

NALREP



Monthly Report of the Fermi National Accelerator Laboratory



January 1975



NALREP is published monthly by the Fermi National Accelerator Laboratory, P. O. Box 500, Batavia, Illinois 60510.

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

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Contributions and comments should be addressed to the Program Planning Office. Requests for copies should be addressed to the Publications Office.

FERMILAB-75/1

0090.01

THE COVER: Members of the Users Office staff, C. Sazama (standing) and P. Hale, are able to assist users visiting at the Laboratory. Their office is located on the first floor of the Central Laboratory, behind the east elevators. Experimenters are encouraged to stop by the Users Office when arriving on site, so that messages and mail can be directed to them.



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CONFIDENTIAL

in Program Advisory Committee Meetings
State Office Activities and Staff
from the State Executive Committee
a Confidentiality Committee Appointed

More Details of the Spring TAC Meeting
Approved Summary Minutes Forwarded for Review
Proposed for Executive Committee May Now Available
New Assignments in the Executive Division
Board Note

RECENT PROGRAM ADVISORY COMMITTEE MEETINGS

The Fermilab Program Advisory Committee met on November 14, 15, and 16. About thirty new proposals had been received since the summer meeting at the end of June, and there was considerable business to cover.

As one result of the summer meeting, three special meetings were held at Fermilab this fall. At one workshop, proposals for studying dilepton production were discussed. At another, the focus was second-generation use of the Single-Arm Spectrometer facility. Bubble chamber proposals dealing with hadron interactions were considered at a meeting of the PAC Bubble Chamber Subcommittee. Reports from these meetings were presented to the full PAC for consideration at their November meeting. In addition, the PAC considered proposals for new neutrino experiments using electronic detectors at their November meeting. In all, twenty proposals were approved; four were rejected.

The numbers of proposals received, approved, rejected, deferred, or withdrawn each year are shown in the table on the next page. These numbers apply to the summer of each year, except for 1974, where one number represents the situation just prior to the fall PAC meeting and the other represents the situation subsequent to that meeting.

Some of the more far-reaching decisions resulting from the November PAC meeting are summarized in the following paragraphs.

Among the dilepton proposals, Di-Muon # 331 was approved. In this experiment, to be performed in the Muon Laboratory, a hadron beam will be used to initiate the dilepton production. The implementation of this experiment

STATUS OF PROPOSALS

	<u>Aug.</u> <u>1970</u>	<u>Aug.</u> <u>1971</u>	<u>July</u> <u>1972</u>	<u>July</u> <u>1973</u>	<u>July</u> <u>1974</u>	<u>Nov.</u> <u>1974</u>
Completed	0	0	0	16	57	61/ 62
Remaining Approved	21	53	70	75	89	95/114
Deferred	29	35	39	43	54	50/ 41
Unconsidered	23	16	19	10	0	22/ 6
Inactive/Withdrawn	1	33	35	47	61	65/ 67
Rejected	8	15	20	42	65	65/ 68
Total	<u>82</u>	<u>152</u>	<u>183</u>	<u>233</u>	<u>326</u>	<u>358/358</u>

will mark the first time the apparatus in the Muon Laboratory will be used to study hadron interactions. The current major experimental commitment in that laboratory is to the Chicago-Harvard-Illinois-Oxford collaboration studying deep inelastic muon scattering (Muon #98). For that experiment, the magnet from the University of Chicago Cyclotron is used as a spectrometer magnet for the analysis of multiparticle final states.

The approval of Di-Muon # 331 provides for the first use of an extremely valuable set of equipment and facilities during periods when it would otherwise not be used. The approval does place a burden upon the experimenters involved in both Muon #98 and Di-Muon # 331 to establish a mutually acceptable scheme for the sharing of complex equipment.

Several Single-Arm Spectrometer (SAS) proposals were considered, and two were approved. One of these, Associated Production #99, is a proposal to study associated production by observing K mesons in the SAS produced by an incident pion beam, and using missing mass techniques to identify the recoiling hyperon. The other approved proposal for the SAS

facility, Inclusive Scattering # 118, is for the study of meson scattering interactions by observing the momentum of the forward meson. Both of the experimental groups proposing new experiments are comprised of members of the consortium which built the SAS and is carrying out the initial experiment, Elastic Scattering # 96. This first use of the spectrometer by subsets of the original consortium will mark the beginning of its availability as a Fermilab facility.

Probably the decision of most general interest regarding the 30-inch bubble chamber program is that which pertains to the future of hybrid spectrometer systems. For several years two systems have been given support by the Laboratory. One, consisting of a downstream set of wide-gap spark chambers, has been in productive operation since the commissioning of the chamber. It was used for Hybrid # 2B, a major experiment which was completed during 1974 with a total of 500,000 pictures. The second system, using proportional wire chambers for the downstream detectors, was approved for Hybrid # 154. The spirit of the 1971 approval of that experiment was that if it were successful, the method might have some distinct advantages over the photographic and rate-limited method of the wide-gap chamber system.

At the meeting of the PAC Bubble Chamber Subcommittee, the groups involved with both hybrid systems were asked to discuss the advantages and disadvantages of their systems, and to describe work completed and projected for the future. After thoroughly reviewing these presentations and discussing them with the full PAC, we have decided to adopt the proportional

wire chamber system, proposed by the Hybrid #154 group, as the hybrid spectrometer to be supported by the Laboratory for future work of this type. It will be developed as a general-use facility, available under appropriate conditions to any experimental group, whether or not the members have been involved in the initial development of the system. A large initial exposure has been approved for Hybrid #299, an experiment proposed by the consortium which developed the proportional wire chamber system.

As a result of the review of these major proposals, the PAC also approved a final exposure of 300,000 pictures for Hybrid #281, the current proposal of the developers of the wide-gap chamber system. Following completion of that exposure, the wide-gap chamber system will be disassembled and removed in order to make possible the optimal deployment of the proportional wire chamber equipment. That transition should require about a year.

Another major component of the Fermilab experimental program which was thoroughly reviewed at the November PAC meeting was that of neutrino experiments using electronic detectors. Both groups involved in the current major efforts made complete presentations of their progress to date, their present status, and their plans for the future. The Committee also heard from some groups which have been developing new ideas for future-generation facilities which might be developed to undertake further research on neutrino interactions.

As a result of this review, we have decided to advance another step with each of the two major collaborations currently engaged in neutrino

studies. The Caltech-Fermilab group, which has used the dichromatic neutrino beam in their program to date (# 24, # 262, # 320), has been approved to carry out Neutrino # 356, a further investigation of deep inelastic neutrino interactions. For this purpose, the present array of equipment in the Wonder Building will be disassembled and moved to a new enclosure further downstream. The toroidal magnets presently used for muon momentum analysis will be replaced by magnets larger in diameter, to improve the acceptance of the detector for events with large-angle muons in the final state.

The other group (the Fermilab-Harvard-Pennsylvania-Wisconsin collaboration) which has used a broad-band neutrino beam in their current experiment (Neutrino # 1A), has been approved for Neutrino # 310, a new experiment aimed toward a better measurement of total cross sections and a more thorough investigation of neutral current and deep inelastic scattering events. This group will also be using an upgraded detector for their new experiment. The present detector building is being enlarged in order to house a larger-acceptance muon analyzing system. Furthermore, the present liquid scintillator calorimeter will be interspersed with lead plates in order to provide a higher interaction rate and some identification of the electromagnetic components of the products of interactions.

In approving these two groups for another major phase of neutrino studies, we at Fermilab, together with the members of our Program Advisory Committee, are seriously concerned about the potentially conflicting pressures of immediate expediency and long-range creativity and productivity.

On the one hand, we can foresee the progression of a situation for which at every given instant it appears that existing equipment can most effectively be exploited by the group which has developed it and has been using it. On the other hand, we are also sensitive to the fact that the lifeblood of high energy physics research has always been the new people who continually come to the fore with new ideas and new methods. If a given group, no matter how competent and imaginative the members, is permitted to become frozen into a given program and a given set of apparatus, the research may very well become stultified, and suffer accordingly.

For these reasons, we wish to re-emphasize the fact that the "real estate" and the equipment that has been assembled for the purpose of conducting neutrino studies does lie in the public domain, and we stand ready to entertain proposals for the use of these facilities submitted by any group having a good, new idea to explore.

In this connection, at the November meeting the PAC approved Neutrino #254, an experiment by a Brookhaven-Purdue collaboration in which it is proposed to test the presumed equality of total cross sections for K-neutrinos and π -neutrinos at the same neutrino energy. This experiment can be done using the dichromatic beam and the detection equipment developed by the Caltech-Fermilab group. The π -neutrino data will probably come from a run associated with the total cross section measurements of Neutrino #21; the K-neutrino data will be obtained in a run scheduled specifically for Neutrino #254.

Just preceding the November PAC meeting, all of us were exhilarated by the discovery of new particles at SPEAR and Brookhaven, immediately confirmed at other laboratories. A last-minute arrangement was made for an early morning seminar on the first day of the meeting, so that two of the PAC members participating in the work at SPEAR could describe the states of the analysis of the new particles. It was a measure of the general excitement stimulated by the discovery that a capacity audience--800 people--filled the Fermilab auditorium for the occasion. At the PAC meeting which followed, only one related proposal, Particle Search # 357, was considered. As was expected, however, immediately after the PAC meeting, the Laboratory was inundated by new proposals related to the discoveries at SLAC and BNL.

We have always indicated that we would treat our approved program and our schedule as flexible plans, and that we would stand ready to modify them, change them, or cancel them when new developments or discoveries in physics or technology argued for such a course of action. On the other hand, we also are sensitive to the fact that a great deal of careful thought has been invested in the development of a strong high energy physics research program which extends over a two-year period, occupying valuable facilities in the Laboratory's many beam lines. Even small changes can have serious repercussions on other important studies that should not lightly be discarded or delayed.

We decided that in this case our best course of action would be a departure from previous practices, and we scheduled a special meeting at which propositions relating to rapidly developing new physics ideas could be

presented and discussed. The workshop was originally planned for a single day, but the influx of proposals demanded an extension to a second day. The panel which was convened for the occasion consisted of R. Diebold, chairman; B. Lee; P. Piroué; G. Snow; and S. Wojcicki. Three of the panel members are also members of the regular Program Advisory Committee.

On December 9 and 10, we heard from about twenty different groups with ideas to present relating to the recent discoveries at SLAC and BNL, and the new opportunities that seemed to present themselves as a result of those discoveries. In the main, we tried to focus the meeting on proposals involving more or less minor changes in the running plans of approved experiments which already have equipment arrayed in the experimental areas. Proposals involving entirely new experimental setups require longer range planning and installation, and can, for the most part, be considered at later, regular meetings of the PAC.

Of the approximately twenty presentations for changes in running plans and new studies that were made before the panel in December, we have now approved about one-third. One of these, the aforementioned Particle Search # 357, is a major new experiment in which the identification of charmed mesons will be explored directly by observing the possible decays into a π^- and K-final state. Other program changes are less far-reaching, involving, for the most part, minor add-ons of equipment and running time or even trade-offs of running time which had already been approved for other purposes.

We expect the next six months to be even more active than the last.
Happy New Year!

Reported by E. L. Goldwasser

THE USERS OFFICE ACTIVITIES AND STAFF

Since the spring of 1974, there has been a new information and communications center for experimenters working on site--the Users Office, located on the east side of the first floor in the Central Laboratory behind the elevators. Organized by Cynthia Sazama, the office is able to respond to the needs of researchers in addition to its responsibilities to the Laboratory. Cynthia has recently been joined by Phyllis Hale, who was transferred from the former Visitors Center. Much of the paperwork associated with the registration of new users on site, such as the issuance of identification cards, vehicle stickers, temporary radiation badges, and the like, is now handled by the Users Office. Copies of NALREP and the Procedures for Experimenters booklet are available there, as is other detailed information which experimenters should find useful.

In addition, the Users Office maintains a message center and a mail station where incoming mail will be held for pickup by users who do not have permanent office assignments elsewhere on site. Phyllis and Cynthia will assist visiting experimenters with occasional typing, make arrangements for meetings, and provide temporary office space for short-term visitors (less than one month). They will also arrange for the typing of reports and technical papers through an outside agency--the typist's fee is, of course, charged to the experimenter's work package account. The office also has bicycles available for rent by experimenters. They are rented on a first-come, first-served basis at the rate of \$2.00 per month.

The Users Office provides administrative assistance to the Users Executive Committee, and maintains the files and membership list of the Fermilab Users Organization. Suggestions and comments directed to the Users Executive Committee may be sent to the Chairman in care of the Users Office, Fermilab, P.O. Box 700, Batavia, Illinois 60510.

Experimenters are encouraged to notify the Users Office (Ext. 3136) of their presence and their planned whereabouts while visiting the Laboratory so that telephone calls and mail may be forwarded to them. All users are invited to stop in the office and get acquainted.

REPORT FROM THE USERS EXECUTIVE COMMITTEE

Since the September issue of NALREP, the Users Executive Committee has established a number of subcommittees. Users are urged to contact members of these subcommittees with any questions or ideas they wish to express. The subcommittees are:

Film Analysis Facility	R. Lander, W. D. Walker, M. L. Stevenson
Satellite Machine Shops	R. Lander, J. Peoples
Computers	T. Ferbel, M. Law, L. Hand
Housing, Site Transportation, and Paved Roads	T. Ferbel, U. Nauenberg, M. L. Stevenson
Stockrooms	D. Caldwell
<u>Procedures for Experimenters</u>	M. L. Stevenson
Experimental Areas	
Proton	U. Nauenberg
Neutrino	M. L. Stevenson, L. Hand
Meson	J. Rosen
Bubble Chambers	W. D. Walker
Internal Target	T. Ferbel
Recreation	W. Lee

At the meeting on November 9, these subcommittees reported to the full Users Executive Committee, and some of their recommendations were transmitted to the Director. For example, we requested that the entrances to the Meson and Proton Areas be paved, and that those parking lots be paved. We also asked that Batavia Road be widened to accommodate bicycle traffic.

The FAF subcommittee reported on the need for a simple film measurer and/or scanner in the Film Analysis Facility which could be used by experimenters to determine the quality of their experimental data.

There was some discussion about the stockrooms, and it was decided that more information regarding users' stockroom needs should be obtained. A questionnaire has been sent to all users on site requesting general opinions about the stockroom, ideas for improvement, and the like.

The question of satellite machine shops was brought up, and action has been taken to remedy the problem. Better satellite shops should be available for users at the Laboratory in the near future.

Fermilab taxi service is now available between the Laboratory and the Continental Air Transport Company bus stop in Batavia. Users are encouraged to take advantage of this service. Detailed information about the schedule may be obtained from the Users Office. If enough people use this means of transportation, we may be able to arrange for the bus to stop at the Pine Street entrance to the Laboratory on Kirk Road, or even at the Central Laboratory. On-site users have been questioned to determine how many would use this service if it were implemented.

A major topic of discussion was computing. There is need for another CDC-6600 computer on site. A search for one is underway, and the Director is aware of the need. We also discussed the interactive BISON-NET system which will be operational shortly. We feel that there has been very little user input into its design, and have suggested that a Laboratory "working computer committee," similar to the PREP Committee, be established with users represented, to provide input to the Fermilab Computer Department.

The Users Center is now in full swing. Users at the Laboratory are urged to gather there for informal meetings. USERS MUST PATRONIZE THE CENTER IF THEY WANT IT TO IMPROVE OR EVEN CONTINUE! So go there to relax and have a good time. It's up to you.

Reported by U. Nauenberg
For the Users Executive Committee

USERS CENTER ADVISORY COMMITTEE APPOINTED

The Director has appointed a Users Center Advisory Committee to provide the Laboratory with a continuing source of information pertinent to the operation of the Center. The function of this Committee will be to make recommendations to the Laboratory from which a set of written procedures will be established and to advise the Laboratory on the activities of the Center. The Committee consists of five members, each appointed to serve a one- or a two-year term. The Committee members are: L. Lederman, J. Rosen, L. Stutte, P. Limon, S. Mukhin, and C. Sazama (ex officio). They were selected from nominations made by the Users Executive Committee.

IN MEMORIAM--DARRELL J. DRICKEY

All of the high energy physics community was saddened by the death, in December, of Darrell Drickey, following a brief illness. Many recent activities of the Users Executive Committee were initiated under his enthusiastic chairmanship of that committee.

Drickey, Associate Professor of Physics at the University of California at Los Angeles, was on leave to work on superconducting accelerator technology at Fermilab at the time of his death. He was also associated with the pion form factor experiment, #216. Survivors include his wife and three children.

Contributions to the Darrell Drickey Memorial Fund, intended to assist in the education of the children, may be sent to H. Ticho in the Department of Physics at UCLA or to H. Peterson in the Directors Office at Fermilab.

NOTES AND ANNOUNCEMENTS

MORE DETAILS OF THE SPRING PAC MEETING. . .

The Program Advisory Committee will next meet at Fermilab on March 20 and 21, 1975. The outcome of the Muon Workshop held on January 17 will be discussed, and the progress of the particle search experiments which were approved at the special meeting on December 9 and 10 will be reviewed. If results are available from Experiments # 161 and # 163A, there may be a limited discussion of proposals on hand for 30-inch bubble chamber experiments requiring neon-hydrogen fills. The deadline for the submission of materials to be considered at this meeting is February 20, 1975.

EXTENDED SUMMER MEETING PLANNED FOR PAC. . .

The Program Advisory Committee will meet in Aspen, Colorado, from June 21 through 27, 1975. This extended meeting will include a comprehensive review of the entire Fermilab experimental program. Special emphasis is planned for 15-foot bubble chamber neutrino proposals requiring neon-hydrogen and deuterium fills. The deadline for submission of materials to be considered at this meeting is May 21, 1975.

PROCEDURES FOR EXPERIMENTERS 1975 NOW AVAILABLE. . .

The Laboratory has just issued the 1975 edition of the Procedures for Experimenters booklet. It has been thoroughly revised since last year, so that it remains timely and informative. As before, the booklet covers the major Laboratory policies which affect users, and in addition, acquaints them with the safety requirements of Fermilab. The booklet attempts to familiarize experimenters with the resources available at the Laboratory and the ways in which the Laboratory is organized to assist them in accomplishing their high energy physics objectives.

The Procedures booklet contains seven chapters. Following a description of the Laboratory and its organization, there is an extensive chapter on the safety requirements. This is supplemented by an appendix on radiation safety. The third chapter contains general information for users, including a considerable discussion about the emergency services available at the Laboratory on an around-the-clock basis.

Chapter 4 covers the administrative arrangements at the Laboratory, including the use of stockrooms and purchasing. Experimenters' support services are covered in Chapter 5. Included in this chapter are descriptions of services provided by many groups throughout the Laboratory.

Chapter 6 covers experimental programming and describes in some detail what is involved in the approval process for proposals made to Fermilab, and the scheduling of experiments. The last chapter describes the policies on publications and the information resources available at Fermilab.

It is our intention that a copy of this booklet be available to each individual who works at the Laboratory in the coming year. We ask that a user, when first coming to the site, stop at the Users Office, pick up a copy of the booklet, and make the necessary arrangements for registering at the Laboratory. In addition, copies of the Procedures booklet are sent to Spokesmen for all approved experiments.

NEW ASSIGNMENTS IN THE RESEARCH DIVISION. . .

Several changes in administrative assignments were made within the Research Division at the start of 1975. After a year of high productivity in the Neutrino Area, R. Huson has turned over the Department Head assignment to R. Lundy, who will be assisted by L. Voyvodic. J. Lach has left the Chairmanship of the Physics Department; T. Yamanouchi has become the Department Head and will be assisted by F. Nezrick. In the Meson Department, C. Brown has become Assistant Head to P. Koehler. Other department assignments remain the same as before, and all are described in the recently issued Procedures for Experimenters 1975.

These changes represent the continuing evolution of the Laboratory and the sharing of the administrative responsibilities among members of the staff. Research Division headquarters are located on the 2nd floor west of the Central Laboratory, where R. Orr and T. Toohig have their offices. They are available to help experimenters work with the departments within the division.

PLEASE NOTE. . .

About Housing: In response to requests from many users, one-third of the rooms in on-site housing facilities are now equipped with extra-long beds. These rooms are rented on a first-come, first-served basis, on request. Dormitory # 3 has been designated as the "quiet facility." Televisions, stereos, radios, and the like are not permitted in this residence, and there is no public lounge area, although there is a kitchen.

During the academic year, single rooms are more available on-site on short-term notice. Experimenters are encouraged to avail themselves of these facilities. Room rates range from \$5.50 to \$10.00 per night.

The Housing Office is now making plans for accommodations for next summer. Since there is always an influx of experimenters during the summer months, the office has established a date for receipt of reservations for on-site housing. All requests for summer housing should be received in the Housing Office by March 30, 1975. There is no guarantee that receipt of a reservation by that date will ensure on-site accommodations, but every attempt will be made to meet such requests. In the event that on-site facilities are filled, the Housing Office will assist experimenters in finding off-site accommodations.

Lights: To save energy, all lighting in the Central Laboratory except that on the computer floors, in the library, and in the Operations Center is turned off each evening at 7:00 p. m. The guard on duty at the front door will turn on lights elsewhere in the building upon request.

Guest Office: The Visitors Center has become the Guest Office.

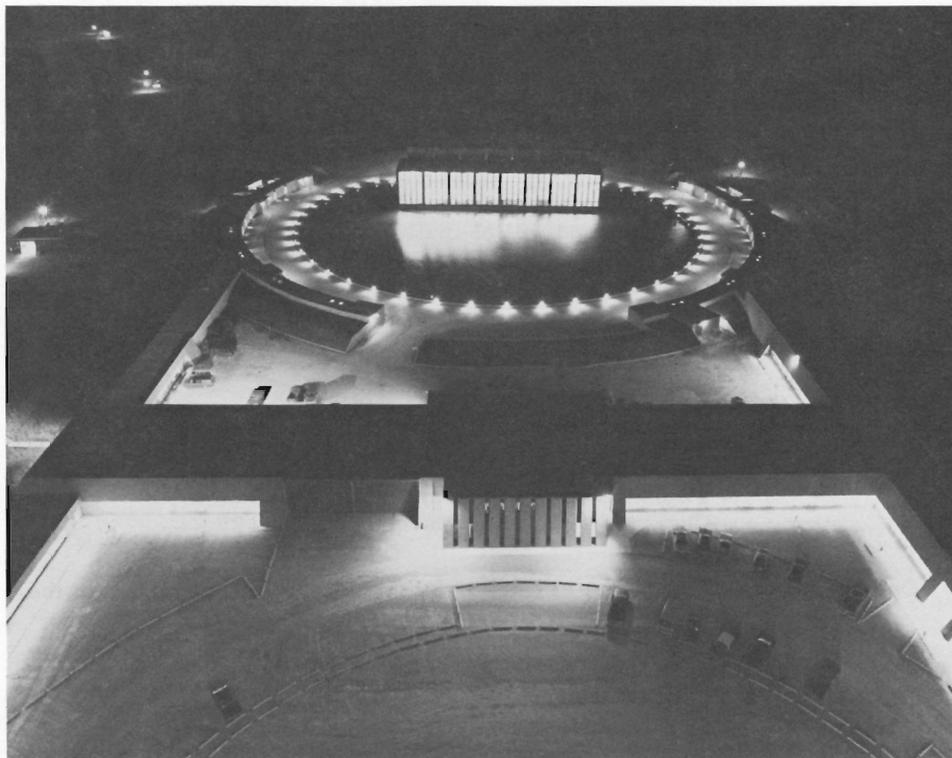
Staffed by Sandra Cox, it provides personal assistance to newcomers to the Fermilab area. The "Cultural Calendar," containing lists of movies and other activities in the vicinity, is issued weekly from the Guest Office; it is distributed widely on site, and will be mailed to each experimenter's local home address upon request.

Holidays: The Laboratory holidays scheduled for 1975 are as follows:

New Year's Day	January 1
Memorial Day	May 26
Independence Day	July 4
Labor Day	September 1
Thanksgiving	November 27 and 28
Christmas	December 24 and 25

On these days, all offices at Fermilab will be closed. The operation of the accelerator and experimental areas will be determined in advance on the Weekly Operations Schedule.

IPP Summer School: The Institute of Particle Physics International Summer School will be held at McGill University in Montreal, Canada, from June 16 through 21, 1975. This year's topic will be "Experimental Status and Theoretical Approaches in Physics at the High Energy Accelerators." Persons interested in attending should write to: Secretary, IPP; Department of Physics, McGill University; P. O. Box 6070, Station A; Montreal, Quebec, Canada, H3C 3G4.



View from the thirteenth floor of the Central Laboratory, over the booster pond. Linac Gallery is on the right and Transfer Gallery is on the left. They are connected by the Cross Gallery, in which the accelerator control room is located. Lights in the background on the left are on service buildings along Main Ring Road. (Photo by Fermilab photographers)

PAGE 2 EXPERIMENTAL PROGRAM SITUATION REPORT (CONT'D)

AREA-TEAM	EXPERIMENT	SPONSORPERSON	EXTENT OF RUN TO DATE
	MONOPOLE #76	CARRIGAN	4 TARGETS EXPOSED
	MONOPOLE #3	FREHARD	4 TARGETS EXPOSED
	SUPER-HEAVY ELEMENTS #142	STOUGHTON	1 TARGET EXPOSED
PA -PF	PHOTOPRODUCTION #87A	LEE	950 HOURS
	D1-MUON #35A	LEE	50 HOURS
ITA-C-O	PROTON-DEUTERON SCATTERING #186	MELISSINDS	450 HOURS

C. EXPERIMENTS THAT ARE IN TEST STAGE (61)

NA -M1	PION DISSOCIATION #86A	LURATTI	100 HOURS
-M6	HADRON JETS #260	PINE	250 HOURS
	MULTIPARTICLE #110A	PINE	50 HOURS
NA -OTHER	SUPER-HEAVY ELEMENTS #285	LEDERMAN	2 HOURS
ITA-C-O	PROTON-NUCLEON INELASTIC #317	MUKHIN	100 HOURS
	PARTICLE SEARCH #363	OLSEN	

D. EXPERIMENTS BEING INSTALLED (91)

NA -M1	FORM FACTOR #216	STORK	
-M2	MUON SEARCH #335	FACKLER	
-M3	PARTICLE SEARCH #365	GARFIELD	
	PARTICLE SEARCH #366	ABELING	
	NEUTRON ELASTIC SCATTERING #248	LONGO	100 HOURS
PA -PC	D1-LEPTON #288	LEDERMAN	
-PW	PHOTON SEARCH #95A	COX	
	PARTICLE PRODUCTION #28A	WALKER	
	PROTON-PROTON ELASTIC #177A	CREAR	

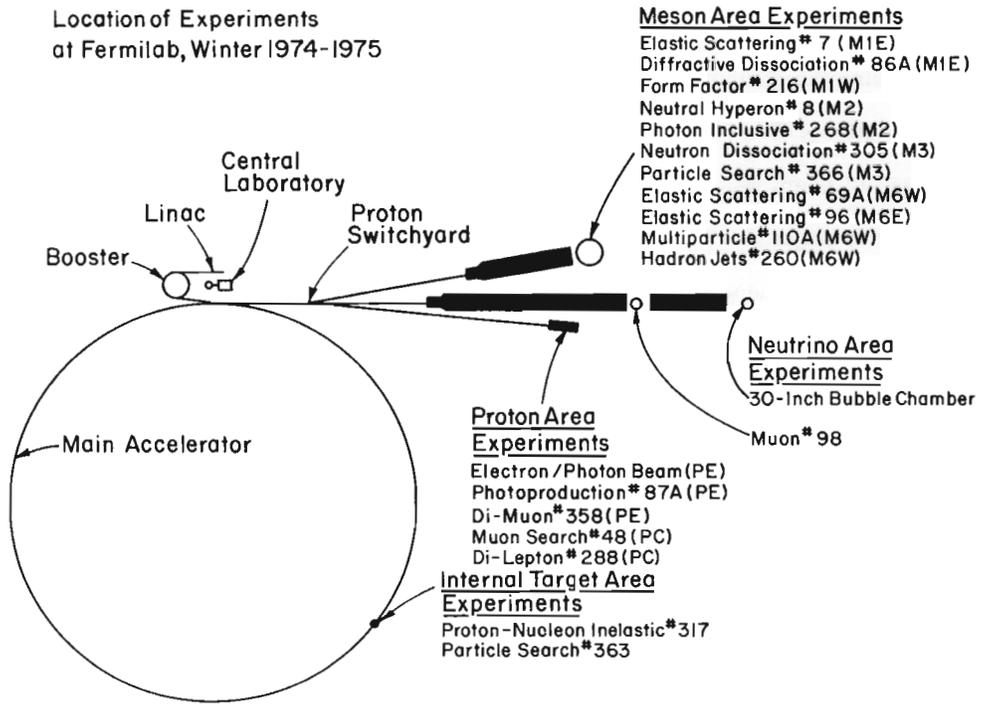
E. EXPERIMENTS TO BE SET UP WITHIN A YEAR (501)

NA -M1	PARTICLE SEARCH #154	KYCIA	
	HADRON JETS #236A	MOCKETT	
	POLARIZED SCATTERING #61	CHAMBERLAIN	
-M2	INCLUSIVE SCATTERING #324	WELSBORG	
	NEUTRAL MESON INCLUSIVE #390	KENNEY	
	TEST HADRON JETS #246	SELWIE	
	PARTICLE SEARCH #357	MEYER	
-M3	TEST PARTICLE SEARCH #330	GUSTAFSSON	
-M4	K-SHORT-LIFE REGENERATION #226	ROSENBERG	
-M6	INCLUSIVE SCATTERING #118A	FRIEDMAN	
NA -NEUTRINO	15-FOOT NEUTRINO/PIZDAE #296	FERY	
	15-FOOT NEUTRINO/PIZDAE FOR NE #53A	BALATY	
	15-FOOT ANTI-NEUTRINO/PIZDAE #180	NEZICK	
	15-FOOT ANTI-NEUTRINO/PIZDAE #172	RINGHAM	
	NEUTRINO #254	KALBREITEN	
	NEUTRINO #310	CLINE	
-MUDA/HADRON	D1-MUON #331	PFLICHER	
-15-FT	15-FOOT PI - P @ 100 #33A	STACAKI	
	15-FOOT PI+P - P @ 150 #36	KO	
-30-IN	30-FOOT PI - P @ 200 #89	FREITER	
	30-INCH PAAR - P @ 100 #311	NEALE	
	30-INCH HYBRID #281	SMITH	
	30-INCH HYBRID #299	PLESS	
-OTHER	30-INCH PAAR - P @ 30-60 #344	GUSTY	
	30-INCH PAAR - P @ 100 #345	PKUPONG	
	DETECTOR DEVELOPMENT #327	ALLISON	
	EMULSION/PROTONS @ 200 #271	GOTTFRIED	
	EMULSION/PROTONS @ 400 #238	LORD	
	EMULSION/PROTONS @ 400 #263	NOU	
	EMULSION/PROTONS @ 400 #265	JAIN	
	QUARK #276	VAN GINNEKEN	
	EMULSION/PROTONS @ 400 #240	GIROLA	
	EMULSION/PROTONS @ 400 #251	KUSUMOTO	
	EMULSION/PROTONS @ 400 #265	YOUNG	
	EMULSION/PROTONS @ 400 #270	YANG	
	EMULSION/PROTONS @ 400 #292	GOTTFRIED	
	EMULSION/PROTONS @ 400-500 #320	TRITAKOVA	
	EMULSION/PROTONS @ 400 #336	OGATA	
	EMULSION/PROTONS @ 400 #365	SACIDON	
	EMULSION/PI - P @ 200 #339	GIROLA	
	EMULSION/PI - P @ 200 #342	JAIR	
	EMULSION/PROTONS @ 400 #366	EKSPONG	
NA -PE	PHOTON TOTAL CROSS SECTION #25A	CALDWELL	
	PARTICLE SEARCH #300	CRONIN	
	D1-MUON #325	CRONIN	
-PE	EMULSION/ELECTRONS @ M1 E #360	DAKE	
	MUON SEARCH #368	ADAIR	
ITA-C-O	PROTON-NEUTRON INELASTIC #301	LEE-FRANZINI	
	PROTON-NUCLEON SCATTERING #108B	ILSEIN	
	NEUTRON-NEUTRON POLARIZATION #313	MEAL	

F. OTHER APPROVED EXPERIMENTS (187)

NA -M2	EMULSION HYBRID #307	LIACH	
-M4	ASSOCIATED PRODUCTION #80	BUTSON	
	BACKWARD SCATTERING #290	BAKER	
NA -NEUTRINO	MUON/PIZDAE #356	BARISH	
-30-IN	30-INCH P - P @ 400 #19A	ENGELMANN	
	30-INCH PI - P @ 400 #330	YAGER	
	30-INCH P-P @ 400 #170	MANDEL VELDE	
	30-INCH PI - P @ 2 MI E #215	OLDENBERG	
	30-INCH PI - P @ 200 #177	BARNEIS	
-OTHER	30 INCH P - P @ 200 #207	ENGELMANN	
	DETECTOR DEVELOPMENT #206	POFFENBERG	
	DETECTOR DEVELOPMENT #37	HOB SCATTER	
PA -PH	PHOTOPRODUCTION #250	HOFER	
	PHOTOPRODUCTION #268	CHEN	
-PW	MUON SEARCH #307	GOODRICH/STAN	
	PHOTON INCLUSIVE #228	PATRICE	
	C-TEST #300	CESTEN-WERDE	
ITA-C-O	PROTON-HELIUM SCATTERING #309	MALAMUD	

Location of Experiments
at Fermilab, Winter 1974-1975



FACILITY UTILIZATION SUMMARY -- DECEMBER 1974

In December the high energy physics research program was limited to three rather short intervals as the result of a scheduled two and one-half week period for facility maintenance and development, and two standby periods, totaling some seven shifts over the Christmas and New Year's holidays. The major accomplishments included a highly successful and efficient startup and tuneup of the accelerator systems, within three days following the shutdown, and a significant segment of data-taking by Photoproduction # 87A / Di-Muon # 358 in the Proton Area in the limited period that 300-GeV beam was available. The smooth startup was achieved despite the fact that major work was performed during the shutdown on main-ring magnets and radio-frequency systems, booster rf and safety systems, the linac injector, and the accelerator switchyard. Of the 248 hours scheduled for the experimental program in December, useful beam was available some 71% of the time. Accelerated beam intensity was gradually increased from about 0.5 to nearly 1×10^{13} protons per pulse by the end of the month.

Startup with all systems operational began on December 18, and by late evening on the 20th, beam was once again available for the experimental program. All four areas made use of the beam during the remainder of the month, with the accelerator operating in the slow-spill-only mode.

Photoproduction # 87A in Proton-East was the only running experiment in the Proton Area. The group's primary effort was to continue studies on the production of heavy mass particles by photons, which had begun just prior to the shutdown period. The two sections of deuterium filter in the

neutral beam operated satisfactorily during the running time logged by the experiment during December, although there was considerable difficulty with the initial filling operation.

Beam to the Neutrino Area was delivered primarily on the triplet trainload target, with some slow spill split into the bypass. The first several days of the month were spent tuning the target train and muon beam line, after which Muon #98 tuned their apparatus and began a data run using the liquid hydrogen target. Meanwhile, the slow spill in the bypass was used for tuning and testing to produce an antiproton beam in the hadron line to the 30-inch bubble chamber. Cooldown of the 30-inch chamber began immediately after the Christmas standby period in preparation for an antiproton run at 100 GeV/c.

In the Meson Area, activities were concentrated on data collection by Elastic Scattering # 7 (working at 50 GeV/c because repairs to the M1 beam septum magnets were not complete), and on final tuneup and preliminary data taking by Neutral Hyperon # 8. Neutron Dissociation # 305 and Hadron Jets # 260 have been setting up and checking out apparatus since the startup and the Di-Muon # 337 group made two short data runs.

In the Internal Target Area, Particle Search # 363 set up their equipment and ran for a portion of the time using a downstream rotating carbon-fiber target for checking and tuning equipment, and for some preliminary data taking. Proton-Neutron Inelastic # 317 also used some beam time to calibrate their detectors and check other equipment. Repair work on the vacuum leak in the gas jet target continued through the month.

A summary of the accelerator utilization for the month of December follows:

I. Summary of Accelerator Operations

	<u>Hours</u>	
A. Accelerator use for physics research		
Accelerator physics research	13	
High energy physics research	175	
Research during other use	<u>(42)</u>	
Subtotal		188
B. Other activities		
Accelerator setup and tuning to experimental areas	35	
Scheduled interruption	369	
Unscheduled interruption	<u>96</u>	
Subtotal		500
C. Unmanned time	56	<u>56</u>
Total		744

II. Summaries of High Energy Physics Research Use

	<u># of Expts.</u>	<u>Hours</u>	<u>Results</u>
A. Counter experiments	14	970	
B. Bubble chamber experiments	0	-	
C. Emulsion experiments	0	-	
D. Special target experiments	1	14	1 Target
E. Test experiments	1	1	
F. Engineering studies and tests	2	138	
G. Other beam use	<u>-</u>	<u>50</u>	
	18	1173	

III. Number of Protons Accelerated and Delivered ($\times 10^{17}$)

		<u>Protons @ 300 GeV</u>
A.	Beam accelerated in main ring Total	5.33
B.	Beam delivered to experimental areas	
	Meson Area	1.31
	Neutrino Area	
	Main beam	3.10
	Bubble chamber beam (estimated)	0.05
	Proton Area	<u>0.35</u>
	Total	4.76

IV. Beam Utilization by Experiment

		<u>Hours</u>	
A.	Meson Area		
	Elastic Scattering # 7	148.6	
	Neutral Hyperon # 8	132.6	
	Neutron Backward # 12	15.0	
	Multiparticle # 110A	14.3	
	Hadron Jets # 260	134.3	
	Photon Inclusive # 268	14.3	
	Neutron Dissociation # 305	127.4	
	Di-Muon # 337 Tests	1.0	
B.	Neutrino Area		
	Neutrino # 1A	10.0	
	Monopole # 76	14.4	1 Target
	Muon # 98	112.4	
	Tachyon Monopole # 202	-	Cosmic ray running
C.	Proton Area		
	Lepton # 70	14.8	
	Photoproduction # 87A	146.3	
D.	Internal Target Area		
	Proton-Nucleon Inelastic # 317	4.9	
	Particle Search # 363	<u>95.5</u>	
	Total	985.8	

MANUSCRIPTS AND NOTES PREPARED
DURING NOVEMBER AND DECEMBER 1974

Copies of preprints with Fermilab publication numbers can be obtained from the Publications Office or Theoretical Physics Department, 3rd floor east, Central Laboratory. Copies of all articles listed are on the reference shelf in the Fermilab Library.

Experimental Physics

- V. Bartenev et al.
Experiment #36 Proton-Proton Diffraction Dissociation at Incident Energies from 175 to 400 GeV [Physics Letters 51B, 299 (1974)]
- F. T. Dao et al.
Experiment #37 Negative Results of a Search for Alignment in High Energy Collisions (FERMILAB-Pub-74/82-EXP; submitted to Physics Letters)
- F. T. Dao et al.
Experiment #37A Evidence for Double Diffraction in pp Interactions at 300 GeV/c (FERMILAB-Pub-74/101-EXP; submitted to Phys. Rev. Letters)
- S. B. Kaufman and
M. W. Weisfield
Experiment 81A Recoil Properties of ^{24}Na and ^{28}Mg Formed by the Interaction of ^{197}Au and ^{238}U with 3-300 GeV Protons (Submitted to Phys. Rev. C)
- J. Whitmore et al.
Experiment 141 Invariant Cross Section for the Inclusive Reaction $p + p \rightarrow p + X$ at 205 GeV/c (Submitted to Phys. Rev. D)
- W. Busza et al.
Experiment #178 Preliminary Results on the Multiplicity in π -Nucleus Interactions at 100 and 175 GeV/c, and Models of the Space-Time Development of Particle Production (Invited paper presented at the Topical Meeting on High Energy Collisions Involving Nuclei, Trieste, 8-14 September 1974)
- V. A. Tsarev
Experiment #186 Nucleon Diffractive Dissociation II. Energy Dependence of the Low Missing Mass Cross Section and Constraints on Triple Regge Couplings (FERMILAB-Pub-74/103-THY/EXP; submitted to Phys. Rev. D)
- G. Giacomelli Recent Experimental Results from the CERN-ISR (FERMILAB-Pub-74/106-EXP; invited paper at the 1974 SLAC Summer Institute on Particle Physics)

M. Atac and
C. Ankenbrandt High Accuracy Parallel Foil Drift Chamber
(FERMILAB-Conf-74/108-EXP; submitted to the
XIV Scintillation and Semiconductor Counter
Symposium, Washington, D. C., 11 December
1974)

Theoretical Physics

M. B. Einhorn and
G. C. Fox Precocious Scaling and Duality in the Quark-
Parton Model--A Reformulation
(FERMILAB-Pub-74/57-THY; submitted to
Phys. Rev. D)

R. Savit and J. Bartels Fermion-Pomeron Interactions in a Reggeon
Field Theory (FERMILAB-Pub-74/61-THY;
submitted to Phys. Rev. D)

S. L. Adler Some Simple Vacuum Polarization Phenomenology:
 $e^+e^- \rightarrow$ Hadrons; The μ -Mesic Atom X-Ray
Discrepancy and $g_\mu - 2$ (FNAL-Pub-74/63-THY;
submitted to Phys. Rev. D)

R. Dashen et al. Non-Perturbative Methods and Extended Hadron
Models in Field Theory I. Semi-Classical
Functional Methods (FERMILAB-Pub-74/83-THY;
submitted to Phys. Rev. D)

R. Dashen et al. Non-Perturbative Methods and Extended Hadron
Models in Field Theory II. Two-Dimensional
Models and Extended Hadrons (FERMILAB-Pub-
74/84-THY; submitted to Phys. Rev. D)

M. K. Gaillard et al. Search for Charm (FERMILAB-Pub-74/86-THY;
submitted to Phys. Rev. D)

S. L. Adler Application of Current Algebra Techniques to
Neutral-Current-Induced Threshold Pion
Production (FERMILAB-Pub-74/90-THY; sub-
mitted to Physics Letters)

R. Dashen and
G. L. Kane Counting Hadron States (FERMILAB-Pub-74/92-
THY; submitted to Phys. Rev. Comments and
Addenda)

M. B. Einhorn and
F. S. Henyey Are There Rescattering Corrections to Inclusive
Reactions (FERMILAB-Pub-74/99-THY; sub-
mitted to Nuclear Physics B)

- C. Quigg et al. Direct Evidence for Independent Emission of Clusters (FERMILAB -Pub-74/100-THY; submitted to Phys. Rev. Letters)
- C. Quigg Local Quantum Number Compensation in Multiple Production (FERMILAB -Pub-74/104-THY; submitted to Phys. Rev. D)

General

- C. Benvenuti Vacuum System for Proton Storage Rings Equipped with Superconducting Magnets (FERMILAB -74/109)
- D. C. Carey The Effect on the Quality of High Energy Beams of Non Linearities in the Field of Magnetic Quadrupoles (Submitted to Nucl. Instr. and Methods)
- K. C. Seino Power Failure Detection Circuit Automatically Restarts Even After Momentary Failure (Submitted to Electronics)

Physics Notes

- J. R. Sanford FN-262 Particle Beams at Proton Accelerators (Invited talk at the 24 April 1974 APS Meeting)
- D. A. Edwards et al. FN-263 The Energy Doubler Design Study --A Progress Report
- F. E. Mills et al. FN-264 Cryogenic Energy Storage System Design Report (Fermilab/University of Wisconsin Collaboration)
- L. Voyvodic FN-265 Neutrino Target-Detector with Triggered Bubble Chamber Modules
- L. Voyvodic FN-266 Nuclear Emulsion-Streamer Chamber Method for Tagging Hadronic Interactions with Nuclei and Searching for Charmed Particle Decays
- L. C. Teng FN-267 "Depolarization" of a Polarized Proton Beam in a Circular Accelerator
- R. A. Carrigan, Jr. FN-270 On the Possibility of a Psi Particle Beam Using Production Channeling

DATES TO REMEMBER

February 20, 1975	Deadline for receipt of material to be considered at the spring meeting of the Fermilab Program Advisory Committee (see page 15).
March 20-21, 1975	Spring meeting of the Fermilab Program Advisory Committee.
March 21, 1975	Fermilab Arts Series: An Evening of Dance. Tickets available in Guest Office.
March 30, 1975	Requests for summer accommodations should be received in the Housing Office.
May 2-3, 1975	Annual meeting of the Fermilab Users Organization.
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.

THE 1971-72 BUDGET

Meeting for review of the budget to be
 considered at the next meeting of the
 Finance Committee. (1971-72)

Meeting for review of the Finance
 Committee. (1971-72)

Meeting for review of the Finance
 Committee. (1971-72)

Meeting for review of the Finance
 Committee. (1971-72)

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 Committee. (1971-72)

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 Committee. (1971-72)

Meeting for review of the Finance
 Committee. (1971-72)

Meeting for review of the Finance
 Committee. (1971-72)

February 10, 1972

March 10-11, 1972

April 11, 1972

May 10, 1972

May 20, 1972

June 10, 1972

June 20, 1972

July 10, 1972