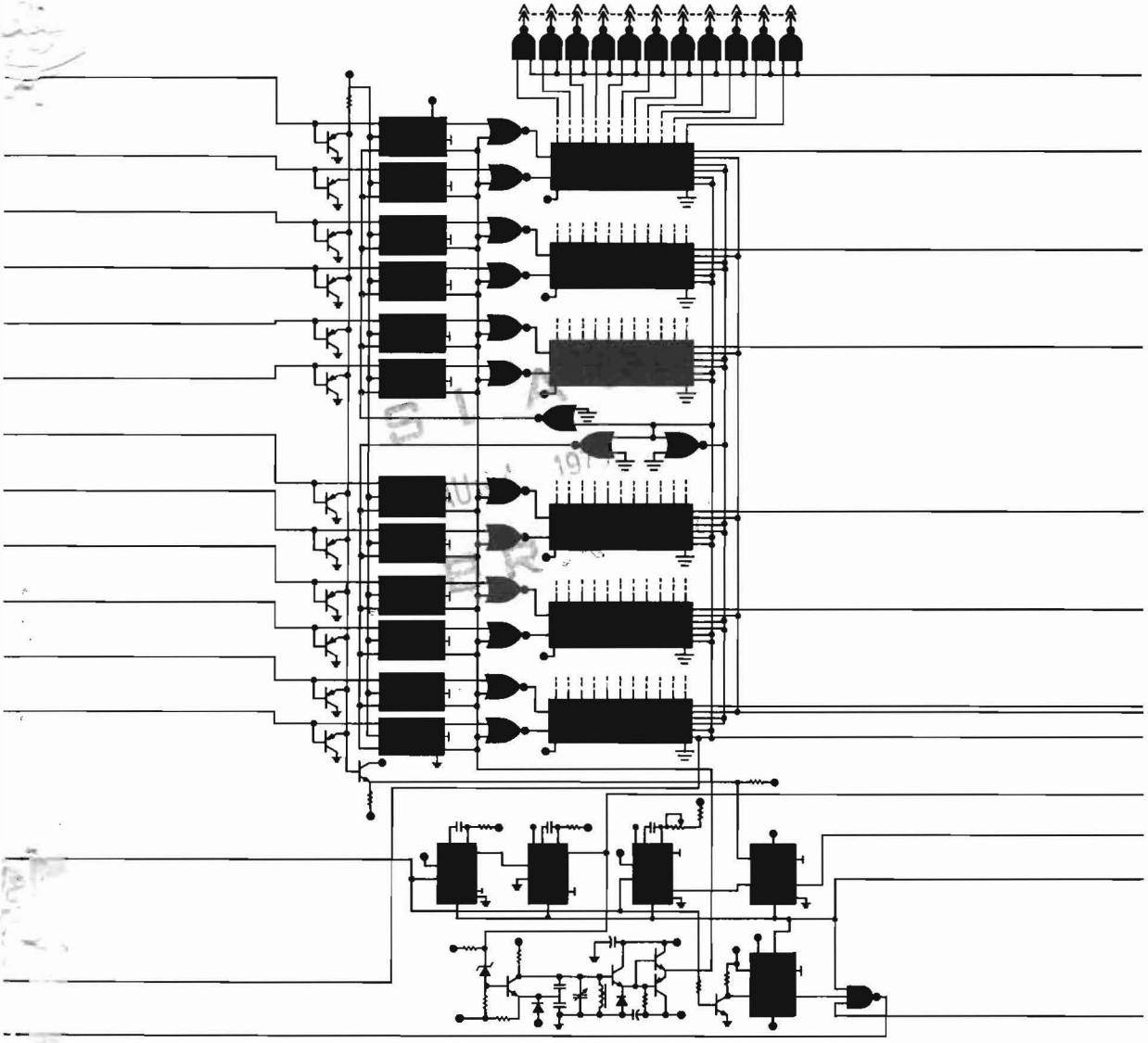
NALREP



Monthly Report of the Fermi National Accelerator Laboratory

July 1975

Fermi National Accelerator Laboratory

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

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THE COVER: Electronic schematic of a portion of a CAMAC module in the Physics Research Equipment Pool (PREP). Circuits like this one make extensive use of ECL (Emitter-Coupled Logic), TTL (Transistor-Transistor Logic), and CMOS (Complementary Metal-Oxide Semiconductor) integrated circuits, as well as the more traditional discrete components (transistors, diodes and the like). To minimize the complexity of schematics, symbolic figures are used to indicate the logical functions of transistor arrays in integrated circuits. (Drawing by A. Gonzales)

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SOME COMMENTS ON THE SUMMER PAC MEETING

The Fermilab's Program Advisory Committee met for its annual, extended meeting during the week of June 20 to 27. Eighty previously "unconsidered" or "deferred" proposals were placed before the Committee for consideration. All in all, just under one hundred proposals had been submitted since the summer PAC meeting of a year ago. The year has therefore been a busy one for the PAC as well as for the Laboratory. The physics which has been done has been rewarding, and the promise of interesting new work in the future is brighter than ever.

From a statistical point of view, the PAC provided advice on all eighty proposals at their June meeting. After the discussion of proposals, 20 were approved, 15 rejected, and 45 others retained in a "deferred" status.

The Committee spent an afternoon, early in the meeting, discussing broad questions of program balance, funding limitations, and research policy. The approaching operation of the CERN SPS was discussed, with emphasis on its possible influence on Fermilab plans and facilities. The degree to which similar facilities and similar experiments should be encouraged, tolerated, or discouraged was one topic of conversation. No final conclusions were reached, but it was recognized that the increasing pressures of limited funding and finite capabilities make it necessary periodically to re-evaluate the basic assumptions which determine the Fermilab program.

Along the same lines, the relative priority of the physics being explored in the beam lines and experimental areas was discussed. It was pointed out that if a particular beam line or experimental area were found to be used for

significantly less interesting physics than others, consideration should be given to shutting down that facility. Independent of installation and rigging costs, there is a real cost associated with every activity undertaken in an experimental area. Again, no specific recommendations were made to curtail activities at this time.

General aspects of the hadron bubble chamber physics program were discussed at some length. The Laboratory already has commitments to hadron bombardments totaling about 1.7 million pictures. There is a backlog of proposals requesting several times that number of pictures. (For the 15-foot chamber, proposals have been submitted requesting about 2.7 million pictures.) It is not possible to run both the 30-inch and the 15-foot chambers simultaneously at present. There is not sufficient crew to run the two chambers together, and the beam facilities are not adequate for providing independent exposures in the two chambers.

The Laboratory's program projections call for alternate, approximately equal running of the two chambers. The 15-foot chamber program is dictated primarily by the high priority demand for neutrino bombardments. Up to the present, these bombardments have been made with a broad-band neutrino beam. This conflicts with use of the dichromatic beam train load. Furthermore, the high intensity, short-spill beam required for neutrino bubble-chamber bombardments is not compatible with the high intensity, long-spill beam required for the muon physics program. Thus, the commitments to dichromatic neutrino physics and to muon physics are the principal constraints which limit the neutrino program in the 15-foot bubble chamber to about half-time.

When the 15-foot chamber is running for neutrino physics, it is also possible to pulse it a second time in the same accelerator spill, the second expansion being used for a hadron bombardment (requiring only a negligible number of primary protons). Thus the natural programming arrangement for hadron physics in bubble chambers, under the present constraints, is to run the 15-foot chamber for one hadron picture per accelerator pulse for about six months of the year, and to run the 30-inch chamber in a multiple-pulsing mode for the other half of the year. Such scheduling could yield about a million hadron pictures in the 15-foot chamber each year, and perhaps two million pictures in the 30-inch chamber. Operating experience during the next year will give a firmer estimate of the number of pictures that can realistically be expected.

In view of the considerable pressure for more data on hadron bombardments, both in the 30-inch and in the 15-foot chamber, and in view of the significant costs that would be entailed in increasing the rate at which data can be obtained, the PAC has recommended that a symposium be held on hadron bubble-chamber physics early this fall. The dates September 18 and 19 have been chosen. At that symposium it is intended to have summary presentations of the main accomplishments of the hadron bubble chamber physics program to date as well as presentations, by both experimenters and theorists, of the promise of the program in the future. The substance of that symposium will be reported to the PAC at its meeting in November; at that time the Committee will be asked for further advice on the priority which should be assigned to the continuing hadron physics program in bubble chambers.

About two years ago experimental groups were encouraged to start thinking about a next step in the neutrino physics program at Fermilab. A primary consideration was that, in view of the great promise of this area of research, it might be appropriate to make a further substantial investment in equipment which would add to the effectiveness with which neutrino interactions could be studied and explored. At the June meeting of the PAC, this idea was discussed further and consideration was given to some of the interim developments as well as one major proposal which had been submitted.

These discussions led to the conclusion that it is premature to make a major commitment to a next generation neutrino detector at this time. Both of the original electronic detectors are currently being improved on the basis of data already in hand. These "second generation" detectors have not yet been brought into operation but promise to give substantial new insight into neutrino interactions. Furthermore, data on neutrino interactions from the 15-foot bubble chamber are just starting to become available. Within the next year the data on hand from that instrument will be increased substantially. Finally, a new experiment involving a new detector has been approved for the study of neutrino-electron scattering. Additional valuable experience should be forthcoming from that work.

Under the circumstances, it seems wise to delay any decision on a third generation detector until more information and better understanding is available from the work already completed and presently committed.

Members of the PAC were pleased with the special meeting which was held on June 5 and 6 for the oral presentation of proposals. Most PAC members were present, and many proposals which would not otherwise have

had a hearing prior to the subsequent, regular PAC meeting were heard at that time. Because of the apparent success of that meeting, the Laboratory has been asked to set aside, before each PAC meeting during the coming year, a two-day period during which presentations of new proposals can be scheduled and heard, if it seems to be desirable as the time of the meeting approaches. One of these meetings is now tentatively scheduled for October 9 and 10, prior to a November 20 and 21 meeting of the PAC; another is scheduled for January 22 and 23, prior to a March 4 and 5 meeting of the PAC; and a final one for the year is scheduled for May 20 and 21, prior to the June meeting of the PAC. In order to plan the programs for these meetings effectively, it will be necessary to establish deadlines for the receipt of new proposals several weeks in advance of the dates of the meetings. Information pertaining to dates and deadlines for PAC-related meetings will continue to appear regularly in NALREP.

One new development, during recent months, has been the appearance of results of tests on the production of hyperons in the Meson Area M2 beam line. These tests have shown that the quality and intensity of the diffracted proton beam will not be adequate for most of the hyperon work which has been proposed. Accordingly, the Laboratory has been advised to consider constructing a new, short-lived particle beam facility, to be located downstream of the existing Proton-Central experimental area. The PAC has suggested that a workshop be held on experiments which might use such a facility, and plans are being made to schedule such a workshop in mid-December.

At the 1974 summer PAC meeting, attention was called to the relatively small backlog of experiments proposed for the Meson Area neutral beams, M3 and M4. This point was mentioned in the NALREP article which followed that meeting, and it was indicated that proposals would be welcome for experiments which would require the conversion of one or the other of those beam line configurations into an additional charged beam in the Meson Area.

At this year's meeting, this same subject was discussed further. In view of the growing financial pressure on the Fermilab program, the Laboratory was advised not to make any commitment for the conversion of a neutral beam to a charged beam unless the experiments that might thus be implemented were of equally high priority with those which were already approved and waiting to be started in other existing charged beams. (To date, the Laboratory has not committed a conversion of either of the neutral beams in the Meson Area.)

The PAC noted with satisfaction the progress that has been made with the commissioning of the 15-foot bubble chamber as an effective instrument for exploring neutrino interactions and also the commissioning of the External Muon Identifier (EMI) as an electronic supplement to the 15-foot chamber for the same studies. The Committee has suggested that the Laboratory make a detailed analysis of the desirability, the feasibility, and the cost of improving the EMI. Such an analysis will probably be carried out in collaboration with the EMI developers during the coming year.

One of the major sets of decisions taken following the PAC meeting, has been a series of approvals of neutrino and antineutrino bombardments of the

15-foot bubble chamber filled with liquid deuterium. An agreement has been negotiated with Argonne and Brookhaven so that sufficient deuterium will be available to Fermilab to fill the 15-foot chamber. The scheduling of deuterium fills for the chamber will be coordinated with the bubble chamber schedules at the other laboratories. Present schedules seem to indicate that an initial deuterium running period for the 15-foot chamber is most likely to come during the autumn of 1976, although possibly it could occur during the previous spring. The PAC expressed its concurrence with the Laboratory's plans for making that run.

The PAC noted the usefulness of the narrow-band beam for carrying out neutrino studies and advised the Laboratory to develop new systems for achieving improved dichromatic beams. Such work will be intensified during the coming year. Also, two 15-foot bubble chamber proposals were approved requiring a dichromatic beam. A new design of a horn-focused dichromatic beam has been submitted as a part of one of those proposals.

As a result of discussions with the PAC, a number of decisions have been taken by the Laboratory which will largely determine the counter physics program this year and next. In the Meson Area, new approvals have been granted for an experiment on coherent dissociation of charged hadrons including measurement of the radiative widths of resonances produced through Coulomb dissociation, an experiment on elastic scattering and diffraction dissociation using a gas target, and other work to study hadron jets. Several high-mass particle search experiments which are primarily extensions of previous work were also approved. Another experiment has been approved

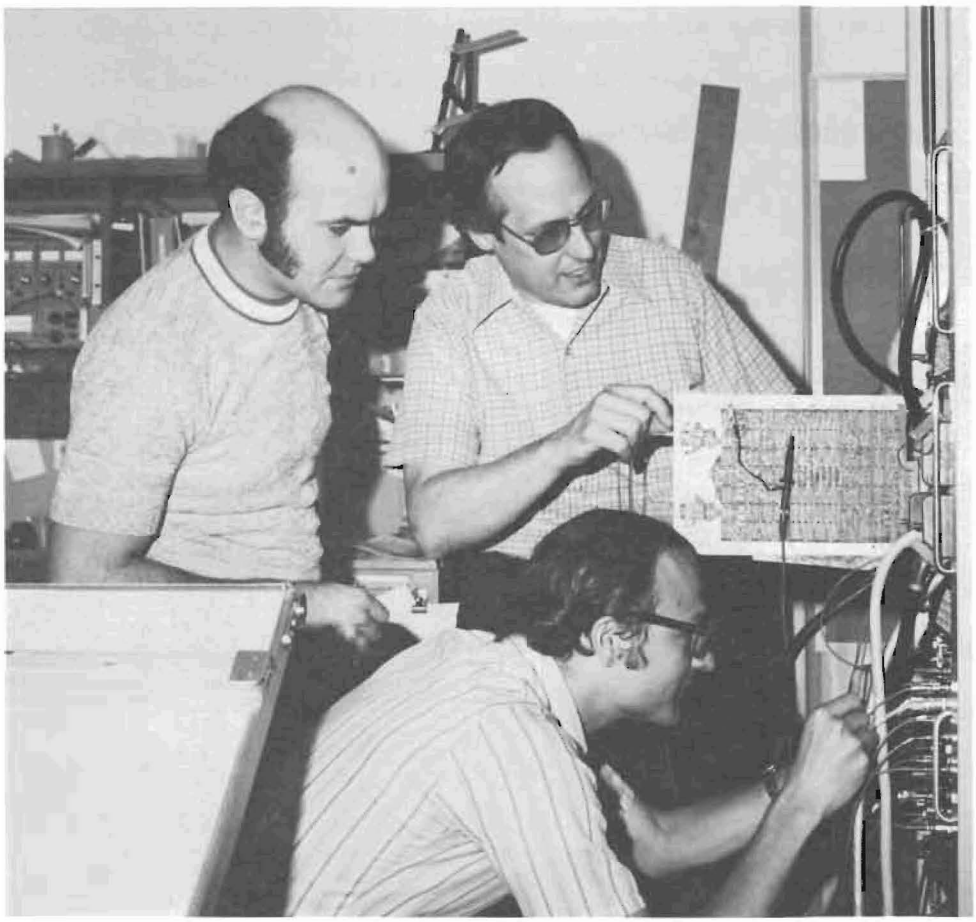
to study muon-nucleon inelastic scattering with the cyclotron magnet spectrometer in the Muon Laboratory. Two newly approved experiments will utilize the apparatus of Photoproduction # 87 in the Proton East Area: a high-mass particle search experiment using incident protons and a study of the photoproduction of high-mass particles decaying into two-body final states. Further details on these approvals and other actions can be found in the Experimental Program Situation Report which appears on pages 23 - 25.

In closing, there follows a list of the meetings that have been tentatively scheduled for the coming year, together with the dates, as now planned.

Meeting	Tentative Date
Symposium on Bubble Chamber Hadron Physics	September 18-19, 1975
Proposal Presentation Meeting	October 9-10, 1975
Program Advisory Committee Meeting	November 20-21, 1975
Workshop on Short-Lived Particle Beam Facility	December 18-19, 1975
Proposal Presentation Meeting	January 22-23, 1976
Program Advisory Committee Meeting	March 4-5, 1976
Workshop on Elastic Scattering at Large P_t (after preliminary results on Proton-Proton Elastic # 177A are available)	April 15-16, 1976
Workshop on Multiparticle Final State Experiments (after preliminary results on Multiparticle # 110A and Hadron Jets # 260 are available)	May 6-7, 1976
Proposal Presentation Meeting	May 20-21, 1976
Program Advisory Committee Meeting	June 26 to July 2, 1976 (possibly a week earlier)

Each meeting will be announced in NALREP as the plan and schedule become definite. In general all written materials to be considered at any meeting will be due in the Director's Office one month prior to the meeting. Exceptions may be allowed for the Proposal Presentation Meetings.

Reported by E. L. Goldwasser



M. Watson (L) and T. Droege testing a drift chamber time digitizer with the help of P. Shepard (below) of Form Factor #216. Fermilab is currently exploring alternative methods of digitizing drift chamber signals.

THE PHYSICS RESEARCH EQUIPMENT POOL (PREP)

Fast electronics is a major part of all counter experiments at Fermilab. The fact that most of the electronics required for high-energy physics is common to many experiments has led to the development of modular plug-in systems called NIM (Nuclear Instrumentation Module) and CAMAC (Computer Automated Measurement And Control). The flexibility of the NIM and CAMAC systems, which can be reconfigured to suit the requirements of each experiment, has led to the establishment of fast electronics equipment pools at most laboratories. At Fermilab, the Physics Research Equipment Pool (PREP) has been established with the primary objective of supporting the physics experiments in the four experimental areas with a reservoir of electronics modules.

Primarily, PREP consists of the fast electronics instrumentation used in experiments at Fermilab. This includes all the modular electronics necessary to interface the experimenters' detector systems to an on-line computer system. The items supplied by PREP include:

	Percentage of PREP ($)
NIM instrumentation	45%
CAMAC instrumentation	25
Oscilloscopes, etc.	10
Power supplies, etc.	8
Pulse height analyzers, etc.	2
All other items	10
	100%

The PREP Group, administratively part of the Research Division, is responsible for managing the equipment pool. The group, with headquarters on the 6th floor west, Central Laboratory, also provides repair service and

technical information regarding PREP equipment, as well as some consultation on electronics problems. At present, daily operations are handled by A. Neubauer and M. Kibilko, under the supervision of R. Shafer. R. Coburn provides secretarial assistance.

The PREP Group is advised by the PREP Committee, whose members are appointed annually by the Laboratory Director. To provide the best possible guidance, the Committee is comprised of twelve representatives of both the engineering and scientific staff at Fermilab and active experimenters. Its present membership includes P. Limon (Chairman), R. Daniels (ex officio), T. Droege, H. Edwards, J. Elias, P. Franzini (Columbia University), B. Gobbi (Northwestern University), C. Kerns, Q. Kerns, T. Nunamaker (University of Chicago), L. Pondrom (University of Wisconsin), and R. Shafer (ex officio). The purpose of the Committee is to make major technical and policy recommendations regarding the operation of the PREP Group. R. Daniels and R. Shafer are responsible for implementing these recommendations. Experimenters who wish to make suggestions regarding the operations or policies of PREP, or regarding instrumentation, are encouraged to see a Committee member. Specific technical problems with existing PREP equipment should be taken directly to the attention of the PREP Group.

During the last twelve months, expenditures for equipment by the PREP Group exceeded $1 million. Itemized listings of all equipment currently in the PREP inventory are available for review at the PREP office, and a catalogue of all items presently available for loan may be obtained from R. Coburn.

PREP equipment is purchased primarily on the basis of written specifications, following PREP Committee recommendations. These recommendations are based upon the experience and requirements of users. One objective of the PREP Group is to maintain a continual dialogue with experimenters about their needs, as well as with manufacturers of fast electronics equipment about their capabilities. It is important for the group to have as much information as possible by the time a specification is written and sent out for competitive bids.

On occasion, the PREP Group has encouraged the development of instrumentation by in-house electronics groups. A good example of this is the very popular proportional chamber high-voltage supply module recently developed by T. Droege. Normally, development work is carried on by outside vendors, but when it appears to be economically preferable, and when a particular expertise exists within the Laboratory, development is carried out at Fermilab.

All instrumentation built to PREP specifications undergoes a rigid evaluation program at Fermilab. This includes testing by PREP Group personnel as well as the lending of units to interested users for their evaluation. To insure that Fermilab obtains the equipment it requires, new purchases of equipment are made on the basis of the performance of these evaluation units as well as on the basis of the bid responses of interested manufacturers.

In order to obtain PREP equipment for a new experiment, a rather definite procedure is followed. After an experiment has been approved but before an Agreement has been drafted, the spokesperson for the experiment,

or his representative, should visit the PREP Group to discuss equipment needs. The results of such discussions will normally be a PREP equipment list, which will be included as an appendix to the Agreement negotiated between the spokesperson and the Director's Office. Once the Agreement is signed, the PREP Group will make commitments to supply the equipment either by ordering it new or by recycling equipment returned to the pool from completed experiments.

Because of budgetary limitations as well as tight time schedules, the major portion of PREP equipment is not allocated to an experimental group until shortly before their experiment is actually scheduled to be set up. Once an experiment has been scheduled to begin tests and use beam, PREP will begin to allocate the full complement of equipment requested in the Agreement. PREP maintains close contact with the Director's Office and the experimental area deparment heads to be fully advised of the schedule of experiments and priorities.

The PREP list included in an Agreement is used mainly as a guide to the requirements of the experiment, and some substitutions are permitted. Clearly, all instrumentation requirements cannot be anticipated at the time an Agreement is negotiated. In addition, the experimenter may request directly from PREP up to 20% additional equipment in excess of the Agreement list. Since these additional requests do not allow the necessary lead time to make purchases of equipment not already available, it is sometimes impossible to provide such equipment on a schedule completely suitable to the user. However, it is the general policy that once the Laboratory has provided beam, floor space, and other services to an experiment, PREP

will make maximum use of its resources to provide experimenters with adequate equipment to carry out their measurements. ALL PREP equipment should be returned to the pool shortly after the experiment is completed. Equipment which is to be used by the same experimental group in a follow-on experiment covered in a new Agreement, however, is often transferred directly to the new experiment with only an inventory being required.

Whenever PREP equipment needs adjustment or repair, users are encouraged to take it to the PREP offices (6th floor west, Central Laboratory) for servicing or exchange. PREP technicians are specialists in servicing NIM and CAMAC instrumentation, and can usually diagnose a problem more quickly than can a user. In order to minimize downtime for an experiment, PREP will exchange a faulty module for a similar unit. PREP will also repair PREP-like equipment brought from a user's institution.

The PREP Group does not condone the modification of PREP equipment by an user. To make the instrument pool successful, standardization must be maintained. This simplifies repair and servicing, and insures that the next user can anticipate normal operation of the equipment. In rare cases when a modification is absolutely necessary, users should discuss the reasons for the modification with the PREP Group; if an alternative cannot be found, the equipment will be modified and documented by PREP personnel.

Off-hour replacement of PREP equipment can be arranged through the Operations Center (first floor east, Central Laboratory). This service is limited to experimenters whose experiments are on the Weekly Operations Schedule. Operations Assistants have access to the available pool of PREP

equipment, and can, if necessary, locate a PREP technician to make an emergency repair. Users should transact their PREP-related business during normal working hours whenever possible, however.

In order to provide as much information as possible about PREP equipment, complete sets of schematics and manuals are maintained at the PREP office for all equipment. In some cases, manuals can be lent to users. In addition, a PREP reference area has been added to the Fermilab Library recently (Central Laboratory, 3rd floor southwest). It includes manuals on most of the popular PREP modules.

Voluminous records are required to operate the equipment pool effectively, and the PREP Group has worked with the Fermilab Computer Department to implement a timeshare-based computer inventory system. The system, which is now fully operational, includes two major files: an equipment request file, in which records on all open requests are stored, and an equipment assigned file, in which up-to-date records on the current status of all existing PREP equipment are maintained. These computer files, updated weekly, provide the necessary information for allocating equipment to users, as well as for projecting future needs. Sorts by user affiliation of both files are available from the PREP office upon request.

At present, the annual volume of requests for PREP equipment averages about 3500 items, with a total value of approximately $2.5 million. This is to be compared with a capital equipment expenditure of roughly $1.1 million during fiscal year 1975, implying that, already, a major portion of the equipment being supplied by Fermilab to user groups is recycled rather than new.

M. Kibilko (L) and A. Neubauer examine a CAMAC module brought in for adjustment. Servicing of all PREP modules is handled on the 6th floor west, Central Laboratory.

The computerization of the PREP inventory and requests has allowed a vast improvement in equipment demand projections, permitting more efficient application of the limited PREP budget, and better control of the physical inventory.

The present allocation of PREP equipment can be summarized as follows:

Equipment Assignment	Value
Approved experiments	$3.4 million
Experimental area departments	0.3
Other Fermilab departments	0.4
Equipment not assigned	0.5
Equipment on order	0.3
	$4.9 million

The tremendous growth of activity in the Fermilab experimental areas during the last several years has kept the PREP Group fully occupied supplying the basic equipment and services required by experiments. With the experimental areas fully scheduled, the supply and maintenance of standard PREP equipment is becoming more routine, and additional effort can now be directed toward the consideration of more innovative equipment requirements. Such requirements may include computer-controlled experimental equipment, the application of microprocessors to reduce the amount of unwanted data read into computers, and standardization of readout systems for proportional and drift chambers.

Reported by R. Shafer

END-OF-YEAR REPORT OF THE USERS EXECUTIVE COMMITTEE

Let us discuss the work carried out by the Users Executive Committee during the 1974-75 year. Darrell Drickey, who was elected Chairman, set out enthusiastically to improve the living and working conditions for users at Fermilab, and thus enhance their physics productivity. L. Hand was chosen as Secretary. Drickey's untimely death in December 1974 did not alter the determination of the Committee to accomplish the goals he set. Among this year's accomplishments were:

1. The Users Center was established, and is now a smoothly operating facility. The former Village Cafeteria was renovated and redecorated, and now contains a game room, color television, reading material, and lounge for use by everyone. An advisory committee, chaired by J. Rosen, provides guidance in its operation.

2. Various problems with on-site housing accommodations were discussed, and the logistics of noise, shower construction, occupancy, and the like were solved. In conjunction with the Laboratory, a new set of guidelines for the allocation of summer housing was developed and adopted. Although there has been an increase in the number of units available, it has not been sufficient to keep up with the great influx of scientists coming to work at Fermilab. The Laboratory Directorate is aware of the shortage of accommodations, and is attempting to correct the problem.

3. The Committee has suggested some physical improvements to the Laboratory site:

   --Lighting of the Meson Area, and paving of its parking lot.

   --Lighting improvements in the horseshoe area in front of the Central Laboratory.

   --A safe bicycle transit from the Village to the experimental areas.

   --Paving and lighting of the Proton Area.

   At this time, a bicycle path between the Village and the Central Laboratory is completed half-way; the remaining portion is under construction. The lighting in the Meson and horseshoe areas is much improved. The Meson Area parking lot should be paved this

summer, and the Proton Area improvements are included in future plans.

4. The Users Office is now in full operation. Mrs. P. Hale joined C. Sazama in the office to help with the increased volume of work. Their help in getting the users properly acquainted with the services provided by the Laboratory has been invaluable. Upon arrival on site, all experimenters must now go first to the Users Office to obtain identification cards and sign the necessary papers related to their stay on site.

5. The Users Executive Committee is taking an active interest in the "computing crunch" at Fermilab. We have written letters to the Director, made a presentation to the Universities Research Association Board of Trustees, and written to the Energy Research and Development Agency in support of the additional computers needed at Fermilab. The Laboratory has acquired a second CDC 6600 computer to help with the present computing load.

Toward the end of this operational year, we began to consider the need for a set of committees to discuss and bring out the needs of the various experimental areas on site. We presently have a committee for each experimental area. Out of this came the useful evening discussions at the Annual Meeting. A report on each meeting is being assembled, and will serve as a springboard for some of the future activities of the Users Executive Committee.

Reported by U. Nauenberg,
University of Colorado
Outgoing Chairman, Users Executive
Committee

NOTES AND ANNOUNCEMENTS

SYMPOSIUM ON BUBBLE CHAMBER HADRON PHYSICS PLANNED. . .

All interested scientists are welcome to attend a two-day symposium on bubble chamber hadron physics which will be held at Fermilab on September 18 and 19, 1975. Results will be presented from experiments in which film from the 30-inch and 15-foot bubble chambers has been analyzed, and future opportunities for utilizing these Fermilab chambers in hadron physics research will be discussed. The relative emphasis to be placed upon the 30-inch bubble chamber program in the future will be examined, as will the areas of overlap between the bubble chamber and counter physics programs.

A panel will participate in the symposium and hear the presentations and discussion. This panel will consist of some members of the Fermilab Program Advisory Committee, augmented by a number of other physicists. It will include physicists involved in using counter experiment techniques as well as bubble chamber techniques and one or two theorists. After the meeting the panel will formulate recommendations on the future bubble chamber hadron physics program based upon their assessment of the present status and future promise of the bubble chamber technique for the exploration and study of hadron interactions at high energies.

PROPOSAL PRESENTATION MEETING SCHEDULED. . .

A meeting has been scheduled for October 9 and 10, 1975, to provide an increased opportunity for the proponents of new proposals to present them orally at the Laboratory. Experimenters wishing to do so should submit their proposals (25 copies) to T. Groves in the Director's Office no later than September 26, 1975.

The proposals selected for presentation at this meeting will be determined, in part, by the general topics to be discussed at the fall meeting of the Fermilab Program Advisory Committee in November. There will also be some opportunity for oral presentations at the PAC meeting itself, as has been the case in the past. If the proposals received prior to September 26 can be handled adequately at the November meeting, the October 9 and 10 meeting will be cancelled.

SITUATION REPORT - JULY 1975

FERMI NATIONAL ACCELERATOR LABORATORY

J. R. SANFORD

16 JUL 1975

EXPERIMENTAL PROGRAM SITUATION REPORT

THE EXPERIMENTAL PROGRAM SITUATION AT FERMILAB IS SUMMARIZED BELOW. THE EXPERIMENTS ARE LISTED SEPARATED BY EXPERIMENTAL AREA UNDER CATEGORIES THAT BEST DESCRIBE THEIR CIRCUMSTANCE AS OF JULY 1, 1975. FOR EXPERIMENTS WHICH HAVE BEEN COMPLETED OR HAVE RECEIVED BEAM THERE IS INDICATION OF THE AMOUNT OF RUNNING TIME OR EXPOSURE. THE EXPERIMENTAL AREA NAMES ARE ABBREVIATED AS FOLLOWS: INTERNAL TARGET AREA (ITA), MESON AREA (MA), NEUTRINO AREA (NA), PROTON AREA (PA). PUBLICATIONS HAVE BEEN PREPARED OR TALKS GIVEN ABOUT THE EXPERIMENTS MARKED WITH AN **.

TOTAL NUMBER OF APPROVED EXPERIMENTS - 217

AREA-BEAM		SPOKESPERSON	EXTENT OF RUN TO DATE	DATE COMPLETED
A. EXPERIMENTS THAT HAVE COMPLETED DATA TAKING (97):				
MA -M1	*ELASTIC SCATTERING #7	MEYER	2,350 HOURS	28 JAN 75
	*DETECTOR DEVELOPMENT #229	YUAN	300 HOURS	16 NOV 74
	*DETECTOR DEVELOPMENT #261	WANG	600 HOURS	20 NOV 74
	MUON SEARCH #335	FACKLER	300 HOURS	6 JUN 75
-M2	*MULTIGAMMA #22	COLLINS	150 HOURS	26 JUN 74
	*MISSING MASS #51A	VON GOELER	800 HOURS	23 OCT 74
	*QUARK #75	YAMANOUCHI	1,050 HOURS	8 SEP 73
	BEAM DUMP #108	AWSCHALOM	350 HOURS	2 JUN 75
	*PION CHARGE EXCHANGE #111	TOLLESTRUP	1,800 HOURS	19 SEP 74
	*PARTICLE SEARCH #365	GARELICK	200 HOURS	5 FEB 75
-M3	*NEUTRON CROSS SECTION #4	LONGO	1,450 HOURS	20 MAR 74
	NEUTRON BACKWARD SCATTERING #12	REAY	1,300 HOURS	2 DEC 74
	*NEUTRON DISSOCIATION #27A	ROSEN	850 HOURS	24 APR 74
	*MULTIGAMMA #230	LONGO	50 HOURS	24 APR 74
	*NEUTRON DISSOCIATION #305	GOBBI	1,400 HOURS	14 APR 75
-M4	*QUARK #72	LEIPUNER	500 HOURS	11 JUN 73
-M6	ELASTIC SCATTERING #96	RITSON	2,550 HOURS	17 FEB 75
	*MULTIPLICITIES #178	BUSZA	600 HOURS	30 JUN 75
-OTHER	*EMULSION/PROTONS @ 200 #90	WOLTER	4 STACKS	20 SEP 72
	*EMULSION/PROTONS @ 200 #103	KING	1 STACK	20 SEP 72
	*EMULSION/PROTONS @ 200 #105	MALHOTRA	1 STACK	20 SEP 72
	*EMULSION/PROTONS @ 200 #114	JAIN	1 STACK	20 SEP 72
	*EMULSION/PROTONS @ 200 #116	HEBERT	5 STACKS	20 SEP 72
	*EMULSION/PROTONS @ 200 #117A	KUSUMOTO	11 STACKS	20 SEP 72
	*EMULSION/PROTONS @ 200 #156	NIU	13 STACKS	20 SEP 72
	*EMULSION/PROTONS @ 200 #171	LORO	6 STACKS	20 SEP 72
	*EMULSION/PROTONS @ 200 #183	TRETJAKOVA	3 STACKS	20 SEP 72
	EMULSION/PROTONS @ 200 #189	RITSON	2 PLATES FROM EXP #171	20 SEP 72
	SUPER-HEAVY ELEMENTS #147	DEBEAUVAIS	4 EXPOSURES	11 JUN 75
	*DI-MUON #337	EARTLY	5 HOURS	7 FEB 75
NA -NEUTRINO	*NEUTRINO #1A	CLINE	2,850 HOURS	30 JUN 75
	15-FOOT NEUTRINO/H2ONE #28A	FRY	97K PIX	11 JUN 75
	15-FOOT ANTI-NEUTRINO/H2ONE #180	ERMALOV	76K PIX	2 JUN 75
	*15-FOOT EMI TEST #155	PETERSON	14K PIX	30 NOV 74
	*NEUTRINO #262	BARISH	400 HOURS	20 MAR 74
	NEUTRINO #370	CLINE	400 HOURS	19 MAR 75
-MUON/HADRON	*MUON #26	MANO	900 HOURS	16 APR 74
	MUON #98	ANDERSON	1,800 HOURS	17 FEB 75
-15-FT	*15-FOOT ENGINEERING RUN #234	HUSON	57K PIX	5 NOV 74
-30-IN	*30-INCH HYBRID #28	SMITH	479K PIX	22 APR 74
	*30-INCH P-P @ 300 #37A	MALAMUD	51K PIX	1 JUN 73
	*30-INCH PI+ & P - P @ 100 #121A	LANDER	104K PIX	23 JAN 74
	*30-INCH PI- - P @ 100 #125	MORRISON	53K PIX	28 AUG 73
	*30-INCH PI- - P @ 200 #137	HUSON	48K PIX	10 MAR 73
	*30-INCH P-P @ 200 #141A	FIELDS	67K PIX	27 NOV 72
	*30-INCH PI- - P @ 300 #143A	KALBFLEISCH	51K PIX	10 APR 74
	*30-INCH HYBRID #154	PLESS	105K PIX	13 MAR 74
	*30-INCH P - PONE @ 300 #161	MAPP	51K PIX	25 JUN 74
	*30-INCH PI- - PONE @ 200 #163A	WALKER	52K PIX	18 JUN 74
	*30-INCH PI+ & P - P @ 200 #217	LANDER	85K PIX	15 MAY 74
	*30-INCH PI- - D @ 200 #218	YAGER	72K PIX	18 SEP 74
	30-INCH PI+ & P - P @ 60 #228	FERBEL	37K PIX	15 APR 74
	*30-INCH P-P @ 100 #252	FERBEL	33K PIX	6 DEC 72
	*30-INCH PBAR - P @ 100 #311	NEALE	98K PIX	27 JAN 75
-OTHER	*MONOPOLE #3	EBERHARD	4 TARGETS EXPOSED	4 SEP 74
	*PROTON-PROTON INELASTIC #14A	FRANZINI	140 HOURS	21 JUN 73
	LONG-LIVED PARTICLES #115	STEVENSON	6 HOURS	23 NOV 74
	SUPER-HEAVY ELEMENTS #142	STOUGHTON	1 TARGET	4 JUN 75
	*MASSIVE PARTICLE SEARCH #199	FRANKEL	2 TARGETS EXPOSED	22 AUG 73
	BEAM DUMP #211	GOEBEL	2 HOURS	14 NOV 73
	LONG-LIVED PARTICLES #239	FRATI	350 HOURS	3 FEB 74
	DETECTOR DEVELOPMENT #34	HUGGETT	50 HOURS	26 JUN 74
	*QUARK #297	LEIPUNER	50 HOURS	10 JUL 74
	*DETECTOR DEVELOPMENT #327	ALLISON	50 HOURS	7 FEB 75
	EMULSION/PROTONS @ 300 #181	CARY	3 STACKS	20 OCT 73
	EMULSION/PROTONS @ 300 #155	LIM	3 STACKS	10 JUN 75
	EMULSION/PROTONS @ 300 #232	KING	2 STACKS	20 OCT 73
	EMULSION/PROTONS @ 300 #233	HEBERT	8 STACKS	20 OCT 73
	EMULSION/PROTONS @ 300 #237	LORO	5 STACKS	10 JUN 75
	EMULSION/PROTONS @ 300 #242	NIU	2 STACKS	20 OCT 73
	*EMULSION/PROTONS @ 300 #244	JAIN	1 STACK	20 OCT 73
	EMULSION/PROTONS @ 300 #250	KUSUMOTO	1 STACK	20 OCT 73
	EMULSION/PROTONS @ 300 #275	ENGE	4 STACKS	20 OCT 73
	EMULSION/PROTONS @ 300 #329	TRETJAKOVA	2 STACKS	10 JUN 75
	EMULSION/PROTONS @ 300 #374	DAVIS	1 STACK	10 JUN 75
	EMULSION/PROTONS @ 300 #419	GIACOMELLI	1 STACK	10 JUN 75
	EMULSION/PROTONS @ 300 #421	OZHELEPOV	1 STACK	24 JUN 75
	EMULSION/PROTONS @ 200 #271	GOTTFRIED	10 STACKS	10 JUN 75
	*EMULSION/MUONS @ 150 #255	JAIN	1 STACK	16 OCT 73
	EMULSION/MUONS @ 150 #205A	KUSUMOTO	2 STACKS	16 OCT 73
	EMULSION/PI- @ 200 #264	YOUNG	2 STACKS	7 OCT 74
	EMULSION/PI- @ 200 #328	TRETJAKOVA	5 STACKS	7 OCT 74
	EMULSION/PI- @ 200 #339	WOLTER	4 STACKS	9 JUN 75
	EMULSION/PI- @ 200 #362	JAIN	1 STACK	9 JUN 75
	EMULSION/PI- @ 200 #387	WILKES	4 STACKS	9 JUN 75
PA -PE	*PARTICLE SEARCH #100A	PIROUE	1,150 HOURS	4 APR 74
-PC	*LEPTON #70	LEDERMAN	2,800 HOURS	1 DEC 74
	*PARTICLE SEARCH #187	LEDERMAN	200 HOURS	6 NOV 73
ITA-C-O	*PROTON-PROTON SCATTERING #36A	COOL	700 HOURS	24 JUN 73
	*PHOTON SEARCH #63A	WALKER	2,600 HOURS	13 MAR 75
	*PROTON-PROTON MISSING MASS #67A	SANNES	600 HOURS	8 AUG 73
	*PHOTON SEARCH #120	CLINE	1,200 HOURS	29 MAY 73
	*PARTICLE SEARCH #184	WANDERER	800 HOURS	29 MAY 74
	*PROTON-DEUTERON SCATTERING #186	MELISSINOS	450 HOURS	19 AUG 74
	*PROTON-NUCLEON INCLUSIVE #188	SANNES	1,050 HOURS	9 MAY 73
	*PROTON-PROTON INELASTIC #221	FRANZINI	950 HOURS	5 SEP 74
	PARTICLE SEARCH #363	OLSEN	650 HOURS	9 APR 75

B. EXPERIMENTS THAT ARE IN PROGRESS (30):

AREA-BEAM		SPOKESPERSON	EXTENT OF RUN TO DATE
MA -M1	*TOTAL CROSS SECTION #104	KYCIA	1,400 HOURS
	PION DISSOCIATION #86A	LUBATTI	350 HOURS
	FORM FACTOR #216	STORK	350 HOURS
	PARTICLE SEARCH #416	LUBATTI	350 HOURS
-M2	*INCLUSIVE PHOTON #268	MELLEMA	1,050 HOURS
	*NEUTRAL HYPERON #8	PONDROM	1,850 HOURS
-M3	PARTICLE SEARCH #366	ABOLINS	1,050 HOURS
-M4	*K ZERO REGENERATION #82	TELEGDI	3,450 HOURS
	TEST PARTICLE SEARCH #330	GUSTAFSON	200 HOURS
-M6	*ELASTIC SCATTERING #69A	MARX	2,000 HOURS
-OTHER	*NUCLEAR CHEMISTRY #81A	KAUFMAN	110 BOMBARDMENTS
NA -NEUTRINO	*NEUTRINO #21A	BARISH	1,300 HOURS
	*15-FOOT NEUTRINO/H2 #45A	NEZRICK	67K PIX
	*15-FOOT ANTI-NEUTRINO/H2 #31A	DERRICK	26K PIX
	*NEUTRINO #32C	SCIULLI	500 HOURS
-MUON/HADRON	DI-MUON #331	PILCHER	500 HOURS
-15-FT	15-FOOT P - P @ 300 #343	ENGELMANN	7K PIX
	15-FOOT PI- - P @ 100 #83A	KITAGAKI	11K PIX
	15-FOOT PI- - PONE @ 200 #89	FRETTER	4K PIX
-30-IN	30-INCH P - D @ 200 #280	FIELDS	64K PIX
	*30-INCH P - D @ 300 #209	DAO	55K PIX
	*30-INCH PI+ & P - D @ 200 #295	YEKUTIELI	54K PIX
	30-INCH HYBRID #299	PLESS	158K PIX
-OTHER	*MONOPOLE #76	CARRIGAN	5 TARGETS EXPOSED
	SUPER-HEAVY ELEMENTS #285	LEDERMAN	3 TARGETS EXPOSED
	TACHYON MONOPOLE #202	BARTLETT	COSMIC RAY RUNNING
PA -PE	*PHOTOPRODUCTION #87A	LEE	1,750 HOURS
	*DI-MUON #358	LEE	150 HOURS
ITA-C-O	PROTON-NUCLEON INELASTIC #317	MUKHIN	350 HOURS
	PARTICLE PRODUCTION #418	SANNES	100 HOURS

C. EXPERIMENTS THAT ARE IN TEST STAGE (10):

MA -M1	HADRON JETS #236A	MOCKETT	
-M2	PARTICLE SEARCH #357	MEYER	
-M6	HADRON JETS #260	MCLEOD	400 HOURS
	MULTIPARTICLE #110A	MCLEOD	50 HOURS
NA -MUON/HADRON	TEST PARTICLE SEARCH #369	KIRK	150 HOURS
PA -PE	PHOTON TOTAL CROSS SECTION #25A	CALDWELL	
-PC	DI-LEPTON #288	LEDERMAN	600 HOURS
	MUON SEARCH #48	ADAIR	50 HOURS
-PW	PHOTON SEARCH #95A	COX	
	PARTICLE PRODUCTION #284	WALKER	

D. EXPERIMENTS BEING INSTALLED (9):

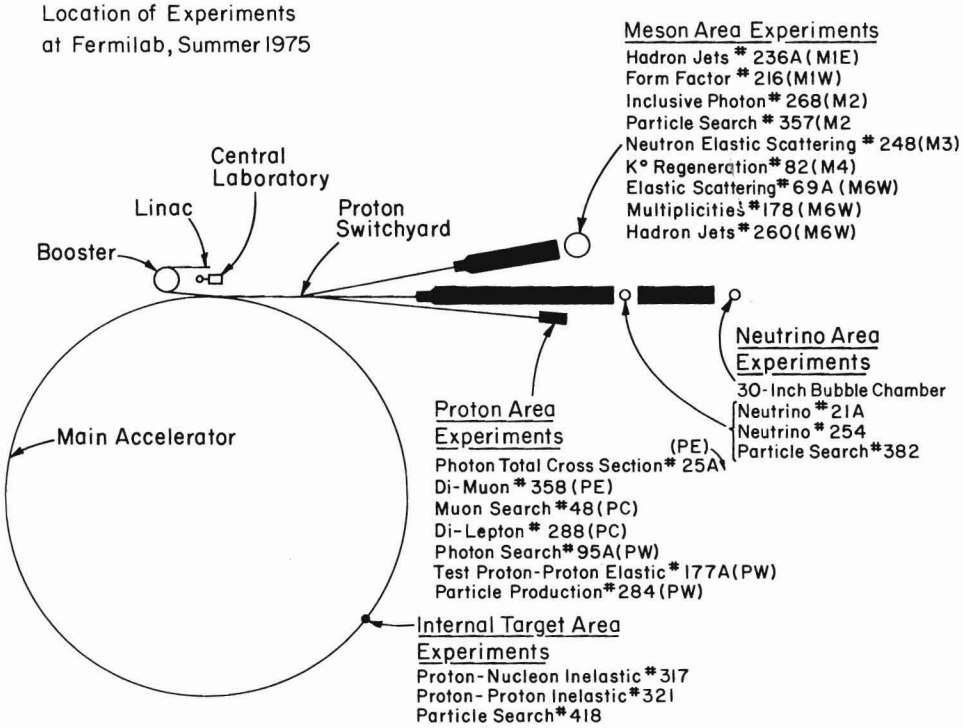
			EXTENT OF APPROVAL
MA -M1	POLARIZED SCATTERING #61	CHAMBERLAIN	800 HOURS
	INCLUSIVE SCATTERING #324	WEISBERG	500 HOURS
-M3	NEUTRON ELASTIC SCATTERING #248	LONGO	400 HOURS
-M6	INCLUSIVE SCATTERING #118A	FRIEDMAN	600 HOURS
NA -NEUTRINO	NEUTRINO #254	KALBFLEISCH	3 X 10 TO 17TH PROTONS
-MUON/HADRON	PARTICLE SEARCH #382	HAND	30 EMULSION STACKS
-OTHER	QUARK #276	VAN GINNEKIN	3 X 10 TO 17TH PARASITIC
PA -PW	TEST PROTON-PROTON ELASTIC#177A	OREAR	100 HOURS
ITA-C-O	PROTON-PROTON INELASTIC #321	LEE-FRANZINI	800 HOURS

E. EXPERIMENTS TO BE SET UP WITHIN A YEAR (43):

MA -M1	PARTICLE SEARCH #354	KYCIA	200 HOURS
-M2	INCLUSIVE NEUTRAL MESON #350	KENNEY	400 HOURS
	SUPER-HEAVY ELEMENTS #371	JURIC	1 EXPOSURE
	PARTICLE PRODUCTION #415	PONDROM	100 HOURS
-M3	PARTICLE SEARCH #397	ROSEN	500 HOURS
-M4	K-SHORT-E REGENERATION #226	TELEGDI	500 HOURS
-M6	BACKWARD SCATTERING #290	BAKER	900 HOURS
NA -NEUTRINO	15-FOOT NEUTRINO/H2 & NE #53A	BALTAY	100K PIX
	15-FOOT ANTI-NEUTRINO/H2&NE#172	BINGHAM	50K PIX
	NEUTRINO #310	CLINE	2 X 10 TO 18TH PROTONS
	PARTICLE SEARCH #247	BURHOP	2X 10 TO 18TH WITH E #310
-MUON/HADRON	MUON #319	CHEN	500 HOURS
	MUON #398	ANDERSON	800 HOURS
-15-FT	15-FOOT PI+ & P - P @ 150 #341	KO	25K PIX
	PARTICLE SEARCH #379	WOJCICKI	200 HOURS
-30-IN	30-INCH P-P @ 400 #138	VANDER VELDE	50K PIX
	30-INCH HYBRID #281	SMITH	300K PIX
	30-INCH P - D @ 400 #196	ENGELMANN	100K PIX
	30-INCH PI- - D @ 400 #338	MORIYASU	50K PIX
	30-INCH PI- - P @ HI E #215	GOLDHABER	100K PIX
	30-INCH PBAR - P @ 30-60 #344	GUTAY	100K PIX
	30-INCH PBAR - D @ 100 #345	EKSPONG	100K PIX
-OTHER	EMULSION/NEW PARTICLES #386	LORD	EMULSION EXPOSURE
	EMULSION/PROTONS @ 400 #238	LORD	EMULSION EXPOSURE
	EMULSION/PROTONS @ 400 #243	NIU	EMULSION EXPOSURE
	EMULSION/PROTONS @ 400 #245	JAIN	EMULSION EXPOSURE
	EMULSION/PROTONS @ 400 #249	WOLTER	EMULSION EXPOSURE
	EMULSION/PROTONS @ 400 #251	KUSUMOTO	EMULSION EXPOSURE
	EMULSION/PROTONS @ 400 #265	YOUNG	EMULSION EXPOSURE
	EMULSION/PROTONS @ 400 #279	KING	EMULSION EXPOSURE
	EMULSION/PROTONS @ 400 #292	GOTTFRIED	EMULSION EXPOSURE
	EMULSION/PROTONS @ 400 #336	OGATA	EMULSION EXPOSURE
	EMULSION/PROTONS @ 400 #364	SACTON	EMULSION EXPOSURE
	EMULSION/PROTONS @ 400 #346	EKSPONG	EMULSION EXPOSURE
	EMULSION/PROTONS @ 400 #385	PRAKASH	EMULSION EXPOSURE
PA -PE	PARTICLE SEARCH #300	CRONIN	600 HOURS
	DI-MUON #325	CRONIN	RUN WITH EXP #300
	EMULSION/ELECTRONS @ HI E #340	DAKE	EMULSION EXPOSURE
	EMULSION/ELECTRONS @ >100 #399	GOLDEN	5 STACKS
	PARTICLE SEARCH #400	PEOPLES	400 HOURS
ITA-C-O	PROTON-NUCLEON SCATTERING #381	MALAMUD	300 HOURS
	PROTON-NUCLEON SCATTERING #198A	OLSEN	800 HOURS
	PROTON-PROTON POLARIZATION #313	NEAL	1,000 HOURS

AREA-BEAM		SPOKESPERSON	EXTENT OF APPROVAL
F. OTHER APPROVED EXPERIMENTS (28):			
MA -M1	HADRON DISSOCIATION #272	FERBEL	600 HOURS
-M2	PARTICLE SEARCH #411	GARELICK	200 HOURS
	PARTICLE SEARCH #413	GARELICK	200 HOURS
	HADRON JETS #395	SELOVE	450 HOURS
	CHARGED HYPERON #97	LACH	400 HOURS
-M6	ASSOCIATED PRODUCTION #99	RITSON	500 HOURS
	HADRON DISSOCIATION #396	GOULIANOS	600 HOURS
NA -NEUTRINO	15-FOOT NEUTRINO/D2 #151A	SNOW	100K PIX
	15-FOOT NEUTRINO/D2 #227	ENGELMANN	100K PIX
	15-FOOT ANTI-NEUTRINO/D2 #390	GARFINKEL	300K PIX
	NEUTRINO #356	BARISH	2 X 10 TO 18TH PROTONS
	NEUTRINO #253	MO	1,000 HOURS PARASITIC
	15-FOOT NEUTRINO/H2 & NE #380	BALTAY	200K PIX
	15-FOOT ANTI-NEUTRINO/H2&NE#388	STEVENSON	200K PIX
-MUON/HADRON	MUON #203A	KERTH	1 X 10 TO 18TH PROTONS
	MUON #391	STROVINK	RUN WITH EXP #203A
-30-IN	30-INCH PI+ & P - P @ 300 #277	BARNES	100K PIX
	30-INCH P - P @ 500 #207	ENGELMANN	50K PIX
-OTHER	DETECTOR DEVELOPMENT #206	PETERSON	PARASITIC RUNNING
	DETECTOR DEVELOPMENT #32	HOFSTADTER	100 HOURS
PA -PE	PHOTOPRODUCTION #401	GORMLEY	300 HOURS
	PHOTOPRODUCTION #152B	HEUSCH	350 HOURS
	PHI PHOTOPRODUCTION #263	CHEN	600 HOURS
-PC	PARTICLE SEARCH #372	BECKER	1,400 HOURS
-PW	PION INCLUSIVE #258	PIROUE	800 HOURS
	C-TEST #302	CESTER-REGGE	400 HOURS
	MULTIGAMMA #192	GUIRAGOSSIAN	400 HOURS
ITA-C-C	PROTON-HELIUM SCATTERING #289	MALAMUD	700 HOURS
PROPOSALS BEING CONSIDERED (47):			EXTENT OF REQUEST
MA -M2	K-SHORT REGENERATION #351	ARONSON	3,000 HOURS
	LAMBDA BETA DECAY #361	MARCH	300 HOURS
-M6	INELASTIC SCATTERING #165	RITSON	475 HOURS
	HADRON DISSOCIATION #312	EDELSTEIN	1,000 HOURS
	ELASTIC SCATTERING #406	MARX	600 HOURS
NA -NEUTRINO	NEUTRINO #316	NYGREN	1,250 HOURS EST.
	15-FOOT ANTI-&NEUTRINO/H2NE#352	STEVENSON	400K PIX
	NEUTRINO #355	BARISH	1,400 HOURS
	15-FOOT NEUTRINO/H2&NE #389	TENNER	100K PIX
-MUON/HADRON	EMULSION/MUONS @ 50-100 #373	JAIN	EMULSION EXPOSURE
	PION DISSOCIATION #318	ASCOLI	400 HOURS
	MUON #348	WILSON	400 HOURS
-15-FT	15-FOOT PI+ - D @ 40 #85	GUTAY	600K PIX
	15-FOOT PHOTON - P @20-250 #145	WALKER	250K PIX
	15-FOOT K+ - P @ HI E #175	ERWIN	300K PIX
	15-FOOT P - P @ > OR = 300 #208	TAKIBAEV	75K PIX
	15-FOOT SIGMA- - P @ 50-200#214	RUSHBROOKE	275K PIX
	15-FOOT PI- -P @ 100 #267	MORRISON	100K PIX
	15-FOOT P - P&NE @ 100&400 #291	MANN	30K PIX
	15-FOOT NEUTRON - P@50-250 #303	SEIDL	100K PIX
	15-FOOT PI- - P/NE @ 485 #309	ERWIN	250K PIX
	15-FOOT K- - P @ 200 #333	RUSHBROOKE	100K PIX
	15-FOOT K+ - P @ 200 #334	RUSHBROOKE	100K PIX
	15-FOOT PI- -P/NE @ 200 #342	KENNEY	210K PIX
	15-FOOT PI- - P@ > OR = 250#384	HUSON	300K PIX
-30-IN	30-INCH P&PI- - HI Z @ 200 #224	JONES	100K PIX
	30-INCH P - P&NE @100-500 #273	OREN	50K PIX
	30-INCH P&PI- -P&NE@100&400#298	MALHOTRA	15K PIX
	30-INCH PI- - HIZ @ 200 #304	WALKER	100K PIX
	30-INCH K+ - P @ 150 #375	RUBIN	400K PIX
	30-INCH K- - P @ 150 #376	LUDLAM	100K/FRACTION OF K
	30-INCH PI- - P @ 300 #377	HAFEN	200K PIX
	30-INCH PI- - P @ 75 #378	YAMAMOTO	200K PIX
	30-INCH PBAR - P@160 OR 200#392	NEALE	100K PIX
	30-INCH PI- - P @ 150 #393	PLESS	1,000K EXPANSIONS
	30-INCH PBAR - P @ 100 #394	WHITMORE	400K PIX
	30-INCH PI+ - P @ 250 #407	BUGG	300K PIX
	30-INCH PBAR - P @ 75 #408	PLANO	300K PIX
	30-INCH PI+ - P @ 75 #409	WATTS	200K PIX
	30-INCH K+&K- - P @ 75 #410	PEVSNER	200K/FRACTION OF K
PA -PC	CHARGED HYPERON #353	ECKLUND	600 HOURS
	LAMBDA POLARIZATION #417	NAUENBERG	1,000 HOURS
-PW	HADRON JETS #246	SELOVE	600 HOURS
	ELASTIC SCATTERING #301	GETTNER	1,000 HOURS
	DI-MUON #326	PIROUE	RUN WITH EXP #258
	ELASTIC SCATTERING #347	WALKER	1,200 HOURS
	HADRON-NUCLEON SCATTERING #420	GUIRAGOSSIAN	1,100 HOURS

Location of Experiments
at Fermilab, Summer 1975



FACILITY UTILIZATION SUMMARY -- JUNE 1975

The accelerator operated regularly for the high energy physics research program during June, with only the usual weekly interruptions for maintenance and accelerator studies. The momentum built up in the latter part of May carried over into June, and new records were set for intensity and number of protons accelerated. The intensity in the booster and main accelerators edged up to 2.21×10^{13} protons per pulse and 1.75×10^{13} protons per pulse, respectively, and a record 2.77×10^{18} protons were accelerated in the main ring during the month. The 451 hours of beam available for the high energy physics research program represented 81 per cent of the time scheduled. Major repairs included fixing a 13.8-kV feeder splice and replacing a shorted main-ring magnet. For the first six months of 1975, the figures corresponding to the aforementioned ones are 9.5×10^{18} protons accelerated in the main ring and 2200 hours (74 per cent) of the scheduled hours available for high energy physics research.

The refurbished 100-MVA pulsed power tranformer for the main ring is being installed as rapidly as possible, in conjunction with work to complete the series capacitor system and to pull additional 13.8-kV feeder lines for the main ring. When this work is complete and the transformer is connected in early July, routine 400-GeV operation should be possible.

In the Neutrino Area, a 75,000-picture run of antineutrinos was completed for Experiment #180 in the 15-foot bubble chamber on June 2. The Experiment #28A group then took about 35,000 additional pictures of incident neutrinos to complete their run; they have received a total of approximately

97,000 pictures. On July 11, the chamber was emptied because of the worsening of a hydrogen leak into the main vacuum tank which had been discovered the preceding weekend. Because a disassembly is required to make the necessary repair, the 15-foot chamber program was terminated with the expectation that it will be resumed in the fall. A substantial program continued, with counter experiments Neutrino #1A and Di-Muon #331 both taking data. At various times the accelerator provided one- and two-turn fast extraction and 1- to 2-msec extraction at various intensities as Neutrino #1A took data with neutral current, dimuon, and heavy neutral particle triggers. The focusing horn was used successfully for neutrino and antineutrino running during most of the month. Beam tests were done in the N-3 hadron beam line to optimize $\bar{p}$ and K^+ yields at various momenta. These data will be useful in planning for future hadron bubble chamber experiments. During June emulsion exposures were completed for ten experiments. These were done in a negative pion beam at 200 GeV and in a proton beam at 200 and 300 GeV. A special target exposure was also completed for Super-Heavy Elements #285.

In the Meson Area several experimental groups took data during the month. Elastic Scattering #69A took data in the Coulomb-nuclear interference region for $\pi^{\pm}$, $K^{\pm}$, p, $\bar{p}$, at momenta of 100, 125, and 150 GeV/c. K^0 Regeneration #82 completed their data runs using a carbon regenerator and then continued to finish some calibration work and to prepare for later data taking using a liquid hydrogen regenerator. Particle Search #366 continued their work, primarily triggering on hadron pairs. Neutral Hyperon #8 started measuring total cross sections from hydrogen and deuterium until difficulties

developed with the target; they then continued their earlier yield measurements. Particle Search #416 used a streamer chamber and a downstream magnetized muon filter to search for interactions, possibly with a new particle decaying into a "V" and a muon. Several other groups were doing preliminary running in preparation for data-taking later this summer, including Particle Search #357, Multiplicities #178, and Hadron Jets #260.

The major development in the Proton Area during June was the commissioning of the quadrupole enclosures in the line to Proton-West. Beam was brought into that experimental area on June 16. Even the earliest results appeared to promise the hoped for suppression of beam halo. Tests continued through the month to establish the optimum collimator combinations and beam tune for the two experiment target locations. In Proton-East, the entire month was devoted to testing the electron-photon beam, primarily in debugging the photon tagging system. In Proton-Central, Di-Lepton #288 set up and took preliminary data on muons. They discovered that an unexpectedly high rate of random coincidences was being caused by preferential extraction of certain rf bunches from the main ring. Subsequently, extraction was greatly improved by blowing up all bunches at transition (at about 20 GeV). Beam time during the last week of June was used by Muon Search #48, which had been setting up and testing apparatus downstream of the Proton-Central area all month.

In the Internal Target Area, activity was dominated by the use of the gas jet by Proton-Nucleon Inelastic #317. In mid-month, when problems arose with the helium liquifier system for the jet, Particle Production #418 began testing and preliminary data taking.

The summary of facility utilization for the month of June is as follows:

I. Summary of Accelerator Operations

		Hours	
A. Accelerator use for physics research			
Accelerator physics research		71.0	
High energy physics research		451.1	
Research during other use		(22.7)	
	Subtotal		522.1
B. Other activities			
Accelerator setup and tuning to experimental areas		11.2	
Scheduled interruption		64.3	
Unscheduled interruption		122.4	
	Subtotal		197.9
C. Unmanned time			
	Total		720.0

II. Summaries of High Energy Physics Research Use

	# of Expts.	Hours	Results
A. Counter experiments	15	3124.7	
B. Bubble chamber experiments	2	118.0	43,070 pictures
C. Emulsion experiments	10	15.0	32 stacks
D. Special target experiments	3	19.4	19 targets
E. Test experiments	4	541.1	
F. Engineering studies and tests	3	756.5	
G. Other beam use	-	33.5	
	37	4608.2	

III. Number of Protons Accelerated and Delivered

		Protons
A. Beam accelerated in main ring	Total	2.77×10^{18}
B. Beam delivered to experimental areas		
Meson Area		.79
Neutrino Area		
Main beam		1.16
Bypass beam		.06
Proton Area		.11
	Total	2.12×10^{18}

IV. Beam Utilization by Experiment

	Hours	
A. Meson Area		
Neutral Hyperon #8	384.1	
Neutrino #21A	85.0	Tests
Elastic Scattering #69A	318.9	
Nuclear Chemistry #81A	14.7	17 targets
K^0 Regeneration #82	315.5	
Beam Dump #108	23.8	
Super-Heavy Elements #147	1.0	1 exposure
Multiplicities #178	43.5	Tests
Hadron Jets #260	14.0	
Photon Inclusive #268	59.8	Tests
Particle Search #330	78.0	
Muon Search #335	59.8	
Particle Search #366	436.0	
Particle Search #416	365.4	
B. Neutrino Area		
Neutrino #1A	375.7	$\int pdt \approx 9.8 \times 10^{17}$
15' ν/H_2 & Ne #28A	108.3	39,222 pictures
15' $\bar{\nu}/H_2$ & Ne #180	9.7	3,848 pictures
Tachyon Monopole #202	-	Cosmic ray running
Super-Heavy Elements #285	3.7	1 target
Neutrino #310	48.0	Tests
Di-Muon #331	329.5	
Emulsion Exposures (10 expts.)	15.0	

C. Proton Area

	Hours	
Muon Search #48	63.3	
Di-Lepton #288	308.8	

D. Internal Target Area

p-N Inelastic #317	301.9	
Particle Production #418	78.6	Tests
Total	3842.0	

MANUSCRIPTS AND NOTES PREPARED DURING MAY AND JUNE 1975

Copies of preprints with Fermilab publications 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

P. H. Eberhard et al. Experiment #3	Evidence Against Production of Magnetic Monopoles at Fermilab (Submitted to Phys. Rev. D)
C. A. Ayre et al. Experiment #4	Neutron Total Cross Sections on Nuclei at Fermilab Energies
A. Firestone et al. Experiment #37A	Evidence for the Goldhaber Effect in pp Interactions at 300 GeV/c (FERMILAB-Pub-75/24-EXP; submitted to Phys. Rev.)
B. C. Brown et al. Experiment #70	Search for ϕ Mesons Produced at High P_t in P-Be Collisions at 300 GeV (FERMILAB-Pub-75/37-EXP; submitted to Phys. Rev. Letters)
Ø. Scheidemann and N. T. Porile Experiment #81	γ-γ Coincidence Spectrometry of High-Energy Nuclear Reaction Targets (Submitted to Nucl. Instr. and Methods)
W. B. Fretter et al. Experiment #137	Charge Asymmetry in Inelastic $\pi^- p$ Interactions at 205 GeV/c for Particles with Transverse Momentum > 1.0 GeV/c (Submitted to Phys. Letters B)
M. I. Tretyakova et al. Experiment #183	Events of Possible Associated Production of the Charmed Particles in Nuclear Emulsion (Submitted to Pisma JETPH)
D. Bintinger et al. Experiment #184	A Measurement of Prompt Muon Production in Nucleon-Nucleus Collisions (Submitted to Phys. Rev. Letters)
Y. Akimov et al. Experiment #186	Excitation of High Energy Protons into Low Mass States in p-d Interactions (FERMILAB-Pub-75/25-EXP; submitted to Phys. Rev. Letters)

Y. Akimov et al. Experiment #186	Diffraction Dissociation of High Energy Protons in p-d Interactions (FERMILAB-Pub-75/26-EXP; submitted to Phys. Rev. Letters)
A. Sheng et al. Experiment #209	Charged-Particle Multiplicity Distribution in pd Interactions at 300 GeV/c (Submitted to Phys. Rev.)
J. A. Appel et al. Experiment #288	Performance of a Lead Glass Electromagnetic Shower Detector at Fermilab (FERMILAB-Pub-75/41-EXP; submitted to Nucl. Instr. and Methods)
E. J. Bleser et al. Experiment #305	Search for Narrow Resonances Produced by Neutron Dissociation (FERMILAB-Pub-75/32-EXP; submitted to Phys. Rev. Letters)

Theoretical Physics

M. B. Einhorn and S. D. Ellis	Hadronic Production of the New Resonances: Are Gluons Important? (FERMILAB-Pub-75/19-THY; submitted to Phys. Rev. Letters)
S-J. Chang	Quantum Fluctuations in a ϕ^4 Field Theory I. The Stability of the Vacuum (FERMILAB-Pub-75/23-THY; submitted to Phys. Rev.)
H. D. I. Abarbanel et al.	A Reggeon Diagram Technique for Inclusive Processes in the Triple Regge Limit (FERMILAB-Pub-75/29-THY; submitted to Phys. Rev. D)
L. S. Brown and R. N. Cahn	Chiral Symmetry and $\psi' \to \psi\pi\pi$ Decay (FERMILAB-Pub-75/33-THY; submitted to Phys. Rev. Letters)
C. H. Albright	Consequences for Neutrino Production of M^0 Heavy Leptons (FERMILAB-Pub-75/35-THY; submitted to Phys. Rev. D)
H. D. I. Abarbanel et al.	Reggeon Field Theory: Formulation and Use (FERMILAB-Pub-75/36-THY; submitted to Physics Reports)
B. W. Lee	A Comment on the BNL Event $\nu p \to \mu^- \Lambda^0 \pi^+ \pi^+ \pi^+ \pi^-$ (FERMILAB-75/38-THY)

General

R. A. Carrigan, Jr.	Single Crystals and Short Lived Particles (FERMILAB-Pub-75/34-EXP)
F. Hornstra, Jr.	The System for Precise Measurement of Accelerator Extraction Efficiency (Submitted to Nucl. Instr. and Methods)
S. I. Baker	Environmental Monitoring Report for Calendar Year 1974
A. Van Ginneken and M. Awschalom	High Energy Particle Interactions in Large Targets Vol. 1 - Hadronic Cascades, Shielding, Energy Deposition
	Proceedings of the Minority Physics Conference Held at Fermi National Accelerator Laboratory November 7-8, 1974

Physics Notes

A. Van Ginneken FN-272	CASIM (First Edition) Program to Simulate Transport of Hadronic Cascades in Bulk Matter
D. Eartly et al. FN-275	Dimuon Production in Proton-Nucleon Collisions at 300 GeV/c

DATES TO REMEMBER

August 16, 1975	Fermilab Auditorium Arts Series: Darlene Blackburn and Company. Tickets available in Guest Office.
September 18-19, 1975	Symposium on Bubble Chamber Hadron Physics.
September 26, 1975	Deadline for receipt of new proposals to be considered for oral presentation at the Proposal Presentation Meeting.
October 9-10, 1975	Proposal Presentation Meeting.
October 11, 1975	Fermilab Auditorium Arts Series: Fine Arts Quartet. Tickets available in Guest Office after October 1.
October 17, 1975	Deadline for receipt of all written materials to be considered at the fall meeting of the Program Advisory Committee.
November 14, 1975	Deadline for receipt of materials to be considered at the Workshop on Short-Lived Particle Beam Facility.
November 20-21, 1975	Fall meeting of the Fermilab Program Advisory Committee.
December 18-19, 1975	Workshop on Short-Lived Particle Beam Facility.