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HEADLINE: Indian Point radiation threat low, experts say

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There is no escape from radiation.

It's in coffee and cocoa. It's in sunlight. It's in the air in our homes, in our bodies, on the ground, in hospitals and spun off from the nuclear fission process used to generate electricity.

Most radiation is harmless, and useful. Radio waves are harnessed to transmit sound ranging from music to fetal heartbeats. Microwaves show astronomers the age of the universe and heat food in the home. X-rays can pass through cells, providing physicians with images of the human interior, or tear apart diseased cells for cancer treatment.

But it is the more dangerous form of radiation - from plutonium, a dangerous, highly radioactive substance produced in nuclear reactions like those at the Indian Point power plants in Buchanan - that has raised fears among residents within 50 miles of the plants, including those in New York City, ever since the plants became viewed as a potential terrorist target after Sept. 11.

Those fears gained new momentum this month, when the Department of Energy announced plans to truck thousands of tons of spent fuel from Indian Point through local roads, before heading to a proposed national repository in Nevada.

Plutonium produces enormous amounts of radioactive particles, which are weak and can be blocked by a shirt-sleeve. But if they are ingested or inhaled, their radioactive emissions will destroy critical body tissues, stirring fears about low-level radiation from accidental and planned discharges of small quantities of radioactive gas or water from Indian Point.

Yet, experts say, there is little to worry about, because very little low-level radiation escapes from the plant.

"If you are at the plant fence and stood there all year, the radiation you would get from Indian Point would be less than a third of the average background radiation for that area," said Jason Jang, a health physicist with the Nuclear Regulatory

Commission. "You would get more radiation if you sat a year at Bear Mountain because of the sunlight and the radiation emitted from the rocks."

Jang said the amount of radioactivity in the steam that escaped into the environment after a tube failure at one of the plants Feb. 15, 2000, was one-eighth of the radiation exposure from an X-ray. "They couldn't detect it at the plant fence," he said.

About 1,000 air, water, and soil samples are taken at Indian Point annually to test for traces of radioactivity emanating from the plants. Water, used to cool the steam or control the reactor, is strained to remove radioactive particles before it is discharged. Air is vented from the containment building after passing through filters. Each process is monitored and recorded.

Fears about radiation are not limited to Indian Point. Residents in Westchester, Putnam and Rockland counties for years have been arguing over the safety of the radiation emitted from cell phone towers and high tension electric wires and transformers. Studies so far have found no increased incidence of cancer associated with the presence of microwave towers or the use of cell phones.

"We are exposed to microwave background radiation from the big bang all the time," said David Brenner, professor of radiation oncology and public health at Columbia University. "We are bathed in it."

Radiology experts in government and the private sector concur that because people are exposed to a wide range of radiation, the human body has adapted to its presence and its negative affects.

"The people in the Capitol building in Washington get more background radiation than the rest of us because that building is made of granite, which emits more radiation than brick," said Dr. Letty Lutzker, chief of nuclear medicine at St. Barnabas Medical Center in New Jersey. "Flying in a plane will give you more radiation than if you were at sea level, and so will living in Denver.

"Radiation is part of the physical universe," she said. "You can do damage to people with large amounts of certain types. Small amounts are harmless."

Most radiation is carried by different types of electromagnetic waves. The waves are characterized by the distance between their peaks, with shorter wavelengths capable of carrying more energy than longer ones.

Radio waves, at the long end of the spectrum, can have several miles between each rolling peak. Microwaves, next in the low-energy spectrum, can be harnessed to provide heat in microwave ovens or sense movement in radar devices. In the center of the spectrum is light, which carries more heat than the two low-energy waves. Light waves are found as infrared, visible and ultraviolet.

Ultraviolet light waves are strong enough to affect chromosomes in the skin, causing sunburn and, in some cases, skin cancer, which is caused when ultraviolet rays bind parts of the skin's chromosomes together. That is not the case with high-energy waves, called ionized radiation, which is found in the form of X-rays and gamma rays.

"Ionizing radiation is far more hazardous than other forms," Brenner said. "They have the ability to tear open chemical bonds inside DNA."

Yet, that happens all the time, usually without problems.

"Every cell in your body has to make 40 to 50 repairs per day because of some damage from natural radiation," said Tom Hinton, radiation ecologist at the University of Georgia's Savannah River ecology station. "All living organisms have evolved their own repair mechanisms and have learned to correct these problems efficiently."

Ionizing radiation can interfere with that repair process, however, leading to cell destruction or distortion in the form of cancer.

It is this type of radiation that is the byproduct of the nuclear reactors at Indian Point. The reactors transform their uranium fuel into a radioactive soup that includes plutonium, uranium, cesium, iodine and strontium. If released into the atmosphere through a severe accident or explosion, these different forms of long-lasting radiation could contaminate the region for centuries.

Ionized radiation also comes in solid form, composed of one or more atomic particles. These range from large alpha particles, which can be blocked easily, to neutrons, which can penetrate most materials except water and concrete. That is why Indian Point has concrete containment buildings with 4.5-foot-thick side walls and a 3.5-foot-thick dome.

Spent fuel at Indian Point is stored in pools under 23 feet of water.

"There is no difference between the man-made radioactivity and natural radioactivity," said Jang of the Nuclear Regulatory Commission. "There is just more of (the man-made kind) and it is more concentrated."

"So you need to take protective action that you would not have to apply to radiation occurring naturally and evenly distributed throughout our environment," Jang said.

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