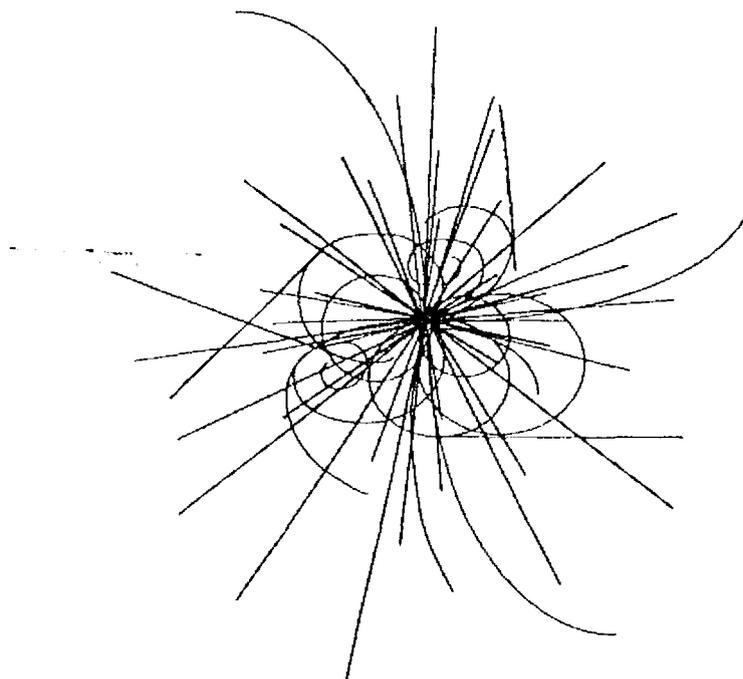


SSC PROJECT
MONTHLY PROGRESS
REPORT
JANUARY 1990



SSC



LABORATORY

SSC PROJECT

MONTHLY PROGRESS REPORT

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EXECUTIVE SUMMARY

The recommended baseline design and cost estimate were completed this month and reviewed by DOE on January 9-11 at the Laboratory. Key elements of the recommended design are: an increase in the Collider injection energy from 1 to 2 TeV; an increase in the HEB and Collider dipole magnet apertures from 4 to 5 centimeters; and a decrease in the half cell length from 114 to 90 meters.

The HEPAP Subpanel on SSC Physics, chaired by Sidney Drell, met on January 6-8 at the SSCL to consider the range of useful machine parameters for the SSC and were briefed by laboratory staff. The Subpanel strongly recommended that the DOE move ahead with the SSC project on the basis of the machine design as recommended by the Laboratory.

The HEPAP Subpanel on the U.S. High Energy Physics Research Program for the 1990s chaired by Frank Sciulli, met on January 19-20 at the SSCL. They were briefed on project status, plans and procedures for the experimental program and estimates of lab manpower needs and user involvement.

D-16N-1, a 5-centimeter aperture dipole, was designed for cable testing with a central field of 7.0 tesla at 4.35 K. The magnet was tested with good results, reaching 7 tesla on the first quench, with a plateau at 7.6 after ten quenches. At 1.8 K, the magnet reached 9.27 tesla. At BNL, the new test stand for 17m SSC dipoles was operated successfully for the first time, using rebuilt cold mass DDA010 for checkout.

Frederic Gilman was appointed Associate Director for Physics Research, replacing Murdoch Gilchriese, who will continue to work on the project as a consultant. Robert Matyas replaced Lieu Smith as Associate Director for Conventional Construction and the CCD staff was reduced from 44 to 25. Thirty-six new employees began work in January, bringing the total staff to 468, and 47 job offers were accepted. Strong interest in SSCL job opportunities continues, with 200-300 resumes received each week.

The AE/CM Selection Board visited each of the three short-listed AE/CM firms in preparation for recommending a firm to the Director.

Ten detector R&D proposals dealing with computing and data acquisition were reviewed and four were recommended for funding. It was decided to construct 200 GeV test beams first, with the intention of providing first beam by 1996.

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)

A major emphasis was placed on the development of Magnet Research and Development Plan and a Request for Proposal (RFP), including a Statement of Work (SOW) for procurement of the collider dipole magnet (CDM) full scale engineering development (FSED) efforts.

Staffing offers have been extended and accepted by: Section Manager, Materials; Section Manager, Analytic Support; and CAD Systems Manager. The Section Manager, Superconducting Technology has reported.

Eight members of the MSD engineering staff attended training on use of ANSYS (a Finite Element Method code). Four members of the Accelerator Division also attended the MSD sponsored training. The class was presented by Engineering Cybernetics, a licensed ANSYS distributor from San Antonio, and was well received by the participants. Interest was generated in obtaining a license for the code that, if purchased, would extend the limit of the current system beyond current limitations of two concurrent users.

Three MSD design engineers attended a week long cryogenics system design course presented by the ASME.

Key personnel attended and supported the MSIM meeting held at LBL 16 & 17 January. Action items generated during the MSIM are presently in work.

Work continued on the CDM RFP. The aperture change from 40 to 50mm has caused some delays because of the necessary changes to the specification.

Summary schedules were developed for the acquisition of all the superconducting magnets. These procurements are being driven by the CDM schedule.

Various members of the QA Group continued in support of developing: the CDM RFP; the alloy, wire and cable specifications; and the cryostat assembly traveller at BNL. Other Quality Engineering personnel conducted a review of the SSC dipole beam tube specification, wrote a provisional specification for beam tube copper plating, and studied photodesorption and outgassing techniques for SSC beam tubes.

A QA member is now attending the weekly Magnet Workshop meetings. A QC inspector has been identified for involvement with development of the workshop. The QA Group has requested assistance from the lab Safety Officer in locating a fully dedicated division safety officer who can also participate in the workshop development and other division safety matters as well.

• HEB MAGNETS (WBS 1.2.2)

Magnet Workshop

- DOE approval of the lease for space in Stoneridge Bldg. 2 was expected last week. Jim Gray was informed this week that DOE is now reviewing the lease agreement.
- The overhead crane order was placed. Lead time was quoted at 4-6 weeks.
- Requisitions have been submitted for a variety of equipment and tooling required to support workshop activities. All remaining requisitions will be submitted by mid-February.
- Magnet DD0018 has been disassembled by BNL down to the cold mass. The cold mass will be shipped on February 13th and will be placed in the Magnet Workshop by February 16th.
- Arrangements are being made to ship Magnet DD0010A to the Workshop. This magnet failed cold test at BNL with turn to turn shorts. This magnet will be used by Bob Viola for vibration tests and will ultimately be disassembled in the Workshop.

Magnet Development Lab (MDL)

- A detailed listing of equipment and tooling for the MDL has been prepared. Each item has been assigned to an engineer for design and procurement. Lead times have been estimated to allow priorities to be established.
- The final draft of the specification for the 15m coil winder is currently in review. An RFP will be prepared and submitted to procurement by the end of February.
- The cable wrapping machine is scheduled for final testing in June 1990.
- Bids for the skinning press were received and will be analyzed in February. It is likely that vendor surveys will be required prior to award of contracts.

Cryogenic System for MTL

- The opening date for bids is scheduled for March 12th. The contract award is anticipated for May 7th.

• COLLIDER MAGNETS (WBS 1.2.3)

TEST

No report this month.

QA

Quality Engineers continued their field assignments of gathering data and inspection requirements for all areas of dipole magnet manufacture. QA personnel accompanied other lab and production personnel on two vendor evaluation visits. One manufacturer of laminations in New York was visited on January 18, 1990 for a tour of its facilities and observation of the company's quality management and systems. Although management stated that quality is controlled by SPC, machine operators and an inspector, there was little evidence produced to support this claim (neither measuring equipment nor inspector were observed on the factory floor). The inspection room was very small and the equipment too crude to permit QC in production quantities required for the SSC. Another vendor in Wisconsin with fineblanking capability was visited on January 25, 1990, in order to evaluate their capabilities and determine the lead time for manufacturing dies required for SSC yoke and collar laminations. This vendor has supplied fineblanked 1/4" yoke laminations to SCC and RHIC as well as several European accelerator projects for DESY and CERN. The QA section of this company is equipped with computerized dimensional measuring equipment to meet close tolerance requirements. QA procedures, equipment and inspection results of SSC laminations were reviewed. The company is confident that it can manufacture dies and deliver clean laminations for a new magnet design within five months.

Quality Engineering has begun investigating recent improvements in digital ultrasonic detection equipment for possible application in the manufacture of wire and beam tube material. The most promising system utilizes the immersion method for coupling the transducers to the test item. Neither the ultrasonic inspection head or the item being inspected is rotated. An annular array of transducers (up to 80 for a 1.5" tube) are electronically controlled at a frequency of 20,000 Hz. For tubes, flaws are detectable in the transverse or axial plane. Data calculations can be made in real time for collapse and burst pressures, tube shape, tensile yield, etc. Due to the arrayed detection heads, the detection of extremely small flaw size is possible -- down to only 3 times grain size. False-positive data is virtually eliminated by the high repetition and data rates of the inspection head. This technique, for example, will detect and verify the presence of a flaw about 25 times, at 45 millisecond intervals, as it passes the detection head at 60 fpm. There seems to be great potential for using this equipment during the processing of monofilament alloy by the wire vendors. At the 3/9" monofilament stage, the equipment could locate both inclusions and occlusions which would introduce variations in the quality of wire during the extrusion and drawing processes. In order to substantiate the application, the QA Group requested that at least one sample of a rejected 24" x 38" stock be provided to the company for analysis. So far, no superconducting alloy or wire manufacturer has been able to identify a sample of rejected material. Therefore, we have asked that some stock which is believed to be good be provided to the company for analysis. A second company has presented information on improved eddy current techniques that possibly could find application in the QC of billet nosecones and wire at the final size. We have provided a point of contact at a superconducting wire manufacturer for further investigation.

• COLLIDER MAGNETS (WBS 1.2.3) - Continued

MANAGEMENT

No report this month.

ENGINEERING

Efforts continued towards finalizing a design concept and the preparation of a development plan for the short magnet and cable test facility. The development plan calls for the prototyping of two complete test systems with tailoring of one system for short magnet test with the second system to be used for cable test. The development plan has established the need for a working prototype system for February 1991. Staffing requirements are becoming critical in meeting our plan goals. Several engineering candidates have been interviewed and offers to an analog/instrumentation engineer, a power electronics engineer, and an interface design coordinator are pending. The technician staff requirements to build the prototypes are being reviewed with the production engineering group.

The Field Quality Study to assess the sensitivity of the field quality to manufacturing tolerances and material variables is continuing. The FQS Team visited BNL 12-15 January to participate in and study the magnet build process and to research the variables having a potential impact on magnet field quality performance. Additional visitations and technical interchange discussions are being scheduled between MSD and the laboratories.

A requisition work sheet and justification for the acceptance of an unsolicited proposal submitted by LTV for shop facilities to support interconnect design efforts was submitted to MSD procurement personnel.

CRYOSTAT DESIGN

Structural Composites Industries (SCI) of Pomona, California was placed under contract (\$25K through Fermi Lab) to fabricate seven re-entrant post assemblies with integrally wound end fittings for thermal and structural test evaluation. Delivery to Fermi should be late March to early April 1990.

Evaluation of alternate cold mass support concepts continues. Posts of larger diameter and smaller height are being analyzed to determine thermal and structural performance. Strut support concepts have been formulated and analytical evaluation will be initiated soon.

The change from 40mm to 50mm aperture for collider dipole magnets significantly impacts the cryostat design. Input information required to initiate redesign includes:

- a. revised heat leak allowables,
- b. cold mass outer diameter,
- c. cold mass weight, and
- d. maximum allowable vacuum vessel diameter.

Activity was initiated to transfer EQE's structural dynamic analysis models of the 17m dipole magnet assembly to the SSC Lab's Sun Computer system. The models require translation from GEMINI to ANSYS.

Activity associated with design and fabrication of prototype magnet stands continues. Baldwin Metals of Dallas estimated a cost of \$1100.00 for each stand and a delivery time of from one to two weeks.

• **COLLIDER MAGNETS (WBS 1.2.3) - Continued**

Collider Dipole Magnet Program

•The first draft of the CDM Master Schedule (with over 400 activities) has been completed and is being reviewed for accuracy prior to distribution.

•A plan was developed (based on FNAL and BNL recommendations) to build short 50mm magnets at both FNAL and BNL and 15m magnets at FNAL. The current plan is to build a scaled up 40mm magnet.

Miscellaneous

•Production personnel visited the following material vendors during January to establish contacts and to evaluate capabilities:

- MPI (fine blankings)
- H&J Tooling (stampings)
- Dayton Rogers (local stamping house)
- Rheaco (local machine shop)

• VAX E-mail has been established between the SSCL and Production Engineers at BNL.

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

No report this month.

CONVENTIONAL CONSTRUCTION (WBS 2.0)

DIVISION MANAGEMENT & ADMINISTRATION (2.6.1.1)

Mr. Bob Matyas, a consultant to URA, replaced Mr. Lieu Smith of Sverdrup Corp. as head of the Conventional Construction Division (CCD). A restructuring of the CCD was completed that resulted in the merger of URA and Sverdrup conventional construction staff into one administrative division. CCD staff were also reduced from 44 to 25.

Editorial/clerical staff began work on the final version of Chapter 6 of the *Site-Specific Conceptual Design Report* (SCDR). This final version is targeted for completion in mid-March and will include the technical and scope changes as presented to DOE on January 9-11. Presentation graphics for the SSC Laboratory presentation to DOE on January 9-11 were prepared, and editorial/clerical staff also helped prepare the prototype installation facility programming requirements sheets and Magnet Development Laboratory (MDL) design criteria.

PROJECT CONTROLS GROUP MGMT & ADMINISTRATION (2.6.1.2)

Work continued on restructuring and reformatting the CCD portion of the cost reporting system to make it conform to a DOE-approved electronic format. Work continued on the CCD FY90 budget. As part of this effort, the inputs of CCD cost account managers (CAMs) were reviewed. The cost estimating group worked through January with the various section authors of chapter 6 of the SCDR to correlate the baseline cost estimate with the text of the SCDR.

DESIGN OVERSIGHT GROUP MGMT & ADMINISTRATION (2.6.1.3)

Work began on the development of a plan 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 being clarified. Manpower demobilization plans were developed and implemented so that design continuity could be assured.

CONSTRUCTION OVERSIGHT GROUP MANAGEMENT & ADMINISTRATION (2.6.1.4)

Planning continued for the prototype installation facility (PIF). The first draft of the PIF schedule was prepared by CCD staff and then reviewed by the PIF task force. At the end of the month, PIF programming requirements were being prepared.

MAJOR STUDIES (2.6.2)

Surface Transportation Study

(Identification of required transportation improvements to serve the SSC.) Estimates and traffic projections were reassessed relative to design and schedule modifications.

• MAJOR STUDIES (2.6.2) - Continued

Building Space Requirements

(Identification of operational stage SSC building population levels and building space program requirements.) The *SSC Surface Facilities Programming Report* remained 85 percent complete. Completion is pending the resolution of technical and scope changes, and the final version of the baseline cost estimate.

Utility Requirements

(Identification of SSC utility requirements.) The *SSC Water and Sanitary Sewer Study* was further revised to reduce overall water requirements and to reflect changes in the technical requirements for the SSC. Studies addressing SSC electrical supply requirements continued in January, but were stopped at the end of the month pending further determination of work scope and cost.

Regional Planning Support

(CCD interface and support for the comprehensive regional plan to be commissioned by TNRLC.) CCD staff participated in the final interviews conducted by TNRLC for selection of the planning consultant.

Overall Site Development Plan

(Prepare an overall site development master plan for the SSC to serve as guidance to the A-E/CM and to help fulfill DOE policy 4300.1B, *Site Development Planning*.) Activity continued to be delayed during January pending management/DOE direction on the desired scope.

Vegetative Stabilization Program

(Site-specific study and design of revegetation/stabilization of SSC spoils disposal sites at service areas and east and west campuses.) This study will be primarily accomplished by a subcontractor who has not yet been selected. Nevertheless, work continued through January on refining the scope of the program.

• DESIGN CRITERIA (2.6.3)

Work began in January to develop programming requirements for both surface and underground structures for the prototype installation facility (PIF) tunnel segment. This work included defining space requirements and usage for all the typical structures that were identified in December.

• DESIGN CRITERIA (2.6.3) - Continued

Sketches are being prepared to evaluate the relationship of these structures with the collider ring alcoves, niches, shafts, and shaft connections.

Work began on updating the SCDR to represent the basis used for the recommended cost estimates, and to make final coordination with technical division requirements. Further developments were made in the conceptual designs for the EMPACT and BCD detector halls. Alternative collision hall concepts were studied to see how costs could be reduced.

The programming requirements for the MDL were finalized, and the work package documentation was revised. This included altering the layout of the MDL process areas, and thoroughly reviewing the revised work package contents with the Magnet Division.

Study continued on the underground structure configuration of the transitional area between the HEB and the collider ring. Different underground space and collider machine configurations continued to be explored through January. One of these options entails combining the two collider rf/klystron galleries into one facility.

Study began in January on the design and construction of a systems test environment structure. Cost models were developed for different exterior envelopes, and programming requirements were determined for the structure's associated cryogenic systems, technical systems, and surface facilities. The systems test environment 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.

• CONFIGURATION MGMT & INTERFACE CONTROL (2.6.6)

Interface Control

This task, which involves establishing the format of interface requirements drawings and interface control drawings, had been anticipated to begin in December 1989. At the end of January, however, initiation of the work was awaiting the approval and distribution by project management of the draft *SSC Configuration Management Plan*.

• GEOTECHNICAL PROGRAM (2.6.8)

Program Oversight

Geotechnical field and laboratory activities continued into January. Field work was hampered by wet site conditions caused by heavy rains. Three remaining exploratory borings were drilled in the injector area. This completes the geotechnical exploration of the injector area. Eight borings were completed at the collider ring service area shaft locations. Down-hole hydro-fracturing testing, which began in January, should be completed early in February.

Work continued on the planning for the large diameter drilled (LDD) hole, which will be used for geotechnical instrumentation and exploration. The LDD hole will provide information on in-situ properties of both the Austin Chalk and the Eagle Ford Shale. This information will be directly applicable to the design/construction of the experimental halls and the tunnels.

- **GEOTECHNICAL PROGRAM (2.6.8) - Continued**

Program Oversight - continued

The applicability of surface-based reflective geophysical surveys was studied. As a result, a decision was made to proceed in February with a trial section of geophysical work.

- **A-E/CM SELECTION & CONTRACT ADMINISTRATION SUPPORT (2.6.10)**

Three CCD representatives who are members of the A-E/CM Selection Board traveled with the board for seven days of interviews and evaluations at offices of the three short-listed A-E/CM firms. The board is expected to conclude its work and present its recommendations to the Directorate by mid-February.

- **SEIS SUPPORT (2.6.12)**

SEIS Support Management

A comparison was made of the October 20, 1989 *SEIS Data Requirements*, Volumes I, II, III, and IV; and Chapter 6 of the December 20, 1989 version of the *Site-Specific Conceptual Design Report*. A memo detailing the results of this comparison was sent to the SSC Environmental Affairs Office (EAO).

SEIS Spoils Management

A draft report—issued October 20, 1989 and included as Volume II of the *SEIS Data Requirements* submitted to Argonne National Laboratory (ANL) on October 25, 1989 by the SSCL/EAO—contained 26 graphics that were still incomplete. In December, 21 of these incomplete graphics were finished. The remaining graphics were completed in January. They will be forwarded as an addendum in early February. A representative set of black and white graphics of a typical E or F shaft service area on the collider ring was prepared for inclusion in the SEIS. In response to a query by the EAO regarding the visual impacts of spoils, aerial photos with conceptual plans superimposed were prepared for eight service areas.

SEIS Ecological Data, Infrastructure Data, Construction Planning

No CCD activity occurred on these tasks during January.

PROJECT MANAGEMENT AND SUPPORT **(WBS 3.0)**

PROJECT MANAGEMENT (WBS 3.1)

• PROJECT MANAGEMENT OFFICE (3.1.1)

The major work for the month of January was completion and DOE review of the recommended design and cost estimate on January 9 - 11. In addition, the following reviews also took place:

- (1) High Energy Physics Review of accelerator technical aspects on January 6 - 8;
- (2) HEPAP Subpanel review of physics research on January 19 - 20; and
- (3) DOE (OSSC) (Jim Carney) reviewed the cost roll-up by WBS and schedule details on January 23 - 24.

Work continued on the Supplemental Environmental Impact Statement. The Record of Decision date in October 1990, (with a draft available in May) was predicated upon receiving approval for the footprint by this time. We are currently in a slip because of footprint approval delay and now anticipate the Record of Decision in November 1990. We have been requested to provide more details on our infrastructure requirements to explicitly define our construction and operation water needs and proposed sources of water for all sites. We will work with CCD on the current understanding of the requirements and changes that have taken place since the October 20, 1989, transmittal of the SEIS Data Requirements Document. There exist a number of other differences (beside water requirements) between the SEIS Data Package and the Site-Specific Conceptual Design Report. Since both of these documents are conceptual, some differences are to be expected. The major differences will be discussed at the February working group meeting.

Rough and final drafts of the Action Description Memorandum for the Magnet Support Facility were released for comment. After reviewing and incorporating these comments, the final draft will be sent to DOE. We anticipate the favorable decision that an Environmental Assessment will suffice for this action since the proposed site (Ellis County Work Farm) is remote from the SSCL campus area and that work at the County Farm site would therefore not influence the Record of Decision in any way.

The Document Management Implementation Plan was rewritten as the Document Control Management Plan and was released in draft form for review on January 12, 1990. The document numbering procedure and interim coding procedure were released and formal training should commence in February. The interim document coding and tracking system was loaded onto the Engineering VAX and will be ready for use with the training in February. Engineering Drawing Standards which have been used by other Divisions and activities are under review for the applicability to the entire SSCL. A listing of typical subjects to be covered for an Engineering Standard is being assembled and will be distributed to the Divisions shortly for review.

• PMRS DEVELOPMENT (3.1.2)

Subnetworks for the Accelerator, Conventional Construction, and Magnet Systems were completed in early January. These subnetworks were reviewed against the master milestone

- **PMRS DEVELOPMENT (3.1.2) - Continued**

list and several low level inconsistencies were discovered. These inconsistencies were still uncorrected as of the end of the month because details of the logic needed to be reviewed and incorporated into the master schedule. Networks for the experimental systems and facilities and injector subsystems have been developed. During February these will be reviewed and incorporated into the master schedule.

Several meetings were held to discuss the needs and requirements of the Project Strategy Room. Charts and detailed networks were on display for the DOE review of the recommended design on January 9-11, 1990. Project Management staff meetings are currently held in this room on a weekly basis so that schedules and logic can be discussed.

- **QA MANAGEMENT SYSTEM (3.1.3)**

There was no activity for this element during the month of January 1990. However an offer was made to and accepted by Robert Hedderick, who will serve as our Quality Assurance Officer starting February 19, 1990. Mr. Hedderick comes to us from EG&G Energy Measurements where he was the Manager of their Quality Assurance activity.

- **CONSTRUCTION CONFIGURATION MGMT. SYSTEM (3.1.4)**

The organization and effort reported here in the past has been moved to the Conventional Construction Division. From this point on, these activities will be reported under WBS 2.6.

- **COST ESTIMATING (3.1.5)**

During the first week in January (prior to the DOE review) a detailed comparison was made of the Fermi Lab and our Magnet Division HEB magnet estimate. The total costs were close, however, some of the details showed significant variance. The analysis revealed different assumptions were used separately by both groups. When similar assumptions were used the estimates were close. This same week, the Accelerator Division cost estimate was computerized. This printout was provided to the estimating team to check for duplications and omissions. These checks were completed and changes incorporated into the final data distributed during the DOE review.

Additional work completed for the DOE review as requested by committee just after the review included: WBS listing, WBS dictionary, and various funding profiles. The funding profiles presented showed the Recommended Design Case with and without de-capitalization for our estimated 9 year construction schedule. Additional funding profiles were provided for these cases where the maximum yearly funding was held to less than \$1.B. It is our feeling that this case would stretch the schedule and increase the cost. Since the DOE review, work has continued to review internally the data and backup details and expand the data base so that each WBS level can be obtained to meet the requirements for the Independent Cost Estimate and validation. Also, Jim Carney, DOE Headquarters, was walked through the cost estimate step-by-step on January 23, 1990.

• SYSTEMS ENG. & INTEG. (WBS 3.2)

• SYSTEMS ENGINEERING MANAGEMENT (3.2.1)

Systems Engineering started working with PMRS (WBS 3.1.2) and the Accelerator Division to develop detailed logic for scheduling. This work evolved into the larger area of Project Management and planning tools for both cost estimating and scheduling. The systems used will be networked or at least more user friendly to allow for fast review and planning of the input data.

In early January, there was a kick-off meeting on engineering standards and practices for SSCL. Currently we are reviewing those systems in use within the Laboratory Divisions, at other Laboratories, and in industry. With these standards, the scope will include architectural, civil, and structural engineering standards. We expect about three months of effort before we can distribute a Laboratory Engineering Standards Document.

Work continued both the Systems Engineering Management Plan and the Configuration Management Plan. Another draft of both was presented to the Project Management Office. The concepts now appear reasonable and when a few corrections are made to the forms used in configuration controls, the plan will be ready for review and sign-off by the Project Manager. We anticipate this will be accomplished in February.

• SE SUPPORT TO ASD (3.2.2)

After reviewing the estimate details and logic, work resumed on a Software Development Plan for the control system. The work identified 65 sections needed. More than 35 of the sections have been prepared and we anticipate the first draft of the plan will be released to the Project Office by February 15 for review.

Work continued on network logic in an attempt to develop basis for the critical path schedule. The goal is to produce detailed milestones for the next two years to provide incentive and so greater detailed schedules will be produced by the various accelerator groups. This schedule milestones will be used in the FTP/A for 1992.

Also, a reliability engineer has started working to assist with the reliability plan for accelerator components and failure modes and effects analyses. To assist in this effort, a VAX-VAX link to Lockheed Sanders Corporation for the purpose of conducting reliability analyses was established. A catalog of available Lockheed computer aided supportability tools describing the elements was received.

Additionally, all Accelerator Division Group Leaders were briefed on the elements of the Configuration Management Plan philosophy and control and change documentation for project baselines. This was generally accepted and is now understood.

• SE SUPPORT TO MSD (3.2.3)

Work in January centered around the Magnet Division specification tree and the review of the collider dipole system statement of work. The current desire of the magnet group is to combine maintainability and availability with the reliability section of the statement of work. The draft

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

reliability program plan for issuance with the statement of work was completed during the month. Specific writing assignments for Systems Engineering in the RFP statement of work include developmental testing, reviews, deliverables, and reliability integrity programs. It is our goal that all of these sections, as well as the others, agree with the intent and philosophy of the overall Configuration Management Plan. Additionally, a review of the overall Systems Engineering Management Plan was held with the magnet group. Comments were incorporated into the latest revision of the plan discussed above.

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

Several meetings were held with Physics Research personnel to discuss the needs for Systems Engineering and Integration support for Physics Research in general and detector collaboration teams. The exact nature of this support should be determined in February with support personnel starting shortly thereafter.

PROJECT ADMINISTRATION AND SUPPORT

(WBS 3.3)

• ADMINISTRATION SYSTEMS & SUPPORT (WBS 3.3.1)

It has become apparent that the Deltek system has serious shortcomings in the Procurement area and at the Procurement/Accounts Payable interface. In conjunction with Management Information Systems we have put together a task force to document our systems' needs in these areas and then to assess the capability of Deltek and competing would-be systems to meet our needs. If this study does, when completed, dictate a change in systems support, our preliminary analysis indicates it could take 12-15 months to complete. We can continue to use Deltek for the present but we must assure availability of truly adequate systems support for the duration of the program.

We also initiated and neared completion of a draft SSCL Travel Policy which has been coordinated with the requirements of the M&O contract and the URA Travel Policy. When completed in early February, the draft will be reviewed by SSCL and URA management before implementation.

A Procurement Review Team composed of outside experts was formed to perform a "pre-CPSR" review of our procurement activity and to advise on any needed upgrades. We also did considerable work with Procurement in addressing service levels.

• ACCOUNTING AND FINANCE (3.3.2)

The Financial Systems Integrations Office, together with Technical Services, continued to review the systems in place and begin the formal systems plan to document SSCL's present and future requirements. The accounts payable cycle was reviewed with expected short term benefits in early February. A program has been written to report, analyze and develop corrective action on delinquent invoices. The procedures for Travel Accounting were developed and documented.

In January the Accounting Operations Section, processed nearly twice the number of vouchers compared to the month before (from 1800 to 3200) following a 50% increase in December and November. Payroll tax forms (W-2, 4782 and 1099) were completed and mailed. We observed the physical inventory of the Storeroom and provided recommendations. We implemented a direct deposit arrangement with TIAA-CREF. We began development of a traveler training program for implementation of new forms, electronic reimbursements, and management of Diner's Club corporate card system. We held a seminar on the Tax Implications of Relocation for the benefit of relocating employees. We began the process of documenting the accounting section of the C/SCSC system.

The Budget Office finalized the Management Allowance calculation and embarked upon URA Fringe Rate and Manpower Skill analyses.

• PROCUREMENT (3.3.3)

During the month of January the Procurement and Contracting Department made awards totaling \$2,330,077 of which \$274,655 were to small disadvantaged businesses as defined in PL101-101 Section 301(a).

Contract provisions/clauses draft packages were completed as six pamphlets to cover all types of contracts expected to be issued by the SSCL. These documents will be submitted to the DOE Contracting Officer upon completion of internal senior management review. All of the Standard Practices necessary for operation of the department have been drafted and upon completion of senior management review, will be submitted to the DOE Contracting Officer for review and acceptance. The Contracting Officer has verbally advised that the URA procurement policies submitted September 1, 1989 will not be formally accepted until such time as he has reviewed the URA Standard Practices and standard subcontract terms and conditions.

The RFP for the collider dipole magnet acquisition is in process. It is now expected to be ready for submission to DOE on February 16, 1990. The statement of work, evaluation criteria and instructions to offers are being correlated.

Additional review by senior management has resulted in the determination to expand the decentralized procurement concept to each of the major operating groups. Analysis is in progress to determine the manpower, space, and communications requirements to support this operating concept.

A MIS review committee has been formed to determine needs and develop requirements to resolve the limitations of the DELTEK financial information system as well as the total Laboratory administrative MIS needs. The purchasing and accounts payable subsystems are of the first priority. Approximately half of the work to the procurement subsystem needs analysis has been completed.

The Procurement and Contracting Department has participated in eight outreach programs during the month reaching approximately 2000 business people representing all classifications of business from small disadvantaged to large. These programs focused on describing the SSCL, what goods and services would be needed and how to conduct business with the Laboratory. The programs were sponsored by civic and business organizations as well as Congressmen Barton, Geren, Watkins, Wilson, Brooks and Stenholm.

The FY90 Small and Disadvantaged Business Plan submitted to DOE-OSSC on December 15, 1989 for approval and incorporation into the prime contract was returned by DOE-CH with comments for inclusion. It is expected that the revised plan will be submitted by February 7, 1990.

- **TRAVEL DEPARTMENT (3.3.4)**

As an added service to the Laboratory travelers, the Travel Department has developed a "Travel Services Newsletter" to keep everyone informed of this department's progress. This newsletter will be distributed on a monthly basis.

The Evaluation Board for the new travel agency has been chosen and the final agency proposals have been received. The Evaluation Board is working toward coming up with a reasonable shortlist for site inspections and final presentations.

- **PERSONNEL (3.3.5)**

January was a month of major activity and progress in the Personnel Department. During January, 47 job offers were accepted and 36 new employees joined the Laboratory.

The Argonne Credit Union is now a reality at SSCL and it began accepting mail applications this month. The Credit Union will establish an office with onsite staff in the near future.

Weekly staffing reports are now being sent out to all divisions. These reports track employment statistics as well as provide detailed listings of employee starts, transfers and terminations. The final draft of the Policy and Procedures Manual was completed this month and will be distributed for management review in early February.

The Compensation Section began participating in salary surveys for benchmark comparisons. The Laboratory conducted its first formal classification review and utilized the new job description form within each division to further streamline the work being done by the Personnel Administrators and hiring managers.

A Laboratory-wide meeting for February 1 was announced for all employees interested in forming an Employee Recreation Association. Volunteers will be solicited at the meeting to develop a survey of employee interest and to begin work on administrative matters.

In the recruiting area, we have implemented an interview tracking system for all SSCL interviews which will help in our EEO tracking. Additionally, the resume flow and sort process has been fully implemented to keep track of the 200-300 resumes received at the Laboratory each week. We have begun a special recruitment program for Cryogenic Engineers and are developing special listings of candidates in a variety of technical fields.

- **STAFF SUPPORT SERVICES (3.3.6)**

During January we inventoried and began transporting furniture and equipment from the Hereford, Texas, DOE facility to the SSCL warehouse. We met with DOE for evaluation and discussion of the SSCL security policy, and began development of policy and procedures for our medical facility. The laboratory food service operation opened this month.

• **MINORITY AFFAIRS (3.3.7)**

The Manager of AA/EEO is developing an EEO Awareness Training Program which should commence during February 1990. Managers and supervisors are being questioned on how they see affirmative action and their areas of concern. The Office of Federal Contract Compliance (U.S. Department of Labor) requested a meeting with the Manager of Affirmative Action to discuss AAP review. Copies of the Sverdrup and EG&G AAPs were requested as well as a list of all contracts issued to subcontractors doing work for the SSCL. Meetings have been held with the Director of Personnel and the Labor Relations Manager to discuss personnel procedures including terminations and hirings. The Personnel Director sent a memo to all hiring supervisors and managers addressing these issues. Meetings have been conducted with the SSC Recruiting Manager and his staff regarding data necessary for AAP compliance. Assurances have been given that all necessary data is available. The concern of how to recruit more minorities and women has been discussed and a new recruiting schedule is being developed with special emphasis on recruiting minorities and women.

The Small and Disadvantaged Business Utilization Manager was selected this month and will report for duty the first week of March. That person will assist in the extensive outreach effort to the Small Business/Small Disadvantaged Business community presently being conducted by the office of Minority Affairs. During January, the office participated in vendor seminars held in Shawnee, Oklahoma, and Arlington, Cleburne, Waco and Fort Worth Texas. Keynote addresses included the Association of Women Entrepreneurs of Dallas and the National Association of Women Business Owners. The office continues to receive a large number of SB/DBE capability statements, SSC procurement forms for entry into the SSC database, and a large number of requests for registration applications. Office visits by potential contractors and other SB/SDBs continue to increase and the volume of telephone activity related to procurement activity remains at a very high level.

In addition, the Office of Minority Affairs submitted a response to the SSC Director of Procurement concerning DOE's Chicago Operations withholding approval of SSC's SB/DBE subcontracting plan until some base funding figures were reviewed. This office maintains that figures originally submitted by SSC are correct and pointed out discrepancies in the DOE reviewer's inquiry.

PROJECT TECH SUPPORT (WBS 3.4)

• TECHNICAL SUPPORT MANAGEMENT (3.4.1)

Options for handling facility requirements were developed with emphasis on the Magnet Development Laboratory. Added space will also be needed this year for other divisions, particularly the Accelerator and Physics Research Divisions. The latter will require some physics laboratory space. The small Magnet Evaluation Laboratory outfitting is awaiting DOE lease approval for the space.

Laboratory Technical Services Division began planning for the SSC Laboratory machine shops to support the Technical Divisions. A laboratory steering committee is being formed.

A greater emphasis was placed on programming and systems support to Management Information Systems (MIS) for both administrative and project management functions. A draft MIS Strategic Plan was prepared and the staffing was approved. Planning and controls efforts continued this month with the completion of all cost account inputs into the C/SCSC software "EASYTRAK".

• FACILITIES ENGINEERING SERVICES (3.4.2)

All facility modifications and associated moves were successfully completed as planned. All divisions are now in their designated locations within the Interim Campus facilities. Action continues on leasing: 1) the remaining 9,100 square feet of the third floor of the Provident Bank Building (formerly the DeSoto State Bank) for the DOE On-Site Project Office and the expanding Procurement function, 2) an additional 5,600 square feet in Stoneridge Building No. 2 for a Magnet Workshop, and 3) additional land immediately adjacent to Stoneridge Building No. 4 for parking. Attention is now being focused on day-to-day operation and maintenance of facilities, re-evaluation of the physical aspects of safety and security systems and procedures, and providing continuing support for the dynamic growth of the interim facilities as well as the planning of the permanent Campus.

• PROPERTY MANAGEMENT (3.4.3)

Representatives from DOE Chicago property management visited our laboratory on an informal basis. They have offered to give us any guidance in setting up our property control system. The property management procedures have been identified and over 50% of the first drafts have been completed. The balance of these procedures are scheduled for completion in the February - March period. A complete manual inventory of all controlled SSCL property was completed on January 3, 1990.

A reader verification inventory will be run in February in order to validate our system. Carl Williamson has been appointed acting Section Head for Property Management.

The warehouse located in Stoneridge #2 is full. A plan has been initiated to inquire into the options available for storage of additional property. Facilities Engineering is pursuing the availability and costs for additional warehouse space and Property management is investigating the availability and costs for contract storage space.

- **FABRICATION SHOPS (3.4.4)**

A manager for this area has been selected and is scheduled to be on site March 5th.

- **GENERAL COMPUTING (3.4.5)**

MIS SOFTWARE SUPPORT

Combination files are being created using Intelligent Query to assist cross-reference listing of certain Deltek database files (i.e., Purchase Requisitions and Purchase Orders) and RMS files on the VAX.

Except for changes to the TeX portion, programming is complete for the time sheet generator.

The A/P Cash Disbursement bank transfer and the EG&G savings plan tape transfer are functional. The ACH (Direct Deposit for URA employees) procedure is being performed by Payroll.

TECHNICAL SUPPORT

The Computer Benchmark Working Group submitted the final draft of their report. The report presents the SSCL strategy for comparing the performance of various computer systems by obtaining coherent and traceable benchmark data. The proposed strategy is designed to enable the cognizant personnel to administer both the benchmark suite and the corresponding results database so that the data are meaningful to the SSCL computing community. The recommended benchmark strategy is expected to significantly enhance the SSCL procurement selection process.

The functional and detailed requirements of the Procurement and Finance organizations were identified and defined as the first step towards developing a comprehensive MIS Strategic Plan. The objective of this plan is to implement a Management Information System consisting of integrated modules which will meet the current and future information requirements of the SSCL and DOE.

Since the SSCL is a start-up operation, the operational needs are both immediate and dynamic. The premise of the MIS Strategic Plan is that the mechanism put in place to satisfy the most pressing needs for ordering materials, paying vendors and employees will not be adequate as a long-term solution. This plan will be further defined and modified to reflect the overall SSCL strategy for managing information and identify potential resources for carrying out that strategy.

A working group made up of the SSCL Chief Financial Officer, Head of Procurement, Associate Director of Administration, Deputy Associate Director of Laboratory Technical Services and key support personnel has been formed to address MIS issues and develop long-term strategies. This group will be expanded to include representatives of other business areas such as Project Management as the needs analysis for MIS develops.

• GENERAL COMPUTING (3.4.5) - Continued

USER SERVICES

The LTS AppleShare server was re-established to run on the same system that runs the Quick-Mail E-mail server as a warm up exercise for the installation of the Directorate AppleTalk network. The first phase of the network was installed, and network related problems corrected, with support from the communications network technicians. With the initial connectivity established, services such as dial-in access, file service and Internet E-mail access can be added as they become available.

Liaison software, an AppleTalk bridge providing security, was tested and accepted as part of the implementation of the Directorate's network. Liaison allows the Directorate to see all other areas of the AppleTalk network, while services, such as LaserWriters, in the Directorate are hidden from all other users. GatorMail, a Quick-Mail to SMTP (TCP/IP) E-mail gateway, is still being tested.

Much of the user support provided in January dealt with Mac and PC network compatibility problems. Accelerator Division personnel problems with TCP/IP and with transferring CAD drawings across multiple computers were identified and resolved. Residual monitoring of outstanding invoices for rented microcomputers will result in lump-sum payment scheduled for early February and return of rented systems by month-end.

General Computing Services and Facilities Management staff coordinated efforts to relocate the Training Room. Courseware was received from Logical Operations and a training schedule submitted to the SSC Bulletin in anticipation of the opening the room February 12th. To assist with coordination of training requests, the following forms have been created: registration form (in-house training) and training room request form (outside vendor training), registration/request log book, attendance sheet, confirmation form and evaluation form. The new training instructor, Tanna Bailey, met with Project Management to coordinate Excel PC training with First Word.

ADPE SUPPORT

The SSCL has been put on the mailing list of the Computer Incident Advisory Capability (CIAC). This organization, which is located at LLNL, provides current information bulletins on known vulnerabilities of computer systems (i.e., Hackers or Viruses). There have been 26 releases since the summer of 1989 which are being circulated to interested groups as they are received.

A Virus Committee has been formed to address problems of viruses that continue appearing on the Macs. This committee has distributed a laboratory-wide mailing to assist users in recognizing problems and providing a contact for rectifying the problem. In addition, Disinfectant 1.6 has been made available to all Mac users to assist them in eradicating a pre-existing computer virus.

Long range planning remains active, particularly involving laboratory CAD requirements and MIS requirements as well as a significant resource required for detector simulation. An acquisition proposal requesting Intergraph workstations for architectural CAD was submitted to and approved by DOE in January.

Additional proposals under development are as follows: Apollo System for CERN Library Development (Physics Research), Upgrade of the Administrative VAX (General Computing) and Apollo system for Software Development (Accelerator Division).

• **GENERAL COMPUTING (3.4.5) - Continued**

ADPE SUPPORT - continued

Short range plans for the processing of administrative information are being addressed vigorously in order to handle the day-to-day business activity of the SSCL. Specific problems are being identified and addressed. This effort is being used as a basis for developing an overall long range plan.

A policy was drafted for the acquisition and utilization of ADP equipment by SSCL organizations. This policy will be presented by the LTS Associate Director for review and comment by the upper management of the laboratory.

• **DESIGN SUPPORT (3.4.6)**

Engineering Design Support staffing in the Magnet Systems Division (MSD) was increased to a total of eight with the addition of two designers, Guy McAdams and Marc Hudson. One senior drafter position remains open but the filling of this has been put on temporary hold by Ray Massey, design/drafting manager.

The position of CAE/CAD system manager in the MSD was filled. MSD personnel interviewed and hired an EG&G employee, Jerry Cox. He is scheduled to report February 12.

Design support to the Accelerator Systems Division was facilitated this month with the hiring of two designers. Mark Hall and Dan Gaigalas will be reporting for work on February 5. They will both be assigned to support Bob Smellie and his spool piece design group. We anticipate hiring a design drafter in February to assist these designers.

Two new people were hired into the Design Support Group as Laboratory Technical Services employees. Kurt Pennington, senior drafter, reported in January 29. He will be working as a member of the general support design/drafting staff. Mike Stegawski is scheduled to start February 12. He is a computer specialist and will be handling CAD system management duties.

DRAWING CONTROL AND REPRODUCTION

The Xerox 5080 engineering drawing copier is being used to produce copies as requested by Laboratory employees. It is being operated as an overhead function without charge to individual requestors. A maintenance contract for this machine is now in effect. A partial order of drawing storage cabinets has arrived and been installed. There is no indication when the remainder of the order will be received. We anticipate the initialization of drawing storage within one or two weeks. The filing system is being set up with the assistance of the Laboratory Document Control Manager.

TSD DESIGN/DRAFTING

The Engineering Design Support design and drafting staff, continued to provide support to the Accelerator Systems Division, the Facilities Coordination group, and the Engineering Standards Committee. Work was done in support of the SCDR, the Cryogenics Laboratory, and the development of a drawing format standard for the Laboratory. Alarm system diagrams, computer room layouts, and other miscellaneous diagrams were provided for the facilities management staff. Facilities support is expected to increase in the months ahead to provide diagrams of computer networks, work module layouts, fire protection systems, power distribution, etc. Two new CAD workstations to assist in this support will be requested.

• GENERAL COMPUTING (3.4.5) - Continued

CAE/CAD ACQUISITION

Work continued with Frank Rydeen, Deputy Chief Engineer, this month to develop a strategy for Laboratory-wide CAD acquisition. Frank is working on a CAD acquisition directive that will hopefully be issued by the project manager, Dick Briggs. This directive will contain sufficient detail to inform all parties of the proper procedures and contacts that must be used when acquiring this type of equipment.

Studies of available CAD systems are in process to accumulate quality data that will be used to make an acquisition recommendation. We will develop a standard model to be used by potential vendors when making presentations to Laboratory personnel. When the directive comes out, a LTS focal point will be named to control all demonstrations received by Lab personnel.

Other activities that are being undertaken are the generation of a long-range plan, an acquisition plan, and an implementation plan. Short-term needs will continue to be addressed through our existing plan.

The MSD is seeking to buy four or five additional workstations in the nearterm. They are working on a plan internally to accomplish this. Accelerator Systems are pursuing a similar purchase within their organization. Both of these acquisitions fall generally within the plan submitted through the Director of Procurement to Mr. Cone of the DOE.

The purchase requisitions to acquire CAD workstations to support civil and architectural tasks in CCD, Physics Research, and Accelerator Systems Divisions are still in the system. We continue to utilize the Intergraph equipment as loaner units while the procurement cycle works its way toward completion, which is expected in February.

Discussions with Physics Research personnel indicate a possible need for additional workstations to carry out their short-term design plans. An acquisition plan will be developed if necessary.

STANDARDS COMMITTEE

Participation on the Engineering Standards Committee has been limited to assisting with the development of a Laboratory document numbering system and drawing title-block format. Discussions are now being directed toward the development of engineering and drafting standards. Engineering Design Support provided design and drafting and plotting services support to the Accelerator Division, Facilities Coordination group, and the Document Control Standards committee this month.

• COMMUNICATIONS (3.4.7)

A proposal to establish video teleconferencing to support SSCL activities at other locations was submitted to DOE. The proposal identifies new technology that can be used to lower video costs.

Operation of a bi-directional CATV system was implemented within the Stoneridge building complex. Inter-building cabling is scheduled to be installed to expand the cable's coverage.

The database for the call accounting system was configured to initiate monitoring of individual telephone usage.

- **COMMUNICATIONS (3.4.7) - Continued**

A voice activated recorder was installed on the emergency hotline to facilitate review of emergency activities.

Planning for the installation of a radio tower behind Bldg. #4 commenced in January. Area coverage and structural installation factors are being reviewed as they apply to the procurement .

- **ENGINEERING SUPPORT/STANDARDS (3.4.8)**

Engineering support to the Accelerator and Physics Research divisions continued at a fast pace. To meet the Accelerator Division schedule for the prototype spool piece string test in fourth quarter of FY90, the design has to be finalized in March, and the hardware completed in June. In the Physics Research Division preliminary studies have begun on the experimental facilities.

Spool Piece Engineering Design

The design and fabrication of a standard spool unit is requested for use on the string tests scheduled at Fermi Lab during the last quarter of FY90. In order to meet this schedule, a concerted effort must be directed towards the design and detailing of the spool and its associated components. The conceptual layouts are continuing for about the next six to eight weeks at EG&G AVO in California. During this time two new designers Mark Hall and Don Gaigalas will join the spool group on February 5th.

They will be learning the Unigraphic MCAD system under review for installation on an integrated Sun hardware platform networked system being proposed for the Cryogenics and Mechanical engineering groups. Some design modeling on the existing Accelerator Division's Intergraph workstation is assisting in conceptual ideas of various components and test fixtures.

In order to provide the structural analysis of the spool design, Kim Costin has joined the group. She will be working half time until her masters thesis is completed in April. Finite element analysis of the vacuum barrier will be her first project. Andy Scheidlemantle is currently working with similar fluid dynamic models of the vacuum barrier to establish the boundary film coefficients for each of the five lines that penetrate the vacuum barrier.

Andy also is doing a special analysis effort to determine the flow scenario of the LN₂ cooling lines around the collider. This work is supporting Saul Abramovich in his review of the nitrogen cooling system.

The transient two phase flow program Flownet was ported to the ALR33/386 and testing of the modules against verification problems was initiated. Along with this software Don Clark has installed MicroStation PC (Intergraph) software to assist in porting graphics models for FEM analysis. Don attended the ANSYS introduction to FEM class given this month at SSCL. The software Electrostat by Algor has been installed and will be used to analysis the power flow in the electrical conductors and safety leads of the Quench Stopper.

- **ENGINEERING SUPPORT/STANDARDS (3.4.8) - Continued**

Spool Piece Engineering Design - continued

We received additional sketches and layouts depicting the standard spool and its associated components from EG&G AVO. Details of how the Correction Elements might assemble into the cold mass tube and mounting of the Beam Position Monitor were shown. Cell schematics are being updated to be more hardware oriented.

Randy McConeghy responded to American Magnets Inc. proposal about Power Leads by requesting additional information on product ownership details. Further discussions will be proposed to clarify this request.

Support is continuing on the cables for the Beam Position Monitor for Don Martin. Details have been drawn and completed for some prototype cables to be ordered for test and evaluation. The mechanical design and mounting of the BPM in the spool is continuing and all efforts are being coordinated with Don.

A presentation was given to the Accelerator Division Staff on the components, their fit and function, in the standard spool piece.

- **METROLOGY LABS (3.4.9)**

No activity planned this month.

SSC LAB DIRECTORS OFFICE (WBS 3.5)

Effective January 1, Frederic Gilman was appointed Associate Director for Physics Research, replacing Murdoch Gilchriese, who will take up a position at LBL in February. Dr. Gilman was previously at the Stanford Linear Accelerator Center.

The HEPAP Subpanel on SSC Physics, chaired by Sidney Drell, met on January 6-8 at the SSCL to consider the range of useful machine parameters for the SSC and was briefed by members of the Directorate. The Subpanel concluded that "...lowering the SSC beam energy from 20 TeV to 17 TeV would yield an insufficient cost reduction to justify the reduction in physics reach and the initial delays... Lowering the beam energy to below 15 TeV would unacceptably increase the risk of missing important new physics." They recommended that the DOE support "...moving ahead with the SSC project on the basis of the machine concept and tunnel footprint as currently proposed."

Members of the Directorate made presentations at a project review led by Edward Temple of DOE on January 9-11 at the Laboratory. The main subjects of discussion were the technical status of the project and the revised cost estimate, especially in view of the revised conceptual design and proposed design changes, such as magnet bore tube diameter and collider injection energy.

The HEPAP Subpanel on the U.S. High Energy Physics Research Program for the 1990s, chaired by Frank Sciulli, met on January 19-20 at the SSCL. They were briefed by the members of the Directorate on project status, plans and procedures for the experimental program and estimates of lab manpower needs and user involvement. A list of high energy physicists at the SSCL was prepared and sent to DOE in the format of their 1985 Census, for use by the Sciulli panel. A Town Meeting was held in conjunction with the panel meeting and presentations were made by several potential users of the facility.

The AE/CM Selection Board visited each of the three short-listed AE/CM firms in preparation for recommending a firm to the Director.

R&D AND PRE-OPERATIONS (WBS 4.0)

Accelerator Pre-Ops (4.1)

No activity for this report.

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 officially baselined as of January 4th. This is the cost estimate that was presented to DOE on January 9th. The cost estimate is now being updated in a temporary file to reflect corrections, additions and planned changes of the Baseline Accelerator Design.

Changes in the Baseline are also being made to the Site-Specific Conceptual Design Report. Such changes are: (1) change of aperture of the HEB and the Collider superconducting dipole magnets to 50 mm; (2) reduction in scale of the Test Beams Facility; and (3) deletion of beam line components through the East and West Inner Bypasses.

During January the Accelerator staff on-board increased from 82 to 92. This is in line with current projections.

Detailed scheduling has started for each machine (Linac, LEB, etc.) and will be an approved activity for the next several months. The budget projections and rate of new hiring for the rest of FY90 are being revised on the basis of actual experience for the first quarter of the fiscal year.

• LINAC (4.2.1.2)

Work on the preliminary design of the linac has begun. The initial studies will optimize the LEBT and RFQ designs. An end-to-end simulation with alignment and rf errors using PARTRACE is also in preparation at LANL. As a cost-saving measure, we are considering reducing the transition energy between the drift-tube and side-coupled linacs. At TAC the ion source has produced 10 mA of H⁻, but has had serious vacuum pump reliability problems.

• LEB (4.2.1.3)

Work concentrated on the SCDR design and completion of the cost estimate. A large-scale simulation was improved with 40,000 particles being tracked for the full ramping cycle of the LEB, including the longitudinal space-charge force. The results confirm that the time-shift is 0.34, and that survival rate is above 95% at the end of the cycle.

- **MEB (4.2.1.4)**

Particle tracking has been initiated using the MEB lattice and incorporating the strong sextupole component at high fields in the MEB dipole magnet. Studies to improve the placement of harmonic correctors in the MEB also have been started.

- **HEB (4.2.1.5)**

Studies on the needed aperture for the HEB continued in January. A new lattice design, consistent with a 5 cm coil-winding-diameter-bore dipole was completed. Magnet multipole specifications for both the 5 cm and 7 cm bore dipoles have been established and will be used, along with the old 7 cm and new 5 cm lattices, in tracking simulations to determine the required apertures. Both lattices have been examined in terms of short-term smear and both exhibit an adequate linear aperture. Two different studies are currently underway. These are (a) a detailed simulation of the resonant-extraction process and (b) a long-term simulation of the dynamic aperture at injection. The dipole aperture required will be determined by the need for very low losses during extraction (of the order of 2%) and by the need to store beam for nearly a million turns during injection.

- **COLLIDER (4.2.1.6)**

Preparation for and participation in the Accelerator Advisory Committee meeting and the DOE review was the dominant activities through January 10. For the remainder of January, the three principal activities were (1) planning for the E-1 area systems test and demonstration facility (2) continued tracking studies, including test use of the Texas A&M Cray YMP, and (3) planning for extension of the corrector element model program beyond the activity underway at LBL.

MAGNET R&D (WBS 4.2.2)

FERMI LAB (WBS 4.2.2.1)

No report this month. January data will be included in the February report.

BERKELEY LAB (WBS 4.2.2.2)

Superconductor and Cable

A number of alternate designs using different cable configurations for a 50 mm bore SSC dipole are being analyzed. We have made several different cables in order to provide the magnet designers with information concerning the degree of difficulty in manufacturing a given cable design and in winding it into a coil. Several months ago, we made 28-strand inner and 36-strand outer cables that were used in magnet D16B1 described below. In January, we completed the necessary tooling and produced a 450 ft. length of a 30-strand cable which is used in the C579, C585, and C600 designs by Morgan et.al at BNL. Samples of this cable have been sent to BNL for I_c measurements, and a length sufficient for winding a practice coil for windability evaluation will be sent to BNL.

Tooling has been designed and ordered to produce cable for a low-current dipole for the SSC cable test facility. The four cables required for this magnet will be made during February.

DIPOLE MAGNETS

Cable Test Facility

D-16N-1, a 5 cm aperture dipole, was tested from January 4 to January 26, 1990. This magnet, with close in iron, is designed for cable testing with a central operating field of 7.0 tesla at 4.35K. The first quench, at 4.3K, was at 7.0 tesla and the field at plateau is 7.6 tesla. The plateau was reached in ten quenches. There was relatively little ramp rate sensitivity. At 200 A/s, the quench current field is still above 7.0 tesla. At 1.8K, the central field reached 9.27 tesla.

After warm up to room temperature and cool down to 4.3K, the first quench occurred at 7.2 tesla.

Magnetic measurements at 4.3K and 1.8K were made, and the results were close to prediction. In particular, the measure effect of iron saturation on the multipoles was very close to what was predicted.

The magnet clearly satisfies all the requirements for a cable testing magnet.

At 4-layer design was made which can produce a field similar to D16B-1 but with must lower operating current.

Collider Dipole

The coils and vertically split yoke of the D16B1 magnet are similar to those of a conceptual collider dipole design D17A made last spring. We recently made a slightly modified version of this design with a more closely fitting iron yoke shaped to minimize distortions from iron saturation, which has a higher transfer function than D17A.

• **BERKELEY LAB (WBS 4.2.2.2) - Continued**

Quadrupole Magnets

Analysis

Computations were made using POISSON on the QC design to evaluate the effect of real iron on the field quality (the effect is negligible). "Ends" were designed for quad QC to produce a field with low integrated harmonics.

1M Quadrupole Model

All coil winding and curing tooling fabrication is complete. All coil end and filler pieces, wedges and winding parts are designed and have been fabricated. Two test coils (one each inner and outer) have been wound and inspected for proper dimensions. Our current design efforts are concentrated on the details of the end plates, splice plates, yoke and shell. Fabrication of these pieces is also under way. The complete collar stamping order has been delivered. The magnet coils for the first model, QC-1, should be wound and cured by the middle of February, the magnet assembly should be ready for collaring in early March, with completion of the magnet in mid-March.

5M Quadrupole Model

Design work continues on the mandrel lifting and insertion tool, coil compression gage, and the collar press. Some components for the coil curing press, the coil winding mandrels, and the coil winder are completed or nearing completion and assembly should start next month.

During the next several months we will focus our efforts on keeping fabrication and purchase order on schedule. Meanwhile preparations are continuing in building 64 and should be completed with adequate time for occupancy.

• SUPERCONDUCTING CABLE R&D (WBS 4.2.2.3)

Work continues in the SQC area for strand and cable. The primary effort is control of variables such as strand diameter, I_c , Cu:SC, cable thickness, etc. The goal is that these characteristics be required to meet statistical tolerance limits during production. This is also related to data/information reporting requirements for strand vendors. A group of data from one vendor has been compiled on 3 billets where 74 tests were applied to I_c , J_c and Cu:SC. Using the data, and additional data as it becomes available, we will be trying to answer the following questions: a) To what extent may statistical analysis techniques be applied to the interpretation of strand performance data?; b) Over what portion of a billet is a single I_c or Cu:SC measurement representative of the "true" conductor performance?; c) Can individual strand mapping provide statistically significant control of cable uniformity?; d) Is it necessary to 100% sample all finished pieces of strand in order to have assurance of process consistency? If less testing is possible, what frequency of tests will provide the necessary confidence?, and; e) Can the cause for apparent "outriders" in I_c data be explained by *controllable* process variables?

Other related work is the definition of a Test Calibration Program for all strand test sites to measure total systematic error in critical current testing. The specific objective of the program is to quantify: test accuracy, repeatability, reproducibility, stability and linearity of data acquired during critical current testing. There is a great deal of work to be done in the QE effort associated with superconducting wire. Expansion of the staff by adding another engineer is receiving serious consideration.

Activity in this area has concentrated on the following activities: 1) Expediting wire orders to fill the needs of the prototype magnets; 2) Issuance of new orders to support FY91 activities; and 3) Establishment of a detailed development plan for FY90-91.

A total of 7894 ft. of SSC Inner and 11,267 ft. of SSC Outer conductor was cabled this month. We have on hand at NEEW an additional 470,000 ft. of inner strand which will be cabled during the next month. As expected, we are beginning to recover from the present conductor shortfall. Our current estimates, based on the projected success of the current billets in process, indicate that we will have produced sufficient conductor for the FY90 magnet program by 4/15/90. The projected total amount of conductor produced during FY90 is 124,000 ft. of Inner and 93,000 ft. of Outer conductor.

Contracts were issued this month to two vendors for a total of 20 12" diameter billets of conductor, split equally into inner and outer conductor. This quantity is sufficient to meet the requirements of the FY91 magnet program. We are presently developing the RFP's for the development program billets for the coming year of development. These will be sent out during February. The 14" diameter billet program is progressing on schedule. The IGC billet processing was completed this month and cabled at NEEW. This material was found to contain broken filaments on the major edge of the cable. The cable is not usable for magnet applications and will be used for practice winding only. The problem was traced to an error in the set-up of the cabling machine. This problem has been corrected and steps taken to prevent its recurrence. All three of the billets are suffering from the effects of thin barriers. This will limit the overall performance of the material. However, we still expect the billets to yield conductor which meets the current specification. We are presently developing RFP's for the next round of 14" billets which will be extruded later this year at Curtis-Wright. These billets will be processed using barriers of adequate thickness eliminating the problems encountered in the present materials.

• **BROOKHAVEN LAB (WBS 4.2.2.4)**

MODEL MAGNETS

Long Magnets

DD0020 awaits installation in the Horizontal Test Facility.

Assembly operations on DD0028 this month began with the completion of end gauging and installation of voltage taps. Pre-collaring operations were performed, and yoke fabrication continued. Collaring started in mid-month, followed by warm measurements, yoke assembly, and finally shell welding.

DDA010, having been previously installed in Bay B of the Horizontal Test Facility, received its warm bore tube, cryogenic piping and other components, followed by leak checking, pumping and purging, cooldown, and finally tests. The test results are described in the tests and measurement section.

Coil assembly was completed on DC0201, followed by end gauging and installation of voltage taps.

Cable for DC0202 was inspected and insulated; outer coils were wound and cured for DC0202/203.

The new stamping die for 16-gauge magnet steel at H&J has been rejected. There are also problems with the recent shipment of 16-gauge magnet steel from Inland Steel -- in particular, excessive crossbow and residual stresses in the material.

Short Magnets

DSS015 was removed from its top hat, the shell was subsequently removed, and a half shell finally attached. The shell was also removed from DSS018, the magnet was disassembled down to the collared coil, and the collared coil sectioned. A first round of vertical tests was completed on DSS019. DSV016 was installed in the top hat, wired, and generally prepared for new tests (involving reduced coil prestress).

Beam Tubes

Fourteen beam tubes have been plated at Silvex. The tubes are slated for shipment to BNL in the second week of February. The design of a beam tube wrapper has been completed and is awaiting signature of the purchase order.

Correctors

Conceptual design work on a corrector coil package continues in close coordination with SSCL personnel.

Insulation Development

Test coils were bonded in January, using the 100H and 100H * XMPI materials, with promising results. The first purchase order for the new insulation system was submitted and approved; this P.O. will cover a quantity of insulation sufficient for 10 full-length, 4-cm dipole magnets. Meanwhile, samples are being prepared for use in confirming that the new insulation works equally well with Fermilab cable.

An "R&D 100" Award Application was prepared in conjunction with the new developmental Kapton.

• BROOKHAVEN LAB (WBS 4.2.2.4) - Continued

TOOLING AND EQUIPMENT

Coils

Work continues in Bldg. 924 on the problem of curing inner and outer coils with all-Kapton insulation. In particular, additional inner and outer 1.8-m Kapton test coils were wound and cured, and measured and inspected.

Work also continues on coil tooling for dipoles of 50-mm aperture, and preparations have begun for wide cable winding tests for the larger-aperture magnets as well.

Test Equipment

Some additional calibration and troubleshooting proved necessary for mole DI. Following that, DI with its transport system was inserted into the warm bore tube of DDA010 without difficulty. However, subsequent problems associated with the clutch on the transporter has caused some minor redesign work. Parts continue to be produced for DIII and spare units.

SUPERCONDUCTOR

Cable Procurement

Brookhaven received two cable shipments in January. The first, Lot No. IGC-14RD, was placed on hold due to cabling problems encountered. Inspection of the cable has revealed filament damage; the cable remains on hold pending instructions from SSCL. The second, SSC-O-I-00002, is awaiting wrapping for coil winding.

Tooling

Analysis of the wrapping line's power train continues. The location of the line within the building has been established and the floor plan revised accordingly. Maintenance work has been completed on the existing line to correct a slippage problem on the wrapping heads and to improve the clamping of the insulating material to the machine.

Miscellaneous

Enough cable was insulated to wind two short test coils using the new insulation scheme employing Kapton only.

As noted last month, the low epoxy fiberglass (20% epoxy content) material has passed Brookhaven's incoming inspection. The material has now been slit and delivered. Meanwhile, the standard epoxy fiberglass (24%) has also passed Brookhaven's inspection, been slit and developed.

A quality control review was conducted during the month to identify procedure improvements and desired tooling changes. Revisions of affected specifications and drawing are being made.

TESTS AND MEASUREMENTS

BNL Test Stand Commissioning

The new test stand for 17m SSC dipoles was operated successfully for the first time this month. A rebuilt cold mass, DDA010, was used for the checkout. The test stand, which uses the existing

Magcool facility, operated well. A mass flow of over 100 g/s was achieved, with satisfactory temperature drop across the magnet. Two minor problems -- the support of ceramic main lead insulators and the routing of voltage tap wires -- came to light during the test. These problems were circumvented during the test and permanent solutions are being implemented for the next test.

The quench performance of DDA010 was much better than that of its original version, DD0010. The difference is attributed to the improved azimuthal and axial support of the coils. DDA010 has shims between the collars and yoke, where as DD0010 did not; DDA010 has a 1.5" thick end plate, whereas DD0010 did not. DDA010 was recollared with higher prestress than was present in DD0010. DDA010 developed a turn-to-turn short during the fourth quench. During subsequent current ramps, a resistive voltage developed at 500A. The magnet has been removed from the test stand and will be shipped to SSCL for inspection.

- **MAGNET R&D PHYSICS (WBS 4.2.2.5)**

No report this month.

- **MISCELLANEOUS LABS AND UNIVERSITIES
(WBS 4.2.2.6)**

No report this month.

EXPERIMENTAL SYSTEMS (WBS 5.0)

EXPERIMENTAL SYSTEMS R&D (WBS 5.1)

The review process was completed for the remaining proposals, those dealing with computing and data acquisition, that the Laboratory received in October, 1989 for R&D work as part of the program on major detector subsystems. The computing topics were reviewed for technical merit by an ad hoc committee convened at the SSCL on January 15-16, 1990. Ten proposals were considered, with presentations made by the contact persons for each proposal. After reviewing the committee's report, as well as the total funding available, the Laboratory recommended the DOE fund four of these projects in FY90. The following table shows the current R&D topics recommended for funding, including the four computing (*) projects.

TOPICS CURRENTLY COVERED IN THE MAJOR DETECTOR SUBSYSTEMS PROJECTS

Liquid Argon Calorimetry
Warm Liquid Calorimetry
Scintillating-Plate Calorimetry
Scintillating-Fiber Calorimetry
Silicon Calorimetry
Scintillating-Fiber Tracking
Wire Chamber Tracking Using Straw Tubes
Hybrid Central Tracking Chambers
Silicon Strip Tracking
Pixel Vertex Detectors
Silicon Drift Chambers
Transition Radiation Detectors
Precision Muon Chambers
Muon Detection in Solenoidal Detectors
* CAE/CAD Tools in Simulations
* RISC/Unix Multiprocessing Systems
* Benchmark Program Testing
* Massively Parallel Computers
Air-Core Magnetic Toroids
Front-End Electronics Development

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

In order to obtain better advice on R&D priorities for data acquisition and triggering systems for SSC experiments, the Laboratory convened a panel of experts, chaired by Dr. Andy Lankford, on January 23-24, 1990. The committee concluded that studies of potential trigger and data acquisition architectures should be supported by functional modeling of architectures and key components. Accordingly, FY1990 subsystem R&D funds should be allocated to the purchase of simulation software and workstations. The laboratory intends to work with the interested community in the near future to implement this plan.

The process of writing the Memoranda of Understanding (MOU) between the SSC Laboratory and the collaborations that will receive funding in FY90 to perform R&D on major detector subsystems is nearing completion. The MOU will specify the work to be performed by each institution in the collaboration and the funding level to be provided. In this regard, many of the collaborations have sent representatives to the SSC to defend their proposed programs to the Laboratory staff. The Laboratory has begun authorizing the DOE to recall funds and to distribute them to the appropriate institutions to cover these expenditures.

LAB OPERATIONS SUPPORT (WBS 6.0)

PHYSICS PROGRAM SUPPORT (WBS 6.1)

• DIVISION OFFICE (6.1.1)

Fred Gilman, of Stanford Linear Accelerator Center, was appointed Acting Head of the Division. M.G.D. Gilchriese will continue to work on the project as a consultant to the Division.

We have added a Secretary III, Wanda Gall, to our Division Office support staff.

Space planning and cubicle construction options were reviewed in an effort to plan for rapidly expanding division needs. Mac and software installations were made for all new hires.

Travel procedures, both domestic and foreign, for Physics visitors were reviewed with the staff and standardized procedures implemented. Meeting planning procedures were reviewed with forms designed and a common filing system implemented.

Frank Paige, Brookhaven National Laboratory, and Nigel Lockyer, University of Pennsylvania, have begun three month Guest Scientist appointments.

Ongoing discussions with personnel were conducted regarding various personnel procedures and requirements.

Preparation of the FY90, 91, and 92 Field Task Proposal Agreement (FTP/A) inputs for the Physics Research Division was started. Each organization within the division began preparing the FY91 and 92 budget proposals and forecasts for their respective group. Documentation of the goals and objectives for each fiscal year, along with the major activities involved in reaching those goals, is being established.

• THEORY (6.1.2)

No activities are anticipated in this group until later in 1990.

• EXPERIMENTAL PHYSICS AND FACILITIES (6.1.3)

Many concepts associated with the Experimental Facilities began to converge and many changes were implemented as a result of the January DOE review. These changes are being documented in the SCDR as part of the initial scope of the project. The modifications include a decision to construct the 200GeV test beams first, with the hope of initial beam by '95-96. This would represent an important start to detector test facilities at the Laboratory. Also, the number and size of the surface facilities for detectors was reduced in the initial scope, but with the intent of providing sufficient support to detector construction. The detector halls were also modified, especially with regard to eliminating the assembly halls. Because the detectors are not yet specified (the Expression of Interest from the potential detector collaborations are due on May 25th), the assembly and hall facilities can only be approximately estimated. The final configuration of detectors and experimental facilities will be determined as part of the detector design process, which is expected to take two years.

• **EXPERIMENTAL PHYSICS AND FACILITIES (6.1.3) - Continued**

The Experimental Facilities Group has begun to study the implementation of Systems Engineering to detector construction. Using a structured approach to detector construction is unprecedented in High Energy Physics, and our pioneering efforts face many hurdles. Perhaps the most important is the Science/Engineering interface that must be developed. The imposition of a strong discipline on the detector construction process runs contrary to the need for creative work on detector components, sometimes well into the lifetime of the project. The successful development of the Science/Engineering interface will be the first challenge for our Systems Engineering Program.

George Kalbfleisch will be working with us on a part-time basis until the end of the summer. George is a Professor at the University of Oklahoma.

Physics Research Engineering Support.

Two engineers were added to the Physics Research support staff. Marvin Hecht, mechanical engineer, is well experienced in mechanical aspects and project management of facility construction. His primary function will be to interface the experimental facility requirements with the detector design collaborations. He is also assisting in the development of engineering standards specific to the Physics Research Division.

John Piles, mechanical engineer, is an experienced development engineer with extensive CAE experience. His primary responsibility will be facility modeling and layout. He is presently tasked with developing facility and assembly layout of the BCD detector hall and the BCD Test configuration hall at Fermi Lab.

Engineering standards and policies are beginning to take shape. Physics Research engineering support is interfacing with the standard committee and is contributing to the desired format, hierarchy, and function of engineering policy, standards, and practice. It has been recommended that the engineering policy have three levels. The top level consists of 'Engineering Policy' which is SSCL wide and basically a QA statement for Engineering. The second level is 'Engineering Discipline Standards' which are general engineering standards organized and monitored by each engineering discipline. The lowest level or working level is 'Division Standards and Practices' which contain variations and exceptions to the second level standards as well as practices pertaining to that division.

The Empact, L *, and BCD collaborations have been contacted and a experimental facilities dialog has begun. This dialog will allow both the facilities and detector efforts to proceed in a beneficial manner to both.

• **COMPUTING AND DATA ANALYSIS (6.1.4)**

VAX SYSTEMS

The user base overseen by System Management and Operations has grown to over 500 accounts on the open system. In order to accommodate these users the following hardware was installed and implemented in order to expand the capabilities of the Administrative and Scientific VAX clusters:

• COMPUTING AND DATA ANALYSIS (6.1.4) - Continued

VAX SYSTEMS - continued

- Two IMAGEN print servers accessible from all VAXs (Multinet TCP/IP) and Sun workstations.
- One EXABYTE 8mm type drive on SSCAD1 for image and incremental backups.
- Upgrade of SSCVX1 to a VAX 6420 with a total of 96 Mb memory and 10 Gb disk storage.
- MicroVAX 3400 clustered with SSCVX1 to support EXABYTE drives by executing backups.
- Two CD readers loaned from DEC were installed on SSCAD1 and SSCVX1 along with the online Consolidated Software Distribution (VMS and most layered products).

The following software packages were installed to support permanent and temporary requirements:

- Upgrade Operating System to VMS 5.2 (SSCVX1).
- Copy of Unified Graphics source code.
- TRANSPORT and TURTLE codes for Accelerator including double precision modifications.
- ANSYS for weeklong class; possibility of acquisition for the appropriate hardware platform.
- Three updates of EASYTRAK and two Version 3.2 modifications to DELTEK.

In addition, a document tracking database was prototyped using Datatrieve and FMS; forms and procedures will follow. Database description and input/delete screens were developed for the database application to establish the Physics Research newsletter mailing list.

A plan is being developed to incorporate systems management and administration under a single organization regardless of operating system. The advantages are that UNIX workstations and/or VAX multi-user systems will receive a consistent management philosophy. Complete implementation of this plan is scheduled for completion by April 1, 1990.

NETWORK

Design of the Network Control Center for the Bldg. #4 computer room is complete. The center will enhance monitoring of the data related circuits which provide wide-area network connectivity.

Two Energy Sciences Network T-1 circuits were installed and should be operational in February.

• COMPUTING AND DATA ANALYSIS (6.1.4)

NETWORK - Continued

A service request database to log all installation and service activity was designed and made operational. In January, 250 requests for network related services were submitted and fulfilled.

A representative attended the Energy Sciences DECNET Working Group (EDWG) meeting as a voting member where a Phase-V DECNET migration plan was reviewed. A thorough testing methodology at various testbeds (eg., LBL) will identify potential problems prior to the first ship date, tentatively scheduled for January, 1991. The ESnet meeting was also attended and information returned for action by the Telecommunications group.

PHYSICS SUPPORT

CERN library modules were demonstrated on SUN and Silicon Graphics workstations during the Simulation Software Packages workshop held at the SSCL. This software, with special emphasis on GEANT3 and the incorporation of Monte Carlo programs into the GEANT3 framework, demonstrated the effort required to port the CERN library to the UNIX operating system. Efforts to get the CERN library running under ULTRIX on a DECstation 3100 for the detector meeting have begun.

The SUN workstations for the Publishing group are available to produce TeX documents on their local cluster using TeX, LaTeX, phTeX, dvipts, dviselect, TeXsun and other software tools.

The UNIX workstations have been updated to permit selection of output to the IMAGEN printers. In addition, the UNIX support group has also supported the Magnet CAD group to include fixing network problems and designing a backup strategy for the CAD systems.

The hardware/software subgroup of the recently established Computer Acquisition Working Group (CAWG) is developing design options for the planned Physics Research Division computer system acquisition. A model of the flow of data and jobs from the user community has been built using the requirement documents provided by the users as well as input from meetings and workshops. This model is currently being used to simulate two competing design options; a tightly coupled network of processors and a loosely coupled network of processors. The results obtained from this simulation/design validation effort will be presented to the CAWG at the February meeting.

The CMZ source code management software has been upgraded to make it consistent with the installation of the CERN libraries. A proposal is being prepared to extend CMZ to more than one machine. Linpack and Whetstone benchmarking routines have been put into a *Patchy* format using CMZ to facilitate change control. C code for doing CPU timing on the VAX has also been written. New executable images of *Patchy* under Version 5.2 of the operating system have been created.

Participated on the Detector Subsystem committee which reviewed and recommended actions on computer related proposals.

- **LIBRARY SERVICES (6.1.5)**

The activities for the month of January consisted of the following:

Two positions were filled this month, the Interlibrary Loan/Equipment Specialist and the Bibliographic Cataloger.

Approximately 115 books were ordered by the SSC Library during the month of January while 74 books were received. There were also nearly 500 items processed through cataloging and approximately 2,500 backfiles of journals were purchased and are presently being added to the collection.

The long awaited library shelving arrived and has been installed.

And finally, the highlight of the month was the implementation of the Interagency Cooperation Contract provided by the Texas National Research Laboratory Commission and The University of Texas at Dallas.

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

Contacts were established with DOE-CH and DOE-HQ concerning Printing and Graphics for the laboratory. We will be submitting reports to DOE-CH on usage of the reprographics center for the next three months. After this period the function will be evaluated and the SSCL will be designated as a duplicating or a printing facility. If this initial three month evaluation is not sufficient to make a determination, the period of evaluation could be extended.

We have started drafting standards for the development of the material being produced by the Lab. We are evaluating vendors to supply typesetting capability to the Lab. In addition to have typeset quality, the SSC Laboratory will be compatible with the CALS standards that are being implemented by the Federal Government. DOE is a proponent of this standard and currently has two facilities that are following the CALS standard. The SSCL will be the third facility.

Typeset quality documents should be available in May 1990.

SAMPLE ONLY - NOT ACTUAL DATA

SUMMARY COST/SCHEDULE NARRATIVE

LEVEL 2 WBS

1.0 TECHNICAL SYSTEMS

ACCELERATOR SYSTEMS

MAGNET SYSTEMS

SAMPLE ONLY

2.0 CONVENTIONAL FACILITIES

3.0 MANAGEMENT AND SUPPORT

4.0 LAB OPERATIONS

5.0 EXPERIMENTAL SYSTEMS

MANAGEMENT CONDITION SUMMARY

<u>ACCELERATOR SYSTEMS</u>	<u>CUR/CUM COST</u>	<u>CUR/CUM SCHEDULE</u>
1.1.1 ACCEL. MGMT. & SUPPORT	G	G
1.1.2 LINAC	G	G
1.1.3 LEB	G	G
1.1.4 MEB	G	G
1.1.5 HEB	G	G
1.1.6 COLLIDER	G	G
1.1.7 TEST BEAMS	G	G

<u>MAGNET SYSTEMS</u>	<u>COST</u>	<u>SCHEDULE</u>
1.2.1 MANAGEMENT & SUPPORT	G	G
1.2.2 HEB MAGNETS	G	G
1.2.3 COLLIDER MAGNETS	G	G
1.2.4 MAGNET FAC. EQUIP/TOOLING	G	G

<u>CONVENTIONAL CONSTRUCTION</u>	<u>COST</u>	<u>SCHEDULE</u>
2.1.1 CAMPUS	G	G
2.1.2 INJECTOR	G	G
2.1.3 COLLIDER	G	G
<u>2.1.4</u> EXPERIMENTAL HALLS	G	G
2.2.1 CENTRAL LAB OFFICE	G	G
2.2.2 HEAVY WORKS BLDGS.	G	G
2.2.3 SHOPS	G	G
<u>2.2.4</u> SUPPORT BLDGS.	G	G
2.3.1 LINAC	G	G
2.3.2 LEB	G	G
2.3.3 MEB	G	G
2.3.4 HEB	G	G
2.3.5 TEST BEAM AREA	G	G

MANAGEMENT CONDITION SUMMARY

<u>CONVENTIONAL CONSTRUCTION</u>	<u>CUR/CUM COST</u>	<u>CUR/CUM SCHEDULE</u>
2.4.1	NORTH ARC	G
2.4.2	SOUTH ARC	G
2.4.3	WEST CLUSTER	G
<u>2.4.4</u>	EAST CLUSTER	G
2.5.1	WEST CLUSTER	G
<u>2.5.2</u>	EAST CLUSTER	G
2.6.1	MGMT/ADMIN/REPORTING	G
2.6.2	MAJOR STUDIES	G
2.6.3	DESIGN CRITERIA & REPORT	G
2.6.4	DESIGN OVERSIGHT	G
2.6.5	CONSTRUCTION OVERSIGHT	G
2.6.6	CONFIG. MGMT./INTERFACE CONT.	G
2.6.7	SPACE PLNG./DESIGN SUPPORT	G
2.6.8	GEOTECHNICAL PROGRAM	G
2.6.9	SURVEY PROGRAM	G
2.6.10	A/E-CM SEL/CONT SUPPORT	G
2.6.11	RESERVED	G
2.6.12	SEIS SUPPORT	G
2.6.13	MISC. RTK SUPPORT	G
2.7.1	ARCHITECT ENGR.	G
2.7.2	CONSTRUCTION MGMT.	G

<u>MANAGEMENT AND SUPPORT</u>	<u>COST</u>	<u>SCHEDULE</u>
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3.1.1	PROJECT MANAGEMENT OFFICE	G
3.1.2	PMRS	G
3.1.3	Q/A MANAGEMENT	G
3.1.4	CONFIGURATION MGMT.	G
<u>3.1.5</u>	COST ESTIMATING	G
3.2.1	SYSTEMS ENG. MGMT.	G
3.2.2	SE SUPPORT TO ASD	G
3.2.3	SE SUPPORT TO MSD	G
<u>3.2.4</u>	SE SUPPORT TO PHYSICS	G
3.3.1	ADMIN SYS. AND SUPPORT	G
3.3.2	ACCTG. AND FINANCE	G
3.3.3	PROCUREMENT & SUBCONTRACT	G

3.3.4	TRAVEL SERVICES	G	G
3.3.5	PERSONNEL	G	G

MANAGEMENT CONDITION SUMMARY

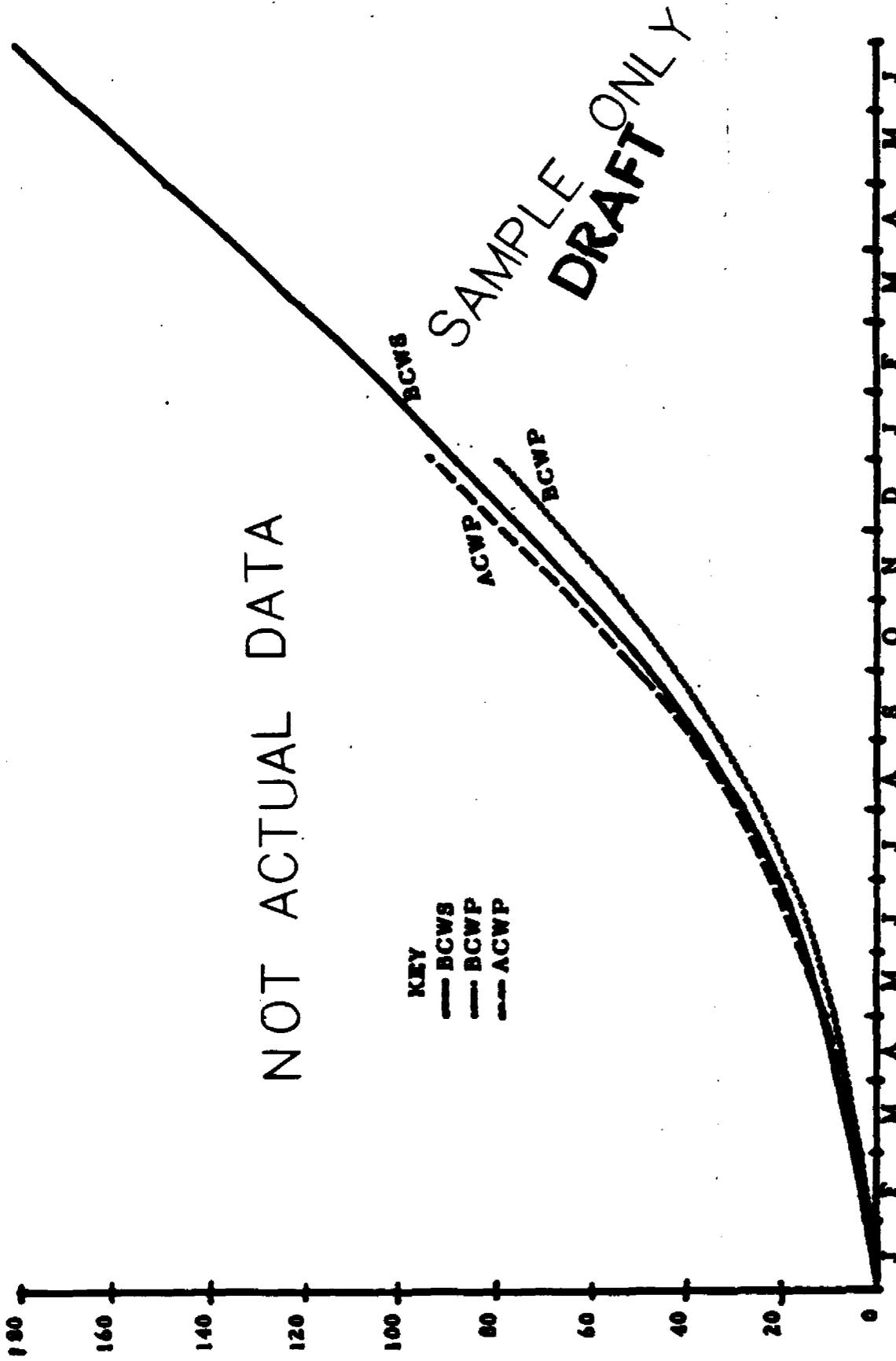
<u>MANAGEMENT AND SUPPORT</u>		CUR/CUM COST	CUR/CUM SCHEDULE
3.3.6	STAFF SUPPORT SERVICES	G	G
<u>3.3.7</u>	MINORITY AFFAIRS	G	G
3.4.1	TECH SUPPORT MANAGEMENT	G	G
3.4.2	FACILITIES ENG. SERVICES	G	G
3.4.3	PROPERTY MANAGEMENT	G	G
3.4.4	FABRICATION SHOPS	G	G
3.4.5	GENERAL COMPUTING	G	G
3.4.6	DESIGN SUPPORT	G	G
3.4.7	COMMUNICATIONS	G	G
3.4.8	ENG. SUPPORT/STANDARDS	G	G
<u>3.4.9</u>	METROLOGY LABS	G	G
3.5.1	DIRECTORATE	G	G
3.5.2	EXTERNAL AFFAIRS	G	G
3.5.3	LEGAL SERVICES	G	G
3.5.4	RESEARCH AND TECH ASSMT.	G	G
3.5.5	USERS OFFICE	G	G
3.5.6	ENVIRON. HEALTH & SAFETY	G	G
3.5.7	PLANNING	G	G
3.5.8	INTERNATIONAL COORDINATION	G	G
3.5.9	MANAGEMENT FEES	G	G

<u>R&D AND PRE-OPERATIONS</u>		COST	SCHEDULE
4.2.1	ACCELERATOR R&D	G	G
4.2.2	MAGNET R&D	G	G
4.2.3	PHYSICS R&D	G	G

<u>EXPERIMENTAL SYSTEMS</u>		COST	SCHEDULE
5.1.1	GENERIC R&D	G	G
5.1.2	MAJOR DETECT. & SUBSYSTEMS	G	G
<u>5.1.3</u>	APPROVED EXPERIMENTAL R&D	G	G
5.2.1	DETECTOR 1	G	G
5.2.2	DETECTOR 2	G	G
5.2.3	DETECTOR 3	G	G
5.2.4	DETECTOR 4	G	G
5.2.5	DETECTOR 5	G	G
5.2.6	DETECTOR 6	G	G

MANAGEMENT CONDITION SUMMARY

<u>LAB OPERATIONS SUPPORT</u>		CUR/CUM COST	CUR/CUM SCHEDULE
6.1.1	PHYSICS ADMIN/SUPPORT	G	G
6.1.2	PHYSICS THEORY	G	G
6.1.3	EXPER. PHYSICS & FACILITIES	G	G
6.1.4	COMPUTING & DATA ANALYSIS	G	G
6.1.5	PHYSICS LIBRARY SERVICES	G	G
<u>6.1.6</u>	TECHNICAL INFO. & PUBS.	G	G
6.2.1	MANAGEMENT	G	G
6.2.2	ADMIN. SYSTEMS & SUPPORT	G	G
6.2.3	PROJECT TECH. SUPPORT	G	G



LEVEL 3 WBS
PERFORMANCE MEASUREMENT CHART

SAMPLE ONLY - NOT ACTUAL DATA

MANAGEMENT CONDITION ANALYSIS

		VARIANCE	
DIVISION:	MAGNETS	COST	SCHEDULE
LEVEL 3 WBS:	HEB MAGNETS	CURRENT	(167) (98)
CURRENT ASSESSMENT:	COST: RED	PRIOR 1 MO. (cum)	(1768) (1433)
	SCHEDULE: RED	PRIOR 2 MO. (cum)	(1555) (1159)
		PRIOR 3 MO. (cum)	(1266) (798)

PROBLEM:

CAUSE/EFFECT:

CORRECTIVE ACTION:

CURRENT STATUS:

CONTACT/PHONE EXT.:

**NOT ACTUAL DATA
SAMPLE ONLY**

SAMPLE ONLY
NOT ACTUAL DATA

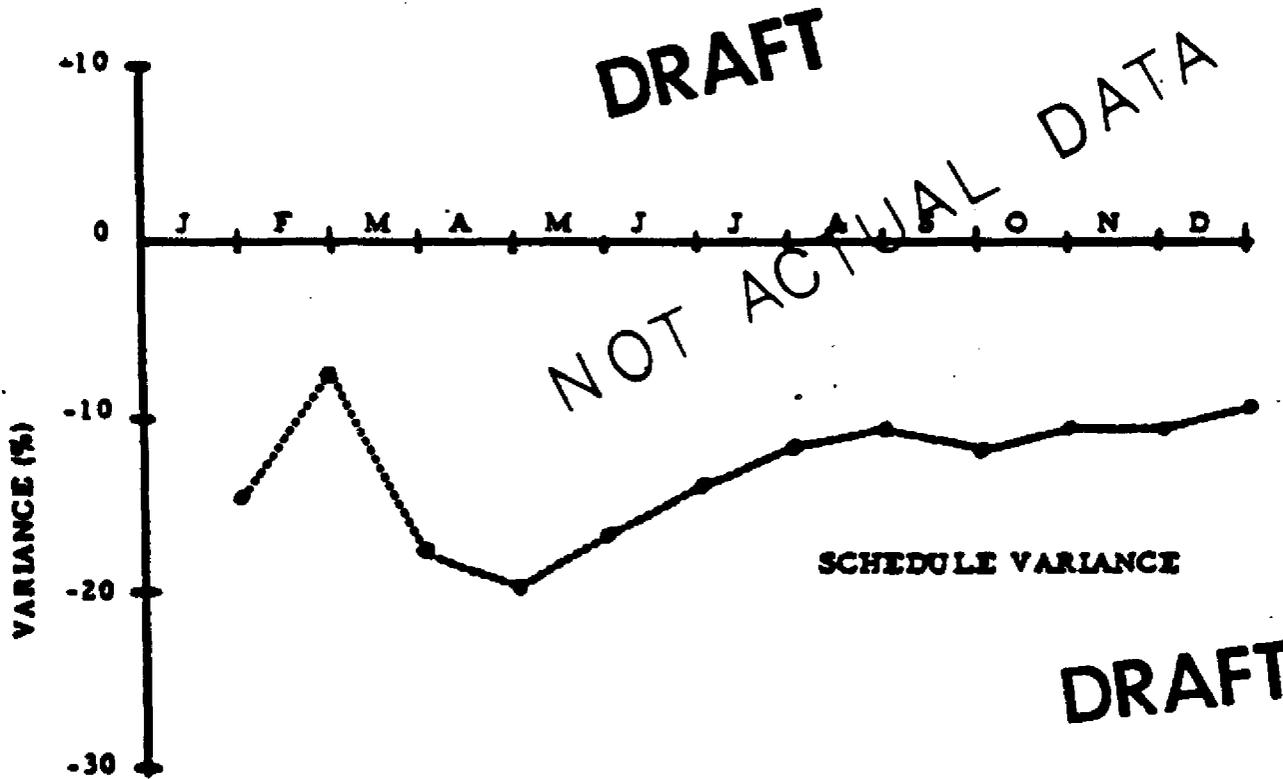
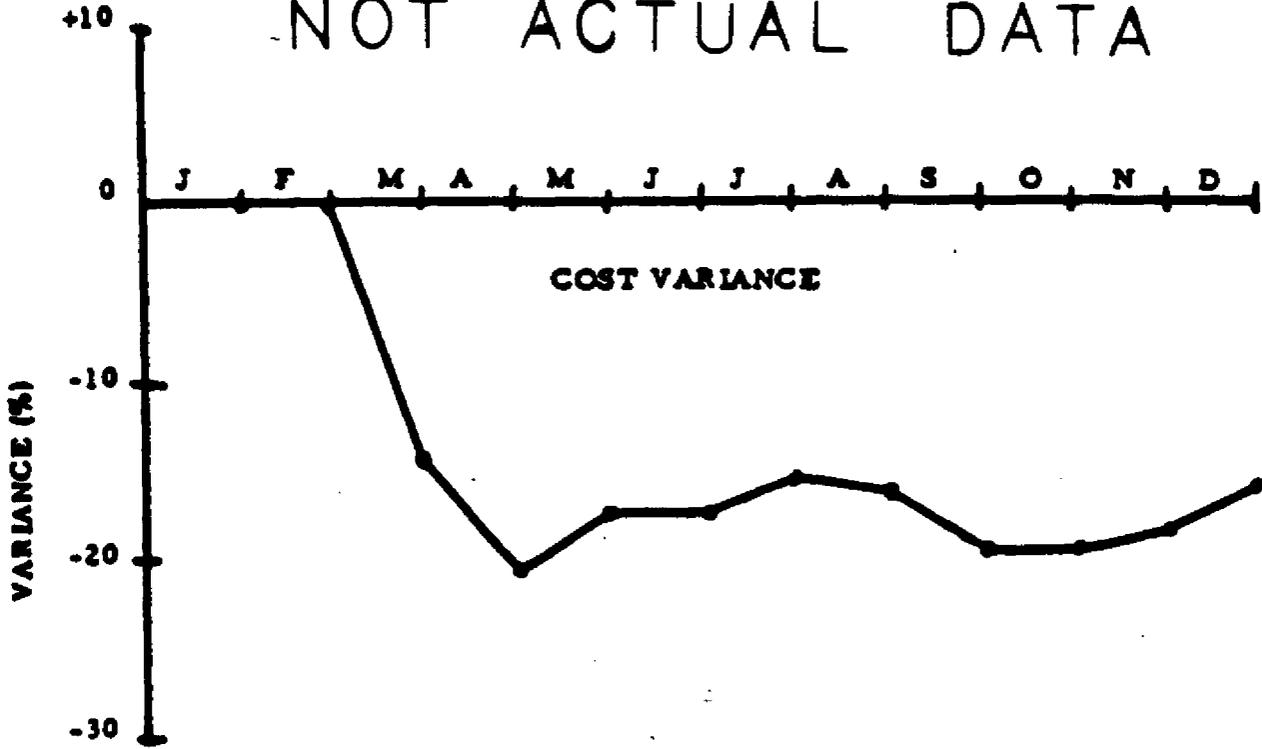


FIGURE VII. 5
PERCENTAGE VARIANCE TREND CHARTS

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

COST PERFORMANCE REPORT - BY WBS													
						REPORT PERIOD				\$ IN 000'S			
										FROM: 12/31/89			
										TO: 01/28/90			
		CURRENT PERIOD				CUMULATIVE TO DATE				**FY90			
	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE	
				SCHEDULE	COST				SCHEDULE	COST			
WBS ITEM													
1.0 TECHNICAL SYSTEMS	700	700	700	0	0	2,648	2,648	2,648	0	0	56,684	56,684	0
2.0 CONVENTIONAL CONSTRUCTION	891	891	891	0	0	4,053	4,053	4,053	0	0	26,220	26,220	0
3.0 PROJECT MGMT. & SUPPORT	2,389	2,389	2,389	0	0	11,597	11,597	11,597	0	0	38,965	38,965	0
4.0 R&D AND PRE-OPERATIONS	3,686	3,686	3,686	0	0	14,447	14,447	14,447	0	0	54,278	54,278	0
5.0 EXPERIMENTAL SYSTEMS	39	39	39	0	0	164	164	164	0	0	10,443	10,443	0
6.0 LAB OPERATIONS SUPPORT	489	489	489	0	0	1,529	1,529	1,529	0	0	10,137	10,137	0
TOTAL DIRECT COSTS	8,194	8,194	8,194	0	0	34,438	34,438	34,438	0	0	196,727	196,727	0
MANAGEMENT RESERVE											87	87	
TOTAL	8,194	8,194	8,194	0	0	34,438	34,438	34,438	0	0	196,814	196,814	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: 12/31/89		\$ IN 000'S	
										TO: 01/28/90			
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90			
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE
				SCHEDULE	COST				SCHEDULE	COST			
2.1.1 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

**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: 12/31/89		
										TO: 01/28/90		
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90		
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE	BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE	
				SCHEDULE COST				SCHEDULE COST				
2.3.1	0	0	0	0	0	0	0	0	0	0	0	
2.3.2	0	0	0	0	0	0	0	0	0	0	0	
2.3.3	0	0	0	0	0	0	0	0	0	0	0	
2.3.4	0	0	0	0	0	0	0	0	0	0	0	
2.3.5	0	0	0	0	0	0	0	0	0	0	0	
TOTAL 2.3 INJECTOR	0	0	0	0	0	0	0	0	0	0	0	
2.4.1	0	0	0	0	0	0	0	0	0	0	0	
2.4.2	0	0	0	0	0	0	0	0	0	0	0	
2.4.3	0	0	0	0	0	0	0	0	0	0	0	
2.4.4	0	0	0	0	0	0	0	0	0	0	0	
TOTAL 2.4 COLLIDER RING	0	0	0	0	0	0	0	0	0	0	0	
2.5.1	0	0	0	0	0	0	0	0	0	0	0	
2.5.2	0	0	0	0	0	0	0	0	0	0	0	
TOTAL 2.5 EXPERIMENTAL FACIL.	0	0	0	0	0	0	0	0	0	0	0	

**BAC REFLECTS FY90 BUDGET ONLY PENDING BASELINE APPROVAL

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

COST PERFORMANCE REPORT - BY WBS														
REPORT PERIOD										\$ IN 000'S				
FROM: 12/31/89														
TO: 01/28/90														
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90				
BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE			
				SCHEDULE	COST					SCHEDULE	COST			
WBS ITEM														
2.7.1	ARCHITECT ENGINEER	0	0	0	0	0	0	0	0	0	7,867	7,867	0	
2.7.2	CONSTRUCTION MGMT.	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL 2.7 AE/CONSTRUCTION		0	0	0	0	0	0	0	0	0	7,867	7,867	0	
TOTAL 2.0 CONVENTIONAL CONST.		891	891	891	0	0	4,053	4,053	4,053	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										FROM: 12/31/89		\$ IN 000'S	
										TO: 01/28/90			
CURRENT PERIOD						CUMULATIVE TO DATE						**FY90	
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE
				SCHEDULE	COST				SCHEDULE	COST			
3.1.1 PROJECT MGMT. OFFICE	142	142	142	0	0	835	835	835	0	0	2,500	2,500	0
3.1.2 PMRS	85	85	85	0	0	296	296	296	0	0	1,700	1,700	0
3.1.3 Q/A MANAGEMENT	0	0	0	0	0	0	0	0	0	0	0	0	0
3.1.4 CONFIGURATION MGMT.	105	105	105	0	0	234	234	234	0	0	600	600	0
3.1.5 COST ESTIMATING	47	47	47	0	0	222	222	222	0	0	1,345	1,345	0
TOTAL 3.1 PROJECT MANAGEMENT	379	379	379	0	0	1,587	1,587	1,587	0	0	6,145	6,145	0
3.2.1 SYSTEMS ENGR. MANAGEMENT	38	38	38	0	0	293	293	293	0	0	1,495	1,495	0
3.2.2 SE SUPPORT TO ASD	11	11	11	0	0	70	70	70	0	0	584	584	0
3.2.3 SE SUPPORT TO MSD	15	15	15	0	0	54	54	54	0	0	421	421	0
3.2.4 SE SUPPORT TO PHYSICS	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 3.2 SYSTEMS ENGINEERING	64	64	64	0	0	417	417	417	0	0	2,500	2,500	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: 12/31/89													
TO: 01/28/90													
CURRENT PERIOD						CUMULATIVE TO DATE						**FY90	
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE
				SCHEDULE	COST				SCHEDULE	COST			
3.3.1 ADMIN SERVICES MGMT.	181	181	181	0	0	822	822	822	0	0	2,520	2,520	0
3.3.2 ACCTG. & FINANCE	133	133	133	0	0	564	564	564	0	0	1,842	1,842	0
3.3.3 PROCUREMENT & S/CONT.	213	213	213	0	0	881	881	881	0	0	2,688	2,688	0
3.3.4 TRAVEL SERVICES	16	16	16	0	0	57	57	57	0	0	219	219	0
3.3.5 PERSONNEL	180	180	180	0	0	627	627	627	0	0	2,152	2,152	0
3.3.6 STAFF SUPPORT SERVICES	78	78	78	0	0	504	504	504	0	0	1,175	1,175	0
3.3.7 MINORITY AFFAIRS	17	17	17	0	0	63	63	63	0	0	424	424	0
TOTAL 3.3 PROC. ADMIN. & SUPPORT	818	818	818	0	0	3,518	3,518	3,518	0	0	11,020	11,020	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: 12/31/89	\$ IN 000'S			
								TO: 01/28/90				
		CURRENT PERIOD				CUMULATIVE TO DATE				**FY90		
		BCWS	BCWP	ACWP	VARIANCE	BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE
					SCHEDULE COST				SCHEDULE COST			
	WBS ITEM											
	3.4.1 TECH SUPPORT MANAGEMENT	118	118	118	0 0	498	498	498	0 0	1,747	1,747	0
	3.4.2 FAC. ENG. SERVICES	67	67	67	0 0	2,230	2,230	2,230	0 0	3,293	3,293	0
	3.4.3 PROPERTY MANAGEMENT	74	74	74	0 0	221	221	221	0 0	641	641	0
	3.4.4 FABRICATION SHOPS	0	0	0	0 0	7	7	7	0 0	171	171	0
	3.4.5 GENERAL COMPUTING	43	43	43	0 0	663	663	663	0 0	2,375	2,375	0
	3.4.6 DESIGN SUPPORT	28	28	28	0 0	117	117	117	0 0	2,271	2,271	0
	3.4.7 COMMUNICATIONS	203	203	203	0 0	360	360	360	0 0	2,372	2,372	0
	3.4.8 ENG. SUPPORT/STDS	8	8	8	0 0	37	37	37	0 0	479	479	0
	3.4.9 METROLOGY LABS	0	0	0	0 0	0	0	0	0 0	171	171	0
	TOTAL 3.4 PROJECT TECH. SUPPORT	541	541	541	0 0	4,133	4,133	4,133	0 0	13,520	13,520	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: 12/31/89	\$ IN 000'S					
								TO: 01/28/90						
		CURRENT PERIOD				CUMULATIVE TO DATE				**FY90				
		BCWS	BCWP	ACWP	VARIANCE	BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE		
					SCHEDULE COST				SCHEDULE COST					
	WBS ITEM													
	3.5.1 DIRECTORATE	360	360	360	0	0	1,278	1,278	1,278	0	0	3,841	3,841	0
	3.5.2 EXTERNAL AFFAIRS	37	37	37	0	0	175	175	175	0	0	574	574	0
	3.5.3 LEGAL SERVICES	32	32	32	0	0	106	106	106	0	0	300	300	0
	3.5.4 RESEARCH & TECH. ASSMT.	0	0	0	0	0	1	1	1	0	0	100	100	0
	3.5.5 USERS OFFICE	61	61	61	0	0	96	96	96	0	0	142	142	0
	3.5.6 ENVIRON. HEALTH & SAFETY	40	40	40	0	0	158	158	158	0	0	422	422	0
	3.5.7 PLANNING	57	57	57	0	0	128	128	128	0	0	250	250	0
	3.5.8 INTERNAT'L. COORDINATION	0	0	0	0	0	0	0	0	0	0	151	151	0
	TOTAL 3.5 PROJECT DIRECT. OFFICE	587	587	587	0	0	1,942	1,942	1,942	0	0	5,780	5,780	0
	TOTAL 3.0 PROJ. MGMT. & SUPPORT	2,389	2,389	2,389	0	0	11,597	11,597	11,597	0	0	38,965	38,965	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: 12/31/89		\$ IN 000'S		
										TO: 01/28/90				
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90				
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE	SCHEDULE	COST	BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE	
4.1 ACCELERATOR PRE-OPS	0	0	0	0	0	0	0	0	0	0	0	0	0	
4.2.1 ACCELERATOR R&D	1,324	1,324	1,324	0	0	0	3,999	3,999	3,999	0	0	17,162	17,162	0
4.2.2 MAGNET R&D	2,362	2,362	2,362	0	0	0	10,448	10,448	10,448	0	0	37,116	37,116	0
4.2.3 PHYSICS R&D	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 4.1/4.2 PRE-OPS/RES. & DEV	3,686	3,686	3,686	0	0	0	14,447	14,447	14,447	0	0	54,278	54,278	0
TOTAL 4.0 R&D AND PRE-OPS	3,686	3,686	3,686	0	0	0	14,447	14,447	14,447	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: 12/31/89		\$ IN 000'S	
										TO: 01/28/90			
CURRENT PERIOD						CUMULATIVE TO DATE						**FY90	
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE
				SCHEDULE	COST				SCHEDULE	COST			
5.1.1 GENERIC R&D	0	0	0	0	0	0	0	0	0	0	0	0	0
5.1.2 MAJOR DETECT. & SUBSYST.	0	0	0	0	0	0	0	0	0	0	0	0	0
5.1.3 APPROVED EXPER. R&D	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 5.1 EXPER. SYST. R&D	0	0	0	0	0	0	0	0	0	0	0	0	0
5.2.1 DETECTOR 1	0	0	0	0	0	0	0	0	0	0	0	0	0
5.2.2 DETECTOR 2	0	0	0	0	0	0	0	0	0	0	0	0	0
5.2.3 DETECTOR 3	0	0	0	0	0	0	0	0	0	0	0	0	0
5.2.4 DETECTOR 4	0	0	0	0	0	0	0	0	0	0	0	0	0
5.2.5 DETECTOR 5	0	0	0	0	0	0	0	0	0	0	0	0	0
5.2.6 DETECTOR 6	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 5.2 DETECTORS	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 5.0 EXPERIMENTAL SYSTEMS	39	39	39	0	0	164	164	164	0	0	10,443	10,443	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: 12/31/89		\$ IN 000'S	
										TO: 01/28/90			
CURRENT PERIOD					CUMULATIVE TO DATE					**FY90			
WBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE
				SCHEDULE	COST				SCHEDULE	COST			
6.1.1 PHYSICS ADMIN/SUPPORT	30	30	30	0	0	223	223	223	0	0	1,145	1,145	0
6.1.2 PHYSICS THEORY	0	0	0	0	0	0	0	0	0	0	183	183	0
6.1.3 EXPER. PHYSICS & FACIL.	193	193	193	0	0	439	439	439	0	0	2,613	2,613	0
6.1.4 COMPUTING & DATA ANALYSIS	142	142	142	0	0	435	435	435	0	0	3,776	3,776	0
6.1.5 PHYSICS LIBRARY SERVICES	91	91	91	0	0	182	182	182	0	0	1,385	1,385	0
6.1.6 TECH. INFORMATION & PUBS.	33	33	33	0	0	250	250	250	0	0	1,035	1,035	0
TOTAL 6.1 PHYSICS PROG. SUPPORT	489	489	489	0	0	1,529	1,529	1,529	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	489	489	489	0	0	1,529	1,529	1,529	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										FROM: 12/31/89		\$ IN 000'S	
										TO: 01/22/90			
CURRENT PERIOD						CUMULATIVE TO DATE				**FY90			
OBS ITEM	BCWS	BCWP	ACWP	VARIANCE		BCWS	BCWP	ACWP	VARIANCE		BAC	LRE	VARIANCE
				SCHEDULE	COST				SCHEDULE	COST			
D - DIRECTORATE	587	587	587	0	0	1,942	1,942	1,942	0	0	5,780		
B - PROJECT MANAGEMENT	443	443	443	0	0	2,004	2,004	2,004	0	0	8,647		
A - ACCELERATOR SYSTEMS	1,360	1,360	1,360	0	0	4,169	4,169	4,169	0	0	24,560		
C - CONVENTIONAL CONSTRUCTION	891	891	891	0	0	4,053	4,053	4,053	0	0	26,220		
T - TECHNICAL SERVICES	541	541	541	0	0	4,133	4,133	4,133	0	0	13,520		
G - ADMINISTRATIVE SERVICES	818	818	818	0	0	3,518	3,518	3,518	0	0	11,020		
P - PHYSICS RESEARCH	528	528	528	0	0	1,693	1,693	1,693	0	0	20,580		
M - MAGNET SYSTEMS	3,026	3,026	3,026	0	0	12,926	12,926	12,926	0	0	86,400		
TOTAL SSC LABORATORY	8,194	8,194	8,194	0	0	34,438	34,438	34,438	0	0	196,727		

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

SSC LABORATORY - CONTRACT #DEACO289ER40486 - MAJOR SUBCONTRACTORS

MAJOR SUBCONTRACTORS												
REPORT PERIOD										FROM: 12/31/89		\$ IN 000'S
										TO: 01/24/90		
CURRENT PERIOD					CUMULATIVE TO DATE					FY 90		
CONTRACT	BCWS	BCWP	ACWP	VARIANCE	BCWS	BCWP	ACWP	VARIANCE	BAC	LRE	VARIANCE	
			SCHEDULE	COST				SCHEDULE	COST			
BROOKHAVEN NATIONAL LAB	1,500	1,500	1,500	0	0	4,959	4,959	4,959	0	0	16,716	
FRMILAB	466	466	466	0	0	4,207	4,207	4,205	0	2	13,000	
LAWRENCE BERKELEY LAB	393	393	393	0	0	1,295	1,295	1,293	0	2	3,500	
LOCKHEED	66	66	66	0	0	368	368	368	0	0	2,500	
RTK	500	500	500	0	0	3,574	3,574	3,574	0	0	6,565	
TEXAS ACCELERATOR CENTER	0	0	0	0	0	0	0	0	0	0	2,247	
SUBTOTAL	2,925	2,925	2,925	0	0	14,403	14,403	14,399	0	4	44,528	
SSCL/OTHER	5,269	5,269	5,269	0	0	20,035	20,035	20,039	0	-4	152,199	
TOTAL	8,194	8,194	8,194	0	0	34,438	34,438	34,438	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	3/90	--	
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

<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>	
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	1/90		
22	2.0	First SEIS Draft Issued	10/89		10/89	
23	2.0	AE/CM Contract	10/89	5/90		
24	3.1	PMRS Implementation Complete	10/89		10/89	Software Implementation
25	3.4	MIS Hardware Operational	10/89		10/89	
26	3.1	Config. Mgmt. Plan Complete	10/89	1/90	1/90	
27	3.4	Draft Document Control Plan Issued	10/89		10/89	

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>	
28	2.6	AE/CM-SSC Performance Objectives & Syst. Requirements Revisions Complete	10/89			
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	1/90		
32	3.0	Initial Baseline Issued	11/89	1/90		
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	1/90	
35	3.2	SEMP Approved and Issued	11/89	2/90		
36	3.1	PMP - Final Draft Issued	11/89	4/90		
37	3.1	Key QA Staff Hired	11/89	1/90	1/90	
38	3.5	ES&H Management Plan	11/89	2/90		
39	3.5	ES&H Final Draft Issued	11/89	2/90		
40	3.1	SSC WBS/WBS Dictionary Complete and Issued	11/89	2/90		
41	1.0	Prototype Dipole Specification Complete	11/89	2/90		
42	1.0	Magnet Criteria Complete	11/89	2/90		

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>	
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	2/90		
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	3/90		
50	3.1	QA Data Base Requirements Document Issued	1/90	4/90		
51	2.1	AE/CM-Complete Near Term Work Authorization Packages	1/90	4/90		
52	4.0	First Land Tract Available	1/90	3/90		Footprint Approval Req'd.
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			
56	3.1	DOE/CSCSC Readiness Review	2/90	6/90		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	4/90		
58	2.6	CCD-Procedures Manual Issued	2/90			
59	3.0	Baseline Validation Complete	2/90	5/90		
60	4.0	Supplemental Environmental Impact Statement Issued	2/90			
61	2.0	A-E/CM On Board	2/90	6/90		

SSCL - MASTER MILESTONE STATUS REPORT

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		
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		
M1-5	1	3.1.1	PM	SCDR Issued	Dec-89		Dec-89
M1-6	1	3.0	Footprint	DOE Approval	Feb-90		
M1-7	1	3.1.1	PM	Baseline Validation Complete	May-90		
M1-8	1	3.1.1	PM	PMP Approved By DOE	Apr-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		
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 MARCH, 1990.

SSCL - MASTER MILESTONE STATUS REPORT

NO.	MIL LEVEL	WBS NO.	TITLE	* BASELINE	CURRENT	ACTUAL
				PLAN	PLAN	
M2-1	2	3.1.1	PM	Issue First Draft PMP	Aug-89	Aug-89
M2-2	2	3.1.1	PM	Award SE&I Contract	Oct-89	Oct-89
M2-3	2	3.1.1	PM	First C/SCSC Test Report Issued	Nov-89	Nov-89
M2-4	2	3.1.1	PM	First Land Tract Available	Aug-90	
M2-5	2	2.1.3	Infrastructure	Start Collider Infrastructure Design	Jun-90	
M2-6	2	2.4	Collider Ring	Start Design	Jun-90	
M2-7	2	2.1.1	Infrastructure	Start Campus Infrastructure Design	Jun-90	
M2-8	2	2.1.2	Infrastructure	Start Injector Infrastructure Design	Jun-90	
M2-9	2	2.1.4	Infrastructure	Start Exper Halls Infrastructure Design	Jun-90	
M2-10	2	2.2.1	Campus Labs/Offices	Start Design	Jun-90	
M2-11	2	2.3	Injector Facilities	Start Design	Jul-90	
M2-12	2	3.1.1	PM	Ready For C/SCSC Validation	Jun-90	
M2-13	2	1.2.6.1	Collider Dipole Magnets	Award Preproduction Contract	Aug-90	
M2-14	2	1.2.6.2	Collider Quad Magnets	Award Preproduction Contract	Sep-90	
M2-15	2	2.2	Camp Hv Wks/Shops/Sup.Bldgs	Start Design	Sep-90	
M2-16	2	1.1.6	Collider Components	Start Fabrication	Jun-91	
M2-17	2	2.4.3	Collider Ring	Start Construction West Cluster Tunnel	May-91	
M2-18	2	2.5	Experimental Facilities	Start AE/Design	Jul-91	
M2-19	2	2.4.4	Collider Ring	Start Construction East Cluster Tunnel	Apr-91	
M2-20	2	1.1.2	LINAC	Complete Fabrication	Jun-93	
M2-21	2	3.1.1	PM	Land Acquisition Complete	Jun-92	
M2-22	2	1.2.6.1	Collider Dipole Magnets	Start Production	Apr-94	
M2-23	2	1.2.6.2	Collider Quad Magnets	Start Production	Nov-94	
M2-25	2	2.4.3	Collider Ring	Complete Construction West Cluster Tunnel	Jun-95	
M2-26	2	1.1.2	LINAC Operational		Jan-95	
M2-27	2	1.1.3	LEB	Complete Fabrication	Oct-94	
M2-28	2	1.1.3	LEB Operational		Jun-95	

SSCL - MASTER MILESTONE STATUS REPORT

NO.	MIL LEVEL	WBS NO.	TITLE	* BASELINE		
				PLAN	CURRENT PLAN	ACTUAL
M2-29	2	1.1.6	Collider System	Complete Acceptance Test Sector A		Aug-94
M2-30	2	1.1.6	Collider System	Complete Acceptance Test Sector B		Mar-97
M2-31	2	2.4	Collider Ring	Complete AE/Design		Jun-94
M2-32	2	2.4.4	Collider Ring	Complete Construction East Cluster Tunnel		Mar-96
M2-34	2	1.1.4	MEB	Complete Fabrication		Jan-95
M2-35	2	1.1.4	MEB Operational			Jan-96
M2-36	2	1.1.6	Collider System	Complete Acceptance Test Sector K		Sep-97
M2-37	2	1.1.6	Collider System	Complete Acceptance Test Sector C		Oct-96
M2-38	2	2.3	Injector Facilities	Complete Construction		Feb-96
M2-39	2	2.5.2	Experimental Facilities	Complete Construction		Jun-95
M2-40	2	1.1.5	HEB	Complete Components Fabrication		Aug-95
M2-41	2	1.2.5.1	COL Dipole Magnets	Complete Fabrication		Jan-98
M2-42	2	1.2.5.2	COL Quad Magnets	Complete Fabrication		Jan-98
M2-43	2	1.1.6	Collider System	Complete Acceptance Test Sector J		Jul-97
M2-44	2	1.1.6	Collider System	Complete Acceptance Test Sector H		Apr-96
M2-45	2	1.1.5	HEB Operational			Sep-97
M2-46	2	1.2.5.1	COL Dipole Magnets	Complete Installation		Mar-98
M2-47	2	1.2.5.2	COL Quad Magnets	Complete Installation		Mar-98
M2-48	2	1.1.6	Collider System	Complete Acceptance Test Sector D		Nov-95
M2-49	2	1.1.6	Collider System	Complete Acceptance Test Sector F		Dec-96
M2-52	2	1.1.6	Collider System	Complete Acceptance Test Sector E		May-97
M2-53	2	1.1.6	Collider System	Complete Acceptance Test Sector G		Oct-96

MEETINGS/CRITICAL EVENTS

<u>Date</u>	<u>Meeting Subject</u>	<u>Participants</u>	<u>Location</u>
Mar 14-16	International Industrial Symposium on the Super Collider	Open	Miami, FL
Apr 23-24	High Energy Physics Advisory Panel (HEPAP)	DOE/SSCL	Wash, DC