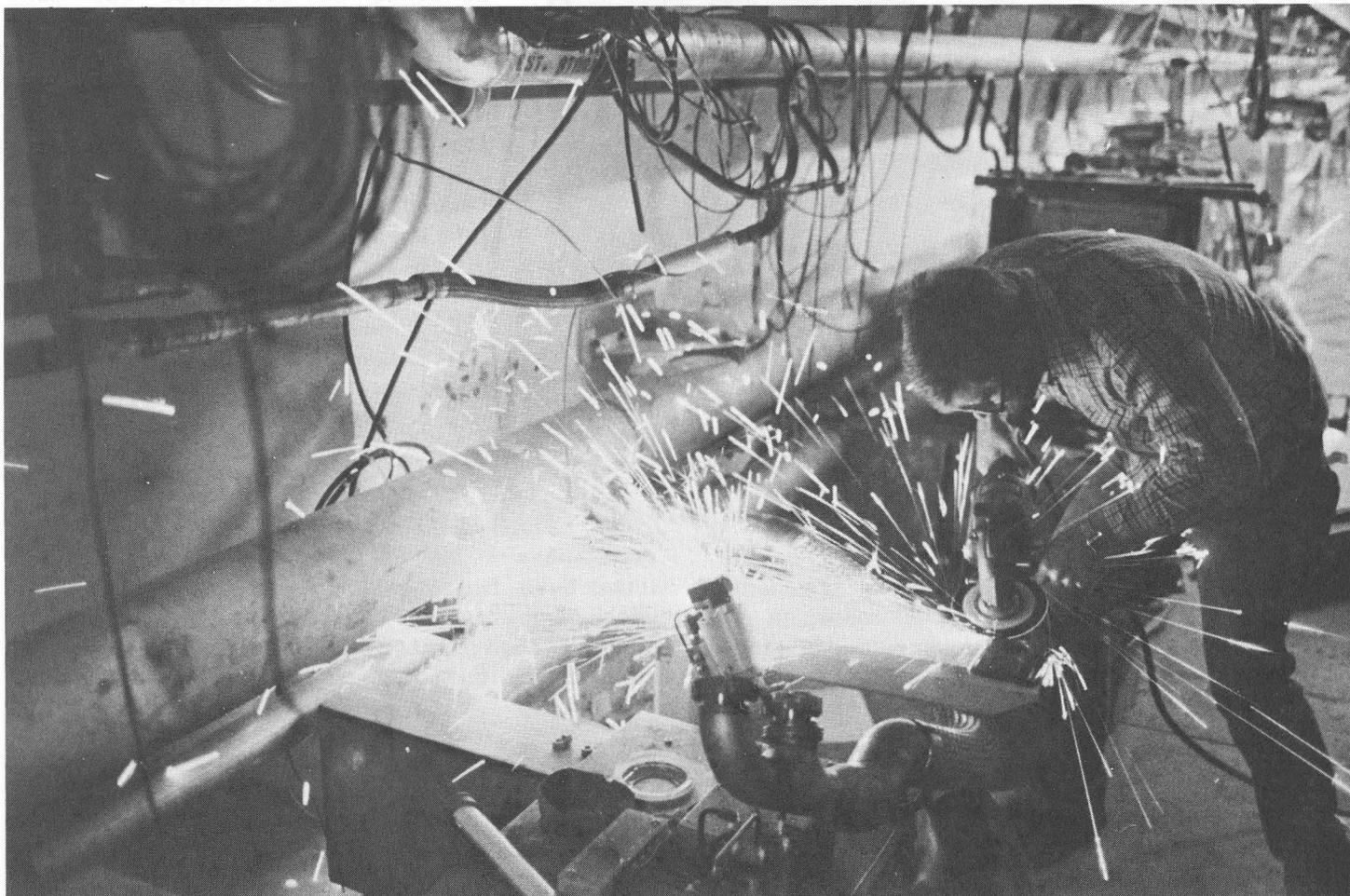


March 22, 1984

FERMI NATIONAL ACCELERATOR LABORATORY

FermiNews

TEVATRON MODIFICATION FOR THE COLLIDER



Sparks fly as Merrill Albertus modifies a magnet stand at A48 as the low-beta system is installed in the Main Ring tunnel.

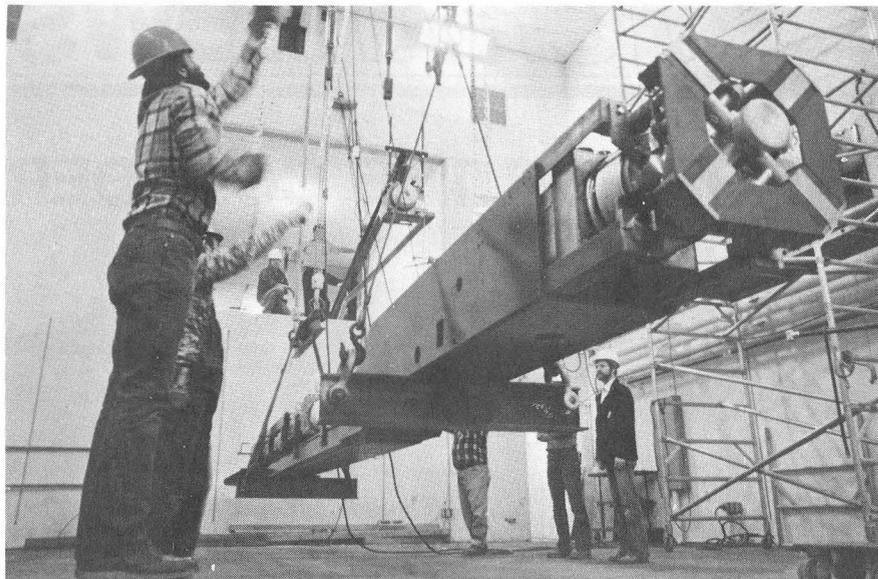
by Karl Koepke

The accelerator shutdown which started on Friday, February 17, is noteworthy for several important events in the life of the Tevatron: The completion of Fermilab's experimental commitments at 400 GeV; the exciting and successful test of the accelerator at 800 GeV; the preparations for fixed-target physics at this new world record energy; and the shutdown itself, which saw the installation of the low-beta insertion at the B0 location of the accelerator.

The low-beta insertion at B0 which is also the location of the Collider Detector Facility (CDF) and a second low-beta insertion which will be installed later at D0, are part of the Tevatron I project reported on in the February 9 issue of **Ferminews**. Although an anticlimax so soon after the satisfying success of the 800-GeV accelerator trials, the low-beta installation is an indication of the exciting future still in store for the Tevatron--the eventual transformation of the Tevatron into a 1-TeV proton-antiproton accelerator and collider. When the Collider becomes operational,

(cont'd. on pg. 2)

(cont'd. from pg. 1)



In the foreground, Fritz Lange and a rigging crew assist as a preassembled magnet beam is hoisted into position at one end of the Collision Hall at CDF.

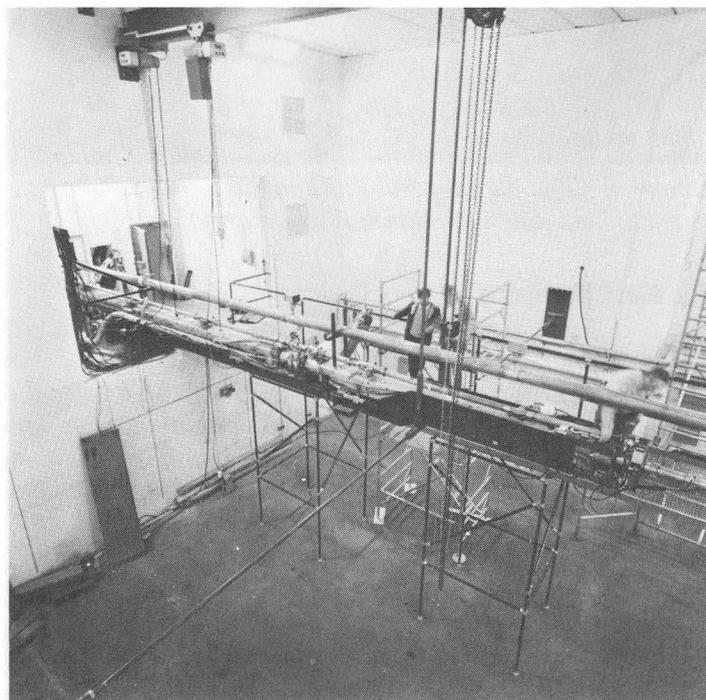
to increase the luminosity by a factor of 75. Physics events, which without low-beta would occur in a year, can therefore be expected on a weekly basis.

The low-beta insertion takes its name from the beta function for particle orbits. The beta function describes the transverse amplitudes of orbit oscillations that occur when particles pass through an array of dipole magnets, quadrupole magnets, and magnets of higher order. By reducing the value of the beta function to B_0 , the transverse size of both the proton beams and antiproton beams are reduced. This reduction in beta at B_0 is accomplished with the addition of three superconducting quadrupole doublets to the Tevatron magnet lattice within the B_0 straight section and the addition of a doublet that replaces the quadrupoles previously located at A48 and B12. The low-beta quadrupoles are powered independently and with the exception of the quadrupole at A48 and B12, are only powered after the proton beam (proton-antiproton beam after the Collider becomes a reality) reaches its peak energy at flattop.

Except for their overall length, the low-beta quadrupoles are indistinguishable in appearance from their Tevatron cousins. However, the superconductor content (niobium titanium alloy) in the cable used to wind the magnet coils has been increased so that these magnets are capable of operating continuously at a current of 6 kA which represents a focusing gradient 50% higher than obtainable in standard Tevatron quadrupoles. A second interesting feature of the low-beta installation at B_0 is that half of the low-beta quadrupoles will eventually be completely enclosed by the

(cont'd. on pg. 4)

beams of protons which circulate clockwise and beams of antiprotons which circulate counterclockwise will be accelerated simultaneously in the Tevatron until at flattop, they reach an energy up to 1 TeV. They then continue to circulate for many hours during which time a small fraction of the protons and antiprotons collide head-on within the low-beta insertions at B_0 and D_0 . The low-beta insertions provide the final focussing which enhances the proton-antiproton collision rate at these locations which contain the experimental facilities that study the by-products of these collisions. The parameter which predicts the collision rate is called the luminosity. The low-beta insertion at B_0 is expected



Adjustments are being made to the laser alignment system at the B sector end of the low-beta system. The scaffolds will remain until the CDF experiment is installed in the Collision Hall.

DANCERS TO STRUT AT LAB

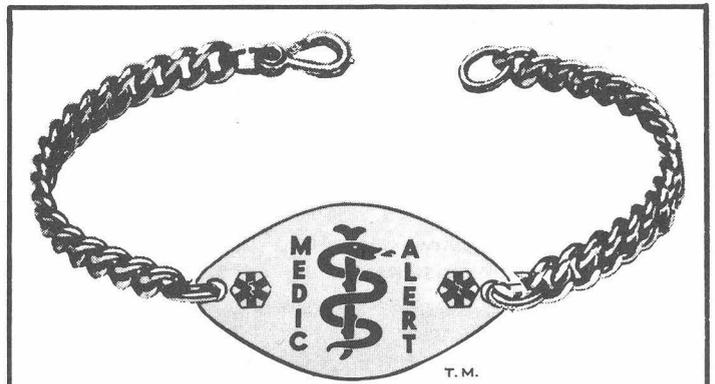
by Jane Green

"Feel the heat of the best jazz dance created" with Gus Giordano Jazz Dance Chicago. At 8 p.m. on Saturday, March 31, 1984, Mr. Giordano, who has been named by Dance Magazine as one of the top three jazz dancers in the world, will bring his highly acclaimed company to Ramsey Auditorium. The ten uninhibited dancers of Giordano's company will perform some of the very finest American jazz dance including "More Than a Machine," a "scorching tribute" to the motorcycle. In addition, company member Jimmy Locust, the "phenomenally talented and creative" dancer who has delighted past Fermilab audiences with his shimmies and strutting, will perform a new solo, "Bravo Firenze."

Gus Giordano Jazz Dance Chicago was established fifteen years ago. Artistic Director Giordano has received three Emmys and a National Educational Television Award of Excellence. In 1978, he was awarded what he calls the "Oscar of dance," the Dance Masters of America award for outstanding contributions to American dance.



Don't hesitate to reserve your seats for this program--a "performance full of imagery, feeling, exhilaration, and sensuality"...seems to suit every taste from classical to funky." Admission is \$8, and tickets are available at the Information Desk in the atrium of Wilson Hall, ext. 3353.



"Medic Alert" is a nation-wide identification system for individuals having some form of chronic condition such as diabetes, severe allergies, or heart problems. Medic Alert members wear a special identification bracelet or necklace describing the wearer's problem, along with a nation-wide 24-hour toll-free phone number for emergency information. The medic alert phone operator will give specific medical information from the patient's file to the ambulance personnel or physician. This can be valuable and needed information for proper emergency treatment of the patient. Bracelets and necklaces are available in stainless steel, sterling silver, and 10 K gold filled.

If you would like an application blank or more information concerning the Medic Alert program, call Chief Ralph Kramp, Fermilab fire department, ext. 3428.

DRIVE DEFENSIVELY ON SITE

It will shortly be our good fortune to again experience the sights, sounds, and feelings of "Good Ole Summertime." Summer driving presents us with a different set of driving circumstances. For example, the average driving speed is higher; this calls for a higher state of readiness. Things seem to happen faster at higher speeds and that means less time to think about what you're going to do in any given situation. Speaking of speed, the maximum speed permitted on site is 40 mph; however, keep in mind that some areas are posted with lower speed limits. Please, drive defensively!

Fermilab is operated by Universities Research Association, Inc. under contract with the U. S. Department of Energy. Fermilab is published by the Publications Office, P. O. Box 500, Batavia, IL 60510, phone (312) 840-3278.

NEW HOME FOR SECURITY

For those of you who haven't already heard, the Security Department now has a new home. They are now located at the Buffalo Farm, Site 52. The old brick house, built by William Geise in 1910, was moved from Site 66 to Site 52 last August. Access to the building is off Old Batavia Road, about half way between Roads D and C.

Bob Armstrong, Chief of Security, and the Security Captains, Glenn Carl, Bill Flaherty, Elaine Jones, Hank Prokop, and Wally Szczesniak, have their offices at Site 52. Mr. Keith Moore of Great Lakes Security represents the security contractor on site, and his office is also there. The Security Department administrative section operates out of the same location.

Even though the location has changed, the phone extensions have remained the same. Chief Armstrong can be reached on ext. 4949 or ext. 3867 and the duty captains can be reached by dialing ext. 4949.

To report thefts and other incidents or to ask for security assistance, one must still dial ext. 3414. This number is located in the Communications Center, WH1E, and will be answered by one of the two Communications Operators on duty. They have the capability for relaying requests for security assistance and the resources to dispatch Security personnel in a timely manner. The Com-Center also handles Fire Department communications.

Congratulations To. . .

Marianne (E/E Support, Accelerator Division) and Charles Battista on the birth of twin boys Thomas Charles and John Newport on Monday, February 20. Thomas weighed 7lbs. 13 oz. and John weighed 7 lbs. 10 oz.

Fred (Training Office) and Judy Ullrich on the birth of their second son Theodore Regan on Sunday, February 26, at Delnor Hospital in St. Charles. Theodore weighed 10 lbs. 8 oz. and was 21 in. long.

John (TeV I) and Priscilla Payne on the birth of Elspeth McCarthy on Saturday, March 3, at Geneva Community Hospital. Elspeth weighed 5 lbs. 8 oz.

HUBCAPS FOUND

Approximately 40 hubcaps of various sizes and styles are now on display at Building 4, Site 55, according to Robert Kraft, Manager, Roads and Grounds Department.

Anyone who is missing a hubcap is welcome to inspect the collection and claim their property if it is found there.

TEVATRON MODIFICATION. . .

(cont'd. from pg. 2)

experimental equipment housed at CDF. This geometric constraint resulted in a support structure composed of 1-5/8-in. diameter Invar rods which, unless you look closely, give the appearance of magnets that levitate within the CDF Collision Hall.

Over a year of design and fabrication effort were required to bring the B0 low-beta system to this stage of completion. As one would expect, the project depended heavily on the expertise acquired at this Laboratory during the design and fabrication of the Tevatron. The low-beta magnets were produced at Fermilab's Magnet Facility and tested at the Magnet Test Facility and at Lab 2 in the Village. The cryogenic system was designed by members of the Accelerator's Cryogenics Department and the cryogenic components were fabricated at the Paramount Warehouse and at Lab 5 in the Village. Mechanical details were handled by the Accelerator's Mechanical Support Group as was the installation in the tunnel during the shutdown. The effort to produce the power supply circuits, quench protection systems, and control systems was shared by members of the Accelerator's Electrical Engineering Support Group, Controls Support Group, Switchyard Group, and Main Accelerator Group.

The low-beta system was installed in a period of three weeks due to the dedication and extraordinary effort of all involved. An additional week was allocated to start all systems in preparation for high-energy physics at 800 GeV on Saturday, March 17. Since the Collider is still several years in the future, the installation of the B0 low-beta system at this time permits a thorough test of its operation with 800-GeV protons before future shutdowns, the first scheduled for this summer.