UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

July 26, 2004

MEMORANDUM TO: ACRS Members

FROM: Marvin D. Sykes, Senior Staff Engineer **/RA/**
Technical Support Staff
ACRS/ACNW

SUBJECT: CERTIFICATION OF THE ACRS FIRE PROTECTION SUBCOMMITTEE MEETING SUMMARY MINUTES, APRIL 23, 2004 - ROCKVILLE, MARYLAND

The minutes of the subject meeting, issued on July 21, 2004 have been certified as the official record of the proceedings of that meeting. A copy of the certified minutes is attached.

Attachment: As stated

cc: J. Larkins
H. Larson
S. Duraiswamy

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MEMORANDUM TO: Marvin D. Sykes, Senior Staff Engineer, ACRS

FROM: Stephen L. Rosen, Chairman
Fire Protection Subcommittee

SUBJECT: CERTIFICATION OF THE ACRS FIRE PROTECTION SUBCOMMITTEE MEETING SUMMARY MINUTES, APRIL 23, 2004 - ROCKVILLE, MARYLAND

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject meeting on April 23, 2004, are an accurate record of the proceedings for that meeting.

July 26, 2004

/RA/

Stephen L. Rosen, Date
Fire Protection Subcommittee Chairman

CERTIFIED

by Stephen Rosen on 7/26/04
Issued: 7/21/04

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
MINUTES OF ACRS FIRE PROTECTION SUBCOMMITTEE MEETING
APRIL 23, 2004
ROCKVILLE, MARYLAND

On April 23, 2004, the ACRS Fire Protection Subcommittee held a meeting in Room T-2B3, 11545 Rockville Pike, Rockville, Maryland. The purpose of the meeting was to discuss three NRC fire protection initiatives. The items discussed included resolution of post-fire circuit analysis issues, proposed issuance of the revised Fire SDP, and the RES/EPRI Fire Risk Requantification Study. The staff also provided status updates on post-fire operator manual action rulemaking and issuance of the final rule revising 10 CFR 50.48 to allow voluntary adoption of NFPA 805 to satisfy existing regulatory requirements.

The meeting was open to the public. No written comments or requests to make oral statements were received from members of the public related to this meeting. Mr. Marvin Sykes was the Designated Federal Official for this meeting. The meeting was convened at 8:30 a.m. and adjourned at 3:55 p.m. on March 26, 2004.

ATTENDEES:

ACRS MEMBERS/CONSULTANTS/STAFF

Stephen Rosen, Chairman	Dana Powers, Member
Graham Wallis, Member	Graham Leitch, Member
John Sieber, Member	Marvin Sykes, ACRS Staff

ATTENDEES

Suzanne Black, NRR	John Hannon, NRR
Dan Frumkin, NRR	Raymond Gallucci, NRR
David Lew, RES	Eileen McKenna, NRR
Mark Reinhart, NRR	Sunil Weerakkody, NRR

Steve Nowlen, Sandia National Laboratory
Bijan Najafi, Electric Power Research Institute (EPRI)
Paul Gunter, Nuclear Information Resource Service (NIRS)
Alex Marion, Nuclear Energy Institute (NEI)

The presentation materials and handouts used during the meeting and a complete list of attendees is attached to the Office Copy of these Minutes. The presentation to the Subcommittee is summarized below.

Opening Remarks (Subcommittee Chair)

Mr. Stephen Rosen, Chairman of the Subcommittee on Fire Protection convened the meeting by providing introductory remarks. He also stated that the purpose of the meeting was to discuss staff resolution of post-fire safe shutdown circuit analysis issues, revisions to the Fire Protection SDP, and the ongoing fire risk requantification study. He later introduced Ms.

Suzanne Black of the Office of Nuclear Reactor Regulation (NRR). Ms. Black briefly introduced the NRC staff involved in the presentations and called on Mr. Sunil Weerakkody to begin the presentations. Mr. Weerakkody prefaced the presentations by discussing how the staff has worked closely with the industry and the staff's commitment to resolve fire protection issues expeditiously and introduced Mr. Mark Salley to discuss the resolution of post-fire safe shutdown circuit analysis issues.

Resolution of Post-Fire Safe Shutdown Circuit Analysis Issues

Mark Salley began the presentation by providing background information on the subject. He noted that 10 CFR 50 Appendix R requires licensees to assure that fire-induced circuit failures that could prevent safe shutdown will not occur. Information Notice 99-17 described instances at a number of licensed power facilities where this required assurance was called into question. In November 2000, NRC suspended inspections of "associated circuits" while the industry performed a series of fire tests to obtain data on expected failure modes of multi-conductor thermosetting and thermoplastic cables. After the analyses and a facilitated public workshop, a consensus on the most risk-significant cable configurations and attributes was reached. In January 2004, Draft NUREG-1778, "Knowledge Base for Post-Fire Safe-Shutdown Analysis" was issued for public comment. The staff has invited ACRS to comment as well.

The staff issued RIS 2004-03, "Risk-Informed Approach for Post-Fire Safe-Shutdown Associated Circuit Inspections" on March 2, 2004 to inform the industry of the risk-informed approach that will be used by the NRC to perform post-fire safe-shutdown associated circuit inspections. The approach concentrates on associated circuits with a relatively high probability of failing and whose failure could cause flow diversion, loss of coolant, or other scenarios that could significantly impact the ability to achieve and maintain hot shutdown. The RIS also notes that inspectors will pay particular attention to associated circuit failures that cause events to occur in the first hour of the fire. The inspectors will consider credible fire scenarios that could produce a thermal insult and potential cable damage. The initial focus of the inspection will be on conductor-to-conductor shorts within a multiconductor cable since the testing indicated that intra-cable shorting is the most probable cause of spurious actuations. Thermoplastic-cable-to-thermoplastic-cable interactions are also probable and should be considered. Inspectors will assume fire damage to no more than two separate cables for each scenario evaluated involving multiple spurious actuations. Fire damage to cables that could initiate other equipment failure modes, such as loss of function, must also be considered.

Mr. Salley stated that prior to resuming inspections, the staff plans to complete the development of necessary inspection procedures, SDP revisions, and changes to the reactor oversight process and enforcement guidance. Current plans provide for completion of these activities by June 2004, and resumption of inspections by December 2004.

Alex Marion, NEI made a brief presentation in which he described the industry's efforts to cooperate with the staff to develop a guidance document (NEI-00-01) that utilities could use to evaluate associated circuit issues at their plants and deal with the results of the evaluation. The document established two approaches for evaluating compliance with the existing regulations based fundamentally on the approved plant-specific licensing basis. Mr. Marion stressed that the industry believes that this document is a useful tool and should be endorsed by the NRC so that licensees can have some level of confidence and understanding of what is acceptable to the NRC. Otherwise, Mr. Marion noted that the two years of developmental work has been wasted. Mr. Marion also discussed proposed pilot self examinations at several plants prior to

resumption of inspections using NEI-00-01 that NEI believes will demonstrate to the staff the relevance of this guidance document.

Paul Gunter, Nuclear Information Resource Service (NIRS) presented a question to the staff and expressed his opinion that the problems stem from what he viewed as the NRC's "regulatory contortion" in dealing with 10 CFR 50 Appendix R, Section III.G.2.

Revised Fire Protection Significance Determination Process

Mark Reinhart, NRR began the next presentation by discussing the development of a revised Fire SDP for use by inspectors when fire issues are identified. The revised Fire SDP was designed to provide NRC analysts and management with a risk-informed tool for identifying potentially risk-significant issues that involve degradations in the plant fire protection program. The issues are evaluated in terms of their impact on the change in fire-induced CDF. The SDP also helps to facilitate communication of the basis for significance between the NRC and regulated licensees and distinguishes findings that do not warrant further NRC engagement, due to very low risk significance. He emphasized that the staff had worked closely with the industry to develop an SDP that used more state-of-the-practice risk tools.

Mr. Reinhart noted that in the process of simplifying existing fire PRA methods for use in the SDP analysis, compromises in analysis complexity were made. The current process strives to achieve an order of magnitude estimate of risk significance and strives to minimize the occurrence of false negative findings. He also presented a chronological history of activities that had been completed and schedules for final issuance and implementation of the revised SDP.

Dan Frumkin provided a simple tutorial on the use of the revised SDP by demonstrating the steps that an inspector would be expected to exercise, from the initial screening of the issue to the final quantification of risk. The SDP uses fire risk factors to screen issues to green and for those issues that do not screen to green, the SDP uses different quantitative delta CDF screening criteria for individual aspects of a licensee's fire protection program (e.g., Fire Prevention and Administrative Controls 1E-4, Fixed Fire Protection Systems 1E-5 etc.). The SDP also incorporates the use of fire dynamics tools to evaluate the effects of non-screened fires and incorporates manual action worksheets that consider performance-shaping factors appropriate for manual responders in fire environments. Use of the revised SDP is expected to begin June 2004. Guidance for assessing risk significance of fire protection issues during low power or shutdown operations are currently not addressed in this SDP.

Alex Marion of NEI supported the use of the new SDP by complimenting the staff for maintaining good communications during the development of the revised SDP and he stated that the industry views the new SDP's technical adequacy to be much better than the previous version. Mr. Marion expressed concern with the the application of the SDP by inspectors and the capability of the SDP for addressing circuit failure and manual actions issues.

Fire Risk Requantification

J.S. Hyslop, RES described the cooperative effort between the NRC's Office of Nuclear Regulatory Research, EPRI, and 10 North American utilities to develop improved guidance for conducting fire risk analysis (FRA) for nuclear power plants; to develop state-of-the-practice fire

risk estimates which reflect this guidance; to determine the qualitative and quantitative impact of this guidance on fire risk; to understand the strengths and weaknesses of this guidance; and to transfer the technology. The work is being performed by Science Applications International Corporation (SAIC) and Sandia National Laboratories (SNL). The staff expects that these improvements will directly advance the overall FRA approach of qualitative screening, quantitative screening, and detailed analysis enabling analysts to perform FRA more efficiently. Mr. Hyslop also noted that RES has ongoing supplemental studies which support the development of more comprehensive fire PRAs. These studies are focused on fire ignition frequencies, fire modeling, and modeling of post-fire safe shutdown in fire PRA.

The NRC is also involved in the American Nuclear Society (ANS) Fire PRA Committee which is coordinating the development of the ANS Fire PRA Standard. This standard is expected to mimic the requantification steps, where possible. Publication of the ANS standard is expected Fall 2004.

The effort will be piloted at D.C. Cook and Millstone 3. It is expected that the improved FRA techniques will provide guidance for risk-informed analyses, become the basis for review by NRC of NFPA 805- related changes and support development of the ANS fire risk standard. Improvements are also expected in fire data and ignition frequency, fire modeling, systems and circuit analyses and human reliability analyses. A draft report is scheduled for June 2004 with a joint EPRI/NRC workshop tentatively scheduled for 1st quarter 2005. A feasibility study to extend the work to fire risk analyses of low power and shutdown is nearing completion.

Operator Manual Actions Rulemaking

Raymond Gallucci, NRR presented a status update on the staff's effort to revise 10 CFR 50, Appendix R, Paragraph III.G.2. to allow the use of operator manual actions as an acceptable method to protect at least one shutdown train during a fire when redundant trains are located in the same fire area. According to Mr. Gallucci, the revised rule will allow licensee to use certain operator manual actions in lieu of establishing a 1-hour fire barrier or 20 feet of separation in situations where fire detection and automatic suppression systems are available.

Mr. Gallucci presented a brief history of the issues that lead to the rulemaking and discussed the staff's approach to resolve the issues including the development of operator manual action acceptance criteria. The acceptance criteria were established for determining the feasibility and reliability of manual operator actions for post-fire safe shutdown. Mr. Gallucci also summarized the staff's plans for issuance of the final rule.

Alex Marion, NEI and Paul Gunter, NIRS expressed concern and questioned the benefits of this rulemaking effort. Mr. Marion so commented that one of the early goals of the rulemaking, to reduce the need for exemptions, would not be achieved with this provision in the rule i.e. allows for the use of manual action only in fire areas where detection and automatic suppression systems are available.

10CFR 50.48 –NFPA 805 Rulemaking Status

Bob Radlinski, NRR provided a status update on the 10 CFR 50.48 Rulemaking. The revised rule would allow licensees to voluntarily adopt NPPA 805 to satisfy existing fire protection requirements. Licensee's may voluntarily implement a performance-based, risk-informed fire

protection program in-lieu of the deterministic rule now in place. The ACRS endorsed the final rule by letter to the Commission December 2003. The Commission action is pending.

Mr. Radlinski mentioned industry's development of NEI 04-02, Revision E "Guidance for Implementing A Risk-Informed, Performance-Based Fire Protection Program Under 10CFR50.48(c)" that was recently submitted for NRC staff review. The staff review is ongoing and a public meeting is scheduled for April 29, 2004 to discuss the issues with NEI. If agreement is reached on this revision of the guide, the staff hopes to be able to endorse NEI-04-02 in a Regulatory Guide and issue a first draft in the Summer of 2004.

Mr. Radlinski also discussed the staff activities to revise the inspection procedures and provide inspector training prior to plant implementation of an NFPA 805 program. The staff does not expect that the change in inspection scope will have a significant impact on current inspection resources since licensees will be tasked with performing detailed plant-wide evaluations before converting to an NFPA 805 program.