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The Director of Central Intelligence
Washington, D.C. 20505

National Intelligence Council

NIC #02194-86
1 May 1986

MEMORANDUM FOR: Director of Central Intelligence
Deputy Director of Central Intelligence

FROM:
Acting NIO for Economics

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SUBJECT: Hard Currency Limitations on the Response
to the Chernobyl Disaster

1. We can expect Gorbachev soon to come under pressure by neighboring countries to shut down all nuclear reactors similar in design to the units at Chernobyl. While Gorbachev may have been able to consider such an option only two years ago when foreign exchange earnings were much higher, the squeeze of lower oil and gas prices effectively precludes this option.

- Each 1,000 MW reactor replaces the equivalent of 25,000 b/d of fuel oil worth about \$130 million per year at current market prices.
- The loss of the four units at Chernobyl, hence, already costs the USSR \$500 million per year. (Even if power is rationed rather than replaced by oil-fired capacity, indirect economic losses would presumably be equally high.)
- It would cost the USSR nearly 500 thousand b/d in fuel oil at a cost of \$2.5 billion annually to shut down all reactors of similar design, causing a drop in oil exports of roughly 40 percent.

2. Looking further ahead, hard currency considerations will also play a role in decisions relating to food. Should the damage to farmland prove widespread, the decision on determining levels of contamination acceptable for distributing food absent an ability to pay for substantial imports will be a difficult one. EC countries may well offer substantial "emergency" credits for such supplies given their surpluses in production. The Soviet bureaucracy, however, might opt to distributing tainted food before taking up such an offer.

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Aging U.S. Reactors Are Used in Buildup Of Nuclear Weapons

Graphite Core of One May Be Dangerous

By Cass Peterson
Washington Post Staff Writer

The Reagan administration is relying on a battery of aging nuclear reactors to support the largest strategic weapons buildup in 20 years, government documents show. All of the reactors have caused environmental problems, and one will require expensive rehabilitation.

In Hanford, Wash., the Department of Energy operates a graphite-moderated reactor similar in design to the ill-fated Soviet plant at Chernobyl. According to government documents, it suffers from a predictable and potentially dangerous distortion of its graphite core.

DOE officials have elected to try to repair the 23-year-old Hanford reactor rather than build a new, \$4 billion reactor as a departmental advisory panel recommended four years ago.

The rest of the nation's weapons-grade fuel production is carried out at four 1950s-era reactors at the Savannah River complex near Aiken, S.C. Spills, leaks and other accidents there in the 1970s prompted Du Pont, the complex's contract operator, to warn in a 1977 report about the dangers of old equipment.

Like the Chernobyl plant, the U.S. military reactors lack the kind of containment buildings required of commercial power plants to prevent the spread of radioactive materials in an accident.

"These are big reactors, as large or larger than commercial reactors," said David Albright, a physicist with the Federal American Scientists. "Why don't they have containment vessels? Part of the reason is that they are old, and they are from a period when the United States didn't care about it much."

Congress and the Reagan administration this week launched safety investigations of the Hanford reactor, despite DOE assurances that the chance of a similar accident there is negligible.

According to DOE documents, however, the reactor's graphite core has become distorted by what is known as the "Wigner effect," named for the physicist who first recognized the dangerously unstable condition, a radiation-induced rearrangement of crystals that makes the graphite "bulge."

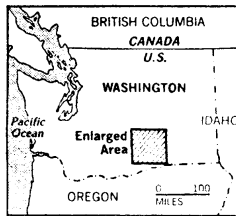
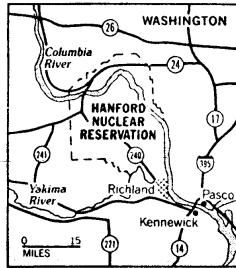
Some scientists speculate that the Soviets were trying to rid their reactor of such distortions by heating it, prompting a runaway reaction that ignited the graphite.

Larry Caldwell, a former Hanford technician, said distortions in the Hanford reactor have caused graphite to swell against the metal tubes that encase the reactor's fuel rods. "That bends the tube, and when the tubes bend, sometimes the fuel element gets stuck," he said. "It has to be rammed out physically."

"All the problems that plagued the Russians could potentially affect this one," he said. "They've blown fuel elements out of the reactor tubes. Two years ago, they . . . spilled 400,000 gallons of radioactive water."

In a 1983 environmental impact statement on the restart of DOE's "L" reactor at Savannah River last year, DOE said that because of the graphite distortion, "the life of N Reactor [at Hanford] . . . is not expected to extend beyond the mid-1990s."

In its fiscal 1987 budget request, however, DOE asked for \$12 million to study distortion, saying that a solution is "essential" if the N Reactor is to serve beyond the mid-1990s. The money also would finance preparations for replacing several hundred reactor tubes that



BY JOSEPH ROBINSON FOR THE WASHINGTON POST

will soon be "unacceptable for operation from embrittlement and/or distortion," the request said.

In an interview yesterday, Energy Secretary John S. Herrington acknowledged the graphite problem at Hanford, but said the reactor has safety mechanisms not thought to be present on the Soviet reactor, such as an independent cooling system for the graphite.

Hanford points up a dilemma for the administration, which is attempting to balance budgetary constraints against a demand for weapons-grade nuclear fuels expected to increase significantly in the 1990s. In a classified report in 1982, a DOE panel said a new production reactor was needed to build warheads for the MX, Trident and cruise missiles and to replenish tritium in older warheads.

Faced with soaring deficits, however, the administration has not requested the \$4 billion to \$8 billion that would be needed for a new reactor. Weapons-grade fuel continues to be produced at Hanford and the Savannah River complex's four reactors, one of which is shut down to repair a crack in the reactor vessel that was leaking 100 pounds of tritium a day.

A fifth reactor was mothballed at Savannah River in 1964 and has been partly "cannibalized" to repair the other four.

In its environmental impact statement for Savannah River's L reactor, DOE said the only alternatives to restarting the reactor would be to run Hanford or the remaining Savannah River reactors at levels "beyond the range of experience" and that possibly are unsafe.

"We are utilizing all our reactors to the maximum," said Charles Payne, who is charge of reactor operations at Savannah River.

Environmental groups have questioned the safety of the Savannah River reactors, which rely on a pressurized ventilation system and filters that Payne said "remove 99-plus percent of fission products and are designed to handle the maximum credible accident, about a 3 percent core melt."

In the L reactor analysis, however, the department assumed that the ventilation system and filters would continue to work even in the event of a 100 percent core melt.

The chances of a complete meltdown are less than one in 100 million, the document said. If one occurred, the radiation dose at the boundary of the 300-square-mile Savannah River complex, with all filtering devices intact, would be 1,000 rem—nearly twice the lethal amount.

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