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Re: Docket ID No. NRC-2012-0246

Fax Cover Sheet

From: Kevin Kamps

To: NRC Nuclear Waste Confidence Directorate & Secretary US NRC

Date: 12/20/13

Re: NUREG-2157 WC DGEIS

# of pages: Cover sheet (1) + cover letter (1) + 2 page pamphlet (legal-sized) + 2 page pamphlet (legal-sized) = 6 pages total

Notes:

NUCLEAR FUEL REPROCESSING = WEAPONS PROLIFERATION + DIRTY, DANGEROUS, EXPENSIVE

Public Comment Re: Docket ID No. NRC-2012-0246, WC DGEIS, NUREG-2157

Dec. 20, 2013

Dear NRC Nuclear Waste Confidence Directorate,

At the December 9, 2013 NRC Waste Confidence Draft Generic Environmental Impact Statement (WC DGEIS) call-in public comment meeting, I mentioned in my oral comments that day, in response to a previous commenter, that reprocessing of high-level radioactive waste – to extract still-fissile plutonium and uranium isotopes – is the single worst thing one can do with irradiated nuclear fuel that already exists, other than dumping it directly into the environment, that is.

Making irradiated nuclear fuel in the first place was the first major mistake; reprocessing it would compound the mistake.

The reasons for this include nuclear weapons proliferation risks, unleashing large-scale radioactive contamination that harms human health over wide regions, and an astronomically expensive price tag, which would be foisted onto the public's back, yet again. All that, and *we'd STILL need a dumpsite!*

Please accept the attached pamphlet, "NUCLEAR FUEL REPROCESSING = WEAPONS PROLIFERATION: An inseparable link between nuclear power & nuclear weapons," as additional public comment in the Nuclear Waste Confidence DGEIS proceeding, as rebuttal against reprocessing being any sort of solution, given its very high costs and risks, given that it's dirty, dangerous, and expensive in its own right, as is nuclear power and radioactive waste in the first place (please also find attached the Beyond Nuclear pamphlet entitled "Dirty, Dangerous, and Expensive: The Verdict Is In On Nuclear Power" (created by Beyond Nuclear board member Kay Drey of St. Louis, MO).

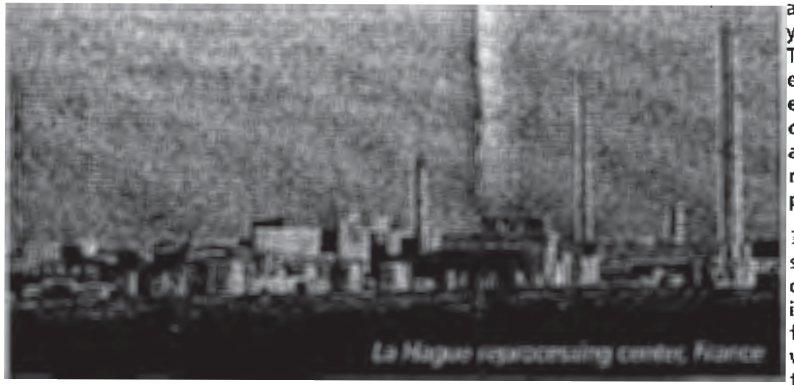
Thank you.

Sincerely,

Kevin Kamps
Radioactive Waste Watchdog
Beyond Nuclear
6930 Carroll Ave., Ste. 400, Takoma Park, MD 20912

RADIATION EXPOSURE

> Reprocessing is hazardous for workers and for people living downstream and downwind. Radiation can cause birth defects, mutations, cancer, and other diseases. Studies near La Hague have found elevated rates of leukemia. Studies at Sellafield have found that children of fathers who work there suffer increased risks of leukemia and non-Hodgkin's lymphoma. Stillbirths have also increased.



La Hague reprocessing center, France

> One of the world's worst nuclear accidents occurred in 1957 at a former reprocessing plant at Mayak in the Ural Mountains of Siberia. A radioactive waste storage tank exploded, exposing 272,000 people to harmful radiation. More than half a century later, Mayak remains one of the most radioactive places on Earth.

HUGE COSTS

> The operation of reprocessing plants is not only hazardous but also extremely expensive. Given the severe and widespread radioactive contamination, effective post-closure cleanup of the plants and their surroundings may not even be possible. The price tag for cleanup may be incalculable.

> Between 1943 and 1990, reprocessing of U.S. military reactor fuel was carried out at Hanford WA, Savannah River SC, West Valley NY, and the Idaho National Lab. As a result, Lake Erie and Lake Ontario, the Columbia, Savannah and Snake rivers, and the Tuscaloosa and Snake River aquifers remain at risk of continuing severe radioactive contamination. The cleanup will likely cost taxpayers many hundreds of billions of dollars, or more. The only reprocessing of U.S. commercial reactor fuel took place at West Valley from 1966 to 1972. Initiation of that plant's cleanup has been deferred repeatedly, and is already estimated to cost from $10 billion to $27 billion, or more.

> Reprocessing plants large enough to handle current U.S. irradiated fuel inventories would cost an estimated $40 billion to $60 billion each to build, and at least $3 billion each year to operate. Taxpayers and/or electric ratepayers would almost certainly bear those added cost burdens, not the nuclear power industry.

> While no safe storage or disposal options exist for irradiated nuclear fuel, reprocessing would cost two to ten times more than continued on-site storage of rods at reactor sites, and from $65 billion to $130 billion more than geologic disposal, assuming a site were ever located. As wastes mount with continued reactor operations, reprocessing costs could at least double.

> As many as 40-75 liquid-sodium-cooled, fast neutron "advanced burner" reactors (formerly known as "breeders") would be needed to fission the new plutonium-based fuel and its transuranic constituents into shorter-lived radioactive isotopes (although yet more long lasting radioactive poisons would also be generated). These reactors could cost U.S. taxpayers yet another $40 billion to $150 billion, or more.

REPROCESSING IN THE U.S.

> Because of the 2010 cancellation of the proposed geologic disposal facility for irradiated fuel rods at Yucca Mountain, Nevada, nuclear power promoters are again advocating reprocessing.

> The U.S. nuclear industry, the national nuclear labs, and the French government's atomic giant Areva successfully lobbied the George W. Bush administration in 2006 to launch the Global Nuclear Energy Partnership, designed to revive reprocessing and expand nuclear power worldwide. Although President Obama has cancelled GNEP's environmental review, funding for reprocessing is continuing within the Energy Department's "Fuel Cycle Research and Development" program.

WHAT YOU CAN DO

> Please contact your U.S. Senators and Representative via the Congressional switchboard, **(202) 224-3121**. Urge them to oppose funding for the research and development of reprocessing.

> Please contact President Obama's office at **(202) 456-1111**. Urge the White House to renew the Ford/Carter ban on reprocessing. President Obama has called for a world free of nuclear weapons. This goal will be unattainable if reprocessing were to be re-authorized.

> Please use this pamphlet to help encourage the public to write to government officials and the media. You may reproduce this pamphlet, download it from our Web site, or contact **BEYOND NUCLEAR** to request copies.

NUCLEAR POWER IS DIRTY, DANGEROUS, AND EXPENSIVE. ITS WASTES REMAIN DEADLY VIRTUALLY FOREVER. SAFE ALTERNATIVES EXIST NOW.

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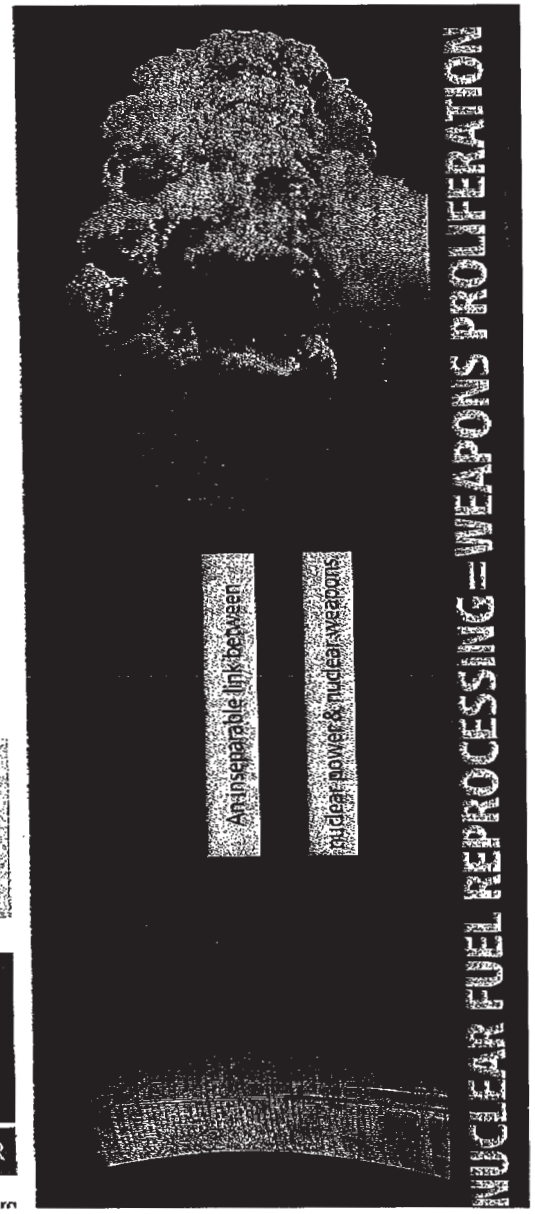
BEYOND NUCLEAR

March 2010. Design by AvenginAngels.org



NUCLEAR FUEL REPROCESSING = WEAPONS PROLIFERATION!

An unacceptable link between nuclear power & nuclear weapons

WHAT IS REPROCESSING?

In nuclear power plants, the highly radioactive fuel rods are removed from the reactor after about three years of fissioning and replaced with fresh rods. Reprocessing involves physically chopping up the irradiated rods and then dissolving them in acid to extract plutonium and uranium. Separated plutonium can be used to make nuclear weapons. Commercial reprocessing currently takes place in five countries — France, India, Japan, Russia, and the United Kingdom.

▷ No permanent waste repository exists on the planet – and none may ever exist – for the disposal of the fuel rods currently in reactors or those that have already been removed. Irradiated rods are therefore being stored at every reactor site. They remain vulnerable to terrorists and accidental releases, and they increase the radiation exposure of workers. The U.S. nuclear industry is promoting reprocessing as its latest illusion of a solution to the high-level radioactive waste problem.

MORE WASTE CREATED, NOT LESS

▷ A fraction of the separated plutonium from reprocessing is intended for use in new reactor fuel. When used, though, the new fuel would then itself generate more plutonium and other long-lived radioactive wastes. Plutonium-239 continues releasing harmful particles and rays for at least 240,000 years.

▷ No safe technology or disposal site exists to isolate the radioactive wastes that reprocessing generates. Especially because the solid irradiated rods are transformed into high-level radioactive liquids and sludges, reprocessing increases rather than decreases the volume of homeless radioactive waste. The waste byproducts cannot be re-used. They have to be abandoned on-site or dumped elsewhere. For example, French uranium wastes left over from reprocessing have been shipped to Siberia for indefinite storage. Reprocessing plant structures and components also become radioactively contaminated and corroded during operations, turning them into radioactive waste, as well.

The atom bomb that destroyed Nagasaki (pictured above, shortly after the blast and fire) used reprocessed plutonium. It killed 40,000 people right away and an additional 100,000 within five years – from radiological and physical injuries.

THE WEAPONS LINK

▷ Both Presidents Ford and Carter banned commercial reprocessing in the U.S. because they feared that the technology's spread would be used for the worldwide proliferation of nuclear weapons. In addition to the use of extracted plutonium in nuclear weapons, the left-over reprocessing wastes can be used to turn an ordinary bomb into a dirty bomb that is designed to disperse radioactivity. President Reagan overturned the reprocessing ban, but the exorbitant cost of building and operating such plants has kept reprocessing from being revived in the U.S. since 1972.

"During my eight years in the White House, every nuclear weapons issue we dealt with was connected to a nuclear reactor program."
– Al Gore

▷ The U.S. invented reprocessing in the 1940s to separate plutonium from irradiated nuclear fuel for use in the Trinity bomb test in New Mexico and in the atomic bomb that destroyed Nagasaki in 1945. The Soviet Union in 1949, the U.K. in 1952, and France in 1960 also tested atomic weapons using reprocessed plutonium. In the 1960s, Israel began to reprocess research reactor fuel to extract plutonium for its atomic arsenal. By 1967, China began to extract weapons-grade plutonium via reprocessing. In 1974, India detonated a nuclear device by using plutonium reprocessed from its "research" reactor fuel. (The reactor came from Canada; the reprocessing technology came from the U.S.) For at least the past decade, evidence has mounted that Pakistan may be pursuing plutonium-based weapons to add to its highly-enriched uranium arsenal. In 2006 and 2009, North Korea tested atomic weapons triggered by reprocessed plutonium extracted from a small "research" reactor's fuel.

▷ Japan already has a large stockpile of separated commercial plutonium, which will grow substantially when its new Rokkasho reprocessing facility becomes operational. If it so chose, Japan would have the technical capability to manufacture nuclear weapons within months. But fortunately, Japan – the only country ever attacked by atomic weapons – continues to renounce them.

▷ France and the U.K. alone have already extracted and stockpiled enough commercial plutonium to make over 30,000 Nagasaki-type atomic weapons.

▷ America's abstinence from commercial reprocessing since the 1970s has no doubt helped to avert the proliferation of atomic arsenals in other countries – most notably in Argentina, Brazil, South Korea, and Taiwan.

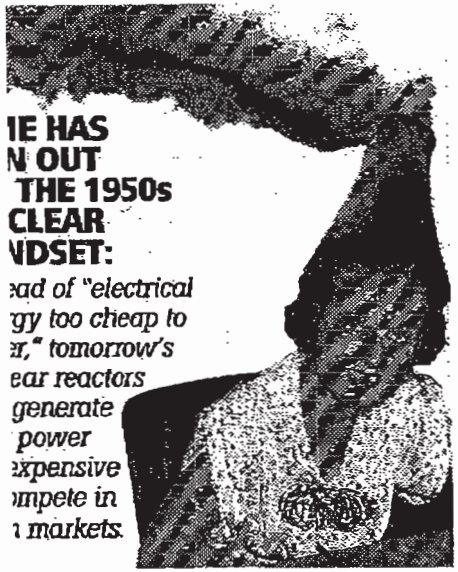
RADIOACTIVE RELEASES

▷ Radioactive wastes are released directly into the environment during the routine operation of reprocessing plants. The British Sellafield plant has dumped its waste liquids, laced with a total of over 1,000 pounds of plutonium, into the Irish Sea. The French La Hague plant discharges tens of millions of gallons of liquid radioactive waste into the English Channel every year. Such discharges would be illegal if dumped overboard in barrels from ships. But France and the U.K. have circumvented a decades-old international treaty against ocean dumping by using underwater discharge pipes. If located in the U.K., the sea beds adjacent to the French discharge pipe could themselves qualify as intermediate-level radioactive waste, requiring deep geologic disposal, under British law and regulation. These radioactive poisons continue to contaminate the food chain. Liquid wastes from La Hague have been traced as far away as the Arctic Sea. Plutonium, almost certainly originating at Sellafield, has been found in teeth of children living hundreds of miles downstream.

A TYPICAL 1,000-MEGAWATT REACTOR GENERATES ENOUGH PLUTONIUM EVERY YEAR TO MANUFACTURE AT LEAST 40 NUCLEAR BOMBS

▷ Reprocessing plants also routinely discharge radioactive gases. For example, La Hague discharges more radioactive krypton-85 gas into the air in one year than was released by the more than 500 atmospheric atomic weapons tests detonated worldwide over the course of decades. Some of the krypton-85 discharged today will continue to release dangerous radioactive beta particles for more than 100 years.

▷ The global-warming gas, carbon dioxide, released from reprocessing plants contains radioactive carbon-14, an extremely harmful isotope that persists for more than 50,000 years.



grade" parts manufacturers, substandard or counterfeit components from domestic or foreign vendors may be installed, increasing reactor hazards.

OPERATING COSTS:

From the start, nuclear plants become radioactively contaminated. Large and small components and whole buildings get "hot." Therefore, operation is expensive; and as reactors age and become more radioactive, operation becomes even more expensive. Repair or replacement of defective, obsolete, or worn-out equipment requires shielding for workers, as well as protective clothing, monitors and respirators. Far more workers, time, and money are required to fix a nuclear plant than a coal- or gas-fired power plant, or a wind or solar farm.

high-quality uranium ore becomes more scarce, its use as reactor fuel will become even expensive, and its manufacture into fuel will increase the emission of greenhouse gases.

PETUAL COSTS:

ntling a decommissioned nuclear plant would also be expensive. Because no disposal sts for most radioactive wastes from most states, contaminated buildings and equipment emain on site for many years. Because of the dangers, environmental monitoring and l guards will be needed indefinitely.

NUCLEAR POWER CAN AND SHOULD BE PHASED OUT AND REPLACED WITH CLEAN, SAFE, AND CONOMICALLY SUSTAINABLE ENERGY ALTERNATIVES.

HELP SPREAD THE WORD: NUCLEAR POWER IS BASED ON FALSE PROMISES AND REAL DANGERS.

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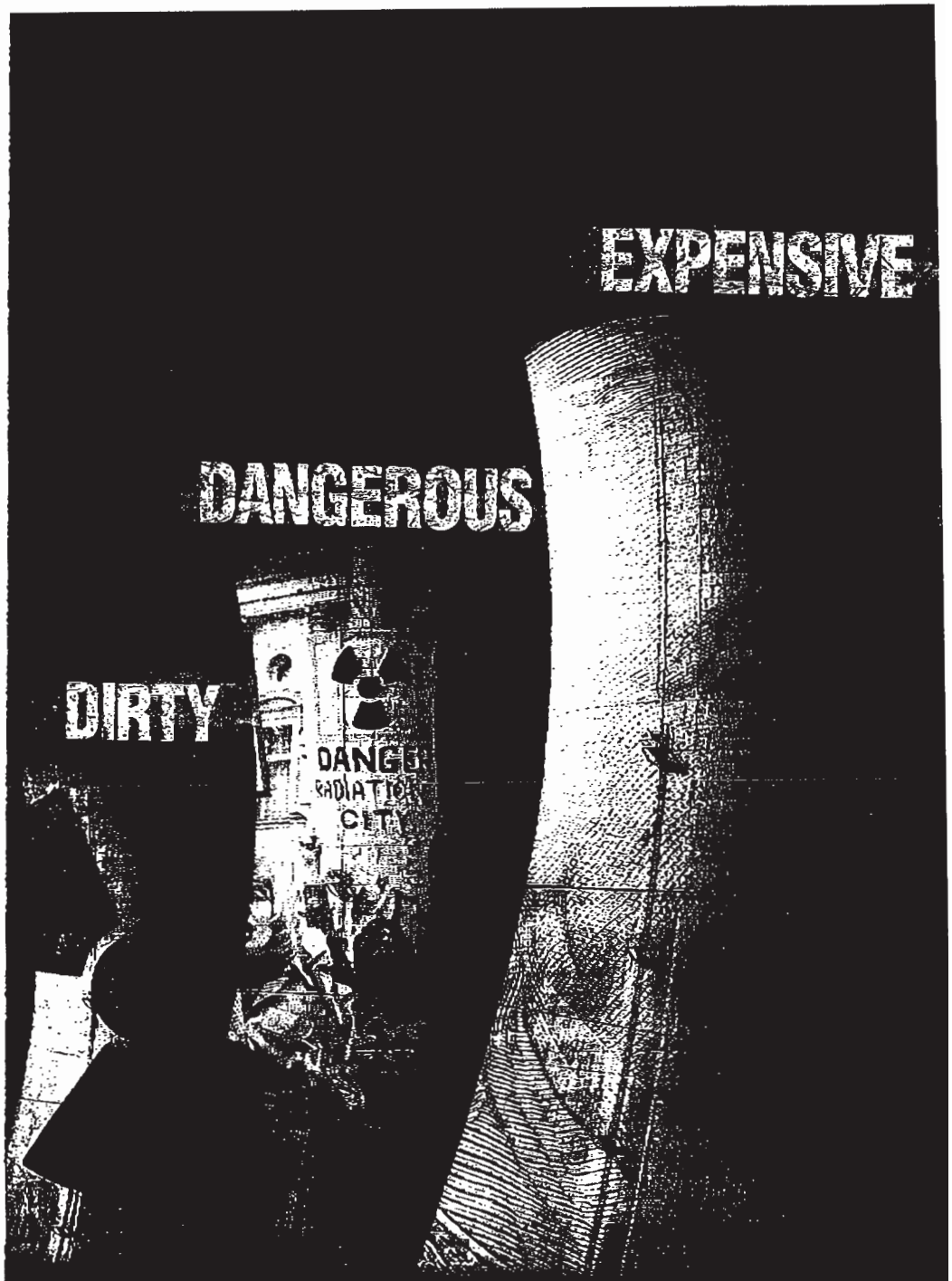


THE VERDICT IS IN ON NUCLEAR POWER.

TERRORISTS:
A typical commercial reactor produces enough plutonium every year to make at least 40 nuclear bombs. If irradiated fuel rods are reprocessed, the extracted plutonium can be diverted to make nuclear bombs. The remaining radioactive materials can be used with conventional explosives to make a "dirty bomb," capable of dispersing radioactivity.

Every nuclear power plant is a potential candidate for a terrorist attack–by land, water or air, and by persons employed within the facility or outsiders who gain access. Terrorists could attack a reactor, the fuel storage pool, or other critical components, causing the release of vast amounts of radioactivity. No existing U.S. nuclear power plant building was designed to withstand a deliberate attack by a jumbo jet.

RADIOACTIVE ROADS AND RAILS AND NEIGHBORHOODS:
If a permanent disposal facility for irradiated fuel rods were ever built, transport of the waste on trains, trucks and barges would put countless communities at risk. If a site were chosen in a western state, long-distance transport would be required because 77 of the 104 operating reactors are east of the Mississippi River.

The potential for an accident, terrorist attack, or theft of nuclear materials during transit is real.

Nuclear power is expensive

A CONTINUING FINANCIAL BURDEN:
Nuclear power cannot survive in a market economy without massive subsidies.

Federal subsidies include loan guarantees for construction and funds for research and development, including the search for a solution to the problem of radioactive waste.

In the event of a major disaster, the Price-Anderson Act requires the nuclear industry to pay for only the first $10 billion–for deaths, injuries, and property damages–a mere fraction of the liability costs federal taxpayers would have to cover. According to the 1982 Nuclear Regulatory Commission CRAC2 report, damages could run as high as $314 billion, depending on a reactor's surrounding population density, and other factors. That would be approximately a trillion dollars today.

If a new reactor were to be built, state regulators would have to be willing to boost electric rates.

Without assurance of such state and federal handouts, private investors would refuse to finance the construction of new nuclear reactors.

CONSTRUCTION COSTS:
Because nuclear power plants are so complicated and dangerous, construction costs are extremely high; lengthy delays are common. Because of a shortage of certified "nuclear-

Nuclear power is dirty

THE FUEL:

Nuclear reactors use uranium. Therefore they release radioactive waste into the environment at every stage of the fuel cycle—starting first at mines, then at mills where enormous piles of tailings are left behind, and finally during chemical conversion, enrichment, and fuel fabrication. Radioactive radon gas that escapes in the West can float across the U.S., over the Atlantic, and beyond.

Valid concerns exist about global warming caused by carbon dioxide from coal-fired power plants. Yet production of uranium fuel also results in greenhouse gas emissions. Indeed, uranium mining and milling are among the most carbon dioxide-intensive industrial operations.

Nuclear reactors use uranium to power turbines by releasing intense heat and radiation through a process called fission. Old fuel rods must be replaced periodically with fresh ones. The irradiated rods are stored in a water-filled pool within the reactor building or in an adjacent building. After a few years, rods may be placed in steel-lined concrete casks outside, to await shipment to a still-nonexistent permanent repository.

Because no such repository has been built anywhere in the world, the nuclear industry would like to reprocess the irradiated rods. The rods would be cut up, soaked in acid, and reprocessed so residues of plutonium and uranium could be extracted and turned into usable reactor fuel. However, the other leftover radioactive fission products, now liberated from the fuel rods, remain as a containment problem for many thousands of years. Reprocessing is extremely hazardous to workers and to the public downstream and downwind. It produces its own massive wastes and releases radioactive CO_2 as well as other radioactive materials into the environment.

ROUTINE RELEASES:

Nuclear power plants don't have to blow up or melt down to release their radioactive poisons. During routine operation, they release pollutants into the atmosphere and into the rivers, lakes, and oceans that provide reactor cooling water.

It is impossible to run a reactor without these routine releases. No economically feasible technology exists to filter out all the radioisotopes, including tritium (radioactive hydrogen) and radioactive krypton and xenon gases, some of which convert into radioactive strontium and cesium.

NO ONE KNOWS HOW MUCH RADIOACTIVITY IS RELEASED:

Some radioactive wastes are released into the environment from a nuclear power plant whenever the concentration level of radioactivity in the waste water is below the lev the monitoring equipment is set to detect. The U.S. government has approved this l be "permissible." But **"permissible" does not mean safe**. It means "as low as reas achievable"—that is, as low as the nuclear industry claims it can afford to achieve.

The Nuclear Regulatory Commission relies on the reactor owner's self-reporting and co modeling to estimate a plant's radioactive releases. A significant portion of the mon data is extrapolated—so it's virtual, not real. Therefore, **no one really knows how** radioactive poison is released. Radioactive gases, liquids, and solids spread near and fa

PERMANENTLY HOMELESS WASTE:

No permanent repository exists for the irradiated fuel rods (termed high-level waste), ar never exist. In fact, no facility exists for most so-called "low-level" waste, either—that the radioactive sludges and saturated air- and water-filters, as well as the pipes, pump other components that must be replaced as they wear out or malfunction. Much of this level" waste is so highly radioactive that it must be handled by remote-control equip The longer a nuclear plant operates, the greater is its accumulation of radioactive was

THE LETHAL LEGACY:

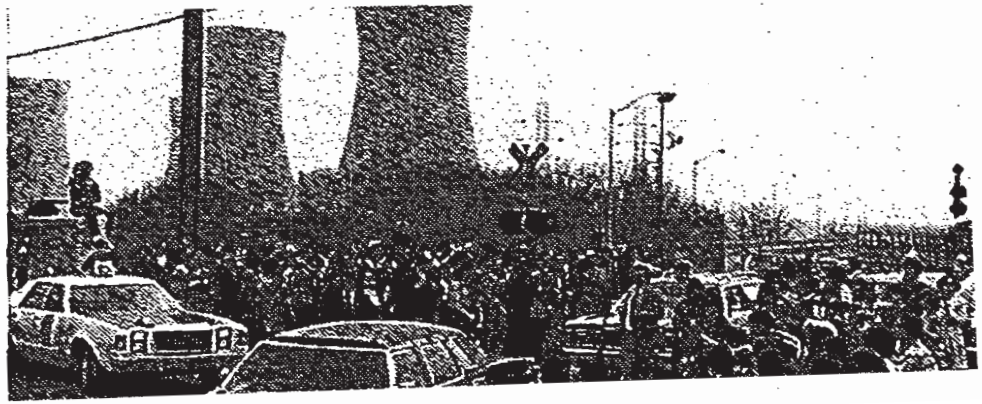
Radioactive waste is dangerous not only now, but some remains dangerous *virtually fo* Each type of radioactive isotope continues to give off rays and radioactive particles constant rate regardless of the temperature, pressure, or chemical environment, until it c into a different radioactive or stable isotope. Nothing can alter or stop this rate.

A radioactive isotope emits appreciable radiation for over 10 times its half-life. one half-life, half the radioactivity is gone. After two half-lives, three-quarters is gon even after 10 half-lives, some radioactivity remains.) This means some radioisotopes plutonium-239 with its 24,000-year half-life, will be dangerous much longer than m humans have walked on the Earth.

Nuclear power is dangerous

ACCIDENTS HAPPEN:

An article in an MIT publication describes an unfortunate fact: "Human factors an effectiveness of people determine success or failure at every stage, from the design plant and its equipment, through manufacture, construction, installation and calibr



On the cover, center cooling tower: A public protest in Harrisburg, PA in 1979, after the major meltdown of the reactor core at the nearby Three Mile Island nuclear plant.

On the right tower: The face of Ben Franklin is on the $100 bill. It would take at least a hundred-twenty million $100 bills to construct a single nuclear reactor if one were ordered today. That's twelve billion dollars, not counting cost overruns, which historically averaged about 200 percent.

to testing, maintenance, repair, and management." ("Human Error in Nuclear Power Plants," *Technology Review*, Feb.1980, p.28)

Every nuclear plant is extremely complex, with thousands of pumps, valves, motors and miles of electrical circuits. Therefore, human error, design flaws, and equipment malfunctions are common.

"All nuclear-power-plant systems, structures, components, procedures, and personnel are potential sources of failures and malfunctions. Problems can arise from defects in design, manufacturing, installation, and construction; from testing, operational, and maintenance errors; from explosions and fires; from excessive corrosion, vibration, stress, heating, cooling, radiation damage, and other physical phenomena; from deterioration due to component aging, and from externally initiated events such as floods, earthquakes, tornadoes, and sabotage." (Daniel F. Ford: Three Mile Island, 1982, p.29)

Because many experienced workers have retired or are nearing retirement age, the industry is faced with a serious shortage of qualified personnel, including some who have important memories of past plant problems.

An average reactor contains the equivalent long-lived radioactivity of at least 1,000 Hiroshima bombs. An accident can be catastrophic, causing the release of tremendous amounts of radioactivity.

Few if any communities have adequate emergency plans, including reliable warning systems and emergency responders who are trained and equipped to deal with radiological devastation on this scale. They lack isolated hospital space for the treatment of irradiated victims. It is unrealistic to assume that a large, panicked population could be evacuated safely. No emergency plan addresses the permanent relocation of people from their homes and communities because of long-term radioactive contamination.

HEALTH HAZARDS:

Exposure to ionizing radiation increases the risk of damage to cells, tissues, and DNA potentially causing mutations, cancer, birth defects, and reproductive, immune, cardiovascular and endocrine disorders.

Radioactive hydrogen and carbon, produced in great quantities, can be incorporated into protein, carbohydrate and fat molecules throughout the body. Fetuses and children are especially susceptible to radiation injury because of the rapid and abundant cell division in their bodies during growth.

According to the National Research Council's BEIR VII report ("Health Risks from Exposure to Low Levels of Ionizing Radiation," 2005), no level of radiation exposure is harmless.

WORKPLACE RISKS:

The nuclear industry depends on workers who are allowed to be exposed to much more radiation than members of the public. Many of the aging metal components, and even the rust, in nuclear plants give off penetrating gamma rays. When clogged or leaking they must be replaced or repaired, a worker can receive a maximum permissible annual dose while making even a minor repair.