the impact on each element of the Division is being performed and a proposed budget reallocation prepared. The status of the staffing in each group is being reviewed and more emphasis is being placed in getting the staff to a level in harmony with the overall tasks to be accomplished.

The Project Office coordinated and performed an internal program baseline review of the overall SSC cost estimate. This is being done in preparation for the DOE review in June. Some proposed changes in the WBS will affect the Physics Research Division but no firm action is being taken in this area at this time.

The Division databases and filing systems are being updated continuously. A new database was created for the HEP address list and Physics Research Division filing.

A procedure manual for the Division Office support staff was begun.

Coordination and production work on the SCDR continued throughout April by the Division staff.

Fred Gilman attended the Solenoidal Detector Workshop at KEK in Japan and presented the opening talk, "The Accelerator, Status and Experimental Program of the SSC". He conferred with KEK management and Japanese physicists on collaboration in SSC experiments. KEK is the Japanese Laboratory for High Energy Physics.

• THEORY (6.1.2)

Preparation continued for the conference on New Topics in Electroweak Physics to be held May 30-June 1 at the SSCL. Approximately 25 theorists have already responded that they are coming to the conference, with 5 staying as visitors for a month around the time of the meeting. Thirty-five to fifty people are expected to attend the meeting. The conference will consist of six sessions, each with invited speakers.

• EXPERIMENTAL PHYSICS AND FACILITIES (6.1.3)

The first draft of a Resource Requirements Report was submitted by each of the five major detector groups submitting an Expression of Interest. Even with these rough drafts, an early look at the scope of facilities required for the detectors can be developed. An outline for a summary of the resource requirements has been written, and considerable effort will be devoted in the next month to writing the full report.

Preliminary results for a comparative cost and schedule study of liquid argon and spaghetti calorimetry carried out with Martin Marietta will become available in May.

A new set of schedules has been developed to reflect the interdependence of detector and civil construction. These schedules are entirely hypothetical at this time, since the detector program has not been defined, but will serve to guide us through the early stages of work with the AE/CM.

A panel of experts will be brought together in May to consider the problems associated with detector safety. The first Expressions of Interest will be available at the time of the meeting, and will serve as a guide to the range of issues that the panel will consider. The panel will try to develop procedures for the Lab to deal with detector safety problems.

Work continued on various aspects of the design of a detector model for the SDC collaboration. Alternate configurations for the muon steel are being considered and detector hall configurations, assembly procedures and detector construction techniques are also being developed. Work is expected to begin soon also on systems integration between SDC and the SSC Lab.

Work continued this month on developing a better understanding of the surface facility requirements for the Bottom Collider Detector (BCD).

The Experimental Facilities Group will begin to coordinate a study of the relative merits of conventional vs superconducting magnets for large detectors. This study is motivated by the L* collaboration, which we believe may ask the SSC Lab to help determine the technology of preference for this detector. The L* detector can use either aluminum or superconducting coils, wherein one is trading off the cost of power for ease of design and construction.

The TeXAS detector has unique structural problems which affect the assembly and construction procedures for the detector. These issues are important in determining the hall size and access shaft requirements. The Experimental Facilities Group is working with the TeXAS collaboration to resolve some of these problems.

• COMPUTING AND DATA ANALYSIS (6.1.4)

Computation and Analyses

Computer Operations is continuing to make progress in locating, testing and acquiring connectivity tools and common interfaces on supported SSC Laboratory systems. The goal of this effort is to provide common system management tools and integration of utilities across VMS and UNIX platforms. The following sections describe new tools installed this month.

VAX Systems

The Alisashare software for the VAX has been implemented on both the scientific (SSCVX1) and the administrative (SSCAD1) VAX systems. This software enables Macintosh users to print on high-speed Ethernet printers, and for VAX users to print small jobs on Apple LaserWriters nearby.

The MULTINET version of Network File System (NFS) for VMS has been installed on SSCVX1. This product will allow the VAX to supply NFS mount points to UNIX systems. The implementation of NFS will be carefully coordinated with Magnet System and Accelerator divisions to ensure consistency throughout the laboratory.

The Powerhouse MENU for MIS, which will provide a coherent user interface for MIS software and which is a critical component in the security model for the VAX, is complete on SSCAD1. Upgrades to VMS v5.3-1, MULTINET V2.1, JNET V3.4, FORTRAN V5.4 and VAX C V3.1 are complete on SSCVX1.

UNIX System Management

A demonstration of DECshell (the UNIX shell for VMS) is available on SSCVX1 for evaluation. This product allows UNIX commands to be executed on VMS systems. The UNIX commands can be executed as DCL commands from the default VMS command language interpreter, or the user may wish to login using the UNIX shell.

The VMS shell and EDT editor for UNIX has been ordered for installation on the Physics Research file server and any UNIX systems where VMS users want a more familiar and user-friendly command language.

A demonstration version of SYSMON, a system performance monitor for UNIX systems has been installed on one SUN server and one SUN workstation. This product will enable system management to monitor resource utilization on UNIX systems, a capability which will become increasingly important as the SSCL moves toward larger UNIX-based systems.

Physics Support

The Systems Development group continued its support of the 500 MIP acquisition project. After preliminary evaluation, the Cooperative Processes Software (CPS) was chosen as the process level distributed computing software. A tape with the CPS code will be obtained from Fermilab when discussions regarding porting and software internals are held there. A detailed design chart of the proposed 500 MIP resource has been prepared and accepted by the Computer Acquisition Working Group (CAWG). Work will continue to refine the initial design.

A final draft of the System Specification for the 500 MIP acquisition has been prepared for review by the red team of the CAWG. A Request for Proposal is being assembled and the source selection criteria is also under development.

Applications supporting the system development and integration plan, such as structured analysis and design and automated system documentation, have been acquired and are undergoing integration.

In the effort to gain expertise in the X window, sample programs have been developed in preparation for an upcoming seminar on the components of the X window system. The Systems Development Group will determine the most appropriate use of X, Motif(tm) and Openwindows(tm) on the 500 MIP acquisition project based on knowledge gained at the seminar.

Networks

The SSC Laboratory line to the Internet and the Texas Higher Educational Network has been upgraded from 56 Kb to T-1 (1.544 Mbs.). The higher speed should allow for faster file transfers and the use of more powerful remote access applications like X-Windows.

• LIBRARY SERVICES (6.1.5)

Checkout procedures were developed which allow patrons the opportunity to check out material twenty-four hours a day.

Also developed was a report of the SSC Library's current collection, as well as the current status of the books that have been checked out. The purpose of the report was to determine how many books the Library presently has in its collection, what call number categories the books are divided into, how many books have been checked out to date, and to what extent we are servicing current SSC departments.

- **TECHNICAL INFORMATION AND PUBLICATIONS (6.1.6)**

We developed a standardized format for the development of viewgraphs which has been implemented throughout the laboratory. Each Division has been given the format on disk and typed specifications.

The group is working with the SSCL Personnel group in the preparation of a SSCL Employee Handbook and a Personnel Policy Manual.

The group is also continuing their investigation into the capabilities of various publishing systems that will meet the needs of the laboratory.

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

COST PERFORMANCE REPORT - BY WBS													
						REPORT PERIOD				FROM: 03-31-90	\$ IN 000'S		
										TO: 04-29-90			
		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	1,109	1,109	1,109	0	0	6,186	6,186	6,186	0	0	56,684	56,684	0
2.0 CONVENTIONAL CONSTRUCTION	1,624	1,624	1,624	0	0	9,064	9,064	9,064	0	0	26,220	26,220	0
3.0 PROJECT MGMT. & SUPPORT	2,556	2,556	2,556	0	0	20,639	20,639	20,639	0	0	38,966	38,966	0
4.0 R&D AND PRE-OPERATIONS	6,188	6,188	6,188	0	0	30,965	30,965	30,965	0	0	54,278	54,278	0
5.0 EXPERIMENTAL SYSTEMS	-10	-10	-10	0	0	228	228	228	0	0	10,443	10,443	0
6.0 LAB OPERATIONS SUPPORT	726	726	726	0	0	4,113	4,113	4,113	0	0	10,137	10,137	0
TOTAL DIRECT COSTS	12,193	12,193	12,193	0	0	71,195	71,195	71,195	0	0	196,728	196,728	0
MANAGEMENT RESERVE											87	87	
TOTAL	12,193	12,193	12,193	0	0	71,195	71,195	71,195	0	0	196,815	196,815	0

**BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL

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											TO: 04-29-90			
CURRENT PERIOD						CUMULATIVE TO DATE						**FY90		
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE	
				SCHEDULE	COST				SCHEDULE	COST				
1.1.1 ACCEL. MGMT. & SUPPORT	-2	-2	-2	0	0	196	196	196	0	0	7,120	7,120	0	
1.1.2 LINAC	0	0	0	0	0	0	0	0	0	0	0	0	0	
1.1.3 LEB	0	0	0	0	0	0	0	0	0	0	0	0	0	
1.1.4 MEB	0	0	0	0	0	0	0	0	0	0	0	0	0	
1.1.5 HEB	0	0	0	0	0	0	0	0	0	0	0	0	0	
1.1.6 COLLIDER	0	0	0	0	0	0	0	0	0	0	280	280	0	
1.1.7 TEST BEAMS	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL 1.1 ACCELERATOR SYSTEMS	-2	-2	-2	0	0	196	196	196	0	0	7,400	7,400	0	
1.2.1 MANAGEMENT & SUPPORT	187	187	187	0	0	1,303	1,303	1,303	0	0	10,378	10,378	0	
1.2.2 HEB MAGNETS	0	0	0	0	0	0	0	0	0	0	1,110	1,110	0	
1.2.3 COLLIDER MAGNETS	924	924	924	0	0	4,687	4,687	4,687	0	0	35,146	35,146	0	
1.2.4 MAGNET FAC EQUIP/TOOLING	0	0	0	0	0	0	0	0	0	0	2,650	2,650	0	
TOTAL 1.2 MAGNET SYSTEMS	1,111	1,111	1,111	0	0	5,990	5,990	5,990	0	0	49,284	49,284	0	
TOTAL 1.0 TECHNICAL SYSTEMS	1,109	1,109	1,109	0	0	6,186	6,186	6,186	0	0	56,684	56,684	0	

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WBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE
				SCHEDULE	COST				SCHEDULE	COST			
2.1.1 CAMPUS	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1.2 INJECTOR	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1.3 COLLIDER	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1.4 EXPERIMENTAL HALLS	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 21 INFRASTRUCTURE	0	0	0	0	0	0	0	0	0	0	0	0	0
2.2.1 CENTRAL LAB OFFICE	0	0	0	0	0	0	0	0	0	0	0	0	0
2.2.2 HEAVY WORKS BLDGS.	0	0	0	0	0	0	0	0	0	0	0	0	0
2.2.3 SHOPS	0	0	0	0	0	0	0	0	0	0	0	0	0
2.2.4 SUPPORT BLDGS.	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 22 CAMPUS	0	0	0	0	0	0	0	0	0	0	0	0	0

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				SCHEDULE				COST				SCHEDULE	COST
2.8.1 LINAC	0	0	0	0	0	0	0	0	0	0	0	0	0
2.8.2 LEB	0	0	0	0	0	0	0	0	0	0	0	0	0
2.8.3 MEB	0	0	0	0	0	0	0	0	0	0	0	0	0
2.8.4 HEB	0	0	0	0	0	0	0	0	0	0	0	0	0
2.8.5 TEST BEAM AREA	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 23 INJECTOR	0	0	0	0	0	0	0	0	0	0	0	0	0
2.4.1 NORTH ARC	0	0	0	0	0	0	0	0	0	0	0	0	0
2.4.2 SOUTH ARC	0	0	0	0	0	0	0	0	0	0	0	0	0
2.4.3 WEST CLUSTER	0	0	0	0	0	0	0	0	0	0	0	0	0
2.4.4 EAST CLUSTER	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 24 COLLIDER RING	0	0	0	0	0	0	0	0	0	0	0	0	0
2.5.1 WEST CLUSTER	0	0	0	0	0	0	0	0	0	0	0	0	0
2.5.2 EAST CLUSTER	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 25 EXPERIMENTAL FACIL.	0	0	0	0	0	0	0	0	0	0	0	0	0

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COST PERFORMANCE REPORT - BY WBS													
REPORT PERIOD										FROM: 03-31-90		\$ IN 000'S	
										TO: 04-29-90			
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90			
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE
				SCHEDULE	COST				SCHEDULE	COST			
2.6.1 MGMT./ADMIN./REPORTING				0	0				0	0	4,880	4,880	0
2.6.2 MAJOR STUDIES				0	0				0	0	958	958	0
2.6.3 DESGN. CRITERIA & REPORT.				0	0				0	0	1,035	1,035	0
2.6.4 DESIGN OVERSIGHT				0	0				0	0	388	388	0
2.6.5 CONSTRUCTION OVERSIGHT				0	0				0	0	235	235	0
2.6.6 CONFIG. MGMT/INTERFACE				0	0				0	0	307	307	0
2.6.7 SPACE PLNG./DESGN. SUPPT.				0	0				0	0	0	0	0
2.6.8 GEOTECHNICAL PROGRAM				0	0				0	0	4,970	4,970	0
2.6.9 SURVEY PROGRAM				0	0				0	0	1,343	1,343	0
2.6.10 A/E-CM SEL/CONT. SUPPORT				0	0				0	0	2,426	2,426	0
2.6.11 RESERVED				0	0				0	0	3	3	0
2.6.12 SEIS SUPPORT				0	0				0	0	608	608	0
2.6.18 MISC. RTK SUPPORT				0	0				0	0	1,200	1,200	0
TOTAL 2.6 CONST. PROJ. MGMT.	1,624	1,624	1,624	0	0	9,064	9,064	9,064	0	0	18,353	18,353	0

Page 46

**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: 03-31-90												
TO: 04-29-90												
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90		
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE	BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE	
				SCHEDULE COST				SCHEDULE COST				
27.1 ARCHITECT ENGINEER	0	0	0	0	0	0	0	0	0	7,867	7,867	0
27.2 CONSTRUCTION MGMT.	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 27 AE/CONSTRUCTION	0	0	0	0	0	0	0	0	0	7,867	7,867	0
TOTAL 2.0 CONVENTIONAL CONST.	1,624	1,624	1,624	0	9,064	9,064	9,064	0	0	26,220	26,220	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: 03-31-90												
TO: 04-29-90												
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90		
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE	BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE	
				SCHEDULE COST				SCHEDULE COST				
8.1.1 PROJECT MGMT. OFFICE	200	200	200	0 0	1,497	1,497	1,497	0 0	2,416	2,416	0	
8.1.2 PMRS	-9	-9	-9	0 0	578	578	578	0 0	1,020	1,020	0	
8.1.3 Q/A MANAGEMENT	14	14	14	0 0	36	36	36	0 0	380	380	0	
8.1.4 CONFIGURATION MGMT.	-18	-18	-18	0 0	250	250	250	0 0	920	920	0	
8.1.5 COST ESTIMATING	110	110	110	0 0	492	492	492	0 0	1,410	1,410	0	
TOTAL 8.1 PROJECT MANAGEMENT	297	297	297	0 0	2,853	2,853	2,853	0 0	6,146	6,146	0	
8.2.1 SYSTEMS ENGR. MANAGEMENT	140	140	140	0 0	619	619	619	0 0	1,495	1,495	0	
8.2.2 SE SUPPORT TO ASD	38	38	38	0 0	209	209	209	0 0	584	584	0	
8.2.3 SE SUPPORT TO MSD	20	20	20	0 0	174	174	174	0 0	421	421	0	
8.2.4 SE SUPPORT TO PHYSICS	22	22	22	0 0	36	36	36	0 0	0	0	0	
TOTAL 8.2 SYSTEMS ENGINEERING	220	220	220	0 0	1,038	1,038	1,038	0 0	2,500	2,500	0	

Page 48

**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: 03-31-90													
TO: 04-29-90													
CURRENT PERIOD						CUMULATIVE TO DATE				**FY90			
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE
				SCHEDULE	COST				SCHEDULE	COST			
3.8.1 ADMIN SERVICES MGMT.	221	221	221	0	0	1,476	1,476	1,476	0	0	2,520	2,520	0
3.8.2 ACCTG. & FINANCE	186	186	186	0	0	1,251	1,251	1,251	0	0	1,842	1,842	0
3.8.3 PROCUREMENT & S/CONT.	228	228	228	0	0	1,651	1,651	1,651	0	0	2,688	2,688	0
3.8.4 TRAVEL SERVICES	14	14	14	0	0	111	111	111	0	0	219	219	0
3.8.5 PERSONNEL	223	223	223	0	0	1,437	1,437	1,437	0	0	2,152	2,152	0
3.8.6 STAFF SUPPORT SERVICES	-101	-101	-101	0	0	727	727	727	0	0	1,175	1,175	0
3.8.7 MINORITY AFFAIRS	42	42	42	0	0	176	176	176	0	0	424	424	0
	*	*	*			*	*	*					
TOTAL 3.8 PROJ. ADMIN. & SUPPORT	774	774	774	0	0	6,790	6,790	6,790	0	0	11,020	11,020	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: 03-31-90		\$ IN 000'S	
											TO: 04-29-90			
CURRENT PERIOD						CUMULATIVE TO DATE						**FY90		
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE	
				SCHEDULE	COST				SCHEDULE	COST				
8.5.1 DIRECTORATE	268	268	268	0	0	1,988	1,988	1,988	0	0	3,841	3,841	0	
8.5.2 EXTERNAL AFFAIRS	57	57	57	0	0	364	364	364	0	0	574	574	0	
8.5.3 LEGAL SERVICES	34	34	34	0	0	195	195	195	0	0	300	300	0	
8.5.4 RESEARCH & TECH. ASSMT.	0	0	0	0	0	1	1	1	0	0	100	100	0	
8.5.5 USERS OFFICE	21	21	21	0	0	165	165	165	0	0	142	142	0	
8.5.6 ENVIRON. HEALTH & SAFETY	43	43	43	0	0	300	300	300	0	0	422	422	0	
8.5.7 PLANNING	29	29	29	0	0	200	200	200	0	0	250	250	0	
8.5.8 INTERNAT'L. COORDINATION	0	0	0	0	0	0	0	0	0	0	151	151	0	
TOTAL 8.5 PROJECT DIRECT. OFFICE	452	452	452	0	0	3,213	3,213	3,213	0	0	5,780	5,780	0	
TOTAL 8.0 PROJ. MGMT. & SUPPORT	2,556	2,556	2,556	0	0	20,639	20,639	20,639	0	0	38,966	38,966	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: 03-31-90													
TO: 04-29-90													
CURRENT PERIOD						CUMULATIVE TO DATE				**FY90			
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE
				SCHEDULE	COST				SCHEDULE	COST			
4.1 ACCELERATOR PRE-OPS	0	0	0	0	0	0	0	0	0	0	0	0	0
4.21 ACCELERATOR R&D	2,062	2,062	2,062	0	0	9,675	9,675	9,675	0	0	17,162	17,162	0
4.22 MAGNET R&D	4,126	4,126	4,126	0	0	21,290	21,290	21,290	0	0	37,116	37,116	0
4.23 PHYSICS R&D	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 4.1/4.2 PRE-OPS/RES. & DEV	6,188	6,188	6,188	0	0	30,965	30,965	30,965	0	0	54,278	54,278	0
TOTAL 4.0 R&D AND PRE-OPS	6,188	6,188	6,188	0	0	30,965	30,965	30,965	0	0	54,278	54,278	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: 03-31-90 TO: 04-29-90 \$ IN 000'S													
**FY90													
WBS ITEM	CURRENT PERIOD					CUMULATIVE TO DATE					BAC	LRE	VARIANCE
	BCWS	BCWP	ACWP	VARIANCE	SCHEDULE	COST	BCWS	BCWP	ACWP	VARIANCE			
6.1.1 PHYSICS ADMIN/SUPPORT	80	80	80	0	0	402	402	402	0	0	1,145	1,145	0
6.1.2 PHYSICS THEORY	0	0	0	0	0	1	1	1	0	0	183	183	0
6.1.3 EXPER. PHYSICS & FACIL.	298	298	298	0	0	1,267	1,267	1,267	0	0	2,613	2,613	0
6.1.4 COMPUTING & DATA ANALYSIS	190	190	190	0	0	1,372	1,372	1,372	0	0	3,776	3,776	0
6.1.5 PHYSICS LIBRARY SERVICES	105	105	105	0	0	493	493	493	0	0	1,385	1,385	0
6.1.6 TECH. INFORMATION & PUBS.	53	53	53	0	0	578	578	578	0	0	1,035	1,035	0
TOTAL 6.1 PHYSICS PROG. SUPPORT	726	726	726	0	0	4,113	4,113	4,113	0	0	10,137	10,137	0
6.2.1 MANAGEMENT	0	0	0	0	0	0	0	0	0	0	0	0	0
6.2.2 ADMIN. SYSTEMS & SUPPORT	0	0	0	0	0	0	0	0	0	0	0	0	0
6.2.3 PROJECT TECH. SUPPORT	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 6.2 GENERAL SUPPORT	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 6.0 LAB OPS. SUPPORT	726	726	726	0	0	4,113	4,113	4,113	0	0	10,137	10,137	0

**BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL

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

COST PERFORMANCE REPORT - BY OBS												
REPORT PERIOD										\$ IN 000'S		
FROM: 03-31-90												
TO: 04-29-90												
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90		
BCWS	BCWP	ACWP	VARIANCE	SCHEDULE COST	BCWS	BCWP	ACWP	VARIANCE	SCHEDULE COST	BAC	LRE	VARIANCE
OBS ITEM												
D - DIRECTORATE	452	452	452	0	0	3,213	3,213	3,213	0	0	5,780	
B - PROJECT MANAGEMENT	517	517	517	0	0	3,891	3,891	3,891	0	0	8,647	
A - ACCELERATOR SYSTEMS	2,060	2,060	2,060	0	0	9,871	9,871	9,871	0	0	24,560	
C - CONVENTIONAL CONSTRUCTION	1,624	1,624	1,624	0	0	9,064	9,064	9,064	0	0	26,220	
T - TECHNICAL SERVICES	813	813	813	0	0	6,745	6,745	6,745	0	0	13,520	
G - ADMINISTRATIVE SERVICES	774	774	774	0	0	6,790	6,790	6,790	0	0	11,020	
P - PHYSICS RESEARCH	716	716	716	0	0	4,341	4,341	4,341	0	0	20,580	
M - MAGNET SYSTEMS	5,237	5,237	5,237	0	0	27,280	27,280	27,280	0	0	86,400	
TOTAL SSC LABORATORY	12,193	12,193	12,193	0	0	71,195	71,195	71,195	0	0	196,727	

**BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL

SSC LABORATORY - CONTRACT #DEACO288ER40486 - MAJOR SUBCONTRACTORS

MAJOR SUBCONTRACTORS													
REPORT PERIOD										FROM: 03-31-90		\$ IN 000'S	
										TO: 04-29-90			
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	1,713	1,713	1,713	0	0	9,937	9,937	9,937	0	0	18,722		
FERMILAB - MAGNETS	1,654	1,654	1,654	0	0	8,245	8,245	8,245	0	0	16,000		
LBL - MAGNETS	758	758	758	0	0	3,107	3,107	3,107	0	0	3,500		
LOCKHEED	156	156	156	0	0	909	909	909	0	0	2,530		
RTK	1,332	1,332	1,332	0	0	7,781	7,781	7,781	0	0	7,900		
HARC/TAC	257	257	257	0	0	1,761	1,761	1,761	0	0	2,772		
SUBTOTAL	5,870	5,870	5,870	0	0	31,740	31,740	31,740	0	0	51,424		
SSCL/OTHER	6,323	6,323	6,323	0	0	39,455	39,455	39,455	0	0	145,303		
TOTAL	12,193	12,193	12,193	0	0	71,195	71,195	71,195	0	0	196,727		

**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		
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	6/90		
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		
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	6/90		
37	3.1	Key QA Staff Hired	11/89		1/90	
38	3.5	ES&H Management Plan	11/89	5/90		
39	3.5	ES&H Final Draft Issued	11/89	5/90		
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 Program Implemented	12/89		2/90	
44	3.1	Configuration Management 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		
50	3.1	QA Data Base Requirements Document Issued	1/90	5/90		
51	2.1	AE/CM-Complete Near Term Work Authorization Packages	1/90	5/90		
52	4.0	First Land Tract Available	1/90	7/90		Footprint Approval Reqd.
53	1.0	Award Magnet Prototype Contract	1/90	8/90		
54	2.0	Award MTL/MDL Facilities Cold Test Fabrication Contract	1/90	5/90		
55	3.3	Final AAAP Approved and Issued	2/90	5/90		
56	3.1	DOE/CSCSC Readiness Review	2/90	2/91		Determined by DOE

SSC PROJECT

STARTUP (NEAR TERM) MILESTONES

<u>MIL NO.</u>	<u>WBS NO.</u>	<u>MILESTONE DESCRIPTION</u>	<u>COMPLETION DATE</u>			<u>COMMENTS</u>
			<u>ORIGINAL PLAN</u>	<u>CURRENT PLAN</u>	<u>ACTUAL</u>	
57	3.1	PMP Approved and Issued	2/90	6/90		
58	2.6	CCD-Procedures Manual Issued	2/90	5/90		
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: May 18, 1990

NO.	MIL LEVEL	WBS NO.	TITLE		* BASELINE PLAN	CURRENT PLAN	ACTUAL
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>
May 30 - June 1	New Topics in Electroweak Theory	35-50	SSCL
June 7 - 9	Program Advisory Committee	100	SSCL
June 14-15	Scientific Policy Committee	25	SSCL
June 25-29	DOE Baseline Validation Review	150	SSCL
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 16-17	Machine Advisory Committee	25-30	SSCL
Dec 14-15	Scientific Policy Committee	25	SSCL