

Richardson Decides to Shut Down the HFBR Permanently; Decision Based on Limited Resources, Not Reactor Safety

As most BNLers learned this Tuesday, November 16, by listening to or reading the morning news, Energy Secretary Bill Richardson has decided to shut down the Lab's High Flux Beam Reactor (HFBR) permanently.

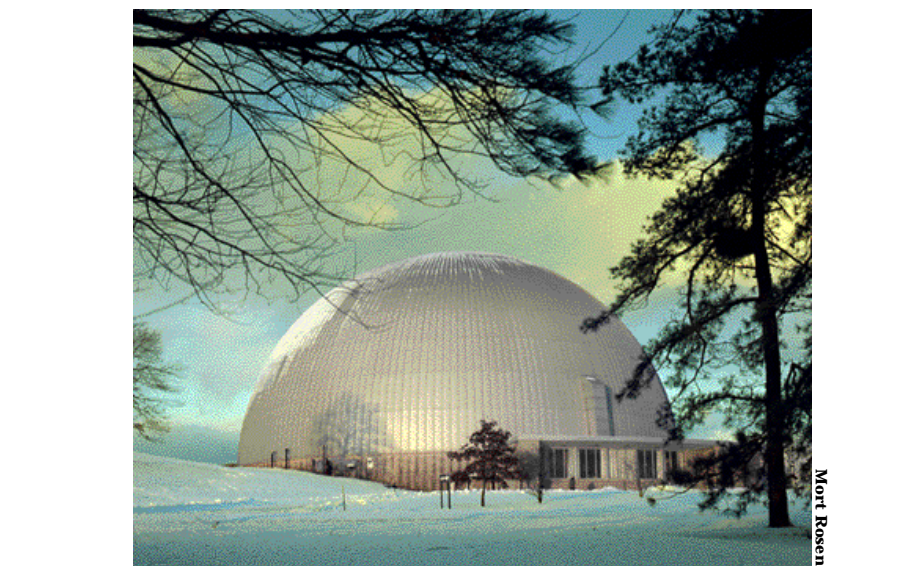
Commissioned in 1965, the HFBR had provided scientists with neutron beams used to study the structure and function of different materials and biological molecules (see sidebar, page 2).

The HFBR has not operated since December 1996, shortly before a small amount of radioactive tritium was found to leaking from its spent fuel pool and contaminating the groundwater at levels above the drinking water standard.

The leak was halted in December 1997 and the tritiated water has been under clean up since May 1997. Extending underground for about 3,600 feet south of the reactor, which is about 3,500 feet north of the Lab's southern boundary, the tritiated water has never been a threat to worker safety and/or public health, according to DOE, the U.S. Environmental Protection Agency, the New York State Department of Conservation, and the Suffolk County Department of Health Services (see sidebar, page 3).

According to DOE's press release, Richardson based his decision not on environmental, safety or health considerations, but rather on his department's limited budget and the availability of other DOE neutron science facilities.

In fact, Richardson noted, "While I



don't believe the Brookhaven reactor is a threat to the public or the environment, we need to focus our limited resources on productive research rather than keeping the reactor in standby mode for an unknown length of time."

Another issue involved in this decision, according to DOE's Office of Science Director Martha Krebs, was the community's trust of BNL. "DOE and the management of the Lab have worked hard to restore trust, but, having shut down a facility, it is not easy to turn it back on." She added, "Changing the management at the Lab was crucial to regaining trust so that future facilities are accepted."

In an e-mail addressed to all Lab employees, Laboratory Director John

Marburger responded to Richardson's announcement: "I am deeply disappointed in the Secretary's decision not to restart the HFBR, which is one of the most productive research tools at Brookhaven. I understand that his decision was not made because of any conclusions about the environmental safety of the reactor, but because of the cost of restarting it. The cost to national science effectiveness is likely to be far greater."

Safe, Secure Shutdown

Speaking to the press via telephone late Tuesday morning, Krebs explained, over the next two to three years, work will take place to ensure the reactor's "safe and secure shutdown." Thereafter, "the remainder of

the reactor will be surveyed and maintained until full decontamination and decommissioning can take place," said Krebs.

Patricia Dehmer, Director of the Office of Basic Energy Science, added that DOE will work with BNL over the next months to determine the cost, schedule and scope of the work needed to shut down the HFBR permanently. Whether or not the instruments used for neutron scattering at the HFBR are removed to other facilities will also be determined.

In response to a reporter's inquiry, Krebs could not estimate whether it was more expensive to decontaminate and decommission the HFBR than to start it back up and operate it.

While Krebs foresees that the approximately 90 BNLers now working at the HFBR can be employed in shutdown activities, she said, "At some point, there won't be a need for the same [number] of operators" and other HFBR workers.

"Laboratory Director John Marburger has agreed to take all necessary steps to mitigate the job impact of the reactor's shutdown," Richardson's press release reads. It continues, "BNL researchers who have done research at the HFBR will continue to be supported and will conduct their research at other facilities."

BNL's Director stated, "Secretary Richardson has expressed his concern for the employees whose jobs in connection with the HFBR are now in jeopardy. I share his concern and expect to work with DOE to assist them in developing their future career plans," (see sidebar, page 2).

Process Obviated

BNL Biologists Discover How Cells 'Catch' a Cold

In what could be a first step toward finding a cure for the common cold, BNL scientists have discovered how one form of cold virus binds to human cells. The discovery, appearing in this week's issue of *Science*, was made by Paul Freimuth, John Flanagan, Maria Bewley, Karen Springer and Yian-Biao Zhang, all of the Biology Department, at the National Synchrotron Light Source (NSLS). The finding could ultimately lead to the development of drugs that block infection by this virus.

"Viruses have to bind to cells in order to infect them," says Freimuth. "If you could interrupt that binding, the virus would be dead in the water."

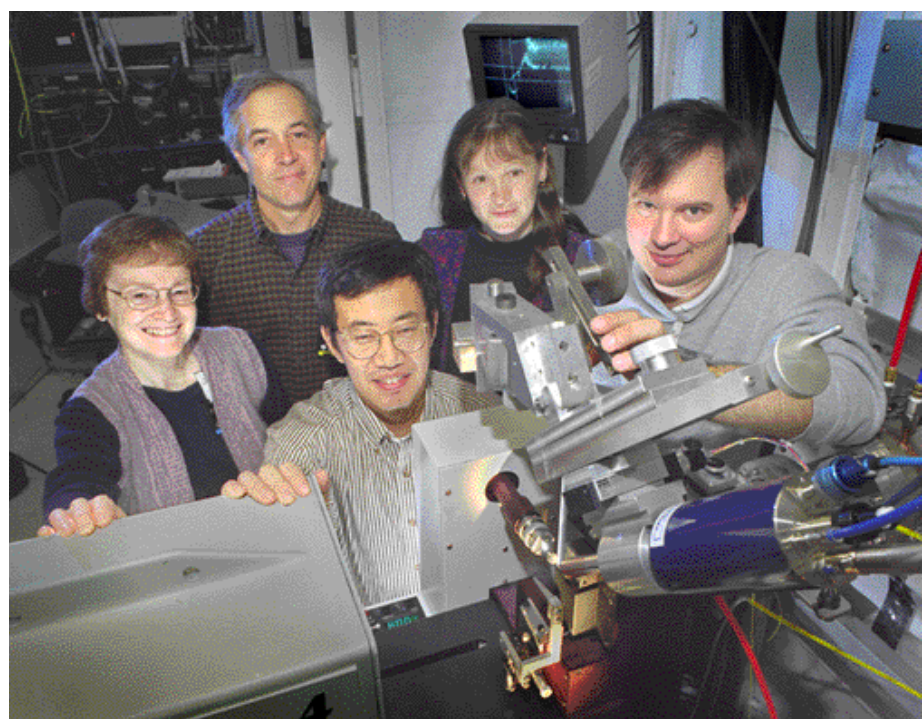
"That, in essence, is what the body's immune system does when it produces antibodies," he explains. "The antibodies bind to the virus so the virus can't bind to the cell."

But it takes time for the immune system to stage its attack. With a molecular understanding of the virus-cell interaction, scientists could potentially tailor-make drugs that disable the virus.

The BNL team members had previously isolated proteins that initiate infection by adenovirus, one type of common cold virus, as well as the protein that the virus binds to on the surface of human cells. They then manufactured biologically active forms of the viral and cellular proteins in *E. coli* bacteria.

"These small purified protein fragments bind tightly to each other in the test tube, and provided the raw material to initiate structural studies," Freimuth says.

To determine the molecular struc-



Biology Department researchers (clockwise from left) Karen Springer, Paul Freimuth, Maria Bewley, John Flanagan, and Yian-Biao Zhang deciphered the structure of the virus protein complexed with its receptor by bombarding crystals of it with high-intensity X-rays at Brookhaven's National Synchrotron Light Source.

ture of the virus/receptor complex, the scientists grew crystals of the complex and bombarded them with high-intensity X-rays from the NSLS. With this technique, called X-ray crystallography, scientists examine how the crystals diffract, or scatter, the X-ray beam. "From that you can work backward to deduce the structure of the proteins in the crystal," Flanagan says. "The NSLS greatly facilitates the study of crystal structures because of the high intensity of the X-ray beam produced there," he adds.

In 1998, other scientists used this technique at the NSLS to characterize how HIV, the human immunodeficiency virus that causes AIDS, binds to its cell-surface receptor (see Brookhaven Bulletin, June 26, 1998). Adenovirus is the second virus to have its binding mechanism characterized at atomic resolution.

"Surprisingly, though adenovirus and HIV are very different, their

The Lab community was caught by surprise by Richardson's announcement because the HFBR's fate was not expected to be determined at least until after DOE released its long-anticipated draft environmental impact statement (EIS) on the HFBR, which had been promised since mid-April.

In fiscal year 1998, Congress had directed DOE to research and write an HFBR EIS, a document required by the National Environmental Policy Act to evaluate the effect that a facility has on the environment. In addition, then Energy Secretary Federico Peña mandated that an EIS be published as part of the deliberative process by which the Secretary of Energy was to make his decision on the HFBR's future, which was originally scheduled for December 1997.

Under that process, opinions from the local, scientific and political communities were to be considered along with the EIS findings and an independent safety assessment performed by the U.S. Nuclear Regulatory Commission (NRC) However, Peña left DOE in June 1997. Richardson was sworn in as the ninth Energy Secretary in August 1997. Regardless, the process continued.

As part of the input collected from the science community, for instance, the National Academy of Sciences sent a letter to Peña in which it noted: [The HFBR] has been an essential component of the national scientific infrastructure with a remarkable record of scientific achievement. It has provided an important source for neutron-scattering experiments in the United

(continued on page 2)

Cells Catch Cold (cont'd)

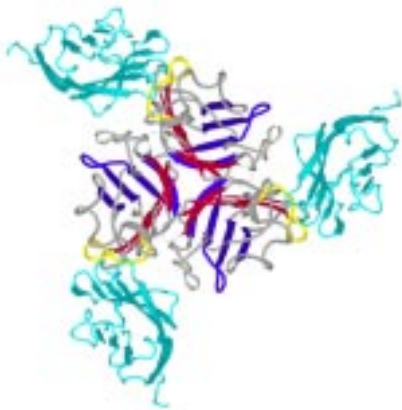
mechanisms of entry into cells show some similarities,” Flanagan says. This may help scientists better understand how viruses evolve—for example, how they change to evade the immune system while retaining their ability to bind to specific cell-surface receptors.

The findings could also have implications for using modified, non-symptom-causing viruses to deliver healthy genes to cells in the technique known as gene therapy.

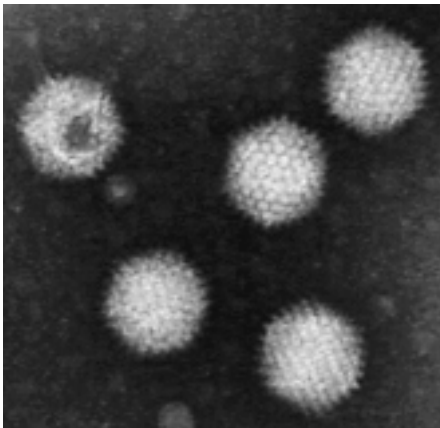
“If you understand the way a virus attaches to a specific cell, you might be able to modify the virus to target specific cells, such as those that make up a tumor,” Freimuth comments.

Understanding the molecular characteristics of viral binding sites might also lead to more effective vaccines. Viral binding proteins are often ornamented or decorated with bits of protein that have nothing to do directly with the virus’s ability to bind to cells, but rather serve to “run interference” and distract the immune system, Freimuth says. “If you could eliminate those factors and make a vaccine that just had the receptor binding site, you

Shown below is a computer drawing of how a surface protein on adenovirus, one type of common-cold virus, binds to a protein receptor on human cells as the first step in causing colds. The lighter (yellow) portion of the viral protein binds with the darker (blue) receptor protein, similarly to the way a key fits into a lock, to gain entry into the cell. If scientists can find a way to block this binding, they might be able to prevent infection.



might have a better chance of focusing the immune response on the binding site itself.”



Adenovirus particles, each about 140 nanometers wide, are covered with protein protrusions. A protein at the tips of these protrusions binds to a specific cell-surface receptor, and may therefore serve as a target for future drugs to block infection.

“This is an excellent example of how interconnected scientific research has become,” said Energy Secretary Bill Richardson. “The physics and engineering that helped build the National Synchrotron Light Source are now making possible insights in other areas of science such as biomedical research.” — Karen McNulty

Richardson Shuts Down HFBR Permanently

States. For reasons with which you are familiar, there is [at present] a dearth of such sources in the United States, [so] the loss of one would seriously constrain U.S. research in this area. The importance of this research has been documented extensively over the years”

Then, in November 1998, the Basic Energy Sciences Advisory Committee recommended to Krebs that the HFBR be restarted as soon as possible, with 1999 as the target date. “The objective is to restore the operation to a level which it had operated at before, and which the advice presented to us

showed was acceptable from all points of view,” noted BESAC’s chair.

And, in a February 1999 report on its safety assessment of the HFBR, the NRC concluded: “The safety programs at the HFBR were found to provide adequate protection of the health and safety of the public, workers, and the environment.”

Now, whether or not the HFBR draft EIS will ever be released is uncertain because Krebs maintained that Richardson’s decision “obviates the necessity to complete the EIS process.”

As Krebs informed the reporters, “This was a difficult decision for the Secretary,” who, she said, “engaged in as deliberate a process as possible, . . . considered all the scientific, programmatic and community issues,” and consulted with “neutron scientists and others, community leaders and elected officials” in coming to his decision.

Spending Constraints

The OS Director continued, “We recognize the science performed at the HFBR over the last 30 years and the fact that the facility was never a threat to the environment, but we need to focus our funds on productive research, rather than keep this reactor in standby mode.”

According to Krebs, operating the HFBR cost around \$27 million, while keeping the HFBR on standby has cost an estimated \$23 million per year. Standby has been necessary because, since FY 1998, Congressional legislation, originally introduced by then U.S. Senator Alfonse D’Amato and U.S. Representative Michael Forbes, has prohibited DOE from starting up the HFBR.

As Krebs explained, the “constraints on spending limited funds” at the HFBR caused Richardson to consider the investments that have been made at four DOE neutron sources: the High Flux Isotope Reactor at Oak Ridge National Laboratory (ORNL), and three spallation neutron sources: the Intense Pulsed Neutron Source at Argonne National Laboratory, Los Alamos Neutron Science Center at Los Alamos National Laboratory, and the planned National Spallation Neutron Source to be built at ORNL.

“Shutting down [the HFBR] is a difficult decision, but we are providing new and improved resources to the neutron-scattering community in this country,” Krebs explained.

“DOE is deeply committed to

(cont'd)

Reactor Employees Face Uncertainty

Stunned by Secretary of Energy Bill Richardson’s sudden announcement that the High Flux Beam Reactor (HFBR) would be permanently closed, about 90 employees at the facility face an uncertain future. As the U.S. DOE decides on the steps and timetable for closure of the reactor, the affected employees must take steps to ensure their future careers.

In a statement to the media on November 16, Martha Krebs, Director of DOE’s Office of Science, said some reduction in staff may be necessary as a result of Secretary Richardson’s decision to close the reactor. She added, however, that most of the employees will be needed over the next two years to carry out activities for the facility’s safe and secure shutdown (see story, page 1).

DOE vowed to continue to support scientists who have conducted their research at the HFBR by sustaining their research as users at other reactor facilities. Including Brookhaven researchers, about 250 scientists annually used the HFBR for a variety of research in materials sciences, chemistry, physics, structural biology, and medicine until its shutdown in 1996.

Approximately one-third of reactor employees are members of unions, with 25 members in the Paper, Allied-Industrial, Chemical & Energy (PACE) Workers International Union, and about ten members in the International Brotherhood of Electrical Workers (IBEW), Local 2230. Union leaders suggested that, in addition to reactor employees’ jobs being endangered, the careers of as many as 100 more employees in such divisions as Plant Engineering, Safety & Health Services, and Safeguards & Security, as well as the Brookhaven Medical Research Reactor may be affected.

The Laboratory administration has pledged to assist employees who may lose their jobs due to the reactor’s shutdown. Laboratory Director John Marburger said he plans to work with DOE to help displaced reactor workers develop their future career plans.

— Diane Greenberg

Some Research Highlights at the HFBR

The HFBR began operating in 1965, producing neutrons that provided the means for important discoveries in condensed matter and nuclear physics, chemistry, biology and medicine.

Of the news of its closure, John Tranquada, head of the neutron-scattering group in the Physics Department, said, “The shutdown of the HFBR is a tragedy for scientific research in the United States. It sets a terrible precedent. Despite upgrades at other facilities, the loss of the HFBR represents a significant net loss in neutron-scattering capabilities in this country.”

Some HFBR research highlights are:

Biology and Medicine: The structure of the “protein factory” of the cell, the 16-part ribosome, was first discerned at the HFBR, as was the structure of myelin, the protein that coats nerve cells.

New uses of radioactive isotopes were developed at the HFBR for treating cancer, cardiovascular disease, arthritis, and other medical disorders. One new chemical compound for relieving the excruciating pain of advanced cancer that has spread to the bone was tested in clinical trials of 45 patients. The treatment significantly reduced or totally eliminated the pain in 75 percent of the patients.

Preliminary research at the HFBR on preventing recurring cardiovascular disease indicated that short-range radiation, affecting only the arteries in question, could be applied.

Condensed Matter Physics: The understanding of one-, two-, and three-dimensional magnets near their critical temperatures gained at the HFBR helped scientists formulate and test Nobel prize-winning theories of cooperative ordering in large collections of atoms.

HFBR scientists addressed the riddle of superconductivity’s mechanism at temperatures above 90 kelvins in high temperature superconductors, demonstrating a relationship between this phenomenon and magnetism.

Physicists also used the HFBR to study unusual behavior, such as superfluidity, found in quantum liquids and solids, materials with a kinetic energy that nearly equals their binding energy even at low temperatures.

Nuclear Physics: Nuclear physicists have looked for regularities in the often complex structural organization of protons and neutrons in nuclei. Other experiments yielded data on the lifetimes and decays of many unstable, neutron-rich nuclei. Among these is zinc-80, an isotope important to astrophysicists in the study of supernovae.

HFBR scientists created many useful nuclear isotopes, such as copper-64, used to create positrons and positronium beams. These probes are valuable in examining surfaces to look for trace impurities in the semiconducting materials used in the electronics industry.

Chemistry: The HFBR has allowed researchers to study the basic nature of chemical structures, including the hydrogen bond that holds much of nature together. HFBR scientists determined the structures of the 23 amino acids, which make up every protein in every cell in living things.

Research in these and other areas will be negatively impacted by the closure of the HFBR. Steve Shapiro, associate chair of Physics, commented, “There are only two other neutron beam research reactors in the country and they are oversubscribed. The shutdown of the HFBR will be devastating to the national scientific community.”

—Ann Ferrar Dusek

Brookhaven Lab, and the Lab has a strong future,” Richardson noted in his prepared statement. “For example, the Relativistic Heavy Ion Collider [RHIC] which I helped dedicate last month will be a world center for nuclear physics. Similarly, the new and planned upgrades to the Lab’s National Synchrotron Light Source [NSLS] will help that facility remain at the forefront of science for years to come.”

Krebs added, “The loss of the reactor is a difficult thing for [Brookhaven], but, with RHIC, they have a facility that will keep them vibrant.” The Office of Science Director also cited the NSLS and BNL’s neuroimaging research, both of which “will also keep them on the cutting edge of science and the Department’s science programs.”

While Marburger was “pleased that the Secretary has expressed his support for the future of the Laboratory,” BNL’s Director added, “The loss of this valuable research facility will come as a blow to many who had invested their lives in the research that it made possible.” — Marsha Belford

HFBR After Tritium

The fate of the High Flux Beam Reactor (HFBR) was called into question soon after Brookhaven found 44,700 picocuries per liter of tritium — more than twice the state and federal drinking water standard — in a well about 200 feet southeast of the reactor during routine monitoring on December 11, 1996.

After installing 140 monitoring wells and analyzing over 1,000 samples in cooperation with the U.S. Environmental Protection Agency (EPA) and the Suffolk County Department of Health Services, BNL defined the contamination, which remained confined to Lab property. Investigations proved that the tritium stemmed from a leak in the reactor's spent fuel pool, which had remained undetected for 12 years.

Although the tritium contamination posed no danger to BNL employees or the public (see story, page 1), community members expressed concerns about it. Subsequently, on May 1, 1997, DOE terminated its contract with Associated Universities, Inc., the management organization that created BNL and had managed the Lab for DOE and its predecessor agencies for the past 50 years. Brookhaven Science Associates took over in March 1998 with the mandate to make environmental and safety concerns a priority, and to create a new dialogue with the community.

While the HFBR has been on standby, the spent-fuel pool has been drained, the fuel rods stored within the pool shipped off site for reprocessing, and a system started to pump tritiated water from the ground and send it to a recharge basin for further decay and dispersion. A stainless steel liner is currently being installed in the reactor's spent fuel pool, a project that is due to be completed in June 2000.

In July 1997, DOE hired a Virginia-based firm, TetraTech, Inc., to develop an environmental impact statement (EIS) for the HFBR. The EIS draft was to be released to the public imminently. When Secretary of Energy Bill Richardson announced the HFBR would be permanently closed, the \$3.5 million EIS process was cut short. — Diane Greenberg

Arrivals & Departures

Arrivals

Loretta E. Cunniff Env. Services
Andrzej J. Olszewski Chemistry
Cenap Ozben Physics
Sophia Zahariou C-A

Departures

Robert J. Malachowsky Plant Eng.

BROOKHAVEN BULLETIN

Published weekly by the Media & Communications Office for the employees, facility-users and retirees of BROOKHAVEN NATIONAL LABORATORY

LIZ SEUBERT, editor
ANN FERRAR DUSEK, reporter
DIANE GREENBERG, contributor
KAREN MCNULTY, contributor
ROGER STOUTENBURGH, photographer

Bldg. 134, P.O. Box 5000 Upton NY 11973-5000
phone (631) 344-2345, fax (631) 344-3368, e-mail bulletin@bnl.gov

On the World Wide Web, the Brookhaven Bulletin is located at www.pubaf.bnl.gov/bulletin.html. A Weekly Calendar listing scientific and technical seminars and lectures is found at www.pubaf.bnl.gov/calendar.html.

Employee Craft Show Starts Monday



Fine needlework by Sue Chrien (left) and Doris Rueger, who has depicted her family hometown in the quilt behind her, will be among the exhibits at the Employee Fall Craft Festival. Sponsored by the BNL Art Society, the show will be held from Monday to Wednesday, November 22-24, 11:30 a.m.-1 p.m. in Berkner Hall, Room B, with an evening reception including wine and hors d'oeuvres from 5 to 7:30 p.m. on Monday, November 22. All are cordially invited.

View High School Artists' 'Discovery' Exhibit

Running concurrently with the Craft Show in Berkner Hall, Room B, will be a display of works by local high school artists who have interpreted the theme of "discovery." These works were entered in competition for a \$500 U.S. Bond given on behalf of BSA by the BNL Art Society at the recent 1999 High School Art Show sponsored by the South Bay Art Association in Bellport. At 4 p.m. on Monday, November 22, the students will be welcomed to BNL with their parents and teachers, and congratulated on their efforts by Lab Director John Marburger. Refreshments will be offered. The BNL community is encouraged to attend.

Noon Concert, Dec. 1

The original piano repertoire for four hands will be explored by husband-and-wife team Du Huang and Xiao Hu, in a program of works by Beethoven, Schubert, Brahms and Ravel. The recital will be given in Berkner Hall on Wednesday, December 1, at noon. Du and Xiao met in the Shanghai Conservatory and graduated from the studio of duo-pianists Eugene and Elizabeth Pridinoff at the University of Cincinnati. They are completing doctoral studies with Gilbert Kalish at SUNY at Stony Brook.

Noon recitals are free and open to the public. Bring a lunch; come and go as you please.

Reimbursement Account Deadline November 30

Those who wish to participate in the Health Care and Dependent Day-Care Reimbursement Accounts for 2000 have until Tuesday, November 30, to sign up. Obtain forms from the Benefits Office, Human Resources Division, Bldg. 185. For more information, call Ext. 2877.

Computing Corner

The Information Technology Division (ITD) will offer these software classes :

Date	Class	Level
11/22	PowerPoint	beginner
11/29	Windows	basics
11/30	Word	beginner
12/1	PowerPoint	intermediate
12/3	Excel	beginner
12/6	Front Page	
12/10	Word	intermediate
12/13-14	Access	beginner
12/15	Excel	intermediate
12/16-17	Projects	intermediate

See the ITD training page at www.ccd.bnl.gov/bnl/training for registration information and course outlines. Classes are scheduled based on the number of requests received. For more information, contact Pam Mansfield at Ext. 7286 or pam@bnl.gov.

Coming Up

On Wednesday, December 15, at 4 p.m. in Berkner Hall, the 350th Brookhaven Lecture, "Quenched! The ISABELLE Story," will be given by Robert Crease, BNL Historian and Associate Professor of Philosophy at the State University of New York at Stony Brook.

Give to BNL's United Way Fund

The 1999-2000 BNL United Way Fund Drive started yesterday, November 18, and will run until December 17. Pledge cards will be sent to all employees. This year's Chair, Patti Bender of the Plant Engineering Division and Co-Chair Beth Blevins of the Director's Office are counting on the generosity of BNLers to make millennium magic happen for many people in need with the \$110,000 set as a minimum goal.

Since 1964, Long Island's United Way has raised funds for agencies and hospitals that deliver desperately needed services to the Long Island community. These services shelter the homeless, feed the hungry, combat drug and alcohol abuse, care for the old and young, counsel those in despair, and provide medical care.

Over the years, BNL employees' support for Long Island's United Way has made the difference for thousands of neighbors, friends, and family members. Of every three Long Islanders, one is helped by these services.

"This end-of-the-century year can be extra special if we make an extra effort," said Bender. "First, we hope to make our goal the easy way — through payroll deductions. But we also have plans for holiday raffles to be conducted Chinese-Auction style and a new way of using volunteers to contribute directly to agencies."

To provide the hundred or so items needed for the raffles, BNLers are asked to donate new or unused gifts or other items through Gail Brown, Department of Applied Science, Ext. 5850. The items will be displayed in Berkner cafeteria for several days before the auction.

"All of us benefit from the agencies that are assisted by United Way funding," said Bender. "I ask every employee to think about what life would be like without these services to count on. Please contribute to BNL's millennium fund drive as part of your share in keeping Long Island's vital services alive."

SCCC On-Site Courses

The following courses will be offered on-site in the Spring 2000 semester and will satisfy requirements for most Suffolk County Community College degrees.

Introduction to Literature (EG13): An introduction to short stories, novels, poems and drama.

Statistics I (MA23): The basics, for those interested in social and health sciences and business.

An information and preregistration meeting will be held on Tuesday, November 30, at 5:15 p.m. in the Human Resources training room, Bldg. 459. Employees taking college courses may apply for tuition assistance.

The Lab offers tuition advances or reimbursements at a rate of 75 percent for undergraduate or vocational courses and 100 percent for graduate courses. For more information, contact Marilyn Pandorf, Ext. 5251, pandorf@bnl.gov, or Starr Munson, Ext. 7631, starr@bnl.gov.

Give Blood Dec. 8 & 9

Blood is always needed, but over the holidays accidents increase and the need for blood becomes even more crucial. To help stock Long Island's blood supply, BNL is holding a Blood Drive on Wednesday and Thursday, December 8 and 9, from 9:30 a.m. to 3 p.m. in the Brookhaven Center.

To make an appointment, contact BNL Blood Drive Chair Susan Foster, Ext. 2888, or e-mail donateblood@bnl.gov with your name, extension, and preferred time to donate.

BERA Holiday Bash

BERA's Second Annual Winter Holiday Bash will be held on Friday, December 17, at the Knights of Columbus in Patchogue. Mingle with a party of fellow employees over dinner and dancing. A cash bar will be available. Before December 10, obtain tickets at \$20 per person, from Charles Gardner, Ext. 5214, chuckg@bnl.gov, Louie Nieves, Ext. 4897, nieves@bnl.gov, or at the BERA Sales Office.

MCSE Registration

The Information Technology Division (ITD) together with Briarcliffe College will be offering Microsoft Certified Systems Engineer (MCSE) courses starting in January 2000. Information packets can be picked up in Room M2-62 of Building 515, ITD, starting today. For more information, e-mail Pam Mansfield, pam@bnl.gov.

IBEW Meeting

Local 2230, IBEW, will hold its regular monthly meeting on Monday, November 29, at 6 p.m. in the Knights of Columbus Hall, Railroad Avenue, Patchogue. There will be a meeting for shift workers at 3 p.m. at the union office. The agenda includes regular business, committee reports and the president's report.

Calling All Carollers

The BNL Choral Group will present its annual holiday concert in the cafeteria at the holiday luncheon to be scheduled just before Christmas. All employees, retirees, facility users and on-site contractors are welcome: sopranos, altos, tenors and bases are needed. To read music is not essential. For more information, e-mail Bob Miltenberger at miltenb@bnl.gov, or call Liz Seubert, Ext. 2346.

Rehearsals will be held from noon to 1 p.m. on Tuesdays and Thursdays, starting Tuesday, November 30, in Berkner Hall. In addition, a group performance of handbells could be organized if enough people are interested. For information, e-mail Miltenberger.

Holiday Notes

In observance of the Thanksgiving holiday, the Lab will be closed on Thursday and Friday, November 25 and 26. There will be no Brookhaven Bulletin on Friday, November 26.

The Cafeteria will be closed on Thanksgiving Day but open for regular weekend holiday service 7:30 a.m.- 2 p.m, Friday-Sunday, 11/26-28.

The Brookhaven Center will be closed Thursday through Saturday; it reopens Sunday, 11/28, 5-9 p.m.

The Research Library, gymnasium and swimming pool will be closed Thursday through Sunday, 11/25-28.

Diwali Tomorrow

Tomorrow, Saturday, November 20, the BERA Indo-American Association will celebrate the Indian tradition of Diwali, the Festival of Lights. The Festival will be held at Berkner Hall, and will include a Rangoli exhibition and a cultural program consisting of dances, songs, skits, and a costume parade, from 3 to 6 p.m. At 6:30 p.m., an authentic Indian dinner will follow the entertainment.

Tickets are \$11; \$10 for senior citizens and full-time college students, and \$5 for children 5-12 years of age. Call Geeta Joshi-Topé, Ext. 5702; Kumi Pandya, Ext. 7734; Dhruba Ghimiray, Ext. 3849; or Achyut Topé, Ext. 5672.



LABORATORY RECRUITMENT - Opportunities for Laboratory Employees

DD8738. SECRETARIAL POSITION - Requires an AAS degree in secretarial science or equivalent experience to provide diversified secretarial functions for the scientific and administrative staff of the RIKEN BNL Research Center. Experience with Microsoft Word and Excel required; knowledge of Web Requisitions and setting up Web pages desired. Position requires the use of established guidelines and procedures involving both routine and non-routine matters. Physics Department.

DD8540. SECRETARIAL POSITION - Requires an AAS degree in secretarial science or equivalent experience and a thorough knowledge of Laboratory policies and procedures including knowledge of IPAP and Web Requisitions. Knowledge of PeopleSoft a plus. Must possess excellent communication skills, be proficient in Microsoft Office products and be able to handle multiple assignments and prioritize work. Must be a self-starter and be able to work independently. Responsibilities include maintaining files, scheduling information, coordinating meetings, processing foreign and domestic travel, preparing technical and administrative reports and correspondence. Department of Advanced Technology .

OPEN RECRUITMENT - Opportunities for Laboratory Employees and Outside Candidates.

MK8737. PHYSICIST - to work for the STAR Group playing a strong role, in collaboration with other members of the group, in helping to guide and carry out the scientific program and in mentoring junior staff working on the analysis of STAR data. STAR, one of the four detectors at the Relativistic Heavy Ion Collider, will begin operation for scientific running in the coming year. In addition to the immediate goal of producing important scientific results from the first phase of STAR data taking, the successful candidate will be expected to participate in developing possible future upgrade paths for the detector and the research program. Requires a Ph.D., a minimum of five years' post-degree experience and a record of outstanding achievement in experimental relativistic heavy ion physics, and excellent leadership, communication and interpersonal skills. Experience in leading experimental research efforts in relativistic heavy ion physics highly desirable. Under the direction of T. Hallman. Physics Department.

MK8739. POSTDOCTORAL RESEARCH ASSOCIATES - (5 Positions) Requires a Ph.D. in experimen-

tal, particle or relativistic heavy ion physics with research experience in relativistic heavy ion physics preferred. Will participate in the collection and analysis of data at RHIC in one of the three ongoing experimental programs (BRAHMS, PHENIX and STAR), in optimizing detector performance (hardware & software), and in pursuing detector R&D to develop upgrades and new capabilities to meet the challenge of improved machine performance and the changing demands of the RHIC scientific program. Under the direction of M. Murtagh. Physics Department.

MK8227. ASSOCIATE SCIENTIST - Requires an M.D. degree, advanced life support qualification and psychiatric residency. Will work as a physician and conduct clinical research using Positron Emission Tomography technologies, prepare and carry out clinical protocols as approved by the Laboratory's Institution Review Board and develop functional Magnetic Resonance Imaging studies with humans. Under the direction of N. Volkow. Medical Department.

MK7945. POSTDOCTORAL RESEARCH ASSOCIATE - to be primarily involved in research on sulfur geochemistry aimed at a fuller understanding of the geochemical mechanisms of sulfur incorporation into sedimentary organic matter and the role of sulfur in the preservation and diagenesis of organic matter in marine sediments. Requires a Ph.D. in organic geochemistry or related field, experience in sulfur and nitrogen geochemistries, and the ability to use several state-of-the-art chromatographic and spectroscopic instruments, including GC-MS and LC-MS. Under the direction of A. Vairavamurthy. Department of Applied Science.

MK8272. POSTDOCTORAL RESEARCH ASSOCIATE - Requires a Ph.D. in nuclear physics with expertise in low and intermediate nuclear physics highly desirable. Will assist in the compilation of nuclear reaction data and the processing of new evaluated nuclear data files for the Evaluated Nuclear Data Center at the Laboratory. Under the direction of C. Dunford. Department of Advanced Technology.

MK7826. POSTDOCTORAL RESEARCH ASSOCIATE - Requires a Ph.D. in structural or molecular biology and experience in protein crystallography. A strong background in molecular biology and protein purification and a desire to learn macromolecular crystallography highly desirable. Current projects include Clostridium toxins, toxins complexed with inhibitors and other related proteins. Will be expected to become involved in biochemical studies on inhibitors. Under the direction of S. Swaminathan. Biology Department.

MK7827. POSTDOCTORAL RESEARCH ASSOCIATE - Requires a Ph.D. in biochemistry or molecular biology. Experience in nucleic acid biochemistry or DNA-protein interactions highly desirable, as is background in radiation biology/DNA damage or repair and mammalian cell biology. Research will focus on the cellular biochemistry and molecular biology of clustered damages in mammalian cells. This includes determining the induction and repair of specific classes of clustered damages by low doses of ionizing radiation, and the genes involved in cluster repair through use of overproducing, and knockout strains, as well as evaluating cluster repair in human deficiency diseases. Must be willing to travel for collaborative research. Under the direction of B. Sutherland. Biology Department.

MK7828. POSTDOCTORAL RESEARCH ASSOCIATE - Requires a Ph.D. in biochemistry or molecular biology. Several years' experience and laboratory research in biochemistry or molecular biology beyond the Ph.D. is preferred. Experience in nucleic acid bDNA-protein interactions highly desirable as is background in radiation biology/DNA damage or repair and mammalian cell biology. Research will focus on the cellular biochemistry and molecular biology of clustered damages in mammalian cells. This includes determining the induction and repair of specific classes of clustered damages by low doses of ionizing radiation, and the genes involved in cluster repair through use of overproducing, and knockout strains, as well as evaluating cluster repair in human deficiency diseases. This position offers the opportunity to participate in the BNL-NASA Heavy Ion Radiobiology Program and in the heavy ion radiobiology program at the BNL Booster Applications Facility now under construction. Must be willing to travel for collaborative research. Under the direction of B. Sutherland. Biology Department.

MK7829. POSTDOCTORAL RESEARCH ASSOCIATE - Requires a Ph.D. in biology, chemistry, or physics, experience in database, GUI development on Windows and Unix operating systems, familiarity with Web development and Internet technology, and experience in programming in VB, C, JavaScript and SQL. Must be capable of original work and possess excellent communication skills. Will work on the Human Proteome Project and develop techniques to determine protein structures in a high-throughput mode with one challenging task being the management of an overwhelming amount of biological information in a dynamically changing environment. This will be part of an informatics system being developed to serve the evolving needs of the Project. Under the direction of D. Lin. Biology Department.

MK7656. ASSISTANT SCIENTIST - (reposting) Needed to work in the Powder Diffraction group on the application of high-resolution powder diffraction techniques to structure-property relationships in complex oxides and alloys. Current areas of interest include piezoelectric, magnetoresistive and battery materials. Candidates should have a strong background in crystallography and materials science, experience with synchrotron x-ray and neutron powder diffraction techniques and a detailed knowledge of structure analysis by the Rietveld technique. A Ph.D. is required. Under the direction of D. Cox. Physics Department.

NS6485. PHYSICIAN - (part-time/50%) Requires physician licensure in NY State and Board Certification in Occupational Medicine, or eligibility to be Board Certified. Duties will include performing medical examinations as well as other tasks that relate to employee health and safety. Occupational Medicine Clinic.

NS8295. PROJECT ENGINEERING POSITION - Requires a BS degree in marine, mechanical or civil engineering, and a minimum of three years' project engineering experience; MS degree and PE license preferred. Familiarity with standard construction techniques and practices, and PC-based software programs such as AUTOCAD and MS Project is necessary. Work will entail project evaluation and the coordination of a broad variety of technical functions associated with power and water distribution.

NS8308. PROGRAMMER/ANALYST POSITION - Requires a bachelor's degree in computer science or the equivalent and a minimum of two years' experience which must include PeopleSoft HRMS, SQR, SQL, PeopleTools, PeopleCode and Query. Experience with Version 7 or higher a plus. Will be lead programmer in the development and implementation

of the PeopleSoft-based HR, benefits, and payroll applications. Business Information Systems Group. Financial Services Division.

NS2584. ES&H MANAGER, C-A - Requires a BS or higher in a related technical discipline, extensive experience in ES&H, preferably with collider-accelerator program, and excellent communication skills. Experience at a DOE-regulated facility, and background in pollution prevention, internal assessment, QA and training programs and Certified Health Physicist status is necessary. Will develop, implement and maintain C-A ESH&Q programs to facilitate accelerator and collider operations and maintenance for conventional and radiation safety, environmental protection and quality. Radiological Control Division.

NS8293. ES&H COORDINATOR - Requires a BS in engineering or a safety-related field, five years' experience in an operating accelerator in the areas of industrial hygiene and industry safety, and certification as a CSP. Five years' experience in radiation protection and training, and PE license is desirable. Will conduct safety, health, and environmental inspections, and assist the department in implementing ES&H programs to comply with DOE requirements and BNL policies. Collider-Accelerator Department.

DD8757. TRAINING COORDINATOR - Requires a bachelor's degree in an engineering discipline or a technical field. Excellent organizational and communications skills, the ability to handle multiple priorities and meet deadlines, and proficiency in Microsoft Word and Access are required. Will administer and coordinate the Plant Engineering and Central Shops training efforts to ensure compliance with DOE Order 5480.20 Personnel Selection and Qualification, and other applicable regulatory requirements (OSHA, EPA, DOT and DOE). Responsibilities also include development of a Training Plant that ensures that technical, ES&H, Quality Assurance training needs are identified and training is provided. Plant Engineering Division.

NS2583. PERSONNEL MONITORING SUPERVISOR - Requires a BS in science or engineering, advanced degree preferred, and a minimum of five years' experience with occupational radiation dosimetry. Experience with applied internal/external dosimetry, knowledge of the design and operation of dosimetry systems, supervisory experience and excellent communication skills are necessary. Experience within a DOE complex and certification by the American Board of Health Physics are desirable. Radiological Control Division.

DD8756. SEWAGE TREATMENT PLANT OPERATOR A - (term appointment) Under minimum supervision maintains and operates Sewage Treatment Plant. Conducts a variety of chemical, quality and other tests of sewage influent and effluent and ground water associated with the operation of the Sewage Treatment Plant. Maintains necessary records. Must have and maintain a valid 3-A certification. Plant Engineering Division.

DD8760. WATER & SEWERAGE OPERATING ENGINEER - Under minimum supervision lays out, constructs or installs, repairs, maintains and operates water and sewerage systems, related facilities and auxiliary equipment. Must obtain and maintain appropriate licensing or certification requirements. Plant Engineering Division.