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ORGANIZATIONS UNITED
For Responsible Low-Level Radioactive Waste Solutions

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Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

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SUBJECT: Release of Solid Materials at Licensed Facilities: Issues Paper, Scoping Process for Environmental Issues, and Notice of Public Meetings – 64 *Federal Register* 35090 – June 30, 1999

On behalf of the 21 members of Organizations United for Responsible Low-Level Radioactive Waste Solutions (OU), I am pleased to offer these comments on the Nuclear Regulatory Commission's referenced issues paper and scoping process. OU is a coalition dedicated to socially, environmentally, technically, economically responsible solutions to low-level radioactive waste disposal. We appreciate the opportunity to comment on this very important issue.

OU commends the Nuclear Regulatory Commission (NRC) for its efforts to establish this long overdue standard to regulate the removal of potentially contaminated materials from nuclear facilities. We would also like to recognize NRC for undertaking a thorough public outreach process, which has allowed interested parties to contribute to the establishment a national policy on this issue. We hope that this process will result in a consistent, dose-based standard for the release of solid materials that will be applied to all nuclear facilities in a nondiscriminatory manner.

ORGANIZATIONS UNITED for Responsible Low-Level Radioactive Waste Solutions *is a coalition dedicated to socially, environmentally, technically, economically responsible solutions to low-level radioactive waste disposal.*

Members include:

- *American Association of Physicists in Medicine*
- *American College of Nuclear Physicians*
- *American Council on Education*
- *American Heart Association*
- *American Medical Association*
- *American Nuclear Society*
- *American Society of Nuclear Cardiology*
- *Appalachian Compact Users of Radioactive Isotopes Association*
- *Association of American Medical Colleges*
- *California Radioactive Materials Management Forum*
- *Council on Radionuclides and Radiopharmaceuticals*
- *Edison Electric Institute*
- *Health Physics Society*
- *International Isotope Society*
- *Michigan Coalition of Radioactive Material Users*
- *National Association of Cancer Patients*
- *National Electrical Manufacturers Association*
- *Nuclear Energy Institute*
- *Pharmaceutical Research and Manufacturers of America*
- *Society of Nuclear Medicine*
- *Society of Prospective Medicine*

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Of the three general categories of materials—liquids, gases and solids—containing minute levels of radiation, the NRC has specific, dose-based standards to govern the process for liquids and gases. However, the NRC treats solid materials differently. Instead of having one consistently applied dose-based standard for solid materials, the NRC makes determinations on a case-by-case basis. This approach requires the agency to conduct technical reviews and evaluations each time a nuclear licensee requests permission to release solid materials from a nuclear facility, whether it is a laboratory, hospital or nuclear power plant. Not surprisingly, this process has proven to be extremely time-consuming and costly both to the NRC and the licensees of nuclear materials.

The following are principles that Organizations United considers critical to the establishment of a proper NRC standard for the reuse and disposal of solid materials with no or minute levels of radiation:

- The movement or release of solid materials should be consistent with gases and liquids. There is no scientific basis for not doing so.
- The NRC must develop a scientifically determined, practically applied reasonable dose-based standard.
- Solid materials that do not pose a threat to public health and safety or the environment should be available for reuse, recycling and/or disposal in landfills.
- OU urges the avoidance of overly conservative assumptions in the selection of parameters for establishing a standard. Simplifying assumptions not supported by scientific data must be avoided.
- Users of radioisotopes need clear guidelines that will not change with time and technology, or regulatory whim.
- Unnecessary regulatory burdens—those not tied to the protection of the public health and safety—should be eliminated.

The adoption of a reasonable standard for the release of solid materials would positively impact hospitals and medical research facilities and ensure that the treatment we provide is not threatened by the increased liability that comes from releasing materials on a case-by-case basis. Such a standard must ensure the continued protection of public health and safety as well as the environment.

A standard of 10 millirem is a fraction of the 360 millirem that the average person receives every year without identifiable health consequences. Solid materials containing this amount of radioactive material do not pose a threat to public health

and safety, and could be disposed of in landfills. The NRC should designate items below the 10-millirem threshold as "safe and clean" and no threat to the health and safety of the American public.

On behalf of the member organizations in Organizations United, I recommend that the NRC adopt 10 millirem as the dose-based standard for the release of solid materials from nuclear facilities. This is a reasonable, scientifically justifiable standard that will provide thorough protection for both the American public and the environment. If you have any questions, please contact me at 409.772.8016.

Sincerely,

Martin L. Nusynowitz, M.D.
Chairman

Enclosure

COMMENTS ON THE NUCLEAR REGULATORY COMMISSION'S DOSE-BASED STANDARD FOR RELEASE OF SOLID MATERIALS

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CHAIRMAN
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RADIOACTIVE WASTE SOLUTIONS

I am Dr. Martin L. Nusynowitz, professor of Radiology, Internal Medicine and Pathology at the University of Texas Medical Branch, and Chairman of Organizations United for Responsible Low-Level Radioactive Waste Solutions (OU).

Organizations United is a coalition dedicated to socially, environmentally, and technically responsible solutions to low-level radioactive waste disposal. OU's membership includes: the American Association of Physicists in Medicine, the American College of Nuclear Physicians, the American Council on Education, the American Heart Association, the American Medical Association, the American Nuclear Society, the American Society of Nuclear Cardiology, the Appalachian Compact Users of Radioactive Isotopes Association, the Association of American Medical Colleges, the California Radioactive Materials Management Forum, the Council on Radionuclides and Radiopharmaceuticals, the Edison Electric Institute, the Health Physics Society, the International Isotope Society, the Michigan Coalition of Radioactive Materials Users, the National Association of Cancer Patients, the National Electrical Manufacturers Association, the Nuclear Energy Institute, the Pharmaceutical Research and Manufacturers of America, the Society of Nuclear Medicine, and the Society of Prospective Medicine.

Organizations United commends the NRC for its efforts to establish a long overdue standard to govern the removal of solid materials with no or miniscule amounts of radiation from nuclear facilities. Treating solid materials in a manner consistent with the current uniform dose-based standards for gases and liquids is meaningful regulatory improvement. We would also like to applaud the meaningful public outreach program coordinated by the NRC on this issue. Allowing all interested parties opportunity to contribute to the establishment of reasonable public policy is the essence of democracy.

Organizations United is participating in the public meeting process to help the NRC develop a comprehensive and thoughtful analysis of this subject. Ultimately, the NRC public meeting process should aid in developing a consistent, dose-based standard for the release of solid materials that will apply to all nuclear facilities in a nondiscriminatory manner.

America's advanced industrial economy and high standard of living would not be possible without the use of nuclear technologies. Many people do not realize the widespread benefits of nuclear technologies that are used in many areas of our lives. Nuclear technology is used in various applications, such as medical diagnosis and treatment, agriculture, industry and environmental protection. These uses of nuclear technology make significant contributions to our quality of life.

NUCLEAR TECHNOLOGIES IN MEDICINE:

Every year, one in three of the 30 million Americans who are hospitalized are diagnosed or treated with nuclear medicine techniques. Radionuclides are also used in literally millions of patient laboratory tests on body fluid and tissue specimens.

Diagnosis is one of the primary uses of nuclear medicine. It is made possible by the ability to label with radioactive pharmaceuticals, which concentrate in certain parts of the body. When a patient is injected with a radioactive pharmaceutical, a special camera can take pictures of the radioactivity in an organ and of its distribution, reflecting whether disease is present. For example:

- Myocardial perfusion imaging maps the blood flow to the heart muscle, allowing physicians to see whether a patient has heart disease and to determine the most effective kind of treatment.
- Bone scans can detect the spread of cancer six to 18 months sooner than X-rays, allowing appropriate treatment planning earlier.
- Kidney scans are more sensitive than X-rays or ultrasound in evaluating kidney function.
- Imaging with radio-technetium-99mlabeled white blood cells can diagnose bone infections in young children at the earliest possible stage.
- Laboratory techniques using radioactivity can detect underactive thyroid glands in newborn babies, making prompt treatment possible and saving many children from mental retardation.
- Radionuclides, in a stronger form, also can be used to treat disease. When President Bush and Barbara Bush both suffered from Grave's disease, a condition of thyroid gland overactivity, they were treated by drinking a form of radioactive iodine that concentrates in the thyroid and restores its function to normal. This treatment is so successful that it has virtually replaced thyroid surgery.
- Radioactive iodine is also widely used to treat thyroid cancer. It lowers the recurrence rate and mortality.

From diagnosis and treatment of benign and malignant diseases to the sterile bandages and gauze most of us use at home, from the sterilization of disposable medical equipment, such as needles, glass syringes and surgical sutures, the medical use of radioactivity makes a tremendous contribution to the health and well being of Americans.

NUCLEAR TECHNOLOGIES IN SCIENTIFIC RESEARCH:

Radioactivity has an important role in a broad range of scientific endeavors:

The FDA requires all new drugs to be tested for safety and efficacy. More than 80 percent of the new drugs are tested using radioactive materials.

Radioactive materials are also essential to the biomedical research that seeks causes and cures for diseases like AIDS, cancer and Alzheimer's disease. Radionuclides are used extensively in metabolic studies, genetic engineering and environmental protection studies.

One example of its scientific application is carbon dating. Carbon-14, is a naturally occurring, long-lived radioactive isotope and its measurement makes it possible for archaeologists to tell when artifacts containing plant or animal materials were alive, created or used. Museums rely on nuclear technology to verify the authenticity of paintings and art objects and criminal investigators use them to examine physical evidence in order to link suspects to crimes.

INDUSTRY USES OF NUCLEAR TECHNOLOGY:

Nearly every industry uses radioactive materials in some manner. Because radiation loses energy as it passes through substances, industry has been able to develop highly sensitive gauges to measure the thickness and density of many materials; imaging devices for radioactivity are also used to inspect finished goods for weaknesses and flaws.

Small amounts of a radioactive isotope are commonly used as tracers in process materials. These tracers make it possible to track leakage from piping systems, monitor the rate of engine wear and corrosion of processing equipment, observe the velocity of materials through pipes, and gauge system filtration efficiency.

Nuclear technology is used widely in the production of instruments that take measurements, without direct physical contact with the substance being measured, and they provide excellent cost savings. An example is level gauges containing radioactive sources that are used where heat, pressure or corrosive substances, like molten glass or metal, make it difficult or impossible to use direct contact gauges.

Other industrial uses of nuclear technologies include the following:

- The automotive industry used radioactive materials to test the quality of steel in cars.
- Aircraft manufacturers use radiation to check for flaws in jet engines.
- Mining and petroleum companies use Radionuclides to locate and quantify mineral deposits.

- Container manufacturers use radioactive materials to obtain the proper thickness of tin and aluminum.
- Pipeline companies use radioactive materials to look for defects in welds. Oil, gas and mining companies use them to map geological contours, using test wells and mine bores, and to determine the presence of hydrocarbons.
- Construction crews use radioactive materials to gauge the density of road surfaces and subsurfaces.

NUCLEAR TECHNOLOGIES IN AGRICULTURE:

The use of nuclear technologies in the field of agriculture improves various types of plants, controls pests and preserves food. Radionuclides are a basic tool for agricultural scientists around the world, including:.

- Developing hundreds of new varieties of hardier, more disease-resist crops—including peanuts, tomatoes, onions, rice, soybeans, and barley in agricultural research laboratories.
- Improving the nutritional value of some crops as well as to improve their baking or melting qualities or reduce their cooking time.
- Pinpointing where illnesses strike animals in order to breed disease-resistant livestock.
- Showing how plants absorb fertilizer, they help researchers learn when fertilizer should be applied and how much is needed. This helps prevent the overuse of fertilizer, a major source of soil and water pollution.
- Helping farmers and scientists control insects. Unlike chemicals, which can leave unhealthy residues in the soil, on the plants and in water, this technology does not pollute. California has used radiation sterilization techniques since the mid-1970's to control infestations of Mediterranean fruit flies.

The use of radiation in food safety continues to grow in the United States and has been used for many years in Europe. In fact, food irradiation has been approved to control food loss and to improve sanitation for over 100 kinds of food in 41 countries. France uses irradiation to destroy salmonella in frozen chicken. France, Holland and Belgium irradiate spices, fish and shellfish. Irradiation is also used to prevent unwanted germination. China applies this to garlic, and Japan to white potatoes. In the United States, we irradiate poultry, beef, fruits and vegetables.

NUCLEAR TECHNOLOGY IN CONSUMER PRODUCTS & SERVICES

Nuclear technologies supply necessities and conveniences upon which virtually everyone depends in our daily lives. One example is electricity. More than 100 nuclear energy plants provide one-fifth of the United States' electricity without any air emissions. Vermont, Connecticut, New Jersey, Maine, New Hampshire, South Carolina, and Illinois rely on nuclear energy for more than 50 percent of their electricity.

Other examples or consumer products or services using nuclear technology include the following:

- Smoke detectors, installed in nearly 90 percent of United States homes, rely on a tiny radioactive source to sound the alarm when they sense smoke from a fire.
- Computer disks "remember" data better when they are treated with radioactive materials.
- Non-stick pans are treated with radiation to ensure that the coating will stick to the surface.
- Photocopiers use small amounts of radioactive material to eliminate static and prevent paper from sticking together and jamming the machine.
- Cosmetics, hair products and contact lens solutions are sterilized with radiation to remove irritants and allergens.

NRC MUST ADOPT REASONABLE STANDARD FOR THE REMOVAL OF SOLID MATERIALS FROM NUCLEAR FACILITES

Americans have a right to expect that they will not be endangered when any materials are removed from nuclear facilities, no matter whether the material is solid, liquid or gas. It is the joint responsibility of the NRC and industry to ensure public health and safety as well as the environment when any materials are moved to and from nuclear facilities. Any standard adopted for the removal of solid materials must guarantee that both the public and the environment continue to be protected from harm.

Of the three general categories of materials—liquids, gases and solids—containing minute levels of radiation, the NRC has specific, dose-based standards to govern the process for liquids and gases. However, the NRC treats solid materials differently. Instead of having one consistently applied dose-based standard for solid materials, the NRC makes determinations on a case-by-case basis. This approach requires the agency to conduct technical reviews and evaluations each time a nuclear licensee requests permission to release solid materials from a nuclear facility, whether it is a laboratory, hospital or nuclear power plant. Not surprisingly, this process has proven to be extremely time-consuming and costly both to the NRC and the licensees of nuclear materials.

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- OU urges the avoidance of overly conservative assumptions in the selection of parameters for establishing a standard. Simplifying assumptions not supported by scientific data must be avoided.
- Users of radioisotopes need clear guidelines that will not change with time and technology, or regulatory whim.
- Unnecessary regulatory burdens—those not tied to the protection of the public health and safety—should be eliminated.

The NRC regulations that set standards for protection of the public against radiation appear in 10 CFR Part 20. These regulations limit the radiation exposure that a member of the public can receive from the operation and decommissioning of a nuclear facility, and also require that doses received be "as low as is reasonably achievable (ALARA)." It is in this provision that the NRC established limits on the amount of radiation acceptable for the release of gases and liquids from licensed nuclear facilities. Without specific criteria for the release of solid materials, the process of setting standards on a case-by-case basis is inefficient; the results inconsistent.

While the case-by-case technical reviews have protected the health and safety of the American public, they have led to confusion with their propensity for inconsistencies. For the nuclear industry, this approach essentially has been like attempting to hit a moving target. The location of the target varies depending on the sophistication of the technology used to survey the material. Different survey instruments result in different levels of detection. This variability increases the potential for disagreements and confusion. The very lack of uniformity makes the case-by-case approach sorely lacking as public policy.

The NRC should strive to adopt a consistent regulatory framework for evaluating releases of all materials by establishing a dose-based standard for solid materials, such as metals, building concrete, soils, equipment, furniture, clothing, shoes, vehicles, tools, and equipment.

WHAT BENEFITS WILL A DOSE-BASED STANDARD FOR RELEASE OF SOLID MATERIALS PROVIDE?

With a dose-based standard, the NRC regulatory process will be a classic "win-win" situation, providing more rationality and predictability to licensees of nuclear materials and reducing the potential for disagreement and confusion among the public. The public, the environment, the NRC and the nuclear industries all will receive major benefits from the new regulation.
The major benefits of a consistent standard include:

- A clear, dose-based standard for the release of solid materials and a consistent regulatory approach should increase public confidence in the NRC's regulatory processes and help allay concerns about inconsistent treatment of radioactive materials.

- Requiring materials that pose a low risk of either human or environmental damage to remain at nuclear facilities wastes societal resources.
- Adoption of a reasonable dose-based standard for releasing solid materials will allow the reuse of materials, or permit disposal at industrial landfills.
- If the NRC ultimately adopts a dose-based standard compatible with proposed international standards, American firms will not be placed at a competitive disadvantage in the global market.
- A reasonable and predictable standard will result in a significant reduction in the compliance costs associated with unnecessary and/or inefficient regulatory burdens. Conversely, a standard set at very low levels could force doctors and other professionals to spend more time dealing with the proper disposal of packages, such as cardboard boxes or metal containers, for shipping radioisotopes rather than diagnosis and treatment of their patients.
- Future decommissioning of nuclear power plants may result in significantly more material and equipment that requires clearance. A reasonable standard can both protect public safety and the environment and lower the cost of disposal of materials as electric companies return these sites to green field status for other uses.

HOW OTHERS HANDLE THE MATTER:

Economic globalization is a trend that demands consideration. Ever greater global economic integration is a fact of life. The nations of the world are increasingly interdependent. Compatibility with the standards adopted by other nations and international agencies is important because materials are imported and exported between the United States and other nations on a daily basis. Differing regulatory standards could create confusion and economic disparities in commerce. It is in our own self-interest as Americans to ensure that our companies are not at a competitive disadvantage due to governmental policies.

America must not abdicate its role as world leader in the peaceful uses of nuclear technology. Since the inception of civilian nuclear industries in the 1950s, the United States has been the world leader in using these applications to improve health care and bolster our economy. It is critical that we continue to play a leadership role by determining a reasonable standard for releasing safe solid materials containing minute levels of radioactive matter from nuclear facilities. We must not leave this decision to other nations. The time to act on this issue is now, while we can still influence the development of a safe and reasonable international standard.
There is considerable effort by other nations and by international agencies, such as the International Atomic Energy Commission (IAEC)—an agency of the United Nations, to establish standards in this area are firmly established. The United States should constructively participate.

WHAT WOULD BE A REASONABLE DOSE-BASED STANDARD?

Radiation is a natural part of our daily lives—it is contained in the food we eat, the water we drink, the air we breathe, and the homes in which we live.

We get radiation from the sun's cosmic rays and from radon gas, and from building materials such as granite and brick. On average, Americans are exposed to 300 millirem per year of naturally occurring radiation and another 60 millirem of manmade radiation

The existing NRC standards, including the public dose limit of 100 millirem per year and the dose criterion of 25 millirem per year for the release of decommissioned structures and lands are safe and provide a ceiling for the establishment of a standard for the release of solid materials. Why should the release of solid materials containing minute amounts of radioactive matter be treated more severely?

The standard must be scientifically determined and practical. Zero millirem is not a reasonable standard. In 1996, the NRC proposed a reasonable standard—it recommended a 10-millirem standard for release of solid materials. 10 millirem, a small fraction of the annual natural radiation we each receive without any identifiable negative health consequences, is a reasonable level for the NRC to formally adopt as its standard for removing solid materials from nuclear facilities.

The Clean Air Act allows up to 10 millirem per year in the air we breathe. The Safe Drinking Water Act allows up to 4 millirem per year in the water we drink. Clearly exposures at these low levels are safe and justified based on the benefits society derives from nuclear technologies. Organizations United commends the NRC for its efforts to develop a standard to provide similar regulatory consistency for the reuse or removal of solid materials from nuclear facilities. Common sense demands this.

We need to replace the current inconsistent system that treats the same levels of radiation at different types of facilities in very different manners. Sound public policy demands consistency. The current case-by-case method of dealing with solid materials containing minute amounts of radioactive material lacks clarity, consistency, and predictability—hallmarks of good public policy.

A single federal standard will eliminate much disagreement and confusion.

ALTERNATIVE APPROACHES TO THE RELEASE OF MATERIALS:

In broad terms, there are several possible approaches for the release of solid materials, with extremely low levels of radiation from nuclear facilities. Some combinations also may be possible.

- Release the materials for unrestricted use. This would allow them to be recycled or reused in consumer goods or industrial products, or be disposed of in solid waste landfills.

- Impose some form of restriction on future use of solid materials. Perhaps restricting reuse to NRC licensed facilities with the only option being disposal at landfills.
- Restrict the release of solid material from nuclear facilities to disposal at solid waste landfills, essentially prohibiting the reuse or recycling of the materials but allowing for regular unrestricted disposal.
- A tiered approach that would allow materials for unrestricted use if the potential dose to the public from the material is less than a specified level. Other materials with higher levels of radiation would be restricted in their future use in some manner. The tiered approach seems to potentially offer the most flexibility.

CONCLUSIONS:

Man has harnessed nuclear technologies in medical diagnosis and treatment; research into cures for disease; the development of new drugs; hardier, more disease-resistant crops; everyday consumer goods and services; and to generate the nuclear energy that supplies 20 percent of our electricity without creating any greenhouse gases or acid rain.

The adoption of a reasonable standard for the release of solid materials would positively impact hospitals and medical research facilities and ensure that the treatment we provide is not threatened by the increased liability that comes from releasing materials on a case-by-case basis. Such a standard must ensure the continued protection of public health and safety as well as the environment.

A standard of 10 millirem is a fraction of the 360 millirem that the average person receives every year without identifiable negative health consequences. Solid materials containing this amount of radioactive material do not pose a threat to public health and safety and could be disposed of in regular landfills. The NRC should designate items below the 10-millirem threshold as "safe and clean" and no threat to the health and safety of the American public.

On behalf of the member organizations in Organizations United, I recommend that the NRC adopt 10 millirem as the dose-based standard for the release of solid materials from nuclear facilities. This is a reasonable, scientifically justifiable standard that will provide thorough protection for both the American public and the environment.