



ENERGY STORAGE PROPOSED FOR FERMILAB

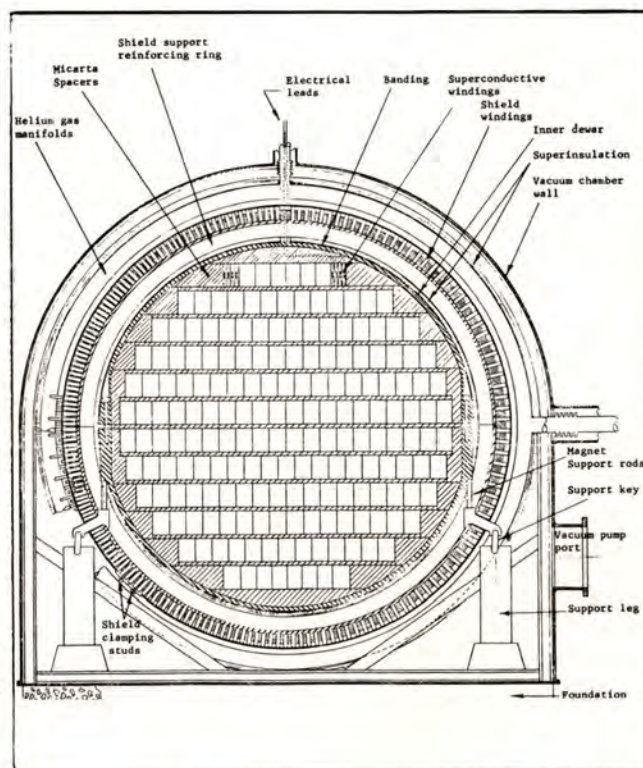
A proposal for building a large experimental superconducting coil to store electrical energy at the Fermilab has been submitted to the U.S. Atomic Energy Commission. The proposed technique would serve to smooth out the effects on the Commonwealth Edison line of pulsing the Fermilab accelerator at 500 BeV. The technique also holds important implications for the future of the power industry.

The plan is an outgrowth of a study that began at the University of Wisconsin some years ago. A Wisconsin group studied a concept of storing energy which could be generated by power companies during off-peak hours so that the stored energy could be fed back into the system during peak demand hours. An energy storage technique could relieve some of the demand for additional generating capacity now under serious consideration in many parts of the United States.

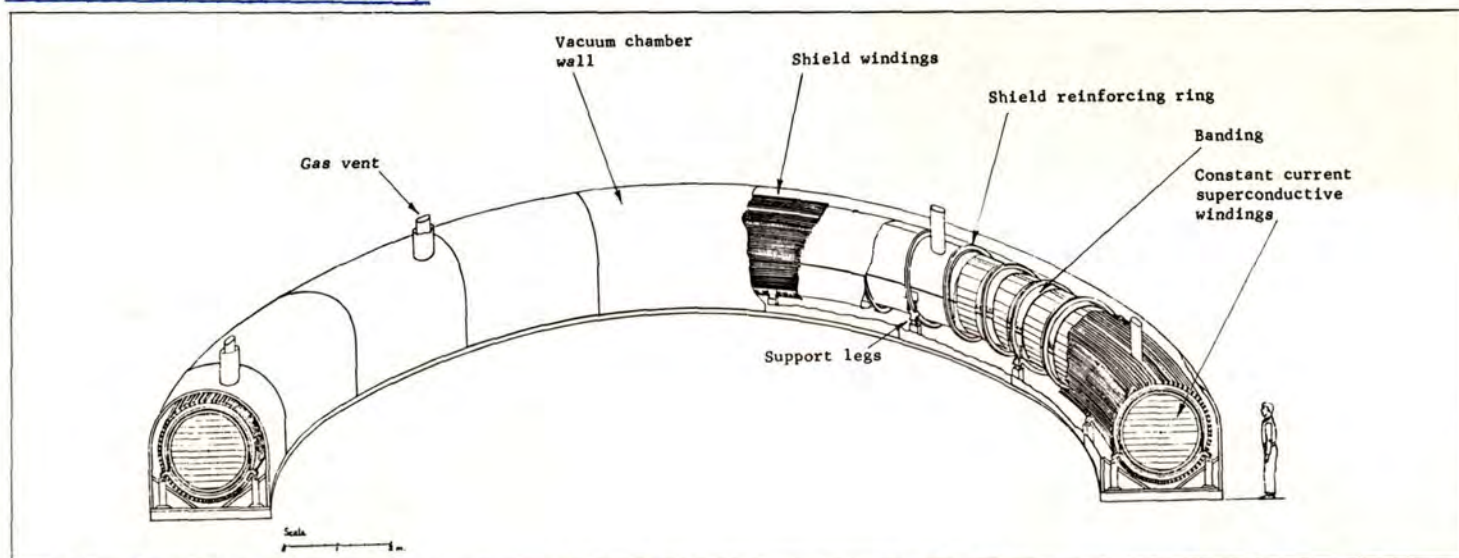
At the Fermilab, the main accelerator requires an average power of about 50 megawatts. However, it operates in such a way that the instantaneous power requirements range from 5 to 300 megawatts over a short period of time. This places a demand on the Commonwealth Edison line similar, on a small scale, to the peak and off-peak demand in the much longer cycle of usage of their power. The idea behind the new plan is that energy could be stored and then released to accommodate the wide swing of accelerator demand, duplicating in a miniature way what occurs in the general power consumption pattern.

The progress being made in superconducting magnet activities at the Fermilab is another important factor in the plan. The competence developed in assembling and operating the superconducting magnet for the Fermilab 15-Foot Bubble Chamber, the expertise being used in developing the energy doubler prototypes, and the other superconducting facility construction going on at the Laboratory make the Fermilab one of the leading centers of applied superconductivity research in the world. Superconducting devices utilize the principle that electrical current will flow without any power loss in a superconducting device that is cooled to about 450 degrees below zero F. It is generally felt that superconductivity may well be a technique on which high energy physics research will rely heavily in the future and a technique that offers many new ways of handling electrical power, including energy storage.

The Fermilab Cryogenic Energy Storage System proposal includes a storage inductor, an inverter-converter system, a cryogenic system, a vacuum system, and control and instrumentation systems. The storage inductor is a coil about 20 yards across. (See illustration top of page 2.) Once current has been established flowing in this coil, it remains in storage until it is extracted. A key feature is that the superconducting coil is surrounded



...Cross section of superconducting magnet for proposed energy storage device at Fermilab...



...Perspective view and cross section of energy storage facility proposed for Fermilab...

by a second aluminum shield coil which is connected parallel to it. The shield protects the superconductor from the rapidly changing fields due to pulse currents in the operation of the accelerator. This shield would probably not be necessary in a power company application where the exchange takes place over hours rather than seconds. The storage facility would be circular, above-ground, with no known detrimental environmental effects. It could be located either near the present Master Substation or inside the Main Ring. Other elements of the system utilize techniques already in use at the Fermilab.

At present the main technique in use for power storage is that used in hydroelectric plants, pumping large quantities of water uphill during off-peak hours which then descends to run turbine generators during peak hours. Many types of power plants (such as the present nuclear reactors, the proposed breeder reactors, and coal stations) cannot easily turn up and down to match sudden fluctuations in demand. More expensive gas and oil-fueled generation must be called upon to supplement the peak-hour needs.

Fermilab staff members serving on the Pulsed Energy Storage System Design Feasibility Study Group have been G. Biallis, R. Cassel, W. Fowler, P. Livdahl, F. Mills (chairman of the group), M. Palmer, P. Reardon, S. Snowden, B. Strauss, L. Teng, and R. Winje. Seventeen University of Wisconsin staff members have worked on the project including Professors R.W. Boom, H.A. Peterson and N.C. Young. Representatives of many segments of the power industry have been close to the planning as it has developed. Among these have been several Wisconsin utility companies, the General Electric Company, Commonwealth Edison Company and the Electric Power Research Institute. The U.S. Atomic Energy Commission has been in close touch with the development.



G. Biallis R. Cassel W. Fowler P. Livdahl F. Mills M. Palmer



P. Reardon S. Snowden B. Strauss L. Teng R. Winje

...Fermilab Storage System Feasibility Study Group...



INTRODUCING . . .

The Laboratory organizations and personnel responsible for the health and safety of employees and visitors would periodically like to provide you with timely information on the subject. We hope that the Health * Safety newsletter will fill this need. It will not be published on a regular schedule, but only when we have a message for you. It will be inserted into the Village Crier as a separate sheet which you may read and file for future reference, post on a bulletin board, or perhaps take home if it contains information of interest to your family. Most important though, we want you to read it.

The Health * Safety newsletter will be edited by the Safety Office with the assistance of the Public Information Office. The articles may be written by the Medical Dept., Fire Protection Dept., Emergency Coordinator, or Radiation Physics, in addition to the Safety Office. We also solicit your contribution of materials or ideas which will improve our health and safety. You may call x3580 with questions or suggestions or send materials to the Safety Office at Site 50.

Normally, the Health * Safety newsletter will be published on this "sunshine" yellow paper. Occasionally, when there has been a serious accident or an injury, we will publish on "shocking" pink. In such cases we will want you to know what happened, why, and what you can do to keep it from happening again. We hope we won't need much pink paper.



"3131"

Perhaps by now the picture has stimulated your curiosity. Diane Burchett, Chief Telephone Operator, is standing by the emergency console located in the Communications Center. This gives us a lead-in to tell you about our emergency telephone system and what happens when you call it.

To report any emergency at any time, dial "3131" from any laboratory telephone with the 840 prefix. This number rings a special red telephone at our Communications Center, which the operator will answer immediately. After you have told her, or him, what the emergency is and where it is, be sure to stay on the line until the operator indicates that help is on the way. The operator will next "CRASH" the emergency page-boy radio system which will alert all the organizations and personnel involved in dealing with emergencies here at the lab.

Very detailed plans have already been made to deal with every kind of emergency we can imagine. We intend to tell you more about these organizations at a later time. Remember, YOU may be the most important part of the system. YOU may be the one to report the emergency. Remember - STAY CALM.

SUNDAY TRAIL RIDE AT FERMILAB

Robert R. Wilson led the trail ride at the Fermilab on Sunday, August 18, with Paul Neeson of the Indian Creek Riding Club, sponsors of the all-day event. The 25 equestrians enjoyed the Fermilab scenery on the ride that went from 8:30 a.m. until 1 p.m., returning to club headquarters for lunch. After lunch and a haywagon ride, John Barry of the Directors Office led the losing team in a great tug of war over the manure pile. Robert Pierce, Site Services, captured the greased pig in an unbelievable three minutes.



...Summer Fun...



...All aboard...



...It wasn't easy...



...Pork chops next winter...

* * * * *

SUCCESSFUL TWO-ENERGY RUN COMPLETED

The Fermilab accelerator system completed two weeks of running in the dual energy (dichromatic) mode on August 22. Beam at both 200 and 300 BeV was delivered to the Lepton Experiment #70 in the Proton Area while 300 BeV beam was also directed on the same accelerator pulse to the Meson and Neutrino areas. This was the first sustained run in this operating mode for collection of data by experimenters since the original successful test of last March.

The dichromatic operating mode required a careful team effort by staff members in all areas of the accelerator system. The Main Ring power supply group started the cycle by reprogramming and bringing on all of the Main Ring power supplies, a portion of which are used for the first stage of acceleration, the other portion coming on for the second part of the cycle. Extraction and Switchyard groups adjusted splitting stations and transport magnets to handle beams at both the 200 and 300 BeV energies as required by the overall experimental program. In addition, 300 BeV beam was supplied, with both slow spill for counter experiments and a fast spike to meet the requirements of the neutrino experiments. In the Proton Area, operating crews adjusted beam transport systems to minimize beam loss and to adjust the split of the beam between the two experiments running there. Behind the whole operation was the careful work of setting up the necessary monitoring and control system by the Controls group and the skillful tuning and systems control by the accelerator operators.

The technique is successful, according to one of the experimenters in Experiment #70. Jeff Appel reports, "The front porch operation solves a lot of experimental problems. It is useful as a physics tool as well as for maintaining a balanced operating schedule."

* * * * *

FERMILAB BULLETIN BOARD

- BOWLING** - There is still time to sign up for the '74-'75 league season. Register from 12 noon to 1 p.m. every day in the Central Laboratory second floor coffee lounge. \$12.00 registration pays for 1st, 32nd, and 33rd weeks of season and membership in ABA, WIBC. Bowl at Warrenville Bowl, Monday nights, 6 p.m., September 9 through April 21. For further information contact Harland Gerzevske, Helen Ecker, Barb Schluchter, Sherry Nila.
- TENNIS** -- Annual Fermilab tournament opens September 9. Sign up with John Satti, Ext. 3676, or Helen Ecker, Ext. 3393, before September 5. All employees and visiting experimenters may participate.
- GOLF** ---- Fermilab Golf League is sponsoring the Second Annual 18-hole tournament on Saturday, September 14 at the Arrowhead Country Club. All employees of Fermilab, AEC, visiting experimenters are invited to participate. Entrance fee is \$8.00 which covers greens fee and dinner. Call Bob Kocanda or Ellery Cook, Ext. 3734 before September 6 to make reservations.
- CHICAGO EVENING** - Moiseyev Dance Company will perform at the Arie Crown Theater on Thursday, September 5. Tickets at \$12.40 each include bus fare from Village Cafeteria leaving promptly at 6:30 p.m. The Moiseyev company is the most widely acclaimed of all USSR folk dance companies. Program includes Polovetsian dances from Prince Igor, the massive Festival in Kirgiziya, the gripping Partisans, and the colorful Zhok. Reservations, additional information from Visitors Center, Ext. 3440, or Helen Ecker, Ext. 3393.
- RECITAL** - Ann Turnbaugh of Geneva, Illinois will present a piano recital in the Fermilab Auditorium on Sunday, September 8, 3:30 p.m. The program will include selections by Bach, Schumann, Mozart, Chopin, and Liszt. The public is invited to attend; there is no charge.
- CANOE RACE** - Only three weeks to practice for the September 23 Canoe Race for employees and visiting experimenters in the Main Ring ponds. Call Larry Allen, Ext. 3721 or Helen Ecker, Ext. 3393, to register, before September 23. The race will start at 11 a.m. in the A-1 sector pond, end in the F sector, 15 portages.

CLASSIFIED ADS

- FOR SALE** - '74 Cutlass Supreme 350, AC, p/s, disc brakes, steel radials, many extras, 13,000 mi., excellent condition, \$3995 FIRM. Call Warren Light, Ext. 3332 or 377-0757.
- FOR SALE** - '72 Gran Torino Sport, p/s/b, FM, 8-trk. stereo, 4 spd, white, green interior, low mi., excellent condition. Call Kathy, Switchboard - Dial "0".
- FOR SALE** - '72 VW Formula Vee Super Beetle, sun roof, AM/FM stereo, cassette player, excellent condition, \$2000 FIRM. Call Kevin, 858-2170 after 5 p.m.
- FOR SALE** - 1969 Volkswagen square back sedan, 45,000 miles, gd. cond. Call Bob Savit, Ext. 3751.
- FOR SALE** - '69 Dodge Dart Swinger, 340 eng. 4BB'L carb., 4 on floor trans., mint condition, \$1196. Call Frank Jasek, Ext. 3719 or MO 8-9513.
- FOR SALE** - '68 Mercury Monterey, 4 dr., auto., p/s/b, AM/FM-\$600. Call Frank Mehring, Ext. 4048.
- FOR SALE** - '64 Plymouth, 6-cyl., stick-\$150; **WANTED** - To record "5th Dimension" albums in exchange for Northern Fox River & Lake area sight-seeing airplane ride. Call Travis, Ext. 3172.
- FOR SALE** - '62 Buick Electra-225, excel. cond. body & mechanics. Call D. Leppard, 665-6364 days.
- REWARD** - Identify hit-run car sideswiping '70 blue mustang about noon Monday, August 12 - Cross Gallery East area. Call R. Kreml, Ext. 3701.
- FOR SALE** - Disposal, new (never used), M-244E National, ½ h.p., continuous feed, in warranty. \$64 value, asking \$50. Call Joyce Sobinsky, Ext. 3572.
- ATTN** - Bible study group now mtg. during lunch hr. Goal - applying the Bible to personal daily living. If interested, call Jim Wendt, Ext. 3734 or Jay Peterson, Ext. 4050.
- FOR SALE** - Sears refrigerator, 1 yr. old, \$190. Call Bill Taylor 665-2510.

* * * * *