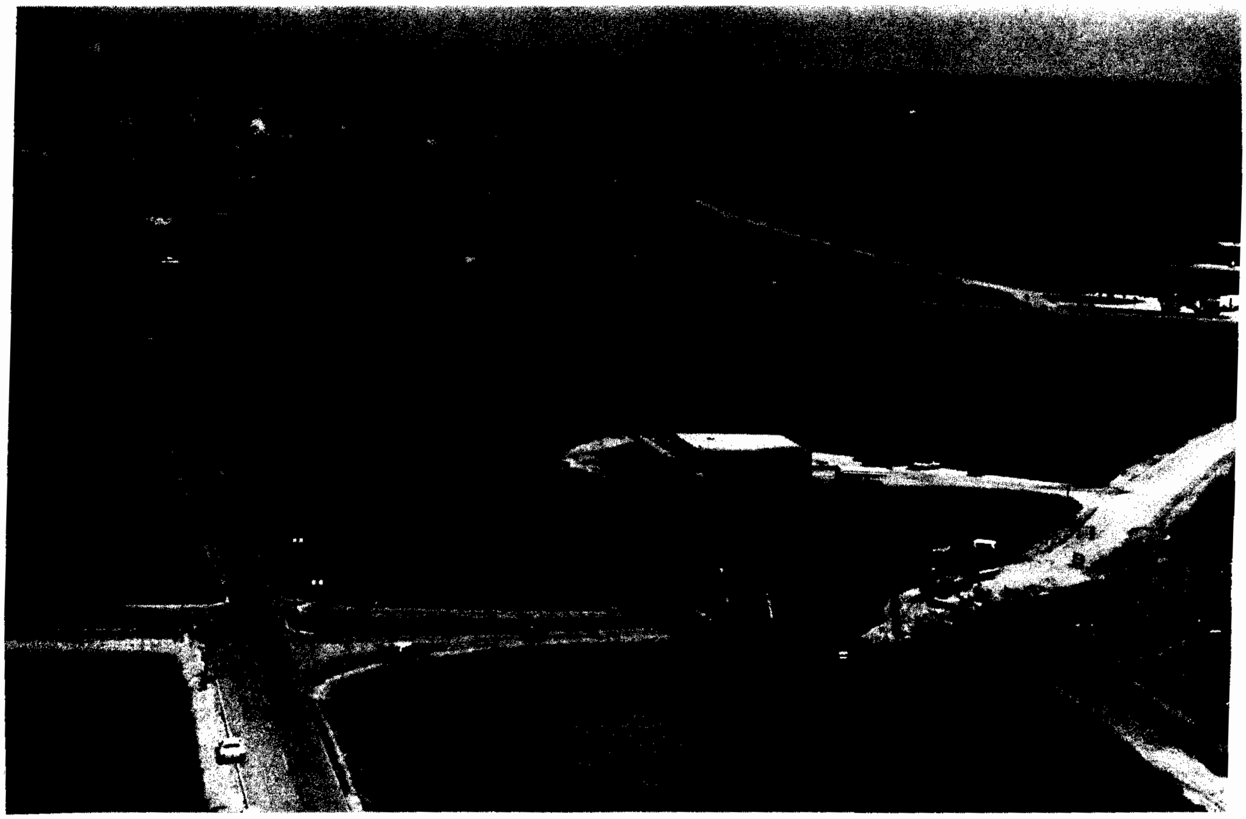
fermilab report

Fermi National Accelerator Laboratory Monthly Report

August 1980



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

F. T. Cole, Editor R. Cole, Acting Assistant Editor R. Donaldson, Assistant Editor

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FERMILAB-80/8 Fermi National Accelerator Laboratory 0090.01

THE COVER: Fermilab is full of construction work this summer. This view from the 15th floor shows the major reconstruction of the switchyard tunnels for 1 TeV. Beyond the trees, one can just see the construction work on Neuhall.

(Photograph by Fermilab Photo Unit)

Operated by Universities Research Association Inc. under contract with the United States Department of Energy

MILESTONES IN ACCELERATOR OPERATION

William A. Merz

The accelerator run that ended June 25, although abbreviated for work on Fermilab's future accelerator, was in many ways the most successful running period we have ever had. We can preen ourselves on:

(i) The highest operating efficiency for any 6-month period in our history. We measure operating efficiency as the ratio of actual to scheduled hours of operation and data are collected separately for high-energy physics and accelerator studies. For the first half of 1980, we measured

	Scheduled Hours	Actual Hours	Efficiency (%)
HEP	2148.4	1708.3	78
Studies	361.5	340.7	94
Total	2559.9	2049.0	80

(ii) The largest number of operating hours ever recorded in a week, 150 out of a possible 168.

(iii) We operated for long periods successfully splitting a high-intensity (more than 2.1×10^{13} protons) beam among the three experimental areas.

We plan to better these marks when accelerator operation resumes.

Members of the Fermilab Users Executive Committee for 1980-81 are (L-R) Frank Turkot, Melvin Schwartz, John Rootherford, Thomas J. Devlin, Vincent Peterson, Sharon Hagopian, Charles M. Ankenbrandt, Phyllis Hale (Fermilab Users Office), Thomas Romanowski, Lawrence W. Jones (chairperson), Richard Gustafson, and Konstantin Goulianos.

(Photograph by Fermilab Photo Unit)

THE FERMILAB USERS ORGANIZATION AND THE USERS EXECUTIVE COMMITTEE

Lawrence W. Jones, Univ. of Michigan
Chairman, Users Executive Committee

The Fermilab Users Executive Committee met July 24 and, among other matters, elected its officers for the coming year. It may be useful on this occasion to recall to the broader community the purpose and function of the Fermilab Users Organization and of its elected Users Executive Committee (UEC).

Membership in the Users Organization is open to graduate students, scientists, and senior engineers from U.S. institutions who are engaged in research in high-energy particle physics. There are non-voting associate memberships for people not eligible for membership. All members receive the minutes of UEC meetings, but it is necessary periodically to return a postcard to reaffirm one's membership. Broadening the condition for membership, particularly to include users from abroad, is now under discussion, as indicated in the minutes of the July 24 meeting.

The UEC consists of 13 members, with 6 elected each year for two-year terms. The chairman serves a third year. This committee serves to represent the interests of the nationwide - indeed the international - community of Fermilab users in its interactions with the Laboratory and with the larger community in matters concerning Fermilab. The Committee is comprised of physicists mostly from user universities, although there are also generally representatives of the Fermilab physics staff among its members.

The UEC meets bimonthly and organizes an annual general meeting of the entire Users Organization, usually following the Washington meeting of the American Physical Society. Concerns of the UEC fall generally into three classes: the interaction of the users with the technical facilities of the laboratory; the external affairs of the laboratory; and the non-technical amenities of the laboratory as they affect users. A perception of these functions may be found in some specific recent examples.

The UEC meets with the Laboratory Director and other Laboratory senior staff periodically to maintain close contact with Laboratory planning, programs, and operations. Concerns such as reliability of accelerator operation and communication between experimentalists and the main control room are shared and discussed with the appropriate management personnel. As an example of one initiative that is currently being pursued, the UEC has asked the Laboratory to explore the feasibility of broadcasting the internal channel-13 TV signal (accelerator status, ramp, spill, and general information) at low power on an available UHF TV channel.

The UEC does not involve itself in program decisions, but the Director does seek from the UEC a slate of candidates for the Program Advisory Committee from which its members are selected. The UEC has also conferred with the Director on a policy statement concerning non-U.S. group proposals to Fermilab. This was stimulated by a policy proposal authored by John Adams and circulated by the International Committee on Future Accelerators.

The annual meeting of the Fermilab Users Organization last spring coincided with a visit to the Laboratory by members of the HEPAP subpanel on future facilites (the Woods Hole Panel), and the UEC joined the Panel members for dinner on the occasion. Part of the program on the following day was a round-table discussion by UEC members and others on the Fermilab program. It is tempting to believe that this interaction with the Woods Hole Panel helped to improve their perception of the Fermilab program. The broad constituency of the UEC and the users in general may also be called upon to interact with Washington on matters affecting Fermilab support and related government policies. For example, last spring the budgetary crisis led to action in the House Appropriations Committee that threatened serious cutbacks in the DOE High Energy Physics program. Together with similar groups, members of the UEC interacted with their local representatives to clarify the interest of the widespread community of university scientists in the vitality of the Fermilab program. The UEC is also interested in maintaining and strengthening close ties with the Universities Research Association Board of Trustees and executive officers.

A frequent concern of the UEC is the problem of on-site housing for Fermilab users. Especially during summer months housing is perennially tight, and the UEC works with the Laboratory in efforts to expand the available housing, to monitor the quality and to advise the Laboratory management on questions of allocation procedures and rates. In recent years, a Quality of Life Committee has been established at the Laboratory to represent the interests of visitors and employees in non-technical matters. The UEC nominates members to this committee and works with it in seeking solutions to user problems.

The Fermilab Users Organization and its executive committee are patterned on a format first initiated at the Argonne National Laboratory when the ZGS was being built. The Berkeley Bevatron, the Brookhaven Cosmotron, and (in its early years) the AGS enjoyed no such formal organization of users, but from its inception the Argonne facility sought to solicit and develop a new community of outside users and found in this organizational structure valuable input. Subsequently users organizations have evolved at Brookhaven (the High Energy Discussion Group, HEDG) and at SLAC (SLAC Users Organization), as well as at Fermilab.

University faculty members may find a close analogy between the Users Executive Committee and the typical academic senate executive or advisory committee. Many universities have such elective groups, which serve as advisors to the university executive officers and as sounding boards for faculty opinion. Although such groups may have minimal official responsibility and power, they can profoundly affect university policy and programs. The UEC, like such faculty groups, is effective if the Director and his staff are receptive to the Committee input and if the Committee membership reflects serious, responsible, and intelligent consideration of the issues before it. Under such circumstances the Users Organization and its Executive Committee can work very effectively with the Laboratory management for the best interests of the Laboratory, its program and its user community. Fortunately, this seems to portray accurately the present situation.

FERMILAB USERS EXECUTIVE COMMITTEE MEMBERS, 1980-81

Dr. Charles M. Ankenbrandt, Fermilab
Dr. George Brandenburg, Harvard
**Dr. Thomas J. Devlin, Rutgers
Dr. Henry Frisch, Chicago
Dr. Konstantin Goulianos, Rockefeller
Dr. Richard Gustafson, Michigan
Dr. Sharon Hagopian, Florida State
*Dr. Lawrence W. Jones, Michigan
Dr. Vincent Peterson, Hawaii
Dr. Thomas Romanowski, Ohio State
Dr. John Rutherfoord, U. of Washington
Dr. Melvin Schwartz, Stanford
Dr. Frank Turkot, Fermilab

* Chairman
** Secretary

FIXED-TARGET TEVATRON WORKSHOP

G. L. Kane
Randall Laboratory of Physics, Univ. of Michigan

Now that the Tevatron is beginning to become a reality in most people's minds, it is a good time to discuss in more detail the Tevatron physics program, to the extent that one can foresee it. That was done at a workshop at Fermilab held July 24-31 (just after the Madison conference). Over 50 physicists, including a dozen theorists, participated in study groups.

Before the initial round of beams and detectors for the Fixed-Target Tevatron Program (which will sometimes be called TeV II in the accompanying text) are firmly determined, it is useful to look more closely at what important physics questions can be addressed there. The workshop, whose results are summarized in the following, was arranged for that purpose. The goal was to go beyond broad statements such as "Test QCD" to give detailed descriptions of significant physics problems which are in the realm of TeV II.

Whenever a new accelerator facility is turned on, it may be that its main contribution will be in surprising areas that no one has thought of. Although that is certainly possible, it is considerably less likely today now that QCD may be the theory of strong interactions and $SU(2)\otimes U(1)$ the theory of electroweak interactions. Both of these have been formulated and partially tested in the energy range available to TeV II, and it is perhaps even probable that they will remain valid there. One important role of TeV II will be to further test these theories. On the other hand, there are fundamental unsolved problems in particle physics today, and there are a number of ways in which breakthroughs in providing experimental input to grand unification, the flavor problem, and spontaneous symmetry breaking could come from TeV II.

From the perspective of possible experimental input to solving fundamental problems in particle physics one might list the main problems as:

(1) Is QCD really the correct theory of strong interactions? Further tests are needed to confirm every aspect of QCD predictions. Is experimental input useful for soft QCD, for helping to solve the confinement problem, and for deciding if quarks and gluons interacting via QCD can account for the observed hadrons and their interactions?

(2) Is $SU(2)\otimes U(1)$ really the correct electroweak theory?

(3) What is the physics of spontaneous symmetry breaking? Are there fundamental Higgs bosons, or is there dynamical symmetry breaking giving composite bosons, or perhaps no particle states below the TeV scale?

(4) Is there a grand unification of QCD and SU(2)⊗U(1)? What is it?

(5) Why are there several families of quarks and leptons? How many? Are they really copies or do heavier families show some different properties?

(6) Are there unexpected discoveries to make? These could come in two kinds. First, there could be truly unexpected findings, such as a fourth family, heavy neutral leptons, light colored Higgs, and (obviously) unspecifiable things. Second, there could be results that fit within the framework of the theories we have. Is the weak isospin eigenvalue of the right-handed muon really zero? Are the charged currents all really V-A? Many of these kinds of questions can be checked at TeV II.

For the rest of this summary I list a number of questions that mainly provided the lines along which the working groups were organized. Some of these questions were considered by them (as well as many others) and some have not yet been considered in detail.

ν Masses and Oscillations

Whether ν masses are zero, and their values if they are not, will tell us a great deal about grand unification and theories in which lepton number is not conserved, as well as about cosmology. Present experiments are suggestive of effects of non-zero masses, and are stimulating much more work; theoretical arguments have been discussed for several years.

At TeV II, the effects of ν masses would show up as oscillations from one ν into others. At TeV II only mass differences $\gtrsim$ 10 eV are likely to be observable. This is an attractive range as it can arise in theories and is the range needed if neutrino masses are relevant for solving cosmological problems.

ν_τ

The question of the existence of ν_τ is, in a sense, especially important. If the existing SU(2)⊗U(1) theory is right it is already known, from the absence of $\tau \to eee$, $\tau \to \mu ee$, $\tau \to \mu\mu\mu$, $\tau \to e\mu\mu$ at the few percent level, that τ must have its own light ν.

Quark Mixing Angles

The eigenstates of weak interactions are not the same as the quark mass eigenstates, so there are mixing angles. There are fundamental parameters like the Cabibbo angle (which is one of them) that need measurement. From the b-quark lifetime, its decays, and its production, some mixing-angle measurements can be made. Although production of a t-quark may be difficult, it would be easy if mixing angles were large, so limits on t production will provide useful limits on the angles.

CP Violation

Does TeV II allow experiments to study the origin of CP violation that are as useful as those at other machines, or more useful?

t-Quark

Apparently a t-quark is not seen at PETRA. Before TeV II it will be known definitely from b-quark decays whether there is a t-quark, but its mass will be unknown. The next chance to find it will be at TeV II.

Further, if there is a sufficiently light, charged, Higgs-like boson $a_T^{\pm}$, e.g., as expected in the technicolor theory, where it has a mass of about 8 GeV, then the usual decays $t \to bq\bar{q}$ or $t \to b\ell\nu$ will not dominate. Instead, $t \to ba_T^{\pm}$ will dominate because it is semi-weak. This is a real possibility that must be considered. If t is found and does not decay this way, it gives an important limit on the mass of a_T.

Rare Processes

Current theoretical ideas such as technicolor or flavor unification now often lead us to **expect** rare decays with typical gauge couplings and gauge boson masses in the 10-50 TeV region. This suggest that many rare processes such as $K \to \mu e$; $K \to \mu\pi e$; $\Sigma^+ \to p\mu e$; $\Xi \to \Lambda\mu e$; $\tau \to eee$, $ee\mu$, $\mu\mu\mu$, $F \to K\mu e$ will occur with branching ratios at the 10^{-9} or 10^{-10} level. It is no longer a random "shot in the dark" to expect a non-zero result in such a search. Good limits will now restrict theories in a significant way. The process $\Sigma^+ \to p\mu e$ may be very nice as it is non-zero in essentially all models, and no limit is published at present.

Left-Right Symmetry

Often theory arguments lead to the expectation that right-handed charged currents should be significant. It is extremely important to check experimentally for such effects.

Higgs Physics, Technicolor

Since spontaneous symmetry breaking occurs, some Higgs physics must occur. It is there waiting to be found. Although the masses of fundamental Higgs bosons are not yet calculable, experiments could put useful contraints on ranges of masses and couplings.

Detecting $W^{\pm}$?

Can one find explicit signs of charged vector bosons at TeV II? The energy is too low to produce one, so it must be an indirect signal. One hope is obviously to study the total ν cross sections to see a departure from the straight-line rise. Another, perhaps more favorable, is to study the y dependence of $d\sigma/dy$, looking for departures from a flat distribution. Scaling violations affect these tests, but by the time they are performed it is likely that we can reliably correct for them. It is hoped that $W^{\pm}$ will have been found by then and one will be confirming their interactions.

Charmed Baryons

Studying the decay systematics and mass spectra of charmed baryons (and b-quark baryons) could be of great interest. In photon beams and hyperon beams it may be possible to produce large quantities of charmed baryons with good signal to noise. Perhaps even some rare modes could be found.

Neutral-Current Measurements and $\sin^2\theta_W$

In the future, measurements of neutral-current interactions may play a role comparable to that of proton decay in helping probe experimentally grand unification and the family problem.

Careful ($\pm$ 0.01?) measurements of $\sin^2\theta_W$ may be one of the main ways to probe grand unification. That $\sin^2\theta_W$ is predicted to 20% accuracy or better by the singlet grand-unification models is a great accomplishment. Confirming any discrepancy between experiment and the simplest theory, as accurately as possible, is important. If there is a discrepancy it will help tell us what form of grand unification is correct.

QCD Tests

Among the significant tests of QCD one can emphasize a few. Measuring σ_L/σ_T in deep inelastic reactions at larger Q^2 is very important. Measuring the strong coupling of $\alpha_S(Q^2)$, and confirming that it agrees with what is found in e^+e^- is very important. Using the larger lever arm provided by TeV II (because $Q^2 \lesssim 20$ GeV^2 is now really available to test scaling-violation predictions) will be very important. And sorting out the situation in large P_T hadron reactions where perturbative QCD is not necessarily under control (Haber et al.) may be important.

Second, there are model-dependent spin effects involving measuring or making assumptions about the polarization of quarks or gluons in polarized hadrons, such as polarized beams or targets. These provide new knowledge abut hadron wave functions, and allow study of behavior expected from, but not rigorously calculable from, QCD.

Using Jets

In addition to testing jet predictions in QCD, we have to learn to recognize quarks and gluons as jets. Probing many new things, such as t-quark physics, technicolor, Z decays and width, may require working with jets. It will be necessary to learn to do effective-mass physics with jets, to identify jet quantum numbers, etc. While new kinds of physics may not come at TeV II from using jets, it may be possible to learn there the techniques that will be very valuable at the Tevatron Collider.

As can be seen from the above list, it is clear that the physics results expected from the fixed-target Tevatron program will be among the most exciting of the next decade. One clear outcome of the study was that some of the most important experiments should be dedicated ones rather than multipurpose detectors. An example was $\Sigma^+ \to p\mu e$, where a dedicated experiment might hope to gain more than 10^3 in sensitivity to such a rare decay. The high-resolution detectors are multipurpose, except for triggering devices that get very specific. Another result was that groups of experiments with a common program could be of great value, and would require planning and foresight on the part of experimenters and the Laboratory; scaling violation tests, full determination of neutral current, interactions for a given family, or measuring the Q^2 dependence of $\sin^2\theta_W$ are examples.

Over a few years, the fixed-target Tevatron will produce perhaps 10^9 charmed particles and 10^6 b-quarks. Using these as probes of new physics will allow discoveries that are hard to predict now, and will leave room for clever experimenters to do important experiments.

Each group wrote up its ideas by the end of the workshop. They are being integrated into proceedings that will be available. The resulting document will make it clear that the opportunities to do new fundamental physics at the fixed-target Tevatron are at least as great as at any other accelerator in the next 10 to 15 years.

SITUATION REPORT -- JULY 1980

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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, 1980. 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: MESON AREA (MA), NEUTRINO AREA (NA), TEVATRON AREA (TEV), PROTON AREA (PA), INTERNAL TARGET AREA (ITA).

TOTAL NUMBER OF APPROVED EXPERIMENTS - 305

A. EXPERIMENTS THAT HAVE COMPLETED DATA TAKING (264):

(ONLY EXPERIMENTS COMPLETED SINCE 1 JAN 1980 ARE LISTED BELOW)

AREA-BEAM		SPOKESPERSON	EXTENT OF RUN TO DATE	DATE COMPLETED
MA-M1	PARTICLE SEARCH #490	SANDWEISS	850 HOURS	9 JUN 1980
-M2	CHARGED HYPERON MAG MOMENT #620	PONDROM	900 HOURS	22 JAN 1980
-M3	PARTICLE SEARCH #584	WINSTEIN	400 HOURS	22 JAN 1980
NA-NO-DICHROM	NEUTRINO #616	SCIULLI	2,900 HOURS	22 JAN 1980
-NO-WB HORN	NEUTRINO #553	SHEPARD	1,500 HOURS	1 APR 1980
-MUON/HADRON	PARTICLE SEARCH #610	KIRK	1,250 HOURS	23 JUN 1980
-15-FT	PARTICLE SEARCH #595	BODEK	1,450 HOURS	16 JUN 1980
-OTHER	MONOPOLE #502	BARTLETT	COSMIC RAY RUNNING	23 JUN 1980

B. EXPERIMENTS THAT ARE IN PROGRESS (15):

			EXTENT OF RUN TO DATE	DATE OF RECENT RUN
MA-M1	PARTICLE SEARCH #515	ROSEN	1,500 HOURS	1 JUL 1980
-M2	QUARK #622	GUSTAFSON	UNSPECIFIED	1 JUL 1979
-M4	KAON CHARGE EXCHANGE #585	FRANCIS	2,450 HOURS	1 JUL 1980
-M6	ELASTIC SCATTERING #577	RUBINSTEIN	550 HOURS	1 JUL 1980
	PARTICLE SEARCH #580	GREEN	800 HOURS	1 JUL 1980
NA-NC-HORN	15-FOOT NEUTRINO/H2&NE #53A	BALTAY	163K PIX	1 JUL 1977
	15-FOOT ANTI-NEUTRINO/H2&NE#180	BRMCLOV	273K PIX	1 JUL 1977
	15-FOOT ANTI-NEUTRINO/D2 #390	GARFINKEL	10K PIX	1 APR 1979
	NEUTRINO #531	REAY	1,150 HOURS	1 JUL 1979
	15-FOOT & EMULSION/NEUTRINO#564	VOYVODIC	EMULSION EXPOSURE	1 JUL 1979
-OTHER	NUCLEAR FRAGMENTS #466	SUGARMAN	40 TARGETS EXPOSED	1 JUL 1980
PA-PE	PHOTOPRODUCTION #516	NASH	2,050 HOURS	1 JUL 1980
-PW	DI-MUON #326	SHOCHET	700 HOURS	1 JUL 1980
	DI-MUON #537	COX	1,000 HOURS	1 JUL 1980
ITA-C-O	PARTICLE SEARCH #591	GOTAY	150 HOURS	1 APR 1980

C. EXPERIMENTS THAT ARE IN TEST STAGE (5):

			EXTENT OF RUN TO DATE	DATE OF RECENT RUN
MA-M2	BEAM DUMP #613	PGE	350 HOURS	1 JUL 1980
-M6	HADRON JETS #557	MALAMUD	250 HOURS	1 APR 1980
NA-NO-DICHROM	NEUTRINO #594	WALKER	550 HOURS	1 JUL 1980
-OTHER	QUARK #549	LONGO	1 TARGETS EXPOSED	1 OCT 1978
PA-PC	CHARGED HYPERON #497	LACH	900 HOURS	1 JUL 1980

D. EXPERIMENTS BEING INSTALLED (1):

			EXTENT OF APPROVAL
PA-PW	PARTICLE SEARCH #650	WEBB	500 HOURS

E. EXPERIMENTS TO BE SET UP WITHIN A YEAR (8):

NOTE: THE ABILITY TO SET UP THESE EXPERIMENTS DURING THE NEXT YEAR IS CONTINGENT ON THE AVAILABILITY OF FUNDS.

			EXTENT OF APPROVAL
MA-M1	DIRECT PHOTON PRODUCTION #629	FERBEL	UNSPECIFIED
-M3	CP VIOLATION #617	WINSTEIN	1,000 HOURS
-M6	HADRON JETS #609	SELOVE	1,500 HOURS
NA-30-IN	30-INCH HYBRID #565	PLESS	PARASITIC RUNNING
	30-INCH HYBRID #570	PLESS	1,500 HOURS
	30-INCH HYBRID #597	WHITMORE	1,000 HOURS
PA-PE	PHOTON DISSOCIATION #612	GOULIANOS	1,150 HOURS
-PC	b & CHARM PARTICLE PROD. #630	SANDWEISS	600 HOURS

F. OTHER APPROVED EXPERIMENTS (12):

			EXTENT OF APPROVAL
MA-M1	HIGH MASS PAIRS #605	BROWN	1,000 HOURS
-M2	NEUTRAL HYPERON #555	DEVLIN	450 HOURS
	POLARIZED SCATTERING #581	YOKOSAWA	UNSPECIFIED
	TRANSITION MAGNETIC MOMENT #619	DEVLIN	250 HOURS
NA-OTHER	EMULSION/PROTONS @ 500 #508	WOLTER	EMULSION EXPOSURE
	EMULSION/PROTONS @ 500 #524	WILKES	EMULSION EXPOSURE
	EMULSION/PROTONS @ 500 #576	HEBERT	3 STACKS
TEV-NEUTRINO	NEUTRINO #634	STEINBERGER	UNSPECIFIED
	NEUTRINO #652	SCIULLI	UNSPECIFIED
PA-PE	PARTICLE SEARCH #400	PEOPLES	500 HOURS
	PHOTOPRODUCTION #458	LEE	UNSPECIFIED
-PW	FORWARD SEARCH #615	ANDERSON	1,000 HOURS

PENDING PROPOSALS (23):

			EXTENT OF REQUEST
MA-M1	PHOTON SEARCH #614	ROSEN	300 HOURS
-M2	CP VIOLATION #621	THOMSON	1,200 HOURS
	BEAM DUMP #644	LONGO	2,000 HOURS
-M6	MULTIPARTICLE #523	DZIERBA	800 HOURS
	PARTICLE SEARCH #623	LAI	1,300 HOURS
NA-30-IN	30-INCH PARTICLE SEARCH #657	VOYVODIC	100 HOURS
TEV-NEUTRINO	15-FT NEUTRINO/H2 & NE #632	MORRISON	250K PIX
	NEUTRINO #635	MO	
	15-FT NEUTRINO/D2 #637	AMMOSOV	
	15-FT NEUTRINO #641	KITAGAKI	200K PIX
	HYBRID NEUTRINO #647	PETERSON	UNSPECIFIED
	NEUTRINO #649	TAYLOR	
	15-FT NEUTRINO/D2 #651	MILLER	100K PIX
-BEAM DUMP	15-FT BEAM DUMP #646	BALTAY	
	BEAM DUMP #654	LEE	UNSPECIFIED
	BEAM DUMP #656	WHITAKER	
-MUON	MUON #640	LOKEN	6,500 HOURS
	MUON #643	BRANDENBURG	2,500 HOURS
	MUON #648	BENVENUTI	600 HOURS
	MUON #658	ECKARDT	
PA-PC	PARTICLE SEARCH #653	REAY	1,500 HOURS
ITA-C-O	PROTON-PROTON SCATTERING #500D	FRANZINI	1,000 HOURS
MISC1	NUC CALIBRATION CROSS SECT #631	BAKER	25 EXPOSURES

Beginning of excavation for the M1 beam line, upstream of the Meson Detector Building.

(Photograph by Fermilab Photo Unit)

MANUSCRIPTS AND NOTES PREPARED
FROM JULY 12 TO AUGUST 11, 1980

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 some articles listed are on the reference shelf in the Fermilab Library.

Experimental Physics

R. Carrigan Experiment #76	Down to Earth Speculations on Grand Unification Magnetic Monopoles (FERMILAB-Pub-80/58-EXP)
R. M. Baltrusaitis et al. Experiment #95	Measurement of High Mass $\gamma\gamma$ and $\pi^0\pi^0$ Producton in 400 GeV/c p Be Interactions: A Search for η_c (FERMILAB-Pub-79/39-EXP; submitted to Phys. Rev. Lett.)
J. P. Berge et al. Experiment #180	Quark Jets from Antineutrino Interactions I; Net Charge and Factorization in the Quark Jets (FERMILAB-Pub-80/62-EXP; submitted to Nucl. Phys. B)

Theoretical Physics

H. B. Thacker	Exact Integrability in Quantum Field Theory and Statistical Systems (FERMILAB-Pub-80/38-THY; submitted to Rev. Mod. Phys.)
M. Fischler	Young-Tableau Methods for Kroenecker Products of Representations of the Classical Groups (FERMILAB-Pub-80/49-THY; submitted to J. Math. Phys.)
N. Sakai	Perturbative QCD Corrections to the Hadronic Decay Width of the Higgs Boson (FERMILAB-Pub-80/51-THY; submitted to Phys. Rev. D)
R. Fukuda and Y. Kazama	Gluon Condensation from Trace Anomaly in Quantum Chromodynamics (FERMILAB-Pub-80/55-THY; submitted to Phys. Rev. Lett.)

C. A. Nelson	Origin of Cancellation of Infrared Divergences in Coherent State Approach: Forward Process qq → qq + gluon (FERMILAB-Pub-80/59-THY; submitted to Nucl. Phys.)
C. Quigg	(Quark)onium Theory and Spectroscopy (FERMILAB-Conf-80/63-THY; Introductory Remarks to Parallel Sessions C7 at the XXth International Conf. on High Energy Physics, Madison, Wisconsin, July 1980)

Physics Notes

Y. Miyahara	A New Approach to the Head-Tail Instability (FN-322)

General Physics

D. E. Young	Progress on Beam Cooling at Fermilab (Submitted to the International Accelerator Conf., CERN, July 1980)

NOTES AND ANNOUNCEMENTS

APPOINTMENTS...

John Peoples will leave the post of the Research Division on October 1. He will be succeeded by **Peter Koehler.**

CALL FOR PROPOSALS...

All proposals for Tevatron experiments with hadron and photon beams in the Meson and Proton Area must be received by February 1, 1981, in order to be considered at the June 1981 PAC meeting. The proposal presentations will take place in April 1981 (dates to be scheduled). If you have any questions please contact:

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%Program Planning Office
MS #105
Fermilab
P. O. Box 500
Batavia, IL 60510

DATES TO REMEMBER

Sept. 25, 1980	Deadline for submitting materials for PAC consideration
Nov. 13-14, 1980	PAC Meeting