MINUTES OF THE AD HOC FIRE PROTECTION
SUBCOMMITTEE, FEBRUARY 5, 1985
WASHINGTON, D.C.

A meeting was held by the ACRS Ad Hoc Fire Protection Subcommittee on February 5, 1985. The purpose of the meeting was to discuss the status of Appendix R compliance, Calvert Cliffs compliance with Appendix R, and the status of fire protection research at Sandia. Notice of the meeting was published in the Federal Register on January 18, 1985 (Attachment A). The schedule of items covered in the meeting is in Attachment B. The list of attendees is in Attachment C. A list of handouts is included in Attachment D. The handouts are filed with the office copy. H. Alderman was the cognizant staff member for this meeting.

Opening Statement

Mr. Michelson convened the meeting at 8:30 a.m. He noted that he was the Chairman of the Subcommittee, and the other ACRS members in attendance were Messrs. Ebersole, Reed and Wylie. Mr. R. Patton was introduced as an invited Fire Protection expert for this meeting.

In response to a request for comments from the Chairman, Mr. Reed noted that he was concerned that some of the invited participants dropped out of the meeting. H. Alderman noted that the stated reasons for the fire insurance group and the utilities dropping out were, that the fire insurance group were involved in litigation that concerned Appendix R and were advised by their legal department to withdraw from the meeting. The utilities fire protection group stated that they were in the process of reviewing the NRC steering committee report and were not prepared to discuss Appendix R until the conclusion of that review.

Mr. Ebersole noted that he would like the staff to address the topic of the characterization of the intrusion fire in the context of whether

they can be reasonably and administratively modified to diminish their potential and what are the risks involved.

V. Benaroya, Chief, Chemical Engineering, NRR

Mr. Benaroya noted the impetus for the current fire protection regulations and positions was the Browns Ferry fire in March 1975. The recommendation related to the Browns Ferry fire were issued under NUREG-0050 in February 1976. Based on these recommendations, the branch technical position on fire protection was issued in March 1976. The branch technical position was for new plants.

Appendix A was an outgrowth of the branch technical position and successive regulatory guide, and was a backfit to all operating plants and plants under construction.

With Appendix A in force, the staff visited every plant and looked at the fire protection systems and saw how well they were performing. As a result of these inspections, a Safety Evaluation Report (SER) was issued for every plant. Some of the plants had open items in the SER's. The mechanism chosen to resolve the open items was to issue a rule. In November 1980, the fire protection rule was issued (10 CFR 50 Appendix R). The rule also includes 10 CFR 50.48 which states that all operating nuclear power plants shall have a fire protection plan. Appendix R establishes the required fire protection features for certain items which were unresolved in the SER issues in 1978 and 1979.

Three of the sections of Appendix R, Section III.g which covers separation and alternative shutdown systems, III.J lighting requirements and III.O, the oil collection system were determined to be backfit items by the Commission. This is irregardless of whether they were approved or agreed on previously.

Mr. Benaroya stated that the biggest problem in Appendix R compliance has been interpretation by non-professionals. He noted that fire protection is not an exact science but relies on judgments that should

be made by professionals in the fire protection discipline. The second protest problem in Mr. Benaroys's view, is the failure in communication between the licensees and the NRC.

Mr. Reed remarked that the notion of consistency and uniformity in the fire protection act bothered him because the fire protection systems vary considerably from plant to plant.

Mr. Ferguson, NRR, responded that there are different levels of consistency. One level of consistency is that there will not be any core damage due to a fire. The mechanism for achieving this goal varies from plant to plant. Individual plant situations can be accommodated by means of the exemption process. One basis for exemption would be if meeting the letter of the rule provided no significant increase in fire safety, then the rule would not have to be met.

Mr. Benaroya briefly discussed the differing professional opinions in fire protection. Basically some members of the staff believe that the utilities are allowed to perform their interpretations and analysis without staff concurrence. The staff is unaware of any changes until the utility fire protection is reviewed.

At this point in time, the utility has incurred large expenditures and sometimes has installed equipment. It is difficult to make any changes in this, after the fact case.

Mr. Kubicki stated that the DPO is based upon the interpretation of Appendix R. He noted that a concern was the potential of prolonging the process of Appendix R compliance. He also noted a concern of allowing the utilities to subvert the rule by virtue of doing in house analyses concerning the validity of fire boundaries.

Warren Minners, Chief, Safety Program Evaluation Branch

Mr. Minners discussed generic issue 57 "Effects of Fire Protection System Actuation on Safety Related Equipment." He noted that their job

is to take generic issues and try to make an evaluation of them. The evaluation is based upon somewhat quantitative objectives. Following the evaluation, the generic issues are arranged in a priority listing to efficiently use the NRC resources.

Mr. Minners introduced Mr. Vandermolen who discussed the prioritization of generic issue 57. This issue was approached on a probabalistic basis. Plant data was compiled to determine the number of spurious actuation events. Based upon the data, the number of actuations where suppresent was released was determined to be about 0.00 33 per reactor year. This series of estimates was extrapolated to consider the availability of various safety systems as needed. The bottom line was the estimate of 3.4×10^{7} core melts per reactor year due to spurious fire protection system actuation.

The next scenario that was considered was a large fire near the site boundary that creates a large quantity of smoke that drifts into the plant area. The first probability estimate was the chance that smoke would not be detected by the plant personnel. The second estimate is the probability that the smoke will enter the plant ventilation system. The third calculation concerns the probability that the smoke would actuate a fire protection detector. The fourth probability calculation is that the sprays damage a safety system. The bottom line of this scenario is an increase in core melt frequency of about 3×10^{-9} per reactor year.

Generic issue 57 has not been prioritized as yet but the indications were that it would be given a medium priority.

Ralph Thompson, Risk Manager, TVA Nuclear Power Program

Mr. Thompson wasn't a scheduled speaker, but was in the audience, and responded to Mr. Ebersole's question on CO2 incidents. Mr. Thompson noted that TVA had two failures with carbon dioxide systems. In one case, the fire door wasn't latched and the door came open during testing. The second case involved a panel above a door. The panel didn't

have the structural requirements to withstand a full scale pressure test.

Mr. Thompson said they use large capacity storage tanks in conjunction with a low pressure system. During the pressure test a transducer is placed in the area to be tested and the pressure rise is observed. If it appears a serious problem will arise due to pressure, then dampers are installed in that room. Mr. Thompson noted that the delivery pipe is sized based on friction loss, to keep the flow to fairly low levels.

Peter Katz, Project Engineer, Baltimore Gas and Electric Company

Mr. Katz noted that he was the project engineer for the fire protection modifications. He remarked that he believed the reason Calvert Cliffs did so well on their Appendix R reviews was the use of a systems approach to the problem. The fire protection engineer was part of the team but the emphasis remained on the system approach with electrical work being one of the major efforts. The major issue, in his view, was the protection of safe shutdown capability from fire. Mr. Katz noted the basic philosophy is not to save the capital investment but to maintain safe operation and shutdown of the plan.

Calvert Cliffs investigated alternate shutdown and issued a report called "Report on Alternate Safe Shutdown. This investigation considered conventional and non-conventional means of shutdown and considered the sequence of operations i.e., which valves, trains, equipment had to remain open or closed and what alternate means can be employed.

Mr. Michelson asked if there were any cases where changes in fire protection philosophy had to be reversed because of Appendix R. Specifically Mr. Michelson referred to things that were done and had to be changed because of Appendix R. Mr. Katz responded that they didn't have to reverse any changes because of Appendix R.

Mr. Katz noted that a complete cable analysis was performed to determine exactly where each cable runs throughout the plant. This was in preparation to determining where the fire areas should be located.

Mr. Katz noted that the only walls erected during the Appendix R process were to separate charging pumps and to turn them into areas. Each charging pump now occupies its own area.

The approach used for the alternate shutdown system was to determine which paths could be used utilizing normally operating equipment. The benefits would be the operators were familiar with the systems and would not have to learn new procedures and techniques. An additional advantage would be that the normally operating systems would be maintained on a regular basis.

A flow charting analyses was performed listing primary flow paths and secondary flow paths, if the normal flow paths were unavailable. Where a singular functionality was indicated in the flow path, divergent means of actuation were assured, which in some cases relied on manual actuation.

A fire protection engineer working in conjunction with an electrical engineer took the cable analysis and did a "three tier analyses." First, all cables were evaluated by room locations. All rooms touching on any one elevation along with elevations above or below that overlapped, were analyzed for separation.

The next series of analyses considered was separation by function. All rooms that contained the same functional equipment were checked for separation requirements.

The last series of evaluations checked all the hot shutdown reactor heat removal rooms in the plant to see what had to be separate.

The end result was 59 bounded fire areas.

Mr. R. J. Tourtellotte, Executive Legal Department

Mr. Tortellotte stated that he was concerned about backfitting in its broadest scope rather than fire protection specifically. He noted he was concerned about:

- The regulatory culture that considers it is appropriate to have post hoc development and imposition of requirements.

- A regulatory culture that believes that it is appropriate to impose requirements without prior analysis.

- A regulatory culture that believes its appropriate to not make a distinction between what is fundamental to safe operation as opposed to what is only a marginal safety improvement.

- A regulatory culture that thinks its appropriate that no cost benefit analysis of marginal safety improvement need to be made.

- A regulatory culture where there seems to be an inability of the staff to reconcile the question of why an operating plant with a certain system, component, or structure is considered safe while a near-term OL with substantially the identical system, structure, or component is considered unsafe.

- A regulatory culture that thinks it's appropriate for the staff to use regulatory leverage to impose requirements with no legitimate basis and without analysis.

- A regulatory culture that seems to approve a wiring around CRGR.

- A regulatory culture that has the "fair game" mentality; that is, whenever there [illegible] loss on an appealed issue at one plant it does not preclude [illegible] staff from trying again with, or

continuing to press another plant if that plant is vulnerable by reason of its licensing posture.

Mr. Tourtellotte remarked that fire protection does not exist for the sake of fire protection alone, fire protection only exists to assure the safe operation of the plan.

David Notley, Fire Protection Engineer, Office of Research

Mr. Notley requested time to express his personal views.

Mr. Notley noted that fire protection for nuclear power plants is not different in kind from fire protection at any complex industrial plant. The consequences of a fire at a nuclear plant can be worse but the fire protection itself, the fire hazards and the protection as provided is not different in kind.

Regarding previous discussion about lack of quality assurance and quality control, he remarked that the fire protection community had quality assurance long before the Nuclear Regulatory Commission existed.

Mr. Notley remarked that it was dangerous to estimate the probability of a fire in a specific area as being very small and then ignoring it. If there is any possibility, at al, it should be included in the consideration.

Mr. Notley took exception to Mr. Patton's remarks about the membership of NFPA committees being self serving to promote manufacturers products.

He noted that membership is open to all interests and parties and there is total public review and comments on all proposed standards.

V. Benaroye, NRC, Diesel Fuel Oil Storage Areas

Mr. Benaroya stated that the Hope Creek Plant has diesel oil storage, right under the diesels. There are four storage tank rooms with two

tanks to a room. Each room is separated from the others by three hour barriers. There are three hour barriers between the rooms and the diesels above. Fire suppression is provided by an automatic carbon dioxide system and a fixed water protection system.

Mr. Michelson noted his concern was that the B&P states that these types of tanks ought not to be in buildings containing vital equipment.

Mr. Benaroya stated that the plant was built this way without the prior knowledge of the NRC, and the end result was to try to see how adequate fire protection would be achieved under the circumstances.

Mr. D. Berry, Sandia National Laboratories, Fire Protection Research at Sandia

Mr. Berry pointed out that one of the major insights received from the testing is that fire retardant insulations do actually reduce the fire severity, but even qualified cable does burn and can be damaged.

In the case of gaseous suppression agents, they do eventually put out the fires but they allow the temperatures to remain high and this could cause damage to some components.

The use of water produces severe moisture environments which spray shielding does not always alleviate.

Penetration seals will fail if they have cracks in them.

Hot gas layers can cause damage to spatially separated components.

Mr. Berry pointed out that one thing that is disturbing to him is PRA's have ignored damage to components due to things other than just burning, things such as spray suppression effects, manual fire fighting effects on redundant systems and things like smoke migrating throughout the plant. The effects of these phenomena on the overall core melt frequency are unknown.

Regarding a separate redundant remote shutdown system, Mr. Berry noted that it is not clear that the millions of dollars that were spent were justified from the standpoint of fire protection. In a number of cases, improvements in the suppression systems, protection within a given room and reduction of fire frequencies would be a more cost-effective approach.

Mr. Berry discussed the fire characterization tests. The objective of these tests is: "For transient and in-situ fuels found in nuclear power plants, determine the rates of heat and combustion product release during open burning." This information is used for source terms for room environmental models. The available fire environmental models are unable to accurately predict the burning characteristics of source fires.

Mr. Berry discussed a cable tray fire analyses performed at Sandia. The rate of burning for a particular array versus the tray surface area was determined. This was based upon tests performed by Factory Mutual. The objective of the analysis is to determine whether or not redundant systems would be vulnerable to the same fire due to the magnitude of the fire.

Mr. Berry pointed out a concern regarding cabinet fires. The concern here is that control rooms and remote shutdown areas and other places in the plant where cabinets are located are single points where redundant systems are concentrated. There is a need to look at the design approaches on cabinets to see whether or not cabinets are vulnerable and whether or not the rates of fire development in cabinets are fast enough so that they cannot be coped with by the operators or whether these transfer things can be done in a timely fashion.

The last major discussion by Mr. Berry concerned component damage. This is related to failure of equipment by conditions of burning and associated effects. Tests are being planned on the combination of the heating, water sprays, high humidities, smoke, particulates and

corrosive vapors. The approach is to determine whether or not the equipment can be damaged by the fire environment.

The meeting was adjourned at 7:05 p.m.

****

NOTE: A complete transcript of the meeting is on file at the NRC Public Document Room at 1717 H St. NW., Washington, D.C. or can be obtained from ACE-Federal Reporters, Inc., 44 N. Capitol Street, Washington, D.C. 2001, (202) 347-3700.

ATTACHMENT A HA

February 5, 1985:

A.M.—Full Committee Review and Discussion of Directorate's Management Plan

—Report and Discussion on FY 1986 Budget Request

—Miscellaneous Information

P.M.—Full Committee Review and Recommendations on Directorate Goals

January 15, 1985.

M. Rebecca Winkler,

Committee Management Officer.

[FR Doc. 85-1488 Filed 1-17-85; 8:45 am]

BILLING CODE 7590-01-M

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Reactor Safeguards Subcommittee on Advanced Reactors; Meeting

The ACRS Subcommittee on Advanced Reactors will hold a meeting on February 5, 1985, Room 1167, 1717 H Street, NW, Washington, DC.

The meeting will be open to public attendance, however, portions will be closed to discuss proprietary information.

The agenda for subject meeting shall be as follows:

Tuesday, February 5, 1985—8:30 a.m. until the conclusion of business

The Subcommittee will discuss the redirected DOE programs for LMFBR and HTGR development as well as the current status of NRC research programs on advanced reactors.

Oral statements may be presented by members of the public with concurrence of the Subcommittee Chairman; written statements will be accepted and made available to the Committee. Recordings will be permitted only during those portions of the meeting when a transcript is being kept, and questions may be asked only by members of the Subcommittee, its consultants, and Staff. Persons desiring to make oral statments should notify the ACRS staff member named below as far in advance as practicable so that appropriate arrangements can be made.

During the initial portion of the meeting, the Subcommittee, along with any of its consultants who may be present, may exchange preliminary views regarding matters to be considered during the balance of the meeting.

The Subcommittee will then hear presentations by and hold discussions with representatives of the Department of Energy, the NRC Staff, their respective consultants, and other interested persons regarding this review.

Further information regarding topics to be discussed, whether the meeting has been cancelled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefore can be obtained by a prepaid telephone call to the cognizant ACRS staff member, Mr. Paul Boehnert (telephone 202/634-3267) between 8:15 a.m. and 5:00 p.m. e.s.t. Persons planning to attend this meeting are urged to contact the above named individual one or two days before the scheduled meeting to be advised of any changes in schedule, etc., which may have occurred.

Dated: January 15, 1985.

Morton W. Libarkin,

Assistant Executive Director for Project Review.

[FR Doc. 85-1504 Filed 1-17-85; 8:45 am]

BILLING CODE 7590-01-M

Advisory Committee on Reactor Safeguards Subcommittee on Fire Protection; Meeting

The ACRS Subcommittee on Fire Protection will hold a meeting on February 5, 1985, Room 1046, 1717 H Street, NW, Washington, DC.

The entire meeting will be open to public attendance.

The agenda for subject meeting will be as follows:

Tuesday, February 5, 1985—8:30 a.m. until the conclusion of business

The Subcommittee will be briefed on the following: (1) The status of Appendix R compliance, (2) ~~Duke and~~ Calvert Cliffs compliance with Appendix R, (3) ~~fire insurance companies' views on fire protection~~, and (4) the status of fire protection research at Sandia.

Oral statements may be presented by members of the public with concurrence of the Subcommittee Chairman; written statements will be accepted and made available to the Committee. Recordings will be permitted only during those portions of the meeting when a transcript is being kept, and questions may be asked only by members of the Subcommittee, its consultants, and Staff. Persons desiring to make oral statements should notify the ACRS staff member as far in advance as practicable so that appropriate arrangements can be made.

During the initial portion of the meeting, the Subcommittee members will exchange preliminary views regarding matters to be considered during the balance of the meeting.

The Subcommittee will then hear presentations by and hold discussions with representatives of the NRC Staff, their consultants, and other invited persons regarding this review.

Further information regarding topics to be discussed, whether the meeting has been cancelled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefore can be obtained by a prepaid telephone call to the cognizant ACRS staff member, Mr. Herman Alderman (telephone (202/634-1414) between 8:15 a.m. and 5:00 p.m., e.s.t. Persons planning to attend this meeting are urged to contact the above named individual one or two days before the scheduled meeting to be advised of any changes in schedule, etc., which may have occurred.

Dated: January 15, 1985.

Morton W. Libarkin,

Assistant Executive Director for Project Review.

[FR Doc. 85-1503 Filed 1-17-85; 8:45 am]

BILLING CODE 7590-01-M

Advisory Committee on Reactor Safeguards Subcommittee on Regulatory Policies and Practices; Meeting

The ACRS Subcommittee on Regulatory Policies and Practices will hold a meeting on February 6, 1985, Room 1046, 1717 H Street, NW, Washington, DC.

The entire meeting will be open to public attendance.

The agenda for subject meeting will be as follows:

Wednesday, February 6, 1985—8:30 a.m. until 1:00 p.m.

The Subcommittee will review the Commission's proposed Backfitting Rule.

Oral statements may be presented by members of the public with concurrence of the Subcommittee Chairman; written statements will be accepted and made available to the Committee. Recordings will be permitted only during those portions of the meeting when a transcript is being kept, and questions may be asked only by members of the Subcommittee, its consultants, and Staff. Persons desiring to make oral statements should notify the ACRS staff member as far in advance as practicable so that appropriate arrangements can be made.

During the initial portion of the meeting, the Subcommittee members will exchange preliminary views regarding matters to be considered during the balance of the meeting.

The Subcommittee will then hear presentations by and hold discussions

ATTACHMENT B

REVISION #6
Feb. 4, 1985

TENTATIVE SCHEDULE
FIRE PROTECTION SUBCOMMITTEE MEETING
FEBRUARY 5, 1985
WASHINGTON, D.C.

8:30 - 8:35 a.m.	Comments by Chairman - C. Michelson	
8:35 - 12 NOON	I.	Staff Presentation
8:35 - 9:35 a.m.	A.	Appendix "R" Reviews. Discussion of the problems in achieving compliance with Appendix R
9:35 - 10:00 a.m.	B.	Discussion of the DPO's on Fire Protection
10:00 - 10:30 a.m.	C.	Discussion of Section 7.J of the Branch Technical position, "Diesel Fuel Oil Storage areas." Discussion of how justifications of deviations from this B.T.P. are documented
10:30 - 10:45 a.m.	******	BREAK ******
10:45 - 11:00 a.m.	D.	Generic Issue 57 "Effects of Fire Protection System Actuation on Safety - Related Equipment." This was scheduled to be prioritized in Jan. 1985. What is the priority?
11:00 - 12 NOON	E.	Progress Report by Sandia on Fire Protection Research including budget constraints.
12:00 - 1:00 p.m.	******	LUNCH ******
	II.	Utility Experiences with Appendix "R"
1:00 - 2:00 p.m.	A.	Calvert Cliffs
2:00 - 2:15 p.m.	IV.	Toutellotte Comments on Appendix "R" Backfits

2:15 - 2:30 p.m. V. Comments on Inadvertent Actuation of Fire Protection System

C. Michelson will submit a written request on this topic to the staff, prior to the meeting. The request will ask for a written response. This time will be allocated for any comments by the staff at this time.

2:30 - 3:00 p.m. VI. Subcommittee Discussion and ADJOURN

H. ALDERMAN

ACRS SUBCOMMITTEE MEETING ON FIRE PROTECTION

ATTACHMENT C

LOCATION: Room 1046, 1717 H St. NW., Washington, D.C.

DATE: February 5, 1985

ATTENDANCE LIST

PLEASE PRINT:

NAME	BADGE NO.	AFFILIATION
M Simons	E-0237	Ace Federal
Dick Patton	E-0982	NRC - Consultant
Dennis Berry	E-0182	Sandia Labs
Ralph Thomson	E-0986	TVA
James Oldham	E-0929	Duke Power ✓
Sam Watson	E-0930	Bechtel ✓
Peter Katz	E-0933	Baltimore Gas & Elec
TA Venkatraman	E-0948	Boston Edison Co ✓
L Dolan	E-0938	Ebasco Services ✓
Berger	E 0910	EPRI ✓
B E Collins	E-0910	KMC Inc ✓
Cathie Bashaw	E-0955	Bishop, Liberman ✓
L. Toth	E-0931	Gasser Associates
D Dahlgren	E 0940	Sandia Lab
Eric Oesterle	E-0214	Bechtel ✓
Bruce Montgomery	E-0906	BG&E

HANDOUTS

1. History and Chronology of Fire Protection
   V. Benaroya

2. Generic Issue 57 - Effects of Fire Protection System Actuation
   H. Vandermolen

3. History of Fire Protection Activities at Calver Cliffs
   P. Katz

4. Fire Protection Research at Sandia
   D. Berry