

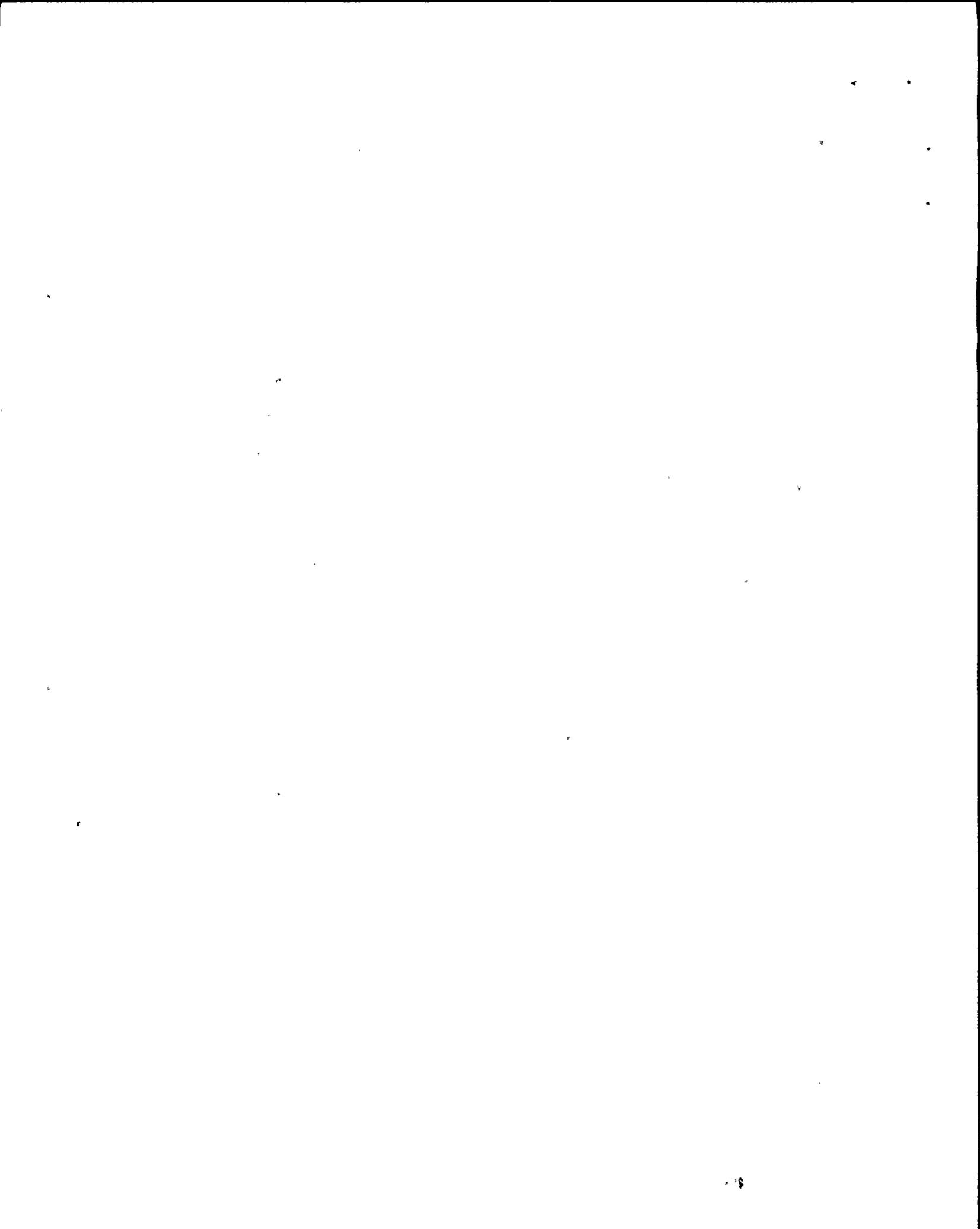
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TESTIMONY OF
CANDEE L. GOTTSHALL
RICHARD A. MUENCH
ON BEHALF OF PACIFIC GAS AND ELECTRIC COMPANY
MAY 19, 1981
CONTENTION 24

Pressurizer Safety Valves

The pressurizer of each unit of the Diablo Canyon plant is equipped with three pressurizer safety valves. Under normal operating conditions, the safety valves remain closed. Under most postulated accident conditions, the pressurizer safety valves are not called upon to operate. In those FSAR accidents analyzed for the Diablo Canyon plant, the safety valves will not open if the power operated relief valves function as designed. If the safety valves were required, the capacity of two safety valves is sufficient to mitigate system overpressure; the capacity of the third safety valve provides redundancy.

The valves supplied to Diablo Canyon for this use were designed and manufactured by Crosby Valve and Gage Co. and are identified as Crosby safety valves model HB-BP-86 (6M6). This model has a six inch inlet and a six inch outlet. The safety valves are spring-loaded, self-actuated, pop-type valves. These safety valves are designed to meet

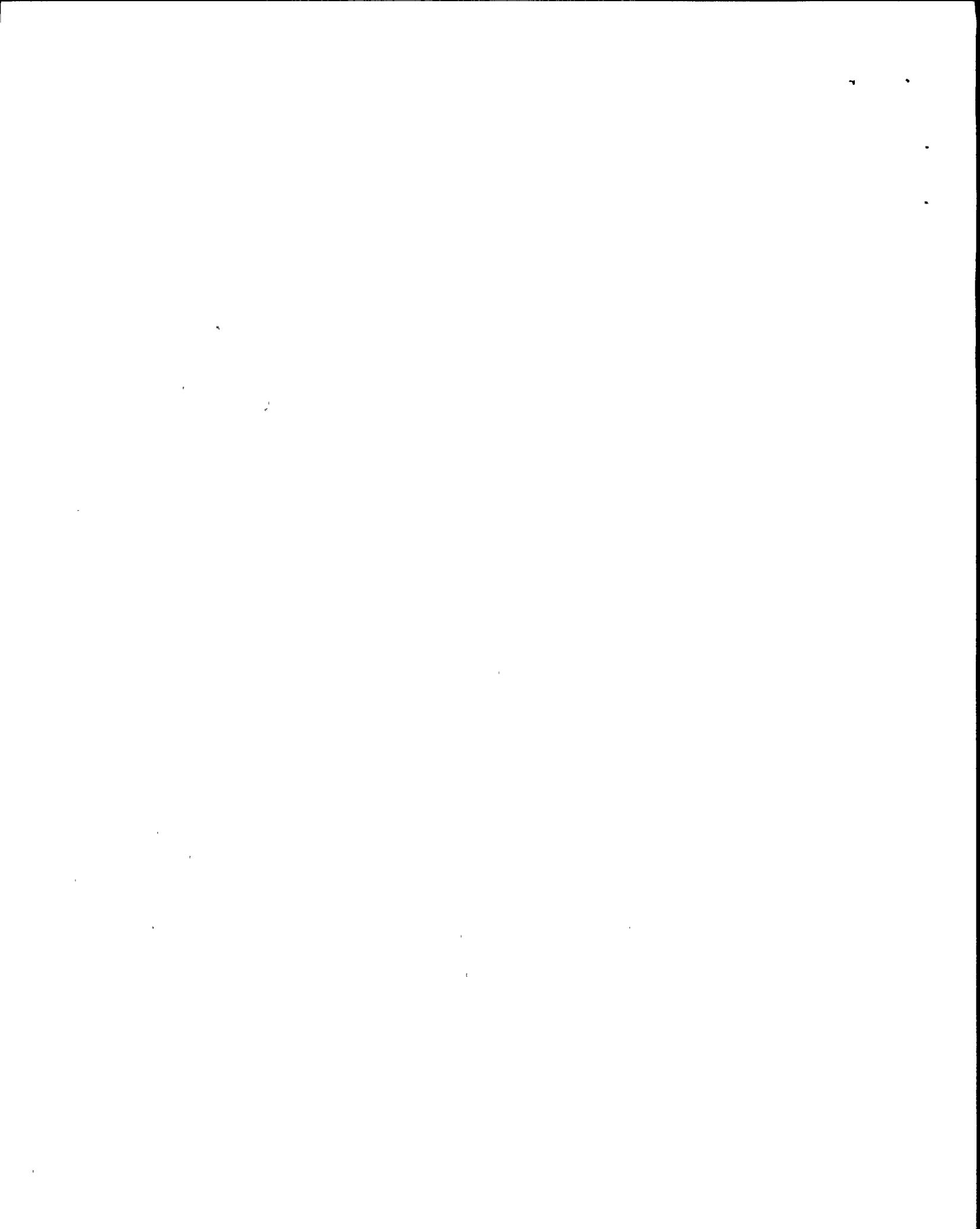


1 the requirements of the ASME Boiler and Pressure Vessel
2 Code, Section III, 1968 Edition. The valve pressure boundary
3 parts were designed in accordance with USAS-B16.5-1968,
4 Steel Pipe Flanges and Flange Fittings. In addition to
5 meeting the requirements of USAS-B16.5-1968 and the ASME
6 Code, Section III, the safety valves were originally
7 qualified to withstand seismic loadings equivalent to 3.0g
8 in the horizontal direction and 2.0g in the vertical
9 direction. Subsequently, the safety valves were qualified to
10 withstand loading due to the Hosgri seismic event
11 accelerations in addition to normal operating and deadweight
12 loads.

13 Prior to shipment to the plant, each of the valves
14 was inspected and subjected to testing. All surfaces of
15 pressure retaining forgings, castings, finished welds, and
16 machined surfaces were liquid penetrant inspected. The body
17 and nozzles were hydrostatically tested. All of the Diablo
18 Canyon safety valves successfully completed these tests.

19 As part of the design verification process, valves
20 of the same design, but with a three inch inlet and a six
21 inch outlet, were successfully tested at the Pacific Gas and
22 Electric Contra Costa plant in a configuration that was
23 representative of the actual Diablo Canyon plant
24 configuration and at the temperatures and pressures for
25 which the valves were designed to function.

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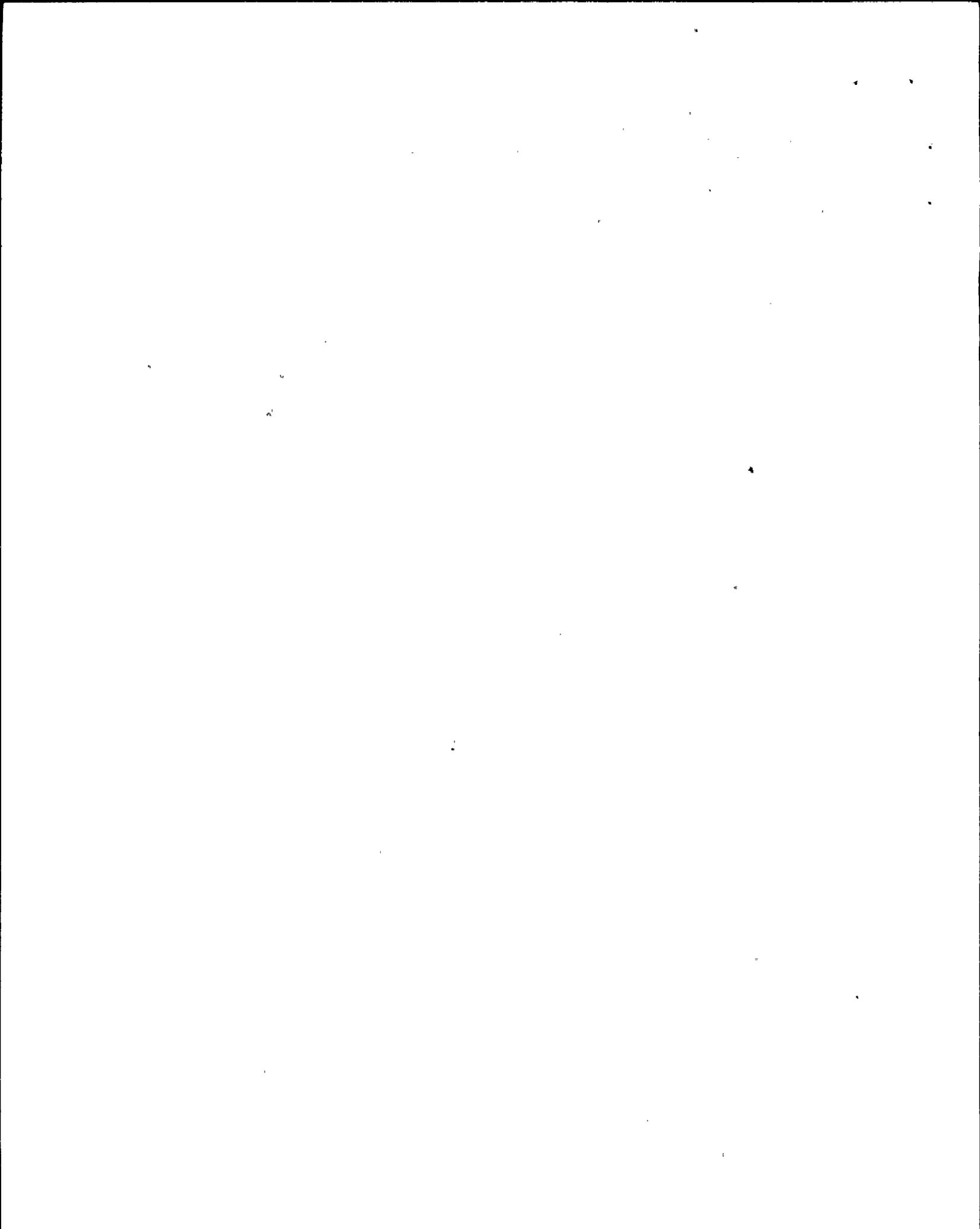


1 Westinghouse has conducted a survey of Westing-
2 house designed operating plants in the United States to
3 determine the number of times that pressurizer safety valves
4 have actuated during plant operations. No instances of
5 actuation of or failure of pressurizer safety valves were
6 reported by the owners of Westinghouse designed plants in
7 the United States. This survey covered plants with a total
8 of 181 reactor years of operation through October 1980. No
9 instances of actuation or of failure have been reported for
10 Westinghouse plants since the time of the survey.

11
12 Pressurizer Power-Operated Relief Valves

13 The pressurizer of each unit of the Diablo Canyon
14 Plant is equipped with three pressurizer power operated
15 relief valves (PORVs). These valves are designed to relieve
16 steam to limit the maximum pressure in the reactor coolant
17 system during full load rejection transients without reactor
18 trip. Under normal conditions, the PORVs remain closed. In
19 the FSAR accident analyses for the Diablo Canyon plant,
20 credit has not been taken for the automatic actuation of the
21 pressurizer power-operated relief valves. If automatic PORV
22 actuation had been considered in the analyses, the
23 calculated consequences would have been less severe. Under
24 actual transient conditions the PORVs would actuate prior to
25 the safety valves since the PORV setpoint is lower.

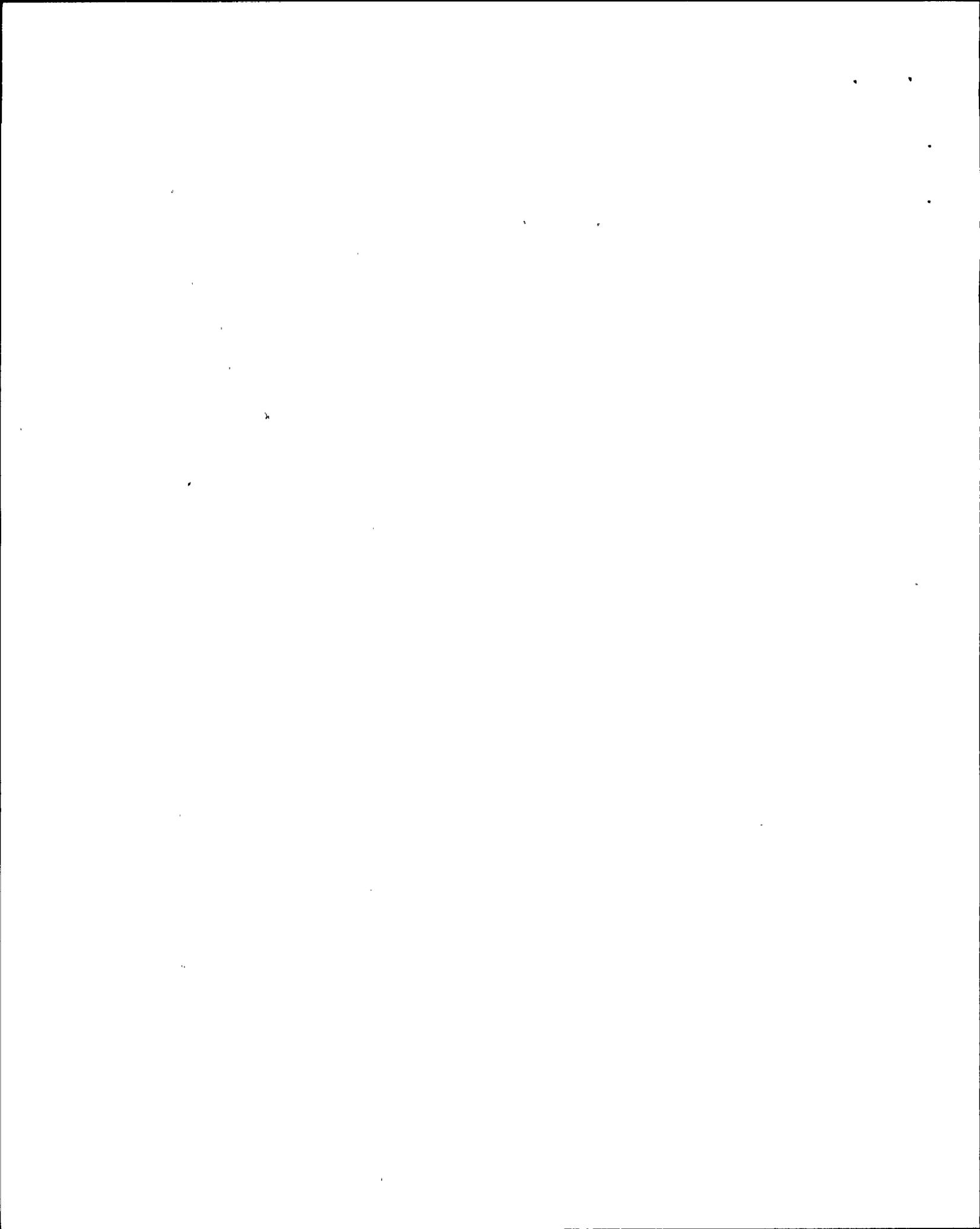
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1 The valves supplied to Diablo Canyon for this use
2 were designed and manufactured by Masoneilan International
3 and are identified as Masoneilan Model 20000 series. The
4 Diablo Canyon valves have two-inch bodies with three-inch
5 end connections. These valves are air-operated globe
6 valves. The valves are designed to be leak tight at the
7 hydrostatic test pressure. The valve bodies, bonnets and
8 flanges were designed and built to USAS-B16.5-1968 and
9 MSS-SP-61. In addition to the requirements of these
10 standards, the PORVs were originally qualified to withstand
11 seismic loadings equivalent to 3.0g in the horizontal
12 direction and 2.0g in the vertical direction. Subsequently,
13 the PORVs were qualified to withstand loading due to the
14 Hosgri seismic event accelerations in addition to normal
15 operating and deadweight loads.

16 Prior to shipment to the plant, each of the valves
17 was inspected and subjected to testing. All pressure
18 boundary cast steel parts were radiographed and liquid
19 penetrant inspected. All forged parts were liquid penetrant
20 inspected. Tests on the assembled valves included a
21 hydrostatic test, as well as backseat and seat leakage
22 tests. All of the Diablo Canyon PORVs successfully
23 completed these tests.

24 As part of the design verification process, valves
25 of the Model 20000 series were successfully tested in a
26 thermal test loop at 2485 psig and 550°F.



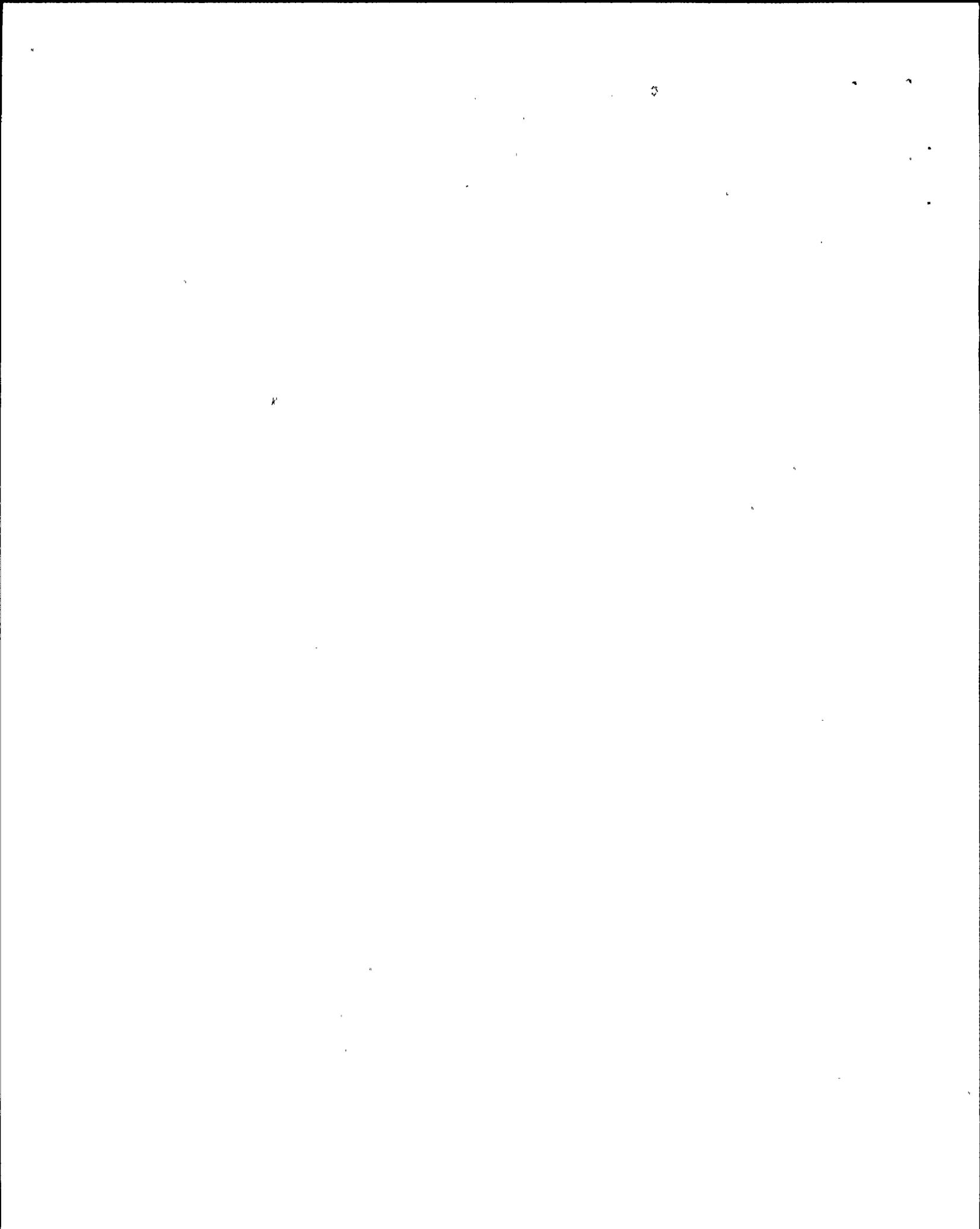
1 After installation in the Diablo Canyon plant,
2 these valves were successfully tested during hot functional
3 testing. In addition, Masoneilan Model 20000 series valves
4 are installed in six Westinghouse designed operating plants
5 in the United States and have also been successfully tested
6 during hot functional testing.

7 Westinghouse has conducted a survey of Westing-
8 house designed operating plants in the United States to
9 determine the number of times that pressurizer PORVs have
10 been opened during plant operations. This survey covered
11 plants with a total of 181 reactor years of operation
12 through October 1980. Responses to the survey indicated
13 that there were 163 occurrences of PORV openings with no
14 failures to close. Of these occurrences, 59 of them
15 involved Masoneilan Model 20000 series valves. There have
16 been no known failures of these valves in these plants since
17 October 1980.

18 19 Pressurizer PORV Block Valves

20 The pressurizer of each unit of the Diablo Canyon
21 plant is equipped with three pressurizer PORV block valves.
22 These valves are located upstream of the pressurizer
23 power-operated relief valves and are provided to isolate the
24 inlets of the PORVs for maintenance and testing.

25 The block valves supplied to Diablo Canyon for
26 this use were designed and manufactured by Velan Engineering



1 Companies and are identified as Velan Model B10-354B-13MS.
2 This model has a three inch inlet and a three inch outlet.
3 These valves are motor operated gate valves. The valve
4 pressure boundary parts are designed in accordance with
5 USAS-B16.5-1968. The block valves were originally qualified
6 to withstand seismic loadings equivalent to 3.0g in the
7 horizontal direction and 2.0g in the vertical direction.
8 Subsequently, the block valves were qualified to withstand
9 loading due to the Hosgri seismic event accelerations in
10 addition to normal operating and deadweight loads.

11 Prior to shipment to the plant, each of the valves
12 was inspected and subjected to testing. All surfaces of
13 pressure containing cast parts were radiographed and liquid
14 penetrant inspected. Tests on the assembled valves included
15 a hydrostatic test, as well as backseat and seat leakage
16 tests. All of the Diablo Canyon PORV block valves
17 successfully completed these tests.

18 Velan-manufactured block valves are installed in
19 twenty-one Westinghouse designed operating plants in the
20 United States. There have been no known failures of these
21 valves in these plants.

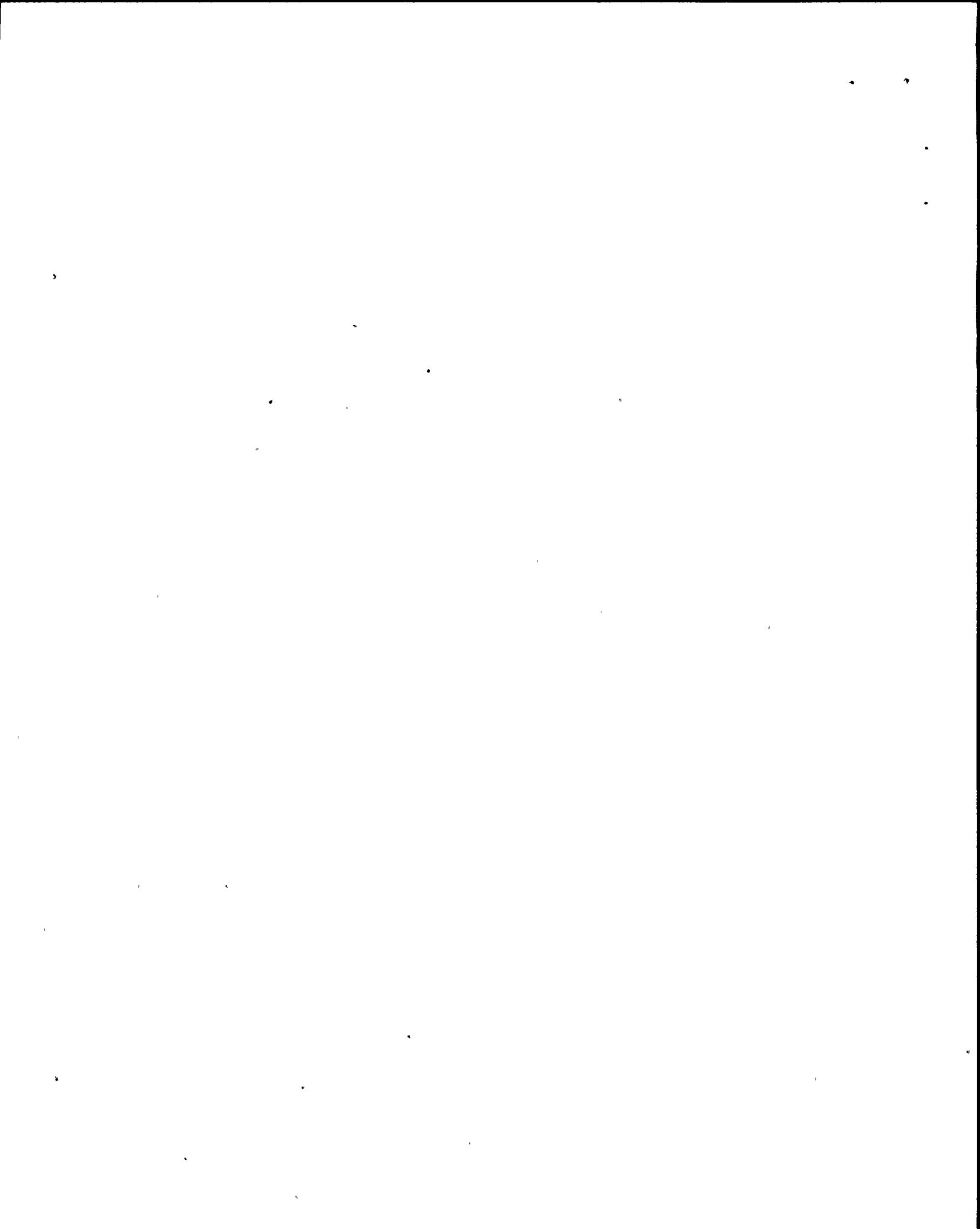
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1 Compliance with GDC's

2 Based on the information presented above, the
3 pressurizer safety valves, PORV, and block valves, which are
4 part of the reactor coolant pressure boundary, comply with
5 the applicable regulatory requirements, including GDC's 1,
6 14, 15, and 30.

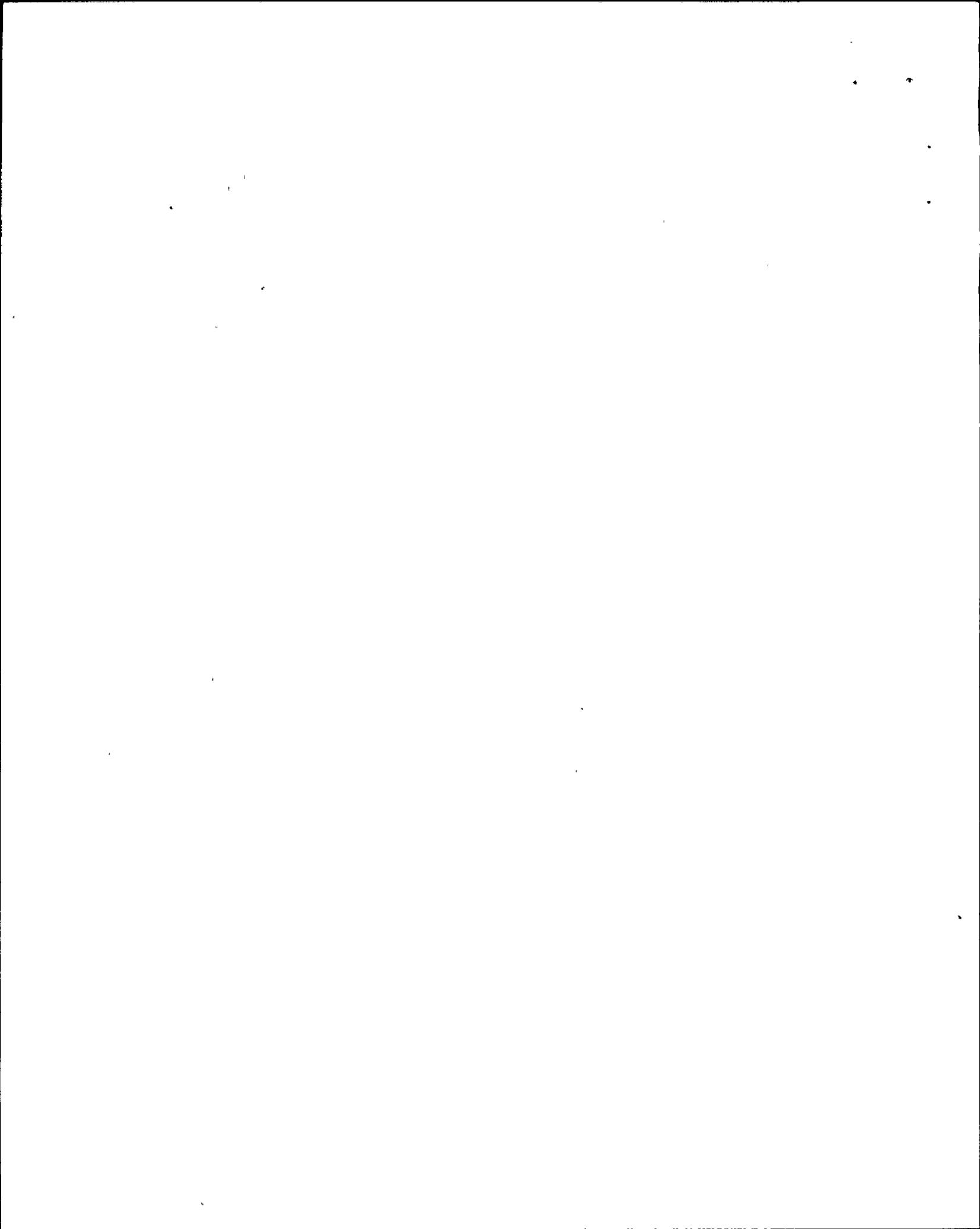
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8 Evaluations of Postulated Valve Failures

9 Westinghouse has performed analyses of postulated
10 loss of coolant accidents (LOCAs) in the pressurizer vapor
11 space for a plant substantially identical to the Diablo
12 Canyon plant. These analyses were performed for 100 percent
13 power level. The conclusions which follow are valid and
14 conservative for five percent power level.

15 Analyses performed included the extremely unlikely
16 case that all three pressurizer PORVs of the size installed
17 at Diablo Canyon were postulated to have stuck completely
18 open. These analyses were performed with the NRC approved
19 evaluation model, which includes the assumption of minimum
20 safeguards. No core uncover was predicted to occur.
21 Therefore, if all three of the pressurizer PORVs failed
22 completely open at Diablo Canyon, no core uncover would be
23 expected.

24 It should be noted that these PORV LOCA analyses
25 also assume that the pressurizer PORV block valves failed to
26 close. Therefore, if all of the pressurizer PORVs failed



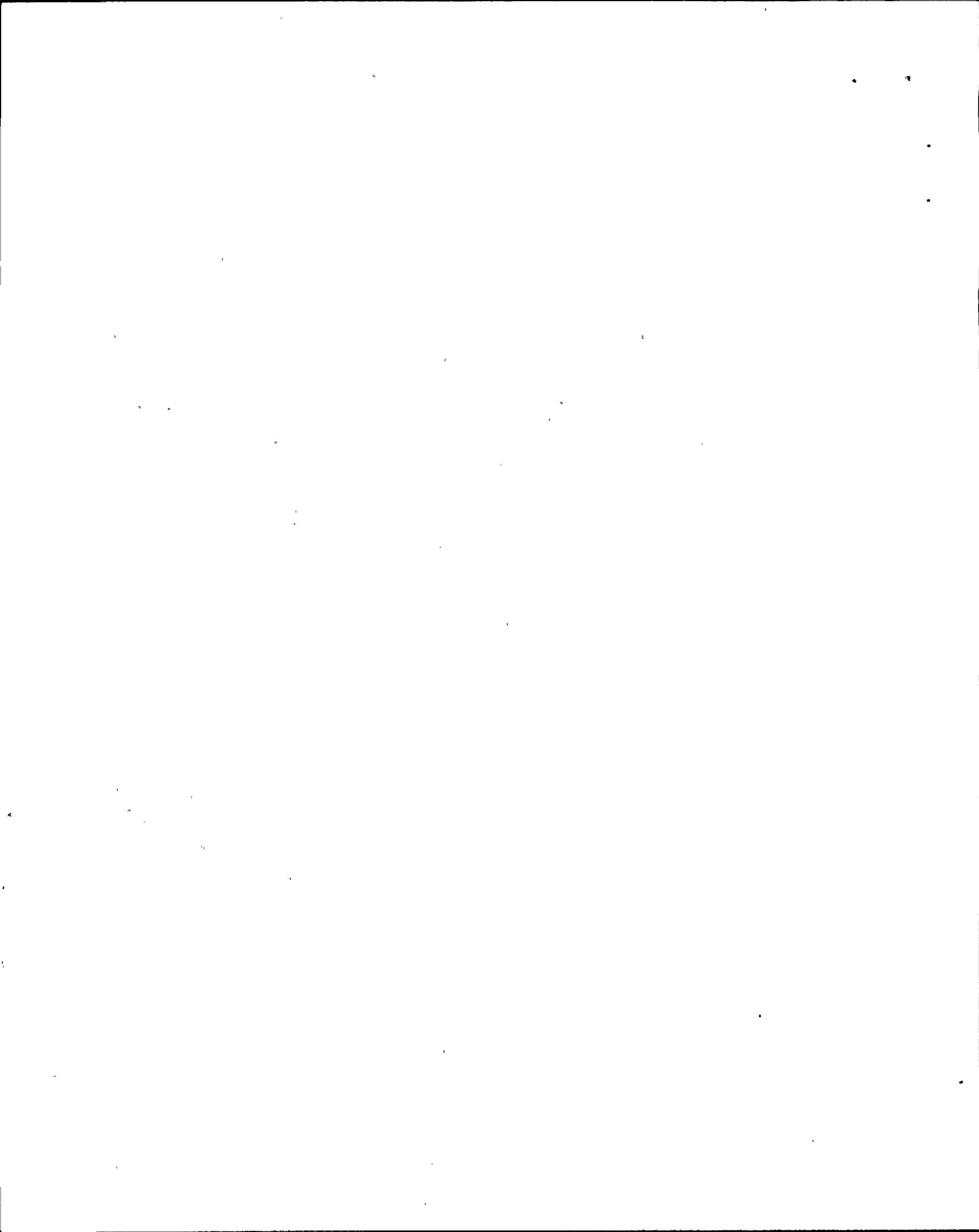
1 completely open and if all three PORV block valves failed to
2 close at Diablo Canyon, no core uncovering would be expected.

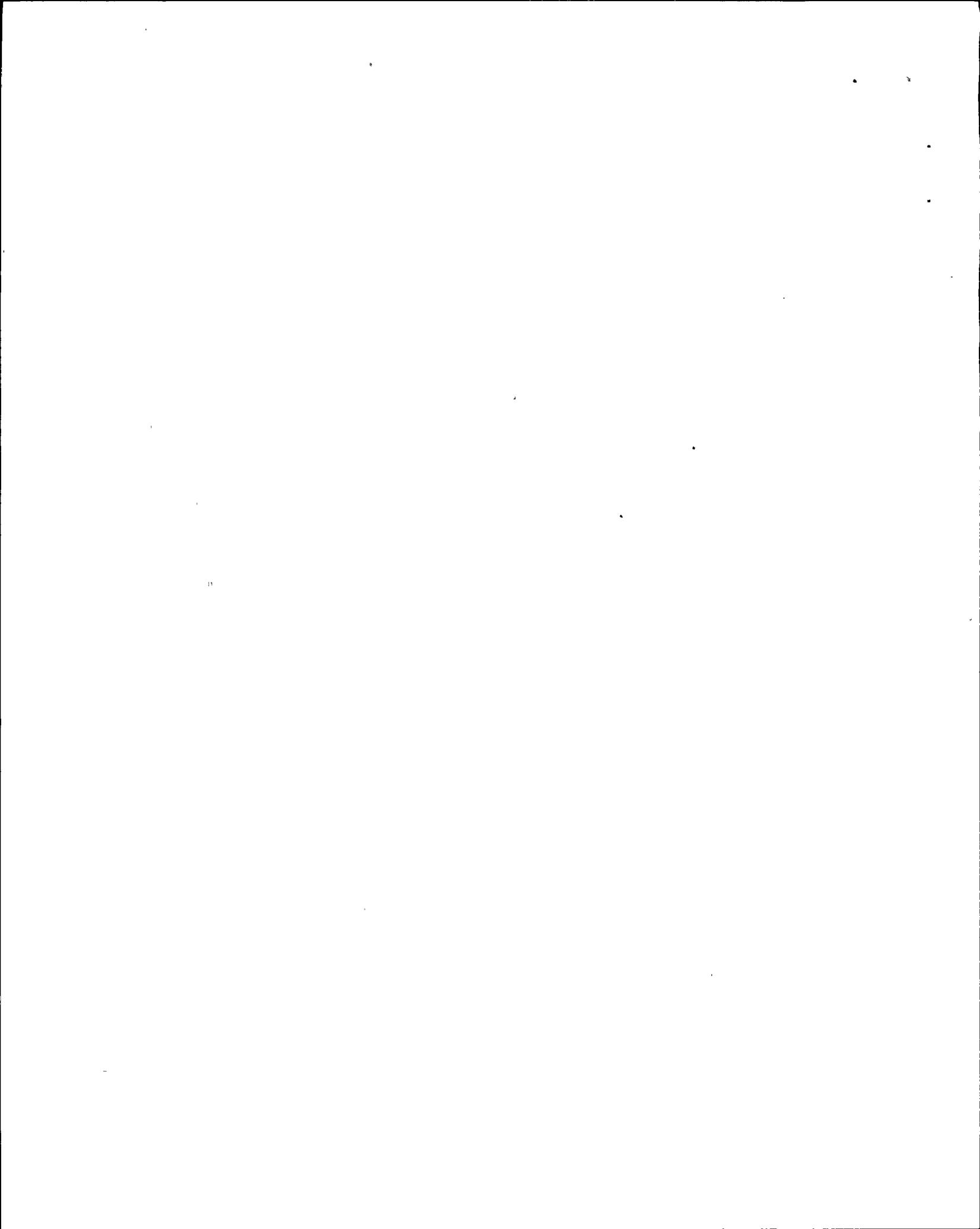
3 Similarly, analyses performed enveloped the
4 extremely unlikely case that all three pressurizer safety
5 valves of the size installed at Diablo Canyon were
6 postulated to have stuck completely open. These analyses
7 were performed with the NRC approved evaluation model, which
8 includes the assumption of minimum safeguards. No core
9 uncovering was predicted to occur. Therefore, if all three of
10 the pressurizer safety valves failed completely open at
11 Diablo Canyon, no core uncovering would be expected.

12
13 Conclusion

14 Based on the design and analysis of, as well as
15 testing applicable to, the pressurizer safety, relief, and
16 block valves at Diablo Canyon, these valves are expected to
17 function as required during any condition of normal
18 operation, including anticipated operational occurrences.
19 As discussed above, even in the hypothetical case of the
20 pressurizer safety, relief, and block valves failing to
21 close, the public health and safety would not be endangered.
22 Accordingly, completion of additional testing of safety
23 valves, PORV, and block valves is not required prior to fuel
24 load, low power testing, or full power operation at Diablo
25 Canyon.

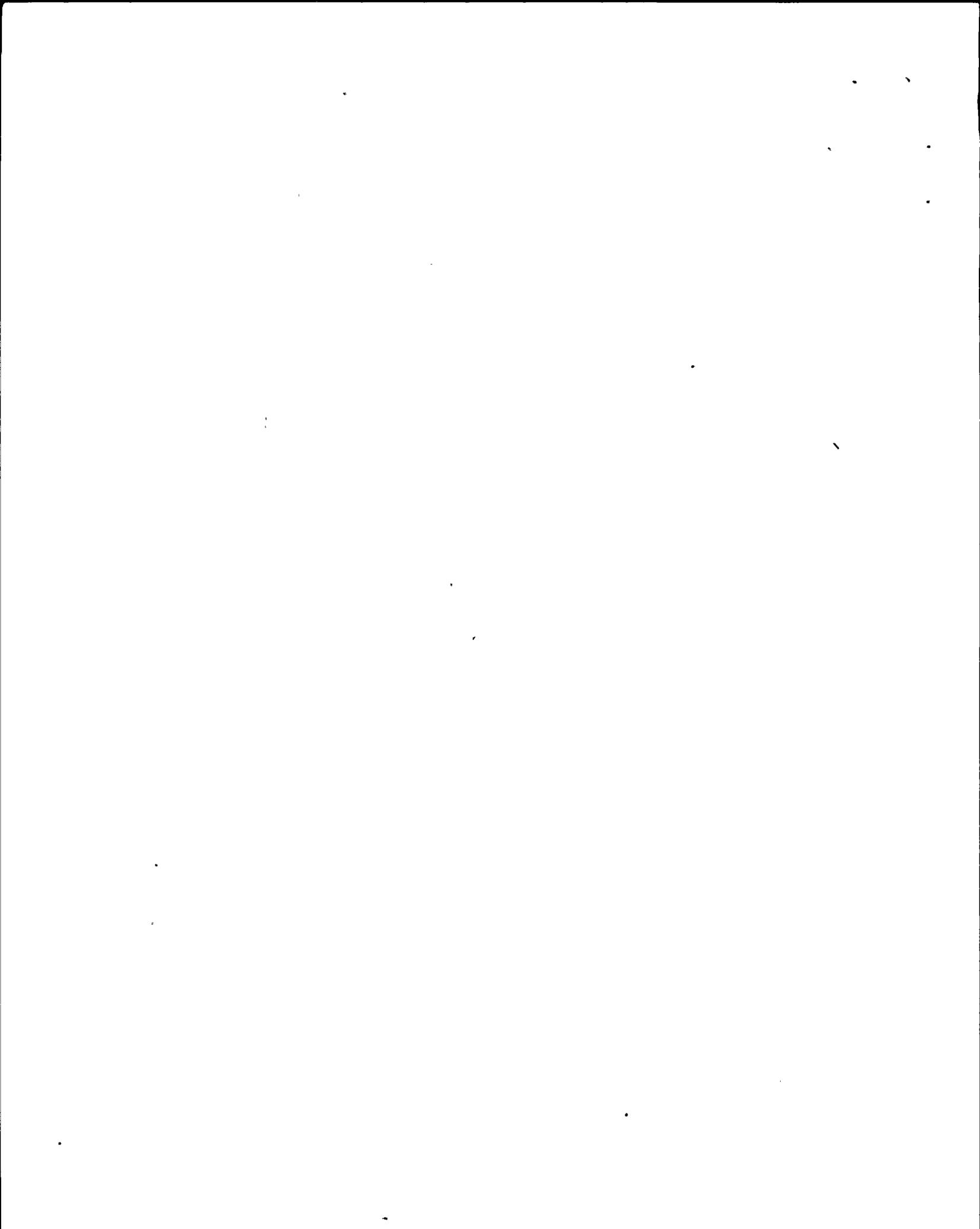
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1 licensing and operation of nuclear power plants. I have
2 remained in this area undertaking assignments of increasing
3 responsibility until my recent transfer to the Nuclear
4 International Division as Project Engineer.

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1 PROFESSIONAL QUALIFICATIONS OF

2 RICHARD A. MUENCH

3
4
5 My name is Richard A. Muench. My business address
6 is Westinghouse Electric Corporation, P.O. Box 355,
7 Pittsburgh, Pennsylvania, 15320. I am employed by
8 Westinghouse Electric Corporation as Manager of Safeguards
9 Analysis within the Nuclear Safety Department of the Nuclear
10 Technology Division. I am responsible for analyzing the
11 thermal hydraulic behavior of the reactor coolant system
12 following postulated loss-of-coolant accidents mainly to
13 demonstrate the integrity of the reactor fuel. Such
14 analysis includes the amount of zirconium which would react
15 with the coolant in the event of a loss-of-coolant accident.

16 I attended the University of Kentucky from 1968
17 through 1972. I received a Bachelor of Science Degree in
18 Mechanical Engineering.

19 In 1972, I joined Westinghouse Electric
20 Corporation as an engineer in Safeguards Analysis with
21 responsibility for performing loss-of-coolant accident
22 analyses. I have remained in this area, becoming Manager of
23 Safeguards Analysis in 1978.

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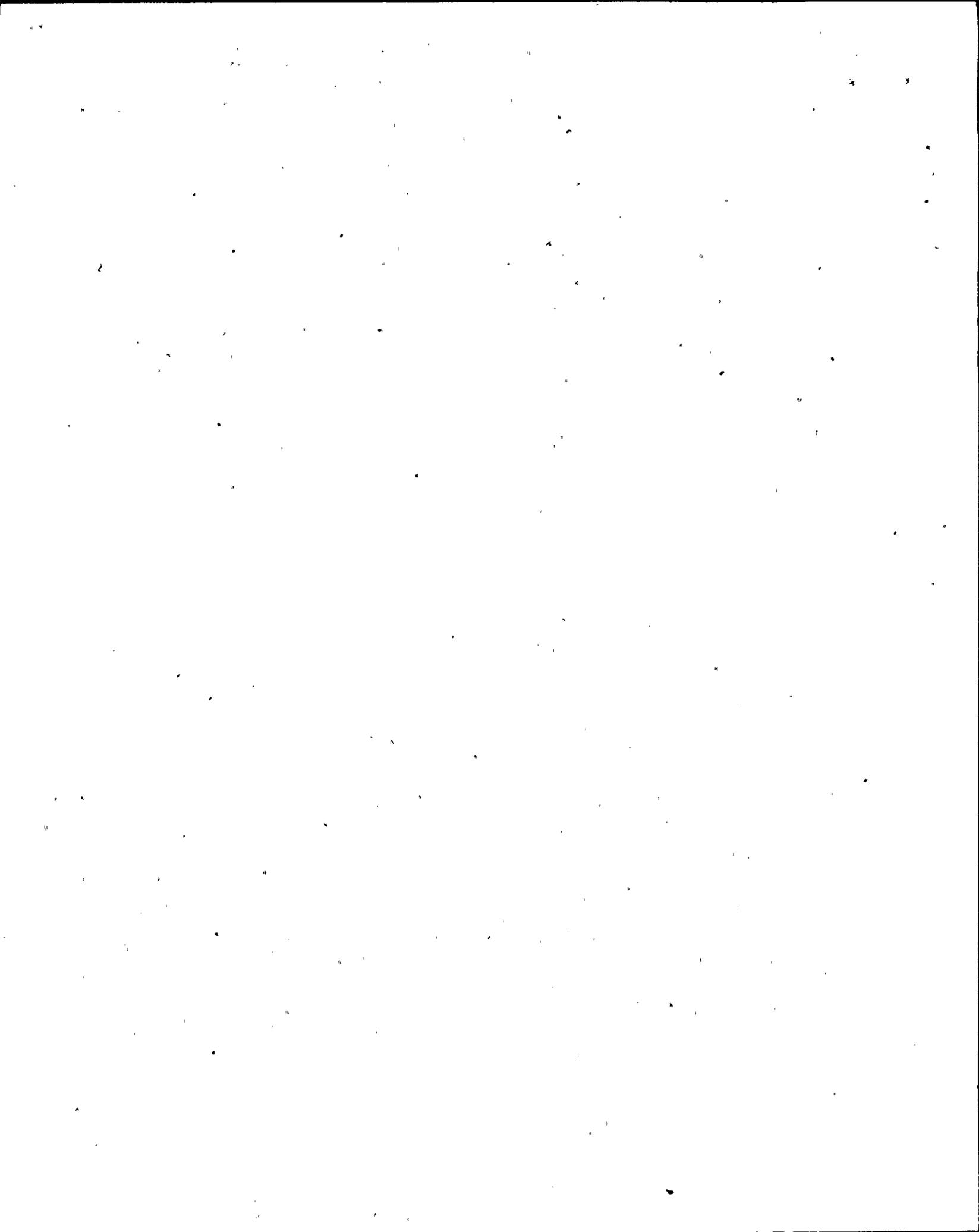
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I was a member of the Industry Advisory Group responding to the Three-Mile Island accident and during the accident worked on projects designed to provide input into plant recovery operations.



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)
)
 . PACIFIC GAS AND ELECTRIC COMPANY)
)
 Units 1 and 2)
)
 Diablo Canyon Site)
)
 _____)

Docket No. 50-275
Docket No. 50-323

CERTIFICATE OF SERVICE

The foregoing document(x) of Pacific Gas and Electric Company has (~~been~~) been served today on the following by deposit in the United States mail, properly stamped and addressed:

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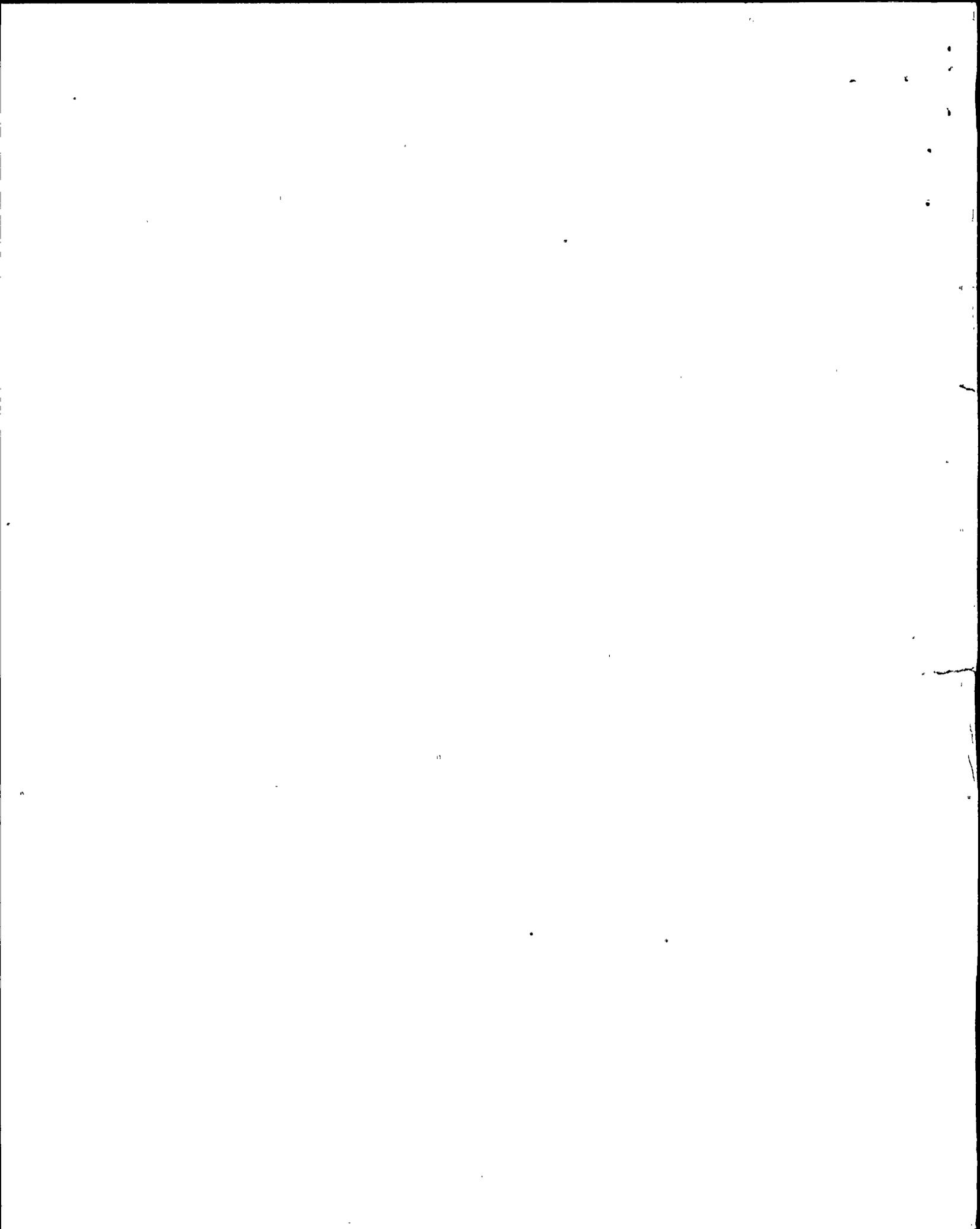
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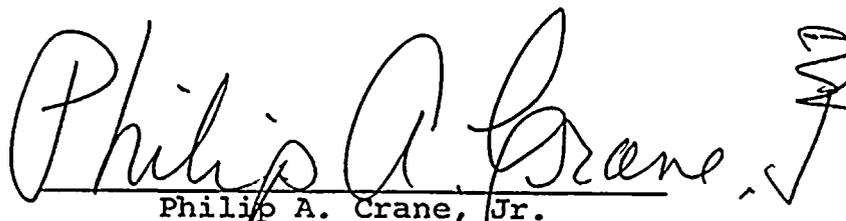
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