50-247

4/24/67

Honorable Leonard Farbstein
House of Representatives

Dear Mr. Farbstein:

You were informed on March 20, 1967, by Mr. Richard L. Callaghan, Assistant Administrator for Legislative Affairs, National Aeronautics and Space Administration, that your inquiry of March 13, made on behalf of Miss Elizabeth R. Hogan, New York City, had been transferred to this agency. The following information and comments are supplied in response.

We have no comment on Miss Hogan's attempt to draw parallels between "the recent NASA accident" and the Commission's program for licensing and regulating nuclear power plants, but will deal with her conclusions which imply that the AEC may give inadequate consideration to the safety of nuclear reactors.

Most of Miss Hogan's questions contain references to the Consolidated Edison Company's Indian Point Station Unit 2, for which the Commission issued a construction permit on October 14, 1966. For your information, Miss Hogan appeared at the public hearing conducted by an atomic safety and licensing board in that case at Buchanan, New York, September 14-15, 1966, and expressed her views concerning the possibility of nuclear accidents at the proposed plant. After consideration of all the evidence and the record in the proceeding, including the safety reviews conducted by the AEC regulatory staff and the Commission's statutory Advisory Committee on Reactor Safeguards, the board issued a favorable decision and ordered the issuance of the construction permit.

Miss Hogan suggests, by references to parts of the AEC regulatory staff's safety evaluation of the Indian Point Unit 2 construction permit application, that danger lies in the fact that some safety-related matters remain to be resolved while the facility is being constructed. Construction permits are not issued unless there is

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assurance, on the basis of specific plans or research and development programs of the applicant, that such matters can be resolved during the construction stage. Further, the applicant must submit another application for the operating license on completion of construction, which again is reviewed separately by the AEC regulatory staff and the Advisory Committee on Reactor Safeguards to assure that all safety-related matters have been resolved. Even then, the initial operating license is issued on a provisional basis until it has been demonstrated that the facility will be operated safely; and thereafter, the reactor is kept under continuing AEC surveillance through periodic inspections and safety reviews. A copy of the booklet "Licensing of Power Reactors" is enclosed, which you may wish to forward to Miss Hogan.

Miss Hogan states that the possibility of a major nuclear plant accident "is dismissed as 'highly improbable.'" While the probability of such an accident is remote, the Commission's requirements of extensive systems of engineered safety features, designed both to prevent accidents and to limit the consequences if any should occur despite all precautions, show that this concern has not been "dismissed." Such safety features are amply illustrated in the AEC regulatory staff's safety evaluation of the Indian Point Unit 2 project, from which Miss Hogan has quoted. I am also enclosing a copy of the booklet "Atomic Power Safety," which discusses these matters in general.

Miss Hogan suggests that the good safety record of nuclear power plants now operating might induce complacency and carelessness; and that the desire of utilities to meet schedules, together with miscalculations and technological overconfidence, may cause a disaster through a major nuclear plant accident. The Commission's concern for public health and safety has always been predominant in the licensing and regulation of nuclear power reactors, and every effort will be made to maintain the safety record that has been achieved to date.

Miss Hogan, both in her letter and in the attachment to her letter, refers to an operating incident last fall which disabled the Enrico Fermi reactor. This operating difficulty did not pose any threat to public safety.

Concerning Miss Hogan's desire to "increase the interest of Congress," the matter of nuclear reactor safety has, of course, been of paramount interest to Congress and its Joint Committee on Atomic Energy.

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I am enclosing a copy of a press release dated March 13, 1967, which announced public hearings on the licensing and regulation of nuclear reactors. These hearings are still in progress.

Sincerely yours,

(signed) Harold L. Price

Harold L. Price
Director of Regulation

Enclosures:
1. Letter from Miss Hogan with attachment
2. Booklet, "Licensing of Power Reactors"
3. Booklet, "Atomic Power Safety"
4. Press Release - Hearings on AEC Regulatory Program

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DR-1126

HOUSE OF REPRESENTATIVES, U.S.
WASHINGTON, D.C.

March 13, 1967

Congressional Liaison Office
National Aeronautics and
Space Administration
400 Maryland Avenue, S.W.
Washington, D. C.

The attached communication is submitted for your consideration, and to ask that the request made therein be complied with, if possible.

If you will advise me of your action in this matter and have the letter returned to me with your reply, I will appreciate it.

Re: Miss Elizabeth R. Hogan
222 West 77th Street
New York City

May I please have your advice and comment.

Very truly yours,

LEONARD FARBSTEIN
M.C.

19th, New York District.

Encl 1.

DR-1126

Benjamin Franklin Hotel
222 West 77th Street
New York, New York 10024

March 7, 1967

Rep. Leonard Farbstein
Rayburn Bldg., Suite 2455
Washington, D.C.

Dear Congressman Farbstein:

In view of the concern you have expressed about nuclear plant hazards, I thought you might be interested in the enclosed questions about nuclear plant safety, raised by the recent NASA accident.

Again, I would be interested in your reaction to a proposal that instructions be published on what the public should do, in the event of a major atomic plant accident or other serious accident involving radiation. I have not been able to find any such instructions, (even elementary ones, such as staying indoors, closing all windows, etc.) but they could be important in two ways.

First, the instructions themselves could save lives in the event of a major accident, (and after the NASA disaster, the Fermi nuclear plant accident of Oct. 5, 1966, and other "highly improbable" events of the past year, this seems essential.) Again, the distribution of booklets on this would serve to make more people aware that there are hazards related to nuclear plants--a fact that is not very well known, at present, (at least among many of the people I have spoken to on the subject).

I am sending copies of the enclosed material to a few other Congressmen, among them Rep. John Saylor, who has spoken on several occasions on the issue of atomic plant safety. Anything you can do to increase the interest of Congress in this vital issue, would be deeply appreciated and could be of great importance.

With thanks for your past interest and efforts on behalf of greater public safety in the nuclear age,

Sincerely,

Elizabeth R. Hogan

(Miss) Elizabeth R. Hogan

Questions the NASA accident of 1-27-67 raises with regard to possible accidents at nuclear power plants

(1) On January 27, 1967, three American astronauts lost their lives because of a flash fire in their spacecraft.

The AEC's Safety Evaluation of Indian Point Nuclear Plant # 2 states: (Pages 37-38)
"Also of concern are the potential adverse effects of fires originating in the control and safety system wiring and/or within the control room itself. In our opinion, a direct, analytical safety analysis relating to the possibility of reactivity excursions resulting from such fires is, in practice, impossible due to the random nature of fire damage and the nearly infinite variety of possible circuit faults (some 'unsafe', some 'safe') which could result. However, we believe that the natural complexity of reactor control and safety systems coupled with a redundant, fail-safe design firmly based on applicable criteria, accepted codes, etc., constitutes the best defense against serious fire-induced accidents.
"In this connection, a literature search was conducted with the assistance of the computer facilities at the Nuclear Safety Information Center (NSIC) at Oak Ridge National Laboratory, to study the historical record of such excursions. NSIC has informed us that they were unable to find any records of incidents involving reactor damage as a result of fire-induced excursions.
"Based on the foregoing considerations, we believe that Criterion 16 is satisfied."

How can the AEC, or the public, be satisfied when potential adverse effects of fires are admitted to be "of concern", when a safety analysis of them is "impossible", and when there are no records of incidents involving reactor damage as a result of fire-induced excursions, on which to base proper safeguards?

This is especially questionable in view of the NASA accident of January 27, 1967. As the N.Y. Times of Jan. 29, 1967 reported: "They all believed that they had a good spaceship, one that could take them on a complete 14 day flight. Commander Chaffee summed up their feelings: 'I think we've got an excellent spacecraft... We're confident it's a darned good spacecraft.'"

(2) "In a discussion at a news symposium here last Dec. 15, Dr. Joseph Shea, the Apollo program manager, said that the oxygen systems on the Apollo spacecraft had been plagued by difficulties. ...
"Dr. Shea said that NASA had decided against trying to overcome every problem arising in connection with space flights.
"'We have been trying to take an approach in the program that in effect says: Run the program in a balanced way, don't try to make everything too perfect, don't try to make everything too complex or you'll never get the job done in the first place,' Dr. Shea said.
"This decision has kept the American space program moving along, even when spacecraft have not functioned according to specifications

(N. Y. Times, Jan. 29, 1967)

This raises the question of whether the AEC, which apparently has taken the same approach to nuclear power plant safety, (as can be seen in the quotation from its Safety Evaluation of Indian Point # 2), might not be inviting an even greater disaster involving thousands of lives?

It is interesting to note, that in an article "How Haste In Space Makes Waste" (Reader's Digest, July, 1964), Joe Alex Morris pointed out:
"Some of NASA's major problems have arisen from the fact that research and development have been conducted concurrently instead of making sure, as one Congressman put it, that 'the scientific homework is completed before trying to build something.'"

There is much evidence to suggest that the AEC is making the same mistake:

"The American Standards Association and the Institute of Electronic and Electrical Engineers are actively engaged in the development of standards governing the design, testing, and installation of reactor protection systems. ... Evaluation of the Indian Point Unit No. 2 reactor protection system will be based on such standards, as they are proposed or adopted."
(Page 15, Safety Evaluation)
Indian Point Unit 2

"Further experimental information should be available from the San Onofre and Connecticut Yankee facilities by the time the Indian Point II facility is to operate."
(Page 22, Safety Evaluation)
Indian Point Unit 2

With regard to other safety factors:
"We believe that these matters can be resolved during the construction of the facility."
(Page 30, Safety Evaluation)
(Indian Point Unit 2)

In view of the NASA disaster, and the AEC's own estimates of the damage a major nuclear plant accident could cause, (in 1957, the AEC estimated that a single accident could cost 3,400 lives, injure 43,000, and cause property damage of $7 billion), the wisdom of keeping the nuclear power industry "moving along"--at an ever-increasing pace--when standards governing the design, testing and installation of reactor protection systems have not yet been fully developed--is highly questionable.

(3) "...space officials have warned repeatedly that the $5-billion-a-year they were receiving was just a little less than they needed to be certain of meeting the 1970 deadline. It forced them, they said, into a 'success schedule'--one that allowed for no contingencies such as Friday's catastrophe.
"For this reason, if no other, critics in Congress may question whether safety, as well as time-tables, were adversely affected by the budget trimming..." (N.Y. Times report, 1-29-67)

A similar question has been raised with regard to utilities and reactor manufacturers.

As Dr. Theos J. Thompson, (Chairman of the Advisory Committee on Reactor Safeguards during 1961), stated, in April, 1962:*
"Increasing the power capability from the same size reactor is the best way to improve the economics in many reactors. Here safety and economics tend to clash head on. The economic pressures are very great, as you know. We need better understanding of the fundamentals of burnout before we know how close we can approach the condition safely. ...
"Since the problem is not well resolved, it is difficult to have a clear conscience about locating a large reactor now, with high pressure, flattened flux distributions, and running near the burn-out conditions--as they must to be economic--in the center of a city. ...
"Every reactor that has been operated to date, unless it has had at least one almost exact prototype as is the case with submarine reactors, has demonstrated some small differences from expected behavior. Almost always these have not been important, but they seem to indicate that one should be very careful in locating a first of its kind (or size) reactor in a place where engineered safety is used exclusively." (Page 66,67, "Indemnity and Reactor Safety")

*Testimony of Dr. Thompson, Hearings before the Subcommittee on Radiation, Research and Development of the Joint Committee, April,1962

These remarks are especially pertinent with regard to Indian Point Nuclear Plant # 2, which is the largest reactor to be considered for licensing to date, and is located 24 miles from the nation's largest city. An initial construction permit has already been issued.

(4) "As the world grieves the deaths of pioneers Virgil I. Grissom, Edward H. White 2d and Roger B. Chaffee, several haunting questions are insistently raised: Did the record of more than a half-decade of manned space flight without a casualty induce carelessness? Were their lives sacrificed because of the stringent, though entirely arbitrary, timetable for the Apollo Project and the short cuts introduced to try to meet that schedule? Were any precautions neglected out of zeal to beat the Russians to the moon?"
(N.Y. Times Editorial, Jan. 29, 1967)

Similar questions can be asked of our rapidly expanding nuclear power industry:

(a) Will the safety record of nuclear power plants now operating, (pointed to with pride so often by the AEC and reactor manufacturers--at least until the recent serious accident at the Fermi nuclear plant in October, 1966) induce complacency or carelessness?

Congressman Leonard Farbstein raised this question, in July, 1965.

In introducing a bill that would make utilities and reactor manufacturers responsible for $100 million in addition to the provisions of the Price-Anderson Act, in the event of a nuclear plant accident, Congressman Farbstein remarked:

"If atomic power grows as rapidly as now forecast by the Atomic Energy Commission, we will have more than 100 large plants in operation within the next 15 years. Unfortunately, the old saw still holds true--'familiarity breeds contempt'. This is true even with respect to extremely dangerous instrumentalities. This bill is designed to keep them careful. "In the push for low-cost power, there is inherent a desire to save costs by placing atomic power plants near the center of power consumption and by reducing the cost of safety devices. I feel certain no utility would bow to such economic pressures at this stage of the development of atomic power. I do fear, however, that there may be a tendency to become complacent as the years go by, and I think the public is entitled to the protection which is inherent in some degree of financial responsibility for negligence."

(Congressional Record, July 12, 1965)

The bill was not passed, but the question remains.

(b) Will lives be sacrificed because of time-tables, and short-cuts introduced to meet these?

Congressional investigation of the loss of our nuclear submarine Thresher revealed that "To meet its deadline for completing overhaul of the Thresher, however, the Portsmouth Naval Shipyard permitted the submarine to go on a shakedown cruise without inspecting all the joints." (N.Y. Times 1-10-65)

Evidence of inadequate design, poor workmanship, and defective piping was also uncovered, and a silver brazing method was chosen to join pipes, instead of welding, because it "appeared to be cheaper and easier".

There is no doubt that there is a special deadline problem with regard to nuclear power plants:

Con-Edison's publication, "Around the System", (November, 1966) stressed that delay in the construction of its Cornwall project "has made it imperative" for Con-Edison to hasten the installation of other equipment, among this, Indian Point Nuclear Plant # 2.

Con-Edison is not the only utility fighting a deadline on nuclear power plants. A spokesman for the Jersey Central Power and Light Company recently said that the fact that its Oyster Creek nuclear plant was several months behind schedule "could be critical". The Company's new power units are planned on a coordinated system basis, "and if they don't get it on time it will create a problem."

(5) Certainly every precaution considered necessary was taken to protect the lives of our astronauts and their spacecraft. Yet the accident occurred.

Obviously, there were miscalculations and technological overconfidence, as to what was necessary to protect the astronauts and the two young airmen who died in a similar accident a few days later, as the N.Y. Times pointed out in an editorial, Feb. 3rd. Again as the Times stated, there had been warnings, prior to these accidents.

Isn't it possible that similar miscalculations and technological overconfidence may cause a national disaster, through a major nuclear plant accident?

There have been warnings in this area, too. The serious accident at the Enrico Fermi atomic plant (30 miles from Detroit), on October 5, 1966 is only the latest in a series of accidents at nuclear power plants. The fact that the Fermi accident involved fuel melting, and that the full extent of the damage is taking months to determine, makes it an especially significant warning.

In any case, an accident at some time in the future was, to some degree, expected in our space program. In a C.B.S. interview in December, news correspondent Nelson Benton asked Colonel Grissom if he was bothered by the "law of averages", so far as the possibility of a catastrophic failure was concerned.

By contrast, the "law of averages" question seems never to have been asked with regard to a major nuclear plant accident. Instead this is dismissed as "highly improbable".

But how "highly improbable" is it--really--in view of the quotations from the AEC's Safety Evaluation of Indian Point 2, and other points raised here?

Is it more -- or less -- probable:

than the NASA accident?
than our loss of the nuclear submarine, Thresher?
than the blackout of November 9, 1965,
(considered so improbable that not even a nuclear attack would trigger it?)
than the collision of two unmanned U.S. spacecraft in orbit disclosed in October, 1966?
(According to the N.Y. Times, Oct. 11, 1966: "The odds against such an accident were estimated at better than a million to one.")

With Consolidated Edison alone planning to change its pattern of electric generation from nuclear plants, from 4.1% in 1966 to 56.4% in 1976;

with thousands of lives, and billions of dollars at stake, this question deserves an answer.

Excerpt from Annual Report to Congress of the Atomic Energy Commission for 1966

Chapter 2

REACTOR AND OTHER NUCLEAR FACILITY LICENSING

The AEC's regulatory program for nuclear facilities is aimed toward assuring that the construction and operation of reactors and other nuclear facilities is conducted in a manner consistent with public health and safety and the common defense and security. The program encompasses both proposed new facilities and surveillance of operations of existing facilities.

THE REGULATORY PROCESS

In addition to its licensing activities, the AEC's regulatory staff has responsibility for the conduct of safety reviews of reactor facilities owned and operated by the AEC and by the Department of Defense, providing advice on siting, design and operation of reactors, and porting operations for nuclear vessels.

The licensing of a power or test reactor involves a comprehensive safety analysis of the application for a construction permit by the AEC regulatory staff and an independent review by the Advisory Committee on Reactor Safeguards as required by the Atomic Energy Act of 1954, as amended. A mandatory public hearing is then conducted by an atomic safety and licensing board appointed by the Commission from the Atomic Safety and Licensing Board Panel. After the hearing, the board renders an initial decision which is then subject to review by the Commission. Essentially the same type of review process occurs with respect to an application for an operating license, except that a public hearing is not mandatory.[1] Licensed reactors continue under AEC surveillance throughout their lifetimes.

[1] The licensing process is described in detail in the booklet, "Licensing of Power Reactors," which may be obtained, without charge, by writing to the Division of Reactor Licensing, or the Division of Public Information, U.S. Atomic Energy Commission, Washington, D.C. 20545.

Encl. 1

Role of the ACRS

The Advisory Committee on Reactor Safeguards (ACRS) is a statutory group established to advise the Commission with respect to the safety aspects of proposed and existing nuclear facilities. The committee (see Appendix 2 for listing of members) conducts an independent review of safety studies referred to it and presents its conclusions and recommendations to the Commission in written reports which are made part of the public record, except for classified material. The ACRS not only evaluates the safety aspects of proposed new facilities, but also reviews significant changes to existing facilities or their method of operation and participates in the preparation and review of proposed safety standards. The ACRS is composed of representatives of the nuclear and other phases of American industry and of several national laboratories and academic institutions, who are experts in their fields with substantial experience in physics, engineering, chemistry, metallurgy, and environmental sciences.

During 1966, the full committee met on 14 occasions, and 69 meetings of ACRS subcommittees were held. The committee provided reports to the Commission on 13 privately or municipally owned facilities, 7 on Commission facilities, and 2 on facilities owned by other government agencies. In addition, the ACRS submitted six reports on general subjects such as periodic, comprehensive (10 year) reviews of operating power reactors and reactor safeguard research, and participated in the development of nuclear facility safety criteria and guides.

ASLB Hearings

Statutory Atomic Safety and Licensing Boards (ASLB) were established in 1962 to permit greater flexibility and informality in the conduct of power reactor licensing proceedings. Prior to the establishment of the boards, the public hearings were conducted by AEC hearing examiners. These boards are selected from a panel (see Appendix 2 for list of members) made up of technically qualified persons from the academic community, private industry (including AEC contractor personnel) and the AEC's hearing examiners. A three-man board—composed of two technical experts and one member qualified in the conduct of administrative proceedings—is drawn from the panel for each licensing matter referred to the ASLB by the Commission. In addition, a technically-qualified alternate is appointed to each board.

During 1966, six new boards were designated.

On November 30, the Commission established the positions of permanent Chairman and Vice Chairman of the ASLB Panel to coordinate the activities of the boards and help expedite the conduct of licensing hearings.