

World’s Fastest Multipurpose, Noncommercial Supercomputer Unveiled at RIKEN BNL Research Center’s First Anniversary

The RIKEN BNL Research Center unveiled the world's fastest multipurpose, noncommercial supercomputer, as the climax of a symposium given at BNL on October 16 to celebrate the Center's first anniversary.

The supercomputer was funded by the Japanese RIKEN, the Institute of Physical & Chemical Research, as part of its support of the Center. The Center was established at BNL in 1997 for the study of theoretical and experimental nuclear physics related to BNL's Relativistic Heavy Ion Collider (RHIC), scheduled to operate in 1999.

"This computer is a tribute to the creativity and resourcefulness of BNL, Columbia University [CU] and RIKEN Laboratory scientists who created it," commented Secretary of Energy Bill Richardson, in a press release issued for the occasion. "This generation of machines and much larger ones soon to follow will be the new tools of discovery and innovation for science and society to solve complex problems in global climate, energy technologies and basic research."

With a top operating speed of 600 billion calculations per second, or 0.6 teraflops, this computer is the twelfth fastest overall in the world. In tandem with the 0.4 teraflop supercomputer at CU, it will form a one-teraflop-plus

computing partnership that will be the world's eighth fastest.

Built for Physics

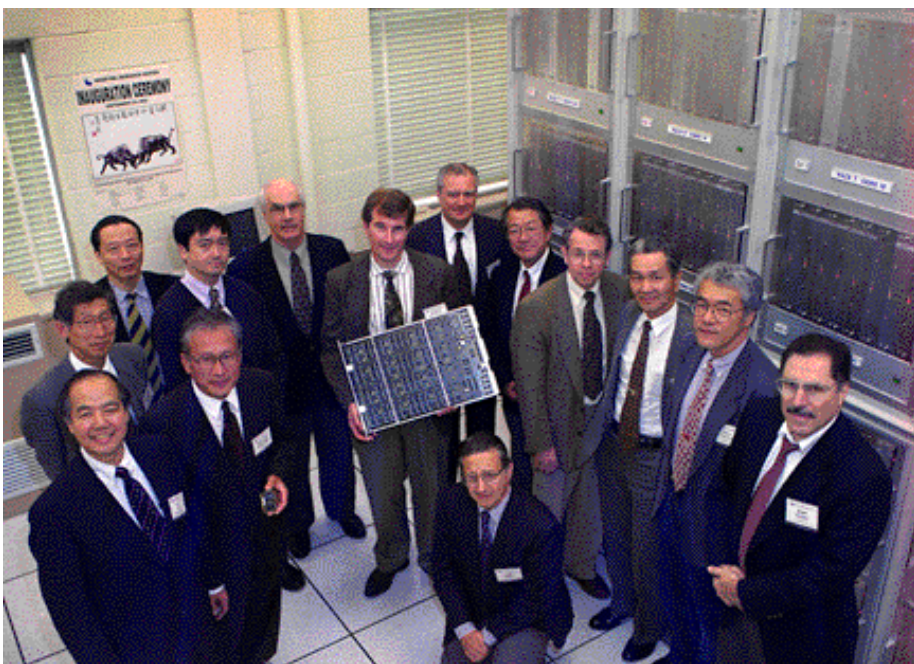
Called the RIKEN-BNL QCD Supercomputer, the machine is optimized for advanced research into quantum chromodynamics, or QCD. QCD describes the theoretical model of matter based on the force known as the strong interaction, which binds quarks and gluons in the particles that make up the nucleus of every atom in the universe.

The computer's high speed will allow scientists to analyze the complex behavior of subatomic particles and phenomena that will be produced at RHIC.

"I am impressed and extremely happy that RIKEN is part of this cutting-edge project. BNL gives RIKEN excellent opportunities to do both theoretical and experimental research," said RIKEN President Shun-ichi Kobayashi, who had assumed his position in August and was making his first visit to BNL for the Center's first anniversary celebration.

"RHIC will open a door to a new realm of discovery," BNL Director John Marburger said. "It is a great pleasure to share this excitement with our col-

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Joe Rubino

Gathered on October 16 in front of the new supercomputer, with a duplicate of one of its 192 motherboards are: (clockwise, from left) T.D. Lee, RIKEN BNL Research Center (RBRC) Director, Columbia University (CU); Shun-ichi Kobayashi, President of RIKEN, the Institute of Physical & Chemical Research, Japan; Kouichi Yazaki, University of Tokyo, Japan; Minoru Yanokura, RIKEN; Shigemi Ohta, RBRC and KEK, Japan; Edward McFadden, BNL; Robert Mawhinney, CU; John Marburger, BNL Director; Satoshi Ozaki, RHIC Project Director, BNL; Norman Christ, CU; Fujio Sakauchi, RIKEN; Akira Ukawa, University of Tsukuba, Japan; Ralph Kasper, CU; and (center) Nicholas Samios, RBRC Deputy Director.

‘Significant Progress’ in Work Planning, Groundwater Protection Cited in Report Issued by DOE Office of Oversight

As a result of a week-long audit, July 27 - August 5, a report released on October 1 by DOE's Office of Oversight (EH-2) noted, "BNL has made significant progress in work planning and control initiatives, and groundwater protection and restoration activities."

The midsummer review was conducted to gauge the progress that BNL has made since EH-2 conducted three separate reviews on site in 1997.

The first one was the interim review of tritium-contamination cleanup efforts around the High Flux Beam

Reactor (HFBR) from January to February; the second review was the Integrated Safety & Management Evaluation (ISME) conducted from February to April and delivered by Tara O'Toole on May 1 last year; and the final EH-2 review of the year was the follow-up on the tritium cleanup efforts, which was done in August 1997.

In addition to improvements in two key areas of the groundwater protection program and in work control and planning, the auditors noted that the DOE Brookhaven Group (BHG) has im-

proved its oversight and assessment of BNL's environment, health and safety programs since the 1997 ISME report.

The auditors, however, found "limited improvements to the BNL radiological-control program," once again citing "performance deficiencies" in that program that had been identified in the 1997 ISME report.

But overall, the auditors found evidence of increased awareness of environment, safety and health issues at the Lab compared to last year.

The high point of this report was

finding significant improvement in BNL's groundwater-protection program, which includes preventing further contamination or leakage, monitoring for potential contaminants, and ongoing cleanup of contaminated sites.

As stated in the report: "Since tritium was discovered in the groundwater south of the HFBR, BNL has aggressively pursued the identification of radiological contaminant sources, and the interim remediation and control of new source areas discovered."

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BSA Awards Tenure to Five BNL Scientists

José Rodriguez, Chemistry Department

Five Brookhaven scientists were granted tenure by the Brookhaven Science Associates Board, effective August 1. The five scientists are: Jeffrey Coderre, Medical Department; Yu-Shin Ding, Chemistry Department; John Gatley, Medical; Stephen Peggs, Relativistic Heavy Ion Collider Project; and José Rodriguez, Chemistry. The following article on Rodriguez is the last in a series to appear over five issues of the Brookhaven Bulletin that started August 28, discussing the work of each of the new tenure recipients, in alphabetical order.

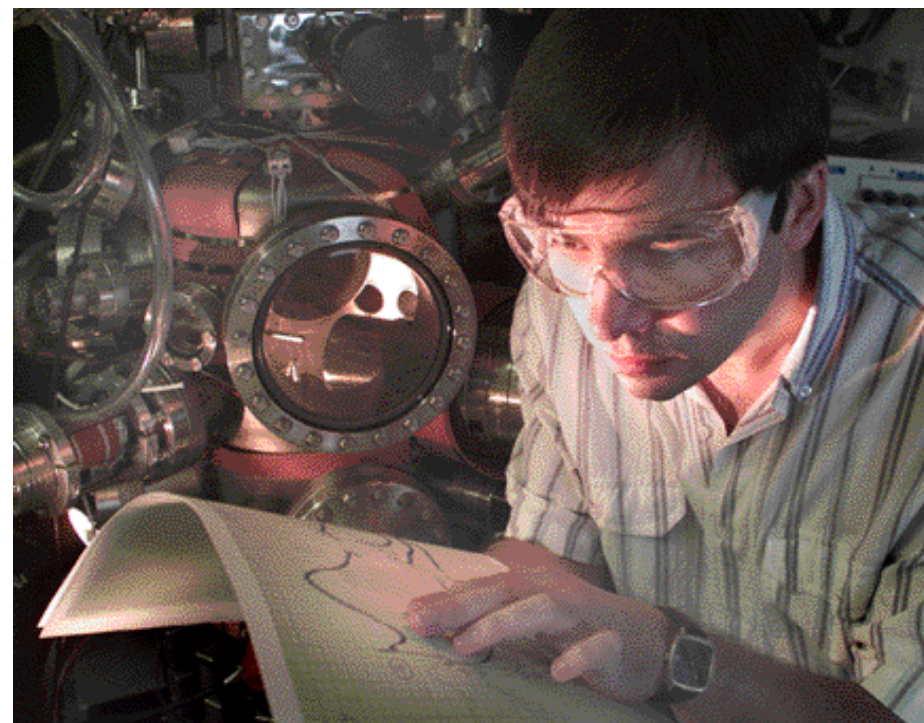
José Rodriguez (right), a chemist in the Chemistry Department, was recommended for tenure for his "exceptional creativity in the field of surface science, shown in his unique ability to discern the 'big picture' in the relationship of chemical reactivity to surface electronic structure, and his extraordinary productivity," said Chemistry Chair Carol Creutz.

"Based on the body of his work," Creutz affirmed, "José is recognized nationally as a leader in the surface-science community. He is an exceptionally careful and productive experimentalist who is playing a central role in charting the direction of the Chem-

istry Department's catalysis effort."

Surface science studies probe the nature of the surface of a solid and its surface in the presence of other chemical species. The information obtained enables scientists to learn more about mechanisms including heterogeneous catalysis. Catalysts promote or accelerate a chemical reaction, but are not themselves consumed. Usually, heterogeneous catalysis involves a solid catalyst, and liquid or gaseous reactants and products.

Although technical difficulties make experimental research on these processes extremely challenging, the many potential industrial applications



Roger Stoutenburgh

of heterogeneous catalysis systems make new discoveries about them technologically and economically important. Thus, DOE's Office of Chemical Sciences has long supported research on surface science and catalysis at

BNL and elsewhere.

Rodriguez's early interest in surface chemistry was clear from his 1988 Ph.D. thesis at Indiana University, "Interactions of Simple Molecules on

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DOE Audit

(cont'd.)



The team of five sent by DOE’s Office of Oversight (EH-2) to conduct the follow-up review are: (from left) Mark Good, senior engineering consultant and operations technical expert, Comex Corporation; Kathryn McCarty, health physicist, Office of Environment, Safety & Health (ES&H), EH-2; team leader Carl Klee, ES&H senior safety engineer, EH-2; Josephine Stegall, DOE environment, safety & health resident in industrial hygiene; and Bernard Kokenge, independent management consultant to DOE.

Evidence of BNL’s aggressive pursuit came in the form of the facility review process that began in April of last year and was completed this month.

Under this review, 450 locations were evaluated for potential contamination. Of the 35 significant findings, more than three-quarters have been addressed, explained William Gunther, project manager for BNL’s Environmental Management Directorate.

Also, over the next three months, 80 additional groundwater monitoring wells will be installed near a number of active research and support facilities where there is a potential for soil or groundwater contamination.

For example, soils adjacent to machines such as the Alternating Gradient Synchrotron (AGS) and the associated Brookhaven Linac Isotope Producer (BLIP) may become slightly activated near beam target and beam stop areas. Therefore, “BNL is planning on installing 40 of the 80 new monitoring wells near the AGS and BLIP to evaluate whether activated soils have affected groundwater quality, and to ensure that protective barriers that are already in place are effective,” explained Douglas Paquette, Project Hydrogeologist for the groundwater monitoring program in the Environment, Safety & Health Services Division.

These additional wells will address a weakness that was identified in the 1997 ISME report pertaining to the Lab’s compliance with DOE Order 5400.1, added Gunther.

The purpose of the DOE Order 5400.1, or the General Environmental Protection Program, is to establish environmental protection program requirements, authorities and responsibilities, to ensure compliance with applicable federal, state and local environmental protection laws and regulations.

The auditors were pleased to find an increased sense of environmental awareness among the facility personnel at the AGS and the Relativistic Heavy Ion Collider Project (RHIC). The EH-2 reviewers noted the upgrades at the AGS, which included adding roofs over beam dumps to reduce water contact with irradiated soils, and installing computer-controlled shutoff valves on cooling loops to minimize the extent of spills in case of a system shutoff.

The groundwater-protection program, however, received some criticism. The auditors found BNL’s use of different data systems for water-quality monitoring and cleanup purposes “inefficient.” As they reported, “Different databases for the water chemistry data make it difficult to integrate results, and there is a general lack of consistency in the data that are collected.”

Paquette explained, “The auditors felt that there were a number of incon-

sistencies between the Superfund and facility groundwater-monitoring programs, particularly in database management, sampling protocols, quality assurance plans and strategies. However, what we must keep in mind is that there are differences in sampling requirements and data-quality objectives for both programs. Although we have worked hard over the past five years to integrate the two programs, there are several areas where improvements are clearly needed, especially in the timely processing and reporting of environmental data.”

The other criticism leveled at BNL’s groundwater-protection program was “communications both within BNL and BHG and with the regulators and stakeholders are not fully effective.”

BNL’s Deputy Director for Operations Tom Sheridan responded: “Communication with regulators and stakeholders is vital as we go forward in addressing environmental issues at BNL. Just last week, Suffolk County Commissioner of Health Clare Bradley met with top BNL and DOE management. I can report that among the positives that came out of that meeting was an agreement to update the 1987 memorandum of understanding, signed by BNL and the County, which calls for conformance with the County’s Sanitary Code.”

The Lab is pursuing other avenues of communication with a broad base of stakeholders. “In fact,” Sheridan added, “this month we participated in the second meeting of the Community Advisory Council, made up of a range of stakeholder representatives interested in any and all issues at BNL.”

Work Planning, Control

Besides the groundwater-protection program, the auditors were pleased to find that many new initiatives are under way to streamline work planning and control at the Lab. These initiatives include: a Lab-wide standard for work planning and control, a revised standard for experimental control, site-wide draft procedures on work planning for all departments and divisions, a site-wide stop-work policy; and several training projects.

The auditors found evidence of, “improvements in the consistency, clarity, detail and documentation of hazards and hazard controls,” which were key issues in the 1997 ISME reports.

The auditors were, however, concerned that BNL has been slow to implement a building-management system and stop-work procedures.

“Until now, we have been operating under policy memos regarding building-management system, but DOE wants a more standardized procedure,” said Patricia Williams, who is the manager of the Safety, Training and

RIKEN BNL Computer (cont'd.)

leagues from Japan.”

Marburger also congratulated Center Director T.D. Lee and Deputy Director Nicholas Samios on their vision and foresight in creating the Center.

Nobel Prize-winner Lee of CU explained that the Center’s focus will make BNL the world center of what is called spin physics, to study the spin structure of the particles within the atomic nucleus. Also, it will greatly intensify world research into the strong interaction.

“All of us at the RIKEN BNL Research Center are eager to put the supercomputer to the test in attempting to solve some of the most pressing questions of modern physics,” Lee said.

Super Machine

Both Lee and Kobayashi praised the CU designers and CCD for their record speed in completing the supercomputer, which was begun on February 19 and operating by August 28.

Shigemi Ohta, staff member of RIKEN BNL and also of KEK, Japan, concluded talks at the first-anniversary symposium by describing the supercomputer and its potential. With its total of 12,288 nodes, or processors, the new machine has the calculational power needed to handle the demands of tracking the movement of literally millions of virtual subatomic particles.

“Essentially, this computer turns space and time into a four-dimensional lattice, which can be thought of as a three-dimensional grid at any moment of time,” said Robert Mawhinney, one of the CU physicists who led the design team for both the RIKEN BNL and the CU machines. “We can use the computer for many grid-oriented problems . . . with calculations more precise than ever before.”

Ed McFadden led the CCD team which installed and debugged the superconductor, which is located in Bldg. 515. “CCD addressed this work with great enthusiasm,” he said. “It’s not every day you get to do a project for a Nobel Prize winner and collaborate with the Chairman of the Physics Department at Columbia University and scientists from around the world.

“The CCD computer hardware technicians who built this machine drew on their skills from the days when they maintained the big supercomputers housed in CCD, such as the CDC 6600 and CDC 7600,” he continued. “Also, the site preparation for the QCD machine was no small task. All the trades within the Plant Engineering Division that were involved did a great job.”

“We have been very keen for the computer to operate well ahead of RHIC’s start so that the theorist com-

Quality Group within BNL’s Plant Engineering Division. “We intend to have this standard issued by the end of this year.”

Radiological Program

As in the 1997 ISME report, the auditors found that the “BNL radiological control program still has not established the infrastructure, leadership and management needed to ensure that basic radiological control requirements are implemented and maintained.”

One of the main objections raised by the auditors was that, despite an institutional radiological program, “departmental and facility radiation-protection programs are still independently managed,” thereby showing a lack of institutional-level direction.

Another objection raised in the report was: “Institutional-level expectations for implementing facility and departmental As Low As Reasonably Achievable (ALARA) programs and work permitting and review processes



Speaking at the symposium to celebrate the RIKEN BNL Research Center’s first anniversary is Shun-ichi Kobayashi, President of RIKEN, Japan.

munity can be prepared to deal with the complex data expected from RHIC,” said Satoshi Ozaki, RHIC Project Director. “The computer’s construction speed as well as its operating speed have lived up to our best hopes.”

World-Class — With Local Roots

The new machine is of world-class stature, but it has local roots: nearly one-third of its components were purchased from Long Island firms as a result of competitive bidding.

Firms which provided components or services include: Marshall Industries of Hauppauge; Nu Horizons Electronics Corp., Melville; Hadco Corp. of Uniondale; AJC Electronics of Syosset; Bell Microproducts, Smithtown; Anthem Electronics, Commack; and Dove Electronics, East Setauket.

“To build such a large computer from scratch is a massive task,” commented Lee, “but the job was made easier by the excellent service we received from these companies.”

“This is what Brookhaven Lab is all about,” said Marburger. “We have a strong collaboration, including a major regional university and an international partner, working at the frontier of science, and at the same time, we are strengthening Long Island’s economy through direct investment.”

Also, at a total cost of \$1.8 million, the BNL-based supercomputer is one of the world’s least expensive. As such, it is a finalist for the Gordon Bell Prize for price performance, an award to be bestowed at the upcoming SC98 High Performance Networking & Computing conference in Orlando, Florida, in November.

— Liz Seubert and Kara Villamil

are inadequate.”

One example provided by the report was the excessive use of general work permits over a range of radiation and contamination levels. The auditors felt more specific work permits were needed to ensure radiological protection.

“BNL must give significantly increased attention to radiological performance in work planning. The report correctly points out a number of weaknesses that will be fixed,” said Robert Casey, Special Assistant to the Environment, Safety & Health Director.

Radiological Control Oversight

Regarding radiological control at the management level, the auditors did, however, point out that BHG has improved its assessment of BNL’s radiological program by adding two more health physicists to its staff. Following DOE radiological controls standards, BHG has not only conducted assessments of BNL’s worker safety

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BERA Entertainment

Halloween Madness

Join the ghostly fun at BERA's first annual Halloween Madness Costume Party next Friday, October 30, 6-11 p.m., at the Brookhaven Center. Refreshments, door and best-costume prizes, and dance music by E.T. are all included in the \$5 per person admission. A cash bar will be available.

Commit to the Holiday Bash

BERA's Winter Holiday Party for 1998 is scheduled for Friday, December 11, at the Rock Hill Country Club in Manorville. The bash will begin at 6 p.m. and feature a sit-down dinner and music by E.T.

To make this event a go, BERA needs a commitment by the end of this month from an adequate number of BNLe rs. So, before Halloween, those interested in attending the party are asked to send their names and the number of tickets that they will purchase to Charles Gardner, Bldg. 911A, or e-mail chuckg@bnl.gov.

Atlantic City Bus Trip

A few seats remain for the next BERA-sponsored, one-day trip to Trump Marina Hotel and Casino in Atlantic City, on Saturday, November 7. The initial cost will be \$24, but the hotel-casino will give a \$17 coin return and a two deferred vouchers for a return visit. Buy tickets now at the BERA Sales Office, Tuesday through Friday, 9 a.m. to 1:30 p.m. For more information, call Andrea Dehler, Ext. 3347, or M. Kay Dellimore, Ext. 2873.

Computer Training

The following classes will be offered by the Computing & Communications Division (CCD) in November, on dates to be announced: EXCEL, beginner and intermediate; HTML, beginner; OUTLOOK, beginner; Project, beginner; Word, intermediate; ACCESS, beginner and intermediate; PowerPoint, intermediate.

To register, or to view the catalog of available courses, contact your Department or Division training coordinator. To register interest and have your name placed on a waiting list, submit a completed training request form to Pam Mansfield, Bldg. 515. All classes are scheduled based on the number of requests received. For more information, contact Mansfield at Ext. 7286, or e-mail pam@bnl.gov.

Health Plan Changes

Obtain forms from the Benefits Office, Human Resources Division, Bldg. 185. For more information, call Muriel Pfeiffer, Ext. 2877, Monday through Thursday, 8:30 a.m.-1 p.m.

Sign-Up Deadline

Next Friday, October 30, is the deadline for making changes to medical and/or dental coverages for 1999.

Those who want to participate in the health care or dependent day care reimbursement accounts for 1999 have until November 30 to sign up.

CIGNA Address Change

Effective November 1, CIGNA will transfer its reimbursement accounts claims office from Pittsburgh, PA, to Bristol, CT. All BNL claims previously handled at Pittsburgh should be addressed to CIGNA Reimbursement Accounts, P.O. Box 0976, Bristol, CT 06010. The toll-free phone number for the Bristol office is 1-(800)-212-2269, where CIGNA staff will be able to assist with claims.

Current claims forms with the Pittsburgh, PA, address may still be used. CIGNA will forward all Pittsburgh mail and phone lines to the Bristol office.

New claim forms will be available on November 1 at the Human Resources Division, Bldg. 185. The only change to the claim forms is the mailing address.

Farmers' Market Pies

Thinking of holiday pies, but have no time to bake? Then order home-baked, home-grown apple and pumpkin pies and apple bread from Bob at the BNL Farmers' Market, which is held every Wednesday, 11:30 a.m.-1:30 p.m. Among the varieties of 9-inch, \$9 pies are Dutch apple with crumbs and a no-sugar version.

Watch Out for Deer

At this time of year, deer are on the move, so drive extra carefully, especially on site. More deer than ever have taken refuge at BNL, and they often come out of the woods and bolt across the road.

Drivers should therefore be prepared to stop very suddenly, and, since deer travel in herds, to remember that more deer may follow the first. Drivers in a long line of cars should be especially careful to leave plenty of space between themselves and the car ahead of them.

You may be in a hurry, but Bambi and family may be crossing the road five cars ahead.



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>.

LABORATORY RECRUITMENT - Opportunities for Laboratory employees.

DD7495. OFFICE SERVICES POSITION - (part-time) Requires an AAS degree or comparable experience in performing a variety of clerical assignments, such as data entry and file organization and maintenance, with particular emphasis on recordkeeping skills. Will assist the Instrumentation & Calibration Group in maintaining required instrumentation documentation. Should have a thorough knowledge of basic office procedures, and of Lab practices, policies, and procedures. Environment, Safety & Health Services Division.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside candidates.

MK7458. DEPARTMENT ES&H ADMINISTRATOR - Will report directly to Department Chair and be responsible for the management of all environmental, safety and health activities with the NSLS. Will assist in developing and executing policies, practices and procedures designed to ensure that department facilities and activities comply with established safety requirements and support all components of the BNL safety program. In addition, will oversee all activities related to safety committees, local area emergency organizations, safety education and training, self assessments, quality assurance, and reporting. Will have supervisory responsibility over the NSLS ES&H coordinator, NSLS safety officer, and NSLS safety engineers, as well as oversight of ES&H Division support staff assigned to the department. Requirements include an MS or higher in health physics or related discipline, or extensive experience in the field, with a knowledge of radiation and conventional safety, and strong communication and presentation skills, as well as leadership ability. A background in scientific research at user facilities is highly desirable. National Synchrotron Light Source Department.

NS3233. ENGINEERING POSITION - Requires a BS, MS preferred, in geology/hydrogeology or civil/chemical/environmental engineering, and strong oral and written technical communication skills. A minimum of five years of demonstrated experience with Long Island's (or hydrogeologically similar) regional and site-specific groundwater flow and contaminant-transport modeling using computer codes MODFLOW, MODPATH and MT3D, and associated pre- and post-processors is necessary. A strong background in quantitative hydrogeology and experience with managing CERCLA/RCRA projects is desirable. Environmental Restoration Division.

NS3230. ENGINEERING POSITIONS - (term appointments) Requires a BS in civil, environmental, chemical, mechanical engineering, hydrogeology or a related field, and three to five years of experience, preferably with environmental characterization/restoration projects. Knowledge and/or experience in the following areas strongly desirable: environmental sampling, drilling, subcontractor field oversight, construction oversight, environmental regulations (CERCLA/RCRA), hydrogeology, waste management, radiochemistry, environmental cleanup technologies, technical writing, analytical chemistry, QA, ES&H,

computer applications, and project management. Excellent communication skills are necessary. Environmental Restoration Division.

NS7724. ENGINEERING POSITION - Requires a BSME with five years' experience in mechanical design and related manufacturing techniques, and a strong background in stress analysis and thermal analysis. CAD/CAE computer skills with ANSYS, mechanical, AutoCAD, and/or Pro-E are highly desirable. Familiarity with systems and components used with particle accelerators, such as vacuum systems, high-voltage/high current equipment, rf, beam instrumentation and/or magnets, is desirable. Will design, procure, assemble, and test mechanical components for the AGS and the Spallation Neutron Source Project. Alternating Gradient Synchrotron Department.

NS7496. ENGINEERING POSITION - Requires a BS in electrical engineering or electrical technology, or the equivalent, and experience in calibration of radiation protection instruments and measurement quality-assurance techniques, and in the development of radiation protection instrument calibration procedures and policies. Excellent communication skills are required; computer skills, specifically MS Excel, MS Word, SQL database and WordPerfect for Windows, highly desirable. Knowledge of pertinent quality assurance standards (e.g., NQA.-1, ANSI/NCSL Z540-1) is highly desirable. Will be responsible for implementing and maintaining an instrument calibration QA program. Environment, Safety and Health Services Division.

NS7873. SCIENTIFIC ASSOCIATE POSITION - Requires a bachelor's degree in physics, electrical engineering or a related field or equivalent, and significant experience in the operation and improvement of accelerator cryogenic systems. Familiarity with common engineering software such as AutoCAD, P-CAD, LabView, MathCAD, and Excel is desirable. Responsibilities include PLC systems with emphasis on documentation of existing controls, PLC programming, and PLC hardware expansion and upgrade. Will also assist in operation of RHIC cryogenic system as operations supervisor. Some shift work is required. RHIC Project.

NS3234. GIS SYSTEMS ANALYST - Requires a bachelor's degree in geography, computer or environmental science, or relevant field and proficiency in the use of ARC/INFO software on a UNIX platform. Experience in UNIX system administration and in administration of multi-seat ARC/INFO in a mixed client/server environment is highly desirable. Familiarity with Oracle or other relational database, NT-based ARC/INFO, or ArcView is a plus. Responsibilities will focus on map production and coverage maintenance; additional tasks will include applications development writing, and implementing GIS procedures, and shared UNIX system administration tasks. Environmental Restoration Division.