

Central Computing Facility Upgrades Shape Up

By Mark Bodnarczuk

The central computing facilities at Fermilab are being upgraded in a multi-faceted project which includes a new building for central computing which will house a new large-scale scientific computer (LSSC), expanded VAX cluster, and farms of micro-processor-based parallel processing systems. Confidentiality must be kept on the LSSC at this time because the acquisition is between the evaluation and the award of the contract stages. However, the building which will house the LSSC and become the new home of Fermilab Central Computing Facilities is rapidly coming to completion and is visible for all to see. The overall cost of the project is \$25 million dollars with about \$9 million of that cost for the new building. Construction of the 74,000 sq ft, three-story building is scheduled for completion in the spring of 1988.

The first floor will house computing hardware, a user's area and tape vault which is capable of storing over 150,000 10-1/2-in. reel tapes. In addition to the present system of 10-1/2-in. reel 6250-bpi tapes which have become the "workhorse" of high-energy physics (HEP) data accumulation, the acquisition package of the LSSC has encouraged potential vendors to propose a complement of new data-storage systems which use more sophisticated technologies like tape cartridges and optical disks.

The second floor is dominated by the LSSC mainframes along with other CPU's, disk drives, and an area for maintenance. The third floor will house the Physics Research Equipment Pool (PREP) and three groups of Computing Department personnel who are currently housed on the 6th and 11th floors of Wilson Hall.

The Central Computing Upgrade Project represents a statement about the magnitude of the future computing needs of the Fermilab HEP community, and is a major step towards meeting those needs. Now that fixed-target and colliding-beams experiments are accumulating higher and higher statistics data samples, the computing demand is impossible to meet with the existing computing systems. The fact that there is no room available in Wilson Hall to add

more equipment further complicates the problem. The upgrade of the Central Computing Facilities, with both a new LSSC and new building to house the computing engine and personnel who service it, is a positive statement about the Department of Energy's and Fermilab's commitment to provide the resources required to do today's high-energy physics experiments.

500,000 Miles and No Overhaul

By Tom Peterson

No, it's not a Rolls Royce. It's a helium expansion engine manufactured by Kock Process Systems, Inc., extensively modified by technicians in the Cryogenics Department of the Accelerator Division, and installed in the Fermilab Main Ring. And while it has not actually traveled anywhere, it has been operating without an overhaul for a solid year.



(Photo: Fermilab Vis.Med.Serv.)

Expansion-engine crew, Cryo. Dept., Accel. Div. Left to right: Steve Dochwat, Jeff Spencer, Dan Freeman, Jim Thompson, Tom Peterson (now with the Mech. Suppt. Dept.), and Mark Gilmore. Not pictured: Joe Savignano. Among recent full-time expansion-engine people not pictured are Ralph Afanador, Ann Eighorn, Carl Pallaver, Ernie Ramirez, and Ted Roberts.

Continued on page 4

Be Advised: October is Energy Awareness Month

In recognition of Energy Awareness Month, October 1987, the theme, "Energy Security: Our Future Depends On It," will pervade the address and honors presented during the 15th Annual Energy Awards Night at Argonne National Laboratory on Thursday, October 22. The keynote speaker will be Richard W. Brancato, Director of the Office of Federal Energy Management Programs for the Office of Conservation at the Department of Energy (DOE) in Washington, D.C.

At that event, Fermilab will receive the Association of Energy Engineers Corporate Energy Management Award and Plaque in recognition of preliminary site cogeneration studies conducted during 1986; for being the first DOE facility to utilize the DOE Mobile Energy Laboratory to conduct energy-consumption monitoring of its buildings for potential energy conservation retrofit projects; and for energy-consumption-optimized design for the Central Computing Facility now under construction.

A preliminary cogeneration study conducted by Bill Riches, Fermilab Energy Management Coordinator, indicated a potential annual energy cost saving of up to \$5 million might be realized by installing two natural-gas, turbine-powered cogeneration units at Fermilab. The waste heat generated would be used to produce chilled-water cooling and hot-water heating.

Because of the potential savings, the DOE has supplied funding for a professional study to verify the feasibility of the project.

Jack Mills, Facility Engineering Supervisor, chaired a committee to define the specifications and select a firm to conduct the study.

Stanley Consultants of Muscatine, Iowa, is currently engaged in the engineering feasibility study. A preliminary report is expected by November 6, 1987, and a final report by December 6, 1987.

In addition, Fermilab has recently submitted funding requests totalling \$863,000 for FY 1989 retrofit projects which, if approved by DOE, would result in an annual \$258,000 energy-cost saving. The Laboratory hopes to soon improve upon its awards for the Employee Conservation Suggestion Program. Employees are reminded that suggestion forms are available from Jenny Rapovich, WH 7E, ext. 3644.

- Bill Riches

Benefits Notes

Connecticut General Medical Plan

I.D. cards were mailed to employees who enrolled in the Connecticut General medical plan during the open enrollment. The I.D. cards were mailed to employees' mail stations. If you did not receive an I.D. card, please call the Benefits Office at exts. 3395 or 4361.

The I.D. card includes the procedure to follow for in-patient hospital stays, both emergency and non-emergency. If you do not follow the pre-certification procedures, you will have to pay 50% of the hospital bill. A description of the pre-certification procedure is on page 19 of the blue (*Fermilab Pension and Group Insurance Programs*) handbook.

Also keep in mind that there are certain surgeries that require a second opinion. The list of surgeries can be found on page 20 of the blue (*Fermilab Pension and Group Insurance Programs*) handbook. A description of the penalty for not getting a second opinion is also on page 20.

Please call the Benefits Office if you need a copy of the blue handbook. As soon as the new supply of Connecticut General certificates are printed, a copy will be mailed to you. - Paula Cashin

In the Library

The Paperback Exchange needs books and readers. Just outside the Library Office, Wilson Hall 3rd-floor crossover, there is a collection of paperbacks for your reading enjoyment. Upon last inspection, *War and Peace*, *Sophie's Choice*, *Gorky Park*, *The Complete Runner*, *The Gulag Archipelago*, and *Don Quixote* were a few of the available titles. Just bring in one or more books from your collection and make an exchange.

For 2 out of every 10 people, the 2nd toe is the longest. The rim of a quarter has 119 grooves. The glue on a postage stamp contains 1/10 of a calorie. There are about 91 billion pennies in circulation in the U.S. (Submitted by Loretta [Vehic. Main.] Nemec)

News from NALREC

The evening at Maywood Park Racetrack was a sell-out and a huge success. We plan to do it again. Congrats to Jesse Guerra for an excellent evening.

Steak and Shake

Tonight is the big night! Steak and the Bruise Brothers at the Village Barn Beginning at 5:15 p.m. Only 300 New York Strip Steaks with all the trimmings are available, so get there early. Bring your wife/husband/friend and make it an evening. A comedian/disk jockey will play all your favorites and the Bruise Brothers Show starts at around 8:30 p.m. Come early and stay late!!

Trick or Treat

The Children's Halloween Party will be on October 25 from 2:00 p.m. to 4:00 p.m. Joanne Hall is putting together a haunted house, and I've heard rumors of a Garfield Goose materialization.

Notes on Boats

Join us for a special film and registration meeting for the cruise to South America aboard *The Victoria*. The film will be shown on the 2nd floor, WH, on Thursday, October 29, at noon. The cruise includes visits to exotic Caribbean Islands in January, March, or April of 1988 starting at around \$880 per person, double occupancy. What a way to spend a week!!

Coming Soon:

Etta Berry is *still* working on the Road Rally, and Joe Morgan is *still* negotiating a deal for tickets to basketball and hockey games. More news on these items in the next issue of *FermiNews*.

Be sure to plan ahead for the annual Fermilab Christmas Dinner Dance which will be held on December 19 right here in Wilson Hall. The committee has been working on this party for nearly a year and it promises to be the highlight of the holiday season.

- Trudy Kramer

Estimated 1986 earnings of the CBS television network: **\$80,000,000** Estimated 1986 earnings of *Wheel of Fortune*: **\$110,000,000** - *Harper's Index*

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Activities Office.

Co-Ed Softball League

The Fermilab Co-ed Softball League was a success the first time around. The league involved four competitive, but fun-loving, teams.

A great time was enjoyed by one and all. The final standings: Angie Velasquez's team was in first place, followed by Rich Thompson's team in second, the Stragglers in third place, and Bob Kinsley's team in fourth. The softball league will return next year, so keep it in mind. No experience is necessary.

Basketball League

The Fermilab Winter Basketball League is gearing up at the Recreational Facility. The league plays on Thursday evenings. Teams, groups, or individuals are needed. For information, contact Jean on ext. 3126. Gym memberships are required.

Soccer

For those of you interested in the game of soccer, there is open soccer play on Wednesday evenings at the Recreational Facility starting at 6:00 p.m. Gym membership is required.

Aerobics Class

The Recreation Office is offering a six-week Low-Impact Aerobics Class. The class will be held from 5:15 p.m. to 6:30 p.m. on Tuesdays and Thursdays at the gym, 16 Potowatomi, beginning October 13 and running through November 19. This class is open to both men and women. Wear comfortable clothes and join us in a good workout. To sign up, call Jean on ext. 3126. Gym membership is required.

Summer is over, but you can continue to keep in shape by joining the Recreational Facility. Memberships are on sale at the Recreation Office, 16 Potowatomi, ext. 3126.

- Jean Guyer

The Film Society Presents:

Laura, Otto Preminger's film of the search for a murdered woman's past, will be shown tonight, October 9, at 8:00 p.m. in the Ramsey Auditorium.

On Friday, October 23, 1987, at 8:00 p.m. in the Ramsey Auditorium, *The 400 Blows*, Francois Truffaut's moving paen to puberty, will unreel.

Admission is \$2.00 for adults, \$.50 for children.

Congratulations to:



"500,000" continued from page 1

Liquid helium is produced for cooling the superconducting magnets of the TEVATRON by 24 satellite refrigerators in conjunction with the Central Helium Liquefier. Each satellite refrigerator has one "wet engine," a machine whose purpose is analogous to that of the expansion valve in a household refrigerator. It expands the coolant, helium in this case, rather than freon, which cools as it expands. The wet engine is much like any other piston-type engine in that high-pressure gas in its cylinders pushes on a piston which is connected to a crank and drive shaft.

The wet engine drives a small electric generator, but that is just an incidental benefit. What we really want is its exhaust, liquid helium (hence the name, "wet"). Even the helium entering the engine is so cold that all other gases except helium are frozen solid. Valves in these engines can be damaged by solid particles of frozen air if the helium is contaminated with air. Lubricants, of course, would also be frozen solid, so none can be used in the cold parts of a wet engine.

Each engine has two pistons and four valves which typically go through about 120 cycles per minute, over a million cycles per week! Valves and piston seals must remain leak tight, but, of course, eventually parts wear and fail and must be replaced.

Although expanders similar to these have been used for making liquid helium since the 1960s,

reliability has always been a problem. Even in the late 1970s when prototype satellite refrigerators began operating, some similar engines did not last 48 hours without breaking. Six to twelve weeks before failure was typical.

But during the last Collider run, which ended in May, our 24 wet engines averaged over 5000 hours (over six months) without failure. Most were overhauled as a part of scheduled maintenance, but a few were let go to see how long they would last. One has now exceeded one year without major repairs. A car averaging 50 miles per hour would have gone almost 500,000 miles in that time, with only oil changes and tune-ups!

The reasons for this success include design improvements made here at Fermilab, years of testing and data collection from operating engines to check performance of newly designed components, and the skill of our technicians in assembling and maintaining these engines. A great many people have been involved in this effort, including people at the Bubble Chamber and others in Research Division cryogenics as well as in the Accelerator Division. The purity of the helium in the cryogenic system is also a key factor affecting lifetime.

Institutions and companies which use similar helium liquefiers have called us for advice regarding these engines. Among these users who have contacted us are the University of Washington, Kansas State University, GA Technologies, and General Electric. We have cooperated with the manufacturer of these engines, Koch Process Systems, in communicating to them our experience, design changes, and suggestions. Helium liquefiers which Koch markets for magnetic resonance imaging devices (powerful new diagnostic tools for hospitals), include expansion engines which incorporate many features based on experience at Fermilab.

Percentage of American high-school students who say they want to be President: **21** Who want to be president of a company: **75**

Percentage of 1971 Yale Law School graduates who took jobs in the public sector: **23** Percentage of 1986 graduates who did: **6**

Income earned in 1985 by residents of the 10021 ZIP code on New York's Upper East Side: **\$4,910,300,000** - from *Harper's Index*

A Proclamation

"ENERGY SECURITY: OUR FUTURE DEPENDS ON IT"

WHEREAS, Fermilab has been a leader in the development of innovative methods of energy conservation, particularly in the use of superconductivity to reduce the use of electrical energy; and

WHEREAS, the wise use of energy and energy-producing resources are the foundations of future economic prosperity for our society; and

WHEREAS, the proper use of coal, water, natural gas, petroleum products, and alternative energy sources comprises a highly complex set of issues that are of paramount importance to every citizen; and

WHEREAS, consensus regarding proper use is not easily reached; however, all involved agree that using less energy, or practicing energy conservation, is most desirable and beneficial; and

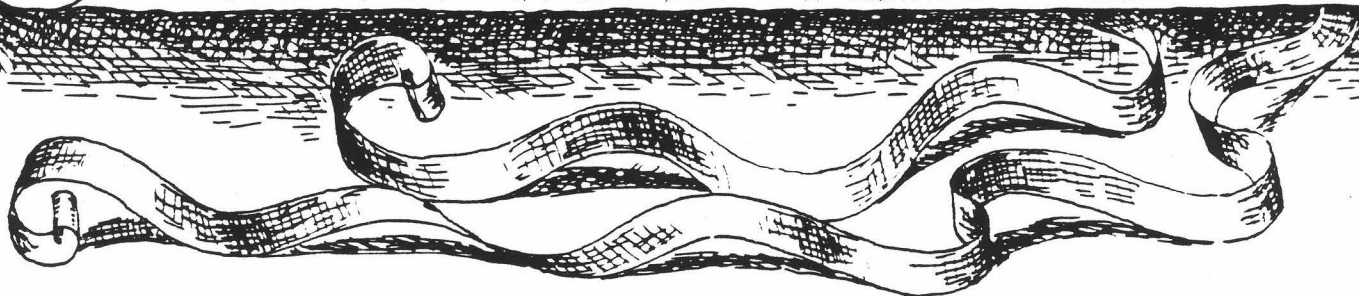
WHEREAS, institutions, government, businesses, and private citizens alike must cooperate to achieve meaningful savings in both energy use and dollars to ameliorate the burden of rising costs of energy; and

WHEREAS, such cooperative efforts are beginning to have an impact on our energy-use habits and to demonstrate reduced energy consumption;

THEREFORE, I, Leon M. Lederman, Director of Fermi National Accelerator Laboratory, proclaim October 1987 as "AMERICAN ENERGY MONTH" at Fermilab, in conjunction with the national observance, because it is important for all citizens to be aware of the necessity of conserving energy for our mutual benefit.

*In Witness Whereof, I have hereunto set my hand.
Done at Fermi National Accelerator Laboratory
this Ninth day of October, in the Year of Our Lord
one thousand nine hundred and eighty-seven.*

Leon M. Lederman
Director



FermiNews - Cla\$\$ified Ad\$

10/9/87

FOR SALE:

Automobiles

1960 CHEVY 4-DOOR. Less than 46,000 mi, new battery, tires, suspension. Serious inquiries only, \$3000. Call Jim Tweed at ext. 2263 or 584-6698 after 5:00 p.m.

1976 FORD LTD WAGON. AC, speed control, radio, power seat, 3 spares. Transmission needs repair. Asking \$200. Call John Satti at ext. 3088.

1979 MUSTANG. 2.3 liter turbo-ph, p.s., sunroof, AM/FM cassette, excellent condition throughout. \$1500 or best offer. Call Boris at ext. 4363.

Miscellaneous

TRAVEL TRAILER. 25' Franklin - sleeps 6, AC, shower, lots of storage space, cedar-lined double closet, fiberglass roof, front & back, good tires, new upholstery and drapes. Complete kitchen facilities. Needs some water-line repair. \$1800 as is. Call Evelyn at ext. 3276 or 365-6663 evenings.

ANTIQUE DOUBLE BED - HEAD AND FOOT BOARD, partially stripped: \$50. TWO OLD-FASHIONED REEL-TYPE PUSH MOWERS: \$10 each. LAWNMOWER, Toro weed-eater style, good for small yards: \$40. SEARS CORDLESS PHONE: \$30. FISHER RECEIVER, tube-type, circa 1964: \$30. TANBURG SPEAKERS: \$25 for the pair. CAR-ROOF CARRIER, never used: \$50. AIRLESS PAINT SPRAYER: \$75. BATHROOM SWAG LIGHTS, one set: \$10. Call Bruce Chrisman, ext. 3211

PRAKTICA LTL 35 MM CAMERA (film advance needs work) with 1.8x50mm lens. Also 2.8x135mm tele and Vivitar 102 flash, \$50. BELL & HOWELL 8MM SOUND MOVIE CAMERA, model 1235, Filmosonic XL, power zoom with zoom mike. Perfect condition: \$25. CORNER SHOWER, terrazzo base with glass doors: \$30. MATTELL INTELLIVISION VIDEO GAME, with 17 game cartridges: \$20. Call Edward Dijak, ext. 3654.

APPLE IIe SYSTEM. Monitor, disc drive, printer, joy stick, 38 discs: \$700 or best offer. Call T. or B. Murphy, 462-9424.

SWIMMING POOL. 24 ft-round, doughboy filter, deck ladder, vacuum, 8'x16' wood deck included free with pool: \$375. 20 GAL. AQUARIUM with air pump and under-gravel filter: \$32. Call Steve at ext. 4975.

HOLTON CORNET. Very good condition, excellent for beginners: \$100. HOYER GUITAR, German made, half acoustic, dual electric pick-up, incl. case: \$75. ARGUS 300 SLIDE PROJECTOR and radiant screen 40"x40", excellent condition: \$65-both.

Continued on reverse

[continued] SEARS KENMORE SEWING MACHINE, model 32 zig-zag, cabinet style (cabinet not included), excellent condition: \$65. FREE TO A GOOD HOME with large yard or farm. One-year-old Rottweiler mix, female. Good dog, knows basic commands. MENS 26" 10-SPEED, \$40. Call Jim Tweed at ext. 2263 or 584-6698 after 5:00 p.m.

QUEEN-SIZE MATTRESS, foam, 60"x80"x5": \$25. Call Amie McConnell at 3762 from 4:00 p.m. to 5:30 p.m. or (home) 406-9561.

SOLID OAK (EARLY AMERICAN) DINING TABLE w/4 high-back chairs, 1-year old, excellent condition: \$600 or best offer. Call Gerald Davis at ext. 3103 or (home) 553-7644.

SMALL BABY-GRAND PIANO. 4'9", good tone, good condition: \$1700. Call Sandra, ext. 3962.

HIGH CHAIR. Cosco, good condition, yellow tray, plaid seat: \$15. TWO BABY BICYCLE SEATS: \$5 each. Call Mike at 208-1751.

FUJI S12-S PROFESSIONAL TOURING BICYCLE. 18-speed, 54 cm (21.5 in.) frame. Ridden less than 50 miles. Current equivalent model new: \$800. Asking \$350. Call ext. 4561 or 879-0787.

WANTED:

15", 6-BOLT MAG. OR SPORT-TYPE WHEELS (4 ea.). How about R78-15 tires? Call Ann at ext 3924 or 231-9518 after 6:00 p.m.

HELP SUPPORT THE FRIENDS OF FERMILAB

The Friends of Fermilab Association (FFLA) has been successful in providing pre-college education programs to teachers and students at the high level of quality traditional at Fermilab. A vital not-for-profit organization, FFLA finances its programs from grants, gifts, and donations.

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- ☐ Benefactor \$ 100.00
- ☐ Member \$ 25.00

Yes! I wish to join the Friends of Fermilab.

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