Docket No. 50-205

Mr. Paul E. Rosenthal
Consulting Engineer
604 Mission Street
San Francisco, California 94105

Dear Mr. Rosenthal:

Your letter to Mr. Lowenstein of May 23, 1964, requests further clarification of several basically technical matters with respect to the Bodega Reactor. I hope the following will prove helpful.

The Atomic Industrial Forum, in their recent public information pamphlet on reactor safety provides an explanation of why reactors are not bombs. Rather than repeat the explanation, I refer you to their pamphlet, a copy of which is enclosed. I am also enclosing a pamphlet entitled, "How Safe is a Nuclear Reactor," prepared by the AEC's Division of Public Information.

The normal pressure retaining boundary represented by the reactor vessel and associated primary coolant piping are not required to have the capacity of withstanding all conceivable pressure surges. Pressure relieving devices are provided on nuclear reactor pressure systems, just as they are on more conventional pressurized plants, to allow release of the pressure effects resulting from sudden energy buildup. Reactor pressure vessels are thus not deliberately made thicker because of concern for large accidental releases of energy.

Vessels are required to show by tests an ability to withstand 150% of design loading. Design loading in turn includes calculated effects of thermal and hydraulic loads for normal operation plus conceivable transient effects such as sudden power demand or sudden loss of load. Nuclear plants are usually operated at 80% of their design pressure. They are protected against over-pressure by several mechanical devices which act to relieve steam in addition to several shutdown mechanisms which act to stop the nuclear chain reaction when the pressure exceeds a certain pre-set value always below the design pressure. The mechanical devices typically consist of:

1. Sensor controlled, power-operated relief valves.

2. A set of spring-loaded safety valves.

When the pressure in the circuit approaches approximately 95% of design pressure, the power-operated safety valves open automatically on signals from pressure sensing control elements. In case the pressure should continue to increase, the spring-loaded safety valves open. The pressure vessel and associated protective features (pressure relieving systems) are thus designed to handle any anticipated behavior of the reactor and still keep the pressure boundary intact.

As to your question concerning the suppression vessel outside the inner vessel: The development of the peaceful uses of atomic power has been marked by a cautious approach in the interest of public health and safety. Power reactors in this country are housed within "containment" structures. This is a part of the philosophy of design of reactors in the United States that provides for public safety by multiple barriers against exposure of the public to accidental and harmful release of radioactivity.

Like the emergency brakes in automobiles that are there as "back-up" devices, a containment building provides an added defense, never expected to be needed but nonetheless available, in the public interest "just in case."

The purpose of our licensing reviews is to satisfy ourselves that the significant potentialities for accidents have been identified and that adequate precautions are taken to protect against their occurrence. In addition, licensees are required to include safeguards in their plants which are designed to protect the public even if such an accident occurs despite the preventive features. On the other hand, we are not concerned in our licensing reviews with problems that might cause extended plant down-time, unless they are such as might cause radiation exposure of the public or employees.

Sincerely yours,

Signed D

Richard L. Doan, Director
Division of Reactor Licensing

Enclosures
1. AEC Press Release
2. AIF Information Pamphlet

Distribution:
PDR, SAN
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Formal Docket File
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| SURNAME ▶ | RLowenstein:ps | | 7/24/64 | | | |
| DATE ▶ | 7/8/64 | 7/23/64 | 7/28 | | | |

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

FROM: PAUL ROSENTHAL
604 Mission Street
San Francisco, Calif.

DATE OF DOCUMENT: 5-23-64
DATE RECEIVED: 5-27-64
NO.: DR-971

LTR. X MEMO: REPORT: OTHER:

TO: Lowenstein

ORIG.: X CC: OTHER: 5 cys xeroxed

ACTION NECESSARY [X] CONCURRENCE [ ] DATE ANSWERED:
NO ACTION NECESSARY [ ] COMMENT [ ] BY:

CLASSIF.: U POST OFFICE REG. NO:

FILE CODE: 50-205

DESCRIPTION: (Must Be Unclassified)
ltr. requesting to be advised as to whether there is any inconsistency between the statements in TID 7024 and our 5-21 ltr re Bodega reactor.

ENCLOSURES:

| REFERRED TO | DATE | RECEIVED BY | DATE |
|---|---|---|---|
| Lowenstein: | 5-28 | | |
| w/2 extras--FOR ACTION | | | |
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| Di Nunno | 6/3 | | 6/3 |
| (OFFICE OF THE DIRECTOR) | | | |

REMARKS: Distribution: 1 - formal file (orig)
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DL

U. S. ATOMIC ENERGY COMMISSION **MAIL CONTROL FORM** FORM AEC-326S (8-60)

☆ U. S. GOVERNMENT PRINTING OFFICE: 1963—708-609

PAUL E. ROSENTHAL • CONSULTING ENGINEER
604 MISSION STREET • SAN FRANCISCO
TELEPHONE SUTTER 1-2871 POSTAL CODE 94105

May 23, 1964

The Atomic Energy Commission
Washington 25, D.C.

Attention: Mr. Robert Lowenstein, Assistant Director of Regulation
Reference 50-205

Dear Mr. Lowenstein:

Your May 21 letter re the Bodega reactor is acknowledged with thanks.

I am sorry, however, that you saw fit to refer me to the Preliminary Hazards Analysis for answers, as it was that report which raised the questions in my mind in the first place.

The basic question remains the possibility of a major, "bomb-like" explosion. On this point I found the following on pp 214-215 of TID 7024: "..eventual melting of the fuel elements may result in a dispersion to a subcritical configuration (the reverse also being possible)." For a fast reactor, a statement on the same page indicates that the energy equivalent during such dispersion is "not more than that of several hundred pounds of TNT." And then it goes on to say that "in addition, it is possible that a thermal reactor under adverse conditions could experience a rapid energy release greater than that in a well-designed fast reactor."

From the foregoing, I draw the conclusion that there is some probability — small, perhaps — of setting off explosive shock waves inside the reactor pressure vessel. My check of the dimensions, temperatures, pressures, and materials of the vessel indicates that no extra factors of safety have been taken beyond those ordinarily present for ASME Code construction. (There is a little guessing here as the PHA indicates "about six inches" for vessel wall thickness. But even a small extra factor of safety would make the walls over 7-1/4.)

Is the design approach here that we build a suppression vessel outside the pressure vessel on the supposition that the inner vessel will fail?

Do you feel that there is any inconsistency between the statements in TID 7024 and your May 21 letter which says "there is no possibility that a reactor can explode like a bomb"? I would be happy to be reassured on this as I have no great desire for further worry or distraction from my obligations to earn a living on less interesting projects.

Very truly yours,

Paul Rosenthal

Rec'd Of. Dir. of Regn.
Date 5/28/64
Time 11:30
Ltr DR



8709210027 2pp.

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Mr. John T. Conway
Executive Director
Joint Committee on Atomic Energy
Congress of the United States

Dear Mr. Conway:

This is in response to your letters dated April 14 and 24, 1964, requesting comments on S. J. Res. 167 and H. J. Res. 1008 relating to the Pacific Gas and Electric Company application to construct a nuclear power plant at Bodega Head, California. The joint resolutions, if adopted, would require the Commission to report to the Joint Committee on Atomic Energy with respect to its investigation of the proposed site and to withhold the granting of a construction permit until it could certify to the Congress "the geological adequacy and seismic safety" of the site.

A comprehensive evaluation of the safety aspects of the Bodega Head application by the Commission's Regulatory Staff has been under way for a considerable time. In view of the proximity of the proposed site to the San Andreas fault, particular attention is being paid to the geological and seismological aspects of the site and to related structural engineering questions. In this connection, the Regulatory Staff has had the assistance of the U. S. Geological Survey of the Department of Interior and the U. S. Coast and Geodetic Survey of the Department of Commerce. Upon completion of its evaluation, the Regulatory Staff will prepare a complete hazards analysis setting forth its position with respect to all the nuclear safety aspects of the application, including the geological and seismological aspects of the proposed site and related structural engineering questions. In addition, an independent review and report will be made by the Commission's Advisory Committee on Reactor Safeguards.

The Regulatory Staff's hazards analysis, the report of the Advisory Committee on Reactor Safeguards, and the reports submitted by the Geological Survey and the Coast and Geodetic Survey will be available for public inspection at the Commission's Public Document Rooms in San Francisco and Washington, D. C.

Following review by the Regulatory Staff and the Advisory Committee on Reactor Safeguards, public hearings are held in cases of this type before atomic safety and licensing boards. At those hearings all nuclear safety aspects of the application are explored and considered. The Commission has previously announced a hearing in the Bodega Head proceeding would be held in Santa Rosa, California. Interested members of the public could participate in the hearing in accordance with the Commission's "Rules of Practice", 10 CFR Part 2, and the proceeding, of course, would be a matter of public record.

After a hearing board has issued its initial decision, the proceeding may also be reviewed by the Commissioners, either upon their own motion or upon petition by a party to the proceeding. The initial decision of the atomic safety and licensing board and the Commission's final decision are also matters of public record.

In our opinion the "extent of the Commission's investigation into the public health and safety" which we would be required by the proposed resolutions to report to the Joint Committee will be fully set forth in the public record of the proceeding. Also, as you know, in all power reactor licensing proceedings the Commission routinely transmits to the Joint Committee copies of the Staff's hazards analysis, the report of the Advisory Committee on Reactor Safeguards, the initial decision of the atomic safety and licensing board and any final decision by the Commission. Prior to any construction permit that might be issued in the proceeding the Commission must first make the finding that the issuance of the permit will not, in the opinion of the Commission, be inimical to the health and safety of the public. We believe that this finding would fully satisfy the objective of the certification to the Congress that would be required by the proposed resolutions.

Since the objectives of the proposed resolutions are being met by the Commission's procedures under present law, we do not believe that any useful legislative purpose would be served by the adoption of the resolutions. In addition, we believe it would be undesirable for the Congress to adopt such resolutions with respect to a matter which is under active consideration in a quasi-judicial proceeding.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely yours,

( signed ) Harold L. Price

Harold L. Price
Director of Regulation

U.S. GOVERNMENT PRINTING OFFICE: 1964 — 725-8

FROM:
R. I. LEWIS
25 Corte Mogal
Danville, Calif.

TO:
Case

DATE OF DOCUMENT: 7-10-64
DATE RECEIVED: 7-17-64
NO.: 3780

LTR: X
MEMO:
REPORT:
OTHER:

ORIG.: X
CC:
OTHER:

ACTION NECESSARY: ☒
NO ACTION NECESSARY: ☐
CONCURRENCE: ☐
COMMENT: ☐
DATE ANSWERED:
BY:

CLASSIF.: U
POST OFFICE
REG. NO.

FILE CODE: Docket 50-205

DESCRIPTION: (Must Be Unclassified)
Ltr. ack. our 6-15-64 ltr and requesting cy of Mr. Price's 5-5-64 ltr sent to PG&E as referenced therein.

| REFERRED TO | DATE | RECEIVED BY | DATE |
|---|---|---|---|
| Edwards: w/3 cys—FOR ACTION | 7-20 | | |
| Please Note: We have a ltr dtd 5-19-64 to PG&E fm Mr. Price; but, not a dtd 5-5-64. Hazel | | | |
| | | | 37 |

ENCLOSURES:

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