HJR

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STATE OF ALASKA
THE LEGISLATURE

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Mary Van Nimwegen

H HESS 5-12-87 8:30 a.m.

STEVE COWPER
GOVERNOR

STATE OF ALASKA
OFFICE OF THE GOVERNOR
JUNEAU

April 2, 1987

Honorable George P. Shultz
Secretary of State
U.S . Department of State
2201 C. Street, N.W.
Washington, D.C. 20520

Dear Secretary Shultz:

As you know, the United States and Japan have recently completed negotiation of a nuclear cooperation agreement which may result in the designation of an Alaska airport as an intermediate stopover point for the shipment of plutonium from Europe to Japan. This agreement could have tremendous consequences for the health and safety of Alaskans, as well as for the state's environment. Based on the information which I have received from my staff, the press, and other sources, I have concluded that there are a number of critical unanswered questions regarding this agreement. Therefore, I am writing to request that the Departments of State and Energy prepare an Environmental Impact Statement (EIS) which would address these questions before you conclude the executive decision making process and submit the agreement to the Congress for review. My concerns and the legal basis for this request are outlined below.

The National Environmental Policy Act (NEPA) requires that the Federal government prepare a detailed statement on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment. This requirement serves two purposes: protection of the environment, and protection of the integrity of the decision making process to ensure that there is an opportunity adequately to review the environmental consequences of a Federal act. Both of these purposes are best served by the preparation of an EIS to accompany the submission of the agreement to Congress.

First, there is no question that a decision to ship plutonium through an Alaskan airport is a major Federal action which could affect the human environment. In this regard, the Nuclear Regulatory Commission (NRC) prepared a site specific analysis of shipping radioactive fuels through New York City. This document analyzed a range of scenarios, including an accident which resulted in thousands of latent cancer fatalities and billions of dollars in economic loss.

In addition, the United States District Court for Western Washington held in September, 1986 that the shipment of such fuels from a foreign country to the United States is covered by NEPA. In that case, the court directed the Department of Energy to prepare an EIS. Finally, regulations promulgated by the Council of Environmental Quality and by the Departments of State and Energy recognize that international agreements with significant domestic environmental consequences are "proposals for legislation" under NEPA.

Second, a systematic presentation of the alternatives to the President and Congress, as contemplated by NEPA, is especially important in this case, given the number of possible scenarios and the different risks involved in each. For example, the agreement does not specify what safety standards the casks which will be used for the shipments must meet. Both the International Atomic Energy Agency (JAEA) and the Nuclear Regulatory Commission have standards for testing the ability of the shipment casks to withstand a crash. However, the international standards are less stringent than those used by the NRC. An EIS is necessary to assess the environmental and health risks which would result from using either of these or some other set of standards.

Similarly, it is unclear whether it will be possible to build a cask which can survive an airplane crash and which is large enough to ship the quantities of fuel contemplated in the agreement. An EIS is needed to evaluate the alternatives which will be used in the event that a safe cask cannot be developed.

In 1980, the Department of Energy prepared an analysis of the storage and shipment of foreign power reactor fuel. With regard to shipment, the analysis listed the following factors which should be covered by an EIS: demography along the transportation routes, emergency response capabilities, weather patterns along the routes, and location of drinking water and food sources for the surrounding population. No information regarding these factors has been presented so far. Without this type of analysis, the President and Congress will be unable to make a reasoned decision regarding the agreement.

In my opinion, it is not sufficient to prepare an EIS at the time when a stopover site is actually designated. (From our discussions with Federal officials, it is by no means clear that an EIS is contemplated even at this point.) For one thing, relevant NEPA case law indicates that a statement should be prepared at the earliest reasonable junction in a Federal decision making process which involves several sequential but related steps. For another, once the President and the Congress have approved the thirty year blanket acceptance embodied in the cooperative agreement, it is difficult to perceive how a truly objective analysis of

possible airport sites, safety measures, and other relevant considerations could occur. In other words, execution of the agreement will generate a momentum that will make stringent protective measures or outright negative decision making far more difficult and less acceptable in the international relations context.

To conclude, I believe that this agreement represents a major Federal action which could significantly affect the human environment in Alaska. Final action by the President and the submission of the agreement to Congress prior to preparing an EIS could foreclose opportunities for decision makers, as well as the public, to consider the full range of alternatives for accommodating Japan's needs for recycled plutonium. For these reasons, I respectfully request that the Departments of State and Energy prepare an EIS prior to concluding their review of the Agreement and its submission to Congress.

Sincerely,

S/S Steve Cowper

Steve Cowper
Governor

cc: Senator Ted Stevens
Senator Frank Murkowski
Senator John Glenn
Congressman Don Young

(b) The legislature shall designate by law the land in the state on which a nuclear fuel production, nuclear utilization, nuclear reprocessing, or nuclear waste disposal facility may be located. In designating the land in the state on which a nuclear fuel production, nuclear utilization, nuclear reprocessing, or nuclear waste disposal facility may be located, the legislature shall act to protect the public health and safety.

(c) The Department of Environmental Conservation shall adopt regulations governing the issuance of permits required by (a) of this section. However, a permit may not be issued until

(1) *[Repealed, § 1 ch 93 SLA 1981.]*

(2) the municipality with jurisdiction over the proposed facility site has approved the permit; and

(3) *[Repealed, § 1 ch 93 SLA 1981.]*

(4) the governor has approved the permit. (§ 8 ch 172 SLA 1978; am § 1 ch 93 SLA 1981)

Cross references. — For radiation protection, see AS 18.60.475.

Sec. 18.45.027. Transportation of nuclear waste material. (a) The transportation of high level nuclear waste material, except for purposes of disposal outside the state. is prohibited.

(b) For purposes of this section, "high level nuclear waste material"

(1) means

(A) used nuclear reactor fuel;

(B) waste produced during the reprocessing of used nuclear reactor fuel; and

(C) elements having an atomic number greater than 92 and containing 10 or more nanocuries per gram;

(2) does not include radioactive materials used in medicine, education, or scientific research that are stored or disposed of in conformity with procedures established by the Department of Environmental Conservation by regulation adopted under AS 46.03.250(3). (§ 2 ch 93 SLA 1981)

Sec. 18.45.030. Conduct of studies concerning changes in laws and regulations with a view to atomic industrial development. The following departments and agencies of the state are directed to initiate and to pursue continuing studies as to the need for changes in the laws and regulations administered by it that would arise from the presence within the state of special nuclear, by-product, and radioactive materials, from the operation of production or utilization facilities, and from the generation of radiation, and, on the basis of these studies, to make the recommendations for the enactment of

Anch. Daily News
5/16/87
Front Page

Accord queried

Nuke-fuel deal raises concern

By DAVID HULEN
Daily News reporter

The U.S. Defense Department is reportedly balking at a proposed nuclear cooperation agreement between the United States and Japan that could eventually mean regular jumbo jet flights hauling highly toxic, weapons-grade plutonium in and out of Anchorage.

A nuclear industry newsletter, Nuclear Fuel, reported last week that Defense Secretary Caspar Weinberger has signed papers raising "a number of concerns" about the agreement and is recommending that President Ronald Reagan not approve it.

The draft agreement, negotiated earlier this year, would give the Japanese blanket 30-year approval to ship plutonium from French and British reprocessing plants to Japan. Once there, the material would be used for fuel in Japan's burgeoning nuclear power program.

The 178-page agreement is circulating among several federal departments and agencies for review and has not been made public. But the proposal has been stirring controversy for several weeks in Alaska, Washington and Canada, where questions are being raised about whether large quantities of plutonium can be moved safely around the world.

No specific routes are outlined in the agreement, officials familiar with it have said. But officials in the State

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PLUTONIUM: Defense agency questions deal

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Department, which negotiated the pact, have said Japan is considering moving the plutonium in special Boeing 747 cargo jets using polar routes over Canada and Alaska with a likely refueling stop in Anchorage.

The shipments could start in the early 1990s, and because of the large amount of plutonium involved, probably would continue regularly for several years, according to some people familiar with the proposal.

Plutonium is a by-product of uranium fuel used in nuclear reactors. It raises more concerns than other radioactive substances because it can be used to make weapons and because it is one of the deadliest and longest-lived materials on Earth. Microscopic amounts have been found to cause cancer when ingested, and as little as 20 pounds is necessary to make a bomb.

If approved, the Japanese shipments would be the first regular, international plutonium transfers ever allowed.

Because of security and safety concerns, there has been only one large-scale international plutonium delivery from Europe to Japan, aboard a ship in 1984. The vessel carried 557 pounds of plutonium and a crew of more than 40 armed guards, and was tracked by surveillance satellites and escorted by warships as it made its way across the Atlantic and Pacific, according to news reports at the time. After the much-publicized, 41-day voyage, both the U.S. and Japan agreed that future shipments would be by air.

The U.S. has control over the plutonium because it originated from American-made uranium fuel.

It's unclear whether the Defense Department's objections involve transportation aspects of the agreement. A Pentagon spokesman said such comments on proposed international agreements are considered classified. The newsletter did not report specific comments, only that the department was concerned about, among other things, allowing Japan long-term access to the plutonium.

Questions about the plan have been raised by the Nuclear Control Institute, a Washington-based group concerned with nuclear weapons proliferation. The group argued in a lengthy report that the agreement is premature because no country has developed containers capable of safely shipping plutonium, and that flights would be vulnerable to terrorist attacks, crashes and other problems.

After the group's report came out, Alaska Gov. Steve Cowper sent a letter to Secretary of State George Schultz, saying the flights have "tremendous consequences for the health and safety of Alaskans, as well as for the state's environment ... there are a number of critical unanswered questions."

Cowper wants the federal government to do an Environmental Impact Statement outlining hazards and alternatives before the agreement is submitted to Congress by the president. Such a study could take a year to complete.

Schultz sent Cowper a response this week, saying federal agencies were trying to decide whether further environmental study was necessary. He stressed that shipments through Alaska were not a certainty under the agreement.

"It requires only that the aircraft returning plutonium from Europe to Japan must take a polar route or another route that avoids civil disorder and natural disasters," Schultz's letter says.

"It is true, as reported, that Japan is considering a route that would include a refueling stop in Alaska. At present, however, no transportation plan has been prepared, and I have been informed that it could be some time before specific proposals are made since a transport cask is still under development and must pass a a series of rigorous tests to gain approval."

Schultz says Japan would have to meet several conditions before being allowed to ship the plutonium, including: "transfer exclusively by air (to minimize time spent in international transport)," use of a cask certified to withstand a crash, armed guards, advanced communications and contingency plans.

"I fully share your concerns for the health and safety of Alaskans and for Alaska's natural environment and want to assure you that all appropriate steps will be taken to ensure that the implementation of the new U.S.-Japan agreement will cause no injury to either one," the letter says.

Critics of the plan say they doubt if a crash-proof cask will ever be developed.

Cowper's office, meanwhile, maintains that details of how the plutonium will be shipped need to be worked out before the agreement is ratified. But given the current timetable, that seems unlikely. C comments are received from various agencies, Reagan will decide, probably later this spring, whether to approve the agreement. If he does, the accord will go to the U.S. Senate, which will then have 90 days to reject it. The agreement becomes public when approved by the president.

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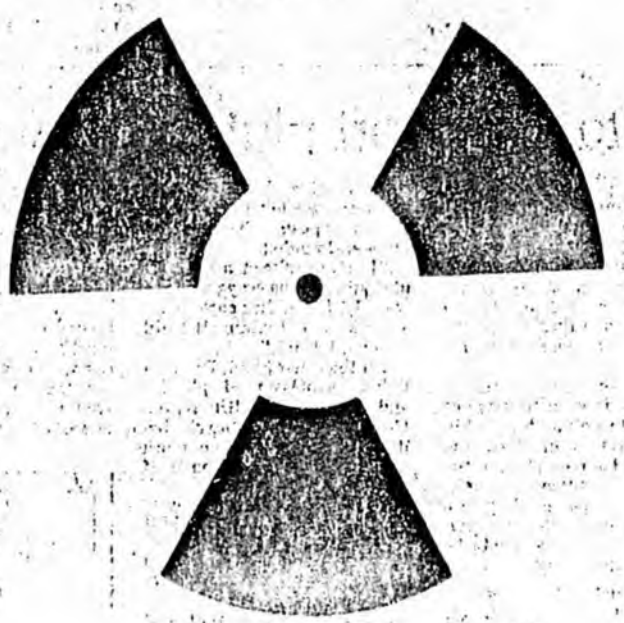

DEADLY CARGO

How safe would it be to fly plutonium over Anchorage skies?

How safe would it be to fly plutonium over Anchorage skies?

By DEBBIE McKINNEY
Daily News reporter

Alaskans go about their day, oblivious to the rumble of a Boeing 747 approaching from the north, 32,000 feet over their heads. Inside the jet, quarantined deep within 5,000-pound steel cylinders, is a substance that looks as innocuous as sand.

But this flight is guarded by armed men and monitored by satellite. So formidable is this cargo that public knowledge of it could threaten national security.

Inside the cylinders is one of the most powerful and deadly elements on Earth: plutonium oxide. A particle too small to see could cause terminal cancer if inhaled. And the plane roaring overhead contains 600 pounds of such particles.

The jet cruises over Big Lake, dropping to 2,000 feet on approach to Anchorage International Airport. Then the unthinkable happens. A small plane obscured by clouds slams into the jet's side, ripping through the fuselage.

Startled by the explosion, people below squint toward the sky as fiery debris plunges toward the ground. Then it starts raining sand. Those who watch haven't a clue what it is or how it will change their lives.

□

This scenario is not beyond the realm of possibility. According to the Federal Aviation Administration, there have been 158 midair collisions in the United States in the past 6½ years. Eight of them occurred in Alaska.

What such a crash would mean is just one of many questions yet to be answered by those considering routing plutonium through the state.

An agreement being negotiated between the United States and Japan would give a 30-year blanket approval for jumbo jets carrying U.S.-supplied plutonium to fly from reprocessing plants in Europe to Japan. Although a route has yet to be chosen, one option being considered includes refueling stops in Alaska, most likely Anchorage.

The transporting of plutonium by air was stopped in 1975 after about a half-dozen such flights passed through Kennedy International Airport in New York. Dr. Marvin Resnikoff, at the time a physics professor at State University of New York in Buffalo and among those who urged Congress to stop the shipments, calculated that 2.8 pounds of plutonium released in a crash could cause as many as 500,000 people to develop lung cancer. If winds were high and the plutonium widely scattered, he testified, 100,000 people eventually would die.

The U.S. State Department is reluctant to discuss details of the proposed agreement. One spokesman says information is vague because details have not been worked out. But the plan, only one component of a major nuclear cooperation agreement, is expected to be signed by President Reagan within weeks. If subsequently approved by Congress, plutonium shipments could resume as soon as 1990.

Gov. Steve Cowper, state Sen. Rick Uehling and other Alaskans are finding this prospect unsettling for one main reason: Containers large enough to make these shipments economical, yet strong enough to survive a midair collision, do not exist. Although the government insists no shipments will be made until such a cask is designed, state officials want assurance before the agreement is signed.

The Nuclear Control Institute, a Washington, D.C.-based non-proliferation group, was the first to raise questions regarding the safety of the proposed flights. Its board of directors includes a former chief of naval development, a Pulitzer Prize-winning writer on modern warfare, and a former member of the federal Nuclear Regulatory Commission. The group doubts that plutonium can be transported safely by air in quantities suggested by the agreement.

If the plan is approved, the institute estimates 45 metric tons of plutonium would be shipped to Japan by the year 2000, as many as two flights each month. The casks being developed weigh 5,000 pounds and hold about 15 pounds of plutonium each. According to NRC data, a 747 cargo plane could carry up to 40 such casks for a total of 600 pounds of plutonium per flight.

Among the institute's concerns is the spread of nuclear material. If Japan were to rebuild its military, it would have the plutonium to devel-

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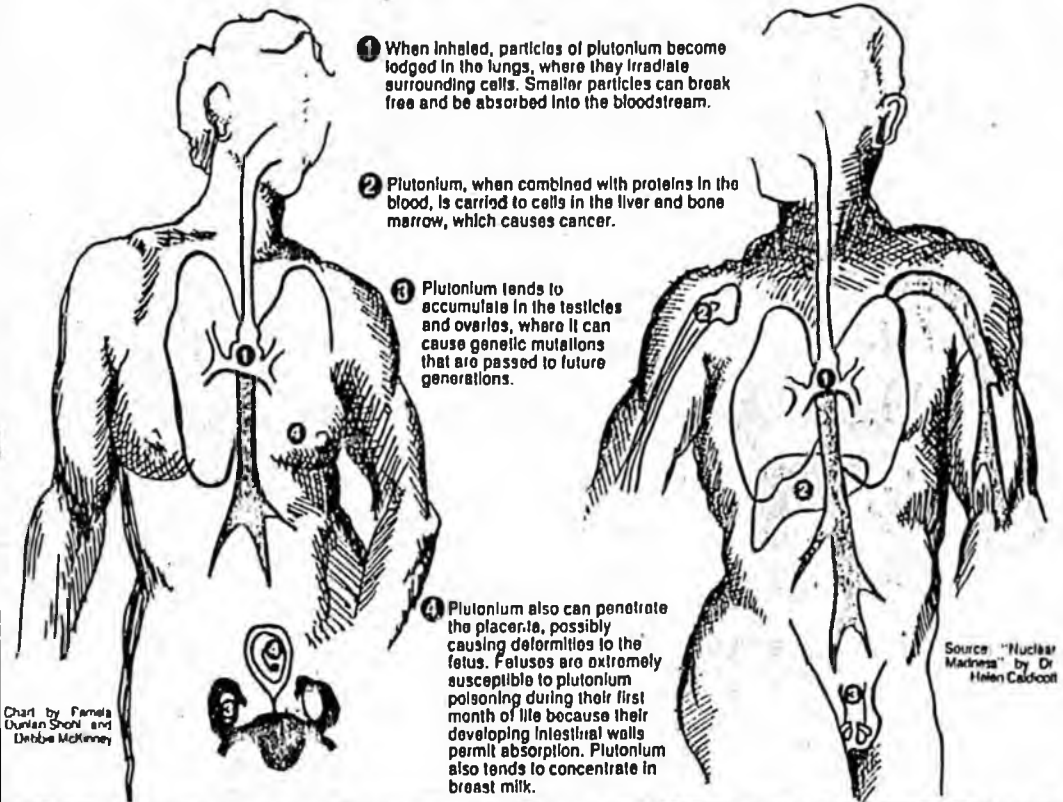
HOW PLUTONIUM AFFECTS YOUR BODY



Element presents two-edged sword

By DEBBIE McKINNEY
Daily News reporter

Pluto, mythical god of the underworld and ruler of the dead, was worshipped by ancient Greeks and Romans. But he was also feared. Subjects turned their faces away while sacrificing black sheep upon his altar.

Like the god from which its name is derived, the element plutonium is a dichotomy, with the capacity to promote life — and destroy it. At least 1,500 Americans owe longer lives to plutonium-powered pacemakers in their chests. These heart-stimulating devices contain less than one-hundredth of an ounce of plutonium. Even so, wearers are asked to notify the Nuclear Regulatory Commission when they leave the country.

Dr. Helen Caldicott, in her book "Nuclear Madness," describes how plutonium affects the body.

Plutonium molecules are large and therefore not easily absorbed directly into the body through the skin or gastrointestinal tract. But when inhaled, particles become lodged in the lungs, where they bathe surrounding tissues with alpha radiation. Smaller particles may break loose and be absorbed through the lungs into the bloodstream. Because plutonium has properties similar to iron, it combines with proteins in the blood and is carried to cells in the liver and bone marrow, where it irradiates surrounding cells.

The human body is made up of more than 10 trillion cells, which take in nutrients, excrete wastes, produces proteins and reproduce themselves. Radiation inflicts damage by ionizing, or altering, the electrical charge of the atoms and molecules that comprise these cells.

In controlled doses, radiation is used to kill cancerous cells, explains Dr. Darwin Zellmer, chief of medical physics at Providence Hospital. Radiation at large, however, can cause one of several things to happen. The radiation may pass through a cell without causing damage. It may cause

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DEADLY CARGO: Plans to transport plutonium raise questions

Continued from Page J-1

op nuclear weapons, the institute says. The group also fears that terrorists could sabotage or steal the shipments en route. A crude bomb can be fashioned from as little as 13 pounds of plutonium oxide.

"Anyone who thinks terrorists aren't cunning and ruthless enough to pull off a nuclear attack has forgotten the Munich Olympics, the showdown at Entebbe and the shooting of the pope," Rep. Richard A. Gephardt (D-Mo.) told members of the Nuclear Control Institute-sponsored conference on international terrorism.

"Transportation is the most vulnerable activity in the nuclear fuel cycle," a spokesman for the State Department admits. But the government will take "extraordinary measures" to ensure the safety of these shipments, he says.

"I think the likelihood of terrorist action is very low ... and the likelihood that it would succeed is zero."

Although the form in which the plutonium would be shipped — plutonium oxide — could reach critical mass and create an atomic explosion if huge quantities were compressed, the chance of that happening during a midair collision is extremely remote. Alan Kuperman, a researcher for the Institute, says a crash releasing plutonium into the environment is much more likely.

Plutonium in its oxide form doesn't burn. But it has the consistency of fine sand, which can be dispersed by high winds. Because the oxide is relatively heavy, the State Department says no more than 25 acres — the equivalent of six city blocks — would be contaminated in the event of a ground crash. However, if the oxide were released at high altitude in a midair collision, contamination could be much more widespread.

Since plutonium is highly radioactive, an accident could be particularly nasty. Plutonium has a half-life of 24,400 years. If a spill were to occur today, its radioactivity would be reduced only by half sometime by the late 24th century A.D.

Dr. Rodman Wilson, the Municipality of Anchorage's top health official, is greatly concerned about the proposed shipments. "I strongly disapprove of that kind of transport through Alaska," he says. "So far as I know, plutonium is the most dangerous toxic substance ever discovered or invented by man. There is no minimum safe level. Every atom is destructive. If there was a spill at Elmendorf or Anchorage International, it might close the airport forever."

Plutonium's primary use is in making nuclear bombs. It was first synthesized in America in 1940. The fission of 6 kilograms leveled Nagasaki, Japan, killing 36,000 people and injuring 40,000 others at the end of World War II.

A less explosive form of plutonium is used to produce power. Plutonium fuels only a few reactors in Germany, France and Japan. Most of the world's 374 commercial nuclear plants are powered by uranium because it's cheaper, much less toxic and cannot be used to make weapons.

Plutonium can be one of most carcinogenic substances on Earth when inhaled. A dose the size of a speck of dust can start a tumor capable of killing in a matter of months. Some scientists say an invisible particle weighing as little as one-millionth of a gram is enough to cause cancer.

Scientist Harry Daghlian is said to be plutonium's first American victim. On Aug. 21, 1945, two weeks after Nagasaki, a plutonium experiment at Los Alamos National Laboratory in New Mexico went awry, dousing Daghlian with a fierce dose of radiation. A month later he was dead.

Dr. Glenn Shaw is a professor of physics at the University of Alaska-Fairbanks who monitored radiation levels in Alaska after the Chernobyl disaster. People's fears of plutonium exposure, he believes, are well-founded.

"I've never seen a hunk of plutonium," he says. "And, frankly, I wouldn't care to see a hunk of plutonium. If I did see one, I'd run."

On the other hand, Bernard Cohen, professor of physics and radiation health at the University of Pittsburgh, believes plutonium is no more dangerous than caffeine — if swallowed.

If swallowed, only one part per 10,000 is likely to get through the gastrointestinal tract into the bloodstream, Cohen says. While some scientists would argue that one part is enough to set a mutation cycle in motion, Cohen is willing to eat the stuff to prove his point. He's had a long-standing offer to eat plutonium for a television audience and has told consumer activist Ralph Nader that he would eat as much plutonium as Nader would drink caffeine. Cohen has not, however, offered to breathe it.

"Anybody who wants to get people upset about plutonium has an ax to grind," Cohen says. "The important thing about plutonium is that it could provide all the electrical power this world would need for the next billion years. It would be the answer to our energy problems forever."

But critics say the risks of nuclear power outweigh the benefits. The disasters at Chernobyl and Three Mile Island, they say, have proven the impossible can happen.

In the 1960s, two U.S. military planes carrying nuclear warheads crashed. In both cases, the detonators — but not the bombs — blew up, spewing plutonium over large, mostly unpopulated areas.

In 1966, when a B-52 bomber and a tanker collided over Palomares, Spain, more than 1,400 tons of soil and vegetation were contaminated. Clean-up cost $500 million.

In the winter of 1968, another B-52 bomber crashed near Thule, Greenland. It took 1,400 Americans and 100

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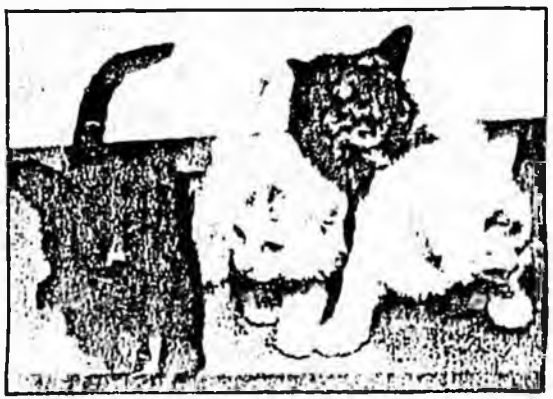
Adopt a Pet



These little kittens are available for adoption! They are all 10 weeks old, 2 are female (tortoise color, and gray/white) and 2 are male (black/brown and white). Adoption fees are $70 each, with $50 refunded after shots & neutering.

To adopt a pet - Come to the Animal Control Center at 3600 Tudor Road. 12:00pm-6:30pm, M-F; 12:00pm-4:00pm, S-S. Adoption fee is $15 plus shots and neutering costs. A refundable deposit is held until animals have been licensed and spayed.

EFFECTS: A little plutonium goes a long way

Continued from Page J-1

damage, but the cell may be able to recover before it divides. The radition may kill the cell. Or, the cell may be damaged in such a way that the damage is repeated when it divides. Such mutations, Zellmer says, result in malignancy.

The affects of radiation are cumulative. The risk of developing cancer may depend on how many other carcinogens a person is exposed to. The greater the exposure, the more difficult it is for cellular repair systems to keep damage under control.

"It's like ... playing darts," Zellmer says. "The more you're exposed — the more darts you throw — the more likely you're going to hit a bull's-eye."

DEADLY CARGO

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Danes four months in the arctic darkness to retrieve radioactive debris and remove 1.4 million gallons of contaminated snow, ice and water. Clean-up that time cost $300 million.

"The potential exists that aircraft would crash within our jurisdiction," says Jack Cervantes, director of emergency management for the municipality of Anchorage. "Depending on what type of containers they come up with, we could have to deal with a hazardous waste materials spill of catastrophic proportions."

In 1984, a DC-10 cargo plane crashed and burned after running into a commuter plane at Anchorage International Airport. In 1975, the fuselage of a Japan Air Lines 747 was cracked after the plane was blown off an icy runway at Anchorage International by a gust of wind.

Low-level radioactive materials, such as X-ray supplies and other pharmaceuticals, are flown through Anchorage all the time, Cervantes says. In fact, many planes carry low-level uranium as ballast in their wings and tail sections.

A city response team within the Anchorage Fire Department is trained to deal with low-level contamination. But the strongest radioactive material the team has worked with, Cervantes says, is cobalt 60, used in condensers to measure soil compaction. "(Plutonium) is something that's 100 times more powerful than what we're used to dealing with."

The municipality and the local military bases have a mutual-aid agreement, meaning they can call upon each other for help in emergencies. A spokesman for Elmendorf Air Force Base says military teams are trained to respond to high-level radioactive spills. But if the government decides to ship plutonium through Anchorage, Cervantes wants the city's response team to be prepared, as well. He says he'll request special training and equipment if and when the time comes.

Japan has been shipping its spent reactor fuel to Europe for reprocessing for years — but by sea, not by air. Spent fuel rods are literally too hot to handle and cannot be used to make weapons. It's the return trip carrying reprocessed, high-grade plutonium that's causing all the commotion.

Reprocessing is a clean-up procedure in which plutonium and uranium are separated from other highly radioactive fission by-products. Construction of the United State's only commercial reprocessing plant in Barnwell, S.C., was halted in 1984 when the government determined reprocessing for civilian use was uneconomical and unsafe. Spent fuel from domestic reactors is stored on-site instead.

The last time a large amount of plutonium was transported from reprocessing plants in Europe to Japan was in 1984. The shipment of 557 pounds of plutonium left the French port of Cherbourg at night and was escorted through the English Channel by three British warships. Once on the open sea, the Japanese ship was under constant satellite surveillance, with 10 U.S. warships and 40 armed men standing by as it crossed the Atlantic. The U.S. Coast Guard accompanied it through the Panama Canal. Then, three U.S. warships, the Coast Guard and Japanese patrol boats intermittently escorted the vessel until it reached Tokyo Bay.

The voyage took 41 days. After that, the United States and Japan agreed that future shipments would be made by air in order to reduce the amount of time the shipment would be vulnerable.

The Scheuer Amendment of 1975, sponsored by Congressman James H. Scheuer (D-N.Y.), prohibited the NRC from licensing air transport of plutonium until a cask capable of remaining intact in a midair collision could be certified.

Since then, crash-proof casks capable of carrying only small amounts of plutonium have been certified. Now, at least three companies are trying to design casks large enough to make plutonium shipments on the scale needed for overseas transport. One such cask was tested at Sandia National Laboratory last summer using standards set by the NRC. According to Alan Kuperman of the Nuclear Control Institute, the cask was propelled by rocket into a concrete and steel wall at 288 mph — the maximum cruising speed for airplanes flying under 10,000 feet. The cask failed.

Some engineers doubt a large, crash-proof cask can ever be built. Since Japan must import about 90 percent of its energy needs, the institute and others are worried that economic and diplomatic pressures may whittle away at loopholes in the Scheuer Amendment, allowing the casks to slip by NRC certification, and instead be approved by the International Atomic Energy Agency, a United Nations-related agency created in 1956 that sets minimum safety standards for international transport. IAEA standards are dramatically lower; the casks need only survive a 30-mph impact.

A State Department spokesman says the suggestion that casks would have to satisfy only IAEA standards "is absolutely false." If the

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DEADLY CARGO

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casks did not meet NRC standards, he says, "the shipments would not be made."

The issue of shipping plutonium, in some ways, parallels the issue of nuclear waste. The problem of how to dispose of high-level nuclear waste was unsolved at the time a commitment was made to develop a nuclear power industry.

The first large-scale nuclear power plant in the United States was built outside of Pittsburgh in 1957. Since then, the industry has proposed injecting nuclear waste into the sea floor, depositing it on polar ice caps and shooting it into outer space. All methods have serious environmental complications. As nuclear wastes pile up in temporary dump sites across the country, the search continues for a state willing to open the first permanent dump for high-level nuclear waste.

To those who oppose the shipments, it makes more sense to address all the issues before the agreement is signed. But the agreement, a State Department official explains, amounts to two or three pages of a 200-page document covering a wide range of foreign policy topics.

Although the agreement says nothing specific about the proposed flights stopping in Alaska, the tremendous weight of the casks would make refueling necessary. The polar route offers the shortest distance between Europe and Japan. If this route is chosen, Canada, the Soviet Union and Alaska are the only possible pit stops along the way. According to the State Department spokesman, if refueling is necessary, Alaska is the most logical place to do it.

Nobody can or will say whether plutonium shipments eventually will pass through Alaska. At a press conference earlier this month, Sen. Frank Murkowski said government officials are considering alternative routes and ways to avoid refueling stops altogether.

Murkowski answered reporters' questions regarding the shipments while fondling a paperweight-sized cylinder of deactivated, vitrified nuclear waste — a souvenir from the nuclear reprocessing plants he recently toured in Europe. The cylinder represented the waste produced after supplying an average French family with power from 1956 to the year 2000, he noted.

In the meantime, state Sen. Rick Uehling has introduced a resolution opposing shipments being routed through the state. Copies have been sent to President Reagan, Secretary of Defense Caspar Weinberger and the Nuclear Regulatory Commission.

In addition, Gov. Steve Cowper has asked the federal government to prepare an environmental impact statement before proceeding any further in negotiations with Japan. The National Environmental Policy Act requires preparation of an EIS for major federal action significantly affecting the quality of the human environment.

"This agreement could have tremendous consequences for the health and safety of Alaskans, as well as for the state environment," Cowper wrote in his letter to Secretary of State George Shultz. "... I have concluded that there are a number of critical unanswered questions regarding this agreement."

As far as Cowper is concerned, preparing an EIS after the fact just won't do. Once the president and Congress have approved the 30-year agreement, "it is difficult to perceive how a truly objective analysis of possible airport sites, safety measures and other relevant considerations could occur."

Cowper has yet to hear from the State Department regarding his request.

U.S. Negotiates a 30-Year Draft Accord Approving Japan's Plutonium Shipments

By Robert E. Taylor
Staff Reporter of The Wall Street Journal

WASHINGTON—With Japan planning to step up international shipments of bomb-grade plutonium, the Reagan administration is moving toward ending case-by-case approval of such shipments.

The administration has negotiated a draft 30-year agreement with Japan that would give blanket U.S. approval of all Japanese shipments of such plutonium, administration officials said.

The agreement also covers shipments of spent nuclear fuel from Japan's electricity generating plants to Europe for reprocessing into a form of plutonium that can be returned to Japan for use in a new type of nuclear reactor.

Currently, the U.S. must separately approve each Japanese shipment of plutonium made from U.S.-supplied fuel or fuel from U.S.-made plants.

Reagan Pledge

The draft agreement, circulating for comment within the Reagan administration and the Japanese government, would carry out a pledge by President Reagan to give Europe and Japan a more predictable supply of plutonium reprocessed from nuclear reactors' spent fuel, according to the officials, who declined to be identified.

The draft agreement stems from the administration's belief that it cannot stop the spread of civilian uses of plutonium, so it should focus on improving security arrang..nents.

But the Nuclear Control Institute, a Washington group dedicated to reducing nuclear weapons proliferation, argues that the agreement should be delayed because the U.S. and Japan haven't demonstrated that they have found a safe way to ship large amounts of plutonium. The agreement, which still must be submitted to Congress, can be blocked only if both houses reject it. The Institute concedes this is unlikely.

"There are many technical issues to be resolved," the Institute said in a report to be released today. The report calls it "premature" for the administration to "negotiate away U.S. authority over" the shipments.

Air Shipments

The report predicts air shipments of the material as often as twice a month from Europe to Japan, starting in the next few years. The group cites estimates that about 45 metric tons of plutonium will be produced for Japan in European reprocessing plants by the year 2000.

It says flights are expected to cross Canada and refuel in Alaska, which would require approval by the U.S. Transportation Department. Brian Smith, energy counselor in the Canadian Embassy in Washington, said Canada has discussed the prospect with Japan and the U.S., but won't assess the issue until a specific proposal is made.

Japan, France, West Germany and Britain have or are building plants to reprocess spent nuclear reactor fuel to produce plutonium, which then is used in specially designed reactors. Plutonium arouses far more concern than other radioactive materials because only 11 to 18 pounds of it are needed to make a bomb the size of the one dropped on Nagasaki, Japan, during World War II. It also is long-lived and is among the most toxic materials on Earth.

The U.S. forged agreements with European countries in the 1950s and with Japan in 1968 while it had a monopoly on nuclear fuel. The agreements give the U.S. extensive control of any reprocessing and shipment, but the pressure is rising to relax those controls.

Concern Voiced

In an interview, Nuclear Control Institute president Paul Leventhal expressed concern that no plutonium cask large enough for bulk air shipments has passed stringent crash tests mandated by the U.S. Nuclear Regulatory Commission.

The NRC has certified a cask capable of carrying about 4.5 pounds of plutonium, but only for single-cask flights. Several nations are working to develop clusters of crash-proof casks, each of which would carry about 15 pounds of plutonium. Joe Stiegler, manager of nuclear transportation system development at the Sandia National Laboratory, confirmed that one cask developed by Battelle Memorial Institute's Columbus, Ohio, lab had failed the tough NRC crash test.

Mr. Leventhal argued that it may be impossible to design a large cask capable of passing the NRC test. He also doubted that international safeguards can keep plutonium out of the hands of terrorists or prevent high levels of radioactivity at accident sites.

The only large plutonium shipment so far from Europe to Japan was by boat in 1984, escorted by French and U.S. war ships. The cumbersome effort forced Japan to look to the air for the future. In the meantime, reprocessed fuel from Japan has been stored in France.

Large-Scale Shipments

Mr. Leventhal's group hopes to prevent large-scale international shipments of plutonium. But the Reagan administration contends that Europe and Japan already are well on their way toward launching a plutonium reprocessing industry and developing sources of fuel independent of the U.S.

The U.S. "is simply not in a position to dictate or prescribe a policy on reprocessing or plutonium use" by advanced nuclear nations, Richard Kennedy, U.S. nonproliferation ambassador, told the Senate Governmental Affairs Committee recently. "Our only realistic course," he said, "is to work with these select countries to help improve safeguards and controls."

Anchorage Daily News March 13, 1987 Page A-1

Nuclear cooperation agreement may bring plutonium through Anchorage

By DAVID HULEN
Daily News reporter

Jumbo jets carrying highly toxic, bomb-grade plutonium may regularly fly in and out of Anchorage within several years under a nuclear cooperation agreement being negotiated by the United States and Japan, according to a Washington, D.C., group following the talks.

If approved by both governments, the agreement would permit shipments of nuclear fuel between European reprocessing factories and Japanese nuclear plants. The possibility of refueling stops in Alaska is causing concern among members of Alaska's congressional delegation and officials in state government.

Officials in the U.S. State Department are reluctant to discuss what would happen under the agreement until it is approved by President Ronald Reagan. Once signed, the deal will be sent to Congress for consideration.

But a report last week by the Nuclear Control Institute, a group concerned with nuclear weapons proliferation, said the agreement, if ratified, would mean flights as often as twice a month from France and Great Britain to Japan, with refueling stops in An-

See Back Page, PLUTONIUM

PLUTONIUM: Anchorage may one day be on flight plan

Continued from Page A-1

chorage. The group predicts that as much as 40 metric tons of plutonium would be shipped from Europe to Japan over several years, starting in the early 1990s.

The institute argues that the agreement is premature because neither the U.S. nor Japan has developed a safe way to transport large amounts of the material.

Plutonium is a by-product of uranium fuel used in nuclear power plants. It is considered one of the most long-lived and toxic materials on Earth, and is the primary ingredient in nuclear explosives. Microscopic amounts of plutonium have been found to cause cancer and other health problems when ingested, and a bomb can be made from as little as 33 pounds of it.

Japan now sends much of the spent fuel from its electric-generating nuclear plants to a reprocessing factory in France, where plutonium is extracted from other wastes. Japan would like to ship the plutonium — oxidized into a powder — from France back to Japan, where it would be combined with uranium oxide to produce fresh fuel, officials have said. Great Britain also is building a plant expected to reprocess spent Japanese reactor fuel into plutonium.

Currently, the U.S. must separately approve each Japanese shipment of plutonium made from U.S.-supplied fuel or fuel from U.S.-made plants. Because of security and safety concerns, there has only been one large-scale plutonium delivery from Europe to Japan, aboard a ship in 1984. The vessel, carrying 557 pounds of plutonium, had a crew of more than 40 armed guards and was accompanied by U.S. warships and tracked by spy satellites as it made its way across the Atlantic and Pacific oceans, according to news reports at the time.

The new agreement would give a 30-year, blanket U.S. approval of certain plutonium shipments, with stipulations over how the material can be moved, according to officials involved in the discussions. The idea is to give Japan a more predictable supply of plutonium. European countries already can ship U.S.-originated plutonium without U.S. approval.

John Moseman, legislative director for Sen. Frank Murkowski, R-Alaska, said officials from the State Department told him Thursday that specifics about how the material would be shipped will not be finalized until after the agreement is ratified. But they said the plutonium likely would be shipped "by the shortest route possible away from populated areas," which would apparently be over Canada and Alaska, he said.

Paul Leventhal, director of the nuclear institute, said his group understands that tentative plans call for the material to be shipped in Boeing 747 cargo jets, with refueling stops in Anchorage. It has not been decided whether Anchorage International Airport or Elmendorf Air Force Base would be used, he said. The institute learned of the plans from officials involved in the negotiations and others familiar with the proposal, Leventhal said.

Some flights travel nonstop between Europe and Japan using polar routes, but the weight of the heavy metal casks used to ship the material would make refueling necessary, Leventhal said. There are few, if any, other airports on the route capable of handling refueling of a jumbo jet aside from those in Alaska, he said.

In its report, Leventhal's group raises questions about the safety of the casks now available, and it contends there is little evidence that safe containers can be developed that could survive a plane crash without releasing high levels of radioactivity into the environment. The group also says the shipments would boost the chance of terrorists getting control of materials to make nuclear weapons.

The U.S. Nuclear Regulatory Commission has certified a cask capable of carrying about five pounds of plutonium, but only on single-cask flights. The report says at least three countries are working to develop larger casks to make shipments of plutonium more economical. The only such cask tested under the NRC crash standards failed a test last summer, although it is unclear whether the shipments would have to meet U.S. standards or less-stringent international guidelines, the report says.

The new casks being developed would weigh about 5,000 pounds each and hold about 15 pounds of plutonium oxide. Citing NRC data, the report says a 747 cargo plane would be capable of holding about 40 casks, containing a total of between 500 and 600 pounds of plutonium — the same amount that was carried under such tight security on the ocean freighter three years ago.

The material would be shipped as a powder, which is far less flammable than when plutonium is in its metallic form, and also is more difficult to use in a nuclear explosive device, according to the report. But plutonium oxide also may present a greater health risk when being transported because it could be more easily dispersed into the air if it left its casks, the group contends.

Officials in the State Department, and an official in the Japanese embassy in Washington, all of whom declined to be identified, disputed that detailed plans for plutonium shipments have been developed, and stressed in telephone interviews that it would be years after the agreement is approved before the flights would occur.

Murkowski's aide, Moseman, said the State Department officials assured him that a series of safeguards would have to be met for the flights to ever occur.

Once submitted to Congress by the president, the agreement can be blocked only if rejected by Congress within 90 days, and Leventhal conceded that's not likely. He suggested that an environmental impact statement on the project be required before the agreement is sent to Congress.

Nadine Winters, an aide to Alaska Gov. Steve Cowper, said state officials were trying to learn more about the agreement and were scheduled to speak with State Department officials within the next several days. But she said it was unclear what jurisdiction, if any, state government would have over such shipments. U.S. Rep. Don Young and Sen. Ted Stevens also have asked for more information after learning of the agreement this week, aides said.

"This is nasty stuff," said Winters. "The state hasn't been consulted. It is a few years in the future, apparently, but we're definitely concerned." Young's spokesman, Chuck Davis, said the congressman "would certainly oppose" the flights landing in Alaska if casks fell short of NRC safety standards.

Why Recycle Plutonium?

DAVID ALBRIGHT AND HAROLD FEIVESON

IN 1984, 250 KILOGRAMS OF PLUTONIUM OXIDE, SEPARATED in France from spent fuel from Japanese reactors, was returned to Japan by cargo ship. The ship carried only the plutonium; it made no intermediate stops; it was escorted partway by French and U.S. warships; and it was continuously tracked by satellite by officials in Japan (*1*).

If the nuclear industries of Europe and Japan continue with their plans to use plutonium in commercial reactors, they will, by the end of the century, have separated and placed into commerce more than 300,000 kilograms of plutonium (*2*) (Fig. 1). (For comparison, the Nagasaki bomb contained 6 kilograms of plutonium.) The extraordinary security measures applied to the French-Japanese shipment to protect the plutonium from theft and sabotage would need to be made routine on a vast scale.

This prospect derives from the decisions of several major countries, including France, Great Britain, the Federal Republic of Germany, Japan, Belgium, Switzerland, and Italy, to separate chemically the plutonium and uranium from the highly radioactive fission products contained in the spent fuel from their commercial reactors (a procedure called "reprocessing") and to recycle this plutonium and uranium into reactor fuel for breeder reactors and light water reactors. Such recycling differs from the "once-through" fuel cycle in use today in that material usable in weapons is not isolated in the latter process.

Barring a sharp turnaround in current programs, by the year 2000 or even earlier, more than 25,000 kilograms of separated plutonium may be placed in routine commerce annually (Fig. 2). Four countries—France, Great Britain, Germany, and Japan—will together separate most of this plutonium. Much will be separated from domestic fuel, but France and Britain also plan to reprocess fuel from West Germany, Japan, Belgium, Italy, the Netherlands, Spain, and Switzerland. Most of this plutonium, along with the nuclear waste, will eventually be returned to the country of origin.

After reprocessing, separated plutonium oxide will travel by truck, or a combination of truck and ship or plane in shipments across water, to fuel fabrication facilities in France, Great Britain, West Germany, Belgium, and Japan. If, on average, each shipment contains 100 kilograms of plutonium, more than 250 shipments of plutonium oxide annually will be required to transport the plutonium to these facilities. Slightly more than half of these shipments will be transported intracountry; the rest will travel from French and British reprocessing plants to other European countries and Japan.

At the fuel fabrication facilities, approximately two-thirds of the plutonium oxide will be blended with uranium oxide and fabricated into mixed-oxide (MOX) fuel elements and assemblies for light water reactors. Several hundred shipments of MOX fuel will be required each year to supply reactors in France, Germany, Japan, and elsewhere. The remaining separated plutonium will be fabricated into fuel elements for prototype breeder reactors in Britain, France, Germany, Japan, and Italy, and two Japanese heavy water reactors. The delivery of these fuel elements to the reactors will require an additional 100 shipments per year.

Neither the isotopic composition of the reactor grade plutonium nor its chemical form affords significant protection. Nuclear weapons designers have stated repeatedly that, despite its relatively high content of plutonium-240, reactor grade plutonium can be used directly in nuclear explosives. Similarly, plutonium oxide, the most common form of plutonium that leaves civilian reprocessing plants or that could be retrieved from unirradiated MOX fuels, could be used in nuclear explosives without reduction of the oxide to the metal. To guard against diversion of the material to weapons by terrorists, separated plutonium and fresh MOX fuel will have to be treated as virtually equivalent to weapon-grade plutonium (*3*). Given the scope of the commerce in separated plutonium, it is clear that stringent protection systems will be required.

Virtually any country engaged in plutonium recycling would have available large quantities of readily accessible fissile material. If a country had produced all the components of nuclear weapons other than the fissile material cores, it could reduce the time between a decision to build nuclear weapons and the achievement, on a potentially large scale, from years to weeks. Such "latent proliferation" would make it easy for governments to hide a nuclear weapons program within an ambitious civilian program.

Reprocessing and recycling are concentrated in countries that have nuclear weapons or support the Non-Proliferation Treaty. However, the emergence of a commercial market in MOX fuels, even if initially restricted to Europe and Japan, would allow other countries, some with dubious commitment to nonproliferation, to gain access to weapons-usable material. The emergence of a plutonium market would also make it extremely awkward for nuclear suppliers in the United States, Europe, and Japan to deny reprocessing and fabrication facilities able to produce such material relatively quickly to other countries.

One source of interest in reprocessing has been the view that reprocessing could improve the efficiency of radioactive waste disposal. This, combined with the willingness of France and Great Britain to reprocess foreign fuel, offered a politically attractive way for some countries to postpone dealing with their own waste disposal problems. However, the fission product contents of spent fuel and high-level waste from reprocessing are essentially identical, and the heat outputs per metric ton of original uranium are similar. Although reprocessing would separate much of the plutonium and perhaps some of the actinides from the spent fuel, significant amounts of plutonium and actinides would still end up in the reprocessing wastes. As a result, final disposal of unreprocessed spent fuel does not appear to represent a significantly greater

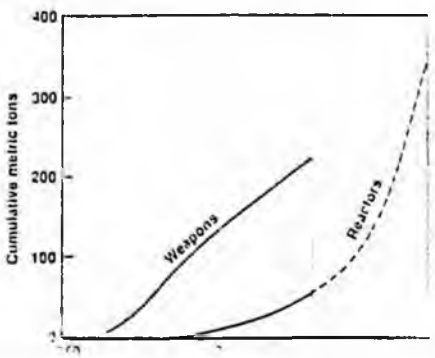

Fig. 1. The growing amount of separated civilian plutonium in noncommunist countries intended as fuel in civilian power reactors compared with the amount of plutonium in the nuclear weapons arsenals of the United States, the Soviet Union, France, and the United King-

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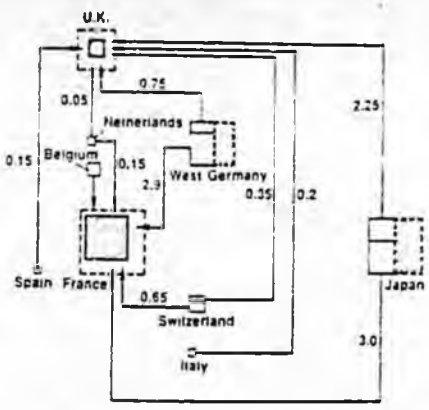

Fig. 2. Annual amount of plutonium to be separated from light water reactor spent fuel at the end of the century. Most of the separated plutonium will eventually be sent back to the originating country. A total of about 27 metric tons of plutonium per year is based on projected reprocessing capacities at the end of the century and already negotiated reprocessing contracts. The area of each country's square is proportional to the total plutonium that would be separated annually from spent fuel produced in the country plus, in the case of France and the United Kingdom, sent to it from abroad. The area of each dashed-outlined square or rectangle is proportional to the total plutonium that would be separated in the country's reprocessing plants. The shaded areas are proportional to the plutonium that would be separated from domestic fuel. The arrows represent international transfers of spent fuel to be reprocessed (in terms of contained plutonium).

environmental hazard than disposal of high-level wastes from reprocessing. Three countries with major nuclear programs—the United States, Canada, and Sweden—have decided to place their spent fuel in long-term storage without reprocessing (*4*, *5*).

Although the waste disposal rationale for reprocessing appears to have weakened, a second motivation remains strong—that the energy content of the plutonium contained in the spent fuel must be captured. Until recently, the nuclear industries in the industrialized countries expected that this recycled plutonium would be used for the initial loadings of prototype and commercial plutonium breeder reactors. However, because of greatly reduced demand for electricity, the higher costs of breeder reactors compared to light water reactors, and larger than expected uranium resources, breeder reactor programs worldwide have slowed dramatically.

Breeder programs can thus absorb only a small portion of the plutonium scheduled or planned to be separated in this century. Unless current reprocessing programs are curtailed, there will be a surplus of separated plutonium of at least 100 metric tons by 1995 and 200 metric tons by the year 2000.

As the commercial viability of the breeder recedes and stockpiles of separated plutonium grow, the nuclear industries in Europe and Japan have initiated programs to use plutonium fuels in current light water reactors. Recycling would in practice reduce uranium feed and enrichment requirements by about one-quarter—the savings depending on the price of uranium and enrichment. At current uranium and enrichment prices, fuel cycles that use recycled uranium and plutonium would cost about 1 mill/kWh more than the normal once-through cycle. The price of uranium would have to more than triple from its present value of less than $80 per kilogram before the savings in uranium costs made up for the extra costs of reprocessing, of plutonium storage, and of MOX fabrication (*6*). Even if the costs of reprocessing are disregarded, the economic benefits of plutonium and uranium recycle are marginal or nonexistent.

Despite the poor economics, the nuclear industries in Europe and Japan often cite national energy independence as a reason to push ahead with reprocessing and thermal recycle. This goal draws mainly upon the persistent vulnerability of these areas to oil import disruptions. However, the uranium savings that could be gained by the recycling in light water reactors of all the plutonium and uranium planned for separation in this century would be only about 100,000 metric tons. For most countries, thermal recycling would lessen their dependence on foreign uranium only at the price of an increased dependence on a steady and assured flow of plutonium separated in foreign reprocessing plants. It would also make them dependent on the integrity of international safeguards and physical security arrangements to prevent the theft or diversion of the separated plutonium.

Countries concerned about the security of their uranium supply may, instead, find it cost-effective to reduce the consumption of uranium by higher burnup of reactor fuel or more complete recovery of uranium-235 from natural uranium at enrichment plants. In addition, uranium costs so little per unit energy-equivalent that it can be readily and economically stockpiled to provide a buffer against a supply disruption.

Reprocessing and recycling on the scale now envisioned would create a challenge of nightmarish proportions for those seeking to prevent diversion of plutonium to weapons. The reasons for European and Japanese interest in recycling are complex—for example, interest in Germany and Japan in postponing domestic debates on waste disposal and the drive in France to stay at the forefront of nuclear technology. But there do not appear to be any clear economic motives. Indeed, with the price of uranium low, and expected to remain so for several years at least, recycling appears to be an economically poor proposition.

It may not be too late for the international community to persuade the countries embarking on these critical activities to abandon plans for plutonium recycling and to defer indefinitely commercial reprocessing not devoted directly to research and development on breeder reactors.

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6. The critical assumptions are: enrichment costs, $130 per kilogram separative work unit; uranium-oxide fabrication costs, $190 per kilogram of uranium (kg-U); MOX fabrication costs, $760 per kilogram of heavy metal (kg-HM); reprocessing costs including vitrification, $750/kg-HM; disposal costs of reprocessing wastes, $150/kg-HM; and spent fuel disposal costs, $350/kg-HM. The fuel cycle costs of a light water reactor on a once-through fuel cycle can be approximated by $4.3 + 0.03x$ mill/kWh, where x is the price of uranium in dollars per kilogram. The fuel cycle costs for a recycling reactor would be $5.6 + 0.024x$ mill/kWh. At a uranium price of $83/kg-U, recycling would cost about 1 mill/kWh more than a once-through system (*4*, pp. 15 and 60).
7. We wish to acknowledge the contributions of R. Socolow, F. von Hippel, and R. Williams.

Nuclear Proliferation: Studies and Strategies for Stopping the Spread of the Bomb

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SPECIAL REPORT

AIR TRANSPORT OF PLUTONIUM OBTAINED BY THE JAPANESE FROM NUCLEAR FUEL SUPPLIED BY THE UNITED STATES

Paul Leventhal, Milton Hoenig and Alan Kuperman

March 3, 1987

Paul Leventhal is president of the Nuclear Control Institute. Milton Hoenig is the scientific director. Alan Kuperman is a research associate. The report was jointly researched, and was written by Mr. Kuperman.
The Nuclear Control Institute is non-partisan and non-profit and conducts independent research on problems relevant to the spread of nuclear weapons.

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I. Overview of the Problem

President Reagan may soon approve and submit to Congress a new nuclear cooperation agreement that his Administration has negotiated with Japan. The agreement would give Japan advance approval to reprocess, over the next 30 years, U.S.-supplied and -controlled nuclear fuel after it is removed from Japanese power reactors. The reprocessing of the spent fuel would result in chemical separation of plutonium for use as a fuel in Japan's nuclear power program.

If the new agreement is approved by the President and is not rejected by Congress, the Japanese will have a blanket authorization to separate all the U.S.-controlled plutonium produced in Japanese reactors. This plutonium will make up most of the 85 metric tons [187,000 pounds] of plutonium that will be produced in Japanese spent fuel by the year 2000.

Plutonium is a man-made element that is created as a waste byproduct of reactor operation. It is highly toxic, and it can be used in nuclear weapons. Laboratory experiments show that microgram quantities can cause cancer. Five to eight kilograms [11 to 18 pounds] is sufficient for use in a "primitive" fission bomb of the type that destroyed Nagasaki. (The United States now has about 100 metric tons [220,000 lbs.] of plutonium in its stockpile of nuclear weapons.)

More than half of the 85 metric tons would be separated by reprocessors in Europe, and then transported back to Japan. The first such shipment was made by ship from France to Japan in 1984. The five-week voyage involved such large risks and required such massive military escort and surveillance activities, that both the United States and Japan agreed that future shipments should be made by air.

Present plans call for air shipments of plutonium to cross over Canada, land for refueling in Alaska, and then proceed to Japan. There are a number of problems with the execution of these plans:

1. Commercial air shipment of multi-ton quantities of plutonium is unprecedented. A few flights of no more than 100 pounds each had come into the United States before enactment of the Scheuer Amendment (P.L. 94-79) in 1975. This law barred the Nuclear Regulatory Commission from licensing "any shipments by air transport of plutonium in any form, whether exports, imports or domestic shipments" until the NRC certified a cask capable of surviving "the crash and explosion of a high-flying aircraft."

2. A cask large enough for efficient, large-scale shipment of the Japanese plutonium has not been certified by the NRC. A prototype cask, weighing 5,000 pounds and designed to hold about 15 pounds of plutonium, failed a crash test last summer.

3. If the cask now being developed is eventually used, one Boeing-747 shipment of more than 500 pounds of plutonium would be required every two weeks---taking off from France or the United Kingdom, overflying Canada, landing for refueling in Alaska, and then taking off again and finally landing in Japan. These flights may prove to be of considerable local and national concern. Canada has had one experience with radioactive fuel falling from the sky, during the reentry of an orbiting Soviet satellite in January, 1978.

4. If the cask proves to be technically unfeasible---as some experts advise us will be the outcome---plutonium air transport (PAT) may have to be accomplished with existing, smaller PAT-1 casks, which were never intended for such large-scale transport.

5. The Japanese shipments may not be subject to licensing by the NRC because, although the Commission is responsible for licensing initial exports of uranium fuel, all subsequent arrangements involving spent fuel and the plutonium contained in it are approved by the Department of Energy. The safety of DOE-approved shipments of separated plutonium comes under the jurisdiction of the U.S. Department of Transportation when any such shipments are flown into U.S. airports and/or air space. According to a DoT official, the Transportation Department probably would consult with the NRC on approving a cask, but the DoT would make clear to the NRC that only the International Atomic Energy Agency (IAEA) standards for safe transport need be met.

The IAEA standards are far less demanding than those set by the NRC. For example, the IAEA impact test requires a velocity of only 44 ft./sec., while the NRC-mandated test requires a velocity of at least 422 ft./sec. . Further, the IAEA crash standards are no more stringent for plutonium casks than they are for casks used for less hazardous nuclear materials.

The Scheuer Amendment prescribes extra precautions for NRC-licensed plutonium transportation, owing to plutonium's extreme toxicity. The Administration, however, appears to be interpreting the Atomic Energy Act in a way that could permit foreign plutonium to be flown into an Anchorage airport in casks that need not meet the NRC's strict crash standards.

The Atomic Energy Act requires NRC licensing of domestic, commercial plutonium shipments, as well as imports of plutonium for commercial use in the United States. (There are presently no such shipments because of Congressional actions resulting in the shutdown of all elements of the U.S. commercial plutonium program---spent-fuel reprocessing, fresh-fuel fabrication and breeder-reactor development.) However, plutonium-bearing cargo planes landing for refueling in the United States, on their way from Europe to Japan, apparently are viewed by the Administration as neither domestic nor import shipments. This interpretation could create a loophole not intended by Congress:

flights of foreign plutonium stopping in the United States may be approved by the DoE on the basis of cask-safety criteria substantially inferior to those set by the NRC.

In the face of known dangers and high clean-up costs associated with environmental releases of plutonium, the United States---under the agreement negotiated by the Reagan Administration with Japan---would acquiesce in the development of a Japanese plutonium fuel economy that could result in a planeload of plutonium landing in Anchorage as often as every two weeks.

Crashes of two U.S. military aircraft carrying nuclear warheads, which resulted in the release of substantial amounts of plutonium, serve to illustrate the problem. One crash occurred at Palomares, Spain, in January, 1966 after a bomber and a tanker collided in a routine mid-air refueling operation. Clean-up of 1,400 tons of contaminated soil and vegetation at Palomares cost $500-million. The crash of a bomber carrying four nuclear weapons at Thule, Greenland, in January, 1968, required the removal of one and a half million gallons of contaminated snow, ice and water at a cost of $300-million. Both of these sites were unpopulated. Plutonium contamination of a more densely populated crash site would involve a public health risk, and evacuation and decontamination costs would be many times higher.

Under the present U.S.-Japan nuclear agreement, which expires in 2003, the Japanese must obtain U.S. approval of each of their reprocessing, plutonium-transfer and plutonium-use requests. Thus, the existing agreement permits the United States to withhold approval of air shipments of U.S.-controlled plutonium in the absence of a crash-proof cask that meets NRC's specifications. The new agreement would replace the existing case-by-case review process with a blanket U.S. approval of Japanese plutonium activities for the 30-year life of the agreement.

By the late 1990s, Japan will have 5,250 kg. [11,550 lbs.] of plutonium separated each year from spent fuel by reprocessors in the UK and France---the equivalent of 5,950 kg. [13,090 lbs.] of plutonium oxide---according to David Albright in "Civilian Inventories of Plutonium and Highly Enriched Uranium."[1] Out of a total of 48 metric tons of plutonium to be separated in Europe for Japan by the year 2000, 45 metric tons are from fuel irradiated in light water reactors (LWRs). According to Albright, a physicist with the Federation of American Scientists, at least 80 percent, if not virtually all, of this LWR-produced plutonium was separated from fuel supplied by the U.S. or used in U.S.-supplied reactors and, therefore, comes under U.S. control.

Air shipments of commercial plutonium of the magnitude to be authorized by the Japanese agreement have never occurred. Indeed, these shipments may exceed the amounts of plutonium now shipped by air for the U.S. nuclear weapons-program.

1/ This paper appears in Preventing Nuclear Terrorism: The Report and Papers of the International Task Force on Prevention of Nuclear Terrorism, A Nuclear Control Institute Book, Lexington Books, 1987, pp. 265-291.

The significance of the plans to ship plutonium by air is underscored by the on-going development of a communications system for the International Atomic Energy Agency to continuously monitor the integrity of casks during flight. The system, called Artemis, is being designed and set up by the U.S. Arms Control and Disarmament Agency. It will use the private Inmorsat satellite to monitor tamper-indicating seals in "real-time" and the U.S. Navstar Global Positioning System to accurately track the position of the aircraft.

II. Brief Historical Background

In January 1978, the NRC, pursuant to the Scheuer Amendment, published NUREG-0360, "Qualification Criteria to Certify a Package for Air Transport of Plutonium," which detailed: (1) a rigorous set of crash, burn and submersion simulations, to which any potential cask would have to be subjected before its certification; and (2) operational conditions for air transport of plutonium, which would have to be followed to ensure the integrity of the cask and its contents.

By June 1978, the safety analysis report on the first prototype cask, the PAT-1, was published, and by August 1978, the NRC officially certified the cask for use. The PAT-1 weighed approximately 500 lbs. and was cylindrically shaped, with a length of 42.5 inches and a diameter of 24.5 inches. It was authorized to hold up to 2 kg. [4.4 pounds] of plutonium oxide, uranium oxide, their daughter products, or any mixture thereof.

The only real need for air transport of plutonium at the time, however, was for quick, international delivery of IAEA plutonium samples---for analysis as part of their international safeguards procedure. The amounts with which the IAEA was dealing were very small, but were still large enough to require a cask under the law's provisions. The size of the PAT-1 was overkill for these small samples, and as a result, its use would have strained the budget of the IAEA.

The IAEA thus asked the U.S. government to help develop a Light Weight Air Transportable Accident Resistant Container (LATARC), later known as the PAT-2. By September 1981, the PAT-2 had been developed, tested and licensed for use by the NRC, weighing only 73 pounds but holding only 40 grams of plutonium oxide, which was satisfactory for the IAEA's needs, but clearly inadequate for large scale transport. Because the operating procedures specified by NUREG-0360 still made the casks' use prohibitively expensive, the NRC reviewed these operational guidelines and eventually relaxed the restrictions on slowing-down the casks and on what other types of hazardous cargo could be aboard flights containing the casks. The NRC concluded that the new, less stringent guidelines did not "significantly" affect the ability of the PAT-2 package to withstand the crash and explosion of a high flying aircraft.

Since then, the only major advance in the development of these casks was the development of a modified PAT-1, which could carry 3.15

kg. of plutonium metal, as opposed to the original 2 kg. of plutonium oxide. This modified PAT-1 was licensed for use by the Department of Energy, but was never submitted to the NRC, because there were no NRC-licensed transports of plutonium taking place at the time. There are no indications that the Japanese are considering shipping the plutonium in its highly flammable (pyrophoric) metallic form, which is also the preferred form for use in weapons.

III. The Present Situation

The PAT-1 and PAT-2 are thus the only two NRC-certified casks in existence for air transport of plutonium. A number of firms around the world, including PNC (Japan), COGEMA (France), and BNFL (UK), are working on developing a larger cask that would make commercial shipment of reprocessed plutonium economically viable.

The only acknowledged test of such a cask took place at Sandia National Laboratories in the summer of 1986. It was an impact test of a prototype PAT-3 cask developed jointly by PNC and Battelle-Columbus. The cask weighed about 5000 lbs. and was designed to hold 6-7 kg. [about 13-15 lbs.] of plutonium oxide. The cask was propelled into a hard target at more than 422 ft/sec. (250 knots---the maximum legal air speed below 10,000 ft. and the speed specified by NUREG-0360). The cask failed the test,and no new prototype has yet been tested or scheduled for testing at Sandia, according to knowledgable Sandia officials. One such official said Battelle has "gone back to the drawing board."

When we asked a leading expert on the engineering of casks to predict when a large, crash-proof cask with a capacity of 6-10 kg. of plutonium oxide would be developed, he replied: "Never." He explained that due to the rigor of the NUREG-required tests, there was a limit to the size of any cask, because past a certain size, the cask "committed suicide"---that is, it collapsed on itself. Thus, he felt that there was an absolute limit---barring an unforeseen developmental breakthrough---to the size of a crash-proof cask, and a corresponding limit to the amount of plutonium that it could hold.

The limitation on size results from a basic principle of engineering which states that as the size of a structure is increased, the weight of the structure grows much faster than the strength. Thus, as bigger casks are developed, the force of impact eventually overwhelms the strength of the package.

IV. Air Transportation Facts for Proposed New PAT-3

According to various informed sources, the PAT-3 cask, if successfully developed, would weigh 5,000 pounds, hold 6 to 7 kilograms of plutonium oxide, and be packed three casks at a time into shipping containers for transport in Boeing-747 cargo planes. The 747s have a maximum cargo load of 255,000 lbs. according to NUREG-0360.

Thus, we can calculate the maximum capacity of plutonium flights using the PAT-3 casks:

Each shipping container would hold 3 casks. A typical container would have a capacity of 12.5 short tons and itself weigh 2,600 lbs. The weight of a packed container would be at least 15,000 pounds for the casks [3 x 5,000 lbs.] plus 2,600 lbs. for the container, or a total of 17,600 pounds. With the addition of packing materials, the total weight of a filled container would likely be as large as 20,000 pounds, or 10 short tons.

Based on its total weight capacity, a 747 could carry some 12 or 13 containers, depending on the added packing materials. Given that each cask can hold 6-7 kg. of plutonium oxide, each container would hold 18-21 kg. [40-46 lbs.] of plutonium oxide, and there would be from 216 kg. to 273 kg. [475 to 600 lbs.] of plutonium oxide in a single 747. Thus, the likely load on each 747 shipment to Japan would be about 250 kg. [550 lbs.] of plutonium oxide. Because of the heavy load, a 747 would need to refuel in Alaska enroute from Europe to Japan.

Volume capacity would not be a problem. According to our calculations, a 747 cargo flight could hold 14 of the above-discussed containers plus additional containers of smaller size if weight were not a factor.

As discussed above, the Japanese will have 5,250 kg. of plutonium per year separated by reprocessors in Europe by the late 1990s, or the eqivalent of 5,950 kg. of plutonium oxide. At 250 kg. [550 lbs.] per 747 flight, that would mean at least 23 flights per year.

Thus, in order to move the estimated 45 metric tons of plutonium that European reprocessors will separate from LWR spent fuel for Japan by the year 2000, a 747 carrying over 500 pounds of plutonium would have to fly over Canada and land in Alaska every two weeks by the mid-to late 1990s.

It is by no means clear, however, that a PAT-3 crash-proof cask can be developed. Such flights may use a cask that does not meet the NRC's present strict requirements, if DoE and DoT choose not to require it. It also should be noted that the last time the NRC's operational requirements hindered use of a cask (the PAT-2), those safety restrictions were relaxed by the NRC itself.

V. Calculations for Air Transport Using PAT-1

If use of a PAT-3 cask eventually is barred because one cannot be developed to meet the NUREG 0360 crash standard, the only NRC-certified cask that exists for potential large-scale shipment of plutonium is the PAT-1.

We estimate that as many as 350 PAT-1 casks, each weighing 500 lbs., could be carried on one dedicated 747 flight. At 2 kg. of plutonium oxide per cask, this yields a capacity of 700 kg. [1540

lbs.] of plutonium oxide per flight. Thus, transporting 5,950 kg. [about 13,000 lbs.] of plutonium oxide per year could be done with as few as nine flights, each carrying about 1,500 pounds of plutonium oxide per 747.

There are serious obstacles, however, to the use of this cask for such commercial transport. According to an NRC official, substantial safety issues would have to be resolved in connection with shipments of such large quantities of plutonium. For example, a 747 fully loaded with PAT-1 casks would be more vulnerable to severe consequences from an engine-rotor accident or a mid-air collision (see next section).

An additional problem is that neither of the two versions of PAT-1 now in existence is capable of holding a COGEMA plutonium container, which is used to store Japanese plutonium in France. Nevertheless, according to an NRC official, there were indications in 1986 of possible Japanese interest in using the PAT-1 for large-scale plutonium transport. However, when COGEMA was asked to modify its plutonium container for use in the PAT-1, the French plutonium producer refused, according to a knowledgeable source. Further, this official said, the three firms actively working on casks---PNC (with Battelle-Columbus), BNFL, and COGEMA---all have resisted suggestions simply to modify the PAT-1 design in order to fit the COGEMA plutonium container, even though, according to him, that modification could be performed by the right engineer. The clear preference has been to develop a crash-proof PAT-3 cask.

VI. Other Cask Issues

1. If a PAT-3 cask is developed that survives the simulated crash test required by NUREG 0360, it would be desirable to further ascertain, and to demonstrate to the public, that a full complement of casks will survive an actual plane crash. This objective can be accomplished by crashing a 747 with a full load of casks containing non-radioactive material. As learned from a December 1984 FAA crash test of a Boeing-720, actual crashes can have very different consequences than simulated crashes in a laboratory. In a test that cost $11.8-million, flame-proof fuel that had been tested successfully in laboratory crash tests, burst into a fireball when the Boeing 720, using the fuel, was actually crashed.

According to knowledgeable officials, the NRC originally considered crashing the PAT-1 cask in a retired naval plane, which was set aside at Sandia specifically for such a test, but they decided not to because of the expense---less than $10-million---of monitoring equipment. An actual crash test of the PAT-3 casks and containers in a Boeing-747 may cost (including the price of an older 747) as much as $25-million---an expense that should be considered in relation to the enormous cost of cleaning up a plutonium spill, and in the context of increased assurance of the casks' integrity.

2. There is the possibility of a terrorist attack on a plane carrying these casks, especially during take-off and landing, during

refueling, and during loading and unloading of the cargo. When the cask specifications were developed, the terrorist contingency was not specifically considered, according to knowledgeable officials.

3. The NUREG-0360 cask specifications do not take into account the possible consequences of a mid-air collision in which a cask is directly hit. The regulation states (page 47) that "in the event of fuselage-to-fuselage collision,...if the package is in a position to be struck directly, the severity of the resulting impact is difficult to predict." Such a collision could occur near a busy airport or during mid-air refueling, as occurred at Palomares, Spain. At present, Japanese plans are to land for refueling in Alaska, not to refuel in mid-air.

4. At the time NUREG-0360 was written, there was concern that an engine-rotor accident could damage a cask. Since the NRC was considering the transport of no more than a few casks at a time, it required that the casks be placed in the aft-most section of the main deck in order to preclude placement near the engine rotors. A plane that is fully loaded with casks would, however, have casks near the engine rotors. According to an NRC official, a complete reevaluation would be required before a cask for use in a plane fully loaded with casks would be licensed, and the issue of an engine-rotor accident would have to be reconsidered.

5. Three firms are known to be working on PAT-3 casks: PNC (through Battelle-Columbus), BNFL, and COGEMA. At the PATRAM-86 (Packaging and Transportation of Radioactive Materials) conference in Davos, Switzerland, each gave presentations on the progress of their work and predicted success by the end of 1986. To date, there have been no reports of any tests in the technical journals. The PATRAM-86 proceedings are being published, but are not yet available. Attempts to acquire the individual presentations through the firms and their embassies, as well as any test results, have not yet proved successful. It is understood within the technical community, however, that the French tested their prototype PAT-3 about one year ago and that the test was a complete failure, resulting in a shattered cask.

6. The Japanese are developing their own plutonium air transport regulations, which are likely to be very similar to the NUREG specifications. It is not clear, however, what the final Japanese specifications will be in the event a crash-proof PAT-3 cannot be developed. It is expected that the Japanese will require at least two more years to develop their regulations and that the first air shipments of plutonium will begin after 1990.

IX. Conclusion

There are many technical issues to be resolved before it can be determined whether commercial air transport of plutonium, as envisioned in the upcoming U.S.-Japan nuclear agreement, can be achieved safely and securely. Considerable uncertainty still surrounds the development of a crash-proof cask suitable for use in large shipments of plutonium. Further, there are environmental and

security implications important to the United States in the establishment of a plutonium fuel economy in Japan. It is premature, therefore, for the Reagan Administration to negotiate away U.S. authority over how Japan makes use of plutonium contained in spent nuclear fuel originally supplied by the United States. The President should not submit the new U.S.-Japan agreement to Congress until all technical issues with regard to air transport of plutonium are resolved.

In addition to air-transport safety questions, there are questions concerning the vulnerability of commercial, weapon-usable plutonium to attacks or thefts by terrorists, as well as the eventual spread of this material to nations seeking the capability to build nuclear weapons. From both counter-terrorism and non-proliferation perspectives, the risks of commercial use of plutonium may outweigh any energy benefits of using this fuel. Further, use of plutonium fuel is no longer regarded as economical because of abundant, low-cost supplies of uranium now available on the world market. The uranium used to fuel nuclear power plants, in contrast to plutonium, is not suitable for use in nuclear weapons.

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Nuclear Proliferation: Studies and Strategies for Stopping the Spread of the Bomb

NUCLEAR CONTROL INSTITUTE
1000 Connecticut Avenue, N.W., Suite 406, Washington, D.C. 20036 (202) 822-8444

FOR IMMEDIATE RELEASE
Tuesday, March 3, 1987

BIWEEKLY FLIGHTS OF HUNDREDS OF POUNDS OF PLUTONIUM
TO BE AUTHORIZED UNDER U.S.-JAPAN NUCLEAR ACCORD

President Reagan is preparing to submit to Congress a new 30-year nuclear-cooperation agreement with Japan that would require biweekly flights of a cargo plane carrying about 500 pounds of plutonium from Europe to Japan. Because of the enormous weight of shipping casks to be used to transport the plutonium, the flights would cross Canada and land for refueling in Anchorage, Alaska, and then take off again for Japan.

A crash-proof cask being developed for these plutonium shipments failed to survive a high-velocity impact test at Sandia National Laboratories last summer. No new tests have been scheduled, and some experts close to the project believe that it will not be possible to build a large cask, for use in large-scale shipments of plutonium, that can survive a realistic crash test. The cask being developed weighs 5,000 pounds and holds about 15 pounds of plutonium. There would be as many as 40 of these casks on a single Boeing-747 cargo plane.

It is possible that the Reagan Administration will permit Japanese plutonium flights in and out of Anchorage utilizing casks that fail to meet strict safety criteria spelled out by the Nuclear Regulatory Commission after Congress mandated the development of crash-proof casks in a 1975 law.

Plutonium, a manmade element created as a waste byproduct of reactor operation, is highly toxic and can be used in nuclear weapons. The Japanese plan to separate plutonium from U.S.-controlled spent reactor fuel and use the plutonium as a fuel in their power reactors---an approach that has been rejected by Congress as too hazardous and costly for the United States domestic nuclear power program.

Details of the planned air shipments of plutonium are disclosed in a Special Report, "Air Transport of Plutonium Obtained by the Japanese from Nuclear Fuel Controlled by the United States," prepared by the Nuclear Control Institute and released today. The Institute is non-partisan and non-profit and conducts independent research on problems relevant to the spread of nuclear weapons.

- more -

The new nuclear agreement---negotiated by the Reagan Administration but still not submitted for Congressional approval---would give the Japanese a 30-year advance approval to recover and use plutonium produced in nuclear fuel originally supplied by the United States or used in U.S.-supplied power reactors. The new agreement would replace the present agreement, which does not expire until the year 2003. Under the existing agreement, the United States can withhold approval on a case-by-case basis of Japanese plutonium activities on safety or security grounds.

The U.S. government blocked for two years a large plutonium shipment by sea that originally was to proceed on its five-week journey from France to Japan without military escort or surveillance. The large risks and costs associated with this shipment, which finally involved the use of French and U.S. warships and satellites in 1984, led to plans to send future shipments by air. Under the new U.S.-Japan agreement, however, the United States would lose its veto power over safety and security arrangements for these shipments, as well as over use of the plutonium itself.

The United States presently exercises legal control over most of the 85 metric tons [187,000 pounds] of plutonium that the Japanese want to recover from their nuclear spent fuel by the year 2000. About half of the plutonium is contained in spent fuel that Japan has sent or has contracted to send, with U.S. consent, to France and the United Kingdom for reprocessing. U.S. controls now apply to at least 80 percent of the 45 metric tons [99,000 pounds] of plutonium to be separated in France and the U.K. from Japanese light-water reactor spent fuel, according to an analysis by David Albright, a physicist with the Federation of American Scientists.

Under the new agreement, the United States would provide one approval, in advance, for Japanese shipment and use of plutonium derived from U.S.-supplied nuclear fuel or fuel used in U.S.-supplied reactors, for the 30-year life of the agreement.

The Nuclear Control Institute report was co-authored by Paul Leventhal, the Institute's president, Milton Hoenig, the scientific director, and Alan Kuperman, a research associate.

The report concludes: "There are many technical issues to be resolved before it can be determined whether commercial air transport of plutonium, as envisioned in the upcoming U.S.-Japan nuclear agreement, can be achieved safely and securely . . . . It is premature, therefore, for the Reagan Administration to negotiate away U.S. authority over how Japan makes use of plutonium contained in spent nuclear fuel originally supplied by the United States or used in U.S.-supplied reactors. The President should not submit the new U.S.-Japan agreement to Congress until all technical issues with regard to air transport of plutonium are resolved."

In addition, the report concluded: ". . . there are also questions concerning the vulnerability of commercial, weapon-usable plutonium to attacks or thefts by terrorists, as well as the eventual spread of this material to nations seeking the capability to build nuclear weapons. From both counter-terrorism and non-proliferation perspectives, the risks of commercial use of plutonium may far outweigh any energy benefits of using this fuel."

STATE OF ALASKA 1987 LEGISLATIVE SESSION
FISCAL NOTE

Bill Version : HJR 35
Publish Date :

REQUEST:

Revision Date:
Title : "Relating to the use of state airports for plutonium shipments..."
Sponsor : Representative Ellis
Requestor : House HESS

Agency Affected : Department of Law
BRU : Legal Services
Components : Operations

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING		-0-	-0-	-0-	-0-	-0-
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND		-0-	-0-	-0-	-0-	-0-
FEDERAL FUNDS						
OTHER						
TOTAL						

POSITIONS:

FULL-TIME		-0-	-0-	-0-	-0-	-0-
PART-TIME						
TEMPORARY						

ANALYSIS : (Attach a separate page if necessary)

Please see attached analysis.

Richard I. Pegues

Prepared by : Richard I. Pegues, Director
Phone : 465-3672
Division : Administrative Services
Date : May 12, 1987

Richard I. Pegues /FOR/

Approved by Commissioner : Grace Berg Schaible, Atty. Gen.
Date : May 12, 1987
Agency : Department of Law

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)
Senate Secretary

CONTINUATION of FISCAL NOTE ANALYSIS

For Bill/Resolution No. HJR 35

House Joint Resolution No. 35 expresses the Legislature's opposition to the proposed 30-year nuclear cooperation agreement between the United States and Japan that would allow shipment of plutonium by air between Europe and Japan via the polar route, resulting in refueling stopovers in Alaska by aircraft carrying plutonium shipments. Of particular concern, a loophole in the Atomic Energy Act may allow the cask standards of the Nuclear Regulatory Commission to be overlooked in favor of the standards of the International Atomic Energy Agency that require the plutonium shipping cask to meet only one-tenth of the impact velocity required by the Nuclear Regulatory Commission. A cask that met the standards of the International Atomic Energy Agency recently failed a test that simulated an airplane crash. Adoption of the lesser, international standards could be particularly hazardous because the shipped plutonium will be in the form of plutonium oxide powder, which is easily airborne, and minute quantities of which, if inhaled, can cause cancer. Of equal concern, a blanket 30-year approval, in lieu of the present case-by-case approval process, may effectively bar authorities from taking proper safety and security precautions due to the shortness, or lack of notice before a particular shipment takes place.

The resolution requests the Governor to prevent the use of state airports for shipments of plutonium under AS 18.45.027, which prohibits the transportation of nuclear waste material, except for disposal outside the state. At the request of Governor Cowper, the Department of Law recently began research of this issue to determine what legal remedies may be available to the state, to insure that the proposed treaty includes proper safeguards for the state's residents. The department is investigating various avenues available to the state, including possible litigation under AS 18.45.027, the National Environmental Protection Act, and the Atomic Energy Act. As this research began only a short time ago no firm conclusions have yet been drawn.

If the state determines that it should move actively to prevent plutonium shipments through state airports, action may be required on two or three separate fronts. Because the proposed agreement between the United States and Japan is subject to ratification by the U.S. Senate, it is important that the state signal its opposition to the current proposal in a manner that provokes the thoughtful attention and discussion of the Senate Foreign Relations Committee to the safety aspects of the treaty. Once ratified by the Senate, the treaty will preempt AS 18.45.027, insofar as shipments of nuclear materials under the treaty are concerned.

Litigation under state or federal law, prior to ratification, may provide this sort of signal. An attempt to prevent shipment under AS 18.45.027 would be handled by the department's existing staff and

would not require fiscal note costs. Alternatively, litigation under federal law would be primarily handled by inhouse staff, but some review by outside counsel well experienced in litigation under the federal Acts is recommended. The department's early research indicates that litigation may delay federal action in the short-term, but it may not be successful in preventing shipments in the long-term.

Due to the uncertainty of litigation, it may also be prudent for the state to employ Washington, D.C., counsel of sufficient prominence to affect policy decisions at the highest levels of the federal government, to convey the state's safety concerns to the U.S. Department of State, the Nuclear Regulatory Commission, the White House, and the Congress. Because there has not been time to fully assess the measures that may be required to support the state interest in this matter, the fiscal impact of state efforts beyond taking action under AS 18.45.027 has not been determined. The cost for outside counsel to review litigation under federal law could cost $20,000 to $30,000. Outside counsel to lobby for changes in the proposed international treaty could be very expensive and cost between $250,000 and $500,000, or more. The department will continue its research and assessment in these areas and report its findings to the Legislature after it convenes next January. A supplemental appropriation to fund legal action, beyond those provided for in AS 18.45.027, may be required.

HOUSE COMMITTEE REPORT

(7)

Date referred: 5/6/87

FURTHER REFERRALS:

DATE: May 12, 1987

The Health, Education and Social Services Committee has considered HJR 35

Relating to the use of state airports for plutonium shipments under a proposed United States agreement with Japan.

RECOMMENDS:

[ ] replace with ____________ [ ] the same title / [ ] a new title

[ ] attached amendment(s)

[✓] do pass

[ ] do not pass

[ ] no recommendation

[ ] individual recommendations

[ ] additional referral to the ____________ Committee

ADOPTS: [ ] ____________ letter of intent

ATTACHES NEW FISCAL NOTE(s):

[ ] fiscal impact

[ ] zero fiscal note

[ ] zero with analysis

[ ] same as previous fiscal note published ____________

[ ] same as previous zero fiscal note published ____________

SIGNING DO PASS:

Rell E. Phillips

Joyce A. Henley

Mary Ellis

Niilo Koponen

Mike Miller

Bill Hudson

Dave Donley

SIGNING OTHER RECOMMENDATIONS:

Niilo Koponen

Co-Chairman's signature

Mary Ellis

THE SECRETARY OF STATE

WASHINGTON

5/1
SNT
JDN

cc:
NEI

April 30, 1987

Dear Governor Cowper:

Thank you for your letter of April 2 requesting the Departments of State and Energy to prepare an environmental impact statement for the proposed new U.S.-Japan agreement for peaceful nuclear cooperation before its submission to the President and the Congress. I fully share your concern for the health and safety of Alaskans and for Alaska's natural environment, and want to assure you that all appropriate steps will be taken to ensure that implementation of the new U.S.-Japan agreement will cause no injury to either one.

The new agreement will provide an overall framework for cooperation between the United States and Japan in the peaceful uses of nuclear energy. As one element, the U.S. will undertake to give its approval to the European Atomic Energy Community (EURATOM) for the return to Japan of Japanese plutonium recovered through reprocessing in France and the United Kingdom. This approval will be embodied in an associated subsequent arrangement concluded under the U.S. agreement for cooperation with EURATOM. It will be conditioned upon a number of requirements being met, including stringent physical security and safety requirements such as transfer exclusively by air (to minimize time spent in international transit), use of a cask certified to withstand a crash, armed guards, redundant communications and detailed contingency plans.

The agreement and the associated subsequent arrangement are currently undergoing rigorous interagency review pursuant to the Atomic Energy Act. One of the issues under consideration is when and in what form any additional environmental review should be concluded, either prior to entering into the agreement or before authorization is given for any air shipments of plutonium through U.S. transit points. In addition to this Department, your letter is being provided to the other agencies considering this issue, which include those with a statutory role under the Atomic Energy Act as well as those whose regulatory responsibilities may be relevant to implementation of the agreement.

The Honorable
Steve Cowper,

Although this review is still in process, I can at this time address several matters raised by your letter concerning the agreement itself. You inquired whether the agreement will constitute a decision to ship plutonium through an Alaskan airport. The agreement will not constitute such a decision. On the question of routing, it requires only that the aircraft returning plutonium from Europe to Japan must take a polar route or another route that avoids civil disorder and natural disasters. It is true, as reported, that Japan is considering a route that would include a refueling stop in Alaska. At present, however, no transportation plan has been prepared, and I have been informed that it could be some time before specific proposals are made since a transport cask is still under development and must pass a series of rigorous tests to gain approval.

You also expressed concern that air shipments of plutonium might take place under the agreement in casks that did not meet the Nuclear Regulatory Commission's stringent safety standards. Regardless of the route chosen, the agreement will require shipment casks to be designed and certified to maintain their integrity even if the aircraft crashes. Moreover, the agreement will not displace the laws and regulations of any nation governing shipment of nuclear materials. For the U.S., this means that the responsibilities of the Nuclear Regulatory Commission and the Department of Transportation to certify the safety of casks in accordance with U.S. standards will not be affected by the agreement.

Finally, your letter raised the question of what would happen if it proves impossible to develop a safe cask for air transport of plutonium. In that event, the U.S. approval to EURATOM pursuant to the agreement will not apply. Any decision to permit transfer of the plutonium from EURATOM to Japan will then be made on a case-by-case basis, as it is today.

Let me emphasize in closing our commitment to ensuring that the agreement poses no hazards to the health, safety or environment of Alaskans or others residing in the United States. We will keep your office fully informed as we review these issues.

Sincerely yours,

George P. Shultz

George P. Shultz

Nuclear Proliferation: Studies and Strategies for Stopping the Spread of the Bomb

P. 2 of 6

NUCLEAR CONTROL INSTITUTE
1000 Connecticut Avenue, N.W., Suite 704, Washington, D.C. 20036 (202) 822-8444

Testimony by Paul Leventhal
President, Nuclear Control Institute
On House Joint Resolution No. 35
Presented to the Alaska House of Representatives
Committee on Health, Education and Social Services
May 12, 1987

Mr. Chairman and members of the Committee: I appreciate your invitation to testify on House Joint Resolution No. 35 relating to the use of state airports for plutonium shipments under a proposed United States agreement with Japan. As an organization concerned with the safety and weapons-proliferation risks in the planned commercial use of plutonium as reactor fuel, we support the expression of opposition to the U.S.-Japan nuclear agreement as contained in the pending House Joint Resolution.

Details of planned air shipments of plutonium from Europe to Japan via Alaska are disclosed in a Special Report, "Air Transport of Plutonium Obtained by the Japanese from Nuclear Fuel Controlled by the United States," prepared by the Nuclear Control Institute and released March 3, 1987. I co-authored the report with Milton Hoenig, the Institute's scientific director, and Alan Kuperman, a research associate. The Institute is non-partisan and non-profit and conducts independent research on problems relevant to the spread of nuclear weapons.

As is noted in our report, President Reagan is preparing to submit to Congress a new 30-year nuclear-cooperation agreement with Japan that would require biweekly flights of a cargo plane carrying about 500 pounds of plutonium from Europe to Japan. Because of the enormous weight of shipping casks to be used to transport the plutonium, the flights would cross Canada and land for refueling in Anchorage, Alaska, and then take off again for Japan. Regular, commercial air shipment of such quantities of plutonium is unprecedented.

A crash-proof cask being developed for these plutonium shipments failed to survive a high-velocity impact test at Sandia National Laboratories last summer. No new tests have been scheduled, and some experts close to the project believe that it will not be possible to build a large cask, for use in large-scale shipments of plutonium, that can survive a realistic crash test. The cask being developed weighs 5,000 pounds and holds about 15 pounds of plutonium. There would be as many as 40 of these casks on a single Boeing-747 cargo plane. British and French firms have

also failed thus far in their efforts to develop a crash-proof cask. An official from Cogema Inc. recently confirmed that a crash test of the French firm's prototype cask resulted in a "shattered" cask.

It is possible that the Reagan Administration will permit Japanese plutonium flights in and out of Anchorage utilizing casks that fail to meet strict safety criteria spelled out by the Nuclear Regulatory Commission (NRC) after Congress mandated the development of crash-proof casks in a 1975 law. Transshipments of plutonium, using U.S. territory for refueling, may not fall under the constraints of the 1975 law, commonly known as the Scheuer amendment, which banned domestic air transport of plutonium until the development of crash-proof casks. If the transshipments were not required to satisfy the Scheuer amendment, the casks might be required only to meet the inadequate standards set by the International Atomic Energy Agency. The cask standards set by the IAEA are the same for transport by trucks as they are for transport by air, and the impact test uses a velocity of only 30 MPH as opposed to 288 MPH in the NRC test.

If a new cask is developed that survives the simulated crash tests required by the NRC, it would be desirable to ascertain, and to demonstrate to the public, that a full complement of casks will survive an actual plane crash. This objective can be accomplished by crashing a 747 with a full load of casks containing non-radioactive, test material. As learned from a December 1984 FAA crash test of a Boeing-720, actual crashes can have very different consequences than simulated crashes in a laboratory. In that test---which cost $11.8 million---flame-proof fuel that had been tested successfully in laboratory crash tests, burst into a fireball when the Boeing 720, using the fuel, was actually crashed.

Plutonium, a manmade element created as a waste byproduct of reactor operation, is highly toxic and can be used in nuclear weapons. Thirteen to eighteen pounds of separated, reactor-grade plutonium is sufficient for use in a crude, nuclear weapon of the type that destroyed Nagasaki. The Japanese plan to separate plutonium from U.S.-controlled spent reactor fuel and use the plutonium as a fuel in their power reactors---an approach that has been rejected by Congress as too hazardous and costly for the United States' domestic nuclear power program.

According to our report, crashes of two U.S. military aircraft carrying nuclear warheads, which resulted in the release of substantial amounts of plutonium (tens of pounds) serve to illustrate the problem. One crash occurred at Palomares Spain, in January, 1966 after a bomber and a tanker collided in a routine mid-air refueling operation. Clean-up of 1,400 tons of contaminated soil and vegetation at Palomares cost $500-million. The crash of a bomber carrying four nuclear weapons at Thule, Greenland, in January, 1968, required the removal of one and a half million gallons of contaminated snow, ice and water at a cost of $300-million. Both of these sites were unpopulated. Plutonium

contaimination of a more densely populated crash site would involve a public health risk, and evacuation and decontamination costs would be many times higher.

The new nuclear agreement---negotiated by the Reagan Administration but still not submitted for Congressional approval---would give the Japanese a 30-year advance approval to recover and use plutonium produced in nuclear fuel originally supplied by the United States or used in U.S.-supplied power reactors. The new agreement would replace the present agreement, which does not expire until the year 2003. Under the existing agreement, the United States can withhold approval on a case-by-case basis of Japanese plutonium activities on safety or security grounds.

Pursuant to Section 102(2)(C) of the National Environmental Policy Act (NEPA) of 1969 and the implementing regulations of the Council on Environmental Quality (CEQ), 40 C.R.R. Part 1500 (1986), the Department of State, 22 C.F.R. Part 161 (1986), and the Department of Energy (DoE), 10 C.F.R. Part 1021 (1986), a full environmental statement is required to analyze the severe environmental risks posed by contemplated air shipment through Alaska of large amounts of separated plutonium during the term of the proposed Nuclear Cooperation Agreement. This section of NEPA requires a detailed statement on "every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment..." As is made clear in section 1508.17 of the CEQ regulations, international agreements fall within the category of "proposals or legislation" specified in the law. The DoE's NEPA regulations adopt the CEQ regulations in full, 10 C.F.R. 1021.2, while the Department of State's regulations generally contemplated the application of NEPA to international agreements and specifically contemplated that where there are significant impacts in the United States, an environmental impact statement must accompany the submission of the agreement to the Congress. 22 C.F.R. 161.5(d).

It is our view, therefore, that the Executive Branch must prepare and consider an environmental impact statement before the President can approve and submit to Congress the new nuclear-cooperation agreement with Japan. We support, therefore, Governor Cooper's request that an EIS be prepreared before the proposed agreement proceed any further.

The U.S. government blocked for two years a large plutonium shipment by sea that originally was to proceed on its five-week journey from France to Japan without military escort or surveillance. The large risks and costs associated with this shipment, which originally involved the use of French and U.S. warships and satellites in 1984, led to plans to send future shipments by air. Under the new U.S.-Japan agreement, however, the United States would lose its veto power over safety and security arrangements for these shipments, as well as over use of the plutonium itself.

The United States presently exercises legal control over most of the 85 metric tons [187,000 pounds] of plutonium that the Japanese want to recover from their nuclear spent fuel by the year 2000. About half of the plutonium is contained in spent fuel that Japan has sent or has contracted to send, with U.S. consent, to France and the United Kingdom for reprocessing. U.S. controls now apply to at least 80 percent of the 45 metric tons [99,000 pounds] of plutonium to be separated in France and the U.K. from Japanese light-water reactor spent fuel, according to an analysis by David Albright, a physicist with the Federation of American Scientists.

Under the new agreement, the United States would provide one approval, in advance, for Japanese shipment and use of plutonium derived from U.S.-supplied nuclear fuel or fuel used in U.S.-supplied reactors, for the 30-year life of the agreement.

The prospect of growing stocks of plutonium, widely available and widely used in the commercial nuclear fuel cycle in Europe and Japan, also conveys a picture with important implications for the interests of U.S. national security. There is heightened concern that plutonium at any number of places in the fuel cycle---in fuel reprocessing plants and fabrication plants or in transit on land, on the high seas, or during stops at airports---will be a potential target for diversion or seizure by terrorists intent on building a crude nuclear bomb, or for diversion by states with similar interests.

Although nuclear terrorism in any form still has a low probability of occurring, there are indications that the probability is increasing, according to a report issued in 1986 by the International Task Force on Prevention of Nuclear Terrorism. The Task Force is a project of the Nuclear Control Institute. According to the Task Force report, one factor is the increasing number of shipments and facilities involving the presence of weapon-usable forms of plutonium and uranium. Another is the growing sophistication of terrorist groups and the level of technical know-how now available in the public domain, the Task Force reported.

According to an article published May 4 in Nuclear Fuel, a respected nuclear trade journal, the Department of Defense (DoD)---in a classified letter signed by Secretary of Defense Caspar Weinberger and sent to the NRC and to relevant executive agencies---opposes the U.S.-Japan nuclear cooperation agreement on the grounds that the thirty-year, advance, programmatic approval of commerce in massive amounts of plutonium engenders grave security risks.

A new U.S. law, the Defense Authorization of 1986, gives DoD an enhanced nonproliferation role in interagency decision-making with full access to classified information available to the State and Energy departments. The Defense Department's growing interest in plutonium trade and other proliferation matters is based not only on a generalized national-security interest, but on concerns that stolen plutonium in terrorists' hands could pose a direct

threat to U.S. military forces, especially in Europe. Richard Perle, then Assistant Secretary of Defense, told a European arms control conference last year that "there is no place for the spread of plutonium around the world in any sensible policy aimed at restricting the proliferation of nuclear weapons, and I think that traffic in plutonium ought to be halted and halted absolutely."

Japan does not require the plutonium that they would acquire under the proposed agreement to keep their power reactors running. These reactors currently use, as fuel, non-nuclear-weapon-usable, low-enriched uranium. This fuel is cheaper than the proposed mixed, uranium-plutonium fuel that Japan is contemplating using. In addition, there is a glut of uranium and uranium-enrichment services on the market, so that Japan could guarantee its energy future safely and securely simply by stockpiling low-enriched, uranium fuel. As nuclear experts Bertram Wolfe and Burton F. Judson of General Electric stated in a Paper prepared for our Task Force, "Nations with advanced nuclear energy programs that are planning reprocessing over the near term raise issues of international plutonium trade and concomitant non-proliferation risks unjustified by economic benefits."

I will close by noting, as we did in our report on air shipment of plutonium, that there are many technical issues to be resolved before it can be determined whether commercial air transport of plutonium, as envisioned in the upcoming U.S.-Japan nuclear agreement, can be achieved safely and securely . It is premature, therefore, for the Reagan Administration to negotiate away U.S. authority over how Japan makes use of plutonium contained in spent nuclear fuel originally supplied by the United States or used in U.S.-supplied reactors. The President should not submit the new U.S.-Japan agreement to Congress until all technical issues with regard to air transport of plutonium are resolved.

In addition, there are also questions concerning the vulnerability of commercial, weapon-usable pluconium to attacks or thefts by terrorists, as well as the eventual spread of this material to nations seeking the capability to build nuclear weapons. From both counter-terrorism and non-proliferation perspectives, the risks of commercial use of plutonium may far outweigh any energy benefits of using this fuel.

We believe the concerns of the State of Alaska, as expressed in this resolution and in the Governor's letter, are well-founded and should be actively pursued to ensure that air shipments of plutonium, if they proceed at all, do so only under foolproof safety and security precautions. The best precaution would be to avoid shipment and use of plutonium altogether.

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An Eskimo dog team stands near the site of B-52 crash. The buildings housed recovery teams; string of lights marks the crash site.

UPI Bettmann News Photos

Fallout from the radioactive crash of '68

DENMARK

By Robin Epstein

IN 1987, AS IN 1968, EVENTS IN DENMARK MAY ONCE again prod the nuclear conscience of the U.S. Then, an American B-52 armed with four thermonuclear weapons crashed in Danish Greenland, provoking then-Secretary of Defense Robert McNamara to cancel the airborne alert program that had maintained nuclear armed bombers permanently in the air since 1961. Now, 19 years later, Danish Prime Minister Poul Schlueter must deal with the fallout from the crash. Under pressure, he has promised that the 1,000-some Danes who were at the crash site will be examined for radiation poisoning. It remains to be seen if the U.S. will follow suit and investigate the thousands of Americans involved in the crash cleanup for plutonium-related illnesses.

On Jan. 21, 1968, a B-52 carrying four 1.1 megaton hydrogen bombs took off from Plattsburgh, N.Y., to fly the "Chrome Dome," a 24-hour Arctic Circle airborne alert route. Near the U.S. Air Base in Thule, Greenland, the cockpit of the plane filled with smoke. After failing to make an emergency landing, the seven-member crew ejected at 8,000 feet. Six of them survived.

The B-52 crashed onto the ice of North Star Bay seven miles southwest of Thule. The conventional explosive detonators in the outer covering of the hydrogen bombs blew up, spewing radioactive plutonium across the ice.

Late last year Prime Minister Schleuter ordered that the Danes who were at Thule be systematically identified and medically examined. Six of the 130 who participated directly in the cleanup are dead. "But all the people on the base were in contact with poisonous radioactive materials," says Lars Melgaard of OOA, a Danish nuclear information group. Everyone ignored signs prohibiting entry to dangerous areas, participants told Melgaard.

This February the Danish minister for internal affairs asked U.S. authorities which radioactive substances were used in the bombs aboard the crashed B-52. But Danish environmentalists harbor little hope that the U.S. will release this classified military information until 1989, when the bombs, which were B-28s, will no longer be in use.

Of particular interest to the Danes is whether the bombs contained beryllium. A highly toxic substance that causes acute and chronic illnesses of the lungs and skin, weight loss and exhaustion, beryllium lessens the amount of plutonium necessary for a nuclear explosion. With beryllium present, four rather than 12.5 kilos of plutonium would have sufficed per bomb. In 1968 a kilo of plutonium ran around $300,000; a kilo of beryllium $150.

More than 700 American soldiers were stationed at Thule when the plane went down. About 1,400 were flown in—some of them on their way home from Vietnam—to help mop up. But so far there are no U.S. plans to find out if they also are suffering due to radiation exposure.

The Broken Arrow Control Group mobilized immediately, sending Richard Hunziker, an Air Force major-general of inspection and safety, to Greenland to oversee the operation. Broken Arrow is a Pentagon euphemism for nuclear-weapons-related accidents, of which Thule was the 30th.

Hunziker was joined by U.S. Navy investigators who in 1966 had cleaned up a similar B-52 crash in Palomares, Spain, as well as the Air Force units flown to Greenland to share the grunt work with Danish civilians.

Missing–11 kilos: More than 2,000 Americans—90 percent of whom were military personnel—and hundreds of Danes spent four winter months of 1968 on dogsleds in the arctic darkness retrieving cigarette-pack-sized pieces of radioactive bomber debris along with 237,000 cubic feet of contaminated ice. It took 10 days to locate the scattered bomb shards, which were sent back to where they came from—the AEC's Pantex plant in Amarillo, Texas. The search for the rest of the wreckage and radioactive material continued through March 15. According to OOA and Greenpeace Denmark, each bomb contained four kilos of plutonium. Only five kilos, rather than the full 16, were recovered.

In September 1968 a combination of ice and tundra was flown to the Savannah River plant in Aiken, S.C. The dirt was buried in a low-level waste disposal trench. The water underwent an ion exchange process and then joined other liquid waste for eventual release to the environment.

Bombers grounded: The Danish left was infuriated by the crash. One hundred and fifty NATO protesters gathered in Copenhagen to accuse the U.S. of violating the 1949 agreement that granted it air base rights at Thule on the condition that no nuclear bombs be flown over Danish territory.

Within a day of the crash, then-Defense Secretary McNamara removed nuclear weapons from the bombers. Outcry from Danish officialdom shielded him from appearing to acquiesce to Soviet condemnation when he cancelled airborne alert altogether in February.

Untrustworthy urinalysis: In 1968 the Wright-Patterson Air Force radiological laboratory in Dayton, Ohio, analyzed for plutonium more than 20,000 urine specimens of the Americans who had been in Thule. Those test results influenced the 1970 joint U.S.-Danish report that called the cleanup "a classic example of international cooperation" in which no health dangers had been posed from the radioactivity.

Dr. Elliot Abbey of the Veterans Administration Hospital in St. Louis, Mo., told *In These Times* that the urine tests may not have conclusively proved that the men were not exposed to significant amounts of plutonium. It is possible that as the flaming plane skidded across the ice, the plutonium was high-fired rather than air-oxidized. And if the plutonium dioxide particles were in a high-fired state after the crash—and were therefore less soluble—they may have remained in the lungs. Consequently, excretion of radioactivity from the workers' bodies would have been delayed and urinalysis would not have indicated exposure.

Abbey first became interested in the Thule crash six years ago when he diagnosed a patient who had participated in the cleanup with a rare blood cancer called hairy cell leukemia. "If there's a single other person with this type of leukemia that was at Thule, then the chances are extraordinarily high that it had to do with that exposure," Abbey said. He tried to locate other Americans involved, but with no success. And at that time he found the Danish ministry of health unresponsive to his suggestion that they conduct a study.

More recently, a Danish woman named Sally Markussen has had better luck. Her efforts, along with those of Danish environmental lobbyists and the subsequent press attention, forced the Danish government to act. Markussen's 49-year-old husband Ole, who was personnel manager at the Thule base in 1968, has trouble breathing. He vomits frequently, excretes blood and has lost 66 pounds. *The Guardian* of London reported that Markussen informally canvassed 800 Danish Thule workers. She found 500 share symptoms such as weight loss, exhaustion, loss of concentration and coordination, breathing problems and wounds on their limbs that won't heal. More than 90 of them have cancer.

But across the Atlantic sits the Pentagon, and it does not like to admit mistakes. Obtaining medical attention for the Americans who were at Thule might require a class-action suit similar to those filed by Vietnam veterans exposed to Agent Orange.

A Freedom of Information Act request may be the only way to find them. The Air Force's world-wide locator will forward letters to retired servicemen, but the Pentagon is not about to volunteer the names of the clean-up participants, let alone their whereabouts. □

Thule alumni with any kind of blood disease contact Dr. Elliot Abbey at the St. Louis VA Medical Center, 111-JC, St. Louis, MO 63125, or call (314) 652-4100. Those with knowledge of the crash and clean-up are requested to write Robin Epstein, c/o In These Times, *or call (718) 857-2950.*

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Flirting with disaster

Denmark's current health crisis and the history behind it should be a warning signal to Congress, which is scheduled to vote soon on President Reagan's proposed legislation sanctioning bi-weekly commercial flights of 500 pounds of plutonium between Europe and Japan. The administration officials who drafted the proposed 30-year agreement hope to render Japan independent from foreign oil, but at what expense? If passed, the nuclear accord will cede the U.S. right—which does not expire until the year 2003—to veto Japanese plutonium transactions on a case-by-case basis for safety or security reasons.

"The agreement in its present form is ill-conceived, lacks foresight and is actually reckless," says Alan Kuperman of the Washington, D.C.-based Nuclear Control Institute, a non-partisan group that has issued a special report on Japan's planned air shipments of U.S.-supplied spent nuclear fuel to Europe for reprocessing. None of the large casks needed to transport such quantities of plutonium have survived crash tests. France and England would reprocess 85 tons of plutonium—an amount equal to that of the U.S. nuclear arsenal—for use in Japanese reactors by the year 2000. It only takes 15 pounds for a terrorist to make a crude nuclear weapon.