

Nuclear Power Threatens the Environment

Alternative Energy Sources, 2006

Helen Caldicott, "Nuclear Power Is the Problem, Not a Solution," *The Australian*, April 13, 2005, p. 24. Copyright © 2005 The Australian. Reproduced by permission of the author.

Helen Caldicott is a founder of Physicians for Social Responsibility, an organization of doctors opposed to nuclear weapons and nuclear power.

There is a huge propaganda push by the nuclear industry to justify nuclear power as a panacea for the reduction of global-warming gases....

At present there are 442 nuclear reactors in operation around the world. If, as the nuclear industry suggests, nuclear power were to replace fossil fuels on a large scale, it would be necessary to build 2000 large, 1000-megawatt reactors. Considering that no new nuclear plant has been ordered in the United States since 1978, this proposal is less than practical. Furthermore, even if we decided today to replace all fossil-fuel-generated electricity with nuclear power, there would only be enough economically viable uranium to fuel the reactors for three to four years.

The true economies of the nuclear industry are never fully accounted for. The cost of uranium enrichment is subsidised by the U.S. government. The true cost of the industry's liability in the case of an accident in the United States is estimated to be \$US560 billion, but the industry pays only \$US9.1 billion—98 per cent of the insurance liability is covered by the U.S. federal government. The cost of decommissioning all the existing U.S. nuclear reactors is estimated to be \$US33 billion. These costs—plus the enormous expense involved in the storage of radioactive waste for a quarter of a million years—are not now included in the economic assessments of nuclear electricity.

Nuclear Power Contributes to Global Warming

It is said that nuclear power is emission-free. The truth is very different.

In the United States, where much of the world's uranium is enriched, the enrichment facility at Paducah, Kentucky, requires the electrical output of two 1000-megawatt coal-fired plants, which emit large quantities of carbon dioxide, the gas responsible for 50 per cent of global warming.

Also, this enrichment facility and another at Portsmouth, Ohio, release from leaky pipes 93 per cent of the chlorofluorocarbon [CFC] gas emitted yearly in the United States. The production and release of CFC gas is now banned internationally by the Montreal Protocol because it is the main culprit responsible for stratospheric ozone depletion. But CFC is also a global warmer, 10,000 to 20,000 times more potent than carbon dioxide.

In fact, the nuclear fuel cycle utilises large quantities of fossil fuel at all of its stages—the mining and milling of uranium, the construction of the nuclear reactor and cooling towers, robotic decommissioning of the intensely radioactive reactor at the end of its 20- to 40-year operating lifetime, and transportation and long-term storage of massive quantities of radioactive waste.

In summary, nuclear power produces, according to a 2004 study by Jan Willem Storm van Leeuwen and Philip Smith, only three times fewer greenhouse gases than modern natural-gas power stations.

Dangerous By-Products

Contrary to the nuclear industry's propaganda, nuclear power is therefore not green and it is certainly not clean. Nuclear reactors consistently release millions of curies of radioactive isotopes into the air and water each year. These releases are unregulated because the nuclear industry considers these particular radioactive elements to be biologically inconsequential. This is not so.

These unregulated isotopes include the noble gases krypton, xenon and argon, which are fat-soluble and if inhaled by persons living near a nuclear reactor, are absorbed through the lungs, migrating to the fatty tissues of the body, including the abdominal fat pad and upper thighs, near the reproductive organs. These radioactive elements, which emit high-energy gamma radiation, can mutate the genes in the eggs and sperm and cause genetic disease.

Tritium, another biologically significant gas, is also routinely emitted from nuclear reactors. Tritium is composed of three atoms of hydrogen, which combine with oxygen, forming radioactive water, which is absorbed through the skin, lungs and digestive system. It is incorporated into the DNA molecule, where it is mutagenic [mutation causing].

The dire subject of massive quantities of radioactive waste accruing at the 442 nuclear reactors across the world is also rarely, if ever, addressed by the nuclear industry. Each typical 1000-megawatt nuclear reactor manufactures 33 tonnes of thermally hot, intensely radioactive waste per year.

The Nuclear Waste Problem

Already more than 80,000 tonnes of highly radioactive waste sits in cooling pools next to the 103 U.S. nuclear power plants, awaiting transportation to a storage facility yet to be found. This dangerous material will be an attractive target for terrorist sabotage as it travels through 39 states on roads and railway lines for the next 25 years.

But the long-term storage of radioactive waste continues to pose a problem. The US Congress in 1987 chose Yucca Mountain in Nevada, 150km northwest of Las Vegas, as a repository for America's high-level waste. But Yucca Mountain has subsequently been found to be unsuitable for the long-term storage of high-level waste because it is a volcanic mountain made of permeable pumice stone, and it is transected by 32 earthquake faults. [In April 2005] a congressional committee discovered fabricated data about water infiltration and cask corrosion in Yucca Mountain that had been produced by personnel in the U.S. Geological Survey. These startling revelations, according to most experts, have almost disqualified Yucca Mountain as a waste repository, meaning that the United States now has nowhere to deposit its expanding nuclear waste inventory.

To make matters worse, a study released [in April 2005] by the National Academy of Sciences shows that the cooling pools at nuclear reactors, which store 10 to 30 times more radioactive material than that contained in the

reactor core, are subject to catastrophic attacks by terrorists, which could unleash an inferno and release massive quantities of deadly radiation—significantly worse than the radiation released by [the nuclear accident at] Chernobyl, according to some scientists.

This vulnerable high-level nuclear waste contained in the cooling pools at 103 nuclear power plants in the United States includes hundreds of radioactive elements that have different biological impacts in the human body, the most important being cancer and genetic diseases.

The incubation time for cancer is five to 50 years following exposure to radiation. It is important to note that children, old people and immuno-compromised individuals are many times more sensitive to the malignant effects of radiation than [are] other people.

Health Threats

I will describe four of the most dangerous elements made in nuclear power plants.

Iodine 131, which was released at the nuclear accidents at Sellafield in Britain, Chernobyl in Ukraine and Three Mile Island in the United States, is radioactive for only six weeks and it bio-concentrates in leafy vegetables and milk. When it enters the human body via the gut and the lung, it migrates to the thyroid gland in the neck, where it can later induce thyroid cancer. In Belarus more than 2000 children have had their thyroids removed for thyroid cancer, a situation never before recorded in pediatric literature.

Strontium 90 lasts for 600 years. As a calcium analogue, it concentrates in cow and goat milk. It accumulates in the human breast during lactation, and in bone, where it can later induce breast cancer, bone cancer and leukemia.

Cesium 137, which also lasts for 600 years, concentrates in the food chain, particularly meat. On entering the human body, it locates in muscle, where it can induce a malignant muscle cancer called a sarcoma.

Plutonium 239, one of the most dangerous elements known to humans, is so toxic that one-millionth of a gram is carcinogenic. More than 200kg is made annually in each 1000-megawatt nuclear power plant. Plutonium is handled like iron in the body, and is therefore stored in the liver, where it causes liver cancer, and in the bone, where it can induce bone cancer and blood malignancies. On inhalation it causes lung cancer. It also crosses the placenta, where, like the drug thalidomide, it can cause severe congenital deformities. Plutonium has a predisposition for the testicle, where it can cause testicular cancer and induce genetic diseases in future generations. Plutonium lasts for 500,000 years, living on to induce cancer and genetic diseases in future generations of plants, animals and humans.

Plutonium is also the fuel for nuclear weapons—only 5kg is necessary to make a bomb and each reactor makes more than 200kg per year. Therefore any country with a nuclear power plant can theoretically manufacture 40 bombs a year.

Further Readings

Books

- Curtis D. Anderson and Judy Anderson *Electric and Hybrid Cars: A History*. Jefferson, NC: McFarland, 2005.

- Harvey Blatt *America's Environmental Report Card: Are We Making the Grade?* Cambridge, MA: MIT Press, 2005.
- Godfrey Boyle *Renewable Energy: Power for a Sustainable Future*. New York: Oxford University Press, 2004.
- Lester Brown *Rescuing a Planet Under Stress and a Civilization in Trouble*. New York: Norton, 2003.
- Rebecca L. Busby *Hydrogen and Fuel Cells: A Comprehensive Guide*. Tulsa, OK: PennWell Corp., 2005.
- Kenneth F. Deffeyes *Beyond Oil: The View from Hubbert's Peak*. New York: Hill & Wang, 2005.
- John M. Deutch *Making Technology Work: Applications in Energy and the Environment*. New York: Cambridge University Press, 2004.
- Lynn Ellen Dokon *The Alcohol Fuel Handbook*. West Conshohocken, PA: Infinity, 2001.
- Ross Gelbspan *Boiling Point: How Politicians, Big Oil and Coal, Journalists and Activists Are Fueling the Climate Crisis and What We Can Do to Avert Disaster*. New York: Basic Books, 2005.
- Paul Gipe *Wind Power: Renewable Energy for Home, Farm and Business*. White River Junction, VT: Chelsea Green, 2004.
- Elizabeth Grossman *Watershed: The Undamming of America*. Jackson, TN: Counterpoint, 2002.
- Scott W. Heaberlin *A Case for Nuclear Generated Electricity*. Columbus, OH: Battle Press, 2003.
- Peter W. Huber and Mark P. Mills *The Bottomless Well: The Twilight of Fuel, the Virtue of Waste, and Why We Will Never Run Out of Energy*. New York: Basic Books, 2005.
- Mark Jaccard *Sustainable Fossil Fuels: The Unusual Suspect in the Quest for Clean and Enduring Energy*. Cambridge, MA: Cambridge University Press, 2005.
- Michael T. Klare *Blood and Oil: The Dangers and Consequences of America's Growing Dependency on Imported Petroleum*. New York: Metropolitan Books, 2004.
- Paul Komor *Renewable Energy Policy*. Lincoln, NE: iUniverse, 2004.
- Greg Pahl *Biodiesel: Growing a New Energy Economy*. White River Junction, VT: Chelsea Green, 2005.
- Doug Pratt *Got Sun? Go Solar: Get Free Renewable Energy to Power Your Grid-Tied Home*. Massonville, CO: PixyJack Press, 2005.
- Vaclav Smil *Energy at the Crossroads*. Cambridge, MA: MIT Press, 2005.
- Christine Woodside *The Homeowners Guide to Energy Independence: Alternative Power Sources for the Average American*. Guilford, CT: Lyons Press, 2006.

Periodicals

- Associated Press "Research Shows Ethanol Isn't Worth the Money," July 17, 2005. www.msnbc.msn.com/
- Dan Bihn "Wood Heating for All?" *Solar Today*, November/December 2005.
- Maryann Bird "Power to the People," *Time Europe*, May 1, 2005.
- John Carey, Adam Aston, Justin Hibbard, and Ronald Glover "Alternative Power: A Change Is in the Wind," *Business Week*, July 4, 2005.
- Joel Darmstadter "Whistling in the Wind? Toward a Realistic Pursuit of Renewable Energy," *Brookings Review*, Spring 2002.
- Daphne Eviatar "Africa's Oil Tycoons," *Nation*, April 12, 2004.

- Alexandra Goho "Energy on Ice," *Science News*, June 25, 2005.
- Amanda Griscom-Little "Shooting the Moon," *American Prospect*, October 2005.
- Dr. Scott Kohl "Agriculture's Role in Ensuring U.S. Energy Independence," *Feed and Grain*, August/September 2005.
- James Howard Kunstler "End of the Binge," *American Conservative*, September 12, 2005.
- Stefan Lovgren "Spray-On Solar-Power Cells Are True Breakthrough," *National Geographic News*, January 14, 2005. www.news.nationalgeographic.com/.
- Emily Matthews "Undying Flame: The Continuing Demand for Wood as Fuel," *EarthTrends*, 2005.
- Jack Nerad "Hydrogen Fuel from Ethanol?" *Driving Today*, August 23, 2005.
- James M. Pethokoukis "A New Look at Nukes: Energy Firms Push to Build Reactors as Natural Gas Prices Soar," *U.S. News & World Report*, September 26, 2005.
- Virginia Phillips "Clean Energy Special: Eastern Promise," *New Scientist*, September 3, 2005.
- Kara Platoni "Bug Juice: Could Termite Guts Hold the Key to the World's Energy Problems? Don't Laugh," *East Bay Express*, September 7, 2005. www.eastbayexpress.com.
- Alan Reynolds "Redesigning Trucks in Washington," *Human Events*, August 25, 2005.
- Paul Roberts "Got Gas? Oil Isn't the Only Fossil Fuel That's in Crisis," *Slate.com* May 11, 2004. www.slate.com.
- Arthur Smith "The Case for Space-Based Solar Power Development," *Space Daily*, August 11, 2003. www.spacedaily.com.
- Tim Sramcik "Fueling Around," *Aftermarket Business*, November, 2004.
- Ronald J. Sutherland "The High Costs of Federal Energy Efficiency: Standards for Residential Appliances," Cato Institute, December 23, 2003. www.cato.org.
- Jerry Taylor "Not Cheap, Not Green," *Washington Times*, August 4, 2003.
- R. James Woolsey "Defeating the Oil Weapon," *Commentary*, September 2002.

Full Text: COPYRIGHT 2006 Gale.

Source Citation:

Caldicott, Helen. "Nuclear Power Threatens the Environment." *The Australian* (13 Apr. 2005): 24. Rpt. in *Alternative Energy Sources*. Ed. Darrin Gunkel. Detroit: Greenhaven Press, 2006. Current Controversies. *Gale Opposing Viewpoints In Context*. Web. 24 Mar. 2011.

Document URL

http://ic.galegroup.com/ic/ovic/ViewpointsDetailsPage/ViewpointsDetailsWindow?displayGroupName=Viewpoints&prodId=OVIC&action=e&windowstate=normal&catId=&documentId=GALE%7CEJ3010426217&mode=view&userGroupName=nysl_ro_phs&jsid=7b491c25e270c5f47fef27e066d32f2e

Gale Document Number: GALE|EJ3010426217

