

# BNL Begins Pumping Water out of HFBR’s Spent-Fuel Pool; Year’s Events Prompt Close Looks at HFBR and Lab

*In January 1997, monitoring wells immediately south of BNL’s High Flux Beam Reactor (HFBR) showed tritium in the groundwater at concentrations above the state and federal drinking water standard. BNL subsequently determined that tritiated water was leaking at a rate of six to nine gallons a day from the spent-fuel pool located in the basement of the HFBR building.*

*The contamination from this leak is confined to the Lab property, and both the U.S. Environmental Protection Agency and Suffolk County have stated that the contamination poses no danger to people on site or to the public.*

*Nonetheless, remediation of the leak has been swift: In May, groundwater pumping was begun as an interim action to prevent further spread of the contamination above the drinking water standard. Between May and September, BNL removed all spent-fuel elements from the spent-fuel pool and shipped them off site, in preparation for pumping water out of the pool.*

*Pumping began on December 18. This action, which Congress has explicitly authorized and funded, will eliminate the primary source of tritium.*

*Over a period of about two weeks, approximately 65,000 gallons of water is being pumped from the spent-fuel pool and transferred via a double-walled underground pipe to double-walled storage tanks on the Lab site. Suffolk County Department of Health Services has inspected the piping and the tanks, as well as a leak-detection system for the tanks and transfer piping. In addition, the tanks were successfully pressure tested and certified by Underwriters Laboratory.*

*The tritium leak prompted many groups to take more in-depth looks at the HFBR, as well as the management and culture at the Lab. Results of three of these investigations — one by the U.S. General Accounting Office, another by the U.S. Department of Energy’s (DOE) Basic Energy Sciences Advisory Committee and one by BNL itself — were recently released and are summarized below.*

## GAO Investigates Tritium Leak

In a report gathered at the request of the House Science Committee, the U.S. General Accounting Office (GAO) concluded that DOE — from the on-site Brookhaven Group through to DOE’s Washington headquarters — shares responsibility with Brookhaven’s managers for the tritium leak.

As the GAO’s report, issued November 12, 1997, observed: “Our concern is that role and responsibility weaknesses raised by DOE and summarized in this report reflect fundamental problems that have long characterized the Department’s administration of all its national laboratories, not just BNL. [D]espite many calls for improvement by internal and external groups, DOE leadership has so far been unable to develop an effective structure that can hold its laboratory contractors accountable for meeting all important departmental goals and objectives.”

“This report indicates that the failure to discover the tritium leak in a timely manner was due, in part, to systemic and management problems at DOE,” noted House Science Committee Chairman F. James Sensenbrenner Jr., who, with his committee’s ranking minority mem-

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## BESAC Supports HFBR Restart

In a November 22 letter to Martha Krebs, Director of DOE’s Office of Energy Research, Basic Energy Sciences Advisory Committee (BESAC) Chair John Stringer reported BESAC’s recommendations in response to Krebs’s charge of June 23 relating to the current shutdown of the HFBR.

The reactor had been shut down for routine maintenance when the tritium leak from the spent-fuel pool was discovered and now remains shut down pending the outcome of an environmental impact statement (EIS) and a decision by Energy Secretary Federico Peña, which is anticipated in early 1999.

Looking at the HFBR’s role in neutron research in the U.S., BESAC concluded: “Where the capability at HFBR is unique . . . or a significant world-leading technique . . . accommodation by other facilities is not really possible: the quality of the results would not be acceptable.”

Thus, BESAC recommended that:

- The HFBR be restarted as soon as possible, to minimize the effect on neutron science research in the U.S. As Stringer wrote, “It should restart at a power of 30 [megawatts] MW, and move to 60 MW in a timely manner. All the actions required for this move to 60 MW should be completed before startup: if the startup were to be at 30 MW with no clear plan to move to 60 MW, it should not be done.
- “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,” he continued. “The effect will be to increase the supply of neutrons to researchers, without requiring unreasonable delays and expenditures at this time.”
- The path to restart should be as expeditious as possible, to aim at a start in 1999.
- DOE should proceed as soon as possible with a full EIS because, wrote

(continued on page 2)

## The Tail of the Dog, And Other Reminiscences



**On the three unforgettable afternoons of the Reminiscence Seminars held in May, 34 BNL scientists broke the time barrier for their enthusiastic audiences, with their stories of the Lab’s early days. Organized by Bernard Manowitz, Department of Applied Science, and moderated by Lab Historian Robert Crease, the seminars were held May 7, 9 and 13 as part of BNL’s 50th anniversary celebration. The first talks focused on early Brookhaven and the Brookhaven Graphite Research Reactor. The second set covered early physics, the Cosmotron and Alternating Gradient Synchrotron, and chemistry. Gathered to give the third and final seminar, on biology and medicine, are: (seated, from left) Eugene Cronkite, Bernard Manowitz, Marion Koshland, Daniel Koshland and Robert Conard; (back, from left) Martin Gibbs, Sanford Lacks, Jack Van’t Hof, Peter Carlson, Jerry Minsche, Irving Schwartz and Pete Hughes. Another speaker, not present for the photo, was Harold Atkins. Among the many stellar tales was the one by Dan Koshland speaking about Donald Van Slyke: Upon a knock on his door, Van Slyke would often hide in his lab closet until the puzzled visitor left — “He did more research that way,” explained Koshland. And the dog’s tail? That came from audience member Red Carsten, who recalled how — 40 years ago — he had announced, at a party held to celebrate his new Ph.D., that he had just accepted a job at BNL. “With so many jobs available in your field, why go to Brookhaven, where it’s 90 percent physics, and medicine and biology are no more than the tail of the dog?” he was asked. “The tail’s all right,” Carsten said, “if the dog’s big enough.” The tales told at all three seminars were proof that the dog was at least a Saint Bernard.**

— Liz Seubert

## Lab Finishes Facilities Review

In mid-December, BNL released a report on the second phase of the Lab’s comprehensive, site-wide environmental review begun last April as part of an ongoing initiative to identify potential environmental concerns and improve environmental management.

The report on the first phase of the review, issued in September, encompassed those buildings thought to have the greatest potential to impact the environment. All other current and former buildings were included in the second phase.

The report on the second phase of the review, compiled after in-depth examination of records and interviews with past and present employees, indicates that further groundwater monitoring and possible remedial action may be needed at 14 of the 560 current and former facilities surveyed.

To reduce any potential risk to the environment, BNL initiated corrective actions during the course of the review for nine of the 14 areas. These actions included installation of additional groundwater monitoring wells, and sampling and removal of tanks and their contents. BNL began to address the remaining findings before the end of the year.

One finding indicated the potential for environmental contamination from past disposal practices at the site of the former medical research complex, which was in use by the U.S. Army when the site was Camp Upton during both World Wars, then by the Laboratory until 1958. A preliminary review of existing groundwater monitoring data in the area and of past aerial and ground surveys for radioactive soil contamination shows no obvious indication of contamination. Additional groundwater monitoring has begun, and remediation will be performed if necessary.

Other findings relate to areas where vehicle maintenance was performed or oil was stored, a greenhouse where pesticides were used in biological research, a tank formerly used to store carbon tetrachloride for a solar-neutrino experiment, several dry wells and a septic tank.

The review was conducted by staff from BNL and DOE’s Brookhaven Group, with participation and technical assistance from other DOE facilities and Suffolk County Department of Health Services.



To Your Health

The following activities are sponsored by the Health Promotion Program (HPP) of the Occupational Medicine Division. For more information or to sign up, call Mary Wood, Ext. 5923 or 6251.

Sign up for Water Aerobics

Eight weeks of water stretching and exercise classes will again be offered at the Lab pool, Bldg. 478, for BNL employees and their spouses, from 5:20 to 6:10 p.m., on Mondays, Tuesday and/or Thursdays. The first classes will be on January 5, 6 and 8, respectively. Classes are free, but participants must pay the pool fee of \$2 a session or show their season pool pass.

No Wait for Weight Watchers

Registration for the next on-site session of Weight Watchers will take place on Wednesday, January 7, at noon, in the dining room of the Brookhaven Center. The \$89 fee includes 10 sessions, with the first on January 14. These sessions feature the new "1-2-3 Success Weight-Loss Plan," which is easy to follow and allows for flexibility in food selections.

Quit Smoking in 1998!

If one of your New Year's resolutions for 1998 is to quit smoking, then call Mary Wood to find out what help is available through the HPP.

According to Wood, who oversees the HPP, over 40 million Americans have quit smoking and more than 3 million quit every year — and you can become one of them this year!

BNL on TV Monday

BNL and cancer on Long Island will be the main focus of the *Montel Williams Show* scheduled to be broadcast on Monday, January 5, at 2 p.m. on WOR-TV channel 9. In-studio guests will include members of the group known as STAR, for Standing in Truth About Radiation, and community members will be interviewed. A brief interview with Bill Gunther, BNL's Interim Associate Director for Reactor, Safety & Security, is also expected to air.

BESAC Supports HFBR (cont'd.)

Stringer, "reassuring the local community that all care is being taken is of paramount importance."

- All work that will be required whatever the outcome of the EIS should be undertaken immediately. This includes the installation of a liner in the fuel pool; the installation of double-wall piping; the modification of the exhaust stack drain piping; and re-sealing floor joints and penetrations. In addition, planning for the seismic upgrades should be completed while the EIS is in progress; and DOE's Office of Basic Energy Sciences should explore what actions on implementing the upgrades prior to the completion of the EIS are permissible.
- To recover the nation's significant place in the important field of neutron research, the National Spallation Neutron Source must be constructed, together with the upgrades to the HFBR, the High Flux Isotope Reactor at Oak Ridge National Laboratory and the Los Alamos Neutron Scattering Center at Los Alamos National Laboratory.
- "The loss of any one of these components is a major issue, because there is now no margin," wrote Stringer, "and we request that, should a decision be taken not to restart HFBR under the conditions outlined above, we have the opportunity to review the implications for the whole field of neutron-based research in the United States once again."

Get a Load of This Great Gift!



Roger Stoutenburgh

Since last holiday season, if you've been on site with a 70-ton weight that you needed to lift 40 feet in the air — then you've been in luck! In December 1996, BNL began using a gift from the U.S. Navy — an excessed crane with 70-ton lifting capacity, which cost the Lab nothing but the freight charge for transferring the crane from its previous location in Little Creek, Virginia. On the crane's arrival at BNL, the Plant Engineering (PE) Division's Heavy Equipment Mechanic Operators (HEMOs) assembled it, made some minor repairs and traded the tires from an older BNL crane that was slated for the salvage yard. The HEMOs are: (front, from left) Supervisor Mike Curtis, John Popielaski, James Ainoris, William Sassano, John Braband; (middle, from left) Edward Durham, Kerry Botts; (back, from left) Ralph Giordano, James Durham, Charles Yezek and Kevin Barnes.

Then, after a fresh coat of paint, the crane was put to work, often in cooperation with PE's site riggers, on such jobs as unloading some of the 5,000 tons of shielding blocks that came on site by rail from Lawrence Livermore National Laboratory in Berkeley, California, for use in the Relativistic Heavy Ion Collider Project, or handling components of the PHENIX detector that were shipped in from Russia.

While 70 tons is the heaviest weight the crane is designed to lift, it has been set up with 80 feet of boom, allowing it to handle loads in the 40-ton range. Because it is mobile, the crane is used all over site, taking its share of lifting jobs along with the Lab's 30-ton hydraulic crane and 150-ton crane. However, there are still times when three cranes are not enough. So, even though cranes were not big in Santa's 1997 pack, the HEMOs can always hope for next year.

— Liz Seubert

GAO Investigates Tritium Leak (cont'd.)

ber George Brown Jr., had requested the GAO investigation on June 4.

As a result of the GAO's findings, Sensenbrenner and Brown have requested that the GAO undertake another study, this time to look into DOE laboratory-management weaknesses and recommend improvements.

"We understand that DOE has made some changes in how it manages the laboratories," noted Sensenbrenner in his letter to the GAO's acting comptroller general. "Nevertheless, we remain concerned about the impact and pace of these changes and the extent to which DOE and the labs are achieving any real change, especially given the revelations from the Brookhaven incident."

As a result of its review, GAO first and foremost faults BNL officials for incorrectly prioritizing the need to install monitoring wells to detect such a leak, "despite public concern and the [Lab's] agreement to follow local environmental regulations."

In addition, the government's investigators criticize BNL's reliance on leak-rate tests conducted in 1989, 1994, 1995 and 1996, which were inaccurate because they did not properly account for the pool's evaporation rate.

According to the GAO document, BNL erroneously reinforced its position that the spent-fuel pool was not leaking by using sampling results from wells drilled to the southeast of the reactor in 1989 that, given today's understanding of site hydrology, were not positioned so that they could adequately monitor for a leak.

The necessary wells were installed in July 1996, the first samples taken October 1996 and the first results, which showed tritium at about 2,000 picocuries per liter, were received in December 1996. However, BNL and DOE staff had originally promised to install these wells during a November 1994 meeting with Suffolk County officials. Because of what GAO calls "the

informality of the agreement," which was "made at the staff level and . . . documented only by informal notes," BNL's management was "not aware that the agreement had been made."

As the GAO summarized: "Thus, these managers lacked the information they needed to (1) gauge the relative importance of the staff's recommendations to install the wells, and (2) use this information to adjust funding priorities . . ."

In addition, the GAO criticized DOE's Brookhaven Group for failing "to hold the [Lab] accountable for meeting all of its regulatory commitments, especially its agreement to install monitoring wells."

Two Public Meetings On EIS for HFBR

The U.S. Department of Energy (DOE) has scheduled the following two meetings to solicit public comment on the scope and content of the Environmental Impact Statement (EIS) that it has been directed to prepare for BNL's High Flux Beam Reactor (HFBR):

- **Saturday, January 10**, Longwood High School, 1-4 p.m.
- **Thursday, January 15**, Shoreham-Wading River Library, 5:30-8:30 p.m.

All are invited, and requests to speak at the meeting can be made either at the meeting or in advance to Michael Holland, DOE Brookhaven Group, Ext. 3552, fax Ext. 1377, or e-mail mholland@bnl.gov.

The EIS process was described in an article on page four of the Brookhaven Bulletin of December 5, 1997. DOE's notice of intent to undertake the EIS for the HFBR is on the World Wide Web at <http://tis.eh.doe.gov/nepa/>.

Arrivals & Departures

Arrivals

John S. Brady.....Plant Eng.  
Joseph P. Maehr.....Central Shops  
Matthew P. McCall.....Financial Services  
Shi Ouyang.....Applied Science  
Lisa Roy.....Financial Services

Departures

This list includes all employees who have terminated from the Lab, including retirees:

Matti K. Alatalo.....Physics  
Doreen Y. Krage.....Financial Services  
Robert J. Weggel.....Physics

Dosimetry badges will be changed tomorrow. Please place your badge in its assigned rack space before leaving work today.

1998 New York City Train Trips

This is the only time that the 1998 schedule of special discounted trips to New York City (NYC) via the Long Island Railroad (LIRR) will be published in the Bulletin, so clip and save the information below:

- **Saturday trips** — The Patchogue-Medford Library runs trips to NYC on the third Saturday of March through June and September through December. The group meets at the Patchogue station at 8:15 a.m., to take the 8:29 a.m. train. Purchase round-trip tickets, at \$7 each, at the library at least one week before the trip. For information, call 654-4700, Ext. 20.
- **Wednesday trips** — Diane Weid will run NYC train trips on Wednesdays as listed below, leaving from Patchogue at 7:56 a.m. The round-trip cost is \$8 per person.

A minimum of 30 people is needed for each trip. For reservations, send a check payable to Cash to: Diane Weid, 645 Old Medford Avenue, Patchogue, NY 11772-1122. Checks should be received by the Monday before a trip, and should include your phone number and the trip date.

For more information, call Weid at 475-2394.

Wednesday trip dates are:

Jan. 7, 21	May 6, 20	Sep. 2, 16, 30
Feb. 18	Jun. 3, 17	Oct. 7, 21
Mar. 4, 18	Jul. 1, 15, 29	Nov. 4, 18
Apr. 1, 15, 29	Aug. 5, 19	Dec. 2, 9, 16, 23





VIPs of BNL’s 50th Year Honored

There were 195 Very Important Persons (VIPs) invited to the 1997 Service Award Reception held in the Brookhaven Center on the evening of December 11. These VIPs included: one employee — Bernard Manowitz — who marked his fiftieth year of service during the past calendar year (see picture caption below), one who realized 45 years at BNL in 1997, eight who observed 40-year anniversaries, 41 who completed 35 years at the Lab, 32 who were at BNL for 30 years and 37 who had served 25 years as BNL employees.

Other VIPs included: 60 employees with between 36 to 39 years of service, 11 who have been with the Lab between 41 and 44 years, two — Elinor Norton and Alfred Wolf — who have logged 46 years at Brookhaven and two — Irving Feigenbaum and Seymour Rankowitz — who have been BNLeers for 48 years.

In emphasizing the vital role played by BNL’s VIPs, Interim Director Peter Bond recalled BNL’s “spectacular list of scientific achievements over the [50] years.” But, he added, “For any institution that has survived that long, there are great years, good years and not-so-good years,” and this year, “despite some wonderful accomplishments, most people would classify as not-so-good.

“It requires long-term dedicated employees,” he concluded, “to keep the Lab on track through the down years to make sure great years will follow. We look forward to a new beginning in 1998 under Brookhaven Science Associates.”

— VIP Photos by Joe Rubino



Double 50th: BNL and Manowitz Share Golden Anniversary Year

BNL was 50 this year, and one employee — Bernard Manowitz, Department of Applied Science (DAS) — shared the Lab’s half-century in a special way by completing his own 50 years of service at BNL this October. Manowitz joined Brookhaven as an associate engineer on October 1, 1947, rose to serve as DAS Chairman 1979-1989, then returned to active research as a chemical engineer. As part of BNL’s 50th Anniversary celebrations, he conceived, organized and hosted three Reminiscence Seminars (see caption on page 1), served as Grand Marshal for the Anniversary Picnic and, on August 1, became a one-day Mayor of Upton Town to receive mail from the U.S. Upton Post Office, which was celebrating its opening on site exactly 50 years earlier. On November 5, Manowitz’s unique scientific and administrative contributions were recognized in a special program and reception organized in his honor by 50th Anniversary Activity Coordinator Renée Flack and attended by many colleagues and friends. Here, Manowitz and his wife Adele enjoy a piece of his anniversary cake. — Liz Seubert



Roger Stoutenburgh

Service Awards

The following employees celebrated service anniversaries during the months of August, November and December 1997.

August

- 35 Years  
Anthony F. LoMonte ..... Medical  
Victoria L. McLane ..... Advanced Tech.
- 30 Years  
Hans F. Abendroth ..... Physics  
Charles A. Nielson ..... NSLS  
Edwin Taylor ..... Comp. & Com.
- 25 Years  
Alexander F. Pendzick ..... AGS  
Daniel A. Visconti ..... Physics  
Charles F. Vogel ..... Central Shops  
David O. Welch ..... Applied Science
- 20 Years  
Richard G. Eggert ... Contracts & Proc.  
John J. Hauser ..... RHIC  
Marilyn Johnson ..... Plant Eng.  
Harold G. Kirk ..... Physics  
Elizabeth A. McBreen ..... Physics  
Louisa Morrison ..... SEP  
John Nagy ..... Applied Science  
Richard R. Savoy ..... Central Shops  
Peter J. Schnitzenbaumer ..... AGS  
Gene A. Sorenson ..... Central Shops  
Peter De Toll ..... NSLS

- 10 Years  
Patrice Benjamin ..... AGS  
Robert J. Chmiel ..... NSLS  
Robert L. Colichio ..... SEP  
Patria M. Cortes ..... Plant Eng.  
John P. Cozzolino ..... RHIC  
Robert DeAngelis ..... Plant Eng.  
Anne Dunbar ..... AGS  
Joann Giambalvo ... Safeguards & Sec.  
Dennis J. Haeg ..... Plant Eng.  
Gary Herbst ..... RHIC  
Troy R. Mayo ..... Plant Eng.  
Franklin Snell ..... Plant Eng.  
John Walsh ..... Central Shops

November

- 35 Years  
Richard W. Allen ..... Plant Eng.  
Jack Fajer ..... App. Science  
Donald R. Meany ..... AGS  
William B. Sampson ..... RHIC
- 30 Years  
Robert R. Kinsey ..... Adv. Technology
- 25 Years  
Carol A. Creutz ..... Chemistry  
Rae Greenberg ..... Director’s Office  
Samuel P. Yamin ..... Director’s Office
- 20 Years  
Gerry M. Bunce ..... AGS  
Mark Cohen ..... Central Shops  
Thomas J. DeSimone...Safeguards & Sec.  
Kathleen A. Griffin ..... Biology  
Sonja B. Haber ..... Adv. Technology  
Marsha R. Kipperman ..... Human Res.  
Lee M. Walcott ..... Chemistry

- 10 Years  
Rosalie M. Alongi ..... Admin. Support  
Karen E. Fiorvante ..... Safety & Env. Prot.  
Joseph B. Gadbois ..... Plant Eng.  
James Giacalone ..... Plant Eng.  
Luke S. Greco ..... Safeguards & Sec.  
Gregory E. Hall ..... Chemistry  
David A. Harder ..... Adv. Technology  
Deborah A. Johnson ..... AUI  
Mabelle L. Latham ..... Plant Eng.  
Susan Lovell ..... Plant Eng.  
Thomas M. Nolan ..... RHIC  
Philip J. Pietraski ..... NSLS  
Donald A. Pinelli ..... Instrumentation  
Donna L. Rubino ..... Financial Serv.  
Craig R. Sirot ..... Plant Eng.  
Brenda L. Thomas ..... Financial Serv.  
Nelson E. Tyler ..... Computing & Comm.

December

- 40 Years  
Tage G. Carlsson ..... Plant Eng.  
Leonard Newman ..... App. Science
- 35 Years  
William C. Crockett ..... Biology  
J. Dennis Klein ..... NSLS  
Bernard L. Stepnoski ..... AGS
- 30 Years  
Ronald W. Weider ..... AGS
- 25 Years  
I. Hung Chiang ..... AGS  
Thomas F. Koetzle ..... Chemistry
- 20 Years  
Bennett J. Azzara ..... RHIC  
Roseann Callister ..... Contracts & Proc.  
Dimitrios Cokinos ..... Adv. Technology  
Keith D. Detmer ..... Plant Eng.  
Jonathan C. Hanson ..... Chemistry  
Marie H. Hobson ..... App. Science  
James F. Osterlund ..... RHIC  
Michael J. Paquette ..... Plant Eng.  
Eugene T. Premuzic ..... App. Science  
Wayne H. Rambo ..... NSLS  
Robert M. Ritter ..... AGS  
Elizabeth H. Seubert ..... Director’s Off.  
John B. Warren ..... Instrumentation
- 10 Years  
Barrett T. Clay ..... AGS  
Frank J. Cullen ..... RHIC  
Paul Geiger ..... Director’s Office  
Ganga P. Ghimiray ..... Plant Eng.  
John C. Lechmanski ..... Plant Eng.  
Antonio M. Rodrigues ..... NSLS  
Jacqueline G. Timko ..... Physics  
Robert J. Todd ..... RHIC  
Wu Zhang ..... AGS

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Classified  
Advertisements

Placement Notices

The Lab's placement policy is to select the best-qualified candidate for an available position. Candidates are considered in the following order: (1) present employees within the department/division and/or appropriate bargaining unit, with preference for those within the immediate work group; (2) present employees within the Laboratory; and (3) outside applicants. In keeping with the Affirmative Action Plan, selections are made without regard to age, race, color, religion, national origin, sex, disability or veteran status.

Each week, the Human Resources Division lists new placement notices, first, so employees may request consideration for themselves, and, second, for open recruitment. Because of the priority policy stated above, each listing does not necessarily represent an opportunity for all people.

Except when operational needs require otherwise, positions will be open for one week after publication.

For more information, contact the Employment Manager, Ext. 2882; call the JOBLINE, Ext. 7744 (344-7744), for a complete list of all job openings; use a TDD system to access job information by calling (516) 344-6018; or access current job openings on the World Wide Web at <http://www.bnl.gov/JOBS/jobs.html>.

**SCIENTIFIC RECRUITMENT** - Doctorate usually required. Candidates may apply directly to the department representative named.

POSTDOCTORAL RESEARCH ASSOCIATES/JUNIOR SCIENTISTS - Positions are expected to be available, beginning September 1, 1998, in the Nuclear Theory Group, which has active programs in the theory of heavy-ion collisions at ultrarelativistic energies and in the structure of nuclear physics. Contact: Robert Pisarski, Physics Department.

SCIENTIST - Trained in experimental nuclear or high energy physics, to join the PHENIX Project. Will provide expertise in and coordination of the technical computing effort for data analysis and simulation. Will also participate in the operation and research program of PHENIX. Must have a Ph.D., several years of experience in research, and significant experience in modern computing software and methods. Experience in supervising teams of scientists, students and software engineers is preferred. Contact: Samuel Aronson, Physics Department.

**OPEN RECRUITMENT** - Opportunities for Laboratory employees and outside candidates.

DD 5091. REGISTERED NURSE POSITION - (term appointment) Requires experience in phlebotomy, monitoring EKGs, blood pressure and pulse, ordering supplies, laboratory work and record keeping; experience in brain imaging and a BS/BA degree in nursing is desirable. Will participate in imaging studies with radioactive tracers, act as a patient advocate and assist in primate studies. Must be highly organized to work rapidly and accurately within a restricted time frame. Flexibility in work hours is also required. (reposting) Medical Department.