8. Accurate, economically-feasible filtering and monitoring technologies ***do not exist*** for some of the major reactor by-products, such as radioactive hydrogen (tritium) and noble gases, such as krypton and xenon. Some liquids and gases are retained in tanks so that the shorter-lived radioactive materials can break down before the batch is released to the environment.

9. Government regulations allow radioactive water to be released to the environment containing "permissible" levels of contamination. **Permissible does not mean safe.** Detectors at reactors are set to allow contaminated water to be released, unfiltered, if below the "permissible" legal levels.

10. The Nuclear Regulatory Commission relies upon self-reporting and computer modeling from reactor operators to track radioactive releases and their projected dispersion. A significant portion of the environmental monitoring data is extrapolated – ***virtual, not real***.

11. Accurate accounting of all radioactive wastes released to the air, water and soil from the ***entire reactor fuel production system*** is simply not available. The system includes uranium mines and mills, chemical conversion, enrichment and fuel fabrication plants, nuclear power reactors, and radioactive waste storage pools,casks,and trenches.

12. Increasing economic pressures to reduce costs, due primarily to the deregulation of the electric power industry, could further reduce the already unreliable monitoring and reporting of radioactive releases. Deferred maintenance can increase the radioactivity released – and the risks.

13. Many of the reactor's radioactive by-products continue giving off radioactive particles and rays for enormously long periods – described in terms of "half-lives." A radioactive material gives off hazardous radiation for at least ten half-lives. One of the radioactive isotopes of iodine (iodine-129) has a ***half-life of 16 million years***; technetium-99 = 211,000 years; and plutonium-239 = 24,000 years. Xenon-135, a noble gas, decays into cesium-135, an isotope with a 2.3-million-year half-life.

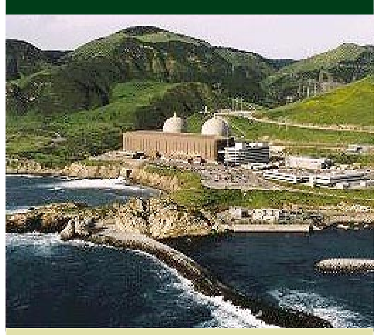
14. ***Every exposure to radiation increases the risk*** of damage to tissues, cells, DNA and other vital molecules potentially causing programmed cell death (apoptosis), genetic mutations, cancers, leukemias, birth defects, and reproductive, immune, cardiovascular and endocrine system disorders.

This pamphlet is intended for reprint. You are encouraged to copy and distribute it widely.

Nuclear Plant Releases to Air, Water and Soil

A reactor building vent at a typical 1000-megawatt pressurized-water reactor.

It does not take an accident . . .



Water discharge area at the Diablo Canyon plant on the Pacific Ocean.

Typical discharge points for gaseous and liquid releases to air, water and soil

from nuclear power plants including:

planned releases from the reactor's routine operation

and

unplanned releases from leaks and accidents.

RADIOACTIVE RELEASES FROM THE NUCLEAR POWER PLANTS OF THE WESTERN UNITED STATES

WHAT ARE THE DANGERS?

Nuclear Information and Resource Service
1424 16th St., NW, #404, Washington, DC 20036
Ph: 202-328-0002 FAX: 202-462-2183
nirsnet@nirs.org www.nirs.org

World Information Service on Energy
Amsterdam
www.antenna.nl/wise

March 2004

What you *ARE NOT* supposed to know:

1. **It doesn't take an accident** for a nuclear power plant to release radioactivity into our air, water and soil. All it takes is the plant's everyday ***routine operation***, and federal regulations permit these radioactive releases.

2. Radioactivity is measured in "curies." A large medical center, with as many as 1000 laboratories in which radioactive materials are used, may have a combined inventory of only about ***two*** curies. In contrast, an average operating nuclear power reactor will have approximately 16 ***billion*** curies in its reactor core. This is the equivalent long-lived radioactivity of at least 1,000 Hiroshima bombs.

3. A reactor's fuel rods, pipes, tanks, and valves can leak. ***Mechanical failure and human error*** can also cause leaks. As a nuclear plant ages, so does its equipment – and leaks generally increase.

4. Some contaminated water is intentionally removed from the reactor vessel to reduce the amount of the radioactive and corrosive chemicals that damage valves and pipes. This water is filtered and then either recycled back into the cooling system or released into the environment.

5. A typical 1000-megawatt pressurized-water reactor (with a cooling tower) takes in 20,000 gallons of river, lake or ocean water per minute for cooling, circulates it through a 50-mile maze of pipes, returns 5,000 gallons per minute to the same body of water, and releases the remainder to the atmosphere as vapor. A 1000-megawatt reactor without a cooling tower takes in even more water – as much as one-half million gallons per minute. ***The discharge water is contaminated with radioactive isotopes in amounts that are not precisely tracked, and are potentially biologically damaging.***

6. Some radioactive fission gases, stripped from the reactor cooling water, are contained in decay tanks for days before being released into the atmosphere through filtered rooftop vents. Some gases leak into the power plant buildings' interiors and are released during periodic "purges" or "ventings." These airborne gases contaminate not only the air, but also soil and water.

7. Radioactive releases from a nuclear power reactor's routine operation often are ***not fully detected or reported***. Accidental releases may not be completely verified or documented.

Yucca Mountain:
a repository for the nation's hottest, most dangerous radioactive waste has been proposed for Yucca Mountain in Nevada, only 80 miles from Las Vegas. An accident or terrorist attack during transport, an on-site earthquake or volcano, or corrosion and leakage could cause massive releases of radioactivity.

See related pamphlet, "Radioactive Releases from Nuclear Power Plants of the Mississippi River Basin."

NUCLEAR POWER PLANTS OF THE WESTERN U.S.
and their cooling water intake and waste water discharge locations

1. Columbia Generating Station
Columbia River.

2. Diablo Canyon 1 & 2
Pacific Ocean.

3. San Onofre 2 & 3
Pacific Ocean.

4. Palo Verde 1, 2 & 3
Because Palo Verde is located in a desert, it has a unique water supply system. The reactor vessel's cooling water Is extracted from ground water. Water for the condensers and cooling towers (about 90 million gallons per day) is piped 35 miles from two sewage treatment plants in the Phoenix area.

The cooling tower effluent is released to two 250-acre evaporation ponds. The radioactive coolant that has leaked or been extracted from the reactor vessel and spent fuel pool is run through evaporators and demineralizers. The resulting sludges, resins and filters are shipped to a radioactive waste dump.

5. Comanche Peak 1 & 2
The cooling water comes from a reservoir on Squaw Creek. The water is discharged back into the creek, and from there it flows into the Brazos River and on into the Gulf of Mexico.

6. South Texas Project 1 & 2
The cooling water comes from an off-channel reservoir diverted from Texas' Colorado River. The discharge water is released into the Colorado River and on into the Gulf of Mexico.