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March 12, 2000

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Dr. George Apostolakis
Advisory Committee on Reactor Safeguards
U. S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, MD 20852-2738

Dear Dr. Apostolakis:

After attending the meeting of the Full Committee of the ACRS on March 1, 2000, and the subsequent ACRS meeting with the Commissioners on March 2, 2000, I believe that it would be worthwhile for me to make a presentation on two subjects at the next available meeting of the ACRS Subcommittee on PRA. These subjects are:

1. My petition for rulemaking on Combustible Gas Control.
2. The "Whole Plant" study for Risk-Informed, Performance-Based Regulation.

In my opinion, both of these topics are very relevant to the work of the ACRS and the discussions that took place on the first two days of March, 2000. I believe that it would be appropriate to spend about an hour on each subject. For your information, I have enclosed some of the relevant material from my petition for rulemaking. I have made a number of presentations on the "Whole Plant" study to the ACRS in the past, but I believe that it is time to revisit the subject.

Thank you for your consideration in this matter. I will be contacting you in the near future to determine whether you will have the desire and the time to have me make the suggested presentations to the Subcommittee on PRA.

Sincerely,

ACRS OFFICE COPY
DO NOT REMOVE FROM ACRS OFFICE
Bob Christie
Bob Christie

GT-270

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October 7, 1999

Chairman Greta Dicus
Commissioner Nils Diaz.
Commissioner Edward McGaffigan, Jr.
Commissioner Jeffrey Merrifield
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2738

Dear Commissioners:

A detailed review of the Safety Evaluation Report by the NRC staff for the San Onofre Task Zero (Pilot Program for Risk-Informed, Performance-Based Regulation) submittal of September 3, 1998 concerning the hydrogen control system convinced me that some immediate action by the NRC Commissioners would be beneficial. To this end, I request some time to talk to you about the two items listed below:

1. The San Onofre Task Zero submittal and the NRC Safety Evaluation Report. See Attachment 1 for relevant excerpts from the NRC Safety Evaluation Report and a possible NRC Commissioners' "interim" policy statement on design basis accident requirements versus severe accident information. .
2. Proposed changes to 10CFR50.44 and 10CFR50 Appendix A, General Design Criteria 41. See Attachment 2.

My purpose in requesting time to discuss these items is to start NRC Commissioner action to remedy any possible adverse conditions at the nuclear units because it is clear (at least to me) that the present regulations with regard to hydrogen control systems are detrimental to public health risk at some nuclear units and similar detrimental situations may apply to other systems as well (10 second diesel start time for example). I would be available for either discussions with individual Commissioners in your offices or at a public meeting at the convenience of the Commissioners. I will contact you in the near future to determine if you believe such discussion would be beneficial.

Sincerely,


Bob Christie

Attachment 1

Subjects for discussion

A. Discussion item: Public Health Risk from Nuclear Electric Power Units.

Since the publication of the Reactor Safety Study (WASH 1400) in 1975, there has been a growing agreement between practitioners of Probabilistic Risk Assessment (both NRC and industry) and licensing personnel (both NRC and industry) that the public health risk from nuclear power units comes from the release of fission products from the reactor core during severe accidents, not from design basis accidents. I believe that this position has now been formally recognized by the staff of the NRC,

Excerpts from the San Onofre Task Zero Safety Evaluation Report:

1. "Subsequent risk studies have shown that the majority of risk to the public is from accident sequences that lead to containment failure or bypass, and that the contribution to risk from accident sequences involving hydrogen combustion is quite small."
2. "As mentioned in the previous section, the risk associated with hydrogen combustion is not from design-basis accidents but from severe accidents."
3. "The overall public risk and radiological consequences from reactor accidents is dominated by the more severe core damage accidents that involved containment failure or bypass."

B. Discussion item: Consideration of Design Basis Accidents

Since the publication of the Reactor Safety Study (WASH 1400) in 1975, there has been a growing agreement between practitioners of Probabilistic Risk Assessment and licensing personnel that compliance with some design basis accident requirements can be detrimental to public health risk. I believe that this position has now been formally recognized by the staff of the NRC.

Excerpts from the San Onofre Task Zero Safety Evaluation Report:

1. "Although the recombiners are effective in maintaining the Regulatory Guide 1.7 hydrogen concentration below the lower flammability limit of 4 volume percent, they are overwhelmed by the larger quantities of hydrogen associated with severe accidents which are typically released over a much shorter time period (e.g., 2 hours)."

2. "From this information, the NRC staff concludes that the quantity of hydrogen, prescribed by 10CFR50.44(d) and Regulatory Guide 1.7, which necessitates the need for hydrogen recombiners and its backup the hydrogen purge system is bounded by the hydrogen generated during a severe accident. The NRC staff finds that the relative importance of hydrogen combustion for large, dry containments with respect to containment failure to be quite low. This finding supports the argument that the hydrogen recombiners are insignificant from a containment integrity perspective."
3. "In a postulated Loss of Coolant Accident, the San Onofre Nuclear Generating Station Units 2 and 3 Emergency Operating Instructions direct the control room operators to monitor and control the hydrogen concentration inside the containment after they have carried out the steps to maintain and control the higher priority critical safety functions. The key operator actions in controlling the hydrogen concentration are to place the hydrogen recombiners or hydrogen purge system in operation which involves many procedural steps. These hydrogen control activities could distract operators from more important tasks in the early phases of accident mitigation and could have a negative impact on the higher priority critical operator actions."

C. Discussion item: Possible NRC Commissioner "Interim" Policy Statement - Design Basis Accident Requirements versus Severe Accident Information

As described in the San Onofre Safety Evaluation Report, the NRC staff granted an exemption to San Onofre from the design basis accident requirements for the hydrogen control system based on information obtained in the analysis of severe accidents. The evaluation by the NRC staff also indicated that adherence to the requirements of design basis accidents could have a detrimental effect on public health risk. It is likely that similar situations exist with respect to the hydrogen control systems at other nuclear units and also for other systems at San Onofre and other nuclear units. Therefore, it is my belief that the Commissioners of the Nuclear Regulatory Commission should consider issuing an "interim" policy statement concerning this situation.

As a "strawman" statement, I offer the following statement for consideration.:

"All situations where there is an indication that adherence to design basis requirements would be detrimental to public health risk must be brought to the immediate attention of the Executive Director of Operations of the Nuclear Regulatory Commission. The Executive Director of Operations will make a decision as to whether an exemption to the design basis requirements should be granted on an expedited basis."

I believe the objective in issuing such a "interim" policy statement would be to clarify the role of the NRC staff in making sure that appropriate high level attention is brought to all matters which are detrimental to public health risk. I believe that the NRC Commissioners would want all individuals, who may be aware of a situation where

adherence to design basis requirements could be adverse to public health risk, to bring the situation to the attention of some member of the NRC staff without fear of recrimination and regardless of the present licensing basis for each nuclear unit. In the present culture of licensing at nuclear electric power units, there are few individuals (either NRC or industry) who are foolhardy enough to suggest that adherence to the design basis accidents can be detrimental to safety. It is my opinion that this culture must change and that the change must have NRC Commissioner blessing. The policy statement is "interim" because the NRC Commissioners, the NRC staff, the nuclear industry and the public are in the process of changing the NRC regulations to eliminate situations where adherence to regulations could be adverse to the public health risk.

Attachment 2

Since I believe that that the present regulations concerning combustible gas control systems have serious flaws, I believe that it is incumbent on me to propose fixes to the regulations as necessary. My proposed revised 10CFR50.44, Standards for combustible gas control system in light-water-cooled power reactors, is as follows:

- (a) An inerted reactor containment atmosphere shall be provided for each boiling light-water nuclear power reactor with a Mark I or Mark II type containment.
- (b) Each licensee with a boiling light-water nuclear power reactor with a Mark III type of containment and each licensee with an ice condenser type of containment shall provide its nuclear power reactor containment with a hydrogen control system. The hydrogen control system must be capable of handling (based on realistic calculations) the hydrogen equivalent to that generated from a metal-water reaction involving 75% of the fuel cladding surrounding the active fuel region (excluding the cladding surrounding the plenum volume).
- (c) All light water reactors with other types of containment than in (a) or (b), must demonstrate that the reactor containment (based on realistic calculations) can withstand, without any hydrogen control system, a hydrogen burn for accidents with a high probability of causing severe reactor core damage. If such an evaluation of reactor containment capability can not be demonstrated, then the licensee shall provide a hydrogen control system per the backfit process. This hydrogen control system must be capable of handling (based on realistic calculations) the hydrogen equivalent to that generated from a metal-water reaction involving 75% of the fuel cladding surrounding the active fuel region (excluding the cladding surrounding the plenum volume)
- (d) Each light-water nuclear power reactor shall be provided with high point vents for the reactor coolant system, for the reactor vessel head, and for other systems required to maintain adequate reactor core cooling if the generation of noncondensable gases in these systems would realistically lead to severe reactor core damage during an accident. High point vents are not required, however, for the tubes in U-tube steam generators.

My proposed revised 10CDR50, Appendix A, General Design Criteria 41, Containment atmosphere cleanup, is as follows:.

As necessary, systems to control fission products, hydrogen, oxygen, and other substances which may be released into the reactor containment shall be provided, consistent with the functioning of other associated systems, to assure that reactor containment integrity is maintained for accidents where there is a high probability that fission products may be present in the reactor containment.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 4, 2000

Mr. Bob Christie
Performance Technology
P.O. Box 51663
Knoxville, Tennessee 37950-1663

SUBJECT: PETITION FOR RULEMAKING (PRM 50-68) - HYDROGEN CONTROL
REQUIREMENTS

Dear Mr. Christie:

Your letter of October 7, 1999, as supplemented by a letter dated November 9, 1999, has been referred to me for response with respect to your proposal for changes to 10 CFR 50.44 and 10 CFR Part 50, Appendix A, General Design Criterion 41 concerning combustible gas control in reactor containments. As discussed in phone conversations between yourself and my staff, your letter is being handled as a petition for rulemaking (PRM) in accordance with 10 CFR 2.802. Docket number PRM 50-68 has been assigned to your petition. The NRC staff met with you on November 29, 1999, to explain the petition for rulemaking process and the planned course of action with respect to your request. As noted, you will be provided a copy of the *Federal Register* notice of receipt and request for comment when it is published. Your letter also suggested discussions with the Commission on related aspects. The Commission is satisfied with the staff's approach toward responding to your proposals, and has not expressed a desire for a meeting on the matters contained in your letter at this time.

In addition, your letter has been sent to the Office of Nuclear Regulatory Research (RES) for its consideration as part of activities concerning "Option 3" (which was presented in SECY-98-300 as part of the staff's plans for a broad consideration of how existing Part 50 requirements could be revised to better accommodate risk insights). RES submitted a paper to the Commission on November 8, 1999 (SECY-99-264), containing current plans and schedules for this undertaking. This paper identifies 10 CFR 50.44 as one regulation for early assessment in the staff's study. As part of this study, the staff will seek input from interested stakeholders through public workshops.

Sincerely,


Samuel J. Collins, Director
Office of Nuclear Reactor Regulation

charges previously computed pursuant to this section. The late charges shall accrue to the administrative assessment fund. For the purpose of this section, any obligation that was determined at a date later than prescribed by 7 CFR parts 1307 and 1308 because of a handler's failure to submit a report to the compact commission when due shall be considered to have been payable by the date it would have been due if the report had been filed when due.

7. Add a new § 1307.9 to read as follows:

§ 1307.9 Dates.

If a date required for payment contained in 7 CFR parts 1307 and 1308 falls on a Saturday, Sunday, or national holiday, such payment will be due on the next day that the compact commission office is open for public business.

PART 1308—ADMINISTRATIVE ASSESSMENT

1. The authority citation for Part 1308 continues to read as follows:

Authority: 7 U.S.C. 7256.

2. Revise the introductory text of § 1308.1 to read as follows:

§ 1308.1 Assessment for pricing regulations administration.

On or before the 15th day after the end of the month, each handler shall pay to the compact commission his pro rata share of the expense of administration of this pricing regulation. The payment shall be at the rate of 3.2 cents per hundredweight. The payment shall apply to:

* * * * *

Dated: January 6, 2000.

Kenneth M. Becker,
Executive Director.

[FR Doc. 00-687 Filed 1-11-00; 8:45 am]

BILLING CODE 1650-01-P

NUCLEAR REGULATORY COMMISSION

10 CFR Part 50

[Docket No. PRM-50-68]

Bob Christie; Receipt of Petition for Rulemaking

AGENCY: Nuclear Regulatory Commission.

ACTION: Petition for rulemaking; notice of receipt.

SUMMARY: The Nuclear Regulatory Commission has received and requests public comment on a petition for

rulemaking filed by Mr. Bob Christie, Performance Technology, Knoxville, Tennessee. The petition was docketed on November 15, 1999, and has been assigned Docket No. PRM-50-68. The petitioner requests that the NRC amend its regulations concerning hydrogen control systems at nuclear power plants. The petitioner believes that the current regulations on hydrogen control systems at some nuclear power plants are detrimental and present a health risk to the public. The petitioner believes that similar detrimental situations may apply to other systems as well (such as the requirement for a 10-second diesel start time). The petitioner believes the proposed amendments would eliminate those situations that present adverse conditions at nuclear power plants.

DATES: Submit comments by March 27, 2000. Comments received after this date will be considered if it is practical to do so, but the Commission is able to assure consideration only for comments received on or before this date.

ADDRESSES: Mail comments to: Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Rulemakings and Adjudications Staff.

Deliver comments to: 11555 Rockville Pike, Rockville, Maryland, between 7:30 a.m. and 4:15 p.m. on Federal workdays.

For a copy of the petition, write to David L. Meyer, Chief, Rules and Directives Branch, Division of Administrative Services, Office of Administration, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

You may also provide comments via the NRC's interactive rulemaking website at <http://ruleforum.llnl.gov>. This site provides the capability to upload comments as files (any format), if your web browser supports that function. For information about the interactive rulemaking website, contact Ms. Carol Gallagher, (301) 415-5905 (e-mail: cag@nrc.gov).

The petition and copies of comments are also available electronically at the NRC's Public Electronic Reading Room on the Internet at <http://www.nrc.gov/NRC/ADAMS/index.html>. From this site, the public can gain entry into the NRC's Agencywide Document Access and Management System (ADAMS), which provides text and image files of NRC's public documents.

The petition and copies of comments received may be inspected and copied for a fee at the NRC Public Document Room, 2120 L Street, NW. (Lower Level), Washington, DC.

FOR FURTHER INFORMATION CONTACT: David L. Meyer, Chief, Rules and

Directives Branch, Division of Administrative Services, Office of Administration, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Telephone: 301-415-7162 or Toll Free: 1-800-368-5642 or email: DLM1@nrc.gov.

SUPPLEMENTARY INFORMATION:

Grounds for Petition

The petitioner performed a detailed review of the San Onofre Task Zero Safety Evaluation Report (Pilot Program for Risk-Informed Performance-Based Regulation) conducted by the NRC staff and dated September 3, 1998, concerning that plant's hydrogen control system. The petitioner is convinced that action by the Commission is necessary to remedy possible adverse conditions at nuclear power plants.

Background

The petitioner includes three topics of discussion in support of the proposed amendments:

A. Public Health Risk From Nuclear Electric Power Units

The petitioner states that since the publication of the Reactor Safety Study (WASH-1400) in 1975, there has been a growing agreement between the practitioners of probabilistic risk assessment and licensing personnel (both at the NRC and within the industry) that there is a greater risk to public health from the release of fission products from the reactor core during a severe accident at a nuclear power plant, than from a design-basis accident. The petitioner asserts that the NRC staff has formally recognized this position. The petitioner sets out the following excerpts from the San Onofre Task Zero Safety Evaluation Report in support of his assertion.

1. "Subsequent risk studies have shown that the majority of risk to the public is from accident sequences that lead to containment failure or bypass, and that the contribution to risk from accident sequences involving hydrogen combustion is quite small."

2. "As mentioned in the previous section, the risk associated with hydrogen combustion is not from design-basis accidents but from severe accidents."

3. "The overall public risk and radiological consequences from reactor accidents is dominated by the more severe core damage accidents that involved containment failure or bypass."

B. Consideration of Design-Basis Accidents

The petitioner also states that since the publication of the Reactor Safety Study (WASH-1400) in 1975, there has been growing agreement between practitioners of probabilistic risk assessment and licensing personnel that compliance with some design-basis accident requirements can be detrimental to public health. The petitioner asserts that the NRC staff has formally recognized this position. The petitioner sets out the following excerpts from the San Onofre Task Zero Safety Evaluation Report in support of his assertion.

1. "Although the recombiners are effective in maintaining the Regulatory Guide 1.7 hydrogen concentration below the lower flammability limit of 4 volume percent, they are overwhelmed by the larger quantities of hydrogen associated with severe accidents which are typically released over a much shorter time period (e.g., 2 hours)."

2. "From this information, the NRC staff concludes that the quantity of hydrogen, prescribed by 10 CFR 50.44(d) and Regulatory Guide 1.7, which necessitates the need for hydrogen recombiners and its backup, the hydrogen purge system is bounded by the hydrogen generated during a severe accident. The NRC staff finds that the relative importance of hydrogen combustion for large, dry containments with respect to containment failure to be quite low. This finding supports the argument that the hydrogen recombiners are insignificant from a containment integrity perspective."

3. "In a postulated Loss of Coolant Accident, the San Onofre Nuclear Generating Station Units 2 and 3 Emergency Operating Instructions direct the control room operators to monitor and control the hydrogen concentration inside the containment after they have carried out the steps to maintain and control the higher priority critical safety functions. The key operator actions in controlling the hydrogen concentration are to place the hydrogen recombiners or hydrogen purge system in operation which involves many procedural steps. These hydrogen control activities could distract operators from more important tasks in the early phases of accident mitigation and could have a negative impact on the higher priority critical operator actions."

C. Recommended Policy Statement on "Design-Basis Accident Requirements Versus Severe Accident Information"

The petitioner states that according to the San Onofre Safety Evaluation

Report, the NRC granted an exemption to San Onofre from the design-basis accident requirements from the hydrogen control system on the basis of information obtained in the analysis of severe accidents. According to the petitioner, NRC staff's evaluation also indicated that adherence to the requirements of design-basis accidents could have a detrimental effect on public health. The petitioner asserts that it is likely that similar situations exist with respect to the hydrogen control systems at other nuclear units, and also for other systems at San Onofre and other nuclear units. The petitioner believes that the Commission should issue an interim policy statement concerning requirements for design-basis accidents. The petitioner believes that the interim policy statement would clarify the role of the NRC staff to ensure that matters that present a risk to public health are given appropriate high-level attention. The petitioner recommends the following "strawman" statement.

All situations where there is an indication that adherence to design basis requirements would be detrimental to public health must be brought to the immediate attention of the Executive Director for Operations of the Nuclear Regulatory Commission. The Executive Director for Operations will make a decision on whether an exemption to the design basis requirements should be granted on an expedited basis.

The petitioner believes that the NRC would want all individuals who may be aware of a situation where adherence to design-basis requirements could be adverse to public health, to bring the situation to the attention of the NRC staff without fear of recrimination and regardless of the present licensing basis for each nuclear unit. The petitioner states that, in the present culture of licensing at nuclear electric power units, there are few individuals (at the NRC or within the industry) who would suggest that adherence to design-basis accident requirements can be detrimental to safety. The petitioner believes that this culture must change and "change with NRC blessings."

The petitioner states that he recommends an interim policy statement because the NRC, nuclear industry, and the public are in the process of changing the NRC regulations to eliminate situations where adherence to the regulations could present a risk to public health.

The petitioner believes that the current regulations concerning combustible gas control systems have serious flaws and proposes that 10 CFR 50.44 be revised to read as follows:

Section 50.44 Standards for Combustible Gas Control System in Light-Water Cooled Power Reactors

(a) An inerted reactor containment atmosphere shall be provided for each boiling light-water nuclear power reactor with a Mark I or Mark II type containment.

(b) Each licensee with a boiling light-water nuclear power reactor with a Mark III type of containment and each licensee with an ice condenser type of containment shall provide its nuclear power reactor containment with a hydrogen control system. The hydrogen control system must be capable of handling (based on realistic calculations) the hydrogen equivalent to that generated from a metal-water reaction involving 75 percent of the fuel cladding surrounding the active fuel region (excluding the cladding surrounding the plenum volume).

(c) All light-water reactors with other types of containment than those in paragraphs (a) or (b) of this section, must demonstrate that the reactor containment (based on realistic calculations) can withstand, without any hydrogen control system, a hydrogen burn for accidents with a high probability of causing severe reactor core damage. If such an evaluation of reactor containment capability can not be demonstrated, then the licensee shall provide a hydrogen control system per the backfit process. This hydrogen control system must be capable of handling (based on realistic calculations) the hydrogen equivalent to that generated from a metal-water reaction involving 75 percent of the fuel cladding surrounding the active fuel region (excluding the cladding surrounding the plenum volume).

(d) Each light-water nuclear power reactor shall be provided with high point vents for the reactor coolant system, for the reactor vessel head, and for other systems required to maintain adequate reactor core cooling if the generation of noncondensable gases in these systems would realistically lead to severe reactor core damage during an accident. High point vents are not required, however, for the tubes in U-tube steam generators.

The petitioner proposes that 10 CFR Part 50, Appendix A—General Design Criteria 41 be revised to read as follows:

Appendix A—General Design Criteria 41—Containment Atmosphere Cleanup

As necessary, systems to control fission products, hydrogen, oxygen, and other substances which may be released into the reactor containment shall be provided, consistent with the functioning of other associated systems, to assure that reactor containment integrity is maintained for accidents where there is a high probability that fission products may be present in the reactor containment.

Dated at Rockville, Maryland, this 6th date of January, 2000.

For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,

Secretary of the Commission.

[FR Doc. 00-725 Filed 1-11-00; 8:45 am]

BILLING CODE 7590-01-P