OFFICE OF THE CHAIRMAN

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TO: DR

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OM Reply for Chairman's signature

For information: GM____ Commissioners____ DR ✓

Remarks______________________________

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Julius H. Rubin
For the Chairman

FROM
Sen. Harold E. Hughes (Iowa)

CONTROL NUMBER
2161

ACTION COMPLETION DEADLINE
5/9/69

DATE OF DOCUMENT
4/30/69

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TO

Chairman Seaborg

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DESCRIPTION Ltr ☐ Original ☒ Copy ☐ Other

Ltr fm the senior American Government Class, Iowa Braille & Sight Saving School, expressing concern re the construction of the Duane Arnold plant and the possible danger by tornadoes

Encl - newspaper clipping on 'The Myth of the Peaceful Atom'
GM 33369

REMARKS
Reply for Chairman's signature
'Dear Senator Hughes'

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16

United States Senate

COMMITTEE ON BANKING AND CURRENCY
WASHINGTON, D.C. 20510

April 30, 1969

Honorable Glenn T. Seaborg
Chairman
Atomic Energy Commission
Washington, D. C. 20545

Dear Dr. Seaborg:

I have enclosed a letter which I received from the senior American Government Class at the Iowa Braille and Sight Saving School expressing their concern over the use of nuclear power plants, and the possible construction of one near Cedar Rapids, Iowa.

Since I am not informed of the guidelines used by AEC in siting nuclear reactors, I would be most appreciative if you could suggest a reply to this correspondence.

Sincerely,

Harold E. Hughes

HAROLD E. HUGHES

HEH:bjp

Enclosure

IOWA BRAILLE AND SIGHT SAVING SCHOOL
VINTON, IOWA

APR 24 1969

April 21, 1969

The Honorable Harold E. Hughes
Senator From Iowa
Washington, D.C.

Sir:

After reading the enclosed article, the senior American government class at the Iowa Braille and Sight Saving School in Vinton, Iowa has become deeply concerned over the dangerous use of the atom as a source of power. We are concerned because the Iowa Electric Light and Power Company is promoting the building of a nuclear power plant a few miles northwest of Cedar Rapids, Iowa. Because Iowa is a tornado state, such a reactor could be very easily damaged by a tornado, which, depending on the extent of the damage, could cause very grave problems for the near by populated areas. Also, accidents could easily occur during the transfer of spent reactor cores from the reactor to storage areas and reprocessing plants. Since such materials must be stored for long periods of time, the containers in which these materials are stored are susceptible to damage by natural disasters such as earthquakes ect.

We are concerned with this matter not only locally but also nationally. We feel that people throughout the nation are concerned but do not voice their concern because they feel that their individual opinions would be ineffective. However, we believe that since you are our senator and spokesman, and are interested in the wellfare of the American public, you will take action to prevent the use of the atom as a source of power until a way can be found to eliminate the possible dangers.

As you are our senator, we felt that we should write to you first concerning this matter. However, we are willing to send letters to other prominent senators and representatives if you feel it advisable. We hope you will answer this letter and advise us as to what action you will take and as to how we should proceed in this matter. We sincerely appreciate your cooperation.

Yours very truly,

Senior American Government Class

A most concerned and apprehensive
senior American government class

Call Safe Atom A Myth

Nuclear power will soon be a reality in Iowa, with several plants near the state borders and another planned near Cedar Rapids. Little has been said publicly about the possible dangers of such plants. The following article, which details these dangers, has been excerpted from the magazine, Natural History, published by the Museum of Natural History in New York.

By Richard Curtis and Elizabeth Hogan

The belief is widespread that the nuclear reactors being built to generate electricity for our cities are safe, reliable, and pollution-free. But a rapidly growing number of physicists, biologists, engineers, public health officials, and even staff members of the Atomic Energy Commission itself have been expressing serious misgivings about the planned proliferation of nuclear power plants. In fact, some have indicated that nuclear power represents the gravest pollution threat yet to our environment.

As of June, 1968, 15 commercial nuclear power plants were operating or operable within the United States, producing about one per cent of our current electrical output. The government, however, has been promoting a plan by which half of our electric power will be generated by the atom by the year 2000. To meet this goal, 87 more plants are under construction or on the drawing boards. Although atomic power and reactor technology are still imperfect sciences, these reactors are going up in close proximity to heavy population concentrations. Most of them will be of a size never previously attempted by scientists and engineers. They are, in effect, gigantic nuclear experiments.

Radioactive Materials

Atomic reactors are designed to use the tremendous heat generated by splitting atoms.

Unfortunately, however, heat is not the only form of energy produced by atomic fission. Another is radioactivity.

Some of the fission by-products have been described as a million to a billion times more toxic than any known industrial chemical.

Because the intense radioactivity in a reactor core eventually interferes with the fuel's efficiency, the spent fuel assemblies must be removed from time to time and replaced. The old ones are transported to reprocessing plants where the contaminants are separated from the salvageable fuel as well as from plutonium, a valuable by-product.

Since no satisfactory means has been found for neutralizing the radioactive liquid containing the contaminants, it must be stored until it is no longer dangerous. Thus, reprocessing plants and storage areas are immense repositories of "hot" and "dirty" material. Furthermore, routes between nuclear power plants and the reprocessing facility carry traffic bearing high quantities of such material.

Even from this glimpse it will be apparent that public and environmental safety depend on the flawless containment of radioactivity every step of the way. For, owing to the incredible potency of fission products, even the slightest leakage is harmful and a massive release would be catastrophic.

The fundamental question, then, is how heavily can we rely on human wisdom, care, and engineering to hold this peril under absolute control?

Abundant evidence points to the conclusion that we cannot rely on it at all.

Nuclear physicists assure us that reactors cannot explode like atomic bombs because the complex apparatus for detonating an atomic warhead is absent. This fact, however, is of little consolation when it is realized that only a conventional explosion, which ruptures the reactor structure, could produce havoc on a scale eclipsing any industrial accident on record or any single act of war, including the atomic destruction of Hiroshima or Nagasaki.

Numerous Ways

There are numerous ways in which such an explosion can take place in a reactor. For example, liquid sodium, which is used in some reactors, as a coolant, is a devilishly tricky

Please turn to Page Eight

NUCLEAR —

Fear 'Perpetual Hiroshima' as Atom Power's Legacy

NUCLEAR --- *Continued from Page One*

element that under certain circumstances burns violently on contact with air. Accidental exposure of sodium could initiate a chain of reactions: rupturing fuel assemblies, damaging components and shielding, and destroying primary and secondary emergency safeguards.

Another possibility is that fission products could be carried out of the reactor and into a city's watershed, for all reactors are being built on lakes, rivers, or other bodies of water for cooling purposes.

What Would The Toll Be?

What would be the toll of such a calamity?

In 1957 the Atomic Energy Commission issued a study (designated Wash. —740), largely prepared by the Brookhaven National Laboratory, that attempted to assess the probabilities of such "incidents" and the potential consequences. Some of its findings were stupefying:

From the explosion of a 100-200 megawatt reactor, as many as 3,400 people could be killed, 43,000 injured, and as much as $7 billion of property damage done. People could be killed at distances up to 15 miles and injured up to 45.

Land contamination could extend for far greater distances: agricultural quarantines might prevail over an area of 150,000 square miles, more than the combined areas of Pennsylvania, New York, and New Jersey.

The scientists and engineers who produced the Brookhaven Report optimistically ventured to give high odds against such an occurrence, asserting that the structures, systems, and safeguards of atomic plants were so engineered as to render it practically incredible.

Many of the grounds on which the Brookhaven team based its conclusions, however, are shaky at best.

For one thing, all of us are familiar with technological disasters that have occurred against fantastically high odds: the November 9, 1965, "blackout" of the northeastern United States, for example. The latter happening illustrates how an "incredible" event can occur in the electric utility field, most experts agreeing that the chain of circumstances that brought it about was so improbable that the odds against it defy calculation.

Many Accidents Already

A disturbing number of reactor accidents already have occurred — with sheer luck playing an important part in averting catastrophe — that seem to have been the product of incredible coincidences.

On Oct. 10, 1957, for instance, the Number One Pile (reactor) at the Windscale Works in England malfunctioned, spewing fission products over so much territory that authorities had to seize all milk and growing foodstuffs in a 400-square-mile area around the plant. A British report on the incident stated that all of the reactor's containment features had failed.

The Problem of Reactor Safety

The atomic industry has attempted to design components and safeguards so that failure of one vital system in a plant will not affect another, resulting in a "house of cards" collapse. However, two highly regarded authorities, Theos J. Thompson and J. T. Beckerley, in a book on reactor safety advise us not to place too much faith in claims of independent safeguards: "A structure as complex as a reactor and involving as many phenomena is likely to have relatively few completely independent components."

Many manufacturers and utility operators have resisted the idea of producing "redundant safeguards" on the grounds of excessive cost.

Investigations of reactor breakdowns usually disclose a number of small, seemingly unrelated failures, which snowballed into one big one.

It should be apparent that if men are to build safe, successful reactors, the whole level of industrial workmanship, engineering, inspection, and quality control must be raised well above prevailing levels. When meters, grams, and seconds are no longer good enough, and specifications call for millimeters, milligrams, and milliseconds, the demands made on men, material, and machinery are accordingly intensified. And when the technology is not only exacting but hazardous in the extreme, then a trivial oversight, a minor defect, a moment's inattention may spell doom.

Technology Meets Its Match

While there is little doubt that American tehnology is the most refined on earth, there is ample reason to believe that it has more than met its match in the seemingly insurmountable problems posed by the peaceful atom. Societies of professional engineers, and others concerned with establishing technical and safety criteria for the nuclear industry, have described between 2,800 and 5,000 technical standards that are necessary for a typical reactor power plant.

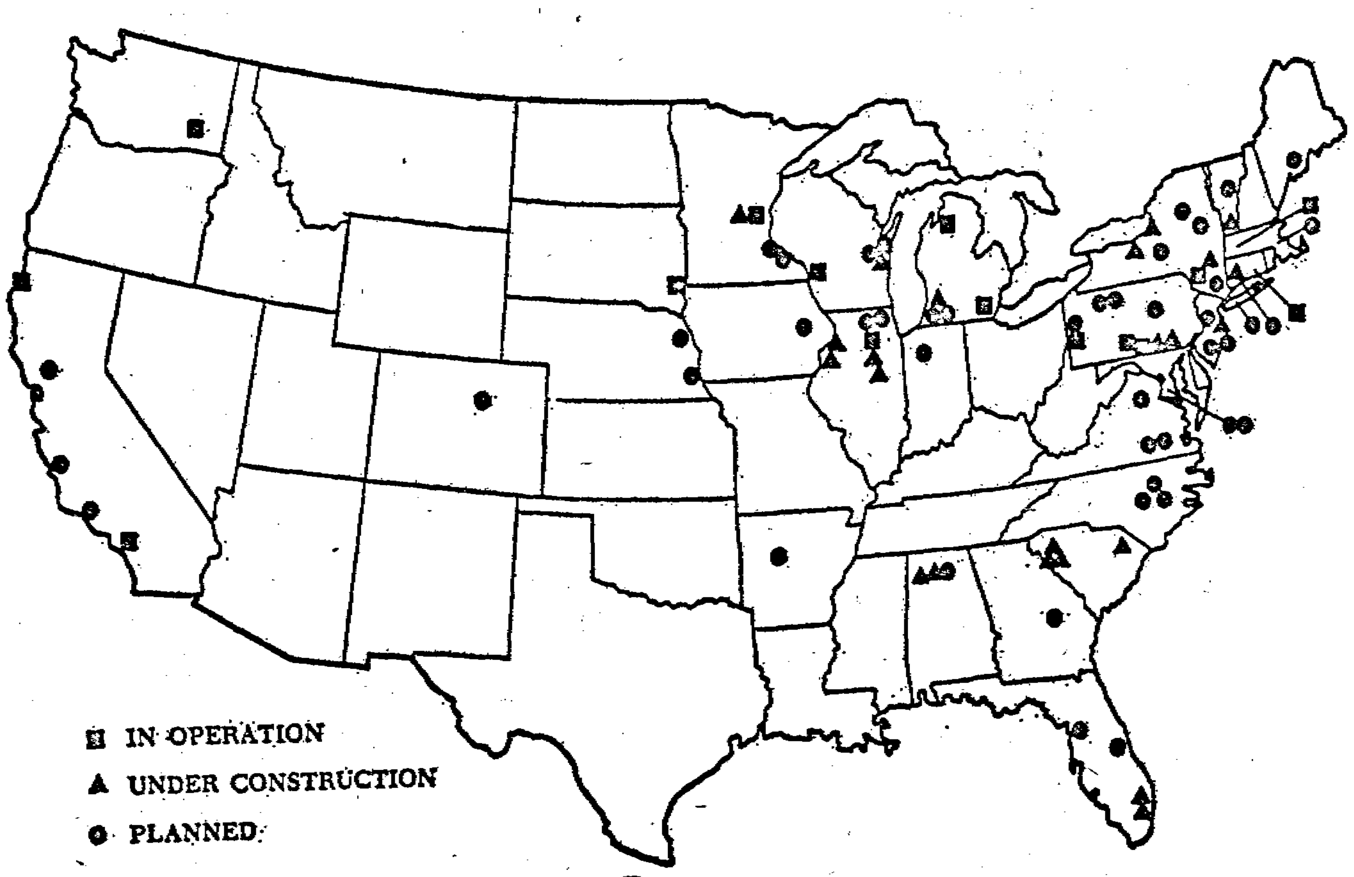
Yet, due to the rapidity with which the nuclear industry has developed, as of March, 1967, only about 100 of these had been passed on and approved for use.

It is not surprising, then, to learn that serious technical difficulties are turning up in reactor after reactor. At the Big Rock Point Nuclear Plant, a relatively small reactor near Charlevoix, Michigan, control rods were found sticking in position, studs failing or cracked, screws jostled out of place and into key mechanisms, a valve malfunctioning for more than a dozen reasons, foreign material lodging in critical moving parts, and welds cracked on every one of sixteen screws holding two components in place.

Reactors in Wisconsin, Minnesota, Connecticut, Puerto Rico, New York, and elsewhere have experienced innumerable operating difficulties, and some, such as the $55 million Hallam plant in Nebraska, have been forced to shut down for good, owing to plant malfunction.

If a major reactor catastrophe did occur there is good reason to believe that the consequences would be far worse than even the dismaying toll suggested by the 1957 Brookhaven Report, for a number of developments since then have made the toll considerably more formidable.

The Brookhaven Report's accident statistics, for instance, pertained to a reactor of between 100 and 200 megawatts. But while the 15 reactors currently operating in the United States average about 186 megawatts, the 87 plants going up or planned for the next decade are many times that size.



Nuclear Power Plant Progress

Map shows locations of nuclear power plants in operation, under construction or planned. The first such plant in Iowa is expected to be completed late in 1973 northwest of Cedar Rapids. The plant, being built by Iowa Electric Light and Power Co., of Cedar Rapids, will cost about $100 million.

Iowa-Illinois Gas & Electric Co., with headquarters in Davenport, is sharing in the construction of a twin $160-million plant along the Mississippi River at Cordova, Ill. The initial Cordova complex, of which Commonwealth Edison Co., of Chicago, Ill., has a majority interest, is expected to be operating in 1970 with the second unit slated for completion a year later.

A small facility was placed in operation last year by Dairyland Power Co-op at Genoa, Wis., across the Mississippi from the northeast tip of Iowa and a huge plant built by Northern States Power Co., of Minneapolis, Minn., has been in operation at Sioux Falls, S.D., since 1962.

Four other plants are proposed near Iowa's border. They are: A $140-million plant being built by Consumers Public Power District of Columbus, Neb., at Brownville, Neb.; a plant being built by the Omaha Public Power District at Fort Calhoun, Neb., north of Omaha; and two facilities being built by Northern States Power Co. at Prairie Island along the Mississippi southeast of Minneapolis. These plants are slated for completion in 1972.

The AEC has admitted that nuclear plants in Connecticut, California, New York, and other locations "have been approved with lower distances than our general guides would have indicated when they were approved."

Is it necessary to build atomic plants so big and so close? The answer has to do with economics. The larger a facility is, the lower the unit cost of construction and operation and the cheaper the electricity. The longer the fuel cycle, the fewer the expensive shutdowns while spent fuel assemblies are replaced. The closer the plant is to the consumer, the lower the cost of rights of way, power lines, and other transmission equipment.

On a few occasions an aroused public has successfully opposed the situation of plants near population centers. When the Pacific Gas and Electric Company persisted in trying to build a reactor squarely over earthquake faults in an area of known seismic activity — the site was north of San Francisco —a courageous conservation group forced the company to back down.

For the most part, however, the battle has been a losing one.

The threat of a nuclear plant catastrophe constitutes only half of the double jeopardy in which atomic power has placed us. For even if no such calamity occurs, the gradual exhaustion of what one scientist terms our environmental "radiation budget," due to unavoidable releases of radioactivity during normal operation of nuclear facilities, poses an equal and possibly more insidious threat to all living things on earth.

Most of the fission products created in a reactor are trapped. Contaminated solids, liquids, and gasses are isolated, allowed to decay for a short period of time, then concentrated and shipped in drums to storage areas. These are called "high-level wastes."

But technology for retaining all radioactive contaminants, is either unperfected or costly, and much material of low-level radioactivity is routinely released into the air or water at the reactor site. These releases are undertaken in such a way, we are told, as to insure dispersion or dilution sufficient to prevent any predictable human exposure above harmful levels. Thus, when atomic power advocates are asked about the dangers of contaminating the environment, they imply that the relatively small amounts of radioactive materials released under "planned" conditions are harmless.

This view is a myth.

Radiation Builds Up In the Body

In the first place, many waste radionuclides take an extraordinarily long time to decay.

Further, many radioactive elements taken into the body tend to build up in specific tissues and organs to which those isotopes are attracted, increasing by many times the exposure dosage in those local areas of the body. Iodine-131, for instance, seeks the thyroid gland; strontium-90 collects in the bones; cesium-137 accumulates in muscle. Many isotopes have long half-lives, some measurable in decades.

The Food Chain

Still another problem has received inadequate attention. Man is by no means the only creature in whom radioactive isotopes concentrate.

The dietary needs of all plant and animal life dictate intake of specific elements. These concentrate even in the lowest and most basic forms of life. They are then passed up food chains, from grass to cattle to milk to man, for example. As they progress up these chains, the concentrations often increase, sometimes by hundreds of thousands of times.

Take zinc-65, produced in a reactor when atomic particles interact with zinc in certain components. Scrutiny of the wildlife in a pond receiving runoff from the Savannah River Plant near Aiken, S.C., disclosed that while the water in that pond contained only infinitesimal traces of radioactive zinc-65, the algae that lived on the water had concentrated the isotope by nearly 6,000 times. The bones of bluegills showed concentrations more than 8,200 times higher than the amount found in the water.

Here then are clear illustrations of the ways in which almost undetectable traces of radioactivity in air, water, or soil may be progressively concentrated, so that by the time it ends up on man's plate or in his glass it is a tidy package of poison.

That "low-level" waste is a grossly deceptive term is obvious. In his book Living with the Atom, author Ritchie Calder in 1962 described an "audit" of environmental radiation that he and his colleagues, meeting at a symposium in Chicago, drew up to assess then current and future amounts of radioactivity released into atmosphere and water. Speculations covered the period 1955-65, and because atomic power plants were few and small during that time, the figures are more significant in relation to the future.

Tallying "planned releases" of radiation from such sources as commercial and test reactors, nuclear ships, uranium mills, plutonium factories, and fuel-reprocessing plants, Calder's group came to a most disquieting conclusion: "By the time we had added up all the curies which might predictably be released, by all those peaceful uses, into the environment, it came to about 13 million curies per annum."

A "curie" is a standard unit of radioactivity whose lethality can be appreciated from the fact that one trillionth of one curie of radioactive gas per cubic meter of air in a uranium mine is ten times higher than the official maximum permissible dose.

Calder's figures did not take into account possible reactor or nuclear transportation accidents.

Above all, they did not include possible escape of stored high-level radioactive wastes, the implications of which were awesome to contemplate: "What kept nagging us was the question of waste disposal and of the remaining radioactivity which must not get loose. We were told that the dangerous waste, which is kept in storage, amounted to 10,000 million curies. If you wanted to play 'the numbers game' as an irresponsible exercise, you could divide this by the population of the world and find that it is over 3 curies for every individual."

Exactly what does Calder mean by "the question of waste disposal"?

It has been estimated that a ton of spent fuel in reprocessing will produce from forty to several hundred gallons of waste. It would take five cubic miles of water to dilute the waste from just one ton of fuel to a safe concentration. Or, if we permitted it to decay naturally until it reached the safe level — and the word "safe" is used advisedly — just one of the isotopes, strontium-90, would still be damaging to life 1,000 years from now.

There is no known way to reduce the toxicity of these isotopes; they must decay naturally, meaning virtually perpetual containment.

The most common disposal practice today is to store the concentrates in large steel tanks shielded by earth and concrete. This method has been employed for some 20 years, and about 80 million gallons of waste are now in storage in about 200 tanks. This "liquor" generates so much heat it boils by itself for years. Most of the inventory in these caldrons is waste from weapons production, but within thirty years, the accumulation from commercial nuclear power will soar if we embark upon the expansion program now being promoted by the AEC.

Dr. Donald R. Chadwick, chief of the Division of Health of the U.S. Public Health Service, estimated in 1963 that the accumulated volume of waste material would come to two billion gallons by 1995.

Inadequate Techniques Of Waste Disposal

It is not just the volume that fills one with sickening apprehension but the techniques of disposing of this material. David Lilienthal put his finger on the crux of the matter when he stated: "These huge quantities of radioactive wastes must somehow by removed from the reactors, must — without mishap — be put into containers that will never rupture; then these vast quantities of poisonous stuff must be moved either to a burial ground or to reprocessing and concentration plants, handled again, and disposed of, by burial or otherwise, with a risk of human error at every step."

We are talking of periods "longer," in the words of AEC Commissioner Wilfred E. Johnson, "than the history of most governments that the world has seen."

Yet already there are many instances of the failure of storage facilities. An article in an AEC publication has cited nine cases of tank failure out of 183 tanks located in Washington, South Carolina, and Idaho. And a passage in the AEC's authorizing legislation for 1968 called for funding of $2,500,000 for the replacement of failed and failing tanks in Richland, Washington. "There is no assurance," concluded the passage, "that the need for new waste storage tanks can be forestalled."

If this is the case after twenty years of storage experience, it is beyond belief that this burden will be borne without some storage failures for centuries in the future.

The burden that radioactive wastes place on future generations is cruel and may prove intolerable. Physicist Joel A. Snow stated it well when he wrote in Scientist and Citizen: "Over periods of hundreds of years it is impossible to ensure that society will remain responsive to the problems created by the legacy of nuclear waste [illegible]."

"Legacy" is indeed a gracious way of describing the reality of this situation, for at the very least we are saddling our children and their descendants with perpetual custodianship of our atomic refuse, and at worse may be dooming them to the same agonizing afflictions and deaths suffered by those who survived Hiroshima.

Aware of Objections

The Atomic Energy Commission is aware of the many objections that have been raised to the atomic power program: why does it continue to encourage it?

Unfortunately, the Commission must perform two conflicting roles. On the one hand, it is responsible for regulating the atomic power industry. But on the other, it has been charged by Congress to promote the use of nuclear energy by the utility industry. Because of its involvement in the highest priorities of national security, enormous power and legislative advantages have been vested in the AEC, enabling it to fulfill its role as promoter with almost unhampered success — while its effectiveness as regulator has gradually atrophied.

The Commission consistently denies claims that atomic power is heading for troubled waters, optimistically reassuring critics that these plants are safe, clean neighbors.

The knowledge that man must henceforth live in constant dread of a major nuclear plant accident is disturbing enough. But we must recognize that even if such calamities are averted, the slow saturation of our environment with radioactive wastes will nevertheless be raising the odds that you or your heirs will fall victim to one of a multitude of afflictions.

We have little time to reflect on our alternatives, for the moment must soon come when no reversal will be possible. Dr. L. P. Hatch of Brookhaven National Laboratory vividly made this point when he told the Joint Committee on Atomic Energy: "If we were to go on for 50 years in the atomic power industry, and find that we had reached an impasse, that we had been doing the wrong thing with the wastes and we would like to reconsider the disposal methods, it would be entirely too late, because the problem would exist and nothing could be done to change that fact for the next, say, 600 or a thousand years."

Going the Way of the Dinosaur?

To which might be added a sobering thought stated by Dr. David Price of the U.S. Public Health Service: "We all live under the haunting fear that something may corrupt the environment to the point where man joins the dinosaurs as an obsolete form of life. And what makes these thoughts all the more disturbing is the knowledge that our fate could perhaps be sealed twenty or more years before the development of symptoms."

What, then, is the answer? The only course may be to turn boldly away from atomic energy as a major source of electricity production, abandoning it as this nation has abandoned other costly but unsuccessful technological enterprises.