BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

# Tritium Found in Groundwater Test Wells Near High Flux Beam Reactor: Intensive Investigation Under Way, No Drinking Water Affected

In a memo sent to all employees on Friday, January 17, BNL Director Nicholas Samios notified Lab staff that, during routine monitoring by BNL, tritium was recently found in groundwater about 200 feet southeast of the High Flux Beam Reactor (HFBR), about 50 feet below ground level. The measured concentration was about two times the New York State Drinking Water Standard.

In the memo, Samios emphasized, "I want to assure employees that the on-site drinking water is not contaminated with tritium, nor is it in any danger of being contaminated. Potable supply wells are located north of the tritium contamination, in the opposite direction of groundwater flow. Also, each supply well is checked quarterly for all contaminants, including radioactivity, and water from the tap is tested daily for radioactivity. Our potable water does *not* contain tritium and *is* safe to drink."

And off-site drinking water wells are also not in any danger, Samios continued. "Groundwater flow is to the south, and our southern border is about 1.5 miles away from the location of the tritium contamination. We have never detected tritium above the Drinking Water Standard in monitoring wells at our southern boundary, in the path of groundwater flow from that location," he said.

Despite these assurances, the discovery of tritium so near the HFBR has naturally raised many questions, which the Laboratory wants to answer. So Samios; Bob Casey, Head of the Safety & Environmental Protection (SEP) Division; and Sue Davis, Associate Director for Reactor, Safety & Security, address several tritium-related issues in this article. Employees with additional questions are encouraged to bring them to the Brookhaven Bulletin.

Roger Stoutenburgh

**On Tuesday, January 21, after completing installation of a temporary monitoring well downstream of the High Flux Beam Reactor, Gary Stoner (left, standing behind a permanent well), Plant Engineering Division, takes groundwater samples for testing from the temporary well to his right. Working with Stoner is hydrogeologist Douglas Paquette, Safety & Environmental Protection Division.**

**What is tritium?**

**Bob Casey**

***Casey:*** Tritium is a naturally occurring radioactive isotope of hydrogen. It is also a by-product of some BNL operations, including the HFBR. Tritium has a half-life of 12 years, which means that, starting with a known quantity, half of it decays into nonradioactive helium in 12 years.

**When was the contamination found?**

***Casey:*** Two new monitoring wells were installed just south of the HFBR in the summer of 1996. They were sampled in October, December and several times this January. The results of the December 11 sampling, which came back to BNL on January 8, showed that the concentrations of tritium in *one* well had increased significantly since October — rising from 2,520 picocuries per liter [pCi/l] on October 17, to 44,700 pCi/l on December 11.

**Why did you wait so long to notify anyone?**

***Samios:*** Let me be very clear: If this contamination posed any danger to anyone, on or off site, we would have notified our employees and the public as soon as we were aware of it.

Since it doesn't pose any danger, we first wanted to make sure it was real — a 17-fold increase in tritium contamination in one well in less than two months is very unusual. So we started by rechecking our data and ordering another test, which came up with a comparable tritium level. This took a couple of days, and we also spent some time planning our course of action. While we were in contact with the U.S. Department of Energy [DOE] from the beginning, on January 16 — eight days after we learned of the contamination — we notified public officials. My memo to employees went out the next day, and a press release went out on Saturday morning.

**What is the source of the tritium?**

***Davis:*** It's really too soon to say for sure. The HFBR is a possible source, but so are sewer lines and waste lines nearby. So we are looking at several possibilities, including piping systems, the spent fuel pool within the HFBR building, and sources outside it.

**Are you sure the reactor itself is not leaking?**

***Davis:*** The core of the reactor where the fission process takes place is in an aluminum vessel. We're sure that the vessel itself is not the source, since sensitive leak detector systems have not detected any leaks.

**How are you going to track down the source?**

**Sue Davis**

***Davis:*** We are going to examine potential sources both within and outside the HFBR building. As part of our efforts, 17 temporary wells will be installed over the next three weeks to help define the extent of the contamination and track down the source. We'll be putting in eight wells about 100 feet downstream of the HFBR, five about 400 feet downstream and four upstream of the reactor.

**I know the on-site drinking water is safe to drink. But what would be the health effect if someone were to drink the tritium-contaminated water?**

***Casey:*** Assuming a consumption of two liters a day of water for an entire year, containing a concentration of tritium at the peak amount measured of 44,700 pCi/L, the dose would be 2 millirems. Each year, the average Long Islander receives about 300 millirems from natural background sources — cosmic rays, radiation in the ground, food and water, and radon. So even at twice the Drinking Water Standard, the dose is small.

**What about BNL's neighbors? Could they be in any danger from this in the future?**

***Samios:*** No. Homes south of BNL, in northern Shirley/East Yaphank, are now hooked up to public drinking water. Prior to the hookups, private wells in the area were tested and none showed any radioactive contamination. The public supply wells are tested quarterly for water quality, including radioactivity.

**Nicholas Samios**

***Casey:*** By the time the tritium-containing water could near any public supply well, which would take about 20 years, more than half of the tritium would have decayed into ordinary helium, so the tritium content of the water would be well below the drinking water standard.

**Does this contamination pose any special danger to the people who work in the reactor?**

***Davis:*** First, our reactor personnel don't drink water from these monitoring wells. No one drinks from these wells. The reactor building's drinking water comes from the same potable water supply as that of the rest of the site. As a routine precaution, employees working in the reactor building undergo tests to check for tritium.

**Did you shut the reactor down when you found the tritium contamination?**

***Davis:*** No. The HFBR was already shut down on December 21 for routine maintenance and refueling. However, the reactor will now remain shut down until the situation is satisfactorily understood.

**How old is the reactor, and can this tritium contamination have anything to do with its age?**

***Samios:*** The HFBR began operating in 1965 and has no set lifetime. We monitor the reactor routinely to see how it is aging, and, through the years, we have upgraded instruments and replaced parts. The most age-sensitive part of the reactor is the vessel, and our materials surveillance program shows that the vessel still has good ductility, which means it is safe to continue operating the reactor. And again, our monitoring for leaks tells us that the vessel isn't leaking. However, other systems are being investigated as possible sources of contamination.

**What is the sampling history in this area before 1996?**

***Casey:*** The two monitoring wells installed last summer were the first in the area.

**If the reactor is 30 years old, why have you just started monitoring the groundwater close to it?**

***Casey:*** Our environmental monitoring program has been evolving as we have learned more about the site's ecology and problems. We first concentrated our wells on our boundaries and known problem areas of concern, such as our landfills. In recent years, we have added permanent monitoring wells around a number of our facilities in the central part of the site.

**When will you know what the problem is?**

***Samios:*** SEP, the Office of Environmental Restoration, the Reactor Division and the Plant Engineering Division, along with DOE, are working aggressively to determine both the source and extent of the tritium contamination. In a few weeks, we will have completed work on the temporary wells. Data from these wells will tell us the extent of the contamination and give us good clues as to when it happened. We will report these results in the Brookhaven Bulletin as soon as they are available. And, of course, when we find the source, we will take immediate corrective action.

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*Healthline Lecture*

## Exercise Affects Metabolism

As people age, their metabolism slows, making it easier to gain weight and body fat. But exercise, when done regularly, can minimize or reverse the metabolic trend.

At the next Healthline lecture sponsored by the Health Promotion Program (HPP) of the Occupational Medicine Clinic, physician Ashok Vaswani will discuss "The Metabolic Effects of Exercise," on Tuesday, January 28, from noon to 1 p.m. in Berkner Hall.

A specialist in clinical nutrition, Ashok Vaswani, M.D., is board certified in internal medicine, endocrinology and metabolism. Over the last 20 years, he has done research at BNL on osteoporosis, obesity and body composition. At present, he is Acting Medical Director of BNL's Marshall Islands medical program. His private practice in Garden City, is limited to endocrinology, metabolism and nutritional disorders.

To register for this lecture, return the completed bottom portion of the Healthline flyer recently sent to all employees to Mary Wood, Bldg. 490, by Monday, January 27. For more information about HPP, call Ext. 5923.

## On-Site Emergencies: Dial 911 or 2222

Until now, dialing Ext. 2222 was the only way to summon the emergency services of BNL's Fire/Rescue Group or Police Group. Now, to serve all those on site who are more familiar with the emergency phone number 911, BNL's emergency services may also be obtained by dialing Ext. 911.

In dialing Ext. 911 from any on-site extension, after you press 9, you will get a second dial tone, as if you were accessing an off-site line. Do not worry, but continue dialing the next two digits, 1 and 1, which will connect you to BNL's Fire/Rescue and Police.

If you are on site, but at a pay phone or using a cellular phone, or if you are off site, dialing 344-911 will *not* work. At those phones, you must continue to use 344-2222 to log an emergency call with the Laboratory Fire/Rescue and Police Groups.

## IBEW Meeting

Local 2230, IBEW, will hold its regular monthly meeting on Monday, January 27, at 6 p.m., in the Knights of Columbus Hall, Railroad Avenue, Patchogue. The agenda includes regular business, committee reports and the president's report. The international representative will be at this meeting. There will be a meeting for shift workers at 3 p.m. at the union office.

## Attn: Computer Experts

Computer experts are needed by BNL's Office of Educational Programs to volunteer time to help local schools with upgrades, networking, repairs, after-school clubs, etc. If you have the expertise and are willing to volunteer, bring your lunch to an informational meeting at noon on Monday, January 27, in Room A, Berkner Hall. For more information, contact Louise Hanson, Ext. 5849 or hanson2@bnl.gov.

## Arrivals & Departures

**Arrivals**

**John W. Heslin**.....AGS
**Hyun-Jo Kim**.....NSLS

**Departures**

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

**Hobart W. Kraner**.....Instrumentation

## Bowling

**Red & Green League**

K. Koebel 269/243/700 scratch, R. Mulderig 238/224/206/668 scratch, K. Asselta 266/205/642 scratch, J. Goode 225/611 scratch, E. Sperry IV 232/203/607 scratch, N. Bessemer 247, R. Wiseman 234, G. Mack 226, E. Larsen 225, W. Powell 222, G. Weresnick 220, A. Pinelli 211/201, E. Sperry III 209, R. Eggert 215, R. Prwivo 210, R. Raynis 205, J. Meier 204, H. Arnesen 201.

**Purple & White League**

M. Meier 269/212/652 scratch, R. Picinich 246/216, M. Guacci 242/198/184/624 scratch, J. Meier 238/181, J. Goode 225/202, Don King 225/180, P. Callagari 224/182, J. Zebuda 213, Doug Fisher 210/181, S. Logan 207, B. Tozzi 206, A. Warkentien 204, G. Mehl 191, M. Picinich 190, M. Addessi 187, A. Pinelli 184/182, Wayne R. 186, A. Almasy 182, Diana Fisher 180, T. Meier 176, P. Manzella 174.


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The Brookhaven Bulletin is printed on paper containing at least 50 percent recycled materials, with 10 percent post-consumer waste. It can be recycled.


## *Send a Love Note to Your Valentine*

Is there a special message you'd like to send to your valentine? Are you looking for a valentine? You can have your Valentine's Day message printed in the Brookhaven Bulletin on February 14.

Send your 15-to-20 word "love note" to the Bulletin, Bldg. 134, by Friday, February 7. Use a Sales & Notices Bulletin classified ad form, but mark it "Valentine's Day." You must sign your name and include your life number and extension, but your name will not be printed unless it is clearly part of the message. Copy must be deemed tasteful. All "love notes" will be accepted at the Bulletin's discretion. Only one message per employee please.

## *Quit Smart!*

If your New Year's resolution is to quit smoking, then you can Quit Smart starting on Monday, January 27, at noon in Bldg. 490, in four, one-hour sessions sponsored by the Health Promotion Program of the Occupational Medicine Clinic.

The Quit Smart program relies on: teaching behavioral coping skills, self-hypnosis using audiotapes, nicotine fading by switching to lower nicotine cigarettes, withdrawal management, and relapse prevention and recovery strategies. The option of the nicotine skin patch will also be covered.

The additional three sessions will be held on February 3, 10 and 14. The per-person fee for BNL employees and their dependents is $10; former participants of any BNL smoking-cessation programs may attend free.

For more information and to register, call Mary Wood, Ext. 5923.

## Linux Fair

Linux is a freely available implementation of the UNIX operating system for personal computers. The second annual Linux Fair sponsored by BNL's Local Linux Users' Group will be held Tuesday, January 28, from 11 a.m. to 2 p.m. in Berkner Hall. Group members will demonstrate Linux applications and answer questions. For more information, contact Matt Surico, Ext. 2520 or e-mail surico@bnl.gov.

## Classified Advertisements

### Placement Notices

The Laboratory's placement policy is to select the best-qualified candidate for an available position. Consideration is given to candidates 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, handicap or veteran status.

Each week, the Human Resources Division lists new placement notices, first, to give employees an opportunity to request consideration for themselves through Human Resources, and second, for general recruiting under 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, or call the JOBLINE, Ext. 7744 (344-7744), for a complete listing of all openings.

Current job openings can also be accessed via the BNL Home Page on the World Wide Web. Outside users should open "http://www.bnl.gov/bnl.html", then, under "Information," select "Jobs." For scientific staff openings, select "Scientific Personnel Openings"; for all other vacancies, select "General Personnel Openings."

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

DD 0597. TECHNICAL POSITION - (term appointment) Requires an AAS degree in electronics or equivalent work experience, and excellent communication skills. Tasks will include but are not limited to conducting production and non-production testing of magnets, with complete documentation of all tasks, in room-temperature and cryogenic environments. Knowledge of harmonic measuring coils and gauss meters highly desirable, as is knowledge of computer databases, word processors and remote data-gathering techniques. The ability to work a rotating shift and overtime as needed also required. RHIC Project.