

NOV 22 1983

50-251

MEMORANDUM FOR: C. J. Heltemes, Jr., Director
Office for Analysis and Evaluation
of Operational Data

FROM: Harold R. Denton, Director
Office of Nuclear Reactor Regulation

SUBJECT: PEER REVIEW OF AEOD CASE STUDY REPORT - LOW TEMPERATURE
OVERPRESSURE EVENTS AT TURKEY POINT UNIT 4

As requested in your memorandum of September 26, 1983, we have reviewed the subject AEOD case study report. On October 17, 1983, a meeting was held among the cognizant NRR reviewers and Mr. Wayne Lanning, author of the AEOD case study. A summary of the case study was presented and the recommendations were discussed. The draft report initially focused on the two low temperature overpressure events at Turkey Point Unit 4 during November 1981 and then expanded to include a generic discussion of NRR's approach to the issue.

The case study indicates that AEOD is in basic agreement to NRR's handling of this generic concern. The recommendations seem to center on fine tuning of our approach through modifications to the Standard Technical Specifications on low temperature overpressurization.

We believe that the case study includes a number of good recommendations that should help reduce the number of future challenges to the low temperature overpressure mitigation system. However, the recommendations include a number of proposed modifications to the Standard Technical Specifications that will result in more stringent plant operation. Such changes will require CRGR review and approval. Therefore we believe the single most important improvement that could be made to this draft report would be to include at least a brief discussion of the cost/impact of these proposed changes.

Additional comments are enclosed.

Original Signed by
H. R. Denton

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Enclosure:
As stated

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THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
5700 SOUTH CAMPUS DRIVE
CHICAGO, ILLINOIS 60637

RECEIVED
JAN 15 1964

TO: DR. J. H. GOLDSTEIN
FROM: DR. R. M. WAYMIRE

Dear Dr. Goldstein:
I have received your letter of January 10, 1964, regarding the
analysis of the sample of polyethylene oxide (PEO) which you
kindly provided to me. The analysis shows that the sample
contains approximately 10% of a low molecular weight
fraction, which is likely to be the cause of the
observed differences in the properties of the sample.

The analysis was performed using gel permeation chromatography
(GPC) with a polystyrene gel column. The results are shown
in the attached report. The low molecular weight fraction
is estimated to have a number average molecular weight
(M_n) of approximately 10,000.

I am sorry that I cannot provide a more detailed analysis
of the sample at this time. However, the results of the
analysis are consistent with the observations made by you.
If you have any further questions, please do not hesitate
to contact me. I will be glad to discuss the results
of the analysis in more detail.

Sincerely,
R. M. Waymire

Dr. J. H. Goldstein
Department of Chemistry
University of Chicago
5700 South Campus Drive
Chicago, Illinois 60637

Enclosed for you are two copies of the report
describing the analysis of the sample of PEO.
The report contains the following information:
1. A description of the sample and the method of
analysis.
2. The results of the analysis, including the
molecular weight distribution and the
presence of a low molecular weight fraction.
3. A discussion of the results and the
implications for the properties of the sample.

Very truly yours,
R. M. Waymire
Department of Chemistry
University of Chicago
5700 South Campus Drive
Chicago, Illinois 60637

Dr. J. H. Goldstein
Department of Chemistry
University of Chicago
5700 South Campus Drive
Chicago, Illinois 60637

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5800 S. DICKINSON DRIVE
CHICAGO, ILLINOIS 60637
TEL: 773-936-3700

RECEIVED
JAN 15 1964
FROM: [illegible]
TO: [illegible]

Dear Sir:
I am in receipt of your letter of January 14, 1964, regarding the matter of [illegible].

The information you have provided is being reviewed and we will contact you again as soon as a decision has been reached. Your patience is appreciated.

Sincerely,
[illegible signature]

Very truly yours,
[illegible name]
[illegible title]

cc: [illegible]
[illegible]

ENCLOSURE

NRR PEER REVIEW COMMENTS

AEOD CASE STUDY REPORT

LOW TEMPERATURE OVERPRESSURIZATION EVENTS AT TURKEY POINT UNIT 4

1. The generic issue of low temperature overpressurization was resolved by the NRC staff in 1979. Backfit requirements were made and licensees were requested to submit technical specifications to ensure operability of the overpressure mitigating systems.

As discussed in Section 6 of the AEOD case study the review and approval of these technical specification changes is still not complete. Some plants have never proposed the appropriate technical specification changes while other plants have incorporated technical specifications that are inadequate.

We agree with the AEOD recommendation that the technical specification deficiencies on operating plants should be corrected. We will examine our in-house generic program on low temperature overpressure protection and determine the most efficient means of correcting the technical specification deficiencies.

2. The draft case study has been limited to low temperature overpressure mitigation systems at PWRs. No mention is made of similar concerns for BWRs. During the past year we recall two events at BWRs where spurious ECCS actuations during shutdown conditions resulted in violations of the Appendix G temperature/pressure curves. These events occurred at Grand Gulf on October 5, 1982 (490 psi at 95°F) and Millstone Unit 1 on November 15, 1982 (290 psi at 140°F). We believe that this case study should be expanded, or a separate study undertaken, to include consideration of BWRs.
3. The draft case study presents an argument opposing water-solid operations. Evidently there may be economic as well as safety incentives to discontinue water-solid operations. We agree with the recommendation that INPO should pursue this item.
4. Table 1 in the case study provides a list of recent challenges to the overpressure mitigation systems. North Anna stands out in that this facility experienced four of the ten events listed. AEOD should attempt to explain this trend, in so far as possible. No other facility has more than one entry on this table.
5. Recommendation (a) of Section 9 suggests increasing the pressure setpoint for automatic isolation of the residual heat removal system to increase the margin to the PORV opening setpoint. By delaying RHR isolation, letdown isolation is also delayed which is desirable for preventing potential overpressurization.

As part of the CE PORV review, the staff rereviewed the CE Shutdown Cooling System (SDCS) auto closure interlock setpoint and design since the SDCS is used for RCS low temperature overpressure protection.

The setpoint for automatic closure is about 750 psig, which is above the design pressure of the SDCS. The autoclosure signal must be set above the SDCS relief valve setpoint to ensure the SDCS is not isolated before the relief valves open to relieve pressure on a postulated overpressure transient. The ASME Boiler and Pressure Vessel Code specifies the open permissive setpoint but does not discuss the auto closure setpoint feature. Since the SDCS isolation valve autoclosure feature provides some measure of protection against overpressurization of the SDCS, the setpoint in the current CE plants is above the SDCS design pressure and the ASME code is silent on this aspect, the staff could not readily resolve the question of whether the CE plants are in compliance with the code requirements.

In a recent meeting of ASME Section III Subgroup on Pressure Relief the NRC staff member discussed the RCS and shutdown cooling system isolation design interface using motor operated isolation valves with auto closure interlocks. The Subgroup unanimously agreed that the configuration meets the intent of the ASME code, even though the isolation valves are interlocked to close at somewhat higher pressure than SDCS design pressure. As long as SDCS safety valve is sized to ensure the pressure in the SDCS remains below 110% of design pressure during all credible overpressure transients, the design is adequate. The current CE plant's SDCS relief valves meet this criterion as stated above.

We agree with both the AEOD recommendation and the decision by the ASME Code Committee. Plans have now begun to incorporate this approach in their setpoint settings.

6. Recommendation (b) of section 9 suggests that when the Appendix G pressure/temperature limits are revised due to irradiation of the primary system, the Technical Specifications should include a requirement to revise the low pressure setpoint of the PORV accordingly. We agree with the recommendation. We typically encourage licensees to revise the low pressure PORV setpoint when revisions are made to the Appendix G pressure/temperature limits. We will consider modifications to the Standard Technical Specifications to include such a requirement.
7. Recommendation (c) in section 9 of the study suggests that the Action Statement of the Standard Technical Specifications be modified to require both trains of the overpressure protection system to be operable during low temperature operations. We agree with the intent of this recommendation. Current Technical Specifications, which allow up to seven days of continued plant operation with one PORV inoperable, may not provide adequate single failure protection against overpressure events. However, a requirement to maintain both trains operable during all low temperature operations may introduce unwarranted maintenance and operations difficulties. Therefore, we suggest that both overpressure protection systems be operable when water solid plant conditions exist. Filling and venting of the RCS should be prohibited when either of the overpressure protection systems are inoperable. When water solid conditions do not exist, Technical Specifications should allow one of the overpressure protection systems to be inoperable for a maximum of 7 days.

8. Recommendation (d) in section 9 of the study states that the primary/secondary temperature differential limit should be reduced from 50°F to as low as is reasonably achievable before starting a reactor coolant pump. We agree that the plant procedures should have a differential temperature reduced to a minimum, but the Technical Specification limit should be consistent with the plant specific analyses. Plants that have been issued Standard Technical Specifications have had this differential temperature based upon analyses.
9. Inadvertent, spurious ESF actuation typically occur during surveillance testing. The two BWR overpressure events discussed in our comment #1 both resulted from spurious ESF actuations from shutdown conditions. A spurious ESF actuation during water-solid conditions would certainly challenge the overpressure protection systems. Therefore, in order to avoid such a potential situation, the recommendation to discontinue all surveillance testing during water-solid conditions should be considered. This may be combined with recommendation (e) in Section 9 of the study.
10. The proposed modifications to the Standard Technical Specifications would introduce new requirements and more stringent plant operations. CRGR review and approval would be required for these changes. In order to promote the AEOD recommended action, we recommend that the case study include a brief discussion of the impact or cost of the requirement proposed by AEOD.

The Technical Specification Section of the Standardization and Special Projects Branch and the Reactor Systems Branch are willing to meet with AEOD to develop revised Standard Technical Specifications that would better address the concerns of low temperature overpressure mitigation systems.



11-11-11