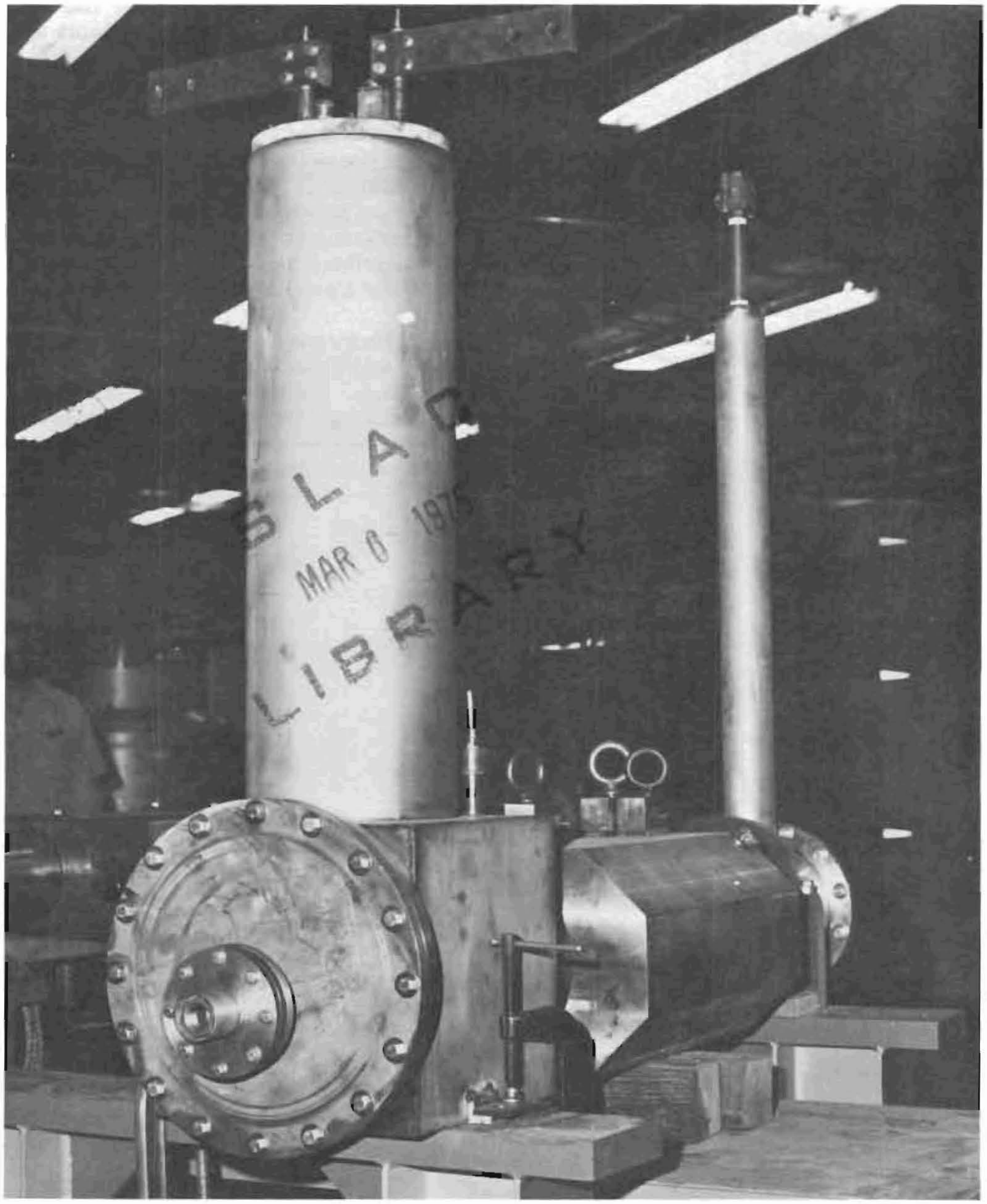
NALREP



Monthly Report of the Fermi National Accelerator Laboratory February 1975

Fermi National Accelerator Laboratory

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J. R. Sanford, Editor
N. Stiening, Assistant Editor

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THE COVER: Model of the 40-kG superconducting magnet being tested for use in Fermilab's proposed Energy Doubler/Saver Accelerator.

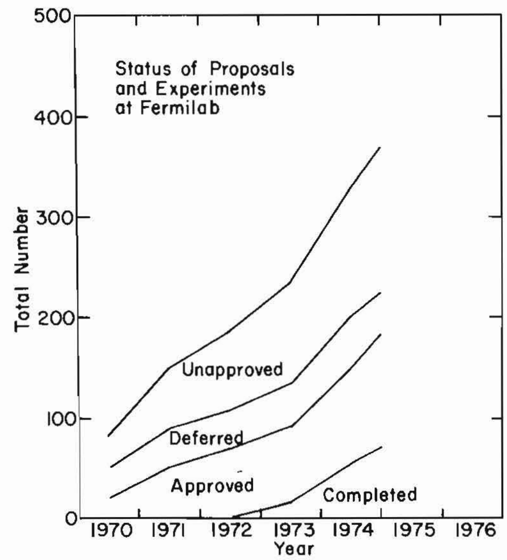
Operated by Universities Research Association Inc. under contract with the Energy Research and Development Administration

THE SCOPE OF THE FERMILAB RESEARCH PROGRAM

The experiments underway at Fermilab in 1974 had their origin in decisions made several years ago. Beginning with meetings of the Program Advisory Committee in 1970, the final plans were made for the research facilities to be used in the first round of experiments at Fermilab. The first beam was available in 1972 and the experimental program got underway in 1973. In the past year a steady progression of experiments has used the particle beams. Thanks to the hard work of a number of dedicated individuals it has been possible to turn proposed experiments into real experiments in the experimental areas.

Making use of the 300-GeV proton beam from the accelerator, the Switchyard has routinely delivered protons to targets in the three external experimental areas and the Internal Target Area has seen beam for experimental use for extended periods. Although not all experimental facilities have been completed, it has been possible for a large number of experiments to take data. The existence of splitting stations has made it possible to provide steady and controlled beams to the Meson, Neutrino, and Proton Areas during every pulse of the main accelerator. From targets in the experimental areas, secondary and sometimes tertiary particle beams have spread out to be directed to individual experiments or to be conveyed into large fixed-detector facilities. Keeping pace with the growth of research facilities has been the ability to handle the installation and operation of experimental apparatus in the experimental areas. This has been possible through the organized efforts of departmental personnel responsible for their respective research areas. After approval, experiments are assigned to departments and the requirements for experimentation are implemented by the assembly of the experimental apparatus on the floor of the detector building.

Proposals are approved while other experiments complete their taking of data. Figure 1 below shows the growth of the program over a period of years.



These curves show the growth of the experimental program at Fermilab.

At present there are over 370 proposals of which 183 have been approved for running. Of these, 70 experiments have completed data taking, and the results are being analyzed by the experimenters. Other approved experiments are either underway, or to be done in the not-too-distant future. Some proposals are deferred pending clarification of a technical or physics problem, while another group of proposals remains unapproved. These include proposals that have been rejected, withdrawn, become inactive due to the passage of time or remain unconsidered. The detailed status of all the approved experiments is displayed in the Situation Report, published quarterly in NALREP. The one upon which these numbers are based was published in the January 1975 issue.

The overall scope of the research program for the approved experiments is displayed in Table 1. Here the major experiments in the beams using electronic and bubble-chamber detectors, are explicitly indicated. The most time-consuming users of the research facilities have their

Table 1. Scope of the Research Program for Approved Experiments at Fermi National Accelerator Laboratory as of January 1, 1975.

Major Electronic Detector Experiments		
Data-taking complete		26 @ 23,700 hours
Experiments underway	- hours used	21 @ 15,600 hours
	hours remaining	(21) @ ~8,000 hours
To be done		39 @ 20,000 hours
	Subtotal	86 @ 67,300 hours
Bubble-Chamber Experiments		
Data-taking complete		15 @ 1,350,000 pictures
Experiments underway	- pictures taken	8 @ 330,000 pictures
	pictures remaining	(8) @ 700,000 pictures
To be done		18 @ 2,020,000 pictures
	Subtotal	41 @ 4,400,000 pictures
Other Experiments		
Data-taking complete		29
Experiments underway		7
To be done		20
	Subtotal	56
	Totals	183

quantitative extent expressed in this table. The other experiments on the table are ones that are not major users of beam time and fit in among the major users of the beam lines. Nearly 24,000 hours have been used by the electronic experiments which have completed data taking while 21 more experiments have used 16,000 hours to collect data up to the present time. This totals 40,000 hours for experiments using electronic detectors. About 1.7 million pictures have been taken in the bubble chambers at the Laboratory while approvals for nearly 2.7 million pictures remain. The numbers in parenthesis in the to-be-done category refer to remaining work for experiments that are underway. An examination of this table shows that about 1000 hours are used per electronic experiment while the average bubble-chamber experiment consists of 100,000 pictures.

The physics coverage of the experiments is displayed in Table 2. Here one sees the primary intent of the electronic experiments that are underway. The predominant category of hadron induced reactions is further described in terms of the key objectives of the experiments.

The approved experiments use beam lines and experimental facilities that have been provided. The distribution of experiments by beam lines is contained in Table 3. Here the major experiments are distributed according to the beam lines that they use. Experiments that are listed in the category, "Other," involve incidental use of the experimental facilities and do not contribute to the backlog of work remaining to be done.

During 1974 the total number of experiments using the beams per month has risen from about 15 to 25 as shown on page 7. Some of the

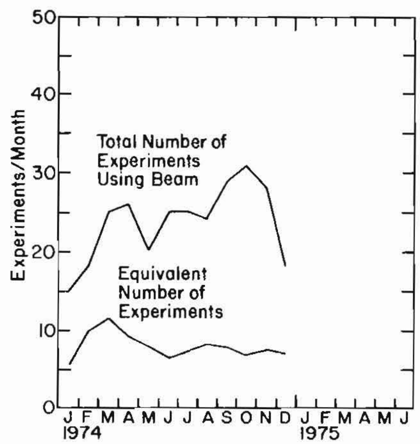
Table 2. The Physics Coverage of Experiments
Completed, Underway, and to Be Done
at Fermi National Accelerator Laboratory as of January 1, 1975.

Primary Experimental Objective	Data Taking Complete	Experiments Underway	To Be Done	Sub-Total
Search and Survey Expts.				
Monopoles	1	2	0	3
Quarks	3	0	1	4
Long-Lived Particles	4	0	1	5
Super-Heavy Elements	1	2	0	3
Other	0	4	7	11
Total Cross Section Expts.	1	1	0	2
Two-Body Expts.				
Elastic Scattering	1	4	6	11
Charge Exchange Scattering	1	1	0	2
Other	0	0	2	2
Inclusive Reaction Expts.	10	2	10	22
Diffractive Dissociation Expts.	1	2	0	3
Multiparticle Expts.	2	2	4	8
Hyperon and Neutral Kaon Expts.	0	2	2	4
Hadron Expts. in Bubble Chambers				
15-ft	1	1	3	5
30-In.	14	4	11	29
Neutrino Expts.				
15-ft Bubble Chamber	0	3	4	7
Electronic	2	2	3	7
Muon Expts.	1	1	0	2
Photoproduction Expts.	0	1	3	4
Emulsion Expts.	23	0	16	39
Miscellaneous Expts.	4	2	4	10
Totals	70	36	77	183

Table 3. The Beam Lines Used by Approved Experiments at Fermi National Accelerator Laboratory as of January 1, 1975.

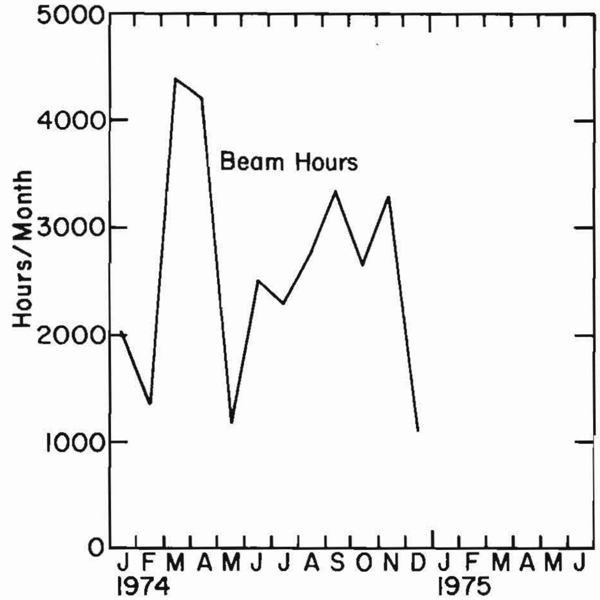
	Data Taking Complete	Experiments Underway	To Be Done	Sub-Total
1. Meson Area				
M1 Beam	2	3	6	11
M2 Beam	4	3	5	12
M3 Beam	3	2	3	8
M4 Beam	1	1	1	3
M6 Beam	1	4	3	8
Other	11	2	0	13
Subtotals	22	15	18	55
2. Neutrino Area				
Neutrino Beam	2	5	7	14
Muon/Hadron Beam	1	1	1	3
B. C. Hadron Beam	15	5	14	34
Other	20	5	19	44
Subtotals	38	16	41	95
3. Proton Area				
Proton East	1	2	7	10
Proton Center	2	0	2	4
Proton West	0	0	5	5
Subtotals	3	2	14	19
4. Internal Target Area				
C-0	7	3	2	12
Recoil Room	0	0	2	2
Subtotals	7	3	4	14
Totals	70	36	77	183

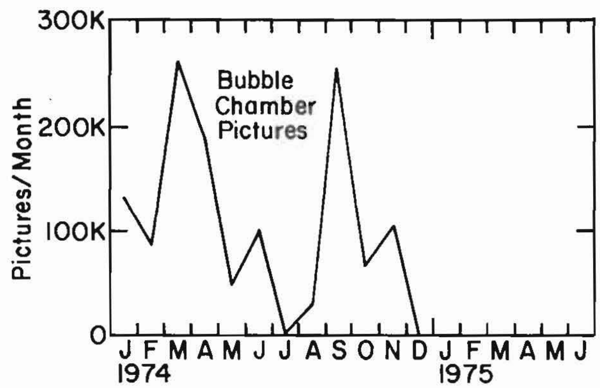
experiments are taking data, while others use a beam for only a few hours while testing apparatus. The lower part of the figure indicates the equivalent number of experiments which, on the average, are using the beam simultaneously. This is also a measure of the multiplicity of use since this number multiplied by the actual number of hours available for high energy physics in a month equals the beam hours used. Figure 3 (page 8) shows more explicitly the beam hours available for electronic experiments. During good months 3,000 beam hours or more are available. The dips in May and December represent off times of the accelerator due to periods of extended maintenance and



The number of different experiments that use the beams at Fermilab is shown along with the average number of experiments per month.

development. The lower part of this figure shows the number of bubble-chamber pictures taken per month. In addition to the dips described above, others in July and October resulted from the attempts to bring the 15-ft chamber into operation. These efforts were rewarded in November when more than 150,000 pictures were taken in the new chamber.





The sum of all the hours used by experiments per month is displayed in the upper curve. The lower curve indicates the number of bubble-chamber pictures taken per month.

How the time was used during 1974 in all the experimental areas is shown on the next page. For ten weeks the facilities were off due to maintenance, development, or repairs including the startup and testing of new

FERMI NATIONAL ACCELERATOR LABORATORY

1974 HISTORICAL CALENDAR OF PROGRAM ACCOMPLISHMENTS

Month	Accel. Energy (GeV)	Internal Target Area	Meson Area	Neutrino Area	Proton Area
Jan. 1974	400	pd scattering	—	ν's from horn	pZ → hadrons
	—	—	—	—	—
	300	pZ → γ pd scattering	—	μ scattering @ 150 GeV 30" B.C.(H_2)	pZ → μ
Feb.	—	—	—	—	—
Mar. Apr.	300	pZ → γ pd scattering pp inelastic scattering pZ → μ	hadron σ_T elastic scatt. π charge exchange neutron σ_T n dissociation K^o regen.	neutral current search μ scaling test @ 56 GeV μ scattering @ 150 GeV 30" B.C.(H_2)	pZ → μ pZ → e & μ
May	—	—	—	—	—
June	300	pd scattering pp inelastic scattering	above exp. & multiplicity studies	μ scattering @ 150 GeV 30" B.C.(H_2&Ne)	pZ → e & μ
	—	—	—	—	—
July Aug.	400 300 200&300	pp inelastic scattering	elastic scatt. π charge exchange missing mass search K^o regen. hadron σ_T n dissociation n backward scattering pp → γ	ν's for 15' B.C. & electronic exp.	pZ → e & μ γ(n)Z → μμ
Sept.	300	—		neutral current study 30" B.C.(D_2)	—
Oct. Nov.		—		15' engr. run ν's for 15' B.C. & electronic exp.	pZ → e → hadrons γ(n)Z → μμ
Dec.	—	—	—	—	—
	300	—	elastic scatt. hyperon prod.	μ startup	γZ → μμ

FERMI NATIONAL ACCELERATOR LABORATORY
DESCRIPTION OF RESEARCH PROGRAM ACCOMPLISHMENTS DURING 1974

A. HADRON INTERACTIONS WITH ELECTRONIC DETECTORS

- CHARGED HADRON TOTAL CROSS SECTIONS @ 23-280 GeV/c
- NEUTRON TOTAL CROSS SECTIONS @ 30-280 GeV/c
- π^--p CHARGE EXCHANGE @ 20-200 GeV/c
- DIRECT PRODUCTION OF e's, μ's FROM PROTON INTERACTIONS (3 EXPERIMENTS)
- CHARGED HADRON ELASTIC SCATTERING @ 50-200 GeV/c (3 EXPERIMENTS)
- NEUTRON DISSOCIATION FROM H/D & HEAVY TARGETS @ 40-280 GeV/c
- K^0 REGENERATION FROM VACUUM, CARBON, CH_2
- PHOTON PRODUCTION FROM PROTON INTERACTIONS @ 50-300 GeV/c
- MISSING MASS SEARCH WITH $\pi^{\pm}$ @ 40-240 GeV/c
- NEUTRON BACKWARD SCATTERING @ 40-280 GeV/c
- PROTON-DEUTERON SCATTERING @ 50-400 GeV/c
- PROTON-PROTON INELASTIC SCATTERING @ 50-400 GeV/c
- π^- MULTIPLICITIES @ 100-175 GeV/c

B. HADRON INTERACTIONS WITH BUBBLE CHAMBERS

- TOTAL OF 1,100K PICTURES IN 30-INCH
- TOTAL OF 64K PICTURES IN 15-FOOT

C. ELECTROMAGNETIC INTERACTIONS WITH ELECTRONIC DETECTORS

- TEST OF SCALING OF μ INTERACTIONS @ 56, 150 GeV/c
- INELASTIC μ SCATTERING FROM HYDROGEN AND DEUTERIUM @ 150 GeV/c
- PRODUCTION OF DI-MUONS BY PHOTON (& NEUTRON) INTERACTIONS

D. WEAK INTERACTIONS

- STUDY OF ν INTERACTIONS WITHOUT μ's (3 EXPERIMENTS)
- TOTAL OF 107K PICTURES OF ν-p AND $\bar{\nu}$-p INTERACTIONS IN 15-FOOT
- STUDY OF DEEP INELASTIC ν SCATTERING

systems. Beyond that there were long running periods from February to May and from July to the beginning of December. The main work underway during the year is indicated in the figure on page 10 where there is an overall summary of experimental research accomplishments during 1974. Data have been accumulated for the research efforts indicated on the table and a considerable number of experiments have already published their findings. Of course more work will be done in 1975 on some of these studies while other experiments will be brought into operation.

Reported by J. R. Sanford

SUPERCONDUCTING MAGNET REACHES 40 KILOGAUSS

Present-day Fermilab main-ring magnets, constructed with water-cooled windings, can reach a maximum field of 22.5 kG, sufficient for accelerating protons to 500 GeV. To reach an energy of 1000 GeV, a field of 45 kG is required for the present arrangement of magnets. A different arrangement might allow 1000 GeV to be reached with only 40 kG. Extensive studies have shown that the only way to produce such high fields economically is by using superconducting magnets. Consequently, a concerted effort to develop high-field dipole and quadrupole magnets needed for an energy-doubler accelerator has been undertaken by the Accelerator Division's Superconductor Group.

Superconducting magnets needed for accelerators and beam lines are long, small in cross section, and operate at very high currents. Few have been built, but active development programs now exist at several laboratories. In January, 1975, an advanced prototype superconducting dipole magnet, designated C1-2.5, was successfully run at 40 kG by Fermilab personnel, thus placing the possibility of reaching 1000 GeV in sight.

The magnet consists of four layers of superconducting wire wound so that the current distribution around the magnet bore axis, in a plane perpendicular to that axis, approximates the cos θ current distribution required for a dipole field. Two sizes of superconducting wire are used in what is called a graded winding scheme. The inner two layers, or shells, are wound from a larger wire (0.075- by 0.150-inch) that consists of seven strands of multifilament niobium-titanium superconducting wire twisted and rolled to the needed rectangular cross section. The outer two shells are wound from 0.050- by 0.150-inch rectangular cable containing eleven strands of multi-filament wire. The four shells are tightly bound to a 3-inch tube that leaves about 2-1/2 inches of clear bore for the proton beam. When finally assembled the entire magnet roughly resembles a cylinder 30 inches long and 6 inches in diameter.

The entire structure must be rigidly held together, not just to preserve overall structural integrity, but to prevent individual wire motion of as little as 10^{-4} inches. Such small motions are sufficient to cause sections of the wire suddenly to switch from the superconducting to the non-superconducting or normal state. This process, called quenching, occurs in the magnets at much lower operating currents than predicted by tests of short samples of the wire. The problems of why the superconducting magnets fail to reach their design limits and why they exhibit training, a puzzling phenomenon wherein the operating limit can be slowly forced toward the maximum theoretical current by repeated quenching, are the present focus of studies at Fermilab and at other laboratories throughout the world.

Magnet C1-2.5 did exhibit training and finally failed after reaching 40 kG. The failure occurred after the magnetic field reached a high enough level for the Lorentz forces acting on individual wires to crush the insulation between wires, causing a turn-to-turn short. This created an initially resistanceless one-turn secondary with a 227-to-one turns-ratio--damage to the magnet was inevitable. Since the superconducting magnets are protected by special circuits that remove the magnetic field energy during a quench, the damage was minimal, and the magnet is being rebuilt for further testing.

Enough has been learned from the successful operation of the C1-2.5 magnet so that the next step in the Energy Doubler/Energy Saver magnet development program, the construction of a 10-foot prototype, is underway. This magnet embodies improvements in insulation, mechanical confinement of coils, and superconducting wire.

At the same time the beam has been extracted inwards from the main ring at straight section B-0 at an energy of 100 GeV. The next step is to install superconducting magnets in the main-ring tunnel and to study them under actual conditions while the external beam is being manipulated by them.

Reported by D. Sutter

OPERATIONS CENTER RELOCATION NOW COMPLETE

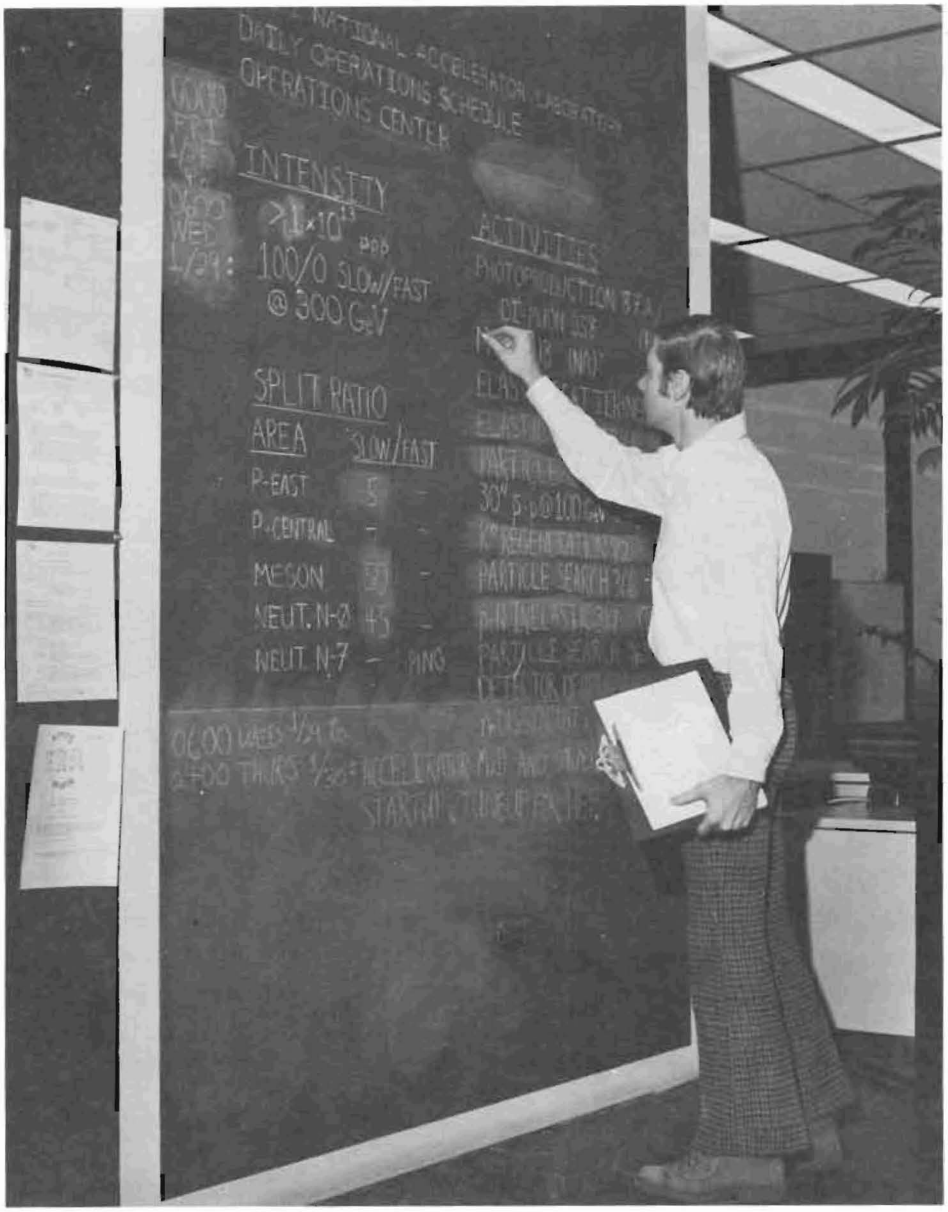
The Operations Center, originally located in a corner of the lobby of the accelerator Main Control Room in the Cross Gallery, is now firmly established on the first floor of the Central Laboratory. The relocation process started gradually in June 1974 with experimentation on the problems of communication between the Central Laboratory and the Main Control Room. The development of improved instrumentation and communication equipment retains as much as possible the Operations Coordinators' thorough understanding of accelerator activities. Even during this experimentation there was strong indication of the benefits that could be derived from increased contact with experimenters in the new location, and it was decided to make a rather complete relocation at the earliest practical time. While the accelerator was off for the maintenance and development period in December, equipment was moved. Procedures were instituted which reduced the old Operations Desk in the Main Control Room to an auxiliary station which can be used during startup or times of rapidly changing operating conditions. Direct tie-in to the accelerator intercom system provides a close coupling to accelerator activities.

Staffing and procedures have been arranged so that the Operations Coordinator can make frequent personal visits to the Main Control Room and to experimental areas without compromising the manning of the Operations Center. The Operations Desk (Ext. 3333) is manned by an Operations Coordinator on an around-the-clock basis. Shift overlap has been arranged to provide an extra man at busy periods and a radio telephone forwarding system for Ext. 3333 has been installed to forward calls to the Operations Coordinator when he must leave the Operations Desk.

The activities at the Operations Center include the distribution of the Weekly Operations Schedule each Tuesday, following the Experimental Planning Meeting. The schedule for the next 24 to 36 hours, updated to reflect any current changes, is posted on a blackboard and displayed throughout the Laboratory on Channel 12 of the closed-circuit TV system. Channel 12 is time-shared to display a chronology of accelerator status and the current status of scheduled experiments. Channel 13 of the TV system displays the familiar ramp and beam intensity traces, the date, time, accelerator cycle count, the spill duty factor, beam splits to experimental areas, and important messages on accelerator operation. A tape recording is maintained on Telephone Ext. 3546 (JIM) to provide authoritative information about the accelerator and experimental program performance.

Beam intensities are monitored at the Operations Center and records are kept on the use of beam by experimental groups. From these records and the Weekly Shift Summaries turned in to the Operations Section by experimenters, the Facility Utilization Summary published in NALREP is compiled. The bulletin boards in the Operations Center are kept up-to-date with most announcements of interest to experimenters including the Daily Operations Report (Morning Report), current call lists for support and maintenance groups, and records of accelerator performance and experimental area operation.

Reported by H. Allen



Anthony Malensek, an Operations Coordinator, puts the current schedule on the board at the Operations Center.

Bob Evans consults with an experimenter while Halsey Allen, the Head of the Operations Section, confers with Jim MacLachlan about the electronic displays available in the Operations Center.

NOTES AND ANNOUNCEMENTS

WORKSHOP PLANNED. . . .

A one and one-half day workshop on ionization calorimeters will be held at Fermilab on May 9 and 10, 1975. This workshop is intended to disseminate the experience gained by some seven experimental groups working at Fermilab, as well as groups working at other laboratories. Such topics as energy resolution, calibration, gain stability, light collection efficiency, calorimeters without photomultipliers, and the like, will be discussed. Experimenters wishing to present papers, or needing assistance with housing and transportation arrangements should contact M. Atac (Ext. 3960) in the Research Services Department. The meeting will be held in the Fermilab Auditorium, and all interested persons are welcome to attend. It is being organized by a committee including M. Atac, M. Awschalom, D. Buchholz, B. Brown, and P. Limon.

RESEARCH TECHNIQUES SEMINAR PLANNING COMMITTEE APPOINTED. . . .

The Research Technique Seminars held at Fermilab on Thursday afternoons at 4:00 p.m. are intended as a forum for new ideas in experimental techniques and, at times, for the presentation of tutorials on special techniques. In order to increase the usefulness of these seminars, a committee has been appointed--M. Atac (Ext. 3960), B. Brown (Ext. 4006), D. Jovanovic (Ext. 3795), and F. Turkot (Ext. 3527). This committee will try to present a balanced program, inviting local and visiting physicists and engineers to talk. Anyone wishing to suggest subjects and/or speakers for this seminar should contact one of the committee members.

SUMMARY REPORT ON MUON WORKSHOP. . .

On January 17, 1975, a workshop on the future muon program for the Laboratory was held. It was attended by approximately 50 physicists, and included presentations on nine proposals, as well as brief reports on plans for the muon program at the CERN SPS and the characteristics of the muon beam at Fermilab.

A panel was present during the meeting, and at its conclusion, prepared recommendations for presentation to the Program Advisory Committee at its meeting in March. Panel members were

B. Barish, California Institute of Technology
J. Bjorken, Stanford Linear Accelerator Center
L. Osborne, Massachusetts Institute of Technology
D. Reeder, University of Wisconsin
M. Tannenbaum (Chairman), Rockefeller University.

One general conclusion that emerged from the workshop was that a substantial effort to improve the intensity of the present muon beam and to reduce the beam halo would be very worthwhile. Also, the use of solid-iron magnets appears to be a promising approach for the future development of the beam.

FACILITY UTILIZATION SUMMARY--JANUARY 1975

Accelerator operation at 300 GeV for the experimental research program resumed in all four experimental areas on the afternoon of January 2, following the New Year's holiday standby period. Operation was fairly steady through the rest of the month, with the exception of two major interruptions of over 24 hours each on successive weekends. These were caused by the failure of cable and splice insulation in the main ring electrical power feeder system. Both failures occurred during accelerator startup, following a scheduled maintenance and studies period. The remainder of the unscheduled down-time was due primarily to problems in the main ring and booster rf systems. Accelerated beam intensities above 10^{13} protons/pulse were generally available during the 386 hours of actual beam time provided for physics research (69% operating efficiency), except for short periods when the program needed less. Scheduled periods for accelerator maintenance, studies, and repairs were basically arranged to occur on Tuesdays and Thursdays so as to produce no more than two interruptions in the run schedule each week, separated by at least four shifts of operation for HEP research. This plan is expected to continue, in an attempt to improve overall operating efficiency.

Some eleven experiments were involved in the Meson Area program during the month. Elastic Scattering 7 completed data collection work after the installation of the second repaired M1 septum magnet permitted 200 GeV/c operation of the beamline. Meanwhile, Neutral Hyperon 8, Elastic Scattering 96, Hadron Jets 260, Neutron Dissociation 305, and Particle

Search 365 were also involved in data-taking activities. K^0 Regeneration 82, Form Factor 216, and Particle Search 366 used beam time for setup and checkout of experimental equipment in preparation for upcoming scheduled runs. Hadron Jets 236A was assigned one shift of beam control for some preliminary test work, and Di-Muon 337 also made a short run.

Muon 98, taking scattering data off hydrogen at +150 and later +100 GeV/c with slow spill, was the primary user in the Neutrino Area and over half the accelerated beam during January was delivered to their production target. The first week-and-a-half was spent in tuning up the tagging system and a 100 GeV/c $\bar{p}$ beam to the 30-in. bubble chamber with slow spill in preparation for a picture-taking run. A tune was achieved which yielded about 25% $\bar{p}$'s in the charged beam. 30-in. $\bar{p}$-p, @ 100 GeV #311 then ran for the following two weeks in a triggered mode using the tagging system and four "pinged" pulses per accelerator cycle to collect nearly 100 K pictures and complete their run. In parallel with this work, the Detector Development 327 group was setting up and checking their equipment in the same beam. Following the completion of Experiment 311, there were some 20 hours of tests by 30-in. $\bar{p}$-p @ 30-60 GeV #344 in which tune conditions for a $\bar{p}$ beam at 30, 40, 50, and 60 GeV were obtained using slow spill. Hybrid #299 also spent a few hours tuning a 150-GeV proton beam in the N-3 line and checking out their tagging system for a future run.

Photoproduction 87A was the only group running in the Proton Area. They spent the entire month taking data on leptons and hadrons produced by the photon beam in the Proton-East line.

In the Internal Target Area, Particle Search 363 and Proton-Nucleon Inelastic 317 used the beam on the evening and owl shifts during alternate weeks, while construction work on the new C-0 experimental area continued during the daytime periods. Particle Search 363 collected data on high mass particles using the upstream rotating target for their runs. During the periods assigned to p-N Inelastic 317, they continued to test their detectors using secondaries from the center rotating target. In the meantime, efforts to repair leaks in the gas jet target were continued with some progress being made. Further work will be required before the target becomes operational.

A summary of the accelerator and beam utilization for the month of January follows:

I. Summary of Accelerator Operations

		Hours	
A. Accelerator use for physics research			
Accelerator physics research		72	
High energy physics research		386	
Research during other use		(59)	
	Subtotal		458
B. Other activities			
Accelerator setup and tuning to experimental areas		13	
Scheduled interruption		88	
Unscheduled interruption		185	
	Subtotal		286
C. Unmanned time			
	Total		744

II. Summaries of High Energy Physics Research Use

	# of Expts.	Hours	Results
A. Counter experiments	14	2343	1 Test
B. Bubble-chamber experiments	2	139	97,623 pix
C. Emulsion experiments	0	-	
D. Special target experiments	0	-	
E. Test experiments	3	62	
F. Engineering studies and tests	2	117	
G. Other beam use	-	8	
	21	2669	

III. Number of Protons Accelerated and Delivered ($\times 10^{18}$)

		Protons @ 300 GeV
A. Beam accelerated in main ring	Total	1.895
B. Beam delivered to experimental areas		
Meson Area		0.559
Neutrino Area		
Main beam		1.017
Bubble chamber beam (estimated)		0.020
Proton Area		0.094
	Total	1.690

IV. Beam Utilization by Experiment

	Hours	
A. Meson Area		
Elastic Scattering #7	345.1	
Neutral Hyperon #8	234.4	
K^0 Regeneration #82	12.6	
Elastic Scattering #96	249.0	
Form Factor #216	2.0	
Hadron Jets #236A	6.9	Tests
Hadron Jets #260	111.6	
n Dissociation #305	320.2	
Particle Search #365	117.4	
Particle Search #366	62.6	
Di-Muon #337	0.4	Tests

B. Neutrino Area

	Hours	
Muon # 98	333.4	
30-In. Hybrid # 299	1.0	Tests
30-In. $\bar{p}$-p @ 100 # 311	138.1	97,623 pix
30-In. $\bar{p}$-p @ 30-60 # 344	13.5	Tests
Detector Development # 327	48.0	

C. Proton Area

Photoproduction # 87A	338.3	

D. Internal Target Area

Proton-Nucleon Inelastic # 317	69.6	Detector Tests
Particle Search # 363	139.7	
Total	2543.8	

PROPOSALS RECEIVED DURING DECEMBER 1974 AND JANUARY 1975

No.	Title	Submitted By
367	A Proposal to Study J and Charmed Meson Production in the M4 Neutral Beam Line	V. Telegdi
368	Proposal to Search for Massive States Decaying into Muon Pairs and Produced by High Energy Muons	L. Litt
369	A Search for Charmed Particles	T. Kirk
370	Continued Search for New Particle Production Using the E1A Detector	D. Cline
371	The Investigation of the Production of Heavy Fragments Induced by Particles of High Energies	M. Jurić
372	Proposal to Search for Long-Lived Particles at Fermilab	U. J. Becker
373	Interaction of 50-100-GeV Muons with Emulsion Nuclei	P. L. Jain
374	A Proposal to Search for Charmed Particles Originating from the Interactions of 300-GeV/c Protons in Emulsion Nuclei	D. H. Davis

DATES TO REMEMBER

March 20-21, 1975	Spring meeting of the Fermilab Program Advisory Committee.
March 21, 1975	Fermilab Auditorium Arts Series: An Evening of Dance. Tickets available in Guest Office (Ext. 3440).
March 30, 1975	Requests for summer accommodations should be received in the Housing Office.
April 18, 1975	Fermilab Auditorium Arts Series: The Atlantis Theatre Company. Tickets available in Guest Office.
May 2-3, 1975	Annual meeting of the Fermilab Users Organization.
May 9-10, 1975	Fermilab Workshop on Ionization Calorimeters. Contact M. Atac, Research Services Department (Ext. 3960) for more information.
May 21, 1975	Deadline for receipt of materials to be considered at the summer meeting of the Fermilab Program Advisory Committee.
June 21-27, 1975	Summer meeting of the Fermilab Program Advisory Committee.