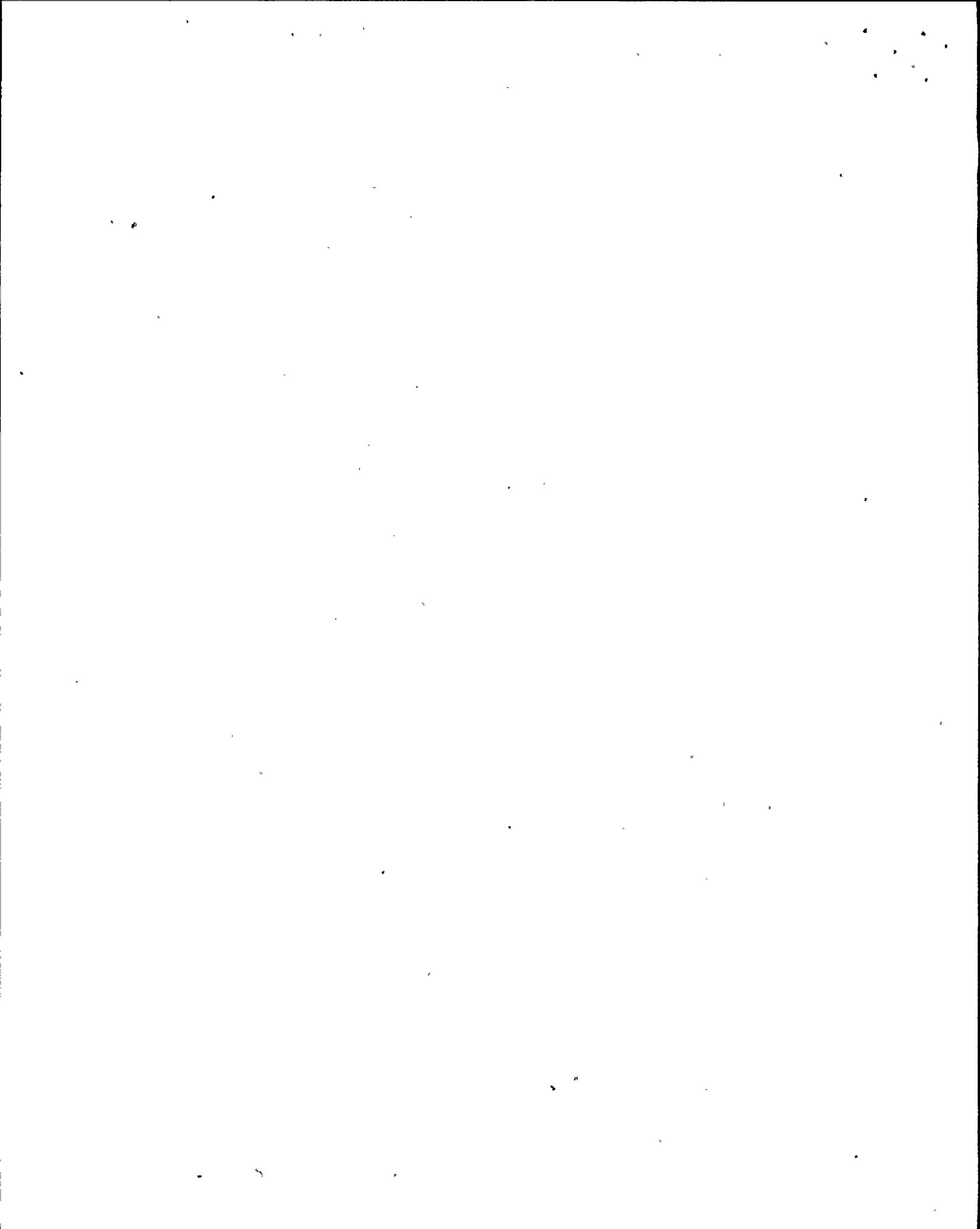
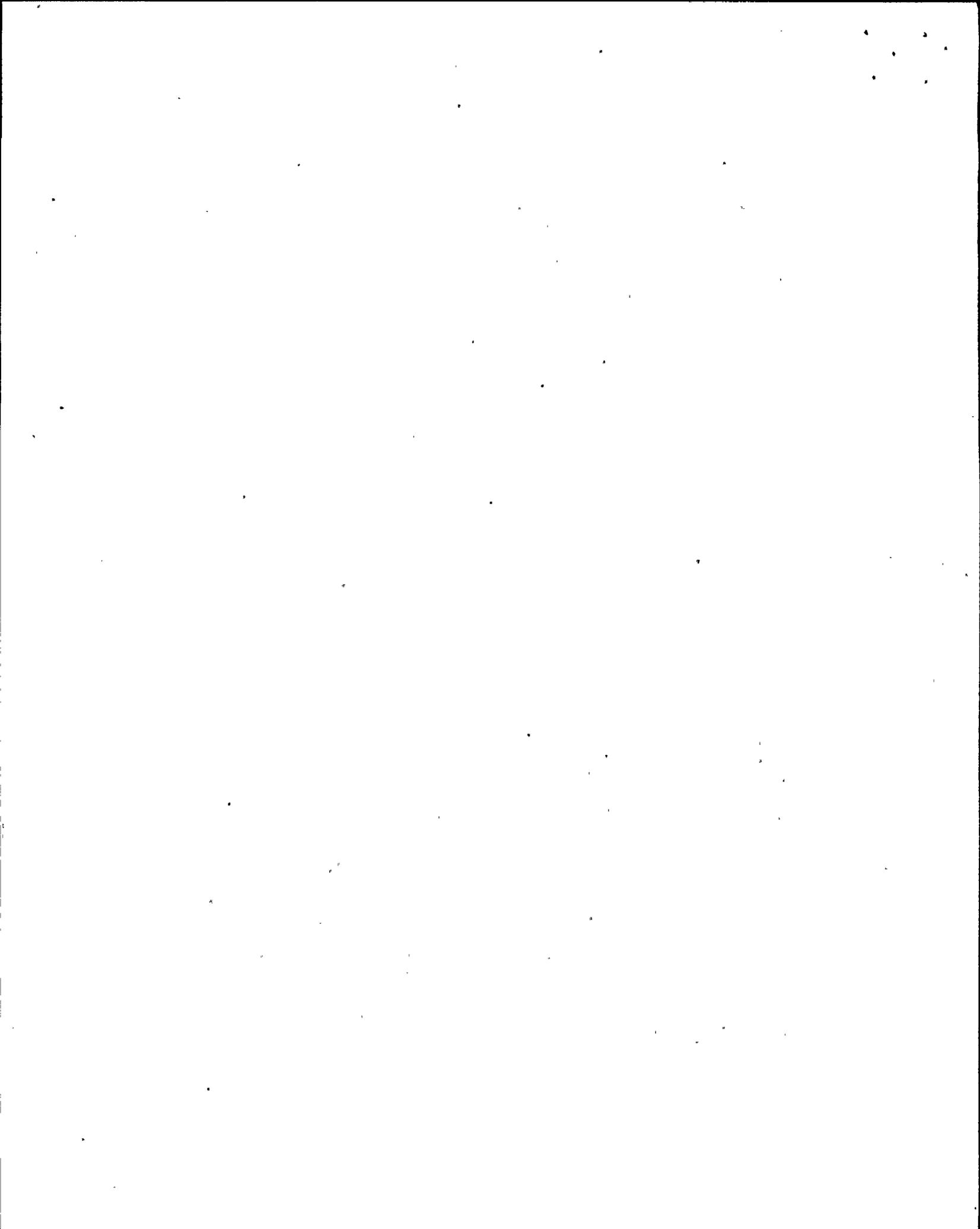


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Diablo Canyon has no capability to directly measure the water level in the fuel assemblies. The absence of such instrumentation delayed recognition of a low-water level condition in the reactor for a long period of time. Nothing proposed by the Staff would require a direct measure of water level or provide an equivalent level of protection. The absence of such instrumentation poses a threat to public health and safety."

Subject 13. Whether licenses should issue prior to installation of PG&E of a reliable and unambiguous method of measuring reactor vessel water level.

A. Whether PG&E's proposed system to measure water level in the reactor vessel is adequate for all conditions, including level swell, 2-phase flow, flow blockage and system dynamics. (SER, Supp. 10, p. II.F-9)

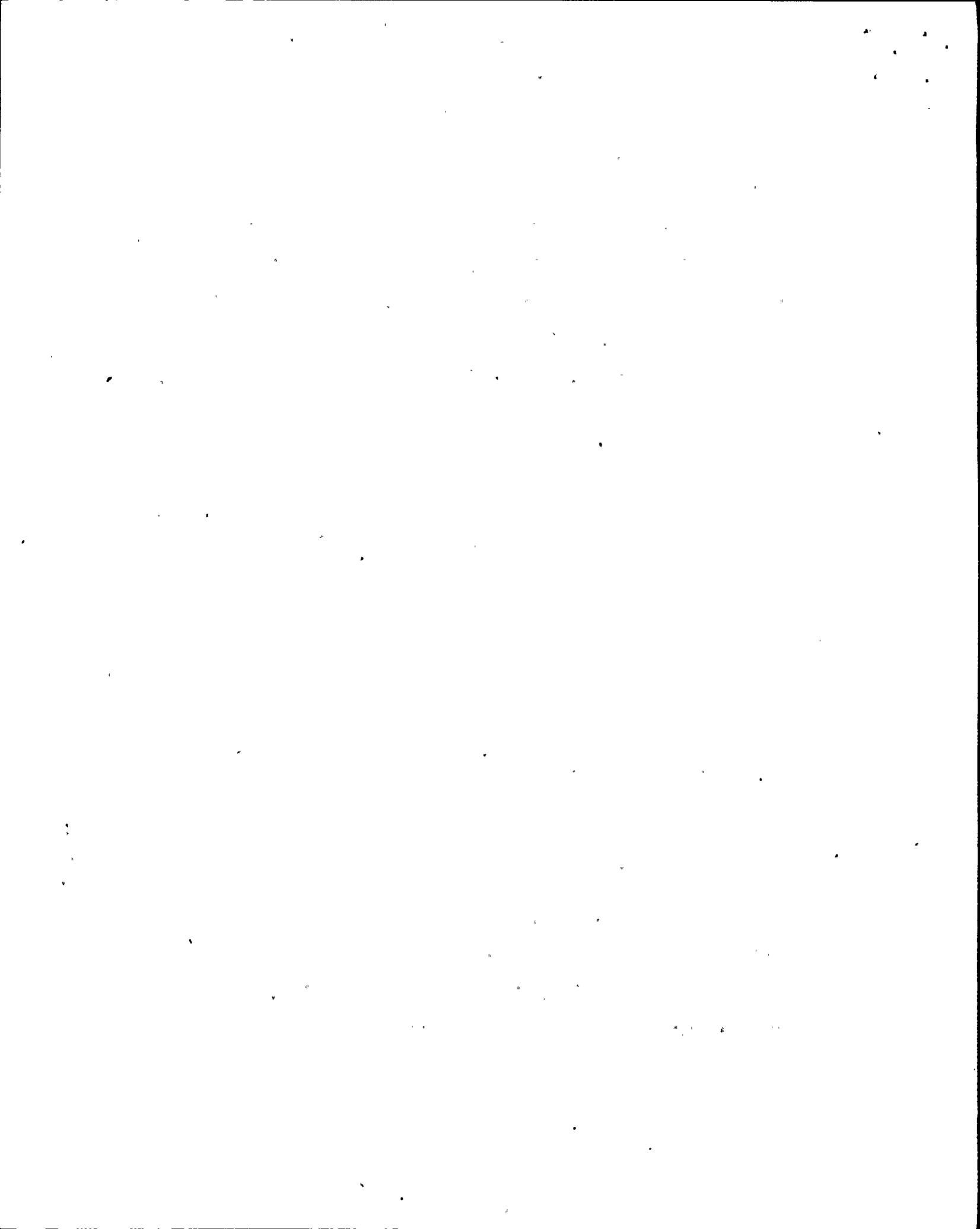
The Board Concluded:

Although lacking the basis and specificity required for an allowable contention, the subject is essentially the same as Joint Intervenors contention 13, which the Board has accepted. Governor Brown may, therefore, participate in litigation of this issue in the form in which the Joint Intervenor's contention was accepted. Prehearing Conference Order at 35 (February 13, 1981).

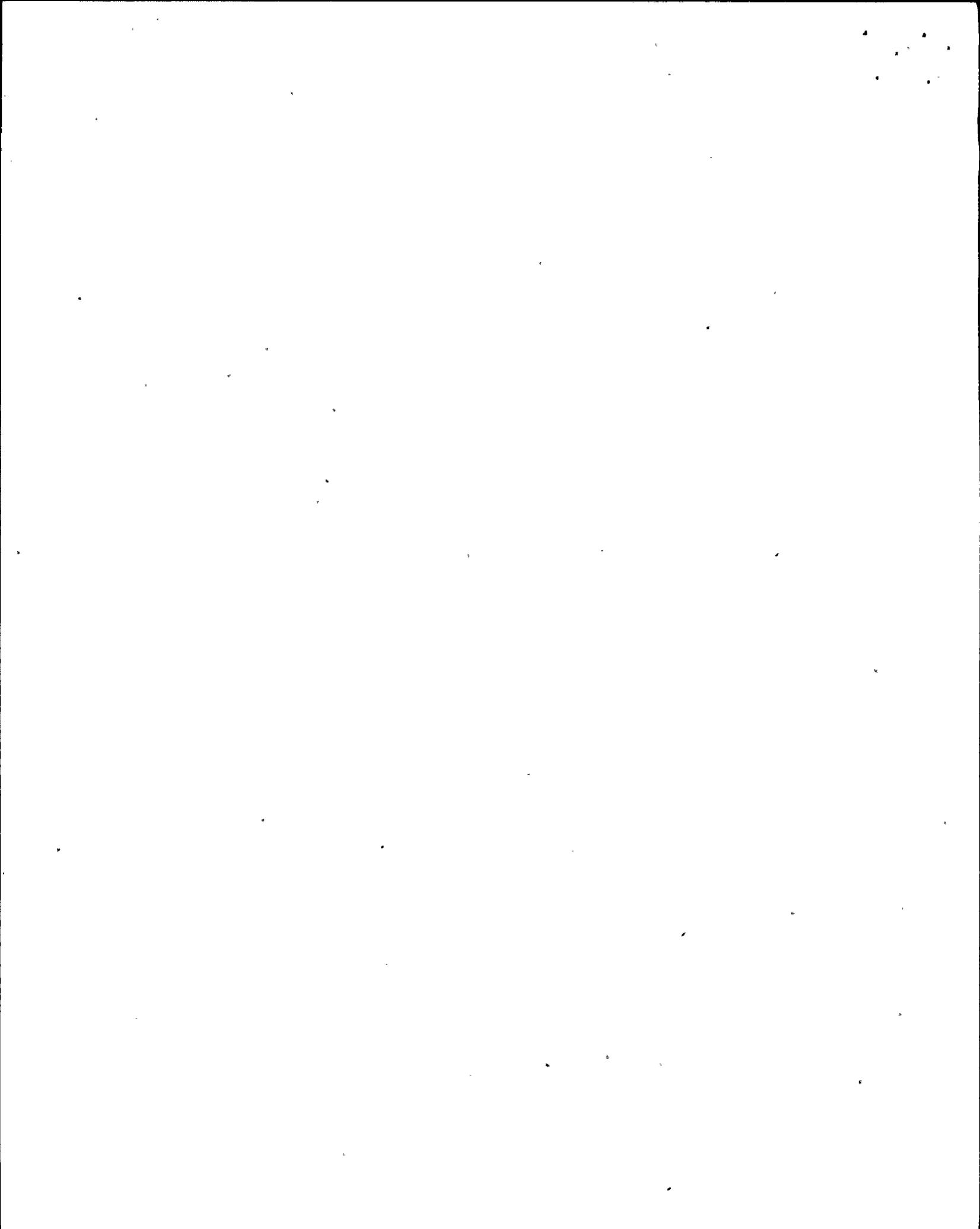
4. General Design Criterion No. 13 states:

"Criterion 13 - Instrumentation and Control. Instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems. Appropriate controls shall be provided to maintain these variables and systems within prescribed operating ranges."

I find no statement in the General Design Criteria such as that set forth by the intervenors and no requirement that the instrumentation shall directly measure the desired variable. Furthermore, the reference to IEEE 279 deals with protection system inputs whereas the water level instrumentation under discussion will not be used as a protection system input.

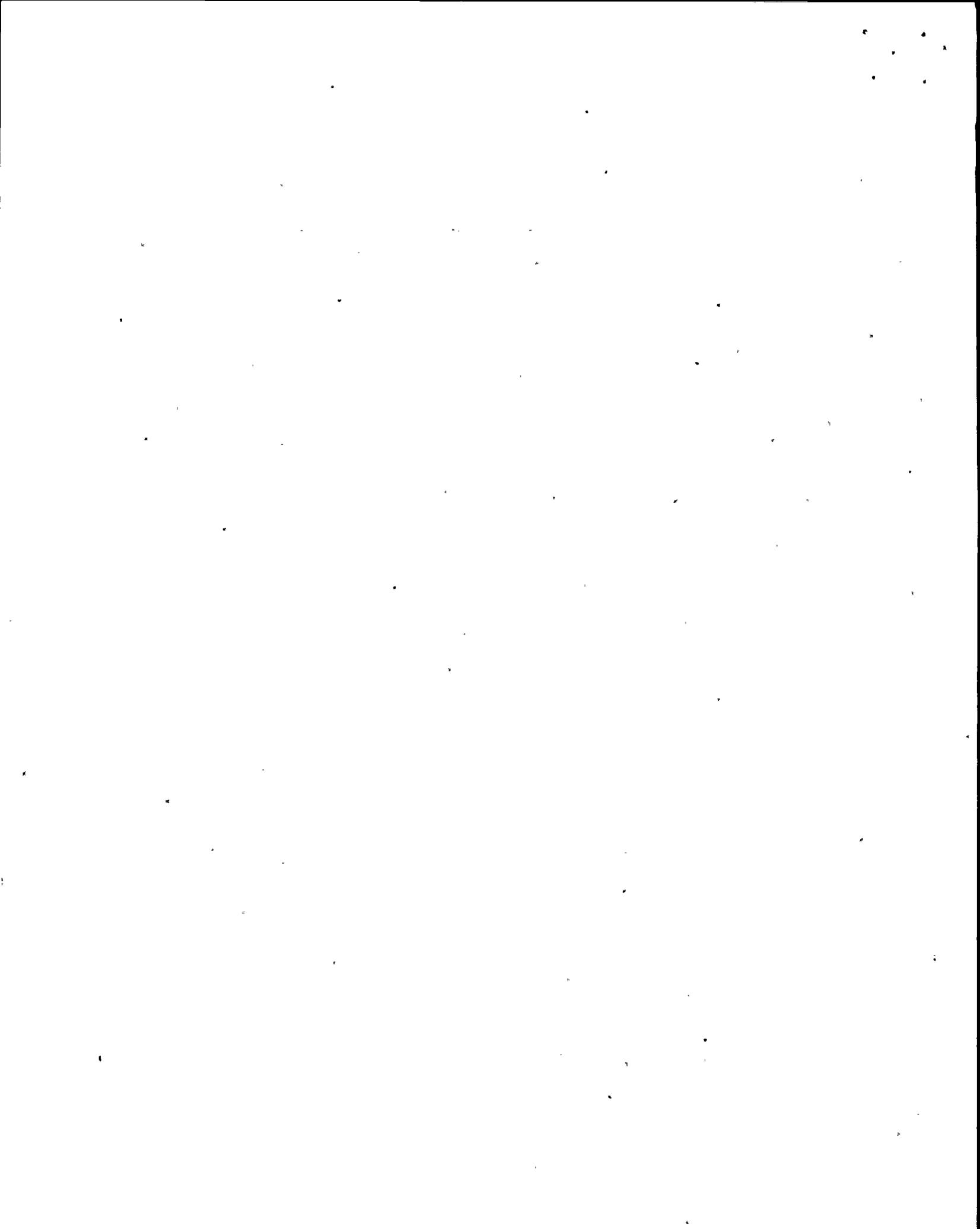


5. Light water reactors do not have instrumentation that can directly measure the water level in the fuel assemblies. The water level instrumentation that the applicant proposes to install by January 1, 1982, will sense differential pressures at three points in the reactor coolant system and make corrections for varying reactor coolant system operating conditions to produce an indication of water level in the reactor vessel. This information will be used by the reactor operator to supplement other information that may indicate an approach to inadequate core cooling or the presence of inadequate core cooling. The applicant's description and commitment to this instrumentation is contained in the PG&E response to Item II.F.2, p. 46. This is a proprietary document and was submitted on February 6, 1981.
6. In the case of TMI, the operator interpreted the water level reading in the pressurizer as an indication of adequate water level in the reactor coolant system and in the reactor vessel. The written procedures permitted the reduction of the flow of water to the reactor vessel under these conditions. This led to a condition of inadequate core cooling. Furthermore, the operator was not instructed to use the core exit thermocouples as an indication of inadequate core cooling. Both of these deficiencies have been corrected at Diablo Canyon. The procedures have been written so that the pressurizer water level will not be used as evidence of adequate core cooling and the exit core thermocouples will be used to determine when a condition of inadequate core cooling might



exist. The applicants description and commitment to these procedures is contained in the PG&E response to Item II.F.2, p. 47. This is a proprietary document which was submitted on February 6, 1981.

7. The present Diablo Canyon procedures and instrumentation provide for prompt recognition of inadequate core cooling by instructing the operator to monitor for conditions of inadequate core cooling during transient and accident conditions, by providing the operator with criteria for the recognition of conditions indicative of inadequate core cooling and providing two instrumentation systems for reading temperatures at the exit of the reactor core. The "P-250" instrument prints out the temperatures of 65 separate thermocouples at the exit of the core. If 5 or more of these readings exceed 1200°F, inadequate core cooling is recognized. The Honeywell instrument on the incore board indicates the temperatures of 62 of the 65 core exit thermocouples. If any 3 of the 10 centrally located thermocouples indicate temperatures greater than 700°F, inadequate core cooling is recognized.
8. The facts relied upon in paragraph 7, above, are documented in the PG&E response to Item II.F.2, p. 47, et seq. This is a proprietary document which was submitted on February 6, 1981.
9. The Staff has concluded that the present Diablo Canyon procedures and instrumentation provide for timely recognition of a condition of



inadequate core cooling and that the absence of additional instrumentation does not present a threat to public health and safety during low power operation.

Samuel D. MacKay
Samuel D. MacKay

Subscribed and sworn to before me this 27th day of
April, 1981

Wendell J. Hollister Notary Public

My Commission expires: July 1, 1982



SAMUEL D. MAC KAY

PROFESSIONAL QUALIFICATIONS

PROCEDURES AND TEST REVIEW BRANCH

I am a Principal Operational Safety Engineer on the staff of the Nuclear Regulatory Commission. I am responsible for reviewing and evaluating the radiological safety considerations associated with the operation of nuclear powered generating stations.

I received a Bachelor of Science Degree in Physics from Siena College in 1950 and I studied for a Master's Degree in Nuclear Physics at Union University.

I am in my 13th year with the Regulatory staff and have functioned in an operating reactors branch as well as a branch that reviews construction permit applications.

Prior to joining the Regulatory staff, I worked for General Electric Company at the Nuclear Energy Division in San Jose, California, from 1965 to 1968 as a field engineer for the startup of nuclear power plants.

From 1959 to 1965 I was associated with Allis Chalmers Company's Elk River Reactor Project. I prepared the startup program for that reactor, supervised many of the preoperational and startup tests and served as a licensed reactor operator and then shift supervisor. I was subsequently the Operations Supervisor and then the Project Manager.

Prior to Elk River, I was employed by Alco Products Company from 1956 to 1959. I performed critical facility tests for the Army Packaged Power Reactor and later was responsible for evaluating the reactor core performance by conducting tests on the operating reactor.

From 1952 to 1956 I worked at the Knolls Atomic Power Laboratory on various critical assemblies measuring reactivity coefficients and neutron cross sections and performing neutron activation analyses.

This is a total of 29 years experience in nuclear engineering and I am a professional nuclear engineer certified by the state of California.

