

“Call Me Unreliable...”

Unplanned Shutdowns Highlight Inefficiency of Nuclear Power

By Paul Vos Benkowski & Bonnie Urfer

As the debate continues over which energy source is most efficient, safe and reliable, Nukewatch has been working hard to counter the unverifiable claims propagated by public relations and advertising departments of the nuclear power industry. While solar panels and wind turbines are dubbed unreliable by the oil, gas and uranium lobby, nuclear energy is portrayed as an ever-present source of electric power — never mind the facts.

A quick survey of nuclear reactor shutdowns in the three months since our Fall '07 *Quarterly* shows that the well-publicized dependability of nuclear power is a hoax. Reactor shutdowns are caused by routine maintenance, refueling needs, human error and malfunctions, all of which involve enormous costs and create dangerous situations that reveal the inherent instability of nuclear reactors.

We have decided to exclude from the following list shutdowns caused by regular maintenance and refueling, though the cost of these off-line periods should not be ignored. The average refueling bill for a 1,000-megawatt reactor is \$24.4 million. Refueling shutdowns, when about one-third of a reactor's fuel rods are replaced, occur every 18 to 24 months and normally last 5 to 8 weeks.

The following list includes only unplanned shutdowns.

In chronological order:

- ♦ Aug. 30 — **Vermont Yankee** was shut down after a lack of grease caused a steam valve to malfunction. This was just nine days after the collapse of its cooling tower, after which the reactor was running at about 62 percent.
- ♦ Sept. 1 — Bulgaria's **Kozloduy Reactor** underwent an automatic scram (emergency shutdown). Experts do not know what caused the automatic shut down or when the reactor will be back online.
- ♦ Sept. 3 — Just three months after Australian Prime Minister John Howard officially opened Australia's first reactor in **Lucas Heights**, near Sydney, at a cost of \$400 million, it was shut down due to loose fuel plates. Scientists do not know when the problem will be solved but it is costing the Australian Science and Technology Organization about \$100,000 a week.
- ♦ Sept. 3 — The Tennessee Valley Authority (TVA)-run **Browns Ferry** reactor shut down due to a leak in an electro-hydraulic control system. It was the fourth shutdown since the May 22 restart of Unit 1, which cost TVA \$1.8 billion. TVA workers also had to reduce the power of all three reactors for several days in mid-August because the intake water from the river, warmed during the summer's heat wave, prevented them from operating within environmental regulations. TVA last month announced it would temporarily increase rates. The Brown's Ferry reactor has been shut down five times since August.
- ♦ Sept. 4 — The Finnish utility Teollisuuden Voima Oy shut down Unit 2 at **Okiluoto** due to an unidentified malfunction in the cooling system. Operators were working to identify and repair the problem before restarting.
- ♦ Sept. 4 — **Ohmi** nuclear reactor in Japan went offline after a leak of some 3.4 tons of radioactive water. No date has been set for restart.
- ♦ Sept. 25 — The reactor at **Point Lepreau** in New Brunswick's Bay of Fundy on Canada's east coast was shut

down after a technical malfunction. The reactor was expected to be off line for more than a week.

- ♦ Sept. 27 — **Palo Verde**, 34 miles west of Phoenix, reduced power output at Unit 3 to 75 percent to repair its main condenser. It will remain at reduced power until an upcoming refueling shutdown.
- ♦ Oct. 9 — **Palo Verde** shut down Unit 2 because of a cooling-water leak simultaneous with Unit 3 being offline. The power losses forced Arizona Public Service (APS) to turn up some of its little-used natural gas-fired power plants in order to meet energy demand. On a related note, APS announced an October 1 rate increase.
- ♦ Oct. 14 — The **Fitzpatrick** reactor on Lake Ontario shut down due to an influx of algae and mussels clogging the cooling water intake. It is not known when the reactor will be back online but this is the third time the reactor has shut down for this reason.
- ♦ Oct. 19 — Both reactors at **Byron** in Illinois were shut down because of “inoperability of ultimate heat sink system due to [the] structural failure” of pipes in the cooling towers. No further information was available.
- ♦ Oct. 22 — **British Energy**, based in Livingston, England, shut down two of its reactors due to faulty wiring. Restart is being delayed by inspections and repairs. According to the London *Guardian*, seven of England's 16 power reactors are currently shutdown for repairs or maintenance, four after recent inspections. Citizens have been warned of possible winter power outages.
- ♦ Oct. 28 — **Shearon Harris** in North Carolina shut down automatically for failure of a start-up transformer. The reactor was in the process of a manual shutdown and at 30 percent power when shutdown occurred.
- ♦ Nov. 8 — The **Ignalina** reactor in Vilnius, Lithuania was shut down after a short circuit closed the entire system. It is unknown when the reactor will be back online.
- ♦ Nov. 11 — Unit 3 at Japan's **Onagawa** reactor north of Tokyo was shut down for unknown causes. The company is still investigating the reasons for the shutdown.
- ♦ Nov. 28 — The Nuclear Regulatory Commission began

a special inspection at **Perry Nuclear Power Station** to review the causes of a reactor scram and problems with systems designed to supply and maintain the appropriate water level in the reactor.

In mid-November Japan's nuclear power output was down to 56.3 percent of capacity. Britain shut down half of its reactors in 2007. Its yearly output totaled 51.2 percent of capacity, down from 60.4 percent in 2006 and 60 percent in 2005. The rate

has been steadily dropping. France experienced worker strikes that cut reactor output by 16 percent in October. On Sept. 1, Germany's Environment Minister Sigmar Gabriel called for seven of the country's oldest nuclear reactors to be closed immediately for safety reasons.

The gargantuan amount of heat that must be removed from steam in nuclear reactors is transferred to cooling water, which in turn transfers this heat primarily to the atmosphere through evaporation.

According to the Southern Alliance for Clean Energy in Ashville, North Carolina, at the Edwin Hatch site in SE Georgia, two 924-megawatt reactors each take 57 million gallons per day from the Altamaha River. Thirty-three million gallons are consumed by evaporation, and 24 million are returned to the Altamaha at higher temperatures.

Georgia, Florida & Alabama Need Water, Reactors Too

On October 25, the governors of Florida, Alabama and Georgia received news from Southern Company, parent of Southern Nuclear, that the Chattahoochee River was about to run too low for the Farley reactors to continue full power. Alabama Gov. Bob Riley asked George Bush to deny a request by Georgia Governor Sonny Perdue for a disaster declaration allowing water from Lake Lanier to be kept in state for residents of Atlanta rather than be allowed to flow south. Riley pointed out to Bush that the Farley reactors must have enough water for cooling to prevent a meltdown. Farley, 20 miles east of Dothan, Alabama, has recently been cited for numerous safety problems including failure of a valve that regulates heating and cooling. A whistle-blower was illegally suspended for raising safety concerns about its understaffed and overextended heating and cooling department. Farley received a “yellow” finding, second worst possible from the Nuclear Regulatory Commission for its poor safety performance. Thirty new reactors are on the drawing board for U.S. utilities.

Seeking Source of Cooling Water Loss

For over a month, radioactive water has been leaking from the 52-year-old Breazeale nuclear reactor at Pennsylvania State University's main campus in central Pennsylvania. On Oct. 9, staff discovered a loss “of several hundred gallons” from the reactor's 71,000-gallon cooling water pool and reported the leak at a rate of ten gallons per hour. A Nov. 7 article on the university's website recorded the leak “at mid-teen gallons per hour.” As if to sound reassuring, Jack Brenizer, the school's chair of nuclear engineering, reportedly said that “every pool — including swimming pools — has these types of issues occasionally.” A'ndrea Elyse Messer, the university's senior science and research spokeswoman, said, “... we are ... continuing to look for the leak.” The search involved draining the cooling pool. The university even said in a formal statement that someone drinking the contaminated water for a year would be exposed to only half the amount of radiation deemed safe by the U.S. Environmental Protection Agency and less than half the amount received from a conventional X-ray. In fact, the EPA actually warns that there is no safe dose of radiation, and internal contamination is far more hazardous than an external medical X-ray.



Scottish Government: No More Nukes!

On Oct. 9, the Scottish Parliament announced on its website that the country “neither wants, nor needs, new nuclear power stations,” offering staunch opposition to and criticism of the pro-nuke British government. According to the document, the risks and costs involved in importing uranium, decommissioning closed reactors, and disposing of radioactive waste, as well as radiation's effects on human and environmental health “remain too great when set against the low levels of carbon dioxide reduction that would be provided by a new generation of nuclear power stations.” The document, “The Scottish Government's Position on Nuclear Power,” announces the intention to decrease the country's carbon emissions by 80 percent by 2050 with the use of micro-generation and the country's “indigenous energy resources” such as wind power and hydroelectricity.

Ministers Oppose Nuclear Waste Transport

Opposition to the nuclear industry continued in Scotland's Shetland region Oct. 17, after the freight ship *Atlantic Osprey*, carrying nuclear fuel bound for the Sellafield Nuclear Site, passed the Shetland Islands en route from Sweden. Councillors discussed the risks of radiation accidents, and John Mouat, the environment liaison officer for the Shetland Islands Council said, “S.I.C. policy is that nuclear waste should be dealt with at the site at which it was produced, or as near to that as possible.” Mouat stressed that when waste must be transported, it should “be in the best available technology.” Calling the *Osprey* unsafe for nuclear shipments, Councillors cited a 2002 fire in the ship's engine room, forcing it to return to port, and the fact that *Osprey* was not specifically built to carry nuclear materials. Mouat suggested that another ship, the *Pacific Pintail*, be used instead, as it was built to carry radioactive waste.

— *Shetland News*, Oct. 18, and *Neimagazine.com*, Oct. 10, 2007; *New Scientist*, March 27, 2002

Fault Lines Rattle Yucca Mt. Project

Irradiated fuel rods, the deadly million-year waste legacy from nuclear reactors, are so radioactively and thermally hot that they must be handled remotely by machines. Moving them out of reactors to cooling pools or to storage or transport casks must be done under water. The Department of Energy plans to place at least 77,000 tons of this waste in oversized casks, transport them from reactors around the country to Yucca Mountain, Nevada (85 miles from Las Vegas), then place them outdoors on concrete pads for decades — until they cool enough to be buried deep under Yucca Mountain.

However, another in a long list of “project stoppers” was revealed in September when U.S. Geological Survey maps showed that the Bow Ridge earthquake fault line runs directly under the site chosen for “long-term parking.”

The DOE learned of the fault last May but kept the discovery secret until private discussions at the Nuclear Waste Technical Review Board meeting in September. The *Las Vegas Review-Journal* obtained a copy of a letter and maps showing the fault and published the news.

The DOE has nevertheless revamped its plans and will move the pad 100 feet from the fault line. The agency still intends to dump at Yucca.

That scientists, who have spent \$8 billion and 25 years studying the Yucca site, miscalculated the location of an earthquake fault line only exposes the DOE's incompetence and shortsightedness. The waste must be isolated from our environment for a million years.

In an ironic twist, Nevada attempted to prevent state water from being used at the site for the boring of test wells. Although the state intended to impede dump plans, the test wells using the contested water may aid Nevada in proving that Yucca Mt. is an unstable and unsuitable dump site.

The DOE has yet to file a license application with the Nuclear Regulatory Commission, due in June 2008. The application will include earthquake probabilities and contingency plans for operating cranes, hoists and other equipment for surface operations. Seismologist Leon Reiter said there are more than 10 earthquake faults that can generate ground motion within a 20-mile radius of Yucca Mountain. The Solitario Canyon fault can cause a 6.5 magnitude earthquake. Since 1976, there have been 621 seismic events of magnitude greater than 2.5 on the Richter scale within 50-miles of Yucca Mountain.

Bob Loux, head of the Nevada Agency for Nuclear Projects and the state's chief Yucca opponent calls the fault line discovery and DOE's 100-foot design adjustment “just-in-time engineering,” and states, “This should not be new information.”