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UNITED STATES NUCLEAR REGULATORY COMMISSION

OFFICE OF THE SECRETARY  
DOCKETING & SERVICE  
BRANCH

U.S. DEPARTMENT OF ENERGY

and

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

(Galileo Radioisotope Thermoelectric Generators)

ISSUANCE OF DIRECTOR'S DECISION UNDER 10 C.F.R. SECTION 2.206

Notice is hereby given that the Director, Office of Nuclear Material Safety and Safeguards, has issued a decision concerning a petition dated September 3, 1989, filed by Thomas J. Saporito, Jr., on behalf of the Nuclear Energy Accountability Project (NEAP). NEAP requested that action be taken by the Nuclear Regulatory Commission (NRC) to intervene and stop the launch of the Galileo Spacecraft scheduled for October 12, 1989. The Petition alleged that the launch of the Galileo Spacecraft, which contains considerable quantities of plutonium-238, would be in violation of Public Law 94-79 which provides that the NRC shall not license any shipments by air transport of plutonium in any form with the exception of certain medical devices. The Petition also alleged a number of health and safety concerns should the launch fail and should the material be dispersed into the atmosphere.

On September 15, 1989, the Director of the Office of Nuclear Material Safety and Safeguards acknowledged receipt of the Petition and notified NEAP that a Decision pursuant to 10 C.F.R. Section 2.206 would be issued within a reasonable time.

89/01/00065XA

The Director has determined that the Petition should be denied. The reasons for the denial are set forth in the Director's Decision Under 10 C.F.R. Section 2.206, DD-89-07, issued on September 25, 1989, which is available for inspection and copying in the Commission's Public Document Room, 2120 L Street, NW, Washington, D.C.

A copy of the Decision will be filed with the Secretary of the Commission for the Commission's review in accordance with 10 C.F.R. 2.206(c). As provided in this regulation, the Decision will become the final action of the Commission 25 days after issuance, unless the Commission, on its own motion, institutes review of the Decision within that time period.

Dated at Rockville, Maryland, this 25<sup>th</sup> day of September 1989.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert M. Bernero, Director  
Office of Nuclear Material Safety  
and Safeguards



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

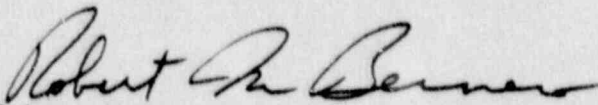
September 15, 1989

Mr. Thomas J. Saporito, Jr.  
Nuclear Energy Accountability Project  
1202 Sioux Street  
Jupiter, Florida 33458

Dear Mr. Saporito:

This letter is to acknowledge receipt of a Petition filed by you on September 3, 1989, on behalf of the Nuclear Energy Accountability Project (NEAP) requesting that action be taken by the NRC to intervene and stop the launch of the Galileo Spacecraft scheduled for October 12, 1989. A formal decision with respect to this matter will be issued within a reasonable time. I have enclosed for your information a copy of the notice that is being filed with the Office of the Federal Register for publication.

Sincerely,

  
Robert M. Bernero, Director  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: As stated

~~8910100067~~

U.S. NUCLEAR REGULATORY COMMISSION  
(Galileo Radioisotope Thermoelectric Generators)

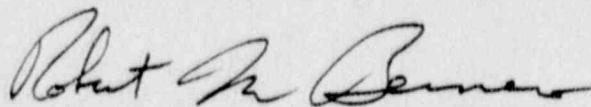
Notice is hereby given that, by Petition filed on September 3, 1989, Thomas J. Saporito, Jr., on behalf of the Nuclear Energy Accountability Project, requested that the NRC intervene and stop the launch of the Galileo Spacecraft scheduled for October 12, 1989. The Petition alleged that the launch of the Galileo Spacecraft, which contains considerable quantities of plutonium-238, would be in violation of Public Law 94-75 which provides that the NRC shall not license any shipments by air transport of plutonium in any form with the exception of certain medical devices. The Petition alleges a number of health and safety concerns should the launch fail and should the material be dispersed into the atmosphere.

The Petition is being treated pursuant to 10 C.F.R. Section 2.206 of the Commission's regulations. As provided by Section 2.206, appropriate action will be taken on the Petition within a reasonable time.

Copies of the Petition are available for public inspection at the Commission's Public Document Room at 2120 L. Street, N.W. Washington, D.C. 20555.

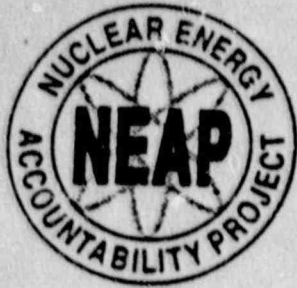
Dated at Rockville, Maryland  
this 15th day of September, 1989.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert M. Bernero, Director  
Office of Nuclear Material Safety  
and Safeguards

~~8910100070~~



# NUCLEAR ENERGY ACCOUNTABILITY PROJECT

1202 Sioux Street • Jupiter, Florida 33458 • (407) 743-0770  
Environmental Protection • Involvement • Litigation • Information

UNITED STATES OF AMERICA  
UNITED STATES NUCLEAR REGULATORY COMMISSION  
REGIONAL ALLEGATION COORDINATOR  
U.S. NRC REGION II  
MR. OSCAR DE MIRANDA

September, 3, 1989

**COPY**

*allegations coord for Jenkins*

\* \* \* \* \*  
In the Matter of the  
National Aeronautics and  
Space Administration  
Project Galileo  
\* \* \* \* \*

42 U.S.C 5841  
10 CFR 2.206

Pursuant to 42 U.S.C. 5841, the Nuclear regulatory Commission shall not license any shipments by air transport of plutonium in any form, whether exports, imports or domestic shipments: Provided, however, That any plutonium in any form contained in a medical device designed for individual human application is not subject to this restriction. This restriction shall be in force until the Nuclear Regulatory Commission has certified to the Joint Committee on Atomic Energy of the Congress that a safe container has been developed and tested which will not rupture under crash and blast-testing equivalent to the crash and explosion of a high-flying aircraft.

Contrary to the above, it appears that the National Aeronautics and Space Administration, NASA intends to launch the space craft Galileo into space on October 12, 1989 carrying a specified amount of plutonium to be used as a fuel source.

We demand intervention by the Nuclear Regulatory Commission to take immediate actions to cause cancellation of the space craft Galileo launch. (42 U.S.C. 5841 & 10 CFR 2.206)

We believe this action by NASA to be in violation of 42 U.S.C. 5841 and therefore a violation of NRC requirements and the law. If NASA is permitted to proceed with the October 12, 1989 launch of the space craft Galileo, we believe that undue risk would place the Public Health and Safety in grave danger wherein grounds for our position would state:

(a) Plutonium is the deadliest payload ever packed into a space craft, one of the world's most dangerous substances. Crushed or burned to breathable particles, wafted on an ocean breeze toward the cities and farms of Central Florida, even a small part of this fuel could, if released, send a toxic shower over hundreds of square miles.

(b) In a draft of a major safety report by NASA, the agency says the risk of an accident is nearly doubled by launching Galileo on the shuttle.

(c) The likliest plutonium spill, according to the draft of NASA's environmental impact statement on Galileo, is an explosion during the shuttle launch that would release a tiny amount of the fuel. The agency estimates the chance of this is (1) in (1,460). An explosion during the launch could cause a handful of cancer deaths, NASA says.

(d) The nature of the cancer threat would be uncertain at first, as well as invisible. Such a situation, involving the chance of lethal dust falling from the sky, would cause widespread uncertainty and anxiety, if not panic, in the area around the Kennedy Space Center.

5 (e) NASA spokesman Charles Redmond says the decision to put Galileo on the shuttle "was not a matter of science." It was part of a political decision to put NASA's eggs entirely in the shuttle basket. "It was a matter of policy." When the Galileo was placed on the drawing board a dozen years ago, "the safety issue was not really looked at, because the shuttle was considered much more reliable than it really is."

(f) The NASA report states that "There are still uncertainties in the estimation of the probabilities of releases, the amount of material released and the consequences to man and the environment from those releases,".

(g) Dr. John Gofman, a leading expert on the health effects of plutonium...he supervised a seven-year study for the U.S. Department of Energy...estimates that as little as (5) percent of Galileo's plutonium, if burned or pulverized and scattered in an accident, could cause cancer in as many as 34,000 people near the Cape Canaveral launch site.

(h) Galileo will be carrying about (49.25) pounds of plutonium, by far the biggest load of radioactive material ever launched into space. Most of it will be plutonium 238. Relatively harmless in lumps, plutonium 238 is one of the world's deadliest substances if inhaled or ingested. Even a mote of the stuff, if lodged in the body, is virtually certain to cause cancer within (18) months.

(i) The plutonium is wrapped in heat-resistant iridium and packed in (203) tough graphite canisters known as radioisotope thermoelectric generators, (RTG'S). The containers are designed to resist powerful, intense fires and severe shocks, but in one test, in 1983, an RTG minus its plutonium was placed about (30) feet from a high-explosive charge. The bomb was detonated and the RTG was blown to smithereens. Nearly one-third of it was so thoroughly pulverized that scientists were unable to find the debris.

(j) The environmental impact statement lists some other effects of an accident as (1) Temporary or longer-term relocation of residents. (2) Temporary or longer-term loss of employment. (3) Destruction or quarantine of agricultural products, including citrus crops. (4) Restriction or bans on commercial fishing. (5) Land use restrictions (which could effect real estate values and tourism activity). (6) Public health effects and medical care... A worst case accident could devastate the economy of a large area.

(k) Citrus exposed to plutonium dust would have to be destroyed, and future crops monitored. Water supplies for the region could be endangered. The NASA reports states the plutonium fallout on the ground could work its way into the aquifer that supplies the cities of Titusville, Mims and Palm Bay. It could also enter the food chain on land and in the sea. This plutonium pollution would pose long-term dangers that are not fully understood.

(l) There could be lasting contamination of the Merritt Island National Wildlife Refuge and the Canaveral National Seashore. The Kennedy Space Center includes nesting sites for bald eagles, wood storkes and other endangered species. The center borders breeding grounds for a variety of commercially important fish and shellfish.



(m) Robert Weatherwax, a leading authority on the dangers of the space shuttle who is the president of Sierra Energy Risk Assessment, a private company, has analyzed shuttle reliability for the Air Force. Weatherwax stated "they're famous for discounting tests when the results aren't what they want." Weatherwax put the chances for an accident (1) in (35). Scientists have had doubts about NASA accident estimates before. In 1986, investigating the Challenger accident, Nobel Laureate Richard Feynman accused the agency of "making up the numbers".

(n) Weatherwax estimates the chance of at least a small, but deadly, plutonium release at about (1) in (350). NASA puts the chance at (1) in (1,460). In either case, the failure rate would be unacceptable in a nuclear waste dump or a nuclear power plant.

15 (o) On the shuttle, Galileo would be fastened near the center of the booster rockets. In an explosion, a wave of force would pass through the probe, flinging spinning fragments and shrapnel at the plutonium canisters.

(p) NASA's continuing problems with the shuttle booster rockets represent an unresolved safety issue.

(q) According to Micho Kaku, professor of nuclear physics at the City University of New York, there could be a "catastrophic incident" with a death toll in the thousands or tens of thousands.

(r) The plutonium which will be encapsulated in "clads" made of an alloy of iridium were tested to survive pressures in excess of 2,000 psi, however, a Department of Energy safety analysis report of 1985 declared that "from the viewpoint of potential nuclear fuel release", the "most critical" accidents would occur on the launch pad...and these could generate pressures higher than 2,000 psi.

Indeed, pressures up to ten times higher were estimated. According to the report, "Because of the large quantities of liquid propellants involved and the proximity of the nuclear payload, most launch pad accidents result in explosions of a magnitude that are very severe in terms of their effect on the nuclear payload."

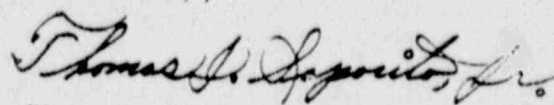
(s) The Biomedical and Environmental Effects Subpanel of INSRP states that "there is one additional consideration that is difficult to resolve. In the case of global dispersion of a low concentration of plutonium-238, the population at risk can equal the total population of the planet, and one is faced in considering the person rem approach, with a situation of 'micro' doses a 'mega' persons."

(t) The Final Safety Analysis Report issued December 17, 1985 states that discounting motor vehicle accidents and diseases, risks due to accidents and extreme weather conditions are approximately in the range of  $10^{-4}$  to  $10^{-7}$  per year. Thus, the risk to an individual associated with these missions is seen to be 20 times less likely than being killed by lightning.

For all the above reasons, and in the interest of Public Health and Safety, we demand your immediate attention in addressing this matter by intervening and stopping the launch of the Galileo. The Public deserves no less. We respectfully request a written response from your office within 15 days of receipt of this letter, detailing specifically what actions your department will take concerning the above.

cc: NRC EDO  
Congressman Fascell  
Governor Martinez  
Ms. Joette Lorton, Director  
Center/Nuclear Responsibility

Sincerely,



Thomas J. Saporito, Jr.  
Executive Director, NEAP

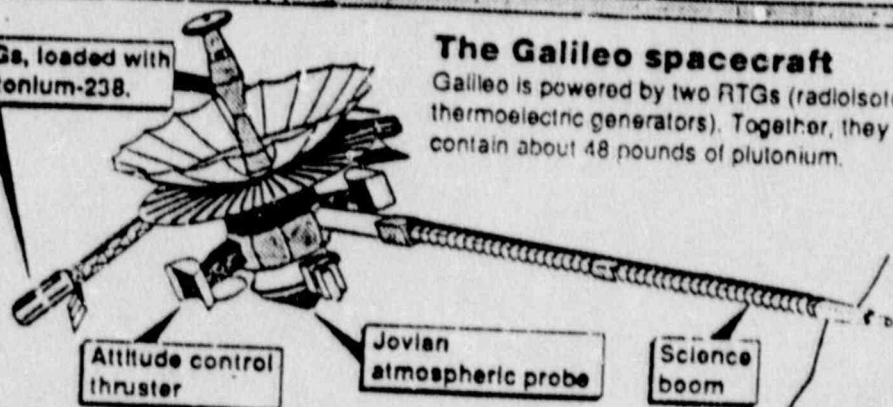
The Galileo probe to Jupiter, scheduled for launch aboard the space shuttle in October, will be the most highly radioactive payload ever

sent into space. If the plutonium that powers Galileo were scattered in an accident, hundreds of people who inhaled the particles could die.

RTGs, loaded with plutonium-238.

### The Galileo spacecraft

Galileo is powered by two RTGs (radioisotopic thermoelectric generators). Together, they contain about 48 pounds of plutonium.



### The plutonium-238

A person could hold a lump of plutonium-238 without serious risk, but inhaling particles of it causes lung cancer. If the deadly isotope were released in a shuttle launch accident, the largest particles would quickly fall to the ground within a six-mile radius. Particle size would decrease with distance from the explosion. The greatest threat might come from the tiniest particles, which could be kept in the air 30 miles or more from the explosion by winds.

