

5/8/86

MEMORANDUM FOR: Dennis Crutchfield, Assistant Director
for Safety Assessment
Division of Licensing

FROM: Robert J. Bosnak, Acting Assistant Director
for Components and Structures Engineering
Division of Engineering

JULY 23, 1985 OPERATING REACTOR EVENTS BRIEFING - SPECIAL ITEM
SUBJECT: - INADEQUATE MAIN STEAM SAFETY VALVE CAPACITY AT SEABROOK

At the Operating Reactor Events briefing on the subject issue on July 23, 1985, DE was asked to investigate the adequacy of testing of PWR main steam safety valves (MSSVs) and the validity of extrapolating test data from small valves to larger full size MSSVs. The Mechanical Engineering Branch (MEB) has planned the following tasks which we think adequately respond to this request:

- (1) MEB has prepared a proposed ^E Information Notice to advise the industry of the MSSV capacity problem as it relates to proper ring settings. The proposed Notice was transmitted to DL with our August 9, 1985 memorandum from R. Bosnak to D. Crutchfield.
- (2) MEB will formally request DST to prioritize a potential generic issue dealing with MSSV operability problems including that of inadequate flow capacity. The procedure outlined in Office Letter No. 40 will be followed.
- (3) MEB will discuss with the ASME Section III Subgroup on Pressure Relief possible changes to the ASME Section III Code Class 2 safety valve certification requirements. Currently Cl.2 safety valves can be capacity certified based on tests performed on prototypical valves much smaller in size and at much lower pressures than are applicable for PWR, Main Steam Safety Valves. The ring adjustment problem encountered with the Seabrook MSSVs raises one of the same questions that arose during the recent EPRI testing of ASME Section III Cl. 1 pressurizer safety valves. That is, do the valve manufacturers have an adequate understanding of how to extrapolate ring adjustments, that affect lift and blowdown, from very small test valves to the very large safety valves used on PWR plants?

Recently changes to the Code safety valve certification procedure, proposed by MEB, to address this concern for Cl. 1 safety valves were accepted by ASME for incorporation into the Code. The change will require that new Cl. 1 safety valve designs be prototypical tested in sizes and at pressures, temperatures, and flow rates that envelope those that the valve design will be used for in service.

MEB will explore with the Code Committee the feasibility/desirability of making similar changes to the Code Cl. 1 safe valve certification requirements.

We believe these actions should adequately resolve the problem of inadequate MSSV capacity.

Robert J. Bosnak, Acting Assistant Director
for Components and Structures Engineering
Division of Engineering

cc: J. Knight
F. Cherny
B. Sheron
G. Holahan
D. Tarnoff

This should be intended as part of item (3).

Document Name:
INADEQUATE MAIN STEAM MEMO

Requestor's ID:
DEMEB01

Author's Name:
GHammer

Document Comments:
Inadequate Main Steam Safety Valve Capacity at Seabrook

to: W.C. Hammer
Cherry
RJB

skf tip.
Please see
9.26

To: D. Crutfield, AD SA, DC

From: RJB

SUBJECT: ^{INADEQUATE}
A Main Steam Safety Valve Capacity at
Seabrook

A.T

~~A result of~~ the operating Reactor
on the subject issue
Events briefing, on July 23, 1985, DE was
asked to investigate the adequacy of testing
~~and the~~ of ^{PWR} main steam safety valves (MSSV's)
and the validity of extrapolating test data
from small valves to larger full size MSSV's.
The Mechanical Engineering Branch (MEB)
has planned the following tasks which we think
adequately responds to this request:

MEB proposed a ~~proposal~~
(1) ~~Information~~ I E Information Notice

to advise the industry of the MSSV
capacity problem as it relates to proper

ring settings. The ~~proposal~~ ~~is~~ ~~being~~ ~~transmitted~~
to ~~the~~ ~~industry~~ ~~with~~ ~~our~~ ~~August~~ ~~9,~~ ~~1985~~ ~~memorandum~~ ~~for~~ ~~the~~ ~~Board~~.
to ~~S. Chant~~ ~~by~~ ~~MEB~~.

(2) MEB will ~~the~~ ~~Request~~ DST to prioritize ~~is~~ a potential

generic issue ~~the~~ ~~MSSV~~ dealing with

MSSV operability problems including

that of inadequate flow capacity ~~we~~

~~will~~ ~~be~~ ~~followed~~.
The procedure outlined in Office Letter No. 40.

(3) Pursue through active working committees ~~is~~ of

the American Society of Mechanical Engineers

Boiler and Pressure Vessel Code, Section III, possible

code changes which would improve ~~required~~ testing and

certification procedures for MSSVs.

Rec
Insert A

we believe these actions ~~will~~ ^{should}
adequately resolve the problem of
inadequate MSSV ~~capacity~~ capacity. ~~TRD~~

RJB

cc: J. P. Knight
F. Chisney
B. Sheron
S. Holahan
D. Tarnoff

Invent (A)

A-1

3) HEB will discuss with the ASME Section III Subgroup on Pressure Relief ~~the~~ possible changes to the ASME Code Class 2 ^{Section III} supercritical certification requirements. Currently Class 2 supercritical critical fluid tests performed on prototype valves much smaller in size and at much lower pressures than are applicable for PWR Main Steam Safety Valves. The ^{ring adjustment} problem associated with the seat-rod MSCVs ^{one of the} same geometry that ^{are being} the recent EPRI testing of ASME Section III CL 1 1500 psi supercritical. That is, to the valve manufacturer here are

adjustments, if how to integrate the
— ring adjustments, it affect lift and
slow down, from very small ^{inches} valves
to the very ^{large} safety valves used on
PWR plants.

Recently change to the ^{code} safety
valve certification procedure ~~for CL.1~~
~~was~~ proposed by NRB, to add to
this concern for CL.1 safety valves
was accepted by ASME for incorporation
into the code. The change will require
that new CL.1 safety valve designs be
prototypical tested in design and at pressures,
temperatures, and flow rates that establish
there that the valve design will be used
for in service.

NRB will comply with the code in the

the possibility of a similar
— similar changes to the C. 6 C. 2
reference identification requirements.

Ring setting - Capacity
Flowdown - too high, too low
Chatter - ends in stuck valve or leaking

ENCLOSURE 2

GENERIC ISSUE INFORMATION

The following information should be provided in sufficient detail so that the safety significance and scope of the proposed generic issue can be determined. If related to issues identified in NUREG-0410, reference for description of deficiency: (i.e., section number and page, NUREG-0410, 0471, 0510, etc.)

1. Suggested Title of Proposed Generic Issue or new requirement.

Reliability of PWR MSSV?

2. What is the known, suspected, or potential deficiency in the technical basis of existing staff guides or requirements?

The individual plant FSARs contain credit for MSSV inherent capacity which includes ability to achieve full backstop within limits to achieve or pressure protection of the secondary cooling system.

3. What present specific safety requirements (e.g., SRP, Regulatory Guide, Rule) appear to be inadequate or in doubt?

That last FSAR Chapter 10 requirements for the Main Steam system.

4. If a new requirement is proposed, what is the proposed requirement?

The revision
Provide, to the extent possible, a value-impact assessment.

5. What new information must be developed either to confirm the adequacy of the current technical bases or to define new requirements that would restore adequate protection?

was to be done conducting of tests on the various MSSV models on US PWRs. The most economical method would probably be through an owners group type of effort whereby prototypical tests would be conducted. The MSSV models used in the current technical bases are based on hydraulic studies of the secondary and primary systems to avoid the impact of inadvertent MSSV capacity.

6. What actions are being taken (if any) or should be taken on operating plants to correct the suggested deficiency?

possibly coupled with probabilistic risk studies
By whom (organization and individual) are these actions being taken? *NRR is planning to initiate 10 CFR*

7. If the issue is related to another generic issue, (e.g., TMI Action Plan Item) identify the generic issue and the area of issue overlap.

50.54f action (severe water) to require immediate to remedy the problem of inadequate capacity. The issue is related to another generic issue, (e.g., TMI Action Plan Item) identify the generic issue and the area of issue overlap.

8. Is anyone currently working on this issue? If so, name and organization.

These issues are very much like those identified in TMI NUREG 5-72. See T.P. 10/1/80
Several persons: RE, MEB, OAB, IE, RSB

9. Name of person supplying information: Date provided.

Ken Hammer & Frank Cheng - MEB

10. Provide references as appropriate (Memoranda, NUREGs, SRPs, etc.)

2 copies memo OAB/MEB re:com. IBSN, RSB prep 50.54f

11. The concurrence of the responsible organization, if possible. This is not necessary, since all issues will eventually be reviewed by the responsible organization.

Mark Green 27940

O c o n e e 1 always same value

5-8+
5-82

RING SETTINGS - don't think so ~~WOOD~~

Resistor fuzzy on 5 (+ # steam lines)

R.F. in 2 year

Reg. \leftarrow ^{Mr.} Dance - FAX UP NEXT WEEK
Ref TUE - WED (2-19)

Scotch® 7664 "Post-it" Routing-Request Pad

ROUTING - REQUEST

Please

| | |
|--|-----------------|
| <input type="checkbox"/> READ | To _____ |
| <input type="checkbox"/> HANDLE | _____ |
| <input type="checkbox"/> APPROVE | <i>Approved</i> |
| and | <i>B</i> |
| <input type="checkbox"/> FORWARD | _____ |
| <input type="checkbox"/> RETURN | _____ |
| <input type="checkbox"/> KEEP OR DISCARD | <i>1 set</i> |
| <input type="checkbox"/> REVIEW WITH ME | _____ |

Date _____ From _____

B/1

SEABROOK - MAIN STEAM SAFETY VALVE
TEST FAILURES, BETWEEN
OCTOBER 16 AND DECEMBER 1, 1984,
(G. HAMMER, NRE)

- PROBLEM - TEST RESULTS INDICATE SPRING-ACTUATED MAIN STEAM SAFETY VALVES MAY NOT ACHIEVE RATED RATE FLOW CAPACITY.

- SAFETY SIGNIFICANCE - ^{POSSIBLE} INADEQUATE OVERPRESSURE PROTECTION OF SECONDARY COOLING SYSTEM IN PWRs

- WYLE TESTS RESULT IN INADEQUATE LIFT OF VALVE DISK (ABOUT 50%) WITH THE VENDOR (CROSBY) RECOMMENDED RING SETTING ADJUSTMENTS. TESTS WERE CONDUCTED TO DETERMINE ADEQUACY OF DISCHARGE PIPING.

- CORRECTIVE ACTION - RINGS READJUSTED. OBTAINED FULL LIFT ON SEABROOK VALVES

- GENERIC IMPLICATION - SEABROOK VALVES AND DISCHARGE PIPING SIMILAR TO OTHER PWRs. FULL FLOW TESTS NOT NORMALLY RUN TO ADJUST RINGS.

- NRC FOLLOWUP ACTION - POSSIBLE IE INFORMATION
NOTICE. STAFF MAY PURSUE AS A GENERIC ISSUE

Gary

- ① I have looked at the proposed notice and it looks good to me. My comments are enclosed. If possible you may want to include a list of other plants with the values, also, should have cover letter
- Transcribing notice Dir/DE → Dir/IE
- ② There will be a conference call with Crosby at 1:00pm on Monday 7/15 in Dick Wassman's office. You should plan to attend.

③ We would like you to give a short summary of this issue at the event briefing on Tue 7/16. I would have normally done this but I'm away this week. Plan on no more than a 5 min talk in which you summarize ~~what~~ what is your notice and the outcome of the call with Crosby on Mon. Sorry to leave you holding the bag.

Mark C

7/12

~~It is known that setting the value of~~

~~The design of the MSSV is based on the specific design setting of the MSSV. The value of the design setting is set at 5%.~~

~~A related problem which has occurred at~~

A related ~~problem~~ MSSV problem which has occurred at several PWRs in the past few years pertains to excessive ~~water~~ blowdown of a system pressure following during transients which have actuated MSSVs. On separate occasions at the Oconee, Salem, Trojan, and Davis-Besse nuclear facilities, MSSVs have ~~actuated~~ ^{prematurely} ~~actuated~~ ^{actuated} below ~~the~~ ^{the} correct ~~pressure~~ ^{pressure} reset pressure and have blown down excessive amounts of steam. ~~The cause of this is~~

The design blowdown value is ^{usually} 5% of setpoint pressure ~~and is independent of the specific value~~ ^{reset setting adjustments} ~~Some values at these facilities have exhibited~~ ^{as much as} 10% blowdown. This raises the concern that some ~~valves~~ ^{valves} MSSVs may remain open ^{too long} ~~blowing~~ ^{releasing} excessive quantities of ~~steam~~ ^{steam} ~~from the system~~ ^{possibly} ~~and thereby~~ ^{component} ~~affected the integrity~~ ^{integrity}.
-and cooling of the primary system and causing excessive thermal stresses on primary system components.

~~excessive blowdown on primary system comp.~~

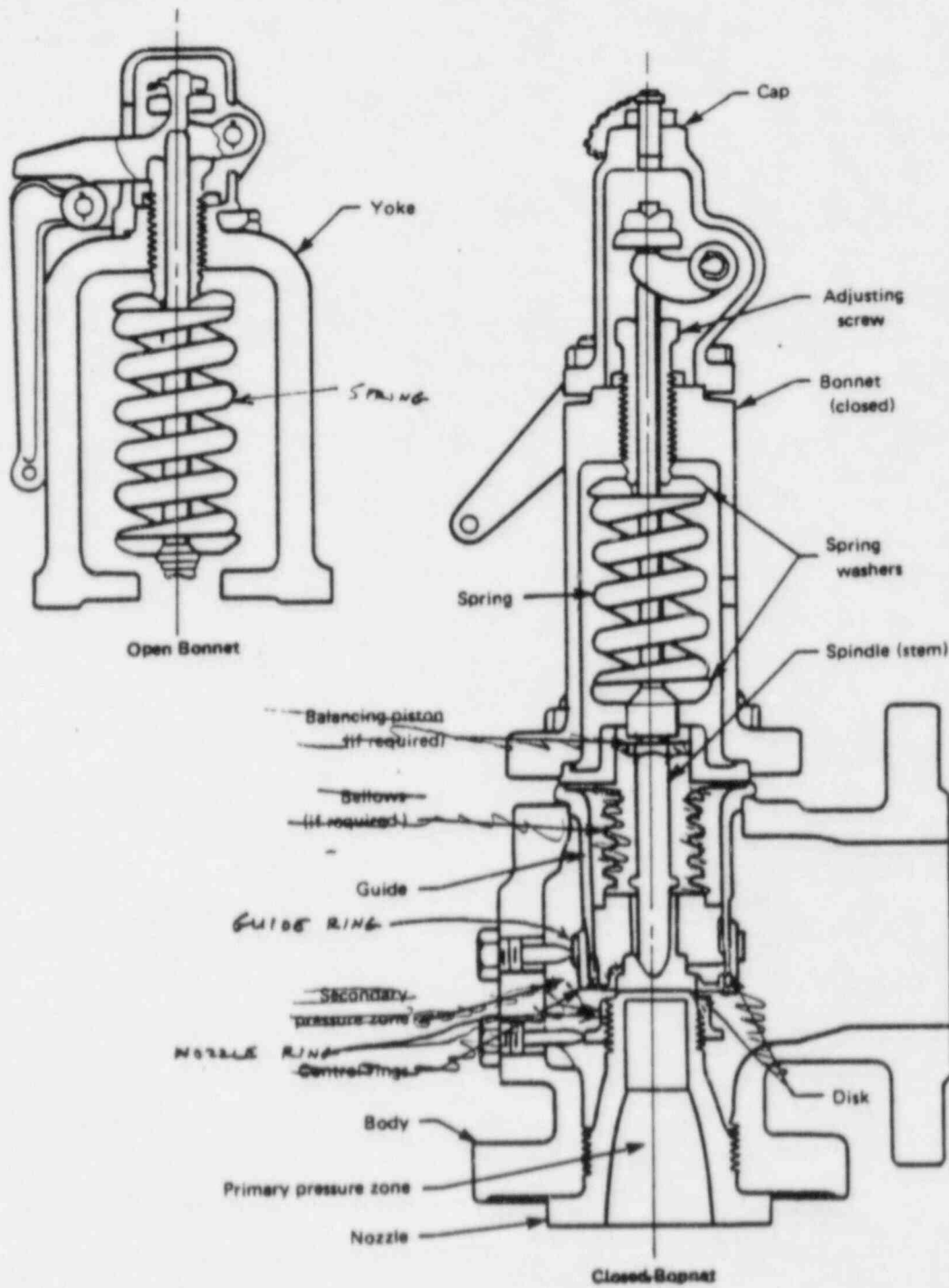


FIG. NC-3591.1.1 TYPICAL PRESSURE RELIEF DEVICES

