

September 22, 2000

MEMORANDUM TO: Cynthia A. Carpenter, Chief  
Generic Issues, Environmental, Financial  
and Rulemaking Branch  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

FROM: Peter C. Wen, Project Manager/**RA**/  
Generic Issues, Environmental, Financial  
and Rulemaking Branch  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF SEPTEMBER 14, 2000, MEETING WITH  
STAKEHOLDERS ON NRC'S REASSESSMENT OF THE  
COMMISSION'S POLICY ON FACTORS CAUSING FATIGUE OF  
OPERATING PERSONNEL AT NUCLEAR REACTORS

On September 14, 2000, a public meeting was held at the Nuclear Regulatory Commission (NRC) offices in Rockville, Maryland to discuss data collected by the Nuclear Energy Institute (NEI) concerning the implementation of the Commission's "Policy on Factors Causing Fatigue of Operating Personnel at Nuclear Reactors." The meeting was held as part of the staff's reassessment of the policy. Meeting participants included members of the NRC staff and representatives from the NEI, the Institute of Nuclear Power Operations (INPO), the Professional Reactor Operator Society (PROS), the Union of Concerned Scientists (UCS), the International Brotherhood of Electrical Workers (IBEW), and the author of a petition to amend NRC regulations to include specific requirements addressing personnel fatigue at nuclear power plants. Attachment 1 lists attendees at the meeting, and Attachment 2 contains the meeting agenda.

Following opening remarks by Mr. Glenn Tracy of the Office of Nuclear Reactor Regulation (NRR), Dr. David Desaulniers, NRR, provided an overview of the policy and research concerning the effects of extended work hours on the risk of fatigue-induced impairment and personnel errors. Dr. Desaulniers noted that the policy provided guidelines for limiting the use of overtime during plant outages and that the policy was explicit in anticipating that approval to exceed these guidelines would be limited to "very unusual circumstances." He noted that most plant technical specifications either incorporate this guidance by reference to the policy or state that "Routine deviation from the guidelines shall not be authorized." Dr. Desaulniers provided data to indicate that individuals working hours in excess of the policy guidelines were at increased risk of fatigue induced impairment and errors. His presentation materials are provided as Attachment 3.

Mr. James Davis of NEI provided an overview of the survey instrument used to collect data concerning industry implementation of the policy statement and discussed the responses to questions concerning who was covered by a licensee's work hour limits and how licensees addressed fatigue in their technical specifications, administrative procedures, and fitness-for-duty programs. NEI's survey instrument and summary of responses to these questions were provided as part of NEI's submittal of the data to the NRC. This document is available in NRC's ADAMS under Accession Number ML 003746495, and is included in this meeting summary as Attachment 4.

Ms. Clare Goodman, NRR, presented the staff's analysis of the data provided by NEI. She noted that only about one-half of the sites surveyed provided data concerning deviations and overtime. Ms. Goodman provided a series of data slides to demonstrate that (1) there is inconsistency among sites in the scope of personnel covered by plant work hour limits, (2) during normal operations, about one-third of the sites authorized more than 200 deviations annually, (3) during plant outages, about one-third of the sites authorize more than a thousand deviations (with three site authorizing more than 6000 deviations) , and (4) the percent of personnel working in excess of 600 hours of overtime annually has increased since 1997. In contrast, Ms. Goodman noted that some sites authorize relatively few deviations. Ms. Goodman's presentation materials are provided as Attachment 5.

Mr. James Davis, NEI, presented NEI's analysis of the data concerning industry implementation of Commission's policy on personnel fatigue. He noted that variation in site implementation of the policy may be a result of the policy guidance having been communicated through several documents and that there may be some benefit if the guidance was consolidated. Mr. Davis provided a series of data slides (Attachment 6) to demonstrate that at most sites, when deviations are averaged over the total population of operators in a category (either licensed or non-licensed operator), the number of deviations for an individual operator was relatively small, whether a plant was operating or in an outage. Mr. Davis indicated that maintenance personnel had some of the highest levels of deviations, however, performing calculations of average use of deviations for non-operations personnel was problematic. He explained that contractors were included with all other classes of non-operations personnel and consequently it was not possible to accurately determine the number of individuals contributing to the data. Mr. Davis concluded that the data did not substantiate the need for regulatory action.

Following Mr. Davis' presentation, meeting attendees were invited to raise questions or state concerns regarding the presentations. Mr. Flowers (PROS) stated his concern that the current policy guidelines limiting individuals to 24 hours in a 48-hour period unnecessarily penalized individuals on 12-hour shifts because it was not possible to "trade" any hours with co-workers to accommodate home or personal matters without exceeding this limit. The staff acknowledged the concern but noted that any approach to address this practical matter would also need to consider the potential for the adverse effects of extended work hours and alternative approaches.

Mr. Tracy noted that whereas Mr. Davis' presentation focused on average values, from a regulatory perspective the NRC must be concerned with the range of licensee and individual performance. Similarly, Mr. Trimble (NRR) noted that NEI had presented averages without knowing the underlying shape of the distribution of deviations. Consequently, it is not clear that

the averages were in any way representative of the "typical" use of deviations. In addition, Dr. Desaulniers noted that averages were not an appropriate statistic for understanding the risk of fatigue induced impairment because fatigue is experienced at the individual level, for specific periods of time, and consequently averaging deviations over individuals or time was not meaningful.

Mr. Davis suggested that the fundamental issue is fatigue, that working hours may not be the most significant contributor to fatigue, and that strategies such as limiting the duration of tasks known to induce fatigue might deserve consideration. Dr. Desaulniers noted that the length of time an individual is awake and the time of day tend to be the predominant causes of fatigue and sleepiness, but concurred that other factors, such as specific task factors, can influence fatigue. He also noted that the Department of Transportation is currently focusing significant emphasis and resources to foster the development of industry programs that address fatigue from any cause and that such programs are becoming increasingly more common.

Mr. Tracy concluded the meeting by stating that the staff would be considering the information and views shared at the meeting as it moves forward with the assessment of the policy and processing of Mr. Quigley's petition for rulemaking.

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**NRC/STAKEHOLDERS MEETING ON FACTORS CAUSING FATIGUE OF OPERATING  
PERSONNEL AT NUCLEAR REACTORS  
LIST OF ATTENDEES  
September 14, 2000**

<u>NAME</u>	<u>ORGANIZATION</u>
Bruce Boger	NRR/DIPM
Frank Gillespie	NRR/DIPM
Glenn Tracy	NRR/DIPM/IOLB
David Trimble	NRR/DIPM/IOLB
Dave Desaulniers	NRR/DIPM/IOLB
Clare Goodman	NRR/DIPM/IOLB
J. P. Bongarra	NRR/DIPM/IOLB
Jack Rosenthal	RES/DSARE/REAHFB
E. A. Trager	RES/DSARE/REAHFB
Joel Kramer	RES/DSARE/REAHFB
James Davis	NEI
David Igyarto	INPO
Dave Lochbaum	UCS
David Flowers	PROS
Will Paul	IBEW
Barry Quigley	Self
Michael Whalen	Dominion Generation
Marcus J. Page	Morgan, Lewis & Beekins
M. Straka	NUS-LIS
Jenny Weil	McGraw-Hill
Deann Ralezl	Serch/Bechtel
Julie Keys	Serch/Bechtel
Scott Phillips	National Sleep Foundation
Roger Huston	Licensing Support Services
Fred Madden	Stars
Jim Savage	Nuclear Management Company

AGENDA FOR PUBLIC MEETING ON  
NRC'S REASSESSMENT OF THE COMMISSION'S POLICY ON FACTORS CAUSING  
FATIGUE OF OPERATING PERSONNEL AT NUCLEAR REACTORS

1:00	Opening Remarks	Glenn Tracy (NRC)
1:10	Policy Background and Basis	David Desaulniers (NRC)
1:40	Data Collection Instrument	Jim Davis (NEI)
2:00	NRC Data Analysis	Clare Goodman (NRC)
2:30	Break	
2:40	NEI Data Analysis	Jim Davis (NEI)
3:10	Discussion	All
3:50	Closing Remarks	Glenn Tracy (NRC)