

SCIENCE NEWS OF THE WEEK

The Ginna Problem: Isolated or Generic?

In the most serious incident at a nuclear power plant since the Three Mile Island accident almost three years ago, a ruptured steam generator tube triggered a plant shutdown and the release of bursts of slightly radioactive steam into the atmosphere. The tube rupture at the Robert E. Ginna plant in Ontario, N.Y., was the latest in a series of problems with leaking and corroded tubes at many pressurized water reactors.

At 9:28 a.m. last Monday, one or more of 3,260 tubes inside one of two steam generators apparently burst, leaking radioactive water from the primary cooling system into the secondary steam line. Normally, the water that circulates through the reactor core (the primary coolant) is kept under pressure and transfers its heat in a steam generator to an independent secondary cooling loop. At this early stage in the incident, the pressure on the primary side was twice that on the secondary side so the leak had a high water flow rate, says John Arthur, engineering vice president for the Rochester Gas and Electric Corp., which operates the nuclear plant. Immediately, the reactor and turbine shut down, engineered safeguards started and containment isolation took effect.

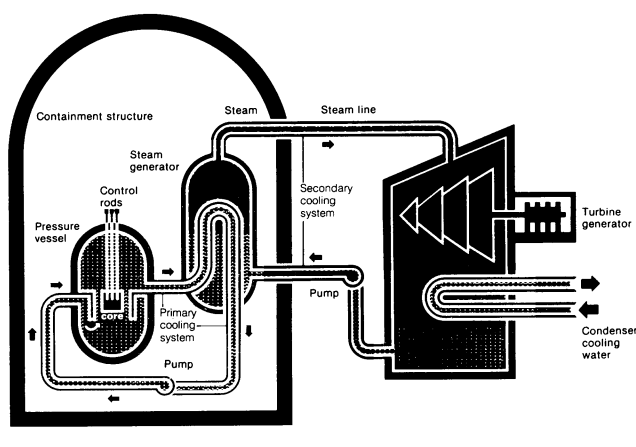
In order to reduce the pressure differential and slow the leak, the operator vented water from the pressurizer, part of the primary cooling system. This radioactive water, perhaps as much as 11,000 gallons, ended up in a bay beneath the reactor. However, the leak in the primary system brought pressure in the secondary loop to a point at which safety valves lifted and released now-contaminated steam into the atmosphere.

Shortly afterward, at 10:50 a.m., a "site area emergency" was declared, the first such emergency since new emergency action levels came into effect about two years ago. Frank Ingram, a Nuclear Regulatory Commission spokesman, says such a declaration occurs when there appears to be "a failure of safety-related systems and the likelihood of those failures having some impact on the public, although releases of radioactivity are expected to be low except right at the site area."

Readings of 3 millirems were measured at the southeast boundary of the plant, and repeated surveys a day later found some extremely low traces of the release. Officials said the released radiation posed no danger to health. About 45,000 people live within 10 miles of the plant, located about 16 miles east of Rochester.

Once the primary pressure was reduced, plant shutdown proceeded routinely, and officials expected the reactor would be in "cold shutdown" within a

In a pressurized water reactor, primary system tubes carry hot, high-pressure, radioactive water to a steam generator. The heat from these tubes boils low-pressure, non-radioactive water in the secondary system that drives the turbines.



SOURCE: Atomic Industrial Forum, Inc.

day. Then technicians were to pump out the radioactive water inside the containment building and begin surveying the extent of damage.

"We've never had a leak that was this large and this sudden," says Arthur. "We're going to find out whether it is a generic problem or an isolated problem." Ingram says tube problems have occurred at Ginna since 1975. Some tubes were already

plugged and out of use, and the plant was in the middle of a program of putting protective sleeves around some tubes. "It's an endemic problem with most pressurized water reactors," says Ingram.

Twenty-six hours after the tube rupture, a spokesman for Rochester Gas and Electric Corp. announced that the emergency was over. The reactor will remain shut for at least several weeks. —I. Peterson

Coffee-linked birth problems premature

Pregnant women can drink coffee without increasing the risk that their babies will be born prematurely or underweight, according to new evidence that contradicts the government's position on caffeine and birth problems and adds fuel to the ongoing controversy over the health effects of coffee consumption. Writing in the Jan. 21 *NEW ENGLAND JOURNAL OF MEDICINE*, six Harvard University researchers report that despite an apparent statistical connection between excessive coffee consumption and both premature deliveries and low birth weight, these problems are actually caused by cigarette smoking—a habit that often accompanies frequent coffee drinking.

Sixteen months ago, Jere Goyan, then commissioner of the Food and Drug Administration, advised "prudent and protective" mothers-to-be to avoid caffeine while research on its safety continued. Goyan based his warning on FDA research that had revealed a connection between caffeine consumption and certain birth defects in rats.

The Harvard scientists — Shai Linn, Stephen Schoenbaum, Richard Monson, Bernard Rosner, Phillip Stubblefield and Kenneth Ryan — argue that because rats and humans differ in their consumption and metabolism of caffeine, the implications of animal studies for expectant mothers are questionable. In their own

study, the researchers interviewed and analyzed the medical records of 12,205 women who delivered children at Brigham and Women's Hospital in Boston over a three-year period; and although they did find that birth problems were more common among heavy coffee drinkers—those who drank four or more cups of coffee per day—further analysis revealed that these effects were not attributable to coffee consumption but to smoking. Frequent coffee drinkers were three times as likely to smoke as were non-drinkers. The researchers also reported no link between heavy coffee use and birth defects.

The researchers concede that their results may have been skewed by the possibility that non-coffee drinkers were consuming caffeine in some other form—chocolate or soft drinks, for example. Still, they conclude that "coffee consumption has a minimal effect, if any, on the outcome of pregnancy" and urge expectant mothers to concentrate on quitting smoking. According to FDA spokesman William Grigg, the administration never sought to put caffeine in the same class with alcohol, cigarettes and drugs, but merely suggested that it would be prudent to avoid it. And although government scientists have been asked to examine the new epidemiological findings, Grigg says, the FDA has not changed its position on the dangers of caffeine use. —W. Herbert