

**Support DOE's RERTR Program
Including the
Transshipment of
Foreign Research and Test Reactor Spent Fuel
Through the Bay Area**

by

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presented

to the

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My name is Thomas B. Cochran. I am a nuclear physicist and the director of the Nuclear Program at the Natural Resources Defense Council, Inc. (NRDC), where I have worked since 1973. I have worked on nuclear energy and nuclear nonproliferation issues for over 30 years, and have worked extensively on nuclear weapons related issues since 1979. I received a Health Physics Fellowship enabling me to obtain a masters degree in physics from Vanderbilt University with my thesis in the field of radiation chemistry. Under a NASA fellowship and while serving as Vanderbilt's Radiation Safety Officer, I received a doctorate in nuclear physics from Vanderbilt University. I received the American Physical Society's Szilard Award and the Federation of American Scientists' Public Service Award, both in 1987.

NRDC is a national environmental organization with a membership of more than 400,000 and offices in New York, San Francisco, Los Angeles, and Washington, D.C. For some 20 years NRDC has been in the forefront of efforts to compel DOE to comply with the same environmental laws that apply to commercial industries. NRDC has brought numerous lawsuits against DOE over its failure to comply with Federal environmental laws and its own regulations related to its civil and military nuclear activities. Currently, NRDC's Nuclear Program is involved in two lawsuits against DOE over its nuclear weapons program activities. Some of NRDC's co-plaintiffs in these suits are on the other side of the spent fuel shipment issue I am here to discuss today.

While we usually find ourselves opposing DOE programs, we believe it is important to support DOE when it does the right thing. In this case--returning foreign research reactor fuel to the United States as part of an effort to eliminate the commercial use of nuclear weapons material--is the right thing. This program deserves your support.

The Proposed Shipments Though the Bay Area Are Not Dangerous

Over a 13 year period, DOE plans to make no more than five shipments of foreign spent nuclear fuel through the Concord Naval Weapons Station. These five shipments will contain no more than 15 casks of spent fuel from nine reactors in seven Asian countries. You will hear testimony today alleging that the planned shipping route through the Bay area and by rail to Idaho is too dangerous. I disagree. These limited shipments do not represent a significant risk to the health and safety of residents of the Bay area or others along the route to Idaho.

Northern California is prone to earthquakes, the Bay is a congested shipping area, and there have been numerous rail accidents on the route from the Bay area to Idaho. Primarily for these reasons, citizens have raised legitimate concerns about the safety of the proposed spent fuel shipments. But I would offer several additional observations. The spent fuel is being transported in a relatively benign state; that is, it cannot explode as did the Chernobyl reactor, and the heat generation rate from radioactive decay of fission products in the spent fuel is very small, unlike that which caused the Three Mile Island reactor meltdown. The shipping containers are very rugged and are unlikely to be breached; and even if they were breached, the quantity of contained radioactivity is relatively small and therefore the consequences would be small. Finally, it is possible to take added precautions to insure that these five shipments are carried out safely.

To put these shipments in perspective, as can be seen from Table 1, the upper limit on the amount of radioactivity in all five shipments over 13 years is about one million curies, which is about one-half of one percent of the activity in the spent fuel discharged annually from the four commercial power reactors in California--from Diablo Canyon Units 1 and 2 and San Onofre Units 2 and 3.¹ Moreover, the relatively small amount of spent fuel is subdivided into about 10 to 15 shipping casks. These 20 ton lead-lined steel casks are about 8-inches thick.

In assessing the consequences of an accident the noble gaseous and volatile fission products are of most concern, since these are more likely to be released in the event a cask is breached. Unless there is a fire the isotope of greatest concern is krypton-85, a noble gas with a radioactive half-life of 10.7 years. The other gaseous radioactive isotopes would have decayed to the point that they are of secondary importance compared to krypton-85. As seen from Table 2, the total amount of Kr-85 in the first shipment is less than 755 curies (Ci) and it will be divided among two or three casks. By comparison, Environmental Protection Agency (EPA) regulations (40 C.F.R. §190.10) permit from the uranium fuel cycle the routine release of 50,000 Ci of Kr-85 per gigawatt-year of electrical energy produced. In other words, the amount of Kr-85 in all the spent fuel casks during the first shipment of fuel through the Bay area is 40 to 50 times less than what EPA regulations permit to be released routinely from the fuel cycle operations associated with one California power reactor. After the Three Mile Island accident some 50,000 Ci of Kr-85 were deliberately vented to the atmosphere from the secondary containment of the damaged TMI Unit 2 reactor after the Nuclear Regulatory Commission (NRC) and the EPA concluded that the release would not represent an undue added risk to the nearby population.

In the event that a cask was breached in an accident associated with a serious and prolonged fire, then other volatile isotopes such as Cs-137 become the dominant consideration. The likelihood of such an accident is very, very small, bearing in mind that in more than 1000 shipments to date none of the casks have even been breached. It is unlikely that these casks will be involved in an accident, and very unlikely that the casks would be breached if an accident were to occur, and even less likely that a breach would be associated with a prolonged fire.

None of this is to say we should permit any accidental releases from spent fuel shipments. My point is that even if there is an accident in the Bay area or during rail shipment, the probability that a cask will be breached is remote; and even if this remote chance were to occur, the amount of radioactivity that is likely to be released is very small as are the health risks to residents in the Bay area or along the rail line.

The People in the Bay Area Should Support The RERTR Program and These Shipments

Most of us want to achieve deep reductions in the nuclear weapon arsenals of the world, with the goal of elimination of nuclear weapons altogether. The United States is a signatory to

¹ This is due largely to the fact that the total thermal power level of all nine foreign reactors combined is 13.35 MWt, which is 0.4 percent of 3382 MWt, the average thermal power of the four California power reactors.

the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). Article VI of the NPT places a heavy burden on the United States:

Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures related to the cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.

According to the World Court,

The legal import of that obligation goes beyond that of a mere obligation to conduct; the obligation involved here is an obligation to achieve a precise result – nuclear disarmament in all its aspects by adopting a particular course of conduct, namely the pursuit of negotiations on the matter in good faith.

In my judgment we will never achieve the elimination of nuclear weapons, or even deep reductions in the size of the arsenals, unless the community of nations are willing to forgo the commercial use of nuclear weapon-usable materials, primarily highly enriched uranium (HEU) and plutonium. Under the Atoms for Peace Program the United States promoted the development of nuclear power around the world. As part of this promotional effort the United States assisted in the construction, and fueling of numerous research and test reactors. Many of these were, and some still are, fueled with weapon-usable HEU. This was a terrible mistake which we are now trying to rectify. The DOE's Reduced Enrichment for Research and Test Reactors (RERTR) Program has as its objective the elimination of HEU from test reactors abroad. We should all support this effort and do our part to insure its success. The RERTR Program is not a perfect program; but it has the strong support of the entire Administration, and it is the only program for eliminating the commercial use of HEU.

The RERTR Program represents a deal between the United States and the reactor operators in 41 other participating countries. The United States will take back the spent fuel from research and test reactors in these countries, and assist the operators in converting the reactors to a non-weapon-usable low-enriched fuel alternative, provided the reactor operators explore all alternatives to reprocessing their spent fuel. In order not to penalize reactor operators that have made the switch the United States has agreed to take back their spent fuel as well. In all the United States will take back less than 20 metric tons (t) of foreign research and test reactor fuel, which is roughly equivalent to the amount of spent fuel discharged *annually* from only one of the 100 commercial power reactors in the United States.

You are being asked to accept transit through the Bay area about 2 percent of the total amount of spent fuel that will be returned under the RERTR Program. The rest of the country is doing its part to insure the success of this program. The California legislature has voted overwhelmingly against the Bay area shipments. I urge you not to follow the State legislature's parochial lead.

If the Bay area local governments or the state of California thwart these shipments it will have damaging repercussions to the entire RERTR effort. Proponents of the commercial use of plutonium in Europe and Asia will highlight RERTR as an example of the failure of U.S. efforts to eliminate the commercial use of plutonium and HEU.

The first of the planned RERTR shipments from Asia includes about 25 kg of HEU (initially 70% U-235)--more than one weapon's worth--from South Korea. There are many in the Korean nuclear power industry who would love to see this shipment prevented. Following the Japanese lead, they advocate reprocessing Korean power reactor spent fuel to recover and recycle plutonium. If the United States is unable to take back 60 kilograms of research reactor fuel, they could then point to this as an example of the utter failure of the U.S. policy to discourage the use of HEU and plutonium. If and when North and South Korea are unified they would be in a stronger position to argue against dismantling the North Korean plutonium program in favor of redefining it as a "civil" program. The last thing in the world we need is for South Korea to start stockpiling plutonium and fresh HEU fuel, ostensibly for peaceful purposes.

It is perhaps also worth noting, to the extent that the RERTR contributes to the elimination of the commercial use of nuclear-weapon usable materials, and to the extent that this contributes to the elimination of nuclear weapons, we will hasten the day when we no longer need to store nuclear weapons in California or design new ones at the Lawrence Livermore National Laboratory.

The Responsible Alternative

For the reasons stated above, I urge you to support these shipments. I am confident that you and other California public officials can coordinate with the U.S. Coast Guard, the U.S. Navy, the Department of Energy and the Department of Transportation to insure that the transport of five shipments of spent nuclear fuel--some 435 kilograms in all--through the Bay area to Idaho is conducted with the utmost attention to safety. The responsible course, in terms of the national security interest of the United States and the interest of all of us who want to eliminate nuclear weapons, is to pull together to make this program work; to guarantee that these shipments are so well executed that there will be no basis for concern over public safety.